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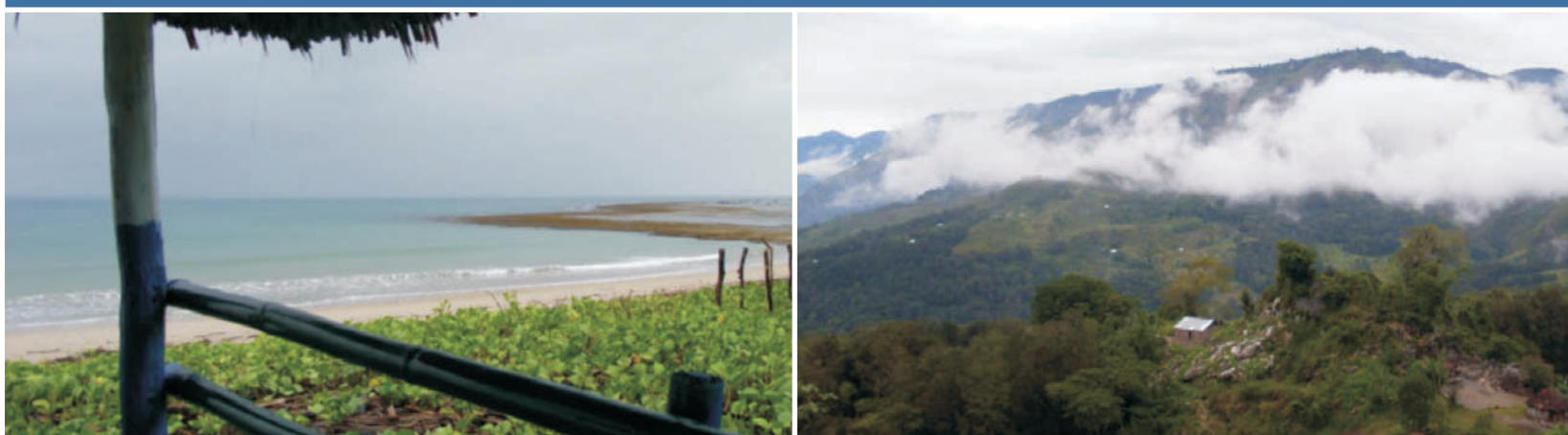
REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project - Betano Petroleum Refinery and Beaco LNG Plant Strategic Environmental Impact Statement

Final Report

June 2012

## Volume 3 - Main Report Part C



301012-01504-EN-REP-0005



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**The Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant Strategic Environmental Impact Assessment (Final Report) is made up of four separate volumes:**

**VOLUME 1 of 4: Betano Petroleum Refinery and Beaco LNG Plant Strategic Environmental Impact Assessment Main Report Part A (Chapters 1 to 6)**

**VOLUME 2 of 4: Betano Petroleum Refinery and Beaco LNG Plant Strategic Environmental Impact Assessment Main Report Part B (Chapters 7 to 10)**

**VOLUME 3 of 4: Betano Petroleum Refinery and Beaco LNG Plant Strategic Environmental Impact Assessment Main Report Part C (Appendices)**

**VOLUME 4 of 4: Betano Petroleum Refinery and Beaco LNG Plant Strategic Environmental Impact Assessment (Attachments)**

**Terrestrial Flora and Fauna Final Technical Report  
Marine Environment Final Technical Report**



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# STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

## Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

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## Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

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# STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

## Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

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# STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

## Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

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# STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

## Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

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# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX A



**GOVERNO**  
**República Democrática de Timor-Leste**  
**Secretaria de Estado dos Recursos Naturais**  
**GABINETE DO SECRETÁRIO DE ESTADO**

---

## **TERMS OF REFERENCE (TOR)**

**Environmental Impact Assessment/Study of Proposed  
Development Area  
In  
Southern Coast of Timor Leste**

## **1. Background Information**

### **1.1 Introduction**

The exploration and production of petroleum resources from the Timor Sea has contributed a significant income to the Government of Timor-Leste (GTL) of which if strategically managed, it will bring long term revenue and opportunities to its people. Therefore, it is anticipated that the petroleum sector, including oil and gas production and downstream industries, will provide a significant industrial base to the economy. This strategic vision of GTL will drive new economic activities that can facilitate long term and sustainable social and economic growth to the country.

In this regard, the GTL has committed to build a full modern infrastructures and facilities at the south of the country to support the growing activities of the petroleum sector. The proposed development will be undertaken with great attention and protection of the natural environment, so that the development does not compromise the natural beauty or the ecosystem functions of the country.

### **1.2 Implementation Arrangement**

The Government of Timor Leste (GTL), through the Secretary of State for Natural Resource, hereinafter referred to as the "Employer" has made available funds in order to finance the EIA Study for South Cost of Timor Leste.

The EIA study shall be conducted based on the GTL Decree Law no.5/2011 on 'Environmental Licensing'.

## **2. The Objectives**

The EIA study and consultancy works for the Proposed Development of Suai Supply Base, Betano Refinery and Petrochemical Industries and Beaco LNG Plant to be undertaken by Consultant, aims to achieve the following global objectives:

- To determine the baseline conditions of the physical, biological and human environment around the vicinity of the site of the proposed project
- To identify the nature and extent of major environmental impacts that is likely to result from the proposed project
- To assess significant environmental impacts resulting from construction, installation and operation of the project based on predictions using appropriate modeling work
- To identify social and economic impacts that is likely to result from the proposed project
- To assess the environmental significance of potential residual impacts due to the installation of the proposed project
- To identify the qualitative environmental costs and benefits of the proposed project to the affected communities, and
- To recommend mitigating and ameliorating measures that will eliminate or minimize deleterious impacts of the proposed project as well as to propose plans for surveillance and monitoring of environmental effects.
- To train local staff related to experience, skill and knowledge transference.

### 3. Area of Study

The Area of EIA study works will encompass, but not limited to, the following:

- Suai:
  - Supply base area
  - Industrial estates
  - Nova Suai
  - Suai Airport
  - Crocodile farm
- Betano:
  - Refinery and Petrochemical complex
  - Petroleum city (Nova Betano)
- Beaco:
  - LNG Plant complex (up to 20 Million Tons per Annum / MTPA)
  - Nova Beaco
  - Nova Viqueque
  - Viqueque airport



Figure 1 – Proposed three centers for the Southern Coast Development

The above study is pertinent to ensure that the proposed development protects and preserves as much as possible the natural environment, maintain the functionality of the eco-system and embrace the concept of sustainable development.

### 4. Scope of Study

The Consultant is expected to undertake the scope of the EIA study for each of the three (3) sites. We anticipated that each site will need to be assessed separately, as they are distinct from each other and being separated by a distance of 50 to 90km.

#### **4.5 Mitigation and Control Measures**

To propose mitigating measures so as to minimize the negative impacts to the environment. Recommendations for environmental pollution control and management of environmental impacts will be made based on professional judgment of known applications of technology for the control of pollutants into the environment. Environmental pollution control technologies that are proposed will be reviewed for their performance and track record of use in similar operations to the extent possible, based on information that is supplied by the technology supplier and/or secondary information about such technologies.

#### **4.6 Environmental Management Planning**

Development of an outline Environmental Management Plan (EMP) for the project will be made with emphasis on the following:

- Environmental audit and monitoring requirements that would help enhance the development of the project and minimize environmental impacts
- Administrative arrangements for environmental management of the project
- Safety and emergency response procedures to avoid and respond to accidents and emergency situations

The findings of the EIA study will lead to the conclusion as to acceptability of the environmental impacts and the measures that can be taken to minimize effects on the environment. The need and benefits of the project should outweigh the adverse impacts, where the plant is deemed to have incorporated all relevant considerations in terms of the plant design, control systems and mitigation measures.

### **5. Environmental Baseline**

The existing environment characteristics of areas within the Proposed Project site and the surrounding vicinity shall be described based on primary data and reviews of available published information or on data sourced from public and private organizations. The EIA Consultant shall carry out appropriate reconnaissance surveys during the tenure of the EIA study to supplement and/or update available information.

### **6. Prediction and Assessment of Environmental Impacts**

The EIA Consultant shall predict the potential impacts to the environment based on results of existing environment studies and the effects that the project will impose to the environment.

### **7. Minimum Staff Numbers and Qualification Requirement**

The following Table considers minimal qualification for staff/personnel to undertake this project. Staff with less than the minimum qualifications will score zero under the staff assessments in technical evaluation.

The number of experience years required in the table below shall reflect the experiences directly and/or closely related to EIA projects.

## Minimum Qualification

International Experts requirement			
No.	International Experts	Qualifications	Experience (years)
1	Project Manager/Team Leader	Master of Chemical Engineering	15
2	Hydrologist	Master of Hydrology	10
3	Geotechnical Engineer	B.Sc. for Geoscience	10
4	Ecologist/Zoologist	B.Sc. of Ecology	10
5	Environmentalist	Master of Environment	10
6	Socio Economy	B.Sc. of Environment	10
7	Mineralogists	B.Sc. for Mineralogy	10
8	Health Environmentalist	B.Sc. for Environment	10
9	Mechanical Engineer	B. Engineering	5
Domestic Staffs requirement			
No.	National Experts	Qualifications	Experience (years)
	Environmentalist	Environmental graduated	2
	Geoscientist	B.Sc for Geoscience	2

### Important Note:

The Consultant must submit its proposal on the basis of the above staff requirements and the estimated man-months as specified in Article 8 below. If the Consultant deems it appropriate, proposed changes must be specified in RFP Section 3 – Form TECH 3 and this will be discussed during the contract negotiations.

## 8. Person Months Requirement

It is estimated that **36 man-months** of Staff services are required for the EIA study.

## 9. Work Program

The required services for the EIA study shall be completed in **four (4) months**.

## 10. Reports

The Consultant shall submit the following reports all in English:

- (i) Draft report
- (ii) Finalization of the Completion Report, two (2) weeks after receiving comments from Employer.
- (iii) Any other reports needed/requested from time-to-time by Employer.

## 11. Facilities to be provided by the Consultant

The Consultant will make his own arrangements for the following facilities and include the cost in his financial proposal

- i) Transportation — transportation of equipment and personnel
- ii) Testing Services.



## 12. Facilities to be provided by the Employer

The Employer will make available copies of all relevant reports, maps and other relevant reference material and will provide liaison with other government agencies, as required to carry out the consulting assignment. The Employer will also allow the Consultant any reasonable use of equipment apparatus/facilities required to execute the investigations for which provision is not already made under the contract. Employer will facilitate the issue of visas, work permits and other documents required for carrying out the assignments under contract as appropriate.

## 13. Payment Milestone

No.	Milestone	Payment
1	Upon Contract Award	20%
2	Upon submission of draft report to SERN	50 %
3	Upon acceptance of final report	30 %
	Total	100%

## 14. Expected Output

The deliverables of this project shall include, but not limited to, the following:

No.	Component study	Expected Output
01	Topography and land use	Land use compatibility assessment
02	Geology	1.Characteristic of study area 2.Geotechnical assessment for the surface condition 3.Assessment of soil erosion
03	Climate and meteorology	1.Seasonal and annual wind speeds and directions in the form of wind rose 2. Climate parameters 3. Rainfall patterns
04	Air Quality	Air quality of study area
05	Noise	Noise quality levels in comparison with the limits as per WHO environmental guidelines
06	Hydrology and Drainage	Rainfall – runoff relationship Estimation of Q (m <sup>3</sup> /s) during dry and wet season Flooding scenario
07	Marine and River water quality	Existing water quality data for freshwater and marine water at the selected sampling stations will be established
08	Land Transport	Future traffic condition from or to the project area
09	Terrestrial flora and fauna	Description of species found within and outside the proposed project area whose habitats will be affected by the development  A list of fauna species found within and outside the proposed project area.

No.	Component study	Expected Output
10	Marine ecology and Fisheries	<p>Checklist and diversity of marine communities around the proposed project site</p> <p>The existing freshwater ecosystem quality estimation using diversity indices</p>
11	Population distribution	<p>Present a description demographic profile of the local population according to size, age, sex, and ethnic group encountered during the survey.</p>
12	Socio - Economic	<p>To present a description of socio-economic profile of the local people</p> <p>To present general view and opinions of local people on the implementation of the project</p> <p>To solicit the degree of acceptance and opposition, as well as the condition set by the public on the proposed project</p>



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**TIMOR GAP, E.P.**  
TIMOR GÁS & PETRÓLEO



REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX B



APPENDIX B1 - Selected plates representing the Betano development area



Plate 6-5 on Figure 6-11 (looking south-east)



Plate 6-6 on Figure 6-11 (looking east)



Plate 6-8 on Figure 6-11 (looking north-west)



Plate 6-17 on Figure 6-11 (looking east)



Plate 6-12 on Figure 6-11 (looking south-east)



Plate 6-13 on Figure 6-11 (looking south-east)



Plate 6-16 on Figure 6-11 (looking south)



Plate 6-17 on Figure 6-11 (looking east)



APPENDIX B1 - Selected plates representing the Betano development area



Plate 6-18 on Figure 6-11 (looking north)



Plate 6-19 on Figure 6-11 (looking west)



Plate 6-22 The Betano development area is characterised by flat coastal plain topography



Plate 6-27 Northern section of the refinery site



Plate 6-38 The wave cut platform at Betano



Plate 6-43 Moist deciduous forest



Plate 6-44 Pes-caprae formation



Plate 6-47 Betano Town intersection

LOCAL IDN: \\pwworff11\mst\udb\Projects\3051012-01504 Enviro Imp Assessment\Timor-Leste\0 Report\2.9 SEIA - Betano and Beaco\Plate03\_Working\Appendix\301012\_01504\_SEIA\_AppendixB-Betano.vsd



APPENDIX B2 - Selected plates representing the Beaco development area



Plate 7-1 Graveyard in the Beaco development area



Plate 7-2 The Beaco development site is characterised by flat coastal plain topography



Plate 7-3 Steeply sloping lands in the mountainous terrain north of the Beaco site



Plate 7-4 The coastal plain is characterised by small scale subsistence agriculture



Plate 7-6 on Figure 7-17 (looking east)



Plate 7-9 on Figure 6-17 (looking east)



Plate 7-12 on Figure 7-17 (looking east)



Plate 7-14 on Figure 7-17 (looking north-east)



APPENDIX B1 - Selected plates representing the Betano development area



Plate 7-15 on Figure 7-17 (looking south-east)



Plate 7-17 on Figure 7-17 (looking west)



Plate 7-18 on Figure 7-17 (looking north-west)



Plate 7-19 on Figure 7-17 (looking west)



Plate 7-23 A view of the Timor Sea from the Beaco development area



Plate 7-26 Northern section of the LNG Plant site



Plate 7-39 The wave cut platform at Beaco



Plate 7-42 Riparian mangrove on a narrow estuarine river

LOCAL IDN: \\pwworff1\mstrud\lib\Projects\351012-01504 Enviro Imp Assessment Timor-Lesae\0 Report\2.9 SEIA - Betano and Beaco\Plate03\_Working\Appendix\361012\_01504\_SEIA\_AppendixB-Beaco.vsd







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REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX C



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2004  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30      Latitude: -9.42      Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1										
2										
3										
4										
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6										
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19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30	25.50	29.60	25.70	56.00	87.50	72.50	4.00	0.61	12.91	2.78
31										
Decade 1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	#DIV/0!	#DIV/0!	#DIV/0!
Decade 2	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	#DIV/0!	#DIV/0!	#DIV/0!
Decade 3	25.50	29.60	25.70	56.00	87.50	72.50	4.00	0.61	12.91	2.78
MONTH	25.50	29.60	25.70	56.00	87.50	72.50	4.00	0.61	12.91	2.78

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2004  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30      Latitude: -9.42      Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	20.80	29.00	24.00	62.00	91.50	79.50	0.00	1.10	13.90	2.95
2	21.40	29.60	24.60	63.00	90.50	81.00	0.00	1.08	13.21	2.89
3	21.00	29.30	24.70	63.50	91.50	81.00	0.00	1.17	11.50	2.67
4	20.20	31.50	24.60	52.00	92.50	78.00	0.00	1.18	18.71	3.85
5	19.80	30.40	24.20	58.50	91.50	79.00	0.50	1.15	17.42	3.52
6	19.90	30.10	24.20	52.00	91.00	75.50	0.00	1.24	17.18	3.60
7	19.90	29.40	23.40	65.50	89.00	81.50	3.50	1.28	7.89	2.24
8	21.30	29.90	24.70	55.00	90.50	78.00	0.00	1.17	13.95	3.15
9	18.60	29.90	23.70	46.00	89.50	72.50	0.00	1.38	19.84	4.03
10	20.40	27.20	23.70	63.00	89.00	74.50	0.00	1.18	6.77	2.02
11	22.20	27.30	24.20	64.00	88.00	78.00	0.00	0.93	7.27	1.99
12	19.90	28.10	23.40	66.50	92.50	83.00	7.00	1.09	8.58	2.15
13	20.70	30.00	23.90	48.50	90.50	76.50	0.50	1.53	16.46	3.76
14	20.20	28.00	22.90	66.00	91.50	84.50	3.00	1.32	8.32	2.23
15	20.60	28.60	23.60	67.50	91.00	83.00	1.50	1.24	9.43	2.35
16	20.40	29.50	23.80	55.00	91.50	80.50	0.50	1.19	14.33	3.18
17	20.90	27.30	23.30	69.50	91.00	82.50	6.50	1.08	7.69	1.99
18	19.50	28.80	23.20	56.00	89.50	76.50	0.00	1.54	17.32	3.64
19	19.50	28.70	23.00	52.00	89.00	76.50	0.50	1.44	14.30	3.30
20	19.90	28.00	22.80	57.50	88.50	78.50	1.50	1.30	11.88	2.83
21	20.30	27.90	23.10	56.50	88.00	77.00	0.00	1.18	10.67	2.65
22	20.00	28.70	23.20	59.50	89.50	77.50	0.00	1.26	12.62	2.91
23	19.10	29.20	23.10	51.00	90.00	76.00	0.00	1.20	19.66	3.86
24	19.50	29.20	23.40	51.00	90.00	74.50	1.00	1.39	17.87	3.76
25	19.20	29.50	23.10	40.50	88.00	72.50	0.00	1.26	14.85	3.52
26	18.90	28.40	22.80	60.00	93.00	78.00	0.00	1.37	13.96	3.05
27	19.50	30.00	23.20	49.00	91.50	77.50	1.00	1.32	19.34	3.99
28	17.30	28.90	22.20	55.50	88.50	75.50	0.00	1.40	17.18	3.57
29	18.20	30.00	22.70	48.50	92.00	72.50	0.00	1.46	20.63	4.19
30	16.40	29.20	22.30	51.50	90.50	73.00	0.00	1.30	20.57	3.97
31	16.40	29.60	22.40	51.50	90.50	73.50	0.00	1.28	20.29	3.97
Decade 1	20.33	29.63	24.18	58.05	90.65	78.05	4.00	1.19	14.04	3.09
Decade 2	20.38	28.43	23.41	60.25	90.30	79.95	21.00	1.26	11.56	2.74
Decade 3	18.62	29.15	22.86	52.23	90.14	75.23	2.00	1.31	17.06	3.59
MONTH	19.74	29.07	23.46	56.69	90.35	77.66	27.00	1.26	14.31	3.15

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2004  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	15.60	29.30	22.50	43.50	92.00	72.00	0.00	1.38	20.40	4.09
2	16.80	29.50	22.60	45.00	93.00	72.00	0.00	1.22	21.02	4.09
3	17.60	30.30	22.80	40.00	91.50	72.00	0.00	1.17	18.94	3.97
4	17.30	31.90	23.60	39.50	91.00	70.00	0.00	1.17	20.46	4.29
5	18.10	31.50	24.10	37.50	86.00	69.50	5.00	1.32	21.49	4.56
6	18.80	30.20	23.90	56.00	86.50	74.50	0.00	0.88	21.77	4.08
7	19.20	29.50	23.70	57.50	91.50	77.00	0.00	1.22	14.98	3.29
8	17.50	30.50	23.80	45.50	89.50	72.50	0.00	1.37	22.13	4.47
9	18.80	30.00	23.50	45.50	90.00	68.50	0.00	1.50	21.96	4.52
10	18.40	30.20	24.10	45.00	87.50	71.00	0.00	1.54	21.51	4.53
11	19.40	30.40	23.80	51.50	87.00	72.00	0.00	1.53	19.38	4.21
12	19.60	30.00	23.90	50.00	80.50	67.50	0.00	1.64	20.21	4.44
13	18.80	29.70	23.00	37.50	78.50	63.00	0.00	1.34	21.76	4.56
14	16.00	30.90	22.30	28.00	84.00	58.50	0.00	1.53	22.14	4.91
15	15.50	30.70	22.60	29.50	73.50	53.50	0.00	1.55	21.11	4.84
16	16.80	30.10	23.10	40.50	80.00	60.50	0.00	1.23	22.16	4.48
17	15.30	29.90	22.90	45.00	86.00	65.00	0.00	1.39	21.52	4.38
18	16.60	30.10	23.10	40.50	85.50	67.00	0.00	1.42	22.33	4.62
19	17.30	29.70	23.10	50.00	84.00	70.50	0.00	1.46	21.54	4.41
20	18.00	29.80	23.80	49.00	83.50	68.50	0.00	1.34	21.16	4.36
21	19.00	30.50	23.50	38.00	83.50	64.50	0.00	1.55	22.67	4.92
22	14.30	29.90	22.20	42.00	81.00	60.50	0.00	1.52	22.94	4.70
23	17.60	29.30	23.30	48.50	88.50	71.50	0.00	1.48	22.67	4.55
24	18.40	30.80	24.20	39.50	88.00	72.00	0.00	1.37	22.84	4.79
25	18.00	30.50	24.00	44.50	87.50	70.00	0.00	1.17	22.63	4.55
26	17.90	30.40	23.90	42.00	85.50	69.50	0.50	1.24	22.20	4.57
27	18.90	31.40	24.30	50.00	91.00	74.00	0.00	1.08	22.30	4.49
28	15.20	30.00	23.60	54.00	91.00	74.00	0.00	1.01	22.68	4.30
29	17.60	30.30	24.20	52.50	92.00	73.50	0.00	1.10	22.52	4.41
30	21.50	30.00	25.10	51.50	86.00	73.00	0.00	1.18	15.26	3.60
31	21.90	29.70	24.70	62.00	89.50	76.50	0.00	1.03	8.13	2.33
Decade 1	17.81	30.29	23.46	45.50	89.85	71.90	5.00	1.28	20.47	4.19
Decade 2	17.33	30.13	23.16	42.15	82.25	64.60	0.00	1.44	21.33	4.52
Decade 3	18.21	30.25	23.91	47.68	87.59	70.82	0.50	1.25	20.62	4.29
MONTH	17.80	30.23	23.52	45.19	86.60	69.16	5.50	1.32	20.80	4.33

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2004  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	21.60	31.30	25.50	41.00	91.00	72.00	0.00	1.33	24.06	5.08
2	19.60	31.00	24.90	53.00	91.00	74.00	0.00	1.45	22.31	4.67
3	20.80	31.20	25.50	43.50	87.50	71.50	0.00	1.32	23.02	4.91
4	20.10	31.60	25.00	33.00	88.00	67.00	0.00	1.27	23.13	5.02
5	17.60	31.90	24.10	24.50	82.00	58.00	0.00	1.23	23.58	5.11
6	14.70	29.60	23.00	40.50	84.00	62.50	0.00	1.22	23.50	4.65
7	18.50	30.10	24.20	50.00	85.50	69.00	0.00	0.82	22.71	4.39
8	21.00	29.20	25.30	57.50	85.50	71.50	0.00	1.19	18.47	3.96
9	20.50	30.80	24.80	46.00	88.00	71.50	0.00	1.22	23.39	4.85
10	20.70	31.80	25.80	47.00	87.50	70.00	0.00	1.12	22.47	4.76
11	19.70	31.50	25.90	52.00	88.50	72.50	0.00	1.54	23.48	5.01
12	21.50	32.80	26.00	48.00	84.50	67.50	0.00	1.46	21.31	4.93
13	18.50	31.90	25.10	29.50	76.00	60.00	0.00	1.10	22.86	4.94
14	20.60	31.10	25.10	46.00	83.50	67.00	0.00	1.50	19.77	4.62
15	18.70	30.50	24.30	48.00	83.50	68.00	0.00	0.98	22.92	4.60
16	19.70	29.40	23.30	56.50	90.00	77.50	1.00	1.52	6.99	2.52
17	21.30	34.60	26.20	29.50	86.50	71.00	0.00	1.18	21.74	5.18
18	19.90	31.30	25.20	42.00	91.00	72.00	0.00	1.09	23.99	4.95
19	16.80	31.20	24.30	48.00	91.00	70.50	0.00	1.32	22.76	4.76
20	18.20	32.40	24.90	42.50	84.50	65.50	0.00	1.32	24.12	5.19
21	19.70	31.40	25.10	49.50	87.00	69.00	0.00	1.24	24.57	5.08
22	19.10	31.00	24.80	50.50	85.00	70.50	0.00	1.41	23.70	4.99
23	19.20	32.10	24.90	41.50	88.50	66.00	0.50	1.31	24.91	5.29
24	18.20	31.30	24.60	43.50	86.00	68.00	0.00	1.31	23.98	5.06
25	18.40	30.60	24.00	50.50	86.50	67.50	0.00	1.34	22.39	4.72
26	18.80	29.90	25.00	49.50	84.50	69.50	0.00	0.90	24.95	4.86
27	20.20	30.70	25.90	55.50	89.50	71.50	0.00	1.01	24.90	4.97
28	20.80	31.40	25.70	48.50	88.50	73.00	0.00	1.12	24.23	5.04
29	20.70	30.80	25.60	52.00	90.00	72.50	0.00	1.15	24.59	5.02
30	19.40	32.40	25.30	51.50	88.00	73.00	0.00	1.12	22.84	4.84
31										
Decade 1	19.51	30.85	24.81	43.60	87.00	68.70	0.00	1.22	22.66	4.74
Decade 2	19.49	31.67	25.03	44.20	85.90	69.15	1.00	1.30	20.99	4.67
Decade 3	19.45	31.16	25.09	49.25	87.35	70.05	0.50	1.19	24.11	4.99
MONTH	19.48	31.23	24.98	45.68	86.75	69.30	1.50	1.24	22.59	4.80

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2004  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	19.40	31.70	25.90	51.50	87.50	72.00	0.00	1.28	23.79	5.03
2	21.10	31.60	26.40	61.00	90.00	75.50	0.00	1.26	20.94	4.52
3	23.10	31.70	26.50	62.00	87.50	76.50	0.00	1.41	22.28	4.85
4	21.50	31.30	25.80	60.50	87.50	75.50	0.50	1.34	18.68	4.22
5	20.20	31.90	26.00	48.00	90.00	73.50	0.00	1.31	24.68	5.25
6	19.70	30.90	25.90	58.50	85.50	73.00	0.00	1.16	23.48	4.83
7	21.40	32.90	26.60	50.00	88.50	71.50	0.00	1.08	23.93	5.13
8	20.80	32.40	26.70	54.00	91.00	71.00	0.00	0.98	23.29	4.90
9	20.60	31.30	26.00	56.00	90.00	74.50	0.00	1.02	24.45	4.99
10	17.30	33.30	25.70	42.00	87.50	66.50	0.00	1.02	23.42	5.00
11	17.10	32.40	25.10	46.00	90.00	67.00	6.00	1.00	23.76	4.92
12	15.90	32.00	25.60	42.50	88.50	69.00	0.00	1.31	22.49	4.94
13	19.40	32.70	26.70	41.00	85.50	66.00	0.00	1.20	23.49	5.19
14	20.50	32.00	26.20	51.50	87.50	71.00	0.00	0.98	24.11	5.02
15	19.40	32.30	25.80	50.50	91.00	72.00	0.00	1.26	21.72	4.79
16	19.80	32.90	26.30	48.50	89.00	71.50	3.00	1.16	23.15	5.04
17	22.10	31.10	26.50	60.00	92.50	77.00	28.00	0.96	18.10	3.98
18	22.30	31.40	26.70	43.50	91.00	74.00	0.00	1.34	25.81	5.54
19	22.60	32.80	27.20	47.00	89.00	74.00	0.00	1.12	23.48	5.17
20	22.80	32.50	27.50	49.00	88.50	70.50	0.00	0.94	25.00	5.29
21	22.80	32.10	27.50	57.00	90.50	75.50	0.00	0.96	24.05	5.07
22	22.70	32.20	27.30	59.50	91.00	77.00	0.00	0.91	23.56	4.96
23	23.80	32.60	27.70	58.00	90.50	74.50	0.00	1.03	24.96	5.31
24	24.10	33.20	27.60	51.50	88.50	71.50	0.00	1.01	23.76	5.21
25	22.00	32.60	27.50	47.00	87.50	73.00	0.00	1.11	21.72	4.89
26	22.90	33.30	27.40	46.00	88.50	70.50	0.00	0.97	25.54	5.47
27	19.30	32.40	26.90	45.00	87.50	71.00	0.00	0.81	24.13	4.99
28	22.80	33.90	26.50	51.00	91.50	81.50	12.50	0.96	16.72	4.04
29	23.00	33.10	27.40	59.00	93.00	80.00	0.00	0.93	23.74	5.06
30	20.80	32.00	26.70	50.00	93.00	74.50	0.00	1.10	21.33	4.68
31	21.30	32.70	27.20	52.00	91.50	74.00	0.00	1.10	24.40	5.22
Decade 1	20.51	31.90	26.15	54.35	88.50	72.95	0.50	1.19	22.89	4.87
Decade 2	20.19	32.21	26.36	47.95	89.25	71.20	37.00	1.13	23.11	4.99
Decade 3	22.32	32.74	27.25	52.36	90.27	74.82	12.50	0.99	23.08	4.99
MONTH	21.05	32.30	26.61	51.58	89.37	73.05	50.00	1.10	23.03	4.95

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2004

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	21.80	32.50	27.10	50.00	89.00	72.00	0.00	1.08	24.82	5.29
2	19.50	31.80	26.30	56.00	91.00	73.50	0.00	1.09	25.47	5.21
3	20.00	32.40	27.10	51.50	88.00	71.00	0.00	1.05	25.72	5.36
4	22.40	32.40	27.10	51.50	90.50	74.00	0.00	1.05	25.59	5.40
5	21.00	32.70	27.20	45.50	90.00	70.00	8.00	0.94	26.17	5.45
6	22.90	33.70	28.10	47.50	88.00	70.50	0.00	0.91	24.88	5.38
7	24.80	33.30	28.10	52.50	86.00	72.00	0.00	1.05	23.07	5.17
8	22.00	32.20	27.50	46.00	89.00	69.50	0.00	1.16	24.38	5.30
9	22.00	33.30	27.90	48.00	88.00	72.50	0.00	0.98	25.13	5.40
10	21.50	33.50	28.00	51.50	88.50	71.50	0.00	0.84	24.95	5.28
11	22.50	34.10	28.60	50.00	85.00	70.50	0.00	1.06	24.55	5.44
12	23.30	34.30	28.60	50.50	89.50	73.50	0.00	1.10	23.67	5.33
13	22.90	34.80	28.80	48.00	88.00	69.00	0.00	1.02	25.82	5.69
14	22.50	34.10	28.40	47.00	91.00	70.50	0.00	1.06	25.37	5.56
15	23.40	33.70	28.70	50.00	86.50	72.50	2.50	1.19	22.98	5.25
16	21.70	34.00	28.70	51.50	87.00	70.00	0.00	1.05	24.69	5.41
17	24.00	34.30	28.90	51.00	86.50	72.00	0.00	1.10	23.46	5.34
18	23.10	35.10	29.20	41.00	90.00	69.50	1.50	1.04	25.09	5.66
19	22.90	34.40	28.70	48.50	91.00	70.00	0.00	0.91	25.42	5.52
20	22.40	34.10	28.30	48.50	82.50	65.50	0.00	1.23	25.77	5.74
21	23.90	35.00	28.90	45.00	80.00	63.00	0.00	1.46	24.23	5.85
22	23.50	34.60	28.80	46.00	86.00	64.50	0.00	1.38	23.27	5.54
23	24.20	33.90	27.70	56.50	80.50	71.50	0.00	1.32	15.66	4.15
24	24.10	34.30	28.00	51.50	84.00	69.50	0.00	1.59	16.53	4.54
25	24.50	35.10	28.60	50.00	85.50	69.00	0.00	1.27	21.02	5.14
26	24.30	34.80	28.80	48.50	88.50	73.00	4.00	1.26	25.41	5.81
27	23.80	33.90	27.20	50.50	92.00	77.00	30.00	1.45	21.61	5.14
28	23.70	32.60	27.10	57.50	93.00	80.00	0.00	0.94	17.21	3.98
29	24.20	33.00	28.00	55.00	85.50	73.00	0.00	1.23	20.34	4.76
30	23.50	33.00	27.80	52.00	81.50	71.00	0.00	1.55	22.67	5.35
31										
Decade 1	21.79	32.78	27.44	50.00	88.80	71.65	8.00	1.02	25.02	5.32
Decade 2	22.87	34.29	28.69	48.60	87.70	70.30	4.00	1.08	24.68	5.49
Decade 3	23.97	34.02	28.09	51.25	85.65	71.15	34.00	1.34	20.80	5.03
MONTH	22.88	33.70	28.07	49.95	87.38	71.03	46.00	1.15	23.50	5.28

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2004

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	25.40	33.00	28.50	58.00	87.50	71.50	0.00	1.20	23.96	5.35
2	23.60	34.20	28.50	44.00	85.50	68.00	0.00	1.32	26.64	6.01
3	23.90	34.70	28.90	34.00	82.00	62.00	0.00	1.17	26.70	6.07
4	24.20	33.60	28.50	41.00	82.00	63.00	0.00	1.60	26.78	6.24
5	23.40	34.30	28.60	43.00	86.50	66.00	0.00	1.19	26.33	5.89
6	23.90	33.70	28.70	52.00	81.00	67.00	0.00	1.26	25.46	5.71
7	24.70	34.60	29.20	40.50	84.00	62.50	0.00	1.25	26.63	6.09
8	24.00	34.90	29.20	48.50	84.00	68.50	0.00	1.41	26.34	6.07
9	25.70	34.50	29.50	49.00	78.50	65.00	0.00	1.44	21.93	5.45
10	25.20	34.90	29.80	48.00	86.50	65.50	0.50	1.08	24.29	5.58
11	23.90	34.40	29.20	45.00	90.50	70.50	0.00	1.24	25.99	5.87
12	25.40	34.30	29.30	49.50	91.00	69.00	1.50	1.48	25.97	5.99
13	24.00	34.10	28.80	49.00	90.00	68.00	0.00	1.55	24.40	5.72
14	25.70	34.10	29.60	55.50	79.50	69.00	0.00	1.49	25.12	5.87
15	26.80	35.40	30.20	55.50	84.00	72.00	0.00	1.04	23.30	5.45
16	26.00	35.00	30.10	50.00	85.00	68.00	0.00	1.16	25.85	5.93
17	26.00	35.00	30.00	47.50	80.00	64.00	0.00	1.24	25.97	6.04
18	25.40	34.70	30.10	49.00	82.00	66.50	0.00	1.16	25.78	5.89
19	25.60	35.10	29.90	52.00	79.00	67.00	0.00	1.12	25.60	5.87
20	23.60	34.00	29.30	56.50	92.00	72.00	22.00	1.20	26.64	5.82
21	23.20	34.10	27.40	53.50	93.50	77.00	47.50	1.38	19.92	4.78
22	22.30	33.10	26.20	60.50	94.50	84.50	51.00	1.01	15.80	3.73
23	23.50	32.20	27.00	60.00	94.50	80.00	0.50	1.12	18.02	4.13
24	23.90	33.40	27.10	59.00	92.00	79.00	0.00	1.33	18.41	4.40
25	22.90	34.10	27.20	51.50	95.00	77.00	76.00	1.46	19.68	4.80
26	22.30	33.40	26.40	53.00	95.00	83.50	20.00	1.01	20.43	4.58
27	23.80	33.60	27.20	56.50	92.00	80.00	0.50	1.19	18.58	4.41
28	23.80	33.10	26.80	61.00	93.00	83.00	23.50	1.02	15.15	3.66
29	24.70	33.60	27.30	59.50	91.50	81.00	0.00	1.26	18.26	4.37
30	24.70	32.80	27.60	64.00	88.50	79.00	1.00	1.41	16.61	4.08
31	25.20	33.10	28.70	52.00	88.50	74.50	0.00	1.02	13.59	3.60
Decade 1	24.4	34.2	28.9	45.8	83.8	65.9	0.5	1.3	25.5	5.8
Decade 2	25.2	34.6	29.7	51.0	85.3	68.6	23.5	1.3	25.5	5.8
Decade 3	23.7	33.3	27.2	57.3	92.5	79.9	220.0	1.2	17.7	4.2
MONTH	24.4	34.0	28.5	51.5	87.4	71.7	244.0	1.3	22.7	5.3

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2005

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	25.40	32.80	28.80	49.50	90.00	74.00	0.00	0.94	15.10	3.80
2	23.30	34.40	28.90	50.50	91.50	73.00	0.00	1.03	25.70	5.64
3	24.20	34.30	29.00	47.50	90.50	70.00	0.00	1.08	25.16	5.62
4	18.20	30.00	23.40	52.00	91.00	73.00	0.00	0.83	20.64	4.19
5	18.60	30.40	23.90	50.50	90.00	71.50	0.00	0.90	22.37	4.54
6	17.00	28.60	21.50	55.00	96.00	84.00	19.00	0.72	14.66	3.11
7	14.70	29.70	20.30	49.00	97.00	87.50	28.50	0.34	13.95	2.80
8	18.10	28.20	21.20	55.00	97.00	86.50	0.00	0.59	15.24	3.12
9	14.30	27.80	20.60	50.00	97.50	85.00	0.00	0.52	19.41	3.61
10	16.60	27.90	21.00	53.50	97.00	85.50	0.50	0.49	19.12	3.59
11	17.30	28.10	20.80	60.50	97.00	86.00	1.00	0.52	16.15	3.16
12	14.00	29.20	21.60	51.50	97.50	77.50	0.00	0.83	24.11	4.49
13	19.80	28.30	22.40	60.00	88.00	77.50	0.50	0.69	15.91	3.32
14	18.30	28.70	22.50	53.50	92.50	75.50	0.00	0.79	22.49	4.33
15	15.30	28.30	20.30	54.50	96.50	87.00	1.00	0.56	16.29	3.20
16	16.20	28.50	20.20	61.50	97.50	90.00	54.50	0.47	15.79	3.06
17	16.20	29.20	20.40	46.50	97.50	89.50	28.50	0.36	14.13	2.86
18	17.90	27.30	21.40	61.50	97.00	89.00	2.00	0.42	12.89	2.65
19	18.30	27.30	20.70	64.00	97.00	91.00	52.00	0.47	16.82	3.21
20	18.20	24.90	20.50	72.50	97.00	90.00	23.00	0.68	9.94	2.15
21	18.60	26.20	21.00	64.50	93.50	84.00	14.50	0.96	10.25	2.43
22	18.50	28.40	22.10	53.50	91.50	77.00	1.50	0.69	19.17	3.79
23	18.20	29.20	22.10	50.50	95.50	81.50	3.50	0.58	18.66	3.70
24	17.70	29.00	22.20	48.00	97.00	84.00	0.50	0.66	27.00	4.91
25	16.90	29.20	21.20	52.00	97.50	86.50	5.00	0.53	20.72	3.90
26	17.30	28.30	20.10	61.50	97.50	89.00	1.50	0.57	18.36	3.46
27	16.40	28.30	20.20	56.00	98.00	90.00	25.50	0.39	20.23	3.67
28	16.90	28.10	20.40	64.00	98.00	90.50	1.00	0.39	15.81	3.03
29	16.80	29.10	20.60	56.00	97.50	90.00	50.50	0.41	17.15	3.29
30	16.90	27.60	20.80	64.00	97.50	89.00	2.00	0.56	14.07	2.84
31	17.50	29.00	21.50	53.50	97.50	85.00	0.00	0.54	13.60	2.90
Decade 1	19.04	30.41	23.86	51.25	93.75	79.00	48.00	0.74	19.14	4.00
Decade 2	17.15	27.98	21.08	58.60	95.75	85.30	162.50	0.58	16.45	3.24
Decade 3	17.43	28.40	21.11	56.68	96.45	86.05	105.50	0.57	17.73	3.45
MONTH	17.86	28.91	21.99	55.55	95.35	83.53	316.00	0.63	17.77	3.56

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: February 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	16.80	29.10	22.40	53.50	94.50	76.50	0.50	1.19	19.94	4.13
2	18.10	26.50	21.60	64.50	92.50	82.50	5.00	1.10	12.94	2.87
3	18.30	26.10	20.80	65.00	93.50	84.00	17.50	1.27	12.76	2.85
4	19.30	26.70	21.60	59.00	91.00	79.50	7.00	1.97	15.23	3.59
5	20.10	27.60	22.40	53.50	91.50	75.00	2.50	1.55	18.99	4.12
6	20.00	28.30	22.80	54.50	90.00	71.50	0.00	1.53	23.58	4.79
7	23.90	33.60	28.10	62.00	91.00	78.00	0.00	0.97	22.64	4.97
8	24.20	34.30	28.30	53.50	88.50	76.00	0.00	1.23	25.45	5.70
9	24.10	33.00	27.50	61.50	92.00	80.50	7.00	1.22	19.41	4.47
10	24.00	32.60	26.50	63.00	93.50	84.00	1.50	1.05	17.60	4.03
11	23.70	32.80	26.90	62.50	93.50	80.50	0.00	1.17	21.65	4.76
12	23.00	33.00	27.70	53.00	92.00	75.00	0.00	1.24	23.90	5.28
13	24.00	33.00	27.90	56.50	92.00	76.50	17.00	1.38	25.89	5.65
14	23.20	33.10	26.80	55.50	93.00	81.50	0.50	1.26	23.53	5.18
15	23.30	32.90	27.60	54.00	92.50	79.00	18.00	0.94	23.73	5.11
16	23.50	32.90	27.70	56.00	94.00	79.50	0.00	0.88	26.51	5.53
17	23.70	33.50	28.00	56.00	91.50	77.00	0.00	1.10	26.44	5.67
18	23.70	34.50	28.40	45.50	89.50	72.00	0.00	1.09	26.98	5.92
19	23.00	33.40	28.10	53.50	91.00	73.50	0.00	1.33	26.89	5.83
20	23.90	32.70	27.60	52.50	91.00	74.00	0.00	1.42	24.56	5.47
21	23.30	33.60	27.80	51.50	91.00	74.00	0.00	1.41	24.03	5.46
22	23.30	33.30	27.60	52.00	91.50	76.50	0.00	1.08	22.87	5.07
23	23.20	33.30	27.90	56.00	91.00	76.00	1.00	1.08	23.99	5.22
24	23.80	33.40	28.10	58.00	92.00	79.00	0.00	0.96	26.20	5.56
25	23.90	33.70	28.40	56.00	92.00	77.00	26.00	1.22	25.68	5.62
26	23.10	33.60	28.10	55.50	92.00	77.50	0.00	1.01	25.96	5.54
27	24.40	33.60	28.40	57.50	92.00	76.00	0.00	1.24	25.86	5.65
28	23.80	33.40	28.30	52.50	90.00	75.00	0.00	1.20	25.44	5.58
29										
30										
31										
Decade 1	20.88	29.78	24.20	59.00	91.80	78.75	41.00	1.31	18.85	4.15
Decade 2	23.50	33.18	27.67	54.50	92.00	76.85	35.50	1.18	25.01	5.44
Decade 3	23.60	33.49	28.08	54.88	91.44	76.38	27.00	1.15	25.00	5.46
MONTH	22.59	32.05	26.55	56.21	91.77	77.39	103.50	1.22	22.81	4.99

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: March 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	24.10	33.40	28.30	53.50	89.50	76.00	0.00	0.98	23.65	5.19
2	24.00	33.50	27.40	56.50	88.50	75.00	0.00	1.26	18.46	4.44
3	24.40	32.90	27.00	53.00	92.00	79.00	0.50	1.27	20.06	4.68
4	23.00	33.50	26.90	52.00	92.50	79.00	4.50	1.34	23.66	5.30
5	23.30	33.50	26.60	54.50	92.50	80.00	2.50	1.13	17.59	4.20
6	23.60	32.80	26.30	57.50	92.00	82.50	0.50	1.06	16.62	3.93
7	23.00	33.40	27.40	57.50	92.00	78.50	0.00	1.06	18.21	4.23
8	25.00	33.80	27.90	55.00	87.00	76.00	0.00	1.16	18.48	4.46
9	23.30	34.20	28.10	53.50	93.50	75.00	24.50	1.15	24.31	5.36
10	23.30	33.30	28.10	52.50	93.00	75.50	0.00	1.22	25.71	5.56
11	23.40	33.70	28.30	56.50	92.00	77.50	0.00	1.12	25.57	5.51
12	23.60	33.00	28.00	53.00	91.50	77.00	6.00	1.09	23.12	5.07
13	22.70	32.00	27.40	59.50	92.50	80.50	1.00	1.00	13.95	3.39
14	24.20	30.00	26.40	62.00	91.50	80.50	4.50	1.09	9.44	2.62
15	24.40	32.80	27.60	48.50	85.00	70.00	0.00	1.54	13.18	3.91
16	22.40	34.80	28.00	54.00	90.00	75.00	0.00	1.00	20.18	4.63
17	23.60	33.20	28.20	56.00	90.00	76.00	0.00	0.95	18.10	4.18
18	23.20	33.30	26.50	53.00	94.50	80.50	19.50	1.10	17.94	4.20
19	22.60	32.20	27.20	61.00	93.50	80.00	1.50	1.26	24.40	5.13
20	22.40	33.10	27.40	53.00	93.50	79.00	15.00	1.22	24.66	5.29
21	23.20	32.90	27.70	53.00	92.50	78.00	0.00	0.80	21.35	4.59
22	23.60	32.30	27.00	56.50	92.00	79.50	1.50	1.17	20.64	4.58
23	23.70	33.00	27.80	49.50	89.50	75.50	0.00	1.13	22.76	5.04
24	23.50	32.70	27.50	59.50	91.00	79.00	0.00	1.01	20.62	4.51
25	23.30	33.00	28.10	55.50	91.00	76.50	0.00	1.03	22.83	4.94
26	24.10	32.80	27.40	61.50	90.00	78.00	0.00	0.96	15.00	3.58
27	23.40	33.30	27.70	58.00	93.00	78.00	27.50	1.05	21.49	4.70
28	23.70	31.30	26.80	68.50	93.00	85.00	6.00	0.93	15.12	3.40
29	23.40	32.60	26.50	64.00	93.50	84.50	9.00	1.04	20.87	4.46
30	23.30	31.60	25.50	63.50	93.50	86.50	25.50	1.17	14.21	3.38
31	22.50	31.50	26.70	65.50	92.00	83.00	8.00	1.06	19.78	4.20
Decade 1	23.70	33.43	27.40	54.55	91.25	77.65	32.50	1.16	20.68	4.74
Decade 2	23.25	32.81	27.50	55.65	91.40	77.60	47.50	1.14	19.05	4.39
Decade 3	23.43	32.45	27.15	59.55	91.91	80.32	77.50	1.03	19.52	4.31
MONTH	23.46	32.88	27.35	56.68	91.53	78.58	157.50	1.11	19.74	4.47

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30      Latitude: -9.42      Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	22.30	32.30	26.40	61.50	91.00	80.50	3.50	1.23	17.83	4.04
2	23.40	32.00	26.70	63.00	93.00	80.50	0.00	1.27	19.34	4.26
3	23.10	31.10	25.30	68.00	93.00	87.00	37.00	0.94	10.90	2.68
4	22.80	32.30	27.10	59.50	92.00	79.50	0.00	1.06	21.81	4.63
5	22.90	31.50	25.30	60.00	91.00	81.50	0.00	1.39	11.24	3.09
6	22.40	32.50	26.60	52.50	92.00	75.00	0.00	0.81	15.64	3.59
7	22.20	30.00	25.10	68.00	92.50	83.50	13.00	1.19	10.73	2.69
8	22.20	31.40	25.30	68.00	93.00	84.00	0.00	0.97	13.34	3.06
9	22.50	31.70	26.10	58.00	94.00	82.50	5.50	1.06	16.13	3.67
10	22.80	32.30	26.20	65.50	94.00	83.50	0.00	0.96	16.59	3.65
11	22.50	31.00	26.30	60.00	95.00	81.00	0.50	0.79	10.84	2.67
12	23.10	31.70	26.10	59.00	94.00	84.00	0.00	0.64	10.67	2.61
13	22.70	31.90	25.10	59.50	95.50	86.00	1.00	0.87	11.00	2.75
14	22.30	31.30	26.30	59.00	96.50	82.50	0.00	0.93	19.43	4.05
15	22.40	32.10	26.90	51.00	96.50	79.50	0.00	1.19	23.85	4.96
16	21.60	32.30	26.40	56.50	97.00	81.00	0.00	0.97	22.11	4.53
17	20.60	32.30	25.80	56.50	96.50	77.50	0.00	1.10	22.68	4.62
18	20.50	31.60	25.90	55.00	96.50	77.50	0.00	1.06	23.38	4.67
19	20.60	33.50	26.20	41.50	92.50	70.00	0.00	1.19	23.67	5.06
20	21.40	32.90	26.30	52.50	90.00	74.50	0.00	1.16	22.73	4.78
21	21.00	32.10	26.00	51.50	96.50	75.00	0.00	1.28	23.13	4.79
22	21.50	31.90	25.90	58.50	96.50	79.00	1.00	0.98	17.53	3.77
23	21.70	32.00	25.00	62.50	97.50	84.00	20.00	1.32	14.22	3.34
24	21.10	32.10	25.40	59.00	98.50	84.00	10.00	1.13	17.50	3.79
25	22.30	32.10	25.80	59.00	99.50	88.00	16.00	0.88	13.86	3.16
26	22.60	31.60	26.40	64.50	99.00	85.50	0.50	1.09	17.82	3.77
27	22.30	31.70	26.80	61.50	97.50	83.00	0.00	1.25	19.77	4.16
28	23.20	31.10	26.40	68.50	96.00	85.00	4.50	1.10	17.41	3.67
29	23.20	31.80	26.80	64.50	98.50	84.50	0.00	1.11	22.25	4.49
30	23.70	31.80	26.70	53.00	93.50	80.00	1.00	1.03	21.09	4.40
31										
Decade 1	22.66	31.71	26.01	62.40	92.55	81.75	59.00	1.09	15.36	3.53
Decade 2	21.77	32.06	26.13	55.05	95.00	79.35	1.50	0.99	19.04	4.07
Decade 3	22.26	31.82	26.12	60.25	97.30	82.80	53.00	1.12	18.46	3.93
MONTH	22.23	31.86	26.09	59.23	94.95	81.30	113.50	1.07	17.62	3.85

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	22.90	32.30	26.40	54.00	97.50	80.50	0.50	1.15	19.71	4.22
2	22.30	31.90	26.20	51.50	94.50	79.00	0.00	1.32	21.13	4.50
3	22.50	32.60	26.20	44.50	90.50	77.50	0.00	1.26	21.23	4.64
4	21.60	32.00	25.80	46.50	90.50	76.50	0.00	1.32	19.61	4.36
5	21.00	31.80	25.70	58.50	100.50	80.00	0.00	1.08	18.80	3.89
6	23.00	31.80	26.20	55.00	93.50	81.00	0.00	1.13	14.81	3.47
7	21.80	31.60	25.10	60.00	97.00	82.50	3.50	1.19	12.17	2.98
8	20.60	31.30	25.50	59.50	93.00	78.00	0.00	1.10	19.38	3.95
9	21.60	32.10	25.90	58.50	99.00	81.00	0.00	1.01	19.03	3.92
10	22.10	31.50	26.10	60.50	98.50	84.00	3.00	0.93	20.36	4.05
11	23.10	31.60	26.30	66.00	98.00	85.00	0.00	0.93	19.36	3.90
12	21.80	32.20	26.10	53.00	98.00	81.00	0.00	0.97	21.22	4.27
13	21.40	32.50	25.50	47.00	93.50	76.00	0.00	1.13	21.18	4.41
14	20.10	31.60	25.20	53.50	91.50	75.50	0.00	1.20	20.96	4.26
15	19.50	31.30	24.90	51.50	93.50	71.00	0.00	1.42	21.48	4.39
16	18.30	32.20	24.80	45.00	86.00	66.00	0.00	1.35	20.61	4.42
17	20.60	32.30	25.30	40.50	89.00	67.00	0.50	1.61	20.92	4.74
18	21.80	31.50	25.40	46.50	90.50	73.50	0.00	1.22	15.81	3.70
19	20.60	31.50	25.20	42.50	87.50	71.50	0.00	1.33	19.94	4.33
20	21.00	30.90	24.90	54.00	100.00	74.00	0.00	1.32	11.50	2.94
21	20.80	31.70	25.70	55.50	87.50	73.50	0.00	1.37	17.59	3.89
22	21.80	31.50	25.50	55.50	91.00	78.00	3.00	1.34	15.88	3.63
23	19.80	31.10	24.00	60.00	99.00	83.00	4.50	1.28	12.46	2.94
24	21.90	30.60	24.90	60.00	95.00	80.50	11.00	1.25	10.87	2.75
25	20.90	30.20	24.70	61.00	99.00	83.00	3.50	1.23	11.77	2.77
26	22.20	31.70	25.50	53.50	96.50	82.50	3.00	1.32	14.51	3.43
27	22.00	30.60	25.40	54.50	96.50	79.00	0.50	1.27	19.88	4.03
28	21.30	26.10	23.30	76.00	95.50	85.00	1.00	1.55	4.79	1.55
29	21.30	30.10	24.80	55.50	93.50	79.00	0.50	1.11	11.45	2.79
30	21.70	30.10	24.80	43.50	94.00	71.50	0.50	1.41	18.76	4.04
31	20.10	29.80	24.10	52.50	92.00	75.00	0.00	1.42	15.74	3.51
Decade 1	21.94	31.89	25.91	54.85	95.45	80.00	7.00	1.15	18.62	4.00
Decade 2	20.82	31.76	25.36	49.95	92.75	74.05	0.50	1.25	19.30	4.14
Decade 3	21.25	30.32	24.79	57.05	94.50	79.09	27.50	1.32	13.97	3.21
MONTH	21.34	31.29	25.34	54.05	94.24	77.76	35.00	1.24	17.19	3.76

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION



MONTHLY METEOROLOGICAL BULLETIN: June 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30      Latitude: -9.42      Longitude: 125.61

Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	21.40	29.50	23.60	62.50	91.50	84.50	0.50	1.15	4.82	1.83
2	20.70	29.50	24.30	61.50	92.00	80.50	0.00	1.23	9.63	2.49
3	21.40	30.30	25.20	59.50	97.50	81.50	14.50	1.11	15.28	3.23
4	22.00	26.50	23.80	75.00	99.00	90.50	0.00	1.03	5.90	1.57
5	20.90	30.50	24.90	60.00	98.00	82.00	0.00	1.16	18.81	3.70
6	20.10	30.80	24.40	55.00	98.00	81.50	0.00	1.23	16.63	3.50
7	19.60	31.20	25.10	60.00	96.50	83.00	0.00	1.04	17.72	3.54
8	20.70	31.20	25.20	64.00	94.50	81.00	0.00	1.10	17.45	3.52
9	22.40	30.90	26.00	59.50	97.00	82.00	8.50	1.09	17.11	3.53
10	22.50	30.70	25.20	64.00	98.00	85.50	0.00	1.16	15.93	3.31
11	21.90	30.10	25.50	65.50	96.00	83.00	0.00	0.94	11.93	2.64
12	20.90	30.30	25.10	64.50	97.50	84.00	0.00	1.05	18.13	3.52
13	20.50	30.60	24.70	51.50	96.00	80.00	0.00	1.12	19.27	3.82
14	20.20	30.10	24.70	51.00	95.00	78.00	0.00	1.15	19.75	3.86
15	20.30	30.40	25.00	61.00	93.00	79.50	0.00	1.17	16.38	3.37
16	21.20	31.20	25.70	52.00	96.00	79.50	0.00	1.25	17.87	3.76
17	21.70	32.00	25.90	53.00	95.00	78.00	0.00	1.12	17.45	3.71
18	18.80	31.10	25.10	59.00	97.50	81.00	0.00	0.74	18.70	3.51
19	20.70	31.10	25.60	63.50	97.50	82.50	0.00	0.87	17.59	3.44
20	22.80	31.70	26.30	57.50	95.50	82.50	0.50	1.10	16.98	3.60
21	21.50	32.10	25.80	57.00	97.50	82.00	0.00	0.98	18.05	3.67
22	20.90	31.60	25.50	58.50	96.50	81.00	0.00	1.00	18.67	3.70
23	20.60	31.70	25.50	64.50	97.50	84.50	0.00	0.90	15.43	3.16
24	20.10	28.70	24.10	73.00	98.00	90.00	2.00	0.74	6.74	1.68
25	21.40	31.50	25.10	55.50	92.00	78.00	0.00	1.23	18.76	3.87
26	20.30	30.70	24.50	49.00	86.00	72.50	0.00	1.37	18.85	3.98
27	20.20	30.40	24.90	46.00	86.50	67.50	0.00	1.46	17.72	3.92
28	20.00	29.80	24.20	50.50	89.00	73.00	0.00	1.12	15.15	3.29
29	20.50	29.50	23.90	52.00	89.50	74.00	0.00	1.05	14.19	3.10
30	19.00	28.90	23.40	52.50	88.50	74.00	0.00	1.23	15.55	3.30
31										
Decade 1	21.17	30.11	24.77	62.10	96.20	83.20	23.50	1.13	13.93	3.02
Decade 2	20.90	30.86	25.36	57.85	95.90	80.80	0.50	1.05	17.41	3.52
Decade 3	20.45	30.49	24.69	55.85	92.10	77.65	2.00	1.11	15.91	3.37
MONTH	20.84	30.49	24.94	58.60	94.73	80.55	26.00	1.10	15.75	3.30

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	19.50	28.50	23.40	48.00	86.50	69.00	0.00	1.13	12.86	2.99
2	19.60	29.50	23.40	51.00	88.50	71.00	0.00	1.10	13.84	3.09
3	19.60	30.30	24.40	57.00	89.50	73.00	0.00	1.22	13.52	3.08
4	19.00	30.60	24.20	55.50	92.00	76.50	0.00	1.17	14.67	3.21
5	18.90	30.80	25.00	53.00	92.50	75.50	0.00	1.10	16.08	3.40
6	21.40	31.90	25.20	57.50	92.00	81.00	0.00	0.89	10.16	2.56
7	21.50	31.80	25.50	58.00	95.50	79.00	0.00	1.30	15.79	3.50
8	21.10	31.10	25.30	65.50	96.50	84.50	14.50	1.04	14.14	3.02
9	22.60	31.50	25.90	57.50	97.00	82.50	0.50	0.89	14.17	3.09
10	20.00	31.40	25.20	48.00	94.50	74.00	0.00	1.45	16.46	3.77
11	18.90	30.70	24.70	61.50	93.50	79.50	0.00	1.25	15.31	3.26
12	23.60	28.70	25.20	70.00	96.00	85.50	0.50	1.12	8.18	2.09
13	21.20	30.80	25.20	57.50	97.00	82.00	0.00	1.10	17.29	3.55
14	20.90	29.60	24.10	66.50	95.50	86.50	2.00	1.11	10.69	2.49
15	21.10	31.10	25.00	49.00	94.50	78.50	0.00	1.23	17.27	3.74
16	19.70	31.60	24.50	49.00	92.00	75.50	0.00	1.34	17.95	3.92
17	20.30	31.20	24.80	51.00	89.00	75.50	0.00	1.37	17.73	3.89
18	19.80	31.00	24.80	49.50	86.50	73.50	0.00	1.35	18.90	4.03
19	19.20	30.20	24.20	42.00	87.50	65.50	0.00	1.42	20.00	4.22
20	19.90	30.60	23.90	52.50	85.50	71.50	0.00	1.11	8.60	2.57
21	20.00	29.70	24.10	55.00	88.50	75.00	0.00	1.23	14.44	3.25
22	19.90	29.70	24.60	59.00	86.50	75.00	0.00	1.12	13.16	3.00
23	20.00	30.30	24.40	55.50	86.50	74.50	0.50	1.22	10.90	2.85
24	19.20	29.90	24.40	51.50	85.50	70.50	0.00	1.40	16.14	3.63
25	20.20	31.10	24.80	46.00	89.50	72.50	0.00	1.30	20.00	4.21
26	19.70	31.10	24.20	36.50	92.00	70.50	0.00	1.30	20.21	4.32
27	19.90	30.00	24.30	47.50	91.00	72.50	0.00	1.32	20.31	4.14
28	19.60	30.70	24.30	42.00	86.50	71.50	0.00	1.44	17.51	4.04
29	20.00	30.30	24.80	49.00	85.00	74.00	0.00	1.37	15.72	3.67
30	20.30	30.60	24.80	60.50	86.50	76.00	0.00	1.35	15.44	3.47
31	19.50	30.30	24.80	51.50	88.50	74.50	0.00	1.08	15.10	3.36
Decade 1	20.32	30.74	24.75	55.10	92.45	76.60	15.00	1.13	14.17	3.17
Decade 2	20.46	30.55	24.64	54.85	91.70	77.35	2.50	1.24	15.19	3.37
Decade 3	19.85	30.34	24.50	50.36	87.82	73.32	0.50	1.28	16.27	3.63
MONTH	20.20	30.54	24.63	53.34	90.56	75.68	18.00	1.22	15.24	3.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30      Latitude: -9.42      Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	22.00	31.00	25.30	44.50	86.50	71.00	0.00	1.19	19.04	4.13
2	20.20	30.30	24.70	52.50	88.00	72.00	0.00	1.27	19.64	4.06
3	20.90	30.40	23.30	47.50	95.50	80.00	1.50	0.93	9.03	2.52
4	18.60	29.80	23.20	47.00	95.50	73.50	0.00	1.25	19.31	3.94
5	19.10	30.30	24.20	38.00	85.00	66.00	0.00	1.76	21.26	4.76
6	17.30	30.60	24.00	48.00	90.00	74.00	0.00	1.11	21.02	4.14
7	19.70	30.50	25.00	59.50	89.50	77.00	0.50	1.27	19.75	4.01
8	21.90	31.60	25.70	51.50	94.50	78.00	24.00	1.45	18.97	4.20
9	22.10	28.60	24.80	66.00	95.00	82.00	0.00	1.17	10.23	2.49
10	20.80	30.80	24.70	39.00	90.50	72.00	0.00	1.18	21.93	4.51
11	17.10	30.40	23.00	41.00	88.50	70.00	0.00	1.47	22.38	4.61
12	14.50	31.00	23.20	29.00	79.00	60.50	0.00	1.37	22.40	4.74
13	18.70	30.40	24.10	51.50	94.00	75.50	3.50	1.52	19.32	4.13
14	19.80	30.10	24.40	61.00	94.00	80.50	0.00	1.50	14.99	3.41
15	21.50	31.80	25.30	34.00	91.50	75.00	0.00	1.31	18.19	4.33
16	18.50	30.20	24.20	48.00	88.00	73.00	0.00	1.28	21.74	4.40
17	19.50	30.90	25.20	50.50	87.50	71.50	0.00	1.59	21.07	4.55
18	20.40	31.60	24.90	50.50	89.50	77.00	0.00	1.31	18.35	4.11
19	21.40	31.10	25.20	48.50	91.50	73.00	0.00	1.34	21.78	4.59
20	19.00	31.00	24.20	42.00	92.50	71.50	0.00	1.32	21.91	4.59
21	19.00	30.60	24.40	45.00	92.00	73.00	0.50	1.39	21.47	4.51
22	20.10	30.30	24.40	51.50	92.00	74.50	0.00	1.31	19.89	4.19
23	19.00	30.60	24.00	48.00	84.00	69.00	0.00	1.44	21.26	4.54
24	18.10	30.70	24.10	48.50	86.50	66.50	0.00	1.44	21.42	4.52
25	19.10	31.50	25.20	48.00	84.50	71.50	0.00	1.48	21.39	4.68
26	20.30	31.10	25.80	51.50	92.50	76.00	1.50	1.46	22.39	4.70
27	22.10	28.50	23.80	67.00	94.00	87.00	3.00	1.28	7.73	2.20
28	19.90	30.80	25.20	53.00	90.50	76.00	0.00	1.50	21.77	4.60
29	19.80	30.80	24.80	51.50	92.00	74.50	0.00	1.37	22.78	4.68
30	19.30	30.40	24.50	50.50	88.00	72.50	0.00	1.31	23.19	4.69
31	19.70	31.30	24.80	47.50	88.50	72.50	0.00	1.42	23.58	4.93
Decade 1	20.26	30.39	24.49	49.35	91.00	74.55	26.00	1.26	18.02	3.88
Decade 2	19.04	30.85	24.37	45.60	89.60	72.75	3.50	1.40	20.21	4.34
Decade 3	19.67	30.60	24.64	51.09	89.50	73.91	5.00	1.40	20.62	4.39
MONTH	19.66	30.61	24.50	48.76	90.02	73.74	34.50	1.35	19.65	4.21

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: September 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	20.10	31.00	24.90	51.00	86.00	72.50	0.00	1.48	21.11	4.60
2	19.50	31.40	25.00	34.00	89.50	70.00	0.00	1.35	23.99	5.12
3	19.90	30.20	24.70	56.00	91.50	76.00	0.00	1.33	18.32	3.98
4	20.00	31.50	25.00	42.50	93.50	76.50	0.00	1.19	21.43	4.59
5	20.40	30.20	24.80	59.00	92.50	76.50	0.00	1.40	22.62	4.57
6	19.90	31.70	25.10	46.50	92.00	70.50	0.00	1.41	23.36	4.97
7	19.70	31.30	24.60	50.00	86.50	70.00	0.00	1.39	22.00	4.72
8	19.30	30.80	25.00	51.00	85.00	67.50	0.00	1.38	23.49	4.87
9	20.30	30.20	25.20	51.50	87.00	69.00	0.00	1.38	24.31	4.95
10	20.10	30.60	25.50	48.50	89.00	70.00	0.00	1.18	22.09	4.61
11	21.30	31.80	26.10	50.50	87.50	71.00	0.00	1.15	20.53	4.49
12	20.80	30.70	26.00	57.00	88.50	76.00	0.00	1.15	18.03	3.97
13	23.50	31.40	26.70	60.50	88.00	77.00	0.00	0.89	18.72	4.05
14	22.30	31.60	27.00	58.00	92.00	75.50	0.00	0.86	21.86	4.52
15	21.80	31.30	26.20	59.00	90.50	77.50	0.00	1.15	18.02	4.00
16	22.10	31.10	26.00	62.00	89.50	76.50	0.00	1.32	21.17	4.50
17	19.10	31.30	25.60	53.00	87.00	72.50	0.00	1.18	21.36	4.53
18	20.30	31.30	25.80	49.00	90.00	72.00	0.00	1.30	23.55	4.96
19	21.50	31.60	26.70	53.50	86.50	72.00	0.00	1.42	22.61	4.93
20	20.60	33.60	26.70	36.50	87.50	69.00	0.00	1.16	22.62	5.09
21	21.40	33.00	26.60	55.50	86.50	74.00	0.00	1.15	23.26	4.98
22	20.40	32.70	26.60	52.00	88.00	72.00	0.00	1.22	22.95	4.95
23	21.10	32.90	26.70	50.50	85.50	69.50	0.00	1.50	22.35	5.10
24	21.30	33.30	26.50	49.00	87.50	70.00	0.00	1.49	21.12	4.96
25	20.00	31.90	26.00	51.00	86.50	70.50	0.00	1.20	24.42	5.10
26	20.60	32.20	26.00	49.50	86.50	71.00	0.00	1.42	24.33	5.27
27	20.40	33.10	26.30	46.50	88.50	71.00	0.00	1.24	24.56	5.30
28	20.10	32.70	26.20	42.00	85.50	68.00	0.00	1.35	24.39	5.37
29	21.40	33.70	26.60	38.00	86.00	67.50	0.00	1.27	24.51	5.51
30	21.70	32.60	26.90	49.50	83.00	68.00	0.00	1.42	24.36	5.39
31										
Decade 1	19.92	30.89	24.98	49.00	89.25	71.85	0.00	1.35	22.27	4.70
Decade 2	21.33	31.57	26.28	53.90	88.70	73.90	0.00	1.16	20.85	4.50
Decade 3	20.84	32.81	26.44	48.35	86.35	70.15	0.00	1.33	23.63	5.19
MONTH	20.70	31.76	25.90	50.42	88.10	71.97	0.00	1.28	22.25	4.80

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2005  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	21.40	32.80	27.10	43.00	84.50	67.00	0.00	1.13	24.76	5.34
2	18.00	32.50	26.30	46.00	87.00	65.50	0.00	1.13	24.17	5.10
3	22.20	33.50	27.20	40.50	84.00	64.00	0.00	1.17	24.63	5.46
4	21.70	32.20	27.00	50.00	84.00	69.50	0.00	1.35	24.33	5.32
5	21.90	33.10	27.20	48.00	84.50	70.00	0.00	1.33	23.43	5.28
6	19.70	32.30	26.50	47.50	87.50	71.00	0.00	1.19	23.23	5.02
7	21.50	33.50	27.10	47.50	85.00	68.50	0.00	1.13	23.60	5.21
8	21.60	32.00	27.00	49.50	89.50	70.00	0.00	1.20	24.36	5.21
9	23.40	32.80	27.40	59.00	95.00	77.50	23.50	1.13	22.76	4.93
10	23.80	32.10	27.30	65.50	96.00	82.50	0.00	0.94	25.40	5.22
11	22.90	32.30	27.20	53.00	93.50	76.50	0.00	1.08	25.98	5.43
12	22.00	32.30	27.20	54.00	93.00	76.00	0.00	1.13	25.39	5.33
13	23.80	32.40	27.30	64.50	93.00	79.00	4.00	1.06	21.38	4.63
14	24.10	32.60	27.60	60.00	93.50	79.00	0.00	1.08	21.57	4.73
15	21.90	32.60	27.20	59.00	91.00	77.00	0.00	1.16	25.43	5.33
16	23.30	33.30	28.00	51.50	87.00	71.50	0.00	1.16	25.78	5.59
17	23.50	32.30	27.70	59.50	86.50	75.50	0.00	1.13	20.25	4.56
18	24.90	33.40	28.30	53.50	85.00	74.00	0.00	1.00	19.30	4.52
19	25.10	32.90	27.90	60.50	92.00	77.00	6.00	1.45	21.66	4.94
20	24.30	31.70	27.00	64.00	93.50	82.00	9.00	1.17	18.05	4.08
21	24.00	32.00	27.60	62.00	95.00	82.50	0.00	1.00	19.90	4.37
22	24.20	32.10	28.00	62.50	93.00	78.50	0.00	1.12	23.79	5.09
23	24.20	32.70	28.30	62.00	90.50	76.50	0.00	1.11	24.05	5.20
24	24.30	32.90	28.50	59.00	93.00	76.00	4.00	1.31	23.02	5.13
25	24.20	32.40	28.00	64.50	94.50	81.50	0.00	1.20	23.58	5.07
26	23.40	32.80	27.90	65.00	91.50	79.50	0.00	1.15	22.70	4.92
27	24.20	33.10	28.30	59.00	91.50	76.50	0.00	1.35	24.25	5.36
28	24.20	32.60	28.30	62.00	89.00	74.50	0.50	1.46	23.85	5.28
29	24.20	33.10	28.20	57.00	86.50	74.00	0.00	1.18	23.04	5.15
30	24.30	33.00	28.30	59.50	86.50	73.50	0.00	1.12	24.41	5.33
31	23.10	33.90	28.40	52.00	84.50	69.50	0.00	1.24	25.98	5.74
Decade 1	21.52	32.68	27.01	49.65	87.70	70.55	23.50	1.17	24.07	5.21
Decade 2	23.58	32.58	27.54	57.95	90.80	76.75	19.00	1.14	22.48	4.91
Decade 3	24.03	32.78	28.16	60.41	90.50	76.59	4.50	1.20	23.51	5.15
MONTH	23.07	32.68	27.59	56.15	89.69	74.69	47.00	1.17	23.36	5.09

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2005

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	23.00	34.50	28.60	44.00	86.50	65.50	0.00	0.97	25.81	5.65
2	24.10	34.60	28.90	39.00	84.00	67.00	0.00	1.40	26.01	6.09
3	24.50	33.80	28.90	45.50	84.50	69.50	5.50	1.23	24.46	5.61
4	24.20	33.40	28.60	50.50	93.50	74.00	0.00	1.04	25.82	5.60
5	23.60	33.70	28.70	50.00	89.00	68.50	0.00	1.35	24.93	5.64
6	23.90	34.50	29.20	48.50	82.00	67.00	0.00	1.24	24.59	5.66
7	24.40	34.20	29.40	48.00	82.00	67.50	0.00	1.24	25.25	5.77
8	24.40	33.80	29.20	49.50	81.00	68.00	0.00	1.34	26.15	5.93
9	24.30	34.40	28.90	49.50	83.00	70.50	0.00	1.12	21.95	5.15
10	24.70	34.10	29.20	52.50	78.50	69.00	0.00	1.45	25.08	5.84
11	26.30	34.00	29.50	59.50	81.00	72.50	0.00	1.30	21.21	5.08
12	25.70	34.20	28.70	56.00	89.50	74.00	2.00	1.17	22.05	5.11
13	24.00	33.60	28.40	52.00	86.50	71.00	0.00	1.12	23.37	5.26
14	24.60	33.60	28.70	55.50	87.00	71.00	0.00	1.45	23.04	5.35
15	24.90	33.90	28.70	58.00	86.00	74.50	0.00	1.13	23.40	5.28
16	24.10	34.60	29.20	51.50	84.00	70.50	0.00	1.20	22.84	5.33
17	24.80	35.20	30.00	46.50	80.50	66.50	0.00	1.26	26.34	6.09
18	23.20	34.60	27.60	53.50	94.50	77.00	27.00	1.31	14.29	3.87
19	23.10	33.10	25.90	64.50	94.00	87.50	5.00	0.94	11.56	2.95
20	23.00	33.30	27.50	59.00	93.50	78.50	0.00	1.16	19.54	4.48
21	24.30	33.40	27.10	59.00	95.00	80.50	29.00	1.28	17.81	4.26
22	22.90	33.00	27.60	58.50	92.50	79.00	0.00	1.26	20.08	4.60
23	24.80	32.80	28.60	59.00	90.00	77.00	0.00	1.35	24.75	5.47
24	24.80	33.00	28.50	61.00	92.00	77.00	0.00	1.52	23.49	5.29
25	24.80	32.20	27.40	58.50	90.00	79.00	0.00	1.15	15.66	3.84
26	24.30	33.00	27.70	60.50	89.50	78.00	1.50	1.19	18.04	4.27
27	23.10	31.50	26.60	65.00	94.00	83.50	11.50	0.96	16.21	3.67
28	23.70	32.40	26.00	64.00	94.00	86.00	6.00	1.05	18.62	4.14
29	23.40	32.30	25.90	65.00	94.00	85.50	4.00	1.09	16.25	3.74
30	23.10	32.80	26.10	58.50	93.50	83.00	1.00	1.06	17.99	4.13
31										
Decade 1	24.11	34.10	28.96	47.70	84.40	68.65	5.50	1.24	25.01	5.69
Decade 2	24.37	34.01	28.42	55.60	87.65	74.30	34.00	1.20	20.76	4.88
Decade 3	23.92	32.64	27.15	60.90	92.45	80.85	53.00	1.19	18.89	4.34
MONTH	24.13	33.58	28.18	54.73	88.17	74.60	92.50	1.21	21.55	4.97

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION



MONTHLY METEOROLOGICAL BULLETIN: December 2005

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61

Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	23.50	32.80	26.60	57.50	92.50	80.00	5.50	1.25	21.34	4.79
2	24.00	33.00	28.10	60.50	86.50	76.00	0.00	1.49	26.14	5.73
3	24.00	33.10	28.20	56.50	87.50	74.50	0.00	1.42	26.33	5.78
4	24.20	33.10	28.00	57.00	89.00	75.00	0.00	1.20	19.56	4.58
5	24.20	34.10	28.20	53.00	100.00	75.00	0.00	1.15	20.18	4.70
6	24.80	33.50	28.70	57.00	89.00	74.50	0.00	1.27	24.68	5.51
7	24.90	33.90	28.90	58.50	88.00	73.00	0.00	1.30	21.69	5.05
8	25.30	33.80	29.00	56.50	87.00	74.00	0.50	1.28	23.62	5.41
9	24.90	34.30	28.30	55.00	91.50	79.00	5.00	1.25	22.09	5.13
10	23.70	34.30	27.60	51.50	94.50	78.50	14.00	1.10	22.99	5.18
11	23.80	33.10	26.70	54.50	94.00	82.50	0.00	0.90	14.38	3.55
12	24.00	32.90	28.00	62.00	91.50	78.50	0.00	0.98	21.60	4.75
13	24.00	33.30	28.50	55.00	91.00	75.50	0.00	1.19	22.28	5.05
14	24.50	33.70	28.30	56.50	86.50	73.00	0.00	1.32	20.00	4.79
15	24.60	34.00	28.50	52.00	82.00	71.50	0.00	1.45	23.75	5.59
16	24.70	34.30	29.00	53.00	85.00	71.50	0.00	1.38	25.45	5.83
17	24.00	33.00	27.30	59.50	94.00	78.50	9.00	1.39	15.20	3.85
18	23.10	30.80	25.90	67.50	94.50	86.00	0.00	0.96	13.18	3.10
19	23.50	30.50	26.50	69.50	94.00	85.00	0.00	0.78	12.72	2.95
20	24.00	33.30	27.80	58.00	94.50	80.00	0.00	1.16	23.70	5.20
21	23.40	33.40	28.00	58.50	92.00	77.50	0.00	1.32	23.83	5.29
22	23.50	33.90	28.70	56.00	92.00	75.00	0.00	1.15	25.73	5.62
23	24.50	33.90	28.70	48.50	84.50	70.00	0.00	1.45	24.12	5.66
24	23.40	35.10	28.90	42.00	86.00	70.00	0.00	1.13	21.31	5.15
25	24.80	33.80	28.50	54.00	89.50	73.00	0.00	1.31	19.26	4.69
26	23.60	33.90	27.10	56.50	96.50	79.00	14.00	1.24	16.80	4.12
27	23.30	32.90	25.80	60.50	94.00	84.50	1.00	1.23	15.62	3.80
28	23.20	32.20	26.30	63.00	94.50	85.50	3.00	0.97	14.87	3.50
29	23.10	32.40	26.00	61.00	95.50	87.00	7.00	0.96	16.24	3.74
30	24.00	32.10	27.00	62.50	93.50	83.00	0.00	0.94	12.97	3.20
31	24.40	34.20	28.30	52.50	92.50	75.50	0.00	1.18	20.32	4.81
Decade 1	24.35	33.59	28.16	56.30	90.55	75.95	25.00	1.27	22.86	5.19
Decade 2	24.02	32.89	27.65	58.75	90.70	78.20	9.00	1.15	19.23	4.47
Decade 3	23.75	33.44	27.57	55.91	91.86	78.18	25.00	1.17	19.19	4.51
MONTH	24.03	33.31	27.79	56.95	91.06	77.47	59.00	1.20	20.39	4.71

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	24.00	33.70	27.60	59.50	91.50	77.50	0.50	1.40	17.51	4.31
2	24.00	29.20	26.10	74.50	93.50	87.00	1.50	0.67	6.69	1.83
3	24.00	29.70	25.70	71.00	94.50	87.50	0.00	0.89	10.43	2.56
4	23.40	31.90	26.40	64.00	93.50	83.00	0.00	1.03	18.57	4.12
5	23.70	32.50	27.50	61.00	92.50	80.00	0.00	0.98	18.57	4.20
6	23.30	32.20	27.10	60.00	93.00	79.50	0.50	0.88	15.01	3.55
7	23.60	32.30	26.70	63.00	94.50	85.00	3.50	0.93	16.22	3.73
8	23.10	33.50	27.00	54.00	94.50	82.50	18.00	1.25	20.78	4.79
9	23.60	32.80	27.40	62.50	94.50	83.50	0.00	0.88	17.05	3.89
10	23.50	32.90	27.00	57.00	93.00	80.50	0.00	1.09	20.16	4.55
11	23.30	33.40	27.90	53.50	93.50	76.50	0.00	1.16	25.03	5.46
12	23.60	33.70	27.00	58.00	94.00	80.50	18.00	1.45	19.41	4.62
13	23.70	32.80	27.30	59.00	92.00	79.00	0.00	1.37	23.38	5.17
14	24.00	33.60	27.70	54.00	92.50	80.50	0.00	1.20	17.92	4.36
15	24.00	33.40	28.30	59.50	92.50	80.50	0.50	0.88	19.93	4.48
16	24.60	32.90	27.40	64.50	95.00	83.50	1.50	0.82	10.87	2.80
17	24.50	33.20	27.90	60.00	93.00	81.50	0.00	0.79	13.10	3.25
18	25.20	35.10	29.00	53.50	91.00	76.00	0.50	1.03	17.14	4.28
19	24.90	35.10	28.90	46.50	91.50	72.50	0.50	1.13	17.22	4.44
20	24.30	34.20	27.60	52.00	92.00	80.50	2.00	0.91	14.57	3.71
21	24.50	34.30	28.20	53.00	91.50	75.50	0.00	1.12	18.91	4.56
22	24.20	30.10	26.70	71.00	93.50	83.00	0.00	0.76	5.61	1.74
23	23.90	28.60	26.00	60.50	93.50	82.50	10.50	1.33	5.38	2.05
24	25.10	31.80	27.70	62.50	87.50	73.00	0.00	1.11	13.43	3.42
25	23.00	33.10	27.60	50.50	90.50	76.50	0.00	1.50	23.09	5.33
26	23.80	32.60	26.80	52.50	93.50	80.50	7.00	1.13	18.41	4.33
27	23.80	34.20	28.90	47.50	92.00	66.00	0.00	2.35	19.24	5.36
28	24.10	34.80	28.30	47.00	92.00	76.50	0.50	1.17	21.14	5.05
29	24.70	36.30	29.40	42.00	93.00	69.50	0.00	1.52	20.92	5.47
30	24.00	37.10	29.90	36.00	89.50	64.50	0.00	1.86	24.59	6.53
31	24.00	34.90	28.40	46.50	89.00	74.50	1.00	1.11	17.94	4.53
Decade 1	23.62	32.07	26.85	62.65	93.50	82.60	24.00	1.00	16.10	3.75
Decade 2	24.21	33.74	27.90	56.05	92.70	79.10	23.00	1.07	17.86	4.26
Decade 3	24.10	33.44	27.99	51.73	91.41	74.73	19.00	1.36	17.15	4.40
MONTH	23.98	33.09	27.59	56.65	92.50	78.68	66.00	1.15	17.04	4.14

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2006

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	24.70	35.20	28.10	43.00	93.50	75.50	1.50	1.17	15.97	4.31
2	24.10	33.10	27.50	59.00	94.00	81.00	0.50	0.98	17.20	4.03
3	23.70	32.90	27.10	55.00	95.00	81.50	1.00	0.87	17.57	4.04
4	24.90	32.60	26.70	46.50	94.00	78.00	0.50	1.13	13.44	3.64
5	21.60	32.80	27.10	51.50	93.50	76.00	0.00	1.19	26.62	5.63
6	23.70	33.30	28.00	55.00	90.50	73.00	1.50	1.18	26.25	5.68
7	24.00	32.70	27.70	48.00	94.50	78.50	0.00	1.05	27.09	5.75
8	23.40	32.40	27.70	51.00	92.50	75.50	3.00	1.40	26.48	5.74
9	23.50	32.60	27.40	61.00	94.00	79.00	46.00	1.23	22.89	4.99
10	23.40	31.70	26.90	61.50	97.00	84.50	4.00	1.08	24.24	5.07
11	22.90	32.20	27.10	57.50	94.50	80.00	0.00	1.28	27.01	5.65
12	23.50	31.90	27.70	63.50	93.50	79.00	0.50	1.40	26.28	5.52
13	24.10	32.80	27.60	58.00	94.50	82.00	2.50	1.22	21.04	4.75
14	23.80	32.50	27.80	64.50	93.50	82.00	0.00	1.02	26.20	5.47
15	24.20	32.90	28.00	62.50	93.50	78.50	0.00	1.16	25.95	5.52
16	23.80	32.90	28.20	60.50	92.00	79.00	0.00	1.15	25.14	5.41
17	24.40	32.60	27.90	64.50	91.50	79.50	0.00	1.10	19.07	4.33
18	23.90	33.30	27.50	61.00	92.50	81.00	0.50	1.19	20.22	4.60
19	24.30	28.10	25.40	78.00	94.00	87.50	6.50	0.94	5.83	1.69
20	22.80	32.30	26.60	63.00	92.00	80.50	1.00	1.35	20.47	4.56
21	23.30	32.20	26.40	63.00	94.00	83.00	10.00	1.37	20.91	4.62
22	23.20	32.20	27.00	64.00	94.50	83.50	0.00	0.95	19.61	4.28
23	23.60	32.20	26.20	69.00	96.50	88.50	40.50	0.93	12.28	2.96
24	23.20	32.70	27.10	62.00	96.50	84.00	0.00	1.00	19.04	4.23
25	24.50	32.30	26.90	62.00	96.00	86.00	3.50	0.83	20.95	4.50
26	22.90	32.40	27.50	61.50	96.00	82.00	0.00	0.84	24.99	5.17
27	24.10	33.30	27.90	61.50	90.00	79.00	0.00	1.20	23.53	5.17
28	24.30	31.10	26.00	70.00	95.50	87.00	24.00	0.91	6.80	2.00
29										
30										
31										
Decade 1	23.70	32.93	27.42	53.15	93.85	78.25	58.00	1.13	21.78	4.89
Decade 2	23.77	32.15	27.38	63.30	93.15	80.90	11.00	1.18	21.72	4.75
Decade 3	23.64	32.30	26.88	64.13	94.88	84.13	78.00	1.00	18.51	4.12
MONTH	23.71	32.47	27.25	59.91	93.89	80.88	147.00	1.11	20.82	4.62

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	22.30	27.20	24.50	70.50	96.50	87.00	7.00	0.91	3.94	1.44
2	23.30	27.30	24.40	75.00	95.00	90.00	31.00	1.69	1.19	1.19
3	22.90	26.60	24.40	70.50	97.00	90.00	50.00	1.04	0.77	0.97
4	22.60	30.70	26.20	70.50	97.00	87.50	0.00	0.76	17.90	3.77
5	24.10	31.70	26.30	69.50	94.50	87.50	2.00	1.03	14.37	3.33
6	23.10	31.60	26.80	68.50	93.50	84.00	0.00	0.95	15.76	3.55
7	23.10	33.30	27.30	54.50	92.50	79.00	1.50	1.01	18.32	4.24
8	22.10	34.90	28.00	42.00	93.50	74.50	0.00	1.31	26.19	5.89
9	23.90	32.80	27.20	58.50	94.50	80.50	0.00	0.79	13.87	3.33
10	22.80	31.90	26.40	61.50	95.00	83.00	0.00	0.88	18.58	4.04
11	23.10	32.40	27.10	59.00	94.00	79.50	0.00	1.09	26.18	5.42
12	23.00	32.00	27.20	61.00	92.50	78.50	0.00	1.16	23.85	5.03
13	23.50	32.60	27.20	53.50	90.00	76.50	0.00	1.10	21.44	4.76
14	22.60	32.50	27.20	54.00	91.00	78.50	0.00	1.03	23.70	5.04
15	22.70	32.70	27.30	61.50	91.00	78.50	0.00	1.01	21.74	4.68
16	23.00	32.50	26.30	62.50	91.00	83.00	0.50	1.18	16.58	3.87
17	22.30	33.10	27.10	58.00	92.50	81.00	0.00	1.00	20.22	4.45
18	24.50	32.80	27.30	61.50	92.50	81.00	0.00	1.06	18.50	4.20
19	23.80	32.40	27.20	60.00	91.00	79.50	0.00	0.98	17.44	3.98
20	23.70	31.40	27.10	63.50	90.50	80.00	0.00	1.16	14.96	3.56
21	24.30	32.80	27.30	62.50	95.00	82.00	5.00	1.04	19.86	4.38
22	23.00	33.10	27.70	61.50	95.00	81.50	0.00	0.89	23.16	4.88
23	23.40	33.30	27.70	58.00	91.00	80.00	0.00	0.97	18.83	4.26
24	23.30	33.60	28.10	56.00	92.50	78.50	0.00	1.12	24.22	5.23
25	23.30	33.20	27.90	57.00	94.50	81.00	0.00	0.89	15.92	3.73
26	24.40	33.00	27.70	62.00	93.00	81.00	0.00	1.00	19.76	4.37
27	23.20	33.90	27.40	53.50	90.00	78.50	0.00	1.27	20.40	4.74
28	23.80	33.10	28.00	54.50	91.00	77.00	0.00	1.10	23.19	5.04
29	24.10	33.30	27.80	58.50	89.50	77.50	0.00	1.16	22.34	4.91
30	23.20	29.40	25.50	74.50	95.00	88.50	13.00	0.68	7.61	1.94
31	22.60	31.80	26.00	62.50	97.00	85.50	62.00	0.90	19.84	4.16
Decade 1	23.02	30.80	26.15	64.10	94.90	84.30	91.50	1.04	13.09	3.18
Decade 2	23.22	32.44	27.10	59.45	91.60	79.60	0.50	1.08	20.46	4.50
Decade 3	23.51	32.77	27.37	60.05	93.05	81.00	80.00	1.00	19.56	4.33
MONTH	23.26	32.03	26.89	61.16	93.18	81.61	172.00	1.04	17.76	4.01

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.30	32.30	26.40	61.50	91.00	80.50	3.50	1.23	17.83	3.50
2	23.40	32.00	26.70	63.00	93.00	80.50	0.00	1.27	19.34	4.20
3	23.10	31.10	25.30	68.00	93.00	87.00	37.00	0.94	10.90	1.30
4	22.80	32.30	27.10	59.50	92.00	79.50	0.00	1.06	21.81	4.50
5	22.90	31.50	25.30	60.00	91.00	81.50	0.00	1.39	11.24	2.30
6	22.40	32.50	26.60	52.50	92.00	75.00	0.00	0.81	15.64	3.20
7	23.40	32.70	27.50	60.50	91.00	78.50	0.00	1.12	22.32	4.77
8	23.90	32.10	27.00	62.50	92.50	81.00	0.00	1.11	19.44	4.24
9	23.70	31.90	26.40	65.00	92.50	84.50	0.00	0.98	12.50	3.03
10	22.70	31.90	26.90	57.50	92.50	80.50	0.00	1.03	22.44	4.66
11	22.60	31.60	26.80	63.00	93.50	82.00	0.00	1.10	21.97	4.54
12	23.50	32.10	27.10	64.50	93.00	81.00	0.50	1.06	21.41	4.49
13	23.10	31.80	26.70	59.50	93.00	79.00	0.00	1.12	22.94	4.74
14	22.40	31.90	26.40	59.00	94.50	78.50	0.00	1.02	19.12	4.09
15	21.70	32.50	27.00	56.50	94.00	79.00	1.50	0.93	23.06	4.71
16	22.60	32.60	27.20	57.50	94.50	81.50	1.50	1.24	20.93	4.53
17	23.10	30.30	26.20	70.50	94.50	86.00	1.00	0.76	11.47	2.63
18	23.00	32.20	25.80	65.00	95.50	88.50	0.50	0.81	12.20	2.86
19	23.50	26.80	24.70	85.50	96.50	93.00	4.00	0.66	4.82	1.31
20	22.50	29.70	24.50	70.50	96.50	92.00	55.50	0.69	7.18	1.87
21	23.00	31.10	25.60	66.50	97.50	90.50	72.50	0.96	15.61	3.36
22	22.90	27.30	23.90	78.50	97.50	95.00	45.00	0.74	6.13	1.58
23	22.70	25.90	23.70	92.50	98.00	96.50	31.00	0.79	2.07	0.79
24	21.90	30.70	25.70	64.50	95.00	84.00	0.00	1.08	17.39	3.66
25	21.90	31.90	25.80	51.50	95.00	79.50	0.00	1.10	17.27	3.86
26	20.80	32.30	25.90	60.00	95.00	81.50	0.00	1.24	20.72	4.32
27	23.20	32.00	26.80	61.50	95.50	83.00	0.00	0.79	18.51	3.86
28	22.40	33.30	26.80	55.00	95.50	82.00	0.50	0.97	20.10	4.28
29	23.00	32.00	26.50	64.00	92.00	82.00	0.00	1.26	18.97	4.08
30	22.70	31.10	25.90	67.00	92.00	82.50	0.00	1.03	16.60	3.53
31										
Decade 1	23.06	32.03	26.52	61.00	92.05	80.85	40.50	1.09	17.35	3.57
Decade 2	22.80	31.15	26.24	65.15	94.55	84.05	64.50	0.94	16.51	3.58
Decade 3	22.45	30.76	25.66	66.10	95.30	85.65	149.00	1.00	15.34	3.33
MONTH	22.77	31.31	26.14	64.08	93.97	83.52	254.00	1.01	16.40	3.49

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.90	31.20	25.70	65.00	92.50	83.50	1.00	1.20	14.85	3.36
2	22.30	31.30	25.10	66.50	96.00	85.00	16.00	1.25	14.26	3.21
3	22.60	29.40	24.90	69.00	94.50	85.50	0.00	1.18	7.14	2.05
4	22.40	30.20	26.00	64.50	93.50	80.50	0.50	1.10	18.01	3.72
5	23.10	29.80	25.80	64.00	93.00	81.50	0.00	0.84	18.37	3.68
6	21.50	30.60	25.40	53.00	92.50	78.00	0.00	1.22	20.54	4.22
7	22.10	30.40	25.70	58.00	94.00	80.00	0.00	0.94	17.20	3.58
8	21.90	30.30	25.80	59.00	92.00	78.00	0.00	1.03	18.81	3.84
9	22.70	29.40	25.40	62.50	87.00	78.00	0.00	1.46	10.06	2.76
10	23.10	29.70	25.60	58.50	89.50	77.50	0.00	1.12	16.73	3.58
11	21.40	30.30	25.00	56.00	92.50	77.50	0.00	1.27	20.48	4.14
12	20.00	31.10	25.10	58.50	96.00	81.50	44.00	1.01	17.97	3.66
13	22.60	30.70	25.50	59.50	98.00	84.50	18.50	0.76	14.03	3.01
14	20.90	30.80	24.80	63.50	96.50	83.50	17.50	1.25	16.44	3.47
15	22.10	30.70	25.70	63.00	94.00	82.00	0.00	1.08	18.86	3.81
16	22.30	31.10	25.80	60.00	94.00	83.00	2.50	1.10	15.90	3.45
17	23.10	30.00	25.40	70.00	96.00	87.50	6.00	1.03	11.35	2.59
18	22.50	29.70	25.00	68.00	96.50	89.00	43.50	0.95	9.95	2.35
19	22.00	29.50	24.50	65.00	95.00	85.00	2.00	1.49	11.69	2.82
20	22.00	31.20	25.60	58.50	93.00	82.50	0.00	1.26	16.24	3.58
21	22.80	30.30	24.20	67.00	97.00	91.00	56.00	1.17	7.46	2.10
22	22.80	30.60	25.30	70.50	98.00	91.00	3.00	0.61	14.93	3.00
23	22.70	29.70	24.80	71.50	97.50	91.00	10.00	0.60	9.65	2.15
24	22.30	30.60	25.90	63.00	95.00	84.00	0.00	1.13	18.66	3.76
25	21.80	27.00	23.80	78.50	96.00	92.50	7.00	0.69	5.41	1.43
26	22.70	30.60	25.40	65.50	96.00	85.50	0.00	1.02	18.53	3.67
27	21.00	29.60	24.50	60.00	95.00	81.50	0.50	1.09	18.63	3.64
28	21.00	28.90	24.00	63.00	92.50	83.00	0.50	1.18	9.68	2.43
29	20.30	29.20	24.20	54.50	92.50	77.50	0.00	1.15	19.71	3.81
30	20.80	28.40	23.90	60.50	92.00	79.00	0.00	0.94	10.59	2.46
31	20.30	28.90	24.10	60.00	92.00	77.00	0.00	1.24	15.68	3.26
Decade 1	22.46	30.23	25.54	62.00	92.45	80.75	17.50	1.13	15.60	3.40
Decade 2	21.89	30.51	25.24	62.20	95.15	83.60	134.00	1.12	15.29	3.29
Decade 3	21.68	29.44	24.55	64.91	94.86	84.82	77.00	0.98	13.54	2.88
MONTH	22.00	30.04	25.09	63.10	94.18	83.11	228.50	1.08	14.77	3.18

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.0	28.8	24.6	62.5	88.0	78.5	0.0	0.8	9.3	2.28
2	23.1	29.6	24.7	64.5	94.0	82.0	0.0	0.8	12.5	2.70
3	20.9	29.8	24.4	60.5	93.5	81.0	0.0	1.3	17.0	3.48
4	21.2	28.3	23.7	58.5	90.5	80.0	0.0	1.1	10.7	2.57
5	19.9	28.8	23.5	54.5	90.0	76.0	0.0	1.4	18.4	3.69
6	19.6	28.9	23.4	58.0	90.5	79.5	0.0	1.0	11.6	2.66
7	21.0	28.9	23.9	56.0	88.5	76.5	0.0	1.3	19.2	3.79
8	19.0	28.4	22.9	55.0	93.0	76.0	0.0	1.3	16.9	3.39
9	19.1	28.5	23.4	54.5	89.5	75.5	0.0	1.0	17.8	3.42
10	19.0	28.9	23.5	58.0	90.0	76.5	0.0	1.0	10.0	2.43
11	20.7	29.1	24.2	60.0	92.0	80.5	0.5	0.8	14.4	2.92
12	21.8	27.6	23.2	65.0	93.5	85.5	0.0	0.9	5.2	1.63
13	19.4	28.3	23.5	56.0	92.5	78.0	0.0	1.0	18.0	3.38
14	20.3	29.1	23.8	59.5	91.5	80.5	0.0	1.0	12.0	2.69
15	20.9	28.9	23.9	64.5	94.0	85.0	8.0	0.9	9.9	2.29
16	21.5	26.0	23.2	85.0	97.0	93.0	35.5	0.9	3.0	1.02
17	22.3	24.2	23.2	90.0	97.0	94.5	4.0	1.2	2.4	0.89
18	21.8	27.8	23.4	76.0	97.0	92.5	12.0	0.6	6.9	1.62
19	21.1	26.3	23.0	80.5	97.0	92.0	4.0	1.2	5.7	1.50
20	20.7	28.9	24.0	65.0	94.5	85.5	0.0	1.1	10.7	2.46
21	20.3	28.4	23.4	60.0	94.0	82.5	0.0	1.3	14.2	3.00
22	20.1	27.9	23.4	53.0	92.5	77.0	0.0	1.2	16.3	3.31
23	19.8	28.3	23.0	62.0	95.0	80.0	0.0	1.0	13.0	2.70
24	19.7	29.6	23.8	64.5	95.5	86.5	3.5	1.0	10.5	2.43
25	21.5	29.3	24.4	60.0	93.5	83.0	0.0	1.1	16.6	3.35
26	19.3	29.7	23.4	45.0	93.0	78.0	0.0	1.1	19.2	3.75
27	18.1	29.9	23.6	62.0	91.5	79.0	0.0	1.2	14.2	3.02
28	20.8	28.6	23.2	69.0	95.0	89.0	7.0	0.9	6.3	1.73
29	22.0	27.6	23.5	69.0	94.0	86.5	0.5	1.1	5.3	1.67
30	20.9	29.4	23.6	55.5	92.0	83.5	0.0	1.2	7.3	2.25
31										
Decade 1	20.48	28.89	23.80	58.20	90.75	78.15	0.00	1.10	14.35	3.04
Decade 2	21.05	27.62	23.54	70.15	94.60	86.70	64.00	0.95	8.81	2.04
Decade 3	20.25	28.87	23.53	60.00	93.60	82.50	11.00	1.12	12.28	2.72
MONTH	20.59	28.46	23.62	62.78	92.98	82.45	75.00	1.06	11.81	2.60

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.50	29.40	24.30	61.50	93.00	81.50	0.00	1.05	16.42	3.29
2	20.60	29.70	24.00	59.00	92.50	80.50	0.50	1.18	17.89	3.55
3	21.00	29.10	23.80	52.00	92.50	79.50	0.00	1.23	18.76	3.72
4	19.30	28.60	23.50	62.00	90.00	79.00	0.50	1.24	13.52	2.92
5	20.70	28.30	23.20	66.50	95.00	85.50	0.00	0.80	7.72	1.91
6	19.40	28.20	23.10	60.00	93.00	79.50	1.00	1.27	16.59	3.28
7	19.80	28.50	23.90	56.00	94.00	81.00	2.00	1.10	15.84	3.20
8	19.80	28.90	24.10	61.00	95.00	82.50	0.50	0.93	14.82	2.98
9	19.70	28.50	23.40	52.50	93.50	76.50	0.00	1.33	18.81	3.70
10	18.20	28.30	22.40	44.50	92.50	76.00	0.00	1.26	19.41	3.77
11	17.00	28.40	22.50	64.00	95.00	83.50	0.00	0.79	16.47	3.02
12	20.50	28.10	23.90	64.50	95.50	84.50	0.00	0.73	9.44	2.14
13	20.70	28.10	23.30	70.50	97.00	88.50	14.50	0.69	6.96	1.72
14	21.50	23.50	22.00	93.50	98.00	97.00	5.00	0.56	5.27	1.20
15	21.00	26.80	22.50	76.50	97.50	93.50	3.00	0.65	8.41	1.82
16	21.50	27.30	23.40	74.50	97.50	90.50	1.00	0.73	10.24	2.14
17	22.00	28.40	24.10	70.50	97.00	87.50	1.00	0.83	11.04	2.36
18	21.80	27.70	23.50	71.50	95.50	87.00	12.00	0.91	7.67	1.89
19	21.00	27.40	22.60	64.50	96.00	86.00	0.00	1.01	11.36	2.47
20	19.50	27.80	22.00	57.50	92.50	80.50	0.00	1.22	10.93	2.62
21	16.70	27.60	22.00	59.00	92.50	77.50	0.00	1.45	20.09	3.70
22	18.70	28.40	23.70	62.50	95.00	82.00	9.00	0.89	18.60	3.43
23	21.40	28.80	23.90	63.50	97.00	87.00	0.00	0.97	10.57	2.44
24	18.70	28.90	23.50	53.50	94.50	81.50	0.00	1.13	19.87	3.78
25	20.70	28.90	24.10	56.50	94.00	80.50	0.50	1.27	19.24	3.79
26	21.00	28.80	23.90	60.50	93.00	81.50	0.00	1.30	18.29	3.64
27	17.50	28.10	22.10	60.50	91.50	79.00	0.00	1.39	18.04	3.51
28	15.50	28.30	21.10	34.00	94.50	72.50	0.00	1.35	21.20	4.14
29	17.80	28.30	22.00	53.50	92.00	74.50	0.00	1.64	20.86	4.06
30	15.90	28.10	21.70	54.00	93.00	75.50	0.00	1.22	20.71	3.80
31	16.00	29.10	22.40	61.00	95.00	80.00	0.00	1.02	19.94	3.64
Decade 1	20.00	28.75	23.57	57.50	93.10	80.15	4.50	1.14	15.98	3.23
Decade 2	20.65	27.35	22.98	70.75	96.15	87.85	36.50	0.81	9.78	2.14
Decade 3	18.17	28.48	22.76	56.23	93.82	79.23	9.50	1.24	18.86	3.63
MONTH	19.56	28.20	23.09	61.32	94.34	82.31	50.50	1.07	15.00	3.02

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	17.50	29.70	23.30	54.50	95.50	80.50	0.00	1.17	21.07	3.99
2	17.60	29.50	23.10	60.50	95.00	80.50	0.00	1.03	20.85	3.85
3	17.00	29.40	22.90	58.50	91.50	78.00	0.00	1.26	20.76	3.94
4	16.90	29.10	22.70	54.00	91.00	75.00	0.00	1.28	19.85	3.87
5	17.60	28.80	23.00	40.00	88.00	71.50	0.00	1.38	18.65	3.99
6	18.20	27.90	22.20	53.00	83.50	73.50	0.00	1.48	10.30	2.89
7	18.50	27.90	22.20	46.50	89.00	71.50	0.00	1.61	18.79	3.99
8	18.20	28.70	22.80	35.00	89.00	68.00	0.00	1.47	19.87	4.27
9	19.20	28.70	22.10	48.00	94.00	79.00	4.50	1.27	12.19	3.04
10	19.30	28.10	22.20	60.00	92.50	83.50	0.50	1.62	8.11	2.48
11	20.80	28.90	23.60	60.00	95.00	80.50	3.00	1.20	19.11	2.73
12	19.60	28.80	23.70	59.50	95.00	82.00	1.50	1.41	19.42	3.78
13	20.80	29.10	23.80	61.00	93.00	81.50	0.00	1.17	19.34	3.87
14	20.60	29.20	24.10	55.50	94.50	80.00	0.00	1.25	20.71	3.83
15	20.30	29.80	24.70	63.00	94.50	83.50	3.50	0.88	13.83	4.10
16	22.10	30.90	25.40	62.50	94.50	83.50	0.00	1.28	17.41	2.98
17	21.90	29.60	24.70	62.50	95.50	84.00	0.00	1.03	15.63	3.75
18	18.10	29.00	23.10	56.00	92.50	77.50	0.00	1.54	19.91	3.32
19	18.30	29.00	23.30	56.00	94.00	76.00	5.00	1.32	20.50	4.05
20	17.30	28.40	22.90	57.50	94.50	79.50	0.00	1.16	22.20	4.04
21	18.50	29.60	23.10	55.00	92.50	79.50	0.00	1.35	21.90	4.12
22	18.90	29.50	23.90	53.50	90.50	78.50	0.00	1.33	20.07	4.31
23	18.70	29.70	23.70	50.00	91.50	76.00	0.00	1.31	23.07	4.12
24	16.70	29.20	22.40	43.50	93.00	70.00	0.00	1.28	22.67	4.54
25	17.50	28.70	22.70	46.00	89.50	69.50	0.00	1.47	21.47	4.44
26	18.40	28.70	23.00	56.00	92.50	78.50	0.00	1.31	21.98	4.38
27	18.30	29.50	23.00	54.50	95.00	79.00	0.00	1.30	22.73	4.25
28	17.20	30.50	23.50	55.50	91.00	74.50	0.00	1.37	22.21	4.40
29	18.50	30.80	23.90	51.00	92.50	76.00	0.50	1.22	23.18	4.44
30	16.10	29.60	22.70	46.50	92.50	72.00	0.00	1.25	23.00	4.61
31	16.10	29.60	22.70	46.50	92.50	72.00	0.00	1.25	23.00	4.49
Decade 1	18.00	28.78	22.65	51.00	90.90	76.10	5.00	1.36	17.04	3.63
Decade 2	19.98	29.27	23.93	59.35	94.30	80.80	13.00	1.22	18.81	3.64
Decade 3	17.72	29.58	23.15	50.73	92.09	75.05	0.50	1.31	22.30	4.37
MONTH	18.54	29.22	23.24	53.60	92.42	77.24	18.50	1.30	19.48	3.90

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2006

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	17.40	29.00	22.50	48.00	85.00	70.00	0.00	1.33	20.45	4.23
2	17.20	29.50	22.60	42.00	86.00	68.00	0.00	1.46	23.35	4.78
3	17.10	29.40	22.90	57.00	90.50	74.50	0.00	1.41	23.63	4.55
4	16.70	29.60	22.90	52.50	91.00	74.50	0.00	1.41	23.98	4.67
5	17.10	31.60	22.90	40.00	95.50	73.50	0.00	1.44	24.19	5.05
6	17.30	29.70	23.80	56.50	91.00	75.50	0.00	1.34	23.86	4.63
7	20.30	30.80	25.30	60.00	99.00	81.50	0.00	1.01	23.87	4.65
8	19.00	31.30	25.20	58.50	94.00	78.50	0.00	1.10	23.39	4.65
9	19.60	31.70	25.00	53.50	93.00	73.50	0.00	1.23	22.79	4.71
10	19.10	30.40	24.20	50.50	87.00	71.00	0.00	1.37	23.57	4.83
11	18.00	29.60	23.80	53.50	89.00	73.50	0.00	1.38	21.06	4.36
12	19.50	29.70	23.80	55.00	88.50	75.50	0.00	1.39	22.20	4.54
13	17.60	29.70	23.30	55.00	92.50	74.50	0.00	1.35	24.10	4.70
14	18.20	29.40	23.40	54.50	93.00	75.50	0.00	1.42	22.88	4.57
15	18.30	30.10	23.70	53.50	92.50	75.50	0.00	1.53	23.64	4.79
16	18.80	30.50	23.90	56.00	85.50	73.50	0.00	1.42	23.28	4.77
17	16.50	30.00	23.70	56.50	92.50	75.50	0.00	1.15	23.52	4.56
18	17.80	30.70	23.70	54.50	93.00	74.50	0.00	1.17	19.30	4.08
19	17.20	30.30	23.50	57.00	92.50	75.00	0.00	1.19	23.63	4.62
20	16.30	29.60	23.50	54.50	94.00	76.50	0.00	1.17	23.87	4.60
21	14.80	31.20	23.50	40.00	92.50	72.50	0.00	1.16	23.23	4.76
22	17.80	31.80	23.70	39.50	94.00	75.00	0.00	1.17	22.61	4.80
23	15.60	30.00	23.30	51.00	93.50	77.00	0.00	1.05	22.93	4.48
24	18.80	31.80	24.00	39.50	92.50	68.00	0.00	0.98	22.31	4.67
25	16.00	32.00	24.40	45.00	92.50	69.00	0.00	0.78	24.61	4.78
26	20.10	31.30	25.10	55.00	92.00	72.00	0.00	1.26	24.39	4.99
27	19.70	31.50	25.40	51.50	89.00	73.00	0.00	1.26	24.13	5.03
28	17.60	31.90	25.10	41.00	91.50	71.00	0.00	1.04	24.46	5.01
29	18.10	31.70	25.50	47.00	87.50	68.50	0.00	1.24	24.87	5.16
30	19.80	31.20	25.30	46.00	91.50	72.50	0.00	1.32	25.24	5.24
31										
Decade 1	18.08	30.30	23.73	51.85	91.20	74.05	0.00	1.31	23.31	4.67
Decade 2	17.82	29.96	23.63	55.00	91.30	74.95	0.00	1.32	22.75	4.56
Decade 3	17.83	31.44	24.53	45.55	91.65	71.85	0.00	1.13	23.88	4.89
MONTH	17.91	30.57	23.96	50.80	91.38	73.62	0.00	1.25	23.31	4.71

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	19.10	31.50	25.00	40.00	93.00	75.50	0.00	1.15	24.80	5.14
2	16.80	31.10	24.70	53.00	93.00	75.00	0.00	1.05	24.49	4.85
3	17.20	33.30	25.20	36.00	88.50	69.00	0.00	1.46	24.48	5.52
4	20.60	31.80	25.70	43.00	87.00	69.00	0.00	1.15	24.61	5.20
5	18.80	31.20	25.10	51.00	89.50	71.00	0.00	1.23	24.67	5.06
6	20.00	32.50	25.50	46.00	83.00	66.50	0.00	1.34	24.14	5.29
7	20.60	32.70	25.40	30.00	88.00	67.50	0.00	1.26	24.62	5.49
8	17.00	31.60	24.70	39.00	93.50	72.00	0.00	1.00	23.00	4.78
9	16.10	32.10	25.10	41.00	92.00	69.50	0.00	1.15	24.95	5.16
10	18.10	32.20	25.80	34.00	87.00	65.50	0.00	1.28	24.47	5.35
11	19.00	31.70	25.30	37.50	84.50	68.00	0.00	1.35	23.98	5.29
12	19.70	31.80	25.50	50.50	87.00	72.00	0.00	1.24	23.22	4.97
13	21.00	31.30	26.10	59.00	91.00	78.00	0.00	1.11	17.58	3.96
14	20.00	31.10	25.60	54.50	93.50	77.00	0.00	1.09	24.88	5.04
15	19.70	31.30	25.50	48.50	93.00	74.00	0.00	1.18	25.03	5.16
16	18.80	32.60	25.50	45.50	92.00	74.00	0.00	1.27	25.23	5.36
17	18.70	32.40	25.40	48.50	92.00	74.50	0.00	1.11	24.03	5.04
18	17.10	31.20	24.80	48.50	91.50	73.00	0.00	1.34	25.39	5.22
19	18.30	31.20	25.10	54.00	91.00	74.50	0.00	1.19	24.46	4.99
20	20.60	32.30	26.20	49.00	90.00	74.00	0.00	1.37	25.11	5.40
21	20.20	31.70	26.40	56.00	91.00	77.00	0.00	1.24	24.08	5.06
22	20.20	31.60	25.80	48.50	93.50	75.50	0.00	1.10	24.29	5.07
23	19.50	32.90	26.20	40.50	87.50	67.00	0.00	1.17	24.97	5.39
24	19.20	31.80	26.00	46.50	87.00	67.50	0.00	1.41	25.75	5.49
25	20.30	31.50	26.00	55.50	87.00	72.00	0.00	1.26	25.12	5.23
26	19.70	32.20	25.60	48.00	93.00	69.50	0.00	1.32	25.81	5.44
27	18.80	31.40	25.60	49.00	87.50	71.50	0.00	1.01	24.92	5.08
28	18.70	32.60	25.80	45.50	90.00	69.50	0.00	1.19	25.00	5.31
29	18.90	31.00	25.50	52.00	86.50	70.00	0.00	1.13	25.54	5.19
30	20.50	31.40	25.70	50.50	92.50	71.00	0.00	1.18	25.43	5.26
31	20.60	31.30	25.60	50.50	90.00	70.00	0.00	1.20	25.17	5.24
Decade 1	18.43	32.00	25.22	41.30	89.45	70.05	0.00	1.21	24.42	5.18
Decade 2	19.29	31.69	25.50	49.55	90.55	73.90	0.00	1.23	23.89	5.04
Decade 3	19.69	31.76	25.84	49.32	89.59	70.95	0.00	1.20	25.10	5.25
MONTH	19.15	31.82	25.53	46.81	89.85	71.61	0.00	1.21	24.49	5.16

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2006  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	19.80	31.70	26.50	56.50	92.00	74.50	0.00	1.15	24.62	5.10
2	20.00	32.60	26.40	48.50	94.50	75.50	0.00	0.88	25.11	5.17
3	20.60	32.40	26.10	51.50	93.50	75.00	0.00	0.88	24.24	5.01
4	21.30	32.70	27.10	48.00	90.00	71.50	0.00	1.05	23.22	5.05
5	22.00	32.10	27.00	55.50	90.00	74.00	0.00	1.05	24.64	5.19
6	21.30	32.40	26.70	57.50	91.00	77.00	0.00	0.98	23.86	5.01
7	21.00	33.40	27.30	49.50	90.50	75.00	0.00	0.96	24.17	5.18
8	21.80	33.40	27.50	51.00	93.00	74.00	0.00	0.93	24.73	5.26
9	20.70	32.80	27.10	52.50	93.50	76.00	0.00	0.83	24.92	5.16
10	21.90	34.60	27.30	38.00	92.50	68.50	0.00	0.97	24.89	5.47
11	20.80	33.90	27.40	39.50	92.50	69.00	0.00	0.93	24.21	5.25
12	19.50	34.70	27.50	41.50	93.00	74.50	0.00	0.96	23.53	5.19
13	22.60	33.70	28.20	57.00	94.00	75.00	0.00	0.97	24.22	5.22
14	22.80	33.50	28.20	44.50	90.00	72.50	0.00	1.09	24.74	5.46
15	22.00	33.40	27.80	56.00	92.50	77.00	0.00	0.84	24.51	5.18
16	22.60	35.00	28.00	36.00	92.50	68.50	0.00	0.84	23.69	5.26
17	21.00	33.70	27.70	54.50	87.00	70.00	0.00	0.98	23.82	5.15
18	22.40	33.70	28.30	54.50	88.50	74.00	0.00	1.27	23.44	5.27
19	23.80	33.50	28.30	51.50	91.00	71.50	0.00	1.22	23.50	5.30
20	23.60	34.10	28.30	52.50	87.50	72.00	0.00	1.27	22.66	5.24
21	23.10	33.70	28.00	50.50	85.00	68.50	0.00	1.37	24.38	5.55
22	22.40	33.70	27.80	45.50	88.50	71.00	0.00	1.26	24.18	5.47
23	20.90	34.70	27.90	35.00	89.50	69.50	0.00	1.20	24.67	5.65
24	21.10	33.60	27.50	51.00	86.00	68.00	0.00	1.00	24.19	5.23
25	20.70	33.50	27.60	46.50	95.00	70.00	11.50	0.97	24.84	1.56
26	19.30	34.50	27.40	36.00	87.00	66.50	0.00	1.08	26.17	2.05
27	20.90	34.10	28.00	41.50	83.50	65.00	0.00	1.05	25.71	1.89
28	22.10	34.20	28.30	41.00	84.50	66.00	0.00	1.06	25.87	1.89
29	24.80	34.70	28.80	47.50	80.00	65.50	0.00	1.15	26.11	1.90
30	23.10	35.50	28.30	33.50	81.00	61.00	0.00	1.17	26.10	2.33
31										
Decade 1	21.04	32.81	26.90	50.85	92.05	74.10	0.00	0.97	24.44	5.16
Decade 2	22.11	33.92	27.97	48.75	90.85	72.40	0.00	1.04	23.83	5.25
Decade 3	21.84	34.22	27.96	42.80	86.00	67.10	11.50	1.13	25.22	3.35
MONTH	21.66	33.65	27.61	47.47	89.63	71.20	11.50	1.05	24.50	4.59

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2006

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.20	33.30	28.10	50.50	88.50	72.50	0.00	1.13	25.31	5.50
2	22.30	34.80	28.80	47.50	90.50	72.00	0.00	0.96	25.62	5.60
3	24.40	34.30	29.10	59.50	87.50	73.50	0.00	1.17	23.93	5.39
4	23.80	34.10	28.60	58.50	85.50	72.50	0.00	1.08	22.36	5.06
5	23.30	34.60	28.60	53.00	89.00	73.00	0.00	1.10	23.98	5.39
6	24.10	34.80	29.50	48.00	85.50	70.00	0.00	1.15	24.37	5.59
7	26.10	34.90	30.00	50.50	85.50	72.00	0.00	1.24	23.65	5.59
8	24.90	35.40	28.80	49.50	86.50	71.00	0.00	1.34	20.88	5.20
9	25.30	35.60	29.30	50.50	87.00	70.50	0.00	1.17	25.34	5.84
10	25.40	35.00	28.60	53.00	88.50	73.00	0.00	1.41	23.25	5.54
11	24.60	34.50	27.90	48.50	90.50	75.50	1.50	1.15	19.23	4.70
12	23.60	34.90	27.70	53.50	91.50	77.00	0.00	1.37	17.96	4.55
13	24.70	34.90	29.10	52.50	86.00	73.50	0.00	1.06	23.64	5.41
14	25.20	34.90	29.50	46.00	88.50	71.00	0.00	1.22	24.99	5.79
15	25.30	34.90	29.60	50.50	87.00	71.50	0.00	1.19	22.88	5.40
16	25.50	35.50	29.80	48.00	88.50	70.50	1.50	1.25	25.57	5.95
17	25.80	35.00	29.60	55.00	91.50	74.50	0.00	1.00	25.41	5.69
18	25.10	34.70	29.70	55.00	83.50	71.00	0.00	1.25	24.35	5.63
19	24.60	34.10	27.60	59.00	93.00	81.50	11.50	0.80	12.20	3.14
20	23.70	34.40	28.50	50.00	93.50	75.50	0.00	1.15	26.56	5.83
21	24.80	34.10	28.80	59.50	90.50	75.50	0.00	1.30	25.57	5.68
22	24.00	34.40	29.00	55.00	88.50	72.00	0.00	1.34	25.72	5.79
23	25.10	36.10	29.20	39.00	89.00	68.50	0.00	1.44	24.68	6.07
24	23.90	33.80	28.50	48.50	87.00	71.00	0.00	1.53	25.68	5.90
25	24.10	34.60	28.00	48.00	90.00	77.50	1.50	1.40	22.68	5.42
26	23.70	34.30	27.60	57.00	92.50	80.50	2.50	1.02	18.63	4.37
27	24.30	34.80	27.50	54.50	93.50	81.50	7.00	1.32	21.44	5.06
28	24.10	32.10	26.40	62.50	96.50	87.50	31.00	0.84	11.53	2.89
29	23.70	32.20	26.20	62.50	97.50	90.00	16.00	0.83	15.12	3.48
30	23.40	32.70	26.10	65.00	96.50	88.50	28.00	1.01	18.01	4.01
31	23.60	32.70	26.60	64.50	96.00	85.50	1.00	1.26	17.00	3.96
Decade 1	24.18	34.68	28.94	52.05	87.40	72.00	0.00	1.17	23.87	5.47
Decade 2	24.81	34.78	28.90	51.80	89.35	74.15	14.50	1.14	22.28	5.21
Decade 3	24.06	33.80	27.63	56.00	92.50	79.82	87.00	1.21	20.55	4.79
MONTH	24.34	34.40	28.46	53.37	89.84	75.47	101.50	1.18	22.18	5.14

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: January 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	24.80	32.80	27.20	65.50	94.50	83.50	1.00	1.25	13.27	3.37
2	24.70	32.90	27.40	68.50	95.00	86.50	2.00	1.00	15.58	3.63
3	25.10	32.60	27.70	68.00	94.00	84.00	0.50	0.86	14.19	3.36
4	24.30	32.80	27.30	55.00	93.50	79.50	7.50	0.97	17.27	4.06
5	24.30	30.80	26.70	65.50	93.50	84.50	0.00	0.71	6.43	1.93
6	24.80	30.80	26.90	62.00	93.00	82.50	3.50	0.86	11.17	2.84
7	22.90	32.20	26.70	64.00	94.00	82.50	15.50	1.03	19.24	4.24
8	23.00	32.70	27.50	59.00	94.00	81.50	0.00	0.97	24.18	5.13
9	24.20	32.40	27.60	64.50	93.50	84.00	10.00	0.90	19.56	4.31
10	24.40	32.50	27.10	61.50	94.00	85.00	0.00	0.95	15.78	3.71
11	24.40	32.90	27.70	61.00	94.50	80.50	1.00	0.96	19.72	4.42
12	24.10	32.90	27.30	61.00	95.00	83.50	2.00	0.95	21.12	4.63
13	23.90	34.70	28.20	49.50	95.50	80.00	0.00	1.03	20.89	4.86
14	24.20	33.00	28.20	59.00	92.00	78.00	0.00	1.15	24.97	5.41
15	24.80	34.40	28.90	57.00	92.00	78.00	0.00	1.03	24.77	5.49
16	25.70	33.90	29.10	64.00	93.00	80.00	0.00	1.02	22.91	5.11
17	25.60	33.30	28.00	64.00	91.50	84.50	3.00	0.94	14.62	3.57
18	25.30	33.60	28.20	63.50	95.50	82.00	32.00	1.17	21.53	4.84
19	24.30	33.20	28.30	65.00	95.50	84.00	0.00	0.79	19.18	4.26
20	24.70	33.20	28.30	63.00	92.00	82.00	3.00	0.93	22.48	4.92
21	24.40	32.80	28.10	55.50	94.50	82.00	4.00	0.96	21.72	4.81
22	24.00	32.70	28.10	64.50	95.00	82.50	1.00	0.84	21.28	4.61
23	24.80	33.20	28.30	64.50	94.50	82.00	23.50	1.06	23.80	5.17
24	23.50	33.20	27.80	61.50	95.50	82.50	5.50	0.84	22.98	4.93
25	23.90	32.70	27.80	63.00	94.00	79.50	7.00	1.24	23.44	5.09
26	24.40	31.70	27.10	66.50	93.00	84.50	0.00	1.08	17.59	3.97
27	24.30	32.80	27.70	64.00	92.50	80.50	4.00	1.08	25.15	5.35
28	23.60	33.00	26.70	60.00	95.00	85.00	40.00	1.02	20.94	4.61
29	22.60	32.40	27.20	64.50	95.50	83.00	0.00	0.88	18.52	4.08
30	23.90	32.30	27.50	58.00	92.50	80.50	1.00	0.90	20.14	4.46
31	23.80	32.50	27.60	60.50	94.50	82.50	6.00	1.00	24.84	5.26
Decade 1	24.25	32.25	27.21	63.35	93.90	83.35	40.00	0.95	15.67	3.66
Decade 2	24.70	33.51	28.22	60.70	93.65	81.25	41.00	1.00	21.22	4.75
Decade 3	23.93	32.66	27.63	62.05	94.23	82.23	92.00	0.99	21.85	4.76
MONTH	24.28	32.80	27.68	62.03	93.94	82.27	173.00	0.98	19.65	4.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: February 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	22.80	32.20	26.80	61.50	94.50	81.50	16.00	1.24	25.77	5.39
2	23.40	32.70	27.20	61.00	92.50	80.00	2.00	1.06	25.68	5.40
3	22.90	33.20	27.10	57.00	94.50	80.00	0.00	0.94	25.23	5.32
4	23.10	32.70	27.10	61.00	92.50	80.50	2.00	1.05	22.83	4.92
5	23.10	33.70	27.70	60.00	91.50	79.50	2.50	0.89	21.33	4.70
6	23.60	35.90	29.10	41.00	90.50	67.00	0.00	1.37	24.09	5.83
7	24.10	34.30	28.60	46.00	90.00	73.50	0.00	1.48	24.62	5.78
8	24.50	33.70	28.10	56.50	93.50	79.00	4.50	0.96	25.56	5.51
9	23.70	32.40	27.50	62.50	94.50	81.50	10.00	1.06	24.76	5.23
10	23.80	32.30	27.60	64.50	94.50	81.00	0.00	1.08	25.83	5.40
11	23.40	32.40	27.50	60.50	92.50	77.00	0.00	1.03	26.41	5.51
12	23.50	32.70	27.80	59.50	92.00	78.50	0.00	0.91	25.77	5.41
13	23.50	33.20	28.20	58.50	92.00	78.00	0.00	0.95	26.55	5.60
14	24.50	32.80	28.40	62.50	92.00	79.00	1.00	0.19	25.48	5.19
15	24.10	33.50	28.30	54.50	93.00	78.50	0.50	0.00	26.26	5.19
16	24.20	32.70	27.70	60.50	91.00	77.50	0.00	0.72	22.77	4.84
17	23.60	33.30	27.80	62.50	88.50	77.00	0.00	1.20	24.56	5.33
18	23.70	33.10	27.90	59.00	90.00	77.00	0.00	1.33	24.77	5.43
19	23.50	33.00	27.30	60.50	91.00	77.50	3.00	1.40	24.35	5.33
20	23.50	33.00	27.80	61.50	94.00	78.00	19.50	1.34	25.24	5.44
21	23.20	33.00	27.40	59.00	94.50	81.00	8.50	1.10	25.53	5.41
22	23.80	32.60	27.00	63.00	95.50	83.00	30.50	1.13	23.86	5.08
23	23.40	31.80	25.60	65.00	96.50	88.50	4.00	1.08	17.07	3.82
24	23.10	31.80	25.50	68.50	94.00	86.50	4.00	1.04	15.55	3.53
25	22.60	32.30	25.40	59.00	95.50	87.50	10.00	0.96	16.92	3.84
26	23.20	32.50	25.50	62.50	95.50	88.50	19.00	0.86	11.89	2.95
27	23.70	33.20	27.30	62.00	93.50	82.00	0.00	0.64	16.36	3.69
28	24.50	32.40	27.70	66.50	92.50	83.00	0.00	0.93	14.64	3.46
29										
30										
31										
Decade 1	23.50	33.31	27.68	57.10	92.85	78.35	37.00	1.11	24.57	5.35
Decade 2	23.75	32.97	27.87	59.95	91.60	77.80	24.00	0.91	25.22	5.33
Decade 3	23.44	32.45	26.43	63.19	94.69	85.00	76.00	0.97	17.73	3.97
MONTH	23.57	32.94	27.39	59.86	92.93	80.05	137.00	1.00	22.85	4.95

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: March 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	25.00	33.80	28.60	62.00	91.50	79.50	0.00	0.98	22.61	5.00
2	24.40	33.90	28.70	61.50	92.00	80.50	0.00	0.86	20.02	4.50
3	25.40	34.60	28.10	64.00	92.50	82.00	0.00	0.73	11.80	3.01
4	25.10	34.50	29.20	51.50	89.00	69.50	0.00	1.49	19.38	4.90
5	24.20	33.90	27.80	58.50	95.00	78.50	3.00	0.93	21.69	4.79
6	23.90	33.00	27.50	64.50	95.00	83.00	0.00	0.98	17.05	3.90
7	24.80	31.90	27.30	65.50	89.50	81.50	0.00	0.90	9.87	2.66
8	24.30	34.00	28.50	49.50	87.00	73.50	0.00	1.00	22.53	5.08
9	24.50	33.90	28.50	54.00	89.50	76.00	0.00	0.75	23.38	5.05
10	24.90	32.90	28.00	65.00	92.50	80.00	7.00	1.03	20.61	4.56
11	23.90	32.00	27.60	64.50	93.50	82.50	3.00	0.78	14.02	3.28
12	23.70	30.10	25.90	69.50	95.00	86.50	0.00	0.91	13.32	3.04
13	22.30	33.30	27.30	47.00	92.00	74.00	0.00	1.05	24.71	5.31
14	23.50	33.00	27.00	59.50	92.00	79.50	0.00	1.04	20.97	4.61
15	23.80	32.10	26.30	65.50	91.00	83.50	0.50	1.16	17.79	4.01
16	22.60	32.30	26.70	65.50	91.00	82.00	0.00	1.22	22.65	4.80
17	23.70	31.90	26.40	68.50	93.00	85.50	0.00	0.82	14.04	3.22
18	23.30	32.50	26.20	62.50	96.50	83.50	27.00	1.19	20.45	4.45
19	22.40	32.50	26.30	58.50	96.00	83.50	7.50	0.86	22.75	4.72
20	22.90	31.90	26.70	60.50	95.50	83.00	1.00	1.02	24.23	4.99
21	23.60	33.20	26.60	53.50	93.50	81.50	0.00	0.60	15.79	3.57
22	23.70	32.20	27.10	58.00	91.00	81.00	0.00	0.00	20.90	4.08
23	23.00	32.20	26.20	64.50	96.00	86.50	29.00	0.61	19.31	4.03
24	22.70	32.80	27.10	62.50	95.50	82.00	0.00	0.97	23.96	4.97
25	23.70	32.30	26.20	66.00	95.00	87.00	3.00	0.88	16.31	3.63
26	23.20	32.50	25.80	67.00	96.50	87.00	29.00	1.25	13.33	3.24
27	22.90	32.70	27.20	58.00	96.00	82.00	1.00	0.73	23.18	4.78
28	23.20	32.60	27.20	62.00	95.50	82.50	0.00	0.90	22.16	4.65
29	23.40	32.40	26.60	64.00	93.50	82.00	8.00	1.24	22.43	4.76
30	22.20	32.60	27.30	55.00	92.00	79.00	0.00	0.57	24.22	4.85
31	23.10	31.20	26.20	71.50	95.00	87.00	33.00	0.72	11.95	2.74
Decade 1	24.65	33.64	28.22	59.60	91.35	78.40	10.00	0.97	18.89	4.35
Decade 2	23.21	32.16	26.64	62.15	93.55	82.35	39.00	1.00	19.49	4.24
Decade 3	23.15	32.43	26.68	62.00	94.50	83.41	103.00	0.77	19.41	4.12
MONTH	23.65	32.73	27.16	61.27	93.18	81.45	152.00	0.91	19.27	4.23

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	23.40	32.20	26.90	67.00	96.50	86.00	15.00	0.87	21.80	4.51
2	23.40	31.80	26.60	61.50	94.00	85.00	11.50	0.76	17.52	3.78
3	22.30	33.60	26.70	58.50	95.00	80.50	2.00	1.06	23.58	4.96
4	22.50	32.20	26.80	63.50	92.50	81.00	0.00	0.97	21.67	4.51
5	22.60	32.30	27.20	62.50	91.50	80.50	0.50	0.98	22.96	4.75
6	22.90	32.20	26.60	64.50	93.50	83.50	7.00	0.86	19.35	4.09
7	22.60	32.80	26.40	55.50	94.00	79.50	5.00	1.23	22.92	4.89
8	23.20	33.00	27.20	55.00	92.50	79.50	0.00	0.86	23.35	4.85
9	23.00	31.90	25.90	62.00	92.50	83.50	2.00	1.01	11.70	2.94
10	23.30	28.50	25.20	79.50	95.50	91.00	6.00	0.41	5.54	1.46
11	23.30	29.10	24.90	79.00	96.00	92.00	1.00	0.53	7.73	1.85
12	23.00	32.00	25.70	68.50	97.00	90.50	4.00	0.67	14.64	3.17
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
Decade 1	22.92	32.05	26.55	62.95	93.75	83.00	49.00	0.90	19.04	4.07
Decade 2	23.15	30.55	25.30	73.75	96.50	91.25	5.00	0.60	11.19	2.51
Decade 3	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
MONTH	22.96	31.80	26.34	64.75	94.21	84.38	54.00	0.85	17.73	3.81

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: August 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1										
2										
3										
4										
5										
6										
7										
8	21.10	26.70	23.30	67.00	92.50	84.00	0.00	0.79	8.07	1.98
9	20.50	29.70	23.90	50.00	92.50	81.00	0.00	1.05	13.67	3.16
10	19.90	29.30	23.70	48.00	92.50	78.00	0.00	1.19	18.09	3.80
11	18.70	30.50	23.80	53.00	92.00	79.00	0.00	1.24	18.93	3.93
12	20.40	30.90	24.60	53.50	94.50	82.00	0.00	1.12	21.56	4.29
13	18.50	29.60	23.90	61.00	93.50	79.50	0.00	1.04	21.52	4.05
14	18.60	29.70	24.00	62.50	93.00	81.00	0.00	0.94	21.13	3.97
15	18.90	30.40	24.10	56.50	93.00	78.50	0.00	0.95	19.08	3.80
16	21.20	30.20	24.80	62.00	93.00	82.50	1.00	0.73	12.86	2.83
17	21.80	25.60	22.70	81.00	97.50	91.00	131.50	1.05	2.71	1.07
18	21.30	26.70	23.00	73.00	97.50	90.00	4.00	1.35	9.09	2.17
19	21.30	26.50	22.90	78.00	95.50	91.00	0.50	1.02	5.45	1.53
20	19.90	29.30	23.50	64.00	94.00	84.00	0.50	1.18	14.07	3.08
21	18.60	28.80	23.60	63.50	100.50	83.50	1.00	1.18	18.94	3.67
22	21.30	30.00	24.40	59.50	96.00	84.00	0.00	0.91	14.98	3.22
23	21.00	30.60	24.40	40.00	92.00	77.00	0.00	1.03	17.89	3.94
24	19.10	28.60	23.80	49.00	87.50	76.50	0.00	1.08	20.83	4.11
25	18.20	30.00	23.20	35.00	92.50	67.50	0.00	1.19	23.26	4.66
26	18.00	29.40	23.10	39.00	87.00	66.50	0.00	1.54	22.89	4.78
27	19.50	28.90	24.00	62.00	91.50	79.00	0.00	1.26	21.98	4.24
28	19.10	29.10	23.80	61.00	93.00	81.00	0.00	1.05	21.54	4.12
29	19.50	29.60	23.70	64.50	93.50	82.50	0.00	0.91	16.86	3.42
30	18.90	29.80	23.60	60.00	92.00	78.00	0.00	1.22	22.35	4.34
31	18.50	29.50	23.60	61.00	91.50	78.50	0.00	1.25	22.00	4.27
Decade 1	20.50	28.57	23.63	55.00	92.50	81.00	0.00	1.01	13.28	2.98
Decade 2	20.06	28.94	23.73	64.45	94.35	83.85	137.50	1.06	14.64	3.07
Decade 3	19.25	29.48	23.75	54.05	92.45	77.64	1.00	1.15	20.32	4.07
MONTH	19.74	29.14	23.73	58.50	93.25	80.65	138.50	1.10	17.07	3.52

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: September 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	20.30	29.90	24.40	64.00	92.00	79.50	0.00	0.93	21.10	4.11
2	20.30	30.00	24.90	65.00	91.00	79.50	0.00	1.00	20.31	4.04
3	20.90	32.00	25.20	60.00	94.00	81.50	0.00	0.80	17.72	3.73
4	20.90	30.80	25.20	63.50	92.00	81.00	0.00	1.04	20.59	4.18
5	19.70	30.80	24.70	57.50	90.50	76.50	0.00	1.11	23.09	4.58
6	19.10	30.00	24.20	52.50	92.00	76.50	0.00	1.10	22.95	4.52
7	18.20	30.30	23.80	43.00	89.50	70.50	0.00	1.22	24.04	4.82
8	17.30	30.80	23.50	32.00	88.50	67.00	0.00	1.23	23.86	4.94
9	16.70	31.10	23.00	29.50	88.00	65.50	0.00	1.20	23.76	4.95
10	17.30	30.30	23.60	48.00	90.00	69.00	0.00	1.26	23.79	4.75
11	18.60	30.40	23.80	52.50	93.50	78.50	0.00	1.26	23.88	4.74
12	17.60	30.30	23.40	56.00	93.00	78.50	0.00	1.10	22.20	4.37
13	18.30	29.60	23.90	59.50	90.00	77.50	0.00	1.22	23.23	4.52
14	18.30	29.40	23.50	64.00	94.00	81.00	0.00	1.16	24.12	4.54
15	19.50	30.50	23.90	59.50	96.00	79.50	0.00	1.12	22.51	4.45
16	19.50	30.60	24.20	58.50	93.50	80.00	0.00	1.09	23.58	4.64
17	19.10	30.30	24.80	61.00	93.00	79.00	0.00	0.94	23.88	4.62
18	18.90	30.90	24.40	53.00	93.50	78.50	0.00	0.94	22.26	4.45
19	17.30	30.60	23.90	60.50	92.50	77.50	0.00	0.97	23.29	4.50
20	18.20	30.80	23.60	56.50	93.50	76.00	0.00	1.04	15.31	3.45
21	18.80	30.50	24.60	59.50	95.50	80.00	0.00	1.00	22.46	4.44
22	19.40	30.70	25.00	62.00	95.50	80.50	0.00	1.04	24.10	4.72
23	20.90	30.50	24.80	59.50	95.00	79.00	0.00	0.98	23.23	4.61
24	18.90	29.70	24.60	67.00	94.50	80.50	0.00	1.03	23.68	4.54
25	18.40	30.60	24.20	57.00	92.50	78.00	0.00	1.17	23.45	4.68
26	18.10	32.20	24.70	41.00	94.00	75.00	0.00	1.01	23.81	4.91
27	18.10	30.50	24.20	60.00	93.00	75.00	0.00	1.22	23.94	4.72
28	19.70	31.50	24.90	50.00	87.00	71.00	0.00	0.78	19.23	4.07
29	20.00	31.70	25.20	50.50	91.50	75.50	0.00	0.83	21.81	4.49
30	20.20	32.00	25.50	49.50	91.00	77.00	0.00	0.91	22.61	4.69
31										
Decade 1	19.07	30.60	24.25	51.50	90.75	74.65	0.00	1.09	22.12	4.46
Decade 2	18.53	30.34	23.94	58.10	93.25	78.60	0.00	1.08	22.43	4.43
Decade 3	19.25	30.99	24.77	55.60	92.95	77.15	0.00	1.00	22.83	4.59
MONTH	18.95	30.64	24.32	55.07	92.32	76.80	0.00	1.06	22.46	4.49

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: October 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	20.80	31.70	25.70	53.50	90.00	75.00	0.00	1.10	23.06	4.83
2	20.90	30.80	25.40	55.50	92.00	76.00	0.00	1.32	24.08	4.97
3	18.90	30.50	24.50	62.00	93.50	77.00	0.00	1.19	22.79	4.57
4	19.60	30.90	24.90	65.00	95.00	81.50	0.00	1.03	23.89	4.71
5	19.80	31.60	25.50	62.00	94.00	81.00	0.00	1.06	25.11	5.01
6	20.30	31.90	26.00	60.50	94.50	81.00	0.00	0.79	22.33	4.55
7	22.50	31.90	26.40	66.00	94.00	81.00	0.00	1.17	23.34	4.85
8	21.50	31.90	26.40	63.50	93.50	82.00	0.00	0.90	22.01	4.56
9	22.60	32.30	26.60	60.00	94.50	80.00	0.00	1.01	24.26	5.04
10	22.10	31.70	26.40	59.00	94.50	81.00	0.00	1.10	22.88	4.80
11	22.40	31.60	26.40	62.00	94.00	80.00	0.00	0.83	20.06	4.25
12	23.30	31.30	26.90	64.00	91.50	79.50	0.00	0.93	16.77	3.76
13	22.70	32.00	26.40	41.50	94.00	79.00	0.00	0.80	19.62	4.32
14	21.60	32.20	26.30	60.50	92.50	79.00	0.00	1.05	22.76	4.79
15	21.60	32.90	26.60	52.50	93.00	76.50	0.00	1.11	23.37	5.04
16	19.60	31.70	25.80	50.50	90.50	74.00	0.00	0.90	23.85	4.88
17	21.60	32.10	26.80	62.00	91.50	79.00	0.00	0.95	22.81	4.77
18	21.90	32.30	26.90	59.00	92.50	77.50	0.00	0.97	23.56	4.94
19	21.00	33.20	26.40	48.50	89.00	73.00	0.00	1.01	22.97	4.98
20	19.90	32.30	26.00	58.50	90.50	76.00	0.00	1.06	23.42	4.89
21	19.90	32.70	26.20	55.00	89.00	74.50	0.00	1.09	23.61	5.00
22	21.20	32.20	26.20	58.00	91.00	76.50	0.00	1.04	24.11	5.02
23	20.00	31.90	26.10	55.50	89.50	76.00	0.00	1.09	24.82	5.12
24	19.40	33.70	26.40	49.00	90.00	74.00	0.00	0.98	24.57	5.20
25	20.20	32.50	26.50	50.50	87.50	73.00	0.00	1.02	22.90	4.91
26	22.70	32.60	27.40	55.50	92.50	77.50	0.00	1.02	25.55	5.37
27	22.70	33.20	27.50	51.50	89.50	76.50	0.00	0.71	24.43	5.11
28	22.50	32.70	27.10	61.50	89.50	78.50	0.00	0.58	21.81	4.55
29	23.00	32.90	27.70	63.50	93.00	78.50	0.00	0.00	24.37	4.85
30	23.20	32.60	26.50	59.50	95.50	84.00	30.50	0.27	16.20	3.45
31	23.00	32.50	27.00	65.50	95.00	83.50	11.50	0.83	21.73	4.59
Decade 1	20.90	31.52	25.78	60.70	93.55	79.55	0.00	1.07	23.38	4.79
Decade 2	21.56	32.16	26.45	55.90	91.90	77.35	0.00	0.96	21.92	4.66
Decade 3	21.62	32.68	26.78	56.82	91.09	77.50	42.00	0.78	23.10	4.83
MONTH	21.37	32.14	26.35	57.77	92.15	78.11	42.00	0.93	22.81	4.76

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: November 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	22.20	33.10	27.20	54.00	93.00	79.00	0.00	0.83	25.41	5.29
2	22.90	32.70	27.30	60.00	93.50	80.00	0.00	0.89	24.54	5.14
3	23.20	32.60	27.10	59.00	92.50	79.50	0.00	1.11	20.13	4.51
4	22.40	32.60	27.40	59.00	92.50	79.00	0.00	1.00	26.09	5.42
5	23.00	32.50	27.70	56.00	92.00	76.50	0.00	0.93	25.58	5.36
6	23.40	33.50	27.60	48.00	91.50	73.50	0.00	1.24	25.26	5.59
7	22.40	32.80	27.30	53.50	89.50	73.00	0.00	1.24	25.39	5.47
8	21.60	32.70	27.10	58.00	90.00	75.50	0.00	1.28	25.51	5.42
9	22.50	32.90	27.50	57.00	88.50	76.00	0.00	1.02	25.01	5.31
10	22.40	33.90	28.00	52.50	90.00	76.00	0.00	0.98	25.12	5.42
11	23.10	33.80	28.10	57.00	90.50	75.50	0.00	1.03	23.92	5.23
12	23.40	33.10	28.20	59.00	92.00	77.50	0.00	0.67	20.52	4.46
13	24.60	36.50	28.50	54.50	91.00	78.00	2.50	0.90	21.43	4.99
14	23.50	34.10	28.20	58.00	92.50	77.50	0.00	0.96	20.77	4.69
15	23.10	33.60	28.10	58.00	90.50	76.50	0.00	1.11	20.46	4.67
16	24.00	34.00	28.40	52.00	92.50	77.00	0.00	1.00	21.73	4.93
17	22.80	33.40	28.30	56.50	91.00	76.00	0.00	1.16	22.76	5.07
18	24.30	33.50	28.80	53.00	86.50	75.00	0.00	1.12	23.84	5.35
19	25.10	33.40	28.90	63.50	89.00	76.00	5.00	1.17	22.18	5.00
20	24.20	33.30	28.10	57.50	94.50	79.00	0.00	1.01	24.25	5.25
21	23.90	33.80	28.50	55.50	90.50	75.50	0.00	1.17	25.50	5.60
22	24.50	31.60	26.80	68.50	95.50	86.00	15.00	0.91	8.53	2.33
23	24.30	30.20	26.60	71.50	96.00	87.50	4.00	0.78	15.52	3.40
24	23.40	32.50	27.80	61.50	95.50	81.50	0.00	0.96	23.84	5.06
25	23.30	33.10	28.10	59.50	89.50	78.00	0.00	1.08	23.95	5.20
26	23.40	33.50	27.90	59.50	94.50	78.50	0.00	1.10	24.66	5.32
27	23.10	33.50	27.70	53.00	92.50	74.50	0.00	1.17	25.75	5.58
28	23.20	32.70	27.70	56.00	94.00	75.50	0.00	1.10	23.38	5.08
29	23.40	34.00	28.40	53.00	89.50	74.50	0.00	1.19	24.58	5.48
30	24.60	34.00	28.60	57.50	88.50	76.00	0.00	1.02	24.01	5.32
31										
Decade 1	22.60	32.93	27.42	55.70	91.30	76.80	0.00	1.05	24.80	5.29
Decade 2	23.81	33.87	28.36	56.90	91.00	76.80	7.50	1.01	22.19	4.96
Decade 3	23.71	32.89	27.81	59.55	92.60	78.75	19.00	1.05	21.97	4.84
MONTH	23.37	33.23	27.86	57.38	91.63	77.45	26.50	1.04	22.99	5.03

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**





**MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION**

**MONTHLY METEOROLOGICAL BULLETIN: December 2007  
AUTOMATIC WEATHER STATION (Enerco 420): Betano**

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	24.30	34.30	27.60	62.50	96.00	82.00	16.50	1.04	21.89	4.86
2	22.60	33.30	28.40	59.00	95.00	78.50	0.00	1.02	25.57	5.43
3	24.00	33.50	28.70	55.00	88.00	74.50	0.00	1.24	25.56	5.64
4	23.80	34.00	28.40	58.50	92.00	76.00	0.00	0.93	22.95	5.05
5	24.20	33.90	28.80	58.50	92.00	76.50	0.00	1.00	24.34	5.33
6	24.80	34.00	28.20	60.50	91.00	78.50	0.00	1.01	18.23	4.29
7	24.80	33.60	28.70	61.50	94.50	77.00	1.00	0.95	23.32	5.11
8	24.00	33.70	28.10	56.50	96.00	78.00	0.00	1.10	22.17	4.96
9	24.10	34.00	28.40	59.00	88.00	75.50	0.00	1.30	20.47	4.82
10	24.10	34.40	28.40	58.50	87.50	76.50	0.50	1.18	22.88	5.20
11	24.50	34.10	28.90	57.00	92.00	75.00	0.00	1.16	24.46	5.45
12	23.50	34.40	28.00	47.50	86.00	73.50	0.00	1.42	23.26	5.52
13	23.80	33.80	28.10	58.50	87.50	76.50	0.50	1.39	21.11	4.95
14	24.50	34.30	28.40	58.50	87.00	77.00	0.00	1.17	18.49	4.47
15	24.60	34.20	29.10	49.00	83.50	70.50	0.00	1.20	24.65	5.64
16	23.80	34.10	26.80	58.00	96.50	83.00	55.50	1.12	16.43	3.99
17	23.40	32.80	27.20	60.00	92.50	80.50	0.00	1.17	17.69	4.15
18	24.00	33.40	27.20	54.00	90.00	79.00	0.00	1.46	22.17	5.16
19	23.90	33.40	27.70	57.50	87.50	77.00	0.00	1.23	19.29	4.56
20	23.60	33.00	26.70	62.50	95.50	83.50	16.00	1.23	18.29	4.21
21	22.80	33.40	27.90	56.00	95.00	78.00	1.00	0.93	23.95	5.14
22	24.20	32.80	27.90	59.50	97.00	83.00	34.00	0.95	21.01	4.62
23	23.30	32.20	27.20	59.50	97.00	84.00	0.00	0.82	19.20	4.20
24	24.50	32.40	26.80	61.00	96.50	84.50	4.00	1.03	14.94	3.58
25	23.60	32.50	26.60	59.00	94.50	84.00	2.00	1.11	20.70	4.58
26	23.30	33.00	26.50	64.00	95.00	85.50	8.00	1.03	16.96	3.89
27	23.80	31.80	27.10	70.50	96.00	86.00	2.00	1.13	15.49	3.55
28	24.80	33.40	28.40	60.00	95.00	82.00	0.00	0.95	17.98	4.17
29	25.40	30.00	26.80	75.00	94.00	87.00	1.00	0.80	5.80	1.73
30	23.90	30.90	26.30	71.50	94.00	86.00	0.00	0.75	5.82	1.77
31	23.90	33.10	27.10	59.50	96.00	82.50	1.50	1.09	18.35	4.23
Decade 1	24.07	33.87	28.37	58.95	92.00	77.30	18.00	1.08	22.74	5.07
Decade 2	23.96	33.75	27.81	56.25	89.80	77.55	72.00	1.25	20.58	4.81
Decade 3	23.95	32.32	27.15	63.23	95.45	83.86	53.50	0.96	16.38	3.77
MONTH	23.99	33.28	27.75	59.60	92.52	79.71	143.50	1.09	19.79	4.53

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2008

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	23.80	32.50	27.70	59.00	95.50	80.00	0.00	0.91	19.35	4.31
2	23.30	33.50	27.70	50.00	95.00	75.50	0.50	1.06	16.36	4.04
3	23.90	32.30	28.50	48.50	90.50	66.50	0.00	2.71	14.42	4.62
4	24.20	32.70	28.40	42.50	87.50	65.50	5.00	2.43	12.87	4.56
5	23.00	33.90	28.00	46.50	95.00	74.00	0.00	1.25	13.05	3.71
6	23.50	33.40	27.90	55.50	94.00	78.00	3.50	1.30	23.97	5.33
7	23.40	32.20	27.60	57.50	95.50	81.50	0.00	1.13	22.75	4.94
8	23.90	32.40	27.80	58.00	94.00	79.00	0.00	1.41	19.93	4.62
9	22.30	32.40	27.10	54.00	93.50	76.00	0.00	1.23	21.04	4.73
10	22.30	32.10	26.40	60.00	97.50	79.50	46.50	1.49	20.71	4.62
11	22.30	35.00	27.50	52.00	96.50	80.00	0.00	1.13	24.24	5.40
12	23.90	32.80	27.40	60.00	96.50	82.50	0.00	0.91	18.77	4.21
13	23.80	32.70	27.40	63.50	92.50	81.00	0.00	0.96	20.48	4.50
14	23.70	32.10	27.50	67.50	92.50	82.50	0.00	0.98	20.64	4.47
15	24.30	33.80	27.50	62.50	96.00	82.00	12.00	1.16	22.55	4.98
16	24.40	32.90	28.40	64.50	93.50	80.00	0.00	1.08	25.02	5.36
17	24.10	33.00	28.80	59.50	92.00	77.50	1.00	1.01	22.15	4.90
18	25.00	32.50	27.40	63.00	95.00	83.00	1.50	0.72	12.96	3.13
19	23.40	32.10	27.10	61.50	94.50	82.50	0.00	0.91	18.35	4.09
20	23.10	32.80	27.50	53.50	95.50	78.50	0.00	1.06	25.11	5.37
21	23.70	32.30	27.50	60.50	93.00	79.50	0.00	1.01	22.60	4.87
22	23.70	33.70	27.80	53.50	95.50	78.00	32.00	1.15	26.39	5.70
23	23.70	32.80	27.10	62.50	96.50	83.00	0.00	1.20	22.78	4.94
24	23.00	32.50	27.40	60.00	93.00	79.50	0.00	0.96	25.39	5.31
25	23.60	32.60	27.60	54.50	92.50	78.50	0.00	1.10	25.59	5.47
26	22.90	32.50	27.20	59.00	93.00	78.00	0.00	1.08	24.67	5.23
27	23.30	32.70	27.60	62.00	91.50	78.00	0.00	1.05	25.66	5.41
28	24.20	32.60	27.00	61.00	94.50	82.50	8.50	1.19	20.66	4.62
29	23.70	32.40	26.90	62.50	95.50	82.00	3.00	1.17	22.49	4.86
30	24.10	32.50	27.50	62.50	94.00	82.00	0.00	1.00	20.80	4.57
31	24.20	32.80	27.70	62.50	94.00	82.50	0.00	0.98	20.92	4.61
Decade 1	23.36	32.74	27.71	53.15	93.80	75.55	55.50	1.49	18.45	4.55
Decade 2	23.80	32.97	27.65	60.75	94.45	80.95	14.50	0.99	21.03	4.64
Decade 3	23.65	32.67	27.39	60.05	93.91	80.32	43.50	1.08	23.45	5.05
MONTH	23.60	32.79	27.58	58.05	94.05	78.98	113.50	1.19	21.05	4.76

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2008

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	23.80	33.10	27.80	60.00	94.00	81.00	0.00	1.15	23.84	5.19
2	23.90	33.40	28.10	62.00	93.00	79.00	0.00	1.35	25.89	5.61
3	23.90	32.90	27.20	61.00	94.00	80.50	1.50	1.40	19.40	4.51
4	23.70	33.20	27.00	61.50	96.00	83.00	10.50	0.93	18.59	4.18
5	23.30	32.80	26.60	61.50	97.50	85.50	3.00	1.13	20.30	4.49
6	23.70	33.20	26.70	63.50	97.00	86.50	7.00	0.88	18.01	4.03
7	23.50	31.90	26.80	56.50	95.00	83.50	4.00	0.84	15.78	3.67
8	24.40	32.90	27.60	61.00	95.00	80.50	0.00	0.84	14.95	3.56
9	24.30	34.10	27.30	58.50	94.50	83.50	1.00	0.81	12.00	3.11
10	23.90	32.60	27.60	53.00	96.00	75.50	1.00	1.69	13.22	3.76
11	23.70	34.70	27.90	50.50	92.50	78.00	0.00	1.03	17.86	4.36
12	24.00	35.10	28.70	50.50	94.00	76.50	0.00	1.04	21.15	4.95
13	25.60	34.10	28.90	53.00	92.50	78.00	0.00	0.86	18.80	4.41
14	25.60	35.20	28.30	54.50	92.00	79.50	0.00	1.02	16.20	4.10
15	24.40	34.10	28.30	54.50	92.00	76.50	0.00	1.00	19.07	4.48
16	24.50	31.90	27.10	61.50	94.00	82.00	2.50	0.82	11.02	2.83
17	24.10	32.60	27.00	61.50	92.50	83.50	1.00	1.01	19.72	4.40
18	23.40	33.20	26.40	59.50	97.50	84.50	13.50	1.03	16.33	3.84
19	23.40	31.10	26.20	65.50	96.00	86.00	0.00	0.63	8.83	2.28
20	23.80	31.60	26.90	62.00	97.00	85.00	2.00	1.23	16.85	3.90
21	23.40	31.50	25.80	59.00	95.50	86.50	0.00	0.88	10.73	2.79
22	23.80	30.50	26.60	66.50	94.00	84.50	0.00	0.68	12.37	2.90
23	23.70	32.00	27.20	64.50	96.00	83.00	0.00	0.87	20.65	4.42
24	23.40	31.80	26.20	67.00	95.50	86.50	8.50	0.84	12.33	2.96
25	23.40	32.30	26.90	62.00	95.50	84.00	0.00	0.86	16.95	3.82
26	23.10	32.60	26.40	64.50	95.00	85.00	0.50	0.96	13.22	3.21
27	23.30	32.00	27.00	59.50	90.50	79.00	0.00	1.01	19.62	4.35
28	23.30	33.90	27.70	53.50	92.50	79.50	0.00	0.95	22.05	4.89
29	23.50	32.80	27.10	63.50	92.50	81.50	0.00	1.16	21.30	4.67
30										
31										
Decade 1	23.84	33.01	27.27	59.85	95.20	81.85	28.00	1.10	18.20	4.21
Decade 2	24.25	33.36	27.57	57.30	94.00	80.95	19.00	0.97	16.58	3.95
Decade 3	23.43	32.16	26.77	62.22	94.11	83.28	9.00	0.91	16.58	3.78
MONTH	23.86	32.87	27.22	59.71	94.45	81.98	56.00	1.00	17.14	3.99

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude: 30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	23.00	33.00	26.60	60.00	91.50	82.50	0.00	1.38	17.68	4.22
2	23.00	32.70	26.40	59.50	94.00	83.50	1.00	1.10	17.19	3.99
3	22.60	31.70	26.30	63.50	94.00	82.50	0.00	1.02	18.61	4.07
4	22.90	32.80	27.00	60.00	92.50	79.50	0.00	1.11	20.55	4.55
5	22.90	33.10	27.10	60.50	93.00	78.00	0.00	1.32	21.95	4.87
6	23.10	32.60	26.70	62.50	94.50	79.50	6.00	1.30	22.26	4.83
7	23.50	32.30	27.00	62.00	97.50	82.50	23.00	1.19	21.32	4.63
8	22.60	32.10	26.70	61.00	98.00	83.50	0.00	0.83	20.13	4.29
9	23.10	32.10	25.90	63.00	93.00	82.50	1.50	1.49	18.51	4.25
10	23.00	33.20	27.60	52.50	89.50	75.50	0.00	1.11	24.96	5.38
11	23.70	32.30	26.90	63.00	93.00	83.50	0.00	1.26	19.28	4.33
12	23.40	32.50	26.30	60.00	92.50	84.50	0.50	1.23	19.99	4.47
13	22.80	32.40	26.60	57.50	93.00	80.50	0.00	1.11	19.46	4.35
14	22.70	32.40	26.90	57.50	88.00	78.00	0.00	1.32	22.38	4.93
15	23.30	31.80	26.60	64.00	95.00	83.50	1.00	0.78	12.84	3.04
16	23.10	31.70	26.40	67.00	96.50	84.50	0.00	1.12	18.96	4.09
17	22.90	32.50	25.90	60.50	95.00	83.50	6.00	1.18	18.87	4.22
18	22.00	31.50	26.00	61.50	96.00	82.50	0.00	1.15	19.40	4.40
19	21.50	31.50	26.00	57.00	95.00	83.00	6.50	0.85	22.50	4.50
20	21.55	30.50	26.00	60.00	94.00	82.00	1.00	1.03	20.55	4.35
21	22.00	33.10	25.50	52.00	92.50	80.50	0.00	0.50	15.60	4.55
22	22.60	31.20	25.10	60.50	90.00	82.00	0.00	0.00	20.60	4.05
23	23.00	32.00	26.20	64.00	95.00	85.00	20.00	0.65	19.21	4.02
24	22.60	32.00	25.10	62.00	94.00	82.00	0.00	0.85	22.50	4.95
25	23.50	31.50	25.50	66.00	95.00	80.00	2.00	0.55	16.30	3.20
26	23.10	32.10	25.30	65.00	95.00	86.50	23.00	1.26	13.44	3.20
27	22.60	32.60	25.20	58.00	95.00	85.00	0.50	0.72	23.00	4.55
28	23.70	32.00	26.50	60.00	91.00	79.50	0.00	0.85	22.16	4.07
29	23.00	32.50	26.40	59.00	93.00	80.00	6.00	1.25	22.40	4.50
30	22.20	32.50	26.20	50.00	91.00	78.00	0.00	0.56	23.22	4.60
31	23.00	31.00	25.00	71.00	94.00	85.00	25.00	0.75	11.50	2.80
Decade 1	22.97	32.56	26.73	60.45	93.75	80.95	31.50	1.19	20.32	4.51
Decade 2	22.70	31.91	26.36	60.80	93.80	82.55	15.00	1.10	19.42	4.27
Decade 3	22.85	32.05	25.64	60.68	93.23	82.14	76.50	0.72	19.08	4.04
MONTH	22.84	32.17	26.22	60.65	93.58	81.89	123.00	0.99	19.59	4.27

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.90	32.60	26.50	60.00	97.00	83.50	6.50	1.19	21.51	4.60
2	22.70	31.90	26.00	68.50	96.50	87.00	0.00	1.02	15.44	3.43
3	23.10	32.10	26.20	60.50	91.00	81.00	0.00	1.30	15.97	3.79
4	23.40	31.50	26.10	65.50	94.50	83.00	0.50	0.97	11.51	2.83
5	22.90	32.40	25.30	67.00	98.50	89.00	60.00	0.93	15.70	3.45
6	22.30	32.20	26.00	56.00	98.50	81.50	1.50	1.10	17.30	3.89
7	22.80	32.40	26.50	57.50	97.50	82.50	3.50	1.01	18.04	3.98
8	23.60	31.80	26.10	66.00	97.00	86.00	10.50	1.06	15.39	3.46
9	22.10	32.60	26.60	46.00	92.50	78.00	0.00	1.22	22.53	4.89
10	21.50	31.90	26.20	61.00	95.00	79.00	3.50	1.11	22.42	4.59
11	22.60	31.90	26.70	61.00	93.50	80.50	0.00	1.13	22.94	4.73
12	22.00	32.30	26.50	50.00	90.00	76.00	0.00	1.30	23.73	5.04
13	22.30	31.70	26.30	55.00	94.00	77.50	0.50	1.08	23.29	4.76
14	21.80	32.20	26.50	55.50	93.00	76.50	0.00	1.23	22.18	4.68
15	22.60	32.20	26.60	59.00	91.00	78.00	0.00	0.98	16.40	3.70
16	22.30	33.10	26.60	47.00	94.00	74.50	0.00	1.03	21.29	4.59
17	22.10	32.50	26.60	53.00	90.50	76.00	0.00	1.12	22.26	4.70
18	23.00	32.50	25.90	57.50	91.50	80.00	0.00	1.46	13.03	3.46
19	23.30	31.90	26.30	46.50	88.00	73.50	0.00	1.23	17.77	4.18
20	21.30	31.80	25.80	56.50	91.00	74.50	0.00	1.34	21.58	4.55
21	21.40	31.60	26.10	51.50	91.00	75.00	0.00	1.31	20.47	4.43
22	21.20	32.50	26.30	58.00	93.00	77.50	0.00	1.12	21.62	4.49
23	22.60	32.90	26.70	50.50	93.00	76.50	0.50	1.18	21.46	4.63
24	22.90	32.60	26.70	57.00	92.00	78.50	0.00	1.28	19.14	4.26
25	21.60	32.50	26.40	52.50	90.50	75.00	0.00	1.10	22.26	4.63
26	20.00	32.30	25.30	46.50	94.00	73.50	0.00	1.15	21.70	4.53
27	19.90	31.20	25.10	53.50	90.50	75.00	0.00	1.24	20.02	4.20
28	21.30	31.60	25.80	56.00	88.00	73.50	0.00	1.45	20.29	4.39
29	21.70	31.30	26.00	54.00	90.00	76.00	0.00	1.12	20.44	4.26
30	20.80	32.50	26.00	55.00	91.00	75.50	0.00	1.16	20.97	4.39
31										
Decade 1	22.73	32.14	26.15	60.80	95.80	83.05	86.00	1.09	17.58	3.89
Decade 2	22.33	32.21	26.38	54.10	91.65	76.70	0.50	1.19	20.45	4.44
Decade 3	21.34	32.10	26.04	53.45	91.30	75.60	0.50	1.21	20.84	4.42
MONTH	22.13	32.15	26.19	56.12	92.92	78.45	87.00	1.16	19.62	4.25

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.20	32.30	26.30	56.50	91.00	77.00	0.00	1.17	19.90	4.25
2	21.90	32.40	26.30	57.50	98.00	78.50	33.50	0.96	20.10	4.14
3	23.00	31.70	26.50	65.00	98.00	84.00	0.00	0.76	18.07	3.70
4	22.20	32.10	26.10	52.50	93.50	77.00	3.00	1.26	21.28	4.49
5	22.30	31.70	26.20	53.00	92.50	75.50	0.00	1.35	21.42	4.52
6	22.30	31.80	25.50	54.00	90.00	77.00	0.00	1.08	14.52	3.41
7	21.10	31.20	25.30	49.50	87.00	72.00	0.00	1.34	19.32	4.22
8	20.10	31.10	24.90	49.50	89.00	74.00	0.00	1.18	18.20	3.93
9	20.70	31.10	25.10	55.00	87.00	74.00	0.00	1.41	18.16	4.00
10	22.10	30.80	25.60	54.00	85.50	74.50	0.00	1.30	17.48	3.89
11	20.90	31.00	25.20	57.00	88.50	75.00	0.00	1.47	15.90	3.68
12	20.90	31.40	25.00	56.50	84.00	75.50	0.00	1.25	15.02	3.52
13	22.20	31.60	26.10	57.00	85.50	74.50	0.00	1.25	15.67	3.63
14	23.40	31.80	26.00	55.00	92.50	79.50	3.50	1.16	11.64	3.02
15	22.70	32.90	25.90	47.50	95.50	79.50	0.50	1.19	13.92	3.50
16	22.90	32.20	26.30	46.00	93.00	75.50	0.00	1.15	17.38	3.93
17	21.50	32.60	26.00	47.50	91.00	76.00	0.00	1.16	20.38	4.32
18	21.50	31.50	26.00	59.00	89.50	77.00	0.00	1.22	18.05	3.84
19	21.80	31.40	25.60	59.00	93.00	80.50	3.00	1.06	11.38	2.81
20	22.70	29.90	25.20	61.00	96.50	83.00	0.50	0.94	9.21	2.33
21	21.80	30.60	25.50	58.00	95.50	77.50	0.00	1.09	16.80	3.52
22	21.80	31.30	25.20	54.50	90.00	76.50	0.00	1.18	15.00	3.43
23	21.70	28.30	24.80	70.00	87.00	79.50	0.00	1.24	6.63	1.99
24	22.40	30.80	25.30	64.00	92.00	81.00	0.00	1.05	9.39	2.43
25	22.70	30.60	25.80	64.00	91.50	79.00	18.00	1.16	11.63	2.79
26	22.10	28.90	24.50	67.50	97.00	86.00	9.00	1.15	9.46	2.30
27	21.50	29.00	23.40	69.00	96.50	88.00	17.00	1.44	7.33	2.07
28	21.50	30.00	24.70	59.50	91.00	79.00	0.00	1.22	9.28	2.52
29	21.60	30.60	24.60	56.50	92.00	78.00	0.00	1.27	12.73	3.07
30	21.90	27.90	24.40	64.50	92.00	80.50	0.00	0.96	5.75	1.78
31	20.90	27.30	23.50	70.50	99.00	85.00	7.50	1.18	6.40	1.76
Decade 1	21.79	31.62	25.78	54.65	91.15	76.35	36.50	1.18	18.85	4.05
Decade 2	22.05	31.63	25.73	54.55	90.90	77.60	7.50	1.18	14.86	3.46
Decade 3	21.81	29.57	24.70	63.45	93.05	80.91	51.50	1.18	10.04	2.52
MONTH	21.88	30.90	25.38	57.74	91.74	78.37	95.50	1.18	14.43	3.32

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.50	29.40	24.00	48.50	93.00	77.50	0.00	1.32	17.63	3.70
2	19.30	29.10	23.00	51.50	89.00	76.00	0.00	1.28	16.90	3.53
3	19.00	29.30	23.00	48.50	91.50	74.00	0.00	1.63	19.85	4.08
4	18.40	29.70	23.90	58.50	91.50	76.50	0.00	1.24	17.54	3.51
5	22.30	30.30	24.90	67.50	97.00	84.00	7.50	0.88	9.36	2.23
6	22.40	31.10	25.10	64.50	97.00	87.00	1.50	0.96	12.81	2.82
7	22.20	31.10	25.40	66.50	97.50	87.00	71.00	0.78	12.68	2.71
8	22.60	29.90	24.40	64.50	98.50	91.00	1.00	1.03	9.02	2.25
9	22.40	28.80	24.20	77.00	97.50	93.50	9.50	0.82	7.50	1.78
10	23.20	28.40	25.00	78.00	95.50	90.50	2.00	1.01	7.54	1.84
11	20.80	30.80	24.90	60.50	95.50	83.00	0.50	1.08	15.95	3.30
12	20.80	31.10	24.90	54.50	95.50	81.00	2.00	1.32	16.14	3.53
13	20.80	26.60	22.70	78.00	97.50	89.00	6.00	1.48	5.32	1.54
14	19.70	30.20	24.10	53.50	93.00	78.00	0.00	1.41	17.52	3.68
15	21.90	29.80	24.60	64.50	97.00	83.50	0.00	0.97	18.06	3.47
16	20.50	30.00	24.30	60.00	96.50	81.00	0.00	1.17	19.19	3.69
17	20.20	30.50	24.30	54.50	92.00	81.50	0.00	1.09	14.22	3.13
18	20.90	29.40	24.50	57.50	92.00	79.50	0.00	1.20	18.38	3.63
19	20.00	29.70	24.20	61.50	92.00	78.50	0.00	1.41	19.44	3.78
20	19.50	31.20	24.50	45.00	96.50	76.00	8.50	1.06	18.87	3.80
21	20.80	24.30	22.10	84.00	97.50	92.00	14.50	1.15	2.77	1.01
22	20.60	28.80	23.50	59.50	92.00	80.50	0.50	1.22	12.93	2.88
23	21.10	26.10	22.90	73.00	97.50	89.00	2.00	0.84	4.82	1.40
24	21.50	28.20	23.60	59.50	97.50	85.00	0.00	1.06	8.42	2.18
25	19.90	29.00	23.70	59.00	93.50	81.00	0.00	1.23	17.81	3.48
26	19.90	28.80	23.50	59.00	92.00	78.50	0.00	1.48	18.42	3.64
27	19.10	29.10	23.40	59.00	93.50	81.00	0.00	1.17	13.63	2.93
28	20.30	29.90	24.20	54.50	95.50	83.00	1.50	1.09	13.44	2.98
29	22.00	30.20	25.00	65.00	95.00	85.00	5.50	1.11	16.85	3.38
30	21.40	30.30	24.70	64.50	97.50	87.00	14.50	0.91	15.10	3.06
31										
Decade 1	21.23	29.71	24.29	62.50	94.80	83.70	92.50	1.09	13.08	2.85
Decade 2	20.51	29.93	24.30	58.95	94.75	81.10	17.00	1.22	16.31	3.36
Decade 3	20.66	28.47	23.66	63.70	95.15	84.20	38.50	1.13	12.42	2.69
MONTH	20.80	29.37	24.08	61.72	94.90	83.00	148.00	1.15	13.94	2.97

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.00	31.10	24.90	43.00	93.50	80.00	0.00	1.30	19.12	4.05
2	20.30	29.60	24.40	64.50	94.50	83.50	0.50	1.19	16.06	3.24
3	20.20	29.30	24.30	62.50	94.50	82.50	0.00	1.19	18.59	3.57
4	20.60	28.80	23.50	63.00	93.50	82.00	0.00	1.18	12.06	2.70
5	18.50	28.90	23.00	57.50	92.00	78.50	0.00	1.31	17.49	3.47
6	20.10	29.60	23.60	52.00	92.50	80.50	0.00	1.06	16.10	3.33
7	20.10	29.20	23.90	57.00	91.00	78.50	0.00	1.17	15.35	3.23
8	19.00	29.90	23.50	51.50	87.00	74.00	0.00	1.54	17.77	3.83
9	18.70	28.90	22.30	59.00	89.50	78.50	0.00	1.28	7.60	2.30
10	19.30	26.00	21.80	72.50	97.00	88.00	3.50	1.17	6.12	1.66
11	19.80	26.90	22.80	68.50	96.50	85.50	0.00	1.05	6.59	1.78
12	19.70	28.60	23.60	66.00	94.00	83.00	0.00	1.00	10.45	2.37
13	20.90	29.90	24.40	59.00	95.00	82.50	0.00	1.11	18.50	3.64
14	18.80	30.90	23.60	31.00	93.00	75.00	0.00	1.32	19.88	4.27
15	17.40	29.40	23.30	61.00	92.50	76.50	0.00	1.23	17.92	3.48
16	19.30	30.50	23.80	60.00	94.50	80.50	0.00	1.22	17.94	3.60
17										
18										
19										
20										
21										
22										
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24										
25										
26										
27										
28										
29										
30										
31										
Decade 1	19.78	29.13	23.52	58.25	92.50	80.60	4.00	1.24	14.63	3.14
Decade 2	19.32	29.37	23.58	57.58	94.25	80.50	0.00	1.15	15.21	3.19
Decade 3	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
MONTH	19.61	29.22	23.54	58.00	93.16	80.56	4.00	1.21	14.85	3.16

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	18.30	29.00	22.80	52.00	88.00	72.00	0.00	1.53	19.10	3.96
2	18.90	29.90	23.50	53.50	91.50	76.00	0.00	1.30	18.70	3.85
3	18.00	29.40	23.20	54.50	88.50	74.00	0.00	1.46	19.30	3.95
4	19.60	29.40	23.60	59.00	92.50	78.00	0.00	1.22	19.94	3.89
5	16.40	30.90	22.90	48.50	94.50	75.50	0.00	1.50	21.30	4.36
6	18.30	29.90	23.50	54.00	89.00	75.50	0.00	1.53	19.15	4.03
7	19.60	29.30	23.40	57.50	92.50	78.50	0.00	1.45	14.63	3.33
8	19.50	29.10	23.30	59.00	89.50	77.00	0.00	1.54	15.55	3.47
9	17.80	29.00	23.00	53.50	88.50	77.50	0.00	1.23	14.29	3.24
10	21.50	29.50	24.20	60.00	92.50	79.50	0.00	1.06	16.57	3.46
11	18.80	29.60	24.10	58.50	93.50	77.50	0.00	1.31	18.87	3.83
12	21.10	29.30	24.10	57.50	92.00	78.50	0.00	0.89	11.92	2.76
13	18.40	29.90	23.50	53.50	89.50	74.50	0.00	1.11	18.70	3.81
14	19.30	30.50	23.80	57.50	87.00	76.00	0.00	0.93	11.22	2.75
15	18.70	30.00	24.00	47.50	88.50	74.00	0.00	1.04	16.59	3.60
16	19.90	29.80	24.40	51.50	86.50	72.50	0.00	1.02	17.49	3.69
17	20.90	29.10	23.90	55.50	87.00	76.00	0.00	1.06	15.95	3.45
18	19.90	28.90	23.10	49.50	88.00	73.50	0.00	1.25	16.65	3.67
19	18.50	29.20	23.20	55.50	86.00	73.50	0.00	1.25	19.80	4.00
20	20.60	29.10	24.30	59.50	91.00	79.50	0.00	1.10	12.82	2.98
21	20.80	30.00	24.10	66.50	95.50	84.50	1.00	0.96	13.27	2.91
22	19.80	31.00	24.40	56.00	91.50	77.50	0.50	1.19	17.58	3.81
23	21.90	29.80	25.10	53.50	92.00	78.00	0.00	0.96	14.90	3.34
24	22.60	28.40	24.30	62.00	91.00	79.00	0.00	0.93	9.82	2.46
25	20.60	30.80	24.80	60.00	95.00	80.00	1.00	1.01	15.39	3.37
26	21.60	31.40	25.50	57.50	95.50	83.00	0.50	1.01	16.77	3.66
27	22.20	31.00	25.80	58.50	94.50	81.50	0.00	1.23	21.37	4.42
28	22.00	31.20	25.80	57.50	96.00	80.00	3.00	1.31	19.90	4.25
29	22.50	31.00	25.70	62.00	97.50	83.00	0.00	1.09	21.86	4.41
30	22.20	31.20	25.80	62.00	94.00	81.50	0.00	0.91	20.67	4.20
31	20.20	30.90	25.10	62.50	94.00	82.00	0.00	1.04	20.26	4.10
Decade 1	18.79	29.54	23.34	55.15	90.70	76.35	0.00	1.38	17.85	3.75
Decade 2	19.61	29.54	23.84	54.60	88.90	75.55	0.00	1.10	16.00	3.45
Decade 3	21.49	30.61	25.13	59.82	94.23	80.91	6.00	1.06	17.44	3.72
MONTH	20.01	29.92	24.14	56.63	91.37	77.71	6.00	1.17	17.11	3.65

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2008

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	19.80	30.50	25.00	63.50	96.00	84.00	0.00	0.84	16.36	3.42
2	21.10	31.40	24.90	66.00	96.50	86.00	7.50	0.94	16.20	3.45
3	21.90	31.00	25.50	59.00	93.50	81.00	0.00	1.12	21.58	4.43
4	19.70	31.30	25.20	53.00	93.50	78.00	0.00	1.09	22.92	4.63
5	20.30	30.90	25.10	56.00	94.50	77.50	0.00	1.20	22.67	4.59
6	20.70	31.00	25.10	56.50	94.50	77.00	0.00	1.10	20.98	4.32
7	19.60	30.70	24.80	59.00	95.00	80.00	0.00	0.89	23.44	4.54
8	20.70	31.60	25.40	60.00	93.50	79.00	0.00	1.10	20.88	4.33
9	20.00	30.90	25.30	58.00	94.50	79.50	0.00	1.05	19.81	4.12
10	19.90	31.60	25.20	41.50	95.00	73.50	0.00	0.91	19.89	4.24
11	19.00	30.30	24.30	65.00	96.50	81.00	0.00	1.05	23.07	4.44
12	17.30	30.50	23.80	64.00	94.50	78.50	0.00	1.09	22.80	4.39
13	18.40	31.50	24.90	45.50	90.50	72.50	0.00	1.17	24.30	4.96
14	17.50	31.20	24.60	47.00	95.50	72.00	0.00	0.98	23.93	4.73
15	21.20	33.00	25.50	48.50	95.00	79.00	0.00	0.91	18.62	4.13
16	20.10	32.20	25.50	52.00	96.00	78.50	0.00	0.91	24.27	4.87
17	16.80	30.90	24.40	50.50	92.00	74.50	0.00	1.06	24.11	4.75
18	20.90	34.00	26.20	43.00	95.00	76.50	0.00	1.01	21.38	4.74
19	20.40	32.40	26.00	53.00	93.50	78.50	0.00	0.94	23.79	4.86
20	19.00	31.80	25.30	46.50	94.00	74.00	0.00	1.10	24.04	4.94
21	17.80	33.10	25.30	50.00	95.00	75.50	0.00	0.96	24.04	4.90
22	19.60	31.50	25.20	55.00	91.50	75.00	0.00	1.13	24.55	4.96
23	19.40	32.10	25.30	51.00	95.00	74.50	0.00	1.03	24.04	4.90
24	19.50	32.50	26.00	47.50	92.50	74.00	0.00	1.28	23.96	5.12
25	21.40	32.00	26.50	53.50	86.00	73.50	0.00	1.18	22.30	4.82
26	23.10	31.90	26.20	48.00	89.50	69.50	0.00	1.06	18.63	4.28
27	20.60	32.20	25.60	48.00	94.50	75.50	7.50	1.22	23.76	5.04
28	20.30	31.40	25.40	53.00	95.00	78.50	0.00	1.06	24.55	4.97
29	19.10	30.90	25.40	50.00	88.50	74.50	0.00	1.34	23.01	4.88
30	20.80	31.50	25.80	57.50	94.00	76.00	0.00	1.18	21.82	4.61
31										
Decade 1	20.37	31.09	25.15	57.25	94.65	79.55	7.50	1.03	20.47	4.21
Decade 2	19.06	31.78	25.05	51.50	94.25	76.50	0.00	1.02	23.03	4.68
Decade 3	20.16	31.91	25.67	51.35	92.15	74.65	7.50	1.15	23.07	4.85
MONTH	19.86	31.59	25.29	53.37	93.68	76.90	15.00	1.06	22.19	4.58

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.80	31.70	25.70	53.50	90.00	75.00	0.00	1.10	23.06	4.83
2	20.90	30.80	25.40	55.50	92.00	76.00	0.00	1.32	24.08	4.98
3	18.90	30.50	24.50	62.00	93.50	77.00	0.00	1.19	22.79	4.57
4	19.60	30.90	24.90	65.00	95.00	81.50	0.00	1.03	23.89	4.71
5	19.80	31.60	25.50	62.00	94.00	81.00	0.00	1.06	25.11	5.01
6	20.30	31.90	26.00	60.50	94.50	81.00	0.00	0.79	22.33	4.55
7	22.50	31.90	26.40	66.00	94.00	81.00	0.00	1.17	23.34	4.85
8	21.50	31.90	26.40	63.50	93.50	82.00	0.00	0.90	22.01	4.57
9	22.60	32.30	26.60	60.00	94.50	80.00	0.00	1.01	24.26	5.04
10	22.10	31.70	26.40	59.00	94.50	81.00	0.00	1.10	22.88	4.81
11	22.40	31.60	26.40	62.00	94.00	80.00	0.00	0.83	20.06	4.25
12	23.30	31.30	26.90	64.00	91.50	79.50	0.00	0.93	16.77	3.76
13	22.70	32.00	26.40	41.50	94.00	79.00	0.00	0.80	19.62	4.32
14	21.60	32.30	27.00	59.00	95.00	77.50	0.00	1.02	24.36	5.06
15	21.60	33.00	27.30	61.50	95.00	79.50	0.00	0.93	23.11	4.87
16	22.80	33.50	27.60	59.00	94.50	79.50	0.00	0.94	25.18	5.31
17	22.00	33.20	27.40	58.00	94.00	77.00	0.00	0.89	25.35	5.28
18	22.30	33.50	27.60	50.00	92.50	74.00	0.00	1.22	25.52	5.54
19	22.50	33.10	27.50	53.00	93.00	76.50	0.00	1.23	24.38	5.31
20	22.30	33.00	27.50	58.00	90.50	73.00	0.00	1.12	23.79	5.13
21	21.80	33.90	27.80	59.00	90.00	75.00	0.00	1.04	20.86	4.67
22	22.70	33.70	28.10	59.00	93.50	76.50	0.00	1.10	23.51	5.13
23	22.10	33.60	27.60	49.50	92.50	69.50	1.50	1.19	23.13	5.17
24	21.60	32.90	27.30	60.00	94.50	78.00	0.00	0.98	24.55	5.14
25	21.60	32.60	27.10	53.50	93.00	75.00	0.00	1.00	25.13	5.26
26	21.60	33.40	27.00	51.00	89.50	72.50	0.00	1.10	25.30	5.42
27	21.80	33.10	27.00	49.00	92.50	73.00	0.00	1.06	20.00	4.57
28	21.00	32.70	26.90	50.50	88.50	71.00	0.00	1.00	23.97	5.10
29	22.10	32.90	27.50	29.00	85.00	64.00	0.00	1.24	23.96	5.52
30	23.10	33.20	26.70	60.00	92.00	78.00	1.50	1.15	15.28	3.75
31	23.30	32.80	27.40	55.00	94.50	80.00	0.00	0.96	24.16	5.15
Decade 1	20.90	31.52	25.78	60.70	93.55	79.55	0.00	1.07	23.38	4.79
Decade 2	22.35	32.65	27.16	56.60	93.40	77.55	0.00	0.99	22.81	4.88
Decade 3	22.06	33.16	27.31	52.32	91.41	73.86	3.00	1.07	22.71	4.99
MONTH	21.78	32.47	26.77	56.40	92.74	76.89	3.00	1.04	22.96	4.89

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.70	33.30	28.10	64.00	92.00	77.50	0.00	1.11	25.00	5.33
2	23.10	33.30	27.90	50.00	91.00	74.50	0.00	1.31	25.91	5.69
3	21.90	32.80	26.80	59.00	93.50	77.00	1.00	1.31	23.08	5.02
4	22.70	32.50	27.50	61.00	94.00	78.50	0.00	1.09	26.10	5.44
5	20.50	33.10	27.40	46.00	95.50	73.50	0.00	0.94	26.17	5.45
6	22.60	32.90	28.10	57.00	91.50	74.00	0.00	1.04	24.34	5.22
7	24.20	33.50	28.20	59.50	91.50	76.00	0.00	1.08	23.12	5.10
8	24.40	34.30	28.90	50.00	91.50	74.00	0.00	1.10	23.20	5.29
9	24.80	33.90	28.80	57.50	88.50	75.50	0.00	1.09	24.91	5.50
10	23.30	34.20	28.70	52.50	87.00	71.00	0.00	1.17	25.48	5.65
11	23.00	33.60	28.40	57.00	91.50	75.00	0.00	1.02	25.29	5.44
12	23.80	33.30	28.40	58.00	88.50	75.00	0.00	1.10	23.41	5.17
13	24.70	33.90	28.80	60.50	86.50	75.00	0.00	1.10	23.45	5.25
14	23.90	34.10	28.80	49.00	86.50	72.50	0.00	1.28	25.26	5.73
15	24.00	33.50	28.80	58.50	87.50	74.50	0.00	1.25	24.81	5.50
16	24.50	34.20	27.40	59.00	95.50	81.50	15.50	1.38	16.50	4.14
17	24.70	33.40	28.00	61.50	93.00	80.00	0.00	1.39	20.90	4.81
18	23.90	34.00	27.60	52.50	95.50	80.50	8.00	1.17	22.04	5.02
19	23.40	33.60	28.20	60.00	95.50	78.00	0.00	1.15	26.12	5.59
20	24.10	33.50	28.50	53.00	92.50	76.00	0.00	1.02	25.84	5.58
21	24.50	34.10	28.80	48.00	92.00	75.00	0.00	1.03	25.28	5.59
22	23.80	34.80	29.20	48.00	91.50	74.50	0.00	0.98	23.38	5.29
23	25.20	34.40	29.30	51.50	94.50	75.00	0.00	1.12	22.02	5.12
24	24.20	34.10	29.10	57.50	91.00	74.50	0.00	0.81	19.05	4.37
25	25.90	35.10	28.80	55.50	90.50	77.00	0.50	1.20	19.97	4.85
26	24.70	34.50	27.20	57.00	95.00	83.50	3.50	1.01	13.47	3.50
27	23.90	33.80	27.10	62.50	96.00	85.00	2.00	0.96	15.90	3.76
28	24.00	33.30	26.20	62.00	97.50	89.00	15.00	0.86	15.50	3.61
29	23.60	32.90	26.90	63.00	96.00	85.00	0.00	1.12	17.60	4.05
30	23.90	32.80	26.60	64.00	97.00	85.50	1.00	1.05	14.57	3.49
31										
Decade 1	23.02	33.38	28.04	55.65	91.60	75.15	1.00	1.12	24.73	5.37
Decade 2	24.00	33.71	28.29	56.90	91.25	76.80	23.50	1.19	23.36	5.22
Decade 3	24.37	33.98	27.92	56.90	94.10	80.40	22.00	1.02	18.67	4.36
MONTH	23.80	33.69	28.08	56.48	92.32	77.45	46.50	1.11	22.26	4.99

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2008

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.10	32.70	27.40	64.00	97.50	82.00	0.00	1.24	20.14	4.49
2	23.50	33.10	26.70	60.50	95.00	82.50	2.00	1.22	18.77	4.32
3	23.10	32.60	26.60	64.00	97.50	85.00	2.50	0.93	15.70	3.61
4	23.60	32.50	26.90	63.00	97.50	85.00	15.00	1.10	21.90	4.72
5	24.00	33.10	27.70	63.00	95.00	82.00	0.50	1.25	22.38	4.93
6	23.90	33.10	27.60	62.00	96.00	81.50	3.00	1.18	23.41	5.08
7	24.40	32.80	27.40	63.50	93.00	82.00	0.00	1.15	20.43	4.57
8	24.30	32.90	28.10	62.00	88.50	78.00	0.00	1.13	19.54	4.48
9	24.50	33.40	27.10	65.50	94.50	84.00	6.00	1.18	16.77	3.95
10	24.10	33.50	26.70	63.00	96.00	86.50	2.00	1.05	15.64	3.73
11	23.70	33.40	27.00	60.00	97.50	82.00	8.00	1.33	20.85	4.72
12	23.20	32.80	26.90	59.50	97.50	84.50	6.00	1.23	19.61	4.44
13	23.20	32.20	26.40	67.50	98.50	88.00	56.00	1.13	18.37	4.04
14	23.10	32.20	26.50	64.00	99.00	87.50	60.00	1.05	15.18	3.54
15	22.70	31.80	26.90	65.00	99.00	84.50	0.00	1.17	16.89	3.82
16	23.60	31.00	25.70	65.50	99.50	87.50	73.00	0.88	8.71	2.33
17	23.10	33.70	27.10	56.00	99.50	85.50	0.00	0.79	15.75	3.69
18	24.50	33.20	27.20	62.00	97.00	86.00	12.00	1.01	16.68	3.89
19	23.10	33.00	27.10	62.50	97.00	85.00	0.00	0.76	13.37	3.20
20	24.50	33.10	27.40	63.50	97.00	84.00	0.00	0.95	14.18	3.43
21	24.10	32.80	27.20	66.50	94.50	84.00	0.00	1.04	14.81	3.53
22	23.00	32.90	26.30	65.00	95.50	85.00	5.00	1.27	15.78	3.75
23	23.00	32.80	26.10	61.00	99.50	87.00	105.00	1.02	17.56	3.97
24	22.50	33.10	26.90	58.00	100.00	85.00	0.00	0.87	22.00	4.71
25	24.20	32.40	27.10	66.50	97.00	85.00	0.00	1.15	19.61	4.33
26	23.90	32.50	26.60	65.50	96.50	86.50	4.00	0.94	18.82	4.14
27	23.70	31.20	26.50	70.50	97.00	87.50	0.00	0.91	11.66	2.81
28	23.40	32.20	27.20	59.50	94.00	81.00	34.00	1.03	16.38	3.84
29	22.60	32.70	26.80	60.50	98.00	84.50	14.00	1.18	20.47	4.52
30	22.80	32.00	26.40	62.00	96.50	83.50	12.00	1.20	19.03	4.24
31	23.00	32.10	26.40	62.00	96.00	87.00	0.00	1.01	15.63	3.64
Decade 1	23.95	32.97	27.22	63.05	95.05	82.85	31.00	1.14	19.47	4.39
Decade 2	23.47	32.64	26.82	62.55	98.15	85.45	215.00	1.03	15.96	3.71
Decade 3	23.29	32.43	26.68	63.36	96.77	85.09	174.00	1.06	17.43	3.95
MONTH	23.56	32.67	26.90	63.00	96.66	84.48	420.00	1.08	17.61	4.01

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.50	32.60	27.30	61.50	97.00	85.00	9.50	1.27	22.90	4.97
2	24.10	32.00	26.20	65.00	98.00	89.50	9.50	0.93	11.80	2.92
3	23.20	32.70	26.70	59.00	97.50	82.50	0.00	1.09	19.22	4.32
4	23.60	33.60	26.60	58.50	97.00	85.50	0.00	0.98	16.76	3.94
5	23.40	33.80	26.70	58.50	97.50	85.00	1.00	1.00	19.82	4.46
6	23.20	32.80	27.40	60.50	97.50	82.50	0.00	1.01	18.12	4.12
7	24.70	33.50	27.30	63.00	98.00	86.00	14.00	1.00	20.41	4.53
8	23.50	33.40	27.30	59.00	97.50	84.00	2.00	1.16	23.04	5.04
9	23.00	33.30	27.00	60.50	98.00	85.50	30.50	1.01	21.91	4.76
10	23.40	33.70	26.40	61.00	98.50	88.50	16.50	0.86	16.59	3.81
11	23.70	32.90	26.50	63.00	98.50	89.50	55.00	0.87	15.97	3.66
12	23.90	33.20	27.90	62.50	98.50	83.50	0.00	0.80	22.96	4.91
13	24.50	32.70	27.50	64.50	96.00	85.00	0.00	0.95	17.06	3.90
14	23.90	33.90	28.30	55.00	95.00	80.00	0.00	0.93	20.58	4.66
15	24.00	33.60	27.90	60.50	95.00	81.00	0.00	1.10	22.80	5.03
16	23.70	33.20	26.40	65.00	95.00	86.50	20.00	1.03	17.87	4.05
17	23.60	31.70	26.40	66.50	98.00	88.50	4.00	0.56	14.05	3.15
18	23.40	32.90	27.70	60.00	95.00	80.50	0.00	1.01	25.96	5.46
19	24.20	33.10	28.00	62.50	94.00	81.00	0.00	1.17	23.69	5.16
20	24.50	33.10	27.50	66.50	93.00	83.50	0.00	1.16	19.10	4.34
21	23.20	32.90	28.20	59.50	96.50	80.00	41.00	0.95	24.35	5.19
22	23.00	32.00	26.30	69.00	98.50	88.50	1.00	0.74	14.31	3.23
23	23.30	32.50	26.90	68.00	95.50	85.00	0.00	1.09	16.90	3.84
24	23.20	32.70	26.70	65.00	97.50	85.00	24.00	1.12	19.32	4.28
25	22.70	32.90	26.40	60.50	97.00	84.00	9.50	1.02	22.06	4.74
26	22.60	32.90	27.00	60.00	93.50	82.00	0.00	0.96	20.61	4.52
27	24.00	33.00	27.20	61.00	96.50	83.50	8.00	0.95	21.47	4.68
28	23.40	32.90	27.10	63.00	95.50	84.50	0.00	1.06	16.34	3.83
29	23.70	32.80	26.90	63.00	94.00	85.00	0.00	0.98	15.68	3.69
30	23.90	32.50	27.70	64.50	95.00	83.00	0.50	1.05	15.31	3.64
31	24.30	32.90	27.50	54.00	97.50	83.00	0.50	1.03	21.15	4.73
Decade 1	23.56	33.14	26.89	60.65	97.65	85.40	83.00	1.03	19.06	4.29
Decade 2	23.94	33.03	27.41	62.60	95.80	83.90	79.00	0.96	20.00	4.43
Decade 3	23.39	32.73	27.08	62.50	96.09	83.95	84.50	1.00	18.86	4.22
MONTH	23.62	32.96	27.13	61.94	96.50	84.40	246.50	0.99	19.29	4.31

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.20	32.30	26.80	58.00	97.00	84.50	0.50	0.83	16.69	3.80
2	23.20	33.70	27.20	56.50	95.50	83.00	1.00	1.18	24.06	5.27
3	23.00	34.00	27.40	52.50	97.50	80.50	0.00	1.28	20.05	4.73
4	23.60	34.20	27.90	52.50	99.00	80.00	0.00	1.02	18.58	4.38
5	24.50	33.00	27.30	65.00	97.00	86.00	0.00	0.80	15.06	3.50
6	24.20	33.20	27.50	61.50	96.00	84.50	1.50	1.02	16.83	3.94
7	24.50	33.70	27.90	53.00	96.00	80.00	0.00	1.04	14.53	3.71
8	24.40	31.80	27.70	64.50	93.00	81.50	0.00	0.74	12.10	2.96
9	24.30	32.80	26.30	58.00	97.00	87.00	8.00	0.90	14.05	3.42
10	23.40	32.60	26.90	63.50	97.50	84.50	0.50	1.24	17.72	4.07
11	24.00	33.10	27.70	63.00	96.00	83.00	0.00	0.80	19.42	4.29
12	24.50	32.80	28.00	64.00	95.50	82.50	0.00	0.87	21.16	4.61
13	23.90	32.60	26.30	68.50	95.50	87.00	1.00	0.98	11.77	2.93
14	23.10	33.30	26.20	60.00	95.50	85.00	0.00	1.08	15.96	3.81
15	23.70	31.90	26.70	64.50	94.50	84.00	0.00	1.06	16.48	3.78
16	23.10	31.30	26.10	66.00	97.00	87.00	10.00	0.72	11.28	2.72
17	23.10	31.00	26.00	60.00	96.00	86.00	2.00	0.72	11.00	3.06
18	23.50	31.50	25.80	64.00	97.50	88.00	8.00	0.87	12.88	3.42
19	23.00	31.30	26.20	63.00	96.50	84.50	0.00	0.87	14.96	4.81
20	23.30	31.40	26.80	64.00	97.00	84.50	0.00	1.08	22.99	4.85
21	23.30	31.30	26.70	70.00	97.00	87.00	4.00	1.20	23.55	4.86
22	22.70	31.70	26.70	63.00	97.00	84.50	0.00	1.04	23.31	5.28
23	23.20	32.90	27.30	53.50	95.50	81.00	0.00	1.12	24.49	4.59
24	23.20	32.60	27.30	64.50	94.00	82.50	0.00	1.10	21.08	4.47
25	23.50	33.10	27.10	57.50	92.00	78.50	0.00	1.32	18.98	4.36
26	22.90	33.60	26.90	59.50	96.50	82.50	8.50	0.80	19.95	3.25
27	24.20	32.70	26.20	65.00	97.00	90.00	3.00	0.82	13.83	4.04
28	23.20	32.70	27.10	68.50	96.00	85.50	0.50	0.88	18.48	
29										
30										
31										
Decade 1	23.83	33.13	27.29	58.50	96.55	83.15	11.50	1.01	16.97	3.98
Decade 2	23.50	31.95	26.59	64.27	96.18	85.32	25.00	0.93	16.50	3.83
Decade 3	23.27	32.76	26.94	61.64	95.43	83.50	12.00	1.01	20.02	4.41
MONTH	23.56	32.58	26.93	61.55	96.13	84.09	48.50	0.98	17.54	4.03

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.70	31.90	26.40	68.00	96.50	87.00	0.00	0.98	17.43	3.84
2	23.00	31.50	26.50	65.00	98.00	86.00	13.50	1.03	19.85	4.24
3	23.30	31.60	26.60	67.50	97.50	87.00	0.00	0.88	18.03	3.90
4	23.20	32.20	26.60	64.50	96.00	85.00	0.00	0.93	17.73	3.92
5	23.10	33.20	26.10	64.50	96.00	88.00	0.50	1.02	16.08	3.71
6	23.50	33.10	26.70	63.50	96.50	86.50	0.50	0.75	17.58	3.89
7	22.90	33.20	26.70	64.50	93.00	81.00	0.00	1.20	21.90	4.76
8	23.20	33.00	27.00	63.00	90.50	79.00	0.00	1.37	23.83	5.16
9	22.70	32.90	27.20	63.00	89.00	79.50	0.00	1.15	23.37	5.01
10	22.50	33.00	27.10	59.00	95.00	78.50	0.00	1.19	23.82	5.10
11	22.60	33.30	27.20	58.00	94.50	77.50	0.00	1.15	24.72	5.26
12	23.10	32.80	27.30	58.50	94.50	79.50	0.00	1.26	25.35	5.38
13	22.50	32.30	27.10	63.50	92.50	79.50	0.00	1.22	23.91	5.03
14	22.70	33.00	26.80	58.50	94.50	79.00	0.00	1.19	19.70	4.44
15	22.90	29.80	24.70	72.50	95.50	88.50	5.00	0.87	5.96	1.76
16	22.10	31.80	26.10	61.50	96.50	86.00	0.50	0.81	17.61	3.81
17	23.40	32.80	26.30	58.00	98.00	86.00	18.00	0.82	15.25	3.53
18	23.30	33.40	27.60	60.50	94.00	81.00	0.00	0.98	24.31	5.14
19	22.80	33.00	27.10	59.00	94.00	80.00	0.00	1.25	24.01	5.14
20	20.70	33.70	26.60	39.50	92.50	70.50	0.00	1.45	25.90	5.75
21	21.50	32.70	25.90	47.50	92.50	74.00	0.00	1.22	16.81	4.11
22	22.10	32.60	27.20	53.00	95.00	76.50	0.00	0.93	23.54	4.93
23	22.40	32.40	27.10	58.00	96.50	79.00	0.00	1.09	23.62	4.95
24	22.60	32.50	27.00	62.50	95.00	81.00	0.00	1.13	23.15	4.86
25	22.00	33.20	27.10	54.50	95.50	78.00	4.50	1.31	24.15	5.20
26	22.20	33.00	26.70	54.50	93.50	79.00	7.50	1.08	21.21	4.63
27	22.50	32.70	26.00	54.00	96.00	84.50	0.00	0.89	13.13	3.24
28	22.90	31.50	24.90	57.00	97.50	85.50	27.00	0.97	9.20	2.57
29	21.30	30.90	24.60	63.00	98.00	89.50	31.00	1.01	10.93	2.72
30	22.30	31.70	25.70	61.50	96.00	86.00	0.00	0.81	17.98	3.83
31	22.50	31.60	26.00	69.50	97.00	86.00	4.00	0.81	14.78	3.24
Decade 1	23.11	32.56	26.69	64.25	94.80	83.75	14.50	1.05	19.96	4.35
Decade 2	22.61	32.59	26.68	58.95	94.65	80.75	23.50	1.10	20.67	4.53
Decade 3	22.21	32.25	26.20	57.73	95.68	81.73	74.00	1.02	18.05	4.02
MONTH	22.63	32.46	26.51	60.23	95.06	82.06	112.00	1.06	19.51	4.29

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.70	31.90	26.30	65.50	97.50	85.50	0.00	0.98	21.08	4.37
2	23.00	32.20	26.80	64.00	94.00	82.00	0.00	1.12	23.59	4.87
3	21.50	32.20	26.10	60.00	92.50	78.50	0.00	1.18	24.21	4.96
4	21.50	32.30	26.30	61.00	92.00	77.50	0.00	1.18	23.45	4.85
5	21.00	34.00	26.50	40.00	90.00	69.50	0.00	1.34	24.48	5.45
6	20.80	32.40	26.20	48.50	92.50	75.00	0.00	1.18	24.12	5.04
7	20.80	32.70	26.30	52.50	89.50	76.50	0.00	1.10	22.25	4.72
8	22.90	32.60	27.10	58.00	92.50	78.50	0.00	1.19	22.81	4.85
9	21.60	32.70	26.90	58.50	91.00	77.00	0.00	1.05	23.51	4.86
10	23.00	33.00	27.50	62.00	92.50	80.50	0.00	1.01	23.34	4.86
11	23.30	33.20	27.60	65.00	94.00	82.00	4.50	1.03	23.02	4.81
12	24.00	33.20	27.80	58.50	96.50	84.00	0.00	0.98	23.40	4.92
13	24.10	33.50	27.90	60.50	95.00	81.00	0.00	0.97	22.00	4.70
14	23.00	33.30	28.00	60.50	95.50	81.50	0.00	0.86	22.31	4.66
15	23.80	34.10	27.90	59.50	94.50	80.50	0.00	0.94	20.26	4.43
16	23.60	33.40	27.90	61.00	93.00	80.50	0.50	0.91	21.36	4.54
17	25.00	33.60	28.40	58.50	93.50	82.00	12.00	0.94	22.12	4.75
18	24.40	33.90	28.40	59.00	96.50	84.00	10.50	0.82	21.09	4.52
19	23.20	28.20	25.00	82.00	96.50	91.00	6.50	0.91	4.31	1.32
20	22.90	32.00	26.50	64.00	94.50	83.00	0.00	0.88	19.25	4.01
21	22.30	33.00	26.90	57.00	95.00	81.00	0.00	1.01	22.11	4.60
22	21.00	32.40	26.20	52.50	90.50	77.00	0.00	1.03	22.10	4.56
23	21.90	32.10	26.30	57.50	94.50	80.00	0.00	1.09	20.28	4.26
24	22.00	32.30	26.50	53.00	91.50	75.00	0.00	1.42	22.31	4.79
25	22.30	32.50	26.70	52.50	94.50	77.00	0.00	1.24	21.58	4.61
26	22.20	32.30	26.20	58.50	96.50	81.50	0.00	0.98	19.24	4.05
27	20.80	32.60	26.10	53.00	96.50	79.00	0.00	1.27	22.16	4.64
28	21.10	32.80	26.60	55.00	89.50	77.00	0.00	1.13	21.27	4.49
29	22.70	32.10	26.60	55.50	93.50	77.00	0.00	0.97	20.81	4.31
30	22.00	32.30	26.20	56.50	89.50	74.50	0.00	1.23	20.08	4.32
31										
Decade 1	21.88	32.60	26.60	57.00	92.40	78.05	0.00	1.13	23.28	4.88
Decade 2	23.73	32.84	27.54	62.85	94.95	82.95	34.00	0.92	19.91	4.27
Decade 3	21.83	32.44	26.43	55.10	93.15	77.90	0.00	1.14	21.19	4.46
MONTH	22.48	32.63	26.86	58.32	93.50	79.63	34.00	1.07	21.46	4.54

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.50	32.40	26.50	54.00	92.00	75.50	0.00	1.15	19.46	4.22
2	23.70	33.50	27.10	50.50	93.00	78.00	0.50	0.98	17.68	4.00
3	23.20	29.40	25.10	72.50	97.00	89.50	9.00	0.87	7.35	1.91
4	23.10	28.70	23.90	79.50	98.00	97.00	67.50	0.51	2.98	1.03
5	22.50	28.00	24.50	82.00	98.50	94.50	33.50	0.52	6.99	1.64
6	22.90	30.30	24.90	69.50	99.50	92.00	0.50	0.88	10.81	2.47
7	22.80	26.30	23.60	85.50	99.00	95.50	83.00	0.72	5.90	1.43
8	22.10	30.90	25.30	65.00	99.50	87.50	0.00	0.96	16.66	3.43
9	22.30	29.90	24.40	71.00	97.50	91.00	4.50	0.93	10.79	2.44
10	21.70	30.40	25.50	65.00	97.50	87.00	3.50	0.94	15.89	3.29
11	22.40	30.10	24.90	68.50	97.50	88.50	0.00	1.00	12.43	2.74
12	22.40	30.30	25.00	66.00	94.00	86.50	14.50	0.83	7.47	2.02
13	22.80	30.10	24.70	65.00	98.50	89.50	0.00	0.68	5.77	1.68
14	22.60	29.40	25.20	65.50	93.50	83.00	0.00	0.93	10.60	2.49
15	21.90	31.50	25.60	59.50	94.50	80.00	1.50	1.19	16.68	3.62
16	23.60	31.20	26.00	65.50	97.00	88.50	20.50	1.10	13.01	2.97
17	21.80	31.70	26.20	66.00	97.50	86.50	0.00	0.95	19.28	3.84
18	22.20	31.40	26.10	71.50	97.00	86.00	0.00	0.88	19.49	3.81
19	21.60	31.70	26.20	68.00	94.50	84.00	0.00	0.86	19.01	3.76
20	22.40	31.80	26.20	64.50	96.00	84.00	0.00	0.93	18.70	3.78
21	21.50	30.50	25.10	68.50	94.50	86.00	1.50	1.03	11.55	2.63
22	22.40	30.10	24.60	72.50	96.50	87.00	5.00	1.13	7.88	2.05
23	23.00	30.90	25.80	68.00	95.50	84.50	0.00	0.88	13.00	2.84
24	23.10	31.00	26.10	68.00	95.00	85.50	0.00	0.89	12.32	2.75
25	22.60	30.50	25.70	67.00	97.00	84.00	0.00	1.08	18.44	3.66
26	20.70	30.00	24.70	60.00	92.50	80.00	0.00	1.27	18.25	3.70
27	21.20	30.90	24.90	59.50	93.50	80.00	0.00	1.31	19.00	3.88
28	17.90	31.10	24.10	62.50	95.00	80.50	0.00	1.28	18.24	3.65
29	20.80	31.70	25.30	58.00	94.00	81.00	0.00	1.28	18.86	3.91
30	20.90	31.40	25.50	64.50	97.00	83.50	0.50	1.00	18.82	3.70
31	22.90	31.70	26.20	62.50	96.50	83.50	2.00	1.23	19.12	3.92
Decade 1	22.68	29.98	25.08	69.45	97.15	88.75	202.00	0.84	11.45	2.58
Decade 2	22.37	30.92	25.61	66.00	96.00	85.65	36.50	0.93	14.24	3.07
Decade 3	21.55	30.89	25.27	64.64	95.18	83.23	9.00	1.13	15.95	3.33
MONTH	22.18	30.61	25.32	66.63	96.08	85.79	247.50	0.97	13.95	3.01

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.70	31.30	25.60	61.50	95.50	82.50	0.00	1.09	17.07	3.53
2	21.80	31.60	25.40	55.50	93.50	83.00	0.00	1.19	16.84	3.64
3	22.30	31.30	25.40	63.50	95.00	83.50	0.50	1.19	17.36	3.59
4	20.70	31.40	25.10	60.50	93.50	81.00	0.00	1.18	17.89	3.67
5	19.80	31.10	24.60	56.50	96.00	81.00	0.00	1.18	19.81	3.90
6	19.60	30.70	24.10	59.00	94.50	78.00	0.00	1.28	18.12	3.66
7	18.80	31.10	23.80	56.00	95.00	76.00	0.00	1.30	19.25	3.85
8	19.80	31.00	24.50	59.00	93.00	80.00	0.00	1.20	19.00	3.78
9	20.40	31.20	24.80	59.00	94.00	80.50	0.00	1.27	19.10	3.84
10	20.90	30.90	24.70	60.00	94.00	79.50	0.00	1.33	15.87	3.42
11	19.40	30.50	24.00	51.50	93.50	76.00	0.00	1.31	18.61	3.81
12	19.70	29.80	23.70	50.00	93.50	74.50	0.00	1.40	18.27	3.78
13	20.00	29.60	23.60	51.00	89.50	73.50	0.00	1.45	18.80	3.88
14	19.00	30.00	23.30	47.50	92.50	74.00	0.00	1.40	19.50	3.96
15	18.20	29.80	23.60	58.50	93.00	76.50	0.00	1.33	18.79	3.67
16	19.40	30.60	24.50	55.00	90.00	77.50	0.00	1.37	17.08	3.63
17	21.50	30.30	24.90	63.50	94.50	82.50	2.00	1.22	14.76	3.15
18	21.80	29.30	24.50	65.50	94.50	83.50	0.00	1.05	7.98	2.11
19	19.90	30.00	23.60	54.00	95.50	79.50	0.00	1.15	19.06	3.70
20	18.70	29.90	23.00	56.50	96.00	79.50	0.00	1.26	17.39	3.48
21	18.60	29.40	22.80	48.50	92.50	74.50	0.00	1.23	19.58	3.79
22	17.30	29.10	22.70	53.00	97.00	76.00	0.00	1.15	19.14	3.58
23	19.20	29.40	23.30	57.00	96.50	80.50	0.00	1.05	17.50	3.38
24	19.00	30.70	24.70	63.00	93.00	82.50	0.00	1.08	18.68	3.60
25	21.90	31.70	26.10	53.00	96.00	80.00	0.00	0.94	17.96	3.66
26	21.10	31.80	25.50	62.50	95.00	81.50	0.00	0.94	17.26	3.48
27	20.40	31.80	25.00	56.00	95.50	80.50	0.00	0.97	19.27	3.79
28	20.60	32.00	24.60	42.00	94.00	76.50	0.00	1.27	17.05	3.86
29	19.00	30.80	24.10	51.50	93.50	74.50	0.00	1.13	15.90	3.39
30	21.80	29.40	23.80	69.50	97.50	88.00	13.50	0.88	9.04	2.11
31										
Decade 1	20.58	31.16	24.80	59.05	94.40	80.50	0.50	1.22	18.03	3.69
Decade 2	19.76	29.98	23.87	55.30	93.25	77.70	2.00	1.29	17.02	3.52
Decade 3	19.89	30.61	24.26	55.60	95.05	79.45	13.50	1.06	17.14	3.46
MONTH	20.08	30.58	24.31	56.65	94.23	79.22	16.00	1.19	17.40	3.56

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.50	31.00	24.60	58.00	95.50	80.50	0.00	1.13	18.74	3.72
2	19.90	31.10	24.60	53.00	93.50	77.00	0.00	1.22	19.03	3.85
3	19.30	31.20	24.20	57.00	90.00	77.00	0.00	1.28	16.11	3.49
4	20.10	31.40	24.40	57.50	94.50	80.50	2.50	1.12	15.08	3.27
5	19.20	30.60	23.90	55.00	94.50	79.00	0.00	1.20	17.88	3.62
6	20.20	30.10	24.10	59.00	93.00	77.50	0.00	1.33	15.74	3.36
7	19.50	29.70	23.70	52.00	93.00	75.00	0.00	1.18	18.67	3.70
8	19.10	29.70	24.10	52.50	84.50	71.00	0.00	1.47	18.66	3.89
9	20.00	29.80	24.00	54.00	88.50	75.50	0.00	1.26	13.75	3.17
10	20.60	29.50	24.00	55.50	87.00	74.50	0.00	1.20	14.33	3.20
11	19.40	29.60	23.90	52.00	91.50	76.00	0.00	1.09	16.28	3.37
12	19.90	27.90	23.70	63.00	89.00	79.00	0.00	1.02	7.10	2.01
13	21.80	30.30	24.80	61.50	92.50	80.00	0.00	1.00	17.88	3.55
14	20.60	31.00	24.50	41.00	90.50	71.00	0.00	1.24	19.67	4.13
15	19.30	30.70	23.80	54.50	91.00	75.00	0.00	1.35	17.91	3.76
16	19.90	30.20	24.50	60.00	85.50	75.50	0.00	1.39	14.31	3.28
17	22.20	27.40	23.90	65.50	93.00	82.50	0.50	0.76	5.04	1.57
18	20.50	27.30	22.80	71.50	97.00	86.50	2.50	1.05	5.31	1.58
19	21.80	29.00	24.60	61.00	95.00	81.00	2.00	1.15	8.40	2.27
20	21.90	30.70	25.00	67.00	96.50	88.00	1.00	0.64	11.60	2.51
21	22.60	31.30	25.60	58.00	95.50	79.50	0.00	1.12	17.61	3.70
22	20.10	30.90	25.00	64.50	93.50	82.00	0.00	1.02	16.69	3.39
23	21.40	30.50	25.10	58.50	95.00	79.50	0.00	1.23	19.54	3.92
24	19.90	30.90	24.40	57.50	90.50	76.50	0.00	1.34	20.01	4.05
25	18.70	30.90	24.40	56.00	93.00	77.50	0.00	1.03	19.63	3.84
26	19.60	31.50	24.60	51.50	93.50	77.00	0.00	1.12	20.19	4.07
27	18.90	30.10	24.10	58.50	91.50	77.50	0.00	1.15	20.11	3.89
28	19.30	31.60	24.50	41.50	87.50	69.50	0.00	1.42	20.12	4.41
29	19.20	30.00	24.10	48.50	95.50	74.00	5.00	1.18	14.85	3.34
30	20.30	28.40	23.70	55.50	95.00	77.00	0.00	0.98	8.42	2.26
31	20.20	30.10	24.20	47.50	86.00	72.00	0.00	1.18	13.88	3.34
Decade 1	19.84	30.41	24.16	55.35	91.40	76.75	2.50	1.24	16.80	3.53
Decade 2	20.73	29.41	24.15	59.70	92.15	79.45	6.00	1.07	12.35	2.80
Decade 3	20.02	30.56	24.52	54.32	92.41	76.55	5.00	1.16	17.37	3.66
MONTH	20.19	30.14	24.28	56.39	92.00	77.55	13.50	1.16	15.57	3.34

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.40	28.50	23.70	64.00	90.50	80.00	0.00	1.06	5.26	1.82
2	22.00	28.00	24.10	62.50	93.00	82.00	1.50	1.08	7.63	2.12
3	21.70	28.80	24.10	66.00	96.00	85.00	0.00	0.87	8.44	2.11
4	20.20	30.20	24.70	58.50	92.00	78.50	0.00	1.02	19.48	3.84
5	21.40	30.60	25.00	61.00	91.50	80.00	0.00	1.10	18.51	3.79
6	18.90	30.20	24.00	52.50	89.00	77.00	0.00	1.23	18.27	3.83
7	20.40	30.90	24.30	35.00	91.50	71.00	0.00	1.37	21.45	4.60
8	19.90	30.00	24.20	58.00	92.00	74.50	0.00	1.40	16.16	3.56
9	18.70	31.40	24.30	32.00	92.00	75.00	0.00	1.06	21.02	4.35
10	18.70	29.70	24.20	58.50	95.00	77.50	0.50	1.30	19.81	3.93
11	17.90	30.00	24.00	47.00	95.50	76.50	0.00	1.15	19.96	4.02
12	19.20	31.80	24.40	38.00	95.00	74.50	0.00	1.12	21.94	4.51
13	19.00	30.50	24.30	47.50	95.50	74.00	1.00	1.34	21.85	4.43
14	20.50	30.60	25.40	53.50	95.50	79.50	0.00	1.05	21.29	4.23
15	21.30	30.70	25.60	63.50	95.00	82.50	0.00	0.96	14.24	3.13
16	21.40	31.40	25.20	53.00	96.50	78.50	0.00	1.08	21.13	4.30
17	19.10	30.40	24.20	56.50	86.50	73.50	0.00	1.35	21.51	4.35
18	19.90	31.40	25.30	49.50	86.50	70.50	0.00	1.27	21.75	4.54
19	18.50	31.10	24.50	47.00	88.50	72.50	0.00	1.27	21.52	4.47
20	20.20	29.80	24.50	54.00	90.50	76.00	0.00	1.20	22.16	4.38
21	19.50	31.00	24.70	52.00	90.50	75.50	0.00	1.20	22.58	4.54
22	19.30	31.30	24.40	51.50	90.00	73.50	0.00	1.23	22.20	4.52
23	17.60	30.10	22.90	55.00	92.00	72.50	0.00	1.20	19.90	4.01
24	18.60	30.10	24.00	47.00	90.50	71.50	0.00	1.22	22.51	4.50
25	18.40	30.30	24.10	50.00	92.50	74.50	0.00	1.18	22.44	4.45
26	18.70	30.80	25.10	52.50	97.00	77.00	0.00	0.86	21.65	4.23
27	20.60	31.40	24.90	54.00	94.50	80.00	0.00	1.09	20.75	4.28
28	20.30	31.70	26.00	53.00	90.50	75.50	0.00	0.88	22.74	4.53
29	21.60	31.20	25.70	61.00	95.50	79.50	0.00	0.91	22.75	4.49
30	20.30	31.20	25.50	59.00	94.00	80.00	0.00	0.91	22.52	4.44
31	22.10	31.60	25.70	64.00	94.50	82.00	0.00	0.94	17.13	3.67
Decade 1	20.33	29.83	24.26	54.80	92.25	78.05	2.00	1.15	15.60	3.39
Decade 2	19.70	30.77	24.74	50.95	92.50	75.80	1.00	1.18	20.74	4.24
Decade 3	19.73	30.97	24.82	54.45	92.86	76.50	0.00	1.06	21.56	4.33
MONTH	19.91	30.54	24.61	53.44	92.55	76.77	3.00	1.13	19.37	4.00

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2009

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.40	31.40	26.00	58.00	94.00	78.50	0.00	1.13	22.84	4.67
2	19.70	32.00	25.50	48.00	92.00	68.50	0.00	1.24	23.47	4.87
3	19.80	32.30	25.30	48.50	86.00	70.00	0.00	1.33	23.46	4.98
4	20.50	31.60	25.30	53.50	85.00	71.50	0.00	1.25	23.29	4.83
5	20.40	31.60	25.50	54.50	90.00	74.00	0.00	1.02	22.65	4.60
6	21.10	31.70	26.00	58.00	90.00	77.50	0.50	1.16	21.90	4.57
7	21.30	32.00	26.40	57.50	92.00	77.00	0.00	0.90	22.12	4.53
8	21.00	33.40	26.30	29.50	93.50	76.50	0.00	1.02	21.48	4.79
9	21.20	34.10	26.60	42.00	94.00	75.50	0.00	1.00	22.87	4.94
10	19.60	31.50	25.50	53.50	94.00	81.00	0.00	0.94	23.11	4.62
11	18.90	32.10	25.80	49.50	93.50	77.00	0.00	1.09	23.06	4.76
12	21.00	31.40	25.90	55.50	94.00	77.00	0.00	1.06	22.08	4.56
13	20.40	31.00	25.60	55.00	92.00	75.50	0.00	1.23	22.76	4.69
14	20.00	32.00	25.80	60.00	95.00	77.00	0.00	1.12	20.95	4.38
15	21.40	32.90	26.50	53.00	93.00	75.50	0.00	1.17	22.37	4.82
16	20.90	32.30	26.10	58.50	93.00	76.00	0.00	1.06	22.32	4.65
17	20.80	32.10	26.00	53.00	90.00	72.50	0.00	1.22	21.74	4.69
18	20.20	32.60	26.10	50.50	87.00	71.50	0.00	1.03	22.99	4.84
19	20.20	32.10	26.00	46.50	87.00	70.00	0.00	1.17	23.55	5.00
20	21.10	31.70	26.40	56.50	91.50	76.00	0.00	1.01	21.32	4.49
21	21.70	31.60	26.40	63.50	94.50	79.50	0.00	0.80	19.35	4.05
22	22.30	31.70	26.60	61.00	93.00	77.50	0.00	1.28	21.64	4.63
23	21.50	32.70	26.50	54.00	93.50	79.50	0.00	1.04	21.48	4.62
24	22.40	31.60	26.50	64.00	93.00	80.00	0.00	1.20	20.83	4.44
25	22.40	33.00	27.00	58.50	94.00	76.50	0.00	1.02	23.80	5.00
26	20.80	32.10	26.50	55.00	92.00	77.50	0.00	0.78	21.42	4.45
27	21.30	32.60	26.80	54.50	92.00	76.50	0.00	0.95	22.46	4.74
28	22.80	32.60	27.00	52.50	88.00	71.00	0.00	1.09	22.11	4.84
29	19.50	32.60	26.30	48.00	91.50	71.50	0.00	1.10	22.72	4.87
30	21.10	31.50	26.80	47.50	91.50	74.00	0.00	1.16	21.53	4.70
31										
Decade 1	20.70	32.16	25.84	50.30	91.05	75.00	0.50	1.10	22.72	4.74
Decade 2	20.49	32.02	26.02	53.80	91.60	74.80	0.00	1.12	22.31	4.69
Decade 3	21.58	32.20	26.64	55.85	92.30	76.35	0.00	1.04	21.73	4.63
MONTH	20.92	32.13	26.17	53.32	91.65	75.38	0.50	1.09	22.26	4.69

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.20	32.20	27.70	63.50	90.50	78.50	0.00	0.79	21.26	4.53
2	24.10	33.20	27.70	56.00	92.50	77.50	0.00	0.75	23.10	4.90
3	23.50	32.60	27.20	61.50	93.00	78.00	0.00	1.05	22.38	4.80
4	22.60	34.10	27.70	51.00	95.00	75.50	0.00	0.87	22.13	4.83
5	22.50	33.70	27.70	54.50	93.00	77.00	0.00	0.97	21.78	4.79
6	23.10	32.90	27.40	54.50	92.00	76.00	0.00	1.01	20.52	4.57
7	22.10	33.70	27.60	52.50	88.00	71.00	0.00	0.93	22.88	4.96
8	21.30	33.80	26.80	41.50	89.50	69.00	0.00	1.24	21.95	5.09
9	20.70	32.80	26.50	51.00	88.00	70.00	0.00	1.28	22.35	4.97
10	20.60	32.30	26.50	55.50	90.00	71.50	0.00	1.27	22.64	4.90
11	21.80	31.90	26.40	46.50	91.50	73.00	0.00	1.31	23.98	5.22
12	20.00	32.00	25.90	52.00	89.00	73.50	0.00	1.23	21.20	4.67
13	21.20	33.30	26.50	53.00	92.00	74.50	0.00	1.12	23.57	5.09
14	18.10	35.60	26.80	29.50	92.00	68.50	0.00	0.68	23.12	4.91
15	22.00	32.90	26.80	52.50	94.00	76.50	0.00	0.94	22.09	4.76
16	21.80	34.30	26.90	45.50	94.50	72.00	0.00	1.00	23.48	5.16
17	22.30	32.80	27.50	55.00	92.00	71.50	0.00	1.20	22.47	4.96
18	22.10	33.10	27.30	50.00	86.00	68.00	0.00	1.23	22.07	5.01
19	20.50	33.50	26.90	44.50	84.50	67.50	0.00	1.13	22.34	5.04
20	20.30	33.20	26.50	40.50	86.00	68.50	0.00	1.10	18.32	4.44
21	23.40	33.00	28.00	58.00	94.50	75.50	8.50	1.22	22.81	5.03
22	22.90	32.90	27.70	60.00	96.50	79.00	0.00	1.05	23.37	5.01
23	21.40	32.60	26.90	55.00	93.00	72.50	0.00	1.12	23.13	4.97
24	21.00	32.70	26.70	50.50	94.00	71.50	0.00	1.12	24.28	5.18
25	18.80	32.80	26.00	44.00	90.00	70.00	0.00	1.12	24.03	5.16
26	18.20	32.80	26.40	37.50	86.00	66.50	0.00	0.98	24.80	5.23
27	20.20	32.60	26.80	51.00	91.50	73.00	0.00	0.95	24.85	5.17
28	18.90	34.50	26.70	39.00	89.50	66.00	0.00	1.00	24.52	5.33
29	18.50	33.00	26.60	44.00	89.50	70.00	0.00	0.95	23.88	5.05
30	21.80	32.40	26.90	54.50	94.00	75.50	0.00	0.95	23.72	5.00
31	20.9	33.4	27.2	41.5	90	70.5	0	1.32	23.84	5.41
Decade 1	22.47	33.13	27.28	54.15	91.15	74.40	0.00	1.02	22.10	4.83
Decade 2	21.01	33.26	26.75	46.90	90.15	71.35	0.00	1.09	22.26	4.93
Decade 3	20.55	32.97	26.90	48.64	91.68	71.82	8.50	1.07	23.93	5.14
MONTH	21.32	33.12	26.97	49.85	91.02	72.50	8.50	1.06	22.80	4.97

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.70	33.10	27.40	48.00	91.00	71.50	0.00	1.18	22.19	5.00
2	21.70	32.50	27.30	58.00	90.00	75.00	0.00	1.19	23.30	5.04
3	22.20	32.60	27.20	58.50	93.00	76.50	0.00	1.22	24.75	5.27
4	21.40	33.40	27.30	52.00	93.00	74.50	0.00	1.26	25.17	5.46
5	21.40	33.20	27.00	56.00	94.00	75.00	0.00	1.09	24.70	5.25
6	20.60	34.00	27.30	47.00	93.00	70.50	0.00	1.11	24.84	5.41
7	22.50	33.00	27.70	57.50	90.50	73.00	0.00	1.25	23.81	5.21
8	21.40	33.30	27.60	56.00	91.00	74.50	0.00	1.05	23.36	5.06
9	22.10	33.00	27.90	58.00	92.50	74.50	0.00	1.20	24.18	5.23
10	23.40	33.30	27.70	62.00	92.50	78.50	0.00	0.95	20.10	4.47
11	22.50	33.60	28.30	60.50	93.00	76.00	0.00	1.31	22.58	5.04
12	24.00	33.50	28.60	60.50	92.00	78.00	0.00	1.16	23.24	5.15
13	23.00	33.60	28.10	52.00	93.50	74.50	0.00	0.98	24.25	5.27
14	21.70	33.70	28.00	51.00	93.00	73.00	0.00	0.84	21.67	4.76
15	21.40	33.60	27.90	52.50	90.00	73.50	0.00	0.93	24.46	5.23
16	20.10	33.10	27.20	51.00	91.50	74.00	0.00	0.97	24.64	5.20
17	23.30	35.30	28.80	33.50	91.50	63.00	0.00	1.04	24.63	5.64
18	23.80	34.90	28.90	41.50	87.50	65.50	0.00	1.09	22.18	5.24
19	24.10	34.60	28.90	47.50	94.50	74.50	13.50	1.24	22.74	5.32
20	24.00	33.90	27.90	50.50	94.50	79.00	0.00	0.87	17.34	4.12
21	23.50	32.30	27.50	54.50	91.50	76.50	0.00	0.81	13.47	3.33
22	23.80	33.70	28.50	53.00	90.50	74.50	0.00	1.03	24.65	5.41
23	23.80	33.20	28.30	54.00	93.00	76.00	0.00	0.90	22.84	4.99
24	24.50	33.70	28.80	59.50	91.50	75.50	0.00	1.04	23.57	5.21
25	24.70	33.20	27.70	60.00	91.50	79.00	0.00	1.18	17.83	4.24
26	24.50	34.00	27.90	52.50	88.50	75.00	0.00	1.06	16.84	4.19
27	24.00	33.70	28.40	54.00	89.50	75.50	0.00	0.88	20.43	4.63
28	24.00	34.60	29.10	50.00	92.50	75.00	0.00	1.09	24.01	5.43
29	25.60	34.30	29.60	55.50	86.00	73.00	0.00	1.16	24.26	5.53
30	24.00	34.50	29.20	52.50	95.50	76.00	21.00	1.00	24.40	5.41
31										
Decade 1	21.84	33.14	27.44	55.30	92.05	74.35	0.00	1.15	23.64	5.14
Decade 2	22.79	33.98	28.26	50.05	92.10	73.10	13.50	1.04	22.77	5.10
Decade 3	24.24	33.72	28.50	54.55	91.00	75.60	21.00	1.02	21.23	4.84
MONTH	22.96	33.61	28.07	53.30	91.72	74.35	34.50	1.07	22.55	5.02

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.30	33.70	29.10	64.00	95.50	81.00	0.00	0.80	24.00	5.17
2	25.70	33.80	28.10	58.00	95.00	79.50	2.50	1.26	22.53	5.13
3	23.50	34.00	28.90	53.50	93.00	76.50	0.00	0.98	24.31	5.34
4	24.70	34.00	27.80	57.50	91.50	77.50	0.00	1.35	20.47	4.84
5	23.80	34.20	28.50	52.00	89.50	70.50	0.00	1.28	24.18	5.51
6	24.50	33.60	29.00	55.50	86.00	72.00	0.00	1.17	22.91	5.21
7	25.50	34.40	29.30	58.50	91.50	76.50	0.00	0.93	22.04	4.99
8	23.30	35.10	29.50	52.50	91.50	73.50	0.00	0.98	23.71	5.33
9	25.00	35.10	28.90	55.50	95.50	77.50	42.50	1.08	21.33	4.96
10	24.20	34.10	29.10	57.00	91.50	75.50	0.00	1.05	23.93	5.32
11	24.90	34.60	28.60	58.50	92.00	75.50	0.50	1.03	20.76	4.79
12	24.70	34.60	28.20	50.00	94.50	79.00	2.00	1.09	21.59	5.02
13	24.80	27.20	25.80	80.00	95.50	90.00	3.00	0.58	3.28	1.14
14	23.10	30.70	26.50	64.00	93.00	83.00	0.00	0.89	7.58	2.22
15	23.80	34.30	27.50	57.50	95.50	82.00	0.00	0.87	16.33	3.88
16	24.30	33.50	26.60	59.50	94.50	86.00	1.00	0.91	12.01	3.12
17	24.40	33.30	28.10	61.00	92.50	79.00	0.50	0.96	19.81	4.47
18	24.90	33.50	27.80	61.00	91.50	81.00	0.00	0.95	19.28	4.40
19	25.00	33.30	27.50	58.00	94.50	82.50	0.50	1.02	18.18	4.24
20	23.80	33.70	27.20	58.00	93.00	82.00	0.00	1.10	17.82	4.22
21	23.50	33.30	27.50	60.00	90.50	78.50	0.50	1.28	22.57	5.04
22	23.20	33.60	27.40	55.00	89.50	76.50	0.00	1.19	20.15	4.69
23	24.20	34.20	28.20	53.50	95.50	77.00	10.00	1.09	20.30	4.72
24	24.60	31.40	27.10	69.50	95.00	86.00	0.50	0.86	11.36	2.79
25	24.40	32.80	28.30	54.50	94.50	77.50	1.00	1.15	25.47	5.51
26	24.60	33.90	28.40	55.00	98.00	81.00	39.50	1.18	21.43	4.91
27	23.10	32.60	27.30	70.00	98.50	85.50	0.50	0.96	14.28	3.32
28	22.90	32.80	26.80	64.00	97.50	85.50	34.50	1.20	22.66	4.86
29	22.80	32.90	27.70	59.50	97.50	80.50	0.00	1.00	23.31	4.99
30	25.30	33.40	28.20	64.00	96.00	81.50	5.50	1.27	22.23	4.97
31	24.20	33.30	28.90	62.50	91.00	79.00	0.00	1.01	23.75	5.18
Decade 1	24.45	34.20	28.82	56.40	92.05	76.00	45.00	1.09	22.94	5.18
Decade 2	24.37	32.87	27.38	60.75	93.65	82.00	7.50	0.94	15.66	3.75
Decade 3	23.89	33.11	27.80	60.68	94.86	80.77	92.00	1.11	20.68	4.64
MONTH	24.23	33.38	27.99	59.32	93.56	79.63	144.50	1.05	19.79	4.53

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	25.00	34.00	28.70	59.50	92.00	79.50	0.00	0.83	20.63	4.65
2	24.40	33.30	28.70	58.50	95.00	80.50	0.50	0.78	19.44	4.36
3	24.20	33.10	28.10	55.00	93.50	80.00	1.00	1.13	18.34	4.35
4	23.00	32.60	26.90	56.50	94.50	82.50	5.50	0.94	11.67	3.07
5	24.00	33.40	28.60	60.00	93.50	78.50	0.00	0.93	21.63	4.79
6	25.30	33.80	28.00	60.00	91.50	80.00	0.00	1.03	17.46	4.17
7	22.90	34.20	27.40	58.00	95.00	80.50	11.00	1.03	20.20	4.59
8	24.00	32.60	27.80	59.50	93.50	80.50	1.00	0.76	15.39	3.60
9	24.30	33.20	28.40	59.50	94.00	78.00	0.00	0.93	24.33	5.24
10	24.00	34.00	27.80	56.00	90.00	78.00	0.00	1.27	22.05	5.08
11	24.40	33.60	28.40	52.00	92.00	76.50	0.00	1.35	23.92	5.45
12	23.20	33.70	28.20	58.00	93.00	77.00	0.00	1.05	23.11	5.09
13	24.30	34.00	27.90	50.50	91.00	76.00	0.00	1.05	17.53	4.30
14	25.10	34.10	27.60	62.00	96.50	81.00	31.00	1.15	19.29	4.47
15	23.40	33.00	26.90	63.50	97.00	87.00	7.00	0.75	20.56	4.42
16	24.40	31.80	26.60	69.00	96.50	86.50	0.00	1.00	12.53	3.03
17	24.40	33.20	27.70	57.50	93.50	81.00	0.00	0.79	15.81	3.73
18	24.20	31.70	27.30	61.00	95.00	83.00	4.00	0.66	13.45	3.17
19	23.90	32.00	27.10	69.50	97.00	87.00	3.00	0.73	17.50	3.82
20	24.10	32.20	26.90	65.50	96.00	87.50	26.50	0.66	12.97	3.05
21	24.00	33.10	28.20	61.50	93.00	81.00	0.00	0.93	22.95	4.98
22	24.70	33.20	27.90	60.00	95.00	83.50	3.50	0.68	19.59	4.32
23	24.70	32.80	27.20	64.50	95.00	85.00	1.00	0.82	18.43	4.10
24	23.80	32.80	26.70	64.50	94.50	84.50	0.00	0.93	14.45	3.44
25	23.20	33.70	27.40	59.50	97.50	81.50	35.00	1.01	25.43	5.40
26	22.40	32.50	27.60	54.00	98.00	81.50	0.00	1.11	25.77	5.44
27	23.00	32.90	27.70	54.00	94.50	79.50	0.00	1.11	23.73	5.17
28	23.20	33.00	27.40	58.00	95.50	83.00	0.00	1.09	20.38	4.57
29	23.40	33.40	26.90	64.00	94.50	84.00	0.50	1.31	23.52	5.11
30	23.20	33.50	26.50	61.50	94.50	86.00	6.00	1.10	18.28	4.21
31	23.5	32.9	27.3	64	95.5	84	0	0.93	16.09	3.73
Decade 1	24.11	33.42	28.04	58.25	93.25	79.80	19.00	0.96	19.11	4.39
Decade 2	24.14	32.93	27.46	60.85	94.75	82.25	71.50	0.92	17.67	4.05
Decade 3	23.55	33.07	27.35	60.50	95.23	83.05	46.00	1.00	20.78	4.59
MONTH	23.92	33.14	27.61	59.89	94.44	81.74	136.50	0.96	19.24	4.35

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.30	33.70	28.10	61.50	96.50	82.50	0.50	1.05	21.34	4.77
2	23.80	33.20	27.90	61.00	95.00	82.00	0.00	0.93	19.89	4.44
3	24.70	33.30	27.30	59.00	96.00	85.50	0.00	0.94	18.24	4.19
4	24.00	33.00	26.50	64.50	98.00	87.00	5.00	1.03	15.54	3.64
5	23.10	32.60	27.40	65.50	97.00	84.00	7.50	0.90	25.07	5.21
6	23.20	32.80	27.70	62.50	95.50	82.50	20.50	0.91	26.14	5.44
7	23.00	32.70	27.50	64.50	97.50	82.50	0.00	0.96	26.07	5.40
8	23.60	33.00	27.80	56.00	95.50	81.50	0.00	0.97	25.32	5.38
9	23.80	33.10	27.80	61.00	93.00	80.00	0.00	1.16	25.92	5.53
10	23.60	32.90	27.90	62.00	96.50	81.50	40.50	1.01	25.83	5.44
11	23.30	32.80	27.70	62.00	99.00	86.00	0.00	0.79	23.09	4.88
12	24.30	32.80	27.40	66.00	96.00	85.00	1.00	0.91	18.85	4.18
13	23.50	33.10	27.60	63.50	96.00	84.50	0.00	0.91	22.70	4.87
14	24.00	34.40	28.40	58.50	97.00	81.00	27.00	1.00	24.78	5.40
15	23.90	33.50	28.10	63.50	97.50	83.50	0.00	0.87	24.27	5.17
16	24.30	33.20	27.30	59.50	94.00	82.50	1.50	1.12	18.15	4.24
17	23.90	33.10	27.30	60.50	96.00	85.00	4.50	0.98	22.09	4.80
18	24.00	33.10	28.00	60.50	96.00	84.00	0.50	0.91	23.05	4.97
19	24.60	33.10	28.50	59.50	96.00	82.50	0.00	1.02	25.50	5.46
20	24.00	33.50	28.50	61.00	95.00	80.00	0.00	1.19	25.63	5.54
21	24.50	33.40	28.00	60.00	94.50	81.00	1.00	1.22	22.59	5.04
22	23.70	33.80	27.90	60.50	94.50	81.00	0.50	1.01	21.24	4.73
23	24.00	33.80	27.40	61.00	95.50	85.00	0.00	0.73	13.69	3.30
24	23.60	33.60	27.30	58.00	97.50	83.50	40.50	1.25	22.61	5.02
25	23.80	34.70	28.30	59.50	95.50	81.00	0.00	0.93	21.04	4.73
26	24.60	35.10	28.10	52.00	93.00	82.00	0.00	1.09	16.19	4.13
27	23.40	35.10	28.40	55.00	92.00	78.50	0.00	1.04	18.93	4.51
28	24.00	34.00	28.90	59.50	93.00	78.00	0.00	1.15	23.45	5.21
29										
30										
31										
Decade 1	23.71	33.03	27.59	61.75	96.05	82.90	74.00	0.99	22.94	4.94
Decade 2	23.98	33.26	27.88	61.45	96.25	83.40	34.50	0.97	22.81	4.95
Decade 3	23.95	34.19	28.04	58.19	94.44	81.25	42.00	1.05	19.97	4.58
MONTH	23.88	33.44	27.82	60.63	95.66	82.61	150.50	1.00	22.04	4.84

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PISCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	25.20	34.00	28.10	64.50	94.50	83.50	0.00	0.87	13.74	3.37
2	23.90	34.00	26.70	60.50	96.50	85.50	2.50	0.98	13.89	3.45
3	23.20	32.70	26.30	65.00	96.50	86.50	0.50	0.89	11.87	2.94
4	24.20	32.80	26.70	62.00	97.50	86.00	2.00	0.81	14.63	3.42
5	23.20	33.50	27.10	55.50	95.00	83.50	0.00	1.02	21.55	4.76
6	24.00	33.60	27.20	61.50	94.50	84.00	0.00	1.00	16.59	3.89
7	23.50	33.20	27.70	59.00	93.50	79.50	0.00	1.23	24.56	5.31
8	22.00	33.40	27.40	55.50	94.50	77.50	0.00	1.13	25.46	5.41
9	22.60	33.50	27.80	56.00	91.00	75.00	0.00	1.27	25.65	5.54
10	23.90	33.80	28.00	56.50	92.00	76.00	0.00	1.23	25.40	5.54
11	22.90	33.60	27.40	56.00	95.00	77.50	7.50	1.20	24.61	5.32
12	22.70	32.80	27.20	64.50	94.00	81.50	0.50	0.95	22.68	4.78
13	23.40	33.00	27.70	54.00	91.50	74.50	0.00	1.20	24.79	5.36
14	23.30	32.80	27.90	58.50	94.50	77.50	56.50	1.06	24.12	5.14
15	23.60	33.00	27.20	54.50	98.50	81.50	0.00	1.01	21.94	4.77
16	23.00	32.80	27.20	60.00	92.00	79.00	0.00	1.18	23.09	4.97
17	23.10	32.90	27.60	60.50	93.50	80.00	0.50	0.95	22.56	4.81
18	23.90	33.00	27.90	61.50	93.00	79.00	0.50	0.96	22.27	4.80
19	24.00	33.40	28.00	56.00	93.00	76.50	0.00	1.00	23.13	5.02
20	23.50	32.90	27.80	58.00	91.00	77.50	0.00	1.17	24.76	5.29
21	23.30	32.90	27.70	61.50	93.00	80.00	0.00	1.01	24.63	5.16
22	23.80	33.20	28.00	59.00	92.50	76.50	0.00	1.23	24.80	5.33
23	23.30	33.80	28.20	54.50	90.00	74.00	0.00	1.09	24.62	5.32
24	23.40	34.00	28.10	58.50	90.00	76.50	0.00	1.17	24.35	5.30
25	24.10	33.60	28.50	58.50	90.00	78.00	0.00	0.93	22.80	4.94
26	24.00	33.40	27.50	61.50	97.50	81.00	10.00	1.08	15.74	3.72
27	23.20	33.80	27.90	58.00	97.50	82.50	9.50	0.94	24.22	5.12
28	23.60	33.10	27.80	59.00	96.00	81.00	2.50	1.16	20.88	4.61
29	24.50	33.20	27.90	62.50	86.00	77.50	0.00	1.17	20.23	4.57
30	23.30	32.90	27.70	58.50	96.50	77.50	20.00	1.19	20.73	4.57
31	23.30	34.10	27.60	54.50	96.00	82.00	0.00	1.16	21.71	4.84
Decade 1	23.57	33.45	27.30	59.60	94.55	81.70	5.00	1.04	19.33	4.36
Decade 2	23.34	33.02	27.59	58.35	93.60	78.45	65.50	1.07	23.40	5.03
Decade 3	23.62	33.45	27.90	58.73	93.18	78.77	42.00	1.10	22.25	4.86
MONTH	23.51	33.31	27.61	58.89	93.76	79.61	112.50	1.07	21.68	4.75

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PASCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.70	33.00	27.10	64.00	97.00	85.00	8.50	1.03	18.81	4.14
2	23.00	33.30	27.40	50.00	97.00	80.50	7.00	1.12	23.53	5.07
3	23.70	32.60	27.70	61.50	97.00	82.00	0.00	0.91	21.26	4.51
4	23.90	32.90	28.00	63.00	94.00	78.50	0.00	1.11	24.14	5.08
5	23.00	32.70	27.50	55.00	93.50	77.50	0.00	1.23	24.28	5.15
6	23.50	33.20	27.80	54.50	93.50	76.00	0.00	1.23	24.03	5.17
7	22.50	33.50	27.80	56.50	92.00	76.50	0.00	1.23	23.13	5.00
8	23.40	34.10	27.90	57.00	92.00	76.50	0.00	1.13	22.01	4.85
9	25.00	33.80	27.60	62.00	95.50	81.50	0.00	0.83	16.94	3.84
10	23.60	33.80	27.20	61.50	95.50	85.00	0.00	0.95	16.27	3.74
11	24.90	33.10	27.80	66.50	94.00	84.50	0.00	0.81	15.27	3.48
12	24.60	33.20	27.10	64.00	96.00	86.50	5.50	0.90	15.37	3.52
13	23.60	33.50	27.40	66.50	94.50	85.00	0.00	0.88	17.25	3.81
14	24.00	33.60	27.40	64.00	97.00	82.50	12.00	1.16	20.58	4.47
15	24.30	32.70	27.10	68.00	98.50	87.50	0.00	0.83	17.52	3.77
16	23.60	32.60	27.60	66.50	94.50	82.50	19.50	1.01	18.68	4.04
17	23.60	32.40	26.60	64.50	98.50	89.00	1.00	0.84	16.38	3.57
18	23.40	31.90	27.10	69.00	96.50	86.50	0.50	0.75	16.01	3.44
19	23.90	31.30	26.30	72.00	98.50	91.00	12.00	0.66	12.23	2.72
20	23.70	30.90	25.30	79.50	99.50	95.50	30.00	0.63	5.65	1.51
21	23.00	31.40	26.20	69.00	100.50	91.50	0.50	0.86	15.97	3.38
22	24.00	32.60	27.10	66.00	97.00	86.00	0.00	0.87	16.70	3.64
23	22.70	32.50	27.00	67.00	92.00	81.50	0.00	1.40	20.45	4.37
24	23.80	33.10	27.60	52.50	93.00	78.50	0.00	1.18	22.27	4.80
25	23.00	33.80	27.00	54.00	95.50	78.00	0.00	1.30	22.32	4.85
26	21.40	32.40	26.60	53.00	94.50	76.50	2.50	1.22	22.31	4.66
27	22.70	32.50	27.00	57.50	95.00	82.00	0.00	1.05	20.97	4.39
28	22.90	32.10	27.40	57.50	94.50	80.50	0.00	0.98	22.01	4.51
29	23.30	32.60	26.90	62.00	96.00	82.50	5.50	1.03	15.88	3.56
30	22.70	31.10	25.30	72.00	98.00	93.00	13.00	0.66	9.73	2.26
31										
Decade 1	23.53	33.29	27.60	58.50	94.70	79.90	15.50	1.08	21.44	4.65
Decade 2	23.96	32.52	26.97	68.05	96.75	87.05	80.50	0.85	15.49	3.43
Decade 3	22.95	32.41	26.81	61.05	95.60	83.00	21.50	1.05	18.86	4.04
MONTH	23.48	32.74	27.13	62.53	95.68	83.32	117.50	0.99	18.60	4.04

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.20	31.00	25.30	69.00	99.00	93.50	14.50	0.88	10.57	2.48
2	23.60	31.90	27.00	66.50	97.50	86.00	10.50	1.11	18.09	3.84
3	23.80	31.20	25.30	70.50	98.00	94.00	22.00	0.89	8.88	2.22
4	23.20	31.70	26.50	63.50	97.50	87.50	14.00	0.98	16.52	3.55
5	23.20	31.60	25.20	72.00	98.50	94.50	84.00	1.17	8.42	2.21
6	23.60	30.80	25.30	74.50	99.50	94.00	26.00	1.04	9.10	2.20
7	23.00	29.20	24.80	77.50	98.00	92.00	13.00	1.38	8.07	2.03
8	23.60	26.00	24.40	91.00	99.50	98.00	58.50	0.96	3.29	0.98
9	23.10	29.30	24.90	78.50	99.50	94.50	13.50	0.83	7.31	1.78
10	23.30	29.70	25.70	75.00	96.50	89.50	0.00	1.00	8.38	2.07
11	24.50	30.60	25.70	73.00	98.00	92.00	3.50	0.78	7.74	1.95
12	23.40	31.30	26.10	68.00	95.00	87.00	0.50	0.97	12.42	2.84
13	23.50	30.60	26.60	73.50	96.50	87.50	0.00	0.95	10.75	2.48
14	23.30	30.40	26.20	77.00	97.50	91.00	2.00	0.82	10.10	2.29
15	23.30	31.80	26.20	70.50	100.50	92.00	160.00	0.83	14.37	3.05
16	23.20	32.50	26.90	72.50	101.50	94.00	0.00	0.71	18.44	3.71
17	23.60	31.50	26.40	75.50	97.50	89.50	0.00	0.84	14.41	3.03
18	23.20	33.30	27.10	63.50	98.00	87.50	0.00	1.00	18.88	3.96
19	23.60	31.80	27.10	68.00	97.50	88.00	0.00	0.91	17.81	3.66
20	22.90	32.10	27.20	71.00	97.00	86.50	0.00	0.84	17.43	3.57
21	24.30	32.10	27.00	68.50	96.50	87.00	0.00	0.96	16.95	3.56
22	23.60	31.80	26.60	69.50	97.50	87.00	0.50	0.83	16.38	3.39
23	23.10	32.00	26.50	70.50	97.00	86.50	0.00	0.95	16.15	3.37
24	23.60	31.80	26.60	70.00	96.00	87.50	2.00	1.11	13.37	2.99
25	23.90	31.50	26.30	73.00	97.50	91.00	11.00	0.84	14.19	2.99
26	23.30	32.00	25.70	70.00	99.00	92.50	1.00	0.86	12.16	2.70
27	22.50	31.80	26.30	65.50	97.00	85.50	0.00	1.05	18.68	3.78
28	23.00	31.90	26.80	65.50	99.00	85.00	0.00	0.91	17.40	3.57
29	23.10	31.40	26.60	66.50	98.00	87.00	0.00	0.89	17.97	3.61
30	22.00	32.10	26.40	63.00	97.00	83.00	0.00	1.12	17.38	3.64
31	23.20	32.10	26.70	64.50	96.00	85.00	0.50	1.12	16.31	3.50
Decade 1	23.36	30.24	25.44	73.80	98.35	92.35	256.00	1.02	9.86	2.34
Decade 2	23.45	31.59	26.55	71.25	97.90	89.50	166.00	0.87	14.24	3.05
Decade 3	23.24	31.86	26.50	67.86	97.32	87.00	15.00	0.97	16.09	3.37
MONTH	23.35	31.25	26.17	70.87	97.84	89.53	437.00	0.95	13.48	2.94

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.70	28.70	25.60	80.00	97.50	93.00	1.50	0.81	6.63	1.65
2	22.30	31.50	26.50	66.50	97.00	84.50	0.00	1.24	18.83	3.81
3	22.70	31.40	26.20	58.50	94.00	81.50	0.00	1.18	18.62	3.86
4	22.20	30.60	25.60	57.50	94.00	79.50	0.00	1.06	16.86	3.50
5	21.90	28.90	24.80	61.50	94.00	80.00	0.00	0.98	10.15	2.42
6	21.80	29.40	24.30	64.00	92.50	81.50	0.00	1.02	9.57	2.35
7	21.70	28.40	24.30	73.00	96.50	87.00	2.00	0.91	7.73	1.89
8	22.80	28.20	24.70	76.50	97.50	89.00	2.00	0.91	6.73	1.70
9	21.90	30.20	25.20	70.00	98.00	86.50	0.00	0.98	13.48	2.81
10	22.90	31.30	26.10	61.00	92.50	82.00	9.50	1.08	15.30	3.32
11	22.70	25.50	23.90	87.50	99.00	96.50	8.00	0.65	2.41	0.86
12	23.30	27.30	24.70	82.50	99.50	95.50	14.00	0.57	3.39	1.04
13	22.90	28.60	24.80	76.00	97.50	91.50	0.00	0.90	7.32	1.79
14	23.20	29.20	25.20	75.00	97.50	91.50	0.00	0.84	8.65	2.00
15	23.30	29.00	25.00	73.50	98.00	91.00	0.00	1.00	8.56	2.03
16	22.50	28.00	25.00	80.00	97.00	90.50	0.00	1.00	6.20	1.59
17	22.00	29.70	25.20	64.50	97.50	85.00	0.00	1.24	15.84	3.25
18	20.90	30.70	25.10	64.00	94.00	83.00	0.50	1.22	18.18	3.62
19	22.50	30.70	25.60	56.00	95.50	82.00	0.00	1.02	18.26	3.67
20	21.20	30.70	25.40	59.00	95.50	82.00	2.00	1.16	17.68	3.59
21	23.10	29.60	24.90	64.50	96.50	87.00	0.00	0.86	9.86	2.31
22	21.70	28.90	24.90	70.50	96.50	86.50	32.00	1.19	10.28	2.36
23	22.80	28.40	24.10	73.00	99.00	94.00	4.00	1.01	4.90	1.49
24	22.20	29.80	24.30	72.00	97.50	91.00	3.00	1.04	7.97	1.99
25	22.10	28.90	24.70	78.50	98.00	92.00	43.00	1.05	9.16	2.05
26	22.90	30.70	25.70	65.50	98.50	86.50	0.00	1.19	14.25	3.07
27	19.90	30.60	24.70	58.50	95.00	80.50	0.00	1.16	18.75	3.69
28	21.30	30.30	25.00	63.00	90.00	80.00	0.00	1.18	11.73	2.77
29	23.00	26.70	23.90	82.00	97.50	91.00	27.00	1.11	4.54	1.31
30	22.60	26.50	23.60	87.00	99.50	97.00	29.50	0.66	4.74	1.20
31										
Decade 1	22.39	29.86	25.33	66.85	95.35	84.45	15.00	1.02	12.39	2.73
Decade 2	22.45	28.94	24.99	71.80	97.10	88.85	24.50	0.96	10.65	2.34
Decade 3	22.16	29.04	24.58	71.45	96.80	88.55	138.50	1.05	9.62	2.22
MONTH	22.33	29.28	24.97	70.03	96.42	87.28	178.00	1.01	10.89	2.43

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.60	26.70	24.00	86.50	100.00	97.50	0.00	0.87	5.51	1.34
2	23.30	27.60	24.30	84.00	100.00	96.50	0.00	1.01	6.10	1.48
3	23.80	27.70	25.30	75.00	100.50	94.00	0.00	0.80	6.20	1.58
4	24.10	27.70	25.30	80.50	99.00	93.00	1.00	0.52	5.64	1.41
5	23.40	26.30	24.20	93.00	98.50	97.00	19.00	0.54	5.55	1.28
6	23.00	30.50	25.40	73.50	99.50	91.50	0.00	0.60	13.08	2.66
7	22.20	29.90	25.30	73.00	97.00	90.00	0.00	0.88	10.91	2.39
8	23.20	29.50	25.70	75.00	98.50	90.50	1.50	0.88	11.87	2.51
9	23.70	28.60	25.00	80.50	99.50	94.50	5.00	0.72	7.61	1.75
10	23.10	30.40	25.80	72.00	99.00	90.00	1.50	1.01	17.06	3.37
11	22.40	30.60	25.20	68.00	99.50	89.00	0.00	0.94	15.60	3.15
12	19.50	30.10	24.50	65.50	97.50	84.50	0.50	1.05	15.70	3.15
13	23.20	28.60	24.50	70.00	99.00	93.00	9.00	0.89	7.20	1.84
14	21.60	30.60	25.20	55.00	97.50	84.50	1.00	1.22	17.96	3.71
15	22.00	28.10	24.00	77.00	96.50	90.00	8.00	1.05	6.32	1.67
16	20.60	26.50	23.40	83.00	98.00	94.00	9.00	0.84	4.13	1.20
17	22.40	29.00	24.80	70.50	99.00	90.00	0.00	0.82	9.83	2.21
18	22.00	28.80	24.80	72.00	98.50	86.50	0.50	0.97	10.32	2.29
19	22.20	30.00	25.10	67.00	96.50	86.00	0.00	0.95	12.90	2.78
20	21.10	30.00	24.70	63.00	97.00	85.00	0.00	1.01	16.32	3.29
21	21.40	29.20	24.50	67.00	96.50	85.50	0.50	0.89	11.38	2.50
22	21.30	28.30	24.10	68.50	93.50	85.50	0.00	0.81	8.20	2.00
23	21.50	29.10	24.50	64.50	95.00	86.00	4.00	0.47	8.20	1.92
24	22.10	26.70	23.40	82.00	100.00	97.00	63.50	0.59	4.16	1.16
25	22.80	29.60	25.60	70.50	100.50	91.50	42.50	0.81	11.47	2.49
26	23.90	28.80	25.10	77.50	99.50	95.00	26.00	0.83	7.39	1.79
27	23.70	29.50	25.80	75.00	97.50	90.00	2.00	0.75	11.51	2.48
28	23.50	30.80	26.10	70.00	97.50	87.50	0.50	0.74	17.79	3.53
29	23.00	30.60	25.70	70.50	98.00	88.00	1.00	0.74	17.32	3.43
30	20.70	30.20	25.00	68.00	97.50	86.50	0.00	0.72	20.36	3.80
31	20.80	30.50	25.40	68.50	96.50	85.00	7.00	0.56	18.65	3.54
Decade 1	23.24	28.49	25.03	79.30	99.15	93.45	28.00	0.78	8.95	1.98
Decade 2	21.70	29.23	24.62	69.10	97.90	88.25	28.00	0.97	11.63	2.53
Decade 3	22.25	29.39	25.02	71.09	97.45	88.86	147.00	0.72	12.40	2.60
MONTH	22.39	29.05	24.89	73.10	98.15	90.15	203.00	0.82	11.04	2.38

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PASCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.40	29.20	24.80	75.50	99.00	93.50	34.50	0.71	10.45	2.26
2	22.20	24.10	23.20	96.50	102.00	99.00	243.00	0.69	1.17	0.57
3	21.40	29.20	24.50	61.50	102.00	88.50	0.00	1.10	12.91	2.84
4	22.00	29.00	24.40	61.50	98.00	85.00	1.00	0.78	13.95	2.90
5	20.50	29.30	24.30	62.00	95.00	83.50	0.00	0.89	19.26	3.68
6	20.70	29.90	24.40	62.00	95.50	82.50	0.00	0.84	18.79	3.64
7	20.80	29.80	24.60	59.50	97.50	84.00	0.00	0.74	19.14	3.67
8	20.50	30.30	24.50	47.00	96.00	80.50	0.00	0.93	19.99	3.96
9	19.70	29.80	24.30	62.50	97.50	83.00	0.00	0.79	20.47	3.84
10	20.80	29.70	24.50	65.50	97.50	86.00	0.50	0.65	16.46	3.23
11	21.70	29.70	24.90	70.00	98.00	88.00	0.00	0.68	15.18	3.05
12	20.50	29.20	24.00	70.00	98.50	90.00	2.50	0.65	10.17	2.25
13	20.40	30.50	24.50	47.50	98.50	82.50	0.00	0.94	21.36	4.18
14	18.10	30.70	23.80	39.50	94.50	72.00	0.00	1.05	22.02	4.35
15	17.10	29.70	23.40	54.50	95.50	77.50	0.00	0.91	21.05	3.96
16	19.00	30.90	24.20	49.50	97.00	82.50	0.00	1.05	21.13	4.20
17	18.10	29.60	24.10	67.00	97.50	82.00	0.00	0.89	18.17	3.50
18	21.80	30.40	25.40	64.50	97.50	86.00	0.00	0.72	17.85	3.57
19	20.40	30.60	25.30	69.00	98.00	85.50	2.00	0.81	18.03	3.58
20	23.00	31.10	26.50	66.50	98.50	87.50	0.50	0.68	21.58	4.24
21	23.40	31.00	26.40	68.50	97.50	87.00	0.00	0.69	18.51	3.75
22	21.80	30.70	26.10	63.50	97.50	84.50	0.50	0.81	21.61	4.23
23	22.80	30.20	25.30	72.50	98.50	91.00	14.00	0.72	13.72	2.90
24	21.40	31.60	25.50	59.50	97.00	86.50	0.00	0.87	19.54	3.98
25	21.00	30.30	24.80	64.50	98.00	82.50	0.00	0.73	18.21	3.62
26	21.10	30.50	25.80	62.50	98.00	84.50	0.00	0.64	22.15	4.25
27	22.70	31.50	26.50	61.50	96.00	83.50	0.00	0.81	22.33	4.46
28	21.80	31.10	26.00	68.00	96.50	85.50	0.00	1.13	21.51	4.31
29	21.70	30.90	25.70	59.50	95.50	82.00	0.00	1.16	22.18	4.48
30	20.70	30.60	25.20	60.00	94.00	80.00	0.00	1.10	22.06	4.39
31	19.20	31.90	25.10	50.00	93.00	75.50	0.00	0.97	22.55	4.54
Decade 1	21.10	29.03	24.35	65.35	98.00	86.55	279.00	0.81	15.26	3.06
Decade 2	20.01	30.24	24.61	59.80	97.35	83.35	5.00	0.84	18.65	3.69
Decade 3	21.60	30.94	25.67	62.73	96.50	83.86	14.50	0.88	20.40	4.08
MONTH	20.93	30.10	24.90	62.63	97.26	84.56	298.50	0.84	18.18	3.63

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2010

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	17.10	30.60	24.50	53.50	94.50	76.00	0.00	1.00	22.71	4.40
2	21.80	30.80	26.10	69.00	98.00	87.00	0.00	0.65	17.97	3.65
3	22.80	31.60	26.10	69.50	100.00	87.50	27.00	0.88	16.24	3.46
4	22.40	31.20	26.30	63.00	100.50	88.00	0.00	0.52	21.16	4.19
5	22.20	31.50	26.50	67.00	97.50	86.00	0.00	0.74	20.22	4.10
6	22.70	32.00	26.80	59.00	97.50	85.00	1.00	0.88	20.89	4.35
7	23.50	30.50	25.90	71.50	98.00	91.00	2.00	0.66	12.88	2.83
8	22.80	32.10	26.20	63.50	98.50	88.00	0.00	0.71	17.88	3.77
9	23.00	31.60	26.10	66.00	98.00	89.50	0.00	0.60	18.50	3.81
10	19.60	31.50	25.50	53.50	94.00	81.00	0.00	0.94	23.11	4.64
11	18.90	32.10	25.80	49.50	93.50	77.00	0.00	1.09	23.06	4.78
12	21.00	31.40	25.90	55.50	94.00	77.00	0.00	1.06	22.08	4.44
13	20.40	31.00	25.60	55.00	92.00	75.50	0.00	1.23	22.76	2.49
14	20.00	32.00	25.80	60.00	95.00	77.00	0.00	1.12	20.95	4.67
15	21.40	32.90	26.50	53.00	93.00	75.50	0.00	1.17	22.37	2.14
16	20.90	32.30	26.10	58.50	93.00	76.00	0.00	1.06	22.32	3.13
17	20.80	32.10	26.00	53.00	90.00	72.50	0.00	1.22	21.74	4.73
18	20.20	32.60	26.10	50.50	87.00	71.50	0.00	1.03	22.99	4.85
19	20.20	32.10	26.00	46.50	87.00	70.00	0.00	1.17	23.55	4.10
20	21.10	31.70	26.40	56.50	91.50	76.00	0.00	1.01	21.32	2.04
21	22.40	30.10	24.80	79.00	102.00	97.00	0.00	1.04	11.28	2.50
22	22.30	31.70	26.60	61.00	93.00	77.50	0.00	1.28	21.64	3.68
23	22.50	31.10	26.00	67.50	99.00	89.00	0.00	0.80	21.74	4.38
24	22.40	31.60	26.50	64.00	93.00	80.00	0.00	1.20	20.83	4.23
25	22.40	33.00	27.00	58.50	94.00	76.50	0.00	1.02	23.80	4.55
26	20.80	32.10	26.50	55.00	92.00	77.50	0.00	0.78	21.42	4.87
27	21.30	32.60	26.80	54.50	92.00	76.50	0.00	0.95	22.46	4.59
28	22.80	32.60	27.00	52.50	88.00	71.00	0.00	1.09	22.11	4.79
29	19.50	32.60	26.30	48.00	91.50	71.50	0.00	1.10	22.72	4.40
30	21.10	31.50	26.80	47.50	91.50	74.00	0.00	1.16	21.53	4.88
31										
Decade 1	21.79	31.34	26.00	63.55	97.65	85.90	30.00	0.76	19.16	3.92
Decade 2	20.49	32.02	26.02	53.80	91.60	74.80	0.00	1.12	22.31	3.74
Decade 3	21.75	31.89	26.43	58.75	93.60	79.05	0.00	1.04	20.95	4.29
MONTH	21.34	31.75	26.15	58.70	94.28	79.92	30.00	0.97	20.81	3.98

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PASCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.20	32.20	27.70	63.50	90.50	78.50	0.00	0.79	21.26	3.56
2	24.10	33.20	27.70	56.00	92.50	77.50	0.00	0.75	23.10	4.70
3	23.50	32.60	27.20	61.50	93.00	78.00	0.00	1.05	22.38	4.53
4	22.60	34.10	27.70	51.00	95.00	75.50	0.00	0.87	22.13	4.46
5	22.50	33.70	27.70	54.50	93.00	77.00	0.00	0.97	21.78	4.74
6	23.10	32.90	27.40	54.50	92.00	76.00	0.00	1.01	20.52	4.17
7	22.10	33.70	27.60	52.50	88.00	71.00	0.00	0.93	22.88	3.62
8	21.30	33.80	26.80	41.50	89.50	69.00	0.00	1.24	21.95	3.26
9	20.70	32.80	26.50	51.00	88.00	70.00	0.00	1.28	22.35	2.64
10	22.00	29.80	24.90	73.00	97.50	90.50	0.50	0.81	11.12	2.56
11	21.80	31.90	26.40	46.50	91.50	73.00	0.00	1.31	23.98	3.41
12	20.00	32.00	25.90	52.00	89.00	73.50	0.00	1.23	21.20	4.67
13	21.20	33.30	26.50	53.00	92.00	74.50	0.00	1.12	23.57	3.46
14	22.60	32.10	27.00	62.50	97.50	85.00	0.00	0.76	23.88	4.90
15	22.00	32.90	26.80	52.50	94.00	76.50	0.00	0.94	22.09	4.98
16	21.80	34.30	26.90	45.50	94.50	72.00	0.00	1.00	23.48	4.38
17	22.30	32.80	27.50	55.00	92.00	71.50	0.00	1.20	22.47	3.80
18	22.10	33.10	27.30	50.00	86.00	68.00	0.00	1.23	22.07	2.25
19	20.50	33.50	26.90	44.50	84.50	67.50	0.00	1.13	22.34	3.19
20	20.30	33.20	26.50	40.50	86.00	68.50	0.00	1.10	18.32	5.23
21	23.40	33.00	28.00	58.00	94.50	75.50	8.50	1.22	22.81	4.33
22	22.90	32.90	27.70	60.00	96.50	79.00	0.00	1.05	23.37	3.61
23	21.40	32.60	26.90	55.00	93.00	72.50	0.00	1.12	23.13	4.76
24	21.00	32.70	26.70	50.50	94.00	71.50	0.00	1.12	24.28	5.09
25	18.80	32.80	26.00	44.00	90.00	70.00	0.00	1.12	24.03	4.19
26	18.20	32.80	26.40	37.50	86.00	66.50	0.00	0.98	24.80	5.26
27	20.20	32.60	26.80	51.00	91.50	73.00	0.00	0.95	24.85	5.17
28	18.90	34.50	26.70	39.00	89.50	66.00	0.00	1.00	24.52	5.33
29	18.50	33.00	26.60	44.00	89.50	70.00	0.00	0.95	23.88	5.05
30	21.80	32.40	26.90	54.50	94.00	75.50	0.00	0.95	23.72	5.00
31	20.90	33.40	27.20	41.50	90.00	70.50	0.00	1.32	23.84	5.41
Decade 1	22.61	32.88	27.12	55.90	91.90	76.30	0.50	0.97	20.95	3.82
Decade 2	21.46	32.91	26.77	50.20	90.70	73.00	0.00	1.10	22.34	4.03
Decade 3	20.55	32.97	26.90	48.64	91.68	71.82	8.50	1.07	23.93	4.84
MONTH	21.51	32.92	26.93	51.48	91.44	73.65	9.00	1.05	22.45	4.25

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.70	33.10	27.40	48.00	91.00	71.50	0.00	1.18	22.19	5.00
2	21.70	32.50	27.30	58.00	90.00	75.00	0.00	1.19	23.30	5.04
3	22.20	32.60	27.20	58.50	93.00	76.50	0.00	1.22	24.75	5.27
4	21.40	33.40	27.30	52.00	93.00	74.50	0.00	1.26	25.17	5.46
5	21.40	33.20	27.00	56.00	94.00	75.00	0.00	1.09	24.70	5.25
6	20.60	34.00	27.30	47.00	93.00	70.50	0.00	1.11	24.84	5.41
7	22.50	33.00	27.70	57.50	90.50	73.00	0.00	1.25	23.81	5.21
8	21.40	33.30	27.60	56.00	91.00	74.50	0.00	1.05	23.36	5.06
9	22.10	33.00	27.90	58.00	92.50	74.50	0.00	1.20	24.18	5.23
10	23.40	33.30	27.70	62.00	92.50	78.50	0.00	0.95	20.10	4.47
11	22.50	33.60	28.30	60.50	93.00	76.00	0.00	1.31	22.58	5.04
12	24.00	33.50	28.60	60.50	92.00	78.00	0.00	1.16	23.24	5.15
13	23.00	33.60	28.10	52.00	93.50	74.50	0.00	0.98	24.25	5.27
14	21.70	33.70	28.00	51.00	93.00	73.00	0.00	0.84	21.67	4.76
15	21.40	33.60	27.90	52.50	90.00	73.50	0.00	0.93	24.46	5.23
16	20.10	33.10	27.20	51.00	91.50	74.00	0.00	0.97	24.64	5.20
17	23.30	35.30	28.80	33.50	91.50	63.00	0.00	1.04	24.63	5.64
18	23.80	34.90	28.90	41.50	87.50	65.50	0.00	1.09	22.18	5.24
19	24.10	34.60	28.90	47.50	94.50	74.50	13.50	1.24	22.74	5.32
20	24.00	33.90	27.90	50.50	94.50	79.00	0.00	0.87	17.34	4.12
21	23.50	32.30	27.50	54.50	91.50	76.50	0.00	0.81	13.47	3.33
22	23.80	33.70	28.50	53.00	90.50	74.50	0.00	1.03	24.65	5.41
23	23.80	33.20	28.30	54.00	93.00	76.00	0.00	0.90	22.84	4.99
24	24.50	33.70	28.80	59.50	91.50	75.50	0.00	1.04	23.57	5.21
25	24.70	33.20	27.70	60.00	91.50	79.00	0.00	1.18	17.83	4.24
26	24.50	34.00	27.90	52.50	88.50	75.00	0.00	1.06	16.84	4.19
27	24.00	33.70	28.40	54.00	89.50	75.50	0.00	0.88	20.43	4.63
28	24.00	34.60	29.10	50.00	92.50	75.00	0.00	1.09	24.01	5.43
29	25.60	34.30	29.60	55.50	86.00	73.00	0.00	1.16	24.26	5.53
30	24.00	34.50	29.20	52.50	95.50	76.00	21.00	1.00	24.40	3.84
31										
Decade 1	21.84	33.14	27.44	55.30	92.05	74.35	0.00	1.15	23.64	5.14
Decade 2	22.79	33.98	28.26	50.05	92.10	73.10	13.50	1.04	22.77	5.10
Decade 3	24.24	33.72	28.50	54.55	91.00	75.60	21.00	1.02	21.23	4.68
MONTH	22.96	33.61	28.07	53.30	91.72	74.35	34.50	1.07	22.55	4.97

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.30	33.70	29.10	64.00	95.50	81.00	0.00	0.80	24.00	3.85
2	25.70	33.80	28.10	58.00	95.00	79.50	2.50	1.26	22.53	3.62
3	23.50	34.00	28.90	53.50	93.00	76.50	0.00	0.98	24.31	4.84
4	24.70	34.00	27.80	57.50	91.50	77.50	0.00	1.35	20.47	5.12
5	23.80	34.20	28.50	52.00	89.50	70.50	0.00	1.28	24.18	4.86
6	24.50	33.60	29.00	55.50	86.00	72.00	0.00	1.17	22.91	5.41
7	25.50	34.40	29.30	58.50	91.50	76.50	0.00	0.93	22.04	5.34
8	23.30	35.10	29.50	52.50	91.50	73.50	0.00	0.98	23.71	5.14
9	25.00	35.10	28.90	55.50	95.50	77.50	42.50	1.08	21.33	5.15
10	24.20	34.10	29.10	57.00	91.50	75.50	0.00	1.05	23.93	3.99
11	24.90	34.60	28.60	58.50	92.00	75.50	0.50	1.03	20.76	4.13
12	24.70	34.60	28.20	50.00	94.50	79.00	2.00	1.09	21.59	2.67
13	24.80	27.20	25.80	80.00	95.50	90.00	3.00	0.58	3.28	2.91
14	23.10	30.70	26.50	64.00	93.00	83.00	0.00	0.89	7.58	2.06
15	23.80	34.30	27.50	57.50	95.50	82.00	0.00	0.87	16.33	2.03
16	24.30	33.50	26.60	59.50	94.50	86.00	1.00	0.91	12.01	2.89
17	24.40	33.30	28.10	61.00	92.50	79.00	0.50	0.96	19.81	4.10
18	24.90	33.50	27.80	61.00	91.50	81.00	0.00	0.95	19.28	3.76
19	25.00	33.30	27.50	58.00	94.50	82.50	0.50	1.02	18.18	4.12
20	23.80	33.70	27.20	58.00	93.00	82.00	0.00	1.10	17.82	4.32
21	23.50	33.30	27.50	60.00	90.50	78.50	0.50	1.28	22.57	2.05
22	23.20	33.60	27.40	55.00	89.50	76.50	0.00	1.19	20.15	3.01
23	24.20	34.20	28.20	53.50	95.50	77.00	10.00	1.09	20.30	2.51
24	24.60	31.40	27.10	69.50	95.00	86.00	0.50	0.86	11.36	3.96
25	24.40	32.80	28.30	54.50	94.50	77.50	1.00	1.15	25.47	4.58
26	24.60	33.90	28.40	55.00	98.00	81.00	39.50	1.18	21.43	2.99
27	23.10	32.60	27.30	70.00	98.50	85.50	0.50	0.96	14.28	2.69
28	23.50	32.60	25.90	64.00	99.00	90.00	40.50	0.83	12.75	3.06
29	23.60	32.40	26.40	68.00	97.50	88.50	11.00	0.82	15.28	3.46
30	23.80	33.50	26.70	58.00	97.00	86.50	6.00	0.96	14.29	3.52
31	23.70	31.90	26.60	68.50	98.00	89.50	1.00	0.56	12.97	2.96
Decade 1	24.45	34.20	28.82	56.40	92.05	76.00	45.00	1.09	22.94	4.73
Decade 2	24.37	32.87	27.38	60.75	93.65	82.00	7.50	0.94	15.66	3.30
Decade 3	23.84	32.93	27.25	61.45	95.73	83.32	110.50	0.99	17.35	3.16
MONTH	24.21	33.32	27.80	59.60	93.87	80.53	163.00	1.01	18.61	3.71

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.20	32.80	25.90	62.00	99.00	89.50	18.00	0.90	18.95	4.15
2	22.20	32.00	26.80	64.00	98.50	84.00	1.00	0.87	19.14	4.13
3	23.40	32.50	27.30	58.50	99.50	84.50	28.00	0.87	24.83	5.18
4	22.90	32.30	26.50	63.00	99.00	88.00	5.50	0.90	21.68	4.58
5	23.20	32.20	26.10	66.50	99.00	91.00	1.50	0.68	17.44	3.77
6	22.80	32.60	26.80	68.00	98.50	85.50	0.00	0.93	22.95	4.79
7	24.10	32.40	26.50	68.00	98.50	88.50	14.00	0.83	13.84	3.22
8	23.70	32.70	26.10	67.50	99.00	90.50	23.00	0.76	15.11	3.41
9	24.00	33.30	27.30	62.50	99.00	85.50	0.00	0.89	17.06	3.90
10	23.90	33.30	28.00	58.50	100.50	81.50	0.00	0.81	16.03	3.74
11	24.40	35.00	28.30	49.50	93.00	79.50	2.00	0.94	14.60	3.80
12	23.90	30.70	27.00	64.50	97.00	81.00	11.00	1.42	8.69	2.56
13	22.90	32.70	26.70	65.00	99.00	88.50	0.00	0.57	17.48	3.79
14	24.20	32.10	26.10	66.50	98.50	90.50	2.00	0.63	8.47	2.22
15	22.90	33.70	27.20	53.50	98.50	83.00	0.00	1.16	22.55	5.02
16	23.20	32.90	27.20	59.50	96.50	83.00	0.50	0.82	20.53	4.47
17	23.30	32.00	26.40	59.00	97.50	85.00	0.50	0.54	12.67	2.97
18	23.30	32.70	27.10	61.00	98.00	84.50	0.50	0.76	20.92	4.48
19	23.50	32.30	27.50	63.00	97.00	84.00	0.00	0.65	15.73	3.55
20	23.70	33.20	28.10	66.00	93.50	82.50	0.00	0.86	24.57	5.20
21	23.20	32.30	26.80	72.00	96.50	88.00	2.50	0.93	13.69	3.18
22	23.70	33.00	26.60	63.50	97.50	86.00	0.00	0.82	19.45	4.24
23	22.80	32.30	25.60	63.50	97.00	89.00	1.00	0.94	14.62	3.41
24	23.00	34.60	27.10	52.50	97.50	83.00	3.00	0.90	19.99	4.55
25	24.10	32.30	27.10	64.50	97.50	86.00	0.00	0.84	10.94	2.78
26	24.20	33.00	27.60	61.50	92.50	82.00	0.00	1.06	20.17	4.54
27	23.90	33.90	28.00	57.50	93.50	80.50	0.00	0.93	24.97	5.38
28	23.40	32.20	27.20	63.00	97.50	85.50	2.00	0.88	18.13	4.02
29	22.90	32.30	26.60	62.50	97.00	84.50	1.00	0.88	20.41	4.39
30	22.90	32.40	27.10	64.00	98.50	85.00	55.00	0.88	22.29	4.71
31	23.80	32.60	27.00	65.50	100.00	89.00	22.00	0.74	21.53	4.56
Decade 1	23.34	32.61	26.73	63.85	99.05	86.85	91.00	0.84	18.70	4.09
Decade 2	23.53	32.73	27.16	60.75	96.85	84.15	16.50	0.83	16.62	3.81
Decade 3	23.45	32.81	26.97	62.73	96.82	85.32	86.50	0.89	18.74	4.16
MONTH	23.44	32.72	26.95	62.45	97.55	85.44	194.00	0.86	18.05	4.02

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PASCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2011

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.30	32.30	26.10	65.50	98.00	91.00	1.00	0.74	15.53	3.48
2	23.60	31.80	26.50	70.00	98.50	88.50	2.00	0.73	15.81	3.48
3	23.70	32.50	27.20	64.50	99.00	86.50	0.00	0.63	17.34	3.80
4	23.30	32.60	27.10	60.50	98.00	83.50	18.00	0.82	20.26	4.39
5	23.30	32.80	26.40	66.00	98.50	89.00	0.00	0.80	17.60	3.87
6	23.60	32.20	26.60	68.50	98.50	90.00	1.50	0.56	13.03	2.98
7	24.20	32.30	26.00	65.00	99.00	92.00	14.50	0.63	9.93	2.49
8	23.90	28.20	25.20	84.50	100.50	94.00	0.00	0.58	4.85	1.33
9	23.20	30.80	25.90	72.00	99.00	92.00	0.00	0.59	11.67	2.67
10	23.90	32.50	27.40	59.50	97.50	85.00	0.00	0.74	21.94	4.67
11	23.20	32.10	27.30	67.50	98.00	86.00	0.00	0.88	24.00	4.97
12	22.60	32.10	25.70	66.00	99.50	86.50	22.00	0.91	15.25	3.45
13	22.30	31.90	25.60	69.50	99.50	90.50	0.00	0.67	17.04	3.63
14	22.30	32.20	26.90	64.00	97.50	85.50	0.00	0.74	21.68	4.54
15	24.00	32.20	27.30	66.00	96.50	85.50	0.00	0.68	14.40	3.31
16	23.90	32.00	27.10	64.50	97.00	86.00	0.00	0.58	9.51	2.42
17	22.90	32.80	26.90	60.00	98.00	85.00	2.50	1.03	19.41	4.32
18	21.80	33.00	26.60	61.50	98.50	83.50	0.00	0.90	21.14	4.52
19	22.30	33.00	26.30	60.50	98.00	84.50	3.50	0.91	21.74	4.63
20	22.50	33.40	26.60	57.50	97.50	83.50	0.00	0.89	18.98	4.23
21	23.60	33.20	27.10	58.00	94.00	81.00	0.00	0.96	19.36	4.36
22	23.80	32.90	26.50	58.50	96.50	83.00	5.50	1.01	19.31	4.33
23	22.50	30.40	25.90	70.50	98.00	88.00	0.00	0.72	9.71	2.37
24	23.30	31.30	25.70	64.50	99.00	89.50	2.50	0.88	12.29	2.94
25	23.00	32.90	26.20	54.50	97.00	83.00	2.00	1.27	14.23	3.67
26	23.10	34.30	27.40	50.50	98.00	81.00	0.50	1.06	19.66	4.58
27	22.90	34.90	27.80	46.00	95.00	76.00	0.00	1.16	21.09	4.98
28	23.00	35.50	28.20	41.50	97.50	79.50	0.00	1.01	24.63	5.53
29										
30										
31										
Decade 1	23.60	31.80	26.44	67.60	98.65	89.15	37.00	0.68	14.80	3.32
Decade 2	22.78	32.47	26.63	63.70	98.00	85.65	28.00	0.82	18.32	4.00
Decade 3	23.15	33.18	26.85	55.50	96.88	82.63	10.50	1.01	17.54	4.10
MONTH	23.18	32.43	26.63	62.75	97.91	86.04	75.50	0.82	16.84	3.78

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PASCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.60	31.30	26.70	70.00	97.00	88.00	1.50	0.83	12.15	2.87
2	23.10	32.80	26.50	62.00	97.00	87.50	1.00	0.80	15.30	3.51
3	23.40	33.10	26.40	62.00	95.00	86.00	0.00	1.03	16.03	3.76
4	23.60	32.90	26.90	66.00	97.00	87.00	0.00	0.91	14.47	3.39
5	23.80	32.50	26.60	67.00	97.50	89.00	9.00	0.73	15.95	3.55
6	23.00	31.90	26.10	69.50	98.00	89.00	1.00	0.78	15.58	3.43
7	22.90	32.20	26.70	67.00	98.50	87.00	0.00	0.79	18.92	4.04
8	23.30	32.70	27.40	67.00	96.50	84.00	0.00	0.94	20.17	4.35
9	23.90	32.50	27.30	67.00	94.50	84.50	0.00	1.03	19.14	4.21
10	24.20	32.80	27.00	68.00	95.00	85.50	0.00	1.06	19.46	4.27
11	23.10	34.20	27.70	51.50	94.50	83.00	0.00	1.04	22.60	5.03
12	24.20	33.20	27.80	64.50	96.00	84.50	2.00	0.84	21.47	4.62
13	23.80	33.80	28.00	65.00	97.00	85.00	0.00	0.84	21.22	4.60
14	24.40	32.80	26.30	68.00	99.00	91.50	23.00	0.68	11.88	2.82
15	23.20	31.90	26.40	69.50	98.50	88.00	0.00	0.87	19.11	4.04
16	23.30	31.60	26.50	70.00	99.00	88.00	0.00	0.73	17.02	3.64
17	23.00	32.30	27.10	66.50	94.00	83.50	0.00	0.96	22.45	4.70
18	23.20	33.00	27.30	60.00	95.50	83.00	2.00	0.87	20.90	4.50
19	23.70	32.80	26.70	64.50	97.50	86.50	0.00	1.01	22.01	4.66
20	23.70	32.80	26.20	60.50	94.00	84.50	0.00	1.28	17.13	4.03
21	23.00	32.80	26.40	63.50	95.00	85.00	0.00	1.03	18.03	4.01
22	23.40	33.00	26.80	66.00	97.50	85.00	0.00	0.86	18.17	3.96
23	22.70	32.70	26.80	63.50	97.50	84.50	5.00	1.06	18.58	4.09
24	23.00	32.50	26.70	60.50	98.00	85.50	2.00	0.87	19.17	4.14
25	23.00	31.20	26.50	70.00	100.50	88.50	0.00	0.61	12.66	2.84
26	22.30	31.00	25.20	72.00	100.50	92.50	127.00	0.60	9.58	2.26
27	22.70	31.40	25.20	68.50	101.50	92.00	15.00	0.73	18.29	3.76
28	22.10	31.40	26.10	64.00	100.00	88.50	1.00	0.72	18.92	3.92
29	22.60	31.70	26.50	64.50	99.50	88.00	19.50	0.90	19.07	4.02
30	23.60	26.90	24.60	94.50	100.00	98.00	27.00	0.23	3.53	1.00
31	22.90	30.00	25.40	72.50	99.50	94.50	4.50	0.46	6.85	1.75
Decade 1	23.48	32.47	26.76	66.55	96.60	86.75	12.50	0.89	16.72	3.74
Decade 2	23.56	32.84	27.00	64.00	96.50	85.75	27.00	0.91	19.58	4.26
Decade 3	22.85	31.33	26.02	69.05	99.05	89.27	201.00	0.73	14.80	3.25
MONTH	23.28	32.18	26.57	66.61	97.44	87.32	240.50	0.84	16.96	3.74

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.00	30.50	26.90	69.50	98.50	88.50	0.00	0.44	8.06	2.00
2	22.40	32.90	27.50	64.00	96.50	83.50	0.00	0.50	16.11	3.48
3	22.90	32.60	27.30	66.50	97.00	85.00	0.00	0.87	21.49	4.47
4	23.60	33.40	27.80	62.00	95.50	82.00	0.00	0.95	22.68	4.80
5	23.40	32.80	27.10	63.50	93.50	83.00	0.00	0.95	18.29	4.02
6	23.50	32.50	26.70	65.50	98.00	87.00	18.00	0.89	19.59	4.14
7	23.80	31.10	26.40	74.00	100.50	91.50	0.00	0.61	14.26	3.06
8	23.00	32.40	26.40	63.00	96.50	87.00	2.00	0.90	17.62	3.83
9	22.80	32.00	26.70	68.50	99.50	89.00	3.50	0.66	16.95	3.58
10	23.00	30.50	25.60	61.50	98.00	92.00	19.50	0.54	9.29	2.27
11	22.50	29.90	25.00	72.00	100.00	94.00	4.50	0.69	15.73	3.22
12	22.60	29.60	25.20	76.50	100.00	94.00	22.50	0.73	12.21	2.62
13	22.70	31.50	26.80	66.50	100.00	89.00	0.00	0.53	17.02	3.53
14	23.40	31.40	26.80	69.50	98.50	88.00	0.00	0.68	15.27	3.27
15	24.00	31.70	26.40	73.50	99.00	91.50	11.50	0.69	13.93	3.03
16	23.40	31.60	26.30	70.00	99.00	91.50	1.50	0.67	13.33	2.93
17	22.90	33.00	27.20	64.50	99.50	86.00	0.00	0.71	17.91	3.80
18	24.10	30.10	26.20	75.50	98.00	91.50	0.00	0.58	9.03	2.12
19	22.80	32.10	25.80	68.00	100.00	93.00	10.50	0.46	12.24	2.68
20	23.70	28.20	24.50	83.00	100.00	97.50	14.50	0.58	3.75	1.13
21	23.30	27.10	24.60	85.00	100.00	95.50	35.50	0.57	7.14	1.65
22	22.30	31.60	25.30	55.00	101.00	88.50	0.00	0.87	15.32	3.38
23	22.60	31.80	25.60	68.00	99.00	89.00	5.50	0.71	14.99	3.18
24	22.80	31.80	26.40	65.50	100.00	88.00	7.50	0.89	18.57	3.84
25	22.70	31.00	25.90	73.00	98.00	89.50	18.00	0.91	16.52	3.41
26	23.10	31.50	26.20	67.00	98.50	87.50	2.00	0.96	16.15	3.45
27	23.20	31.50	25.70	64.50	97.00	87.00	0.50	0.89	13.10	2.98
28	23.30	31.30	26.30	64.50	97.50	85.00	0.00	0.94	19.69	4.01
29	22.50	30.60	25.80	65.00	96.00	83.50	0.00	0.97	20.88	4.13
30	21.50	30.90	25.70	69.50	96.00	84.00	0.00	1.09	18.98	3.82
31										
Decade 1	23.24	32.07	26.84	65.80	97.35	86.85	43.00	0.73	16.43	3.56
Decade 2	23.21	30.91	26.02	71.90	99.40	91.60	65.00	0.63	13.04	2.83
Decade 3	22.73	30.91	25.75	67.70	98.30	87.75	69.00	0.88	16.13	3.39
MONTH	23.06	31.30	26.20	68.47	98.35	88.73	177.00	0.75	15.20	3.26

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PASCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30      Latitude: -9.42      Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18	21.50	30.10	25.00	67.00	98.00	86.50	0.00	1.04	17.18	3.42
19	21.00	30.00	24.80	70.00	95.50	85.00	1.50	0.87	13.03	2.75
20	21.80	30.10	25.30	69.50	97.50	87.50	0.00	0.83	13.59	2.83
21	21.90	29.90	25.00	69.50	97.00	87.50	0.50	0.96	16.51	3.28
22	21.10	30.30	24.80	63.00	96.50	83.00	0.00	0.89	16.33	3.28
23	21.70	31.30	25.10	53.00	95.50	80.50	0.00	0.88	17.45	3.58
24	20.70	30.50	24.60	53.50	94.50	79.00	0.00	1.00	19.12	3.78
25	21.20	30.30	24.80	57.00	97.50	81.00	1.00	1.06	17.92	3.61
26	22.00	28.30	24.30	70.00	97.50	87.50	0.00	0.86	8.01	1.95
27	22.50	29.00	24.80	69.50	95.50	85.50	0.50	0.82	10.01	2.27
28	22.60	29.90	25.80	68.50	96.00	85.00	2.50	0.83	14.01	2.91
29	23.30	28.60	25.00	77.00	99.00	93.00	0.50	0.66	8.51	1.91
30	23.50	28.60	25.00	72.50	96.50	89.00	0.00	0.78	8.50	2.00
31	20.70	29.80	24.10	61.00	96.00	83.00	0.00	1.19	15.50	3.23
Decade 1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Decade 2	21.43	30.07	25.03	68.83	97.00	86.33	1.50	0.91	14.60	#DIV/0!
Decade 3	21.93	29.68	24.85	64.95	96.50	84.91	5.00	0.90	13.81	#REF!
MONTH	21.82	29.76	24.89	65.79	96.61	85.21	6.50	0.91	13.98	2.91

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PISCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	19.70	29.20	23.60	61.50	95.00	79.50	0.00	1.44	16.99	3.44
2	19.60	28.90	23.40	54.50	94.00	78.00	0.00	1.34	17.81	3.59
3	20.00	29.10	23.20	57.50	92.50	77.00	0.00	1.32	16.35	3.39
4	18.00	29.20	23.30	56.00	90.50	77.50	0.00	1.27	15.17	3.23
5	18.60	29.60	23.70	61.00	95.00	81.00	0.00	1.18	18.44	3.54
6	20.60	30.10	24.40	57.00	95.00	79.00	0.00	1.08	18.51	3.63
7	18.90	30.10	24.00	62.00	94.00	81.00	0.00	1.03	13.53	2.88
8	21.30	30.40	25.00	63.00	96.00	83.50	1.50	0.83	13.83	2.89
9	20.80	30.00	24.90	64.50	96.50	85.00	0.00	0.82	14.19	2.89
10	21.40	28.80	24.60	71.50	98.50	87.00	0.00	0.68	9.11	2.03
11	20.70	29.60	24.30	66.50	97.00	85.50	23.00	1.12	11.90	2.63
12	21.30	22.70	21.80	96.00	100.50	99.50	8.00	0.25	2.27	0.75
13	20.30	26.20	22.20	68.50	101.00	89.00	0.00	0.41	6.49	1.51
14	19.50	26.70	22.00	56.50	97.50	82.00	0.00	0.67	8.92	2.02
15	19.40	26.40	21.70	58.50	92.00	81.00	0.50	0.94	10.18	2.30
16	18.00	27.80	22.00	60.50	91.50	80.50	0.00	1.12	10.32	2.42
17	19.30	27.90	22.70	62.50	91.50	82.50	0.00	1.00	9.61	2.28
18	20.40	27.90	23.10	66.00	92.00	82.50	0.00	0.91	9.69	2.22
19	19.20	28.40	22.90	65.00	93.50	83.50	0.00	1.08	9.47	2.26
20	20.20	29.00	23.60	65.50	95.50	84.50	0.00	1.05	10.52	2.40
21	20.80	28.50	23.40	65.00	100.50	85.50	0.00	0.63	8.40	1.92
22	18.90	28.10	22.90	58.00	93.50	80.00	0.00	0.94	14.14	2.84
23	20.90	28.00	23.40	56.00	92.00	76.00	0.00	1.04	13.34	2.86
24	20.40	28.10	23.70	67.50	90.50	83.00	3.50	1.02	9.06	2.18
25	21.40	25.30	22.80	85.00	99.50	96.50	8.50	0.57	3.82	1.06
26	21.90	28.40	24.30	76.50	99.50	93.50	1.00	0.67	8.08	1.82
27	20.90	29.60	24.40	62.50	98.00	86.00	0.00	0.97	18.14	3.45
28	17.90	29.10	23.00	63.00	97.50	82.50	0.00	1.13	18.72	3.45
29	19.00	28.30	22.60	65.00	94.50	84.50	0.00	0.96	10.19	2.29
30	18.60	29.50	23.30	56.50	96.00	80.50	0.00	1.18	18.92	3.61
31										
Decade 1	19.89	29.54	24.01	60.85	94.70	80.85	1.50	1.10	15.39	3.15
Decade 2	19.83	27.26	22.63	66.55	95.20	85.05	31.50	0.86	8.94	2.08
Decade 3	20.07	28.29	23.38	65.50	96.15	84.80	13.00	0.91	12.28	2.55
MONTH	19.93	28.36	23.34	64.30	95.35	83.57	46.00	0.96	12.20	2.59

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.00	29.90	24.10	66.00	97.50	86.00	13.50	1.11	14.57	2.98
2	19.50	30.10	23.90	53.00	98.00	85.00	0.00	1.00	18.16	3.53
3	19.40	29.60	23.20	66.00	96.00	85.50	1.00	0.94	13.10	2.70
4	18.90	29.60	23.30	61.00	95.00	81.00	0.00	1.27	18.05	3.51
5	19.20	29.60	23.10	53.50	93.00	80.00	0.00	1.20	16.05	3.35
6	19.70	30.20	23.70	62.50	93.00	83.50	1.50	1.22	12.12	2.79
7	21.80	28.80	24.00	70.00	97.50	89.50	4.00	1.05	8.84	2.12
8	22.20	29.10	24.70	68.50	98.50	86.50	0.00	0.96	11.26	2.46
9	20.70	28.60	23.30	66.50	96.00	84.00	0.00	1.08	10.40	2.37
10	19.60	29.30	23.50	61.00	93.50	83.50	0.00	1.09	12.17	2.72
11	19.90	28.40	23.60	76.00	98.00	91.00	26.00	0.96	10.45	2.21
12	23.20	28.10	24.60	80.00	99.00	93.00	2.00	0.98	7.36	1.74
13	23.00	28.20	24.50	77.00	98.50	93.00	5.50	0.38	5.71	1.42
14	20.30	29.60	24.30	63.50	100.50	88.00	0.00	0.94	18.20	3.44
15	19.80	29.60	24.40	68.00	97.50	87.50	4.00	0.95	16.01	3.12
16	22.40	29.60	25.20	71.00	98.50	89.50	0.00	0.66	16.24	3.14
17	21.80	29.10	24.60	68.50	99.00	90.00	0.00	0.75	12.57	2.59
18	20.50	29.90	24.60	65.00	96.50	85.00	0.00	0.91	18.61	3.54
19	18.70	30.40	23.60	51.00	97.00	82.00	0.00	0.83	16.11	3.24
20	19.90	29.00	23.80	64.00	93.00	82.00	0.00	1.13	15.34	3.13
21	20.20	29.60	23.60	61.00	93.50	80.50	0.00	0.89	16.40	3.24
22	19.70	29.70	23.70	61.50	94.50	82.50	2.00	0.96	16.02	3.21
23	20.60	28.50	23.60	65.50	97.50	86.50	0.50	0.64	10.97	2.33
24	20.20	29.10	24.00	62.00	96.50	82.50	0.00	0.83	14.87	2.99
25	20.60	28.60	23.90	61.00	97.00	84.50	2.00	0.38	10.00	2.13
26	20.50	28.80	23.60	68.50	96.00	85.50	2.00	0.78	14.38	2.84
27	20.00	29.20	23.90	59.00	95.50	82.00	0.00	0.83	19.66	3.66
28	20.00	29.70	24.20	50.50	94.00	81.00	0.00	0.75	18.75	3.59
29	19.70	29.70	23.70	55.00	99.00	84.00	14.00	0.89	17.71	3.46
30	19.90	29.80	23.80	51.50	99.50	83.00	0.00	1.00	19.76	3.82
31	18.00	29.20	23.50	58.50	95.00	82.00	0.50	0.90	17.52	3.38
Decade 1	20.10	29.48	23.68	62.80	95.80	84.45	20.00	1.09	13.47	2.85
Decade 2	20.95	29.19	24.32	68.40	97.75	88.10	37.50	0.85	13.66	2.76
Decade 3	19.95	29.26	23.77	59.45	96.18	83.09	21.00	0.80	16.00	3.15
MONTH	20.32	29.31	23.92	63.42	96.56	85.15	78.50	0.91	14.43	2.93

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.900	29.400	24.600	64.500	97.000	87.000	0.000	0.764	17.410	3.39
2	18.900	29.300	23.400	57.500	95.000	80.500	0.000	0.903	19.740	3.71
3	19.500	29.000	23.400	50.500	92.000	78.000	0.000	0.613	19.360	3.56
4	19.800	28.400	23.300	55.500	92.000	79.000	0.000	0.509	10.270	2.27
5	17.700	28.100	23.000	61.500	94.500	81.500	6.000	0.891	12.030	2.60
6	20.200	29.400	23.500	65.000	99.500	87.500	4.000	0.451	13.380	2.65
7	20.600	29.200	24.200	64.000	97.000	83.000	2.000	0.787	20.750	3.85
8	20.100	27.000	22.600	74.500	98.500	89.000	1.500	0.451	8.670	1.87
9	20.500	29.800	24.000	55.000	97.000	82.000	0.000	0.868	17.020	3.44
10	17.500	30.500	23.400	58.500	96.500	79.000	0.000	0.613	18.070	3.42
11	19.300	31.800	24.300	39.000	96.000	79.000	0.000	0.706	20.970	4.06
12	18.600	30.100	23.500	51.500	96.000	76.000	0.000	1.100	20.700	4.06
13	18.900	29.900	23.700	52.000	94.500	80.000	0.000	1.123	20.640	4.06
14	19.000	29.500	23.700	60.500	95.000	81.500	0.000	1.100	18.520	3.67
15	16.900	29.100	23.000	59.000	94.500	78.500	0.000	1.111	20.140	3.83
16	17.100	29.500	22.500	58.500	95.000	76.000	0.000	1.030	20.960	3.93
17	15.000	29.300	22.100	54.500	96.000	75.000	0.000	1.030	21.290	3.95
18	16.300	31.000	23.000	38.500	93.500	69.500	0.000	1.100	20.390	4.20
19	18.900	30.300	23.900	55.000	97.000	78.500	2.500	0.914	19.120	3.79
20	20.600	28.200	24.000	64.000	97.000	83.500	0.000	0.660	11.970	2.56
21	20.000	29.200	24.300	59.500	91.000	78.000	0.500	0.556	21.140	3.91
22	18.500	29.000	23.500	54.000	91.500	75.500	0.000	1.088	20.810	4.05
23	17.700	29.200	23.400	54.000	91.500	75.000	0.500	1.100	19.330	3.86
24	18.700	29.100	23.100	42.000	93.000	75.500	0.000	0.903	19.660	3.90
25	17.900	29.100	23.100	54.500	94.500	78.500	0.000	0.891	18.070	3.58
26	18.700	29.500	23.400	52.500	93.000	77.500	0.000	0.984	16.830	3.53
27	18.600	30.900	24.000	41.500	95.500	78.000	0.000	0.752	21.270	4.14
28	16.800	30.000	23.600	61.000	96.500	82.000	0.000	0.752	20.920	3.92
29	19.400	29.900	24.200	67.000	97.000	85.000	0.000	0.671	20.030	3.81
30	17.900	30.900	24.000	63.000	97.000	83.000	0.000	0.729	19.950	3.85
31	17.300	30.900	23.700	60.000	95.500	78.500	0.000	1.019	21.550	4.19
Decade 1	19.67	29.01	23.54	60.65	95.90	82.65	13.50	0.69	15.67	3.08
Decade 2	18.06	29.87	23.37	53.25	95.45	77.75	2.50	0.99	19.47	3.81
Decade 3	18.32	29.79	23.66	55.36	94.18	78.77	1.00	0.86	19.96	3.89
MONTH	18.67	29.56	23.53	56.39	95.15	79.69	17.00	0.84	18.42	3.60

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2011

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	18.10	31.20	23.90	43.50	95.00	71.00	0.00	1.05	21.40	4.38
2	18.40	30.40	24.10	55.00	96.50	78.00	0.00	1.01	21.04	4.17
3	19.10	30.10	24.40	64.50	97.00	84.00	0.00	0.95	22.28	4.26
4	19.30	30.70	24.50	64.50	98.00	84.00	0.00	0.83	22.67	4.33
5	18.80	32.50	24.70	42.50	98.00	76.00	0.00	0.91	21.92	4.50
6	19.00	31.30	24.60	57.50	94.00	78.00	0.00	1.02	20.06	4.12
7	20.10	30.40	25.00	65.00	97.00	83.00	0.00	0.87	22.43	4.34
8	19.80	30.20	24.70	60.00	97.00	84.00	0.00	0.78	21.35	4.15
9	18.80	32.20	24.70	45.00	95.50	76.00	0.00	1.09	22.07	4.62
10	19.10	31.20	25.10	57.00	92.00	77.00	1.00	0.97	21.02	4.28
11	22.30	30.00	25.10	55.50	90.50	77.50	0.00	0.80	18.83	3.90
12	19.90	29.50	24.10	56.00	94.00	76.00	0.50	1.16	19.73	4.06
13	19.10	29.30	24.10	57.50	89.00	74.50	0.00	1.18	20.81	4.21
14	19.70	29.80	23.90	59.50	88.00	77.00	0.00	1.09	15.11	3.40
15	19.10	29.90	24.10	58.50	95.50	77.00	0.00	1.30	21.82	4.38
16	19.20	30.50	24.30	57.00	96.00	81.50	0.00	1.18	23.39	4.63
17	19.30	30.30	24.80	64.00	94.50	82.00	0.00	1.31	23.29	4.60
18	19.80	30.90	25.00	61.50	96.00	82.00	0.00	1.15	22.97	4.59
19	19.70	30.90	25.20	57.00	95.00	81.00	0.00	1.05	23.58	4.70
20	21.70	31.60	25.80	63.00	95.50	82.00	0.00	0.80	20.22	4.17
21	20.80	31.60	26.00	59.00	95.00	79.00	0.00	0.88	22.03	4.49
22	20.50	31.30	25.30	58.00	96.50	81.50	0.00	1.08	23.57	4.75
23	18.70	31.00	25.00	61.00	97.00	81.50	0.00	0.96	21.84	4.37
24	20.60	31.60	25.60	60.00	96.00	78.00	0.00	0.93	21.51	4.41
25	20.70	30.80	25.20	58.00	96.00	79.00	0.00	1.01	22.09	4.49
26	19.80	31.90	25.10	57.00	95.50	75.50	0.00	1.15	22.77	4.70
27	18.70	31.70	25.30	53.00	94.50	72.00	0.00	1.00	23.13	4.71
28	18.40	31.50	24.60	48.50	97.00	76.00	0.00	0.94	23.73	4.75
29	20.70	31.00	25.30	50.50	95.00	75.00	0.00	1.03	23.75	4.84
30	22.00	31.40	26.10	54.00	95.50	78.50	0.00	0.79	23.31	4.73
31										
Decade 1	19.05	31.02	24.57	55.45	96.00	79.10	1.00	0.95	21.62	4.32
Decade 2	19.98	30.27	24.64	58.95	93.40	79.05	0.50	1.10	20.98	4.26
Decade 3	20.09	31.38	25.35	55.90	95.80	77.60	0.00	0.97	22.77	4.62
MONTH	19.71	30.89	24.85	56.77	95.07	78.58	1.50	1.01	21.79	4.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Betano  
Altitude:30 Latitude: -9.42 Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.20	31.20	25.70	64.00	99.00	82.50	0.00	0.72	21.71	4.34
2	21.10	31.10	26.20	69.00	98.00	85.50	6.00	0.88	16.42	3.53
3	22.40	30.60	25.80	70.50	98.50	88.00	30.50	0.86	13.31	2.99
4	22.80	29.10	25.10	75.00	101.00	93.00	25.50	0.75	17.85	3.60
5	22.20	30.30	25.60	71.50	101.00	91.00	0.00	0.57	15.88	3.32
6	23.00	31.10	26.50	67.00	98.50	87.00	16.50	0.61	20.88	4.27
7	22.80	30.10	25.90	75.50	99.50	91.00	2.50	0.66	12.15	2.70
8	22.70	29.90	26.10	74.50	99.50	89.00	0.50	0.66	12.33	2.74
9	21.90	30.90	26.10	73.00	98.00	89.00	1.00	0.80	16.21	3.45
10	22.30	30.50	26.00	73.00	99.50	88.50	0.00	0.83	16.70	3.52
11	22.10	31.10	26.30	68.00	98.00	85.00	0.00	0.98	23.51	4.75
12	21.50	31.60	26.40	68.50	98.50	85.00	0.00	0.98	22.90	4.66
13	22.50	31.60	26.50	70.50	98.00	87.00	0.00	0.66	22.20	4.51
14	21.70	31.20	26.50	69.50	100.00	86.00	0.50	0.66	23.88	4.76
15	22.90	31.40	27.00	67.00	95.50	84.00	0.00	0.86	21.23	4.44
16	22.30	31.90	27.00	67.50	95.50	84.50	0.00	0.88	23.88	4.89
17	22.00	32.00	26.70	62.50	97.00	83.50	0.00	1.12	23.43	4.89
18	22.10	32.20	27.00	63.50	95.50	82.00	0.00	0.96	23.67	4.91
19	21.60	31.80	26.90	61.50	93.50	81.50	0.00	1.10	23.75	4.95
20	23.20	32.60	27.20	64.50	97.00	84.00	5.50	1.25	23.95	5.07
21	22.50	31.90	26.70	67.00	96.50	85.00	0.50	1.28	21.10	4.51
22	22.70	31.80	27.00	67.50	94.00	84.50	0.00	1.01	19.93	4.28
23	22.30	32.10	26.80	64.00	94.50	84.00	0.00	1.17	25.03	5.18
24	22.30	32.20	27.10	63.00	95.50	81.00	0.00	1.11	25.02	5.19
25	21.90	32.00	27.00	65.50	94.00	82.50	0.00	1.17	23.38	4.90
26	22.70	32.30	26.90	65.00	97.00	83.00	0.00	1.16	24.23	5.06
27	21.80	32.40	26.80	61.00	97.00	80.00	0.00	1.13	24.96	5.19
28	22.60	31.70	27.00	64.50	93.50	81.50	0.00	1.00	24.49	5.05
29	22.90	33.60	27.70	52.50	92.00	78.00	0.00	1.00	24.92	5.36
30	22.80	32.90	27.20	61.50	93.50	80.00	0.00	0.96	23.28	4.95
31	22.80	32.90	26.90	64.00	94.50	81.00	1.00	1.24	20.16	4.48
Decade 1	22.14	30.48	25.90	71.30	99.25	88.45	82.50	0.73	16.34	3.45
Decade 2	22.19	31.74	26.75	66.30	96.85	84.25	6.00	0.95	23.24	4.78
Decade 3	22.48	32.35	27.01	63.23	94.73	81.86	1.50	1.11	23.32	4.92
MONTH	22.28	31.55	26.57	66.82	96.87	84.76	90.00	0.94	21.04	4.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PISCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2011

AUTOMATIC WEATHER STATION (Enerco 420): Betano

Altitude:30

Latitude: -9.42

Longitude: 125.61



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.70	32.60	27.10	57.00	94.50	80.00	0.00	1.19	23.51	5.08
2	22.30	33.00	27.10	57.00	88.50	74.50	0.00	1.23	25.00	5.38
3	20.60	33.20	27.00	54.50	90.50	75.50	0.00	1.09	25.22	5.33
4	21.20	31.70	26.70	54.50	91.50	73.50	0.00	1.30	22.98	4.97
5	22.60	32.60	27.20	61.00	95.00	80.50	0.00	0.83	24.35	5.06
6	22.80	32.60	27.60	65.50	96.00	83.00	0.00	0.83	23.30	4.89
7	23.30	32.70	27.70	63.50	94.50	81.50	0.00	0.94	21.30	4.61
8	23.80	33.10	28.10	61.00	90.50	78.50	0.00	1.17	23.47	5.15
9	24.00	34.20	28.50	59.50	93.50	77.50	0.00	1.02	23.61	5.20
10	23.50	33.60	28.10	60.00	96.00	82.00	0.50	0.83	23.00	4.96
11	23.70	33.70	28.30	58.50	93.00	78.00	0.00	1.23	25.07	5.49
12	23.50	34.00	28.00	51.50	90.50	75.50	0.00	1.22	25.15	5.59
13	22.70	33.20	27.50	49.50	91.50	72.50	0.00	1.35	25.70	5.66
14	22.70	33.30	28.10	51.50	86.50	73.00	0.00	1.27	24.90	5.52
15	24.40	33.90	28.30	53.50	88.00	74.50	0.00	1.25	23.69	5.39
16										
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Decade 1	22.68	32.93	27.51	59.35	93.05	78.65	0.50	1.04	23.57	5.06
Decade 2	23.40	33.62	28.04	52.90	89.90	74.70	0.00	1.26	24.90	5.53
Decade 3	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
MONTH	22.92	33.16	27.69	57.20	92.00	77.33	0.50	1.12	24.02	5.22

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



**WorleyParsons**

resources & energy

**TIMOR GAP, E.P.**  
TIMOR GÁS & PETRÓLEO



REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX D



## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: EB1202480</b>	<b>Page</b>	<b>: 1 of 10</b>
<b>Client</b>	<b>: WORLEY PARSONS - INFRASTRUCTURE MWE</b>	<b>Laboratory</b>	<b>: Environmental Division Brisbane</b>
<b>Contact</b>	<b>: GRANT HICKSON</b>	<b>Contact</b>	<b>: Customer Services</b>
<b>Address</b>	<b>: LEVEL 3/600 MURRAY STREET WEST PERTH WA, AUSTRALIA 6005</b>	<b>Address</b>	<b>: 32 Shand Street Stafford QLD Australia 4053</b>
<b>E-mail</b>	<b>: grant.hickson@worleyparsons.com</b>	<b>E-mail</b>	<b>: Brisbane.Enviro.Services@alsglobal.com</b>
<b>Telephone</b>	<b>: +61 08 9278 8111</b>	<b>Telephone</b>	<b>: +61 7 3243 7222</b>
<b>Facsimile</b>	<b>: ----</b>	<b>Facsimile</b>	<b>: +61 7 3243 7218</b>
<b>Project</b>	<b>: 301012-01504-Timor Leste-Environmental Impact Assessment</b>	<b>QC Level</b>	<b>: NEPM 1999 Schedule B(3) and ALS QCS3 requirement</b>
<b>Site</b>	<b>: Timor Leste-Environmental Impa</b>	<b>Date Samples Received</b>	<b>: 27-JAN-2012</b>
<b>C-O-C number</b>	<b>: Teimor Leste EIA</b>	<b>Issue Date</b>	<b>: 09-FEB-2012</b>
<b>Sampler</b>	<b>: Joana Fernandes</b>	<b>No. of samples received</b>	<b>: 78</b>
<b>Order number</b>	<b>: ----</b>	<b>No. of samples analysed</b>	<b>: 77</b>
<b>Quote number</b>	<b>: EN/034/11</b>		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

Accredited for compliance with  
ISO/IEC 17025.

### Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Stephen Hislop	Senior Inorganic Chemist	Brisbane Inorganics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY



### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :  
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot  
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
LOR = Limit of reporting  
RPD = Relative Percentage Difference  
# = Indicates failed QC



## Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EA002 : pH (Soils) (QC Lot: 2147987)</b>									
EB1202480-004	TPSS II-0.39m	EA002: pH Value	----	0.1	pH Unit	8.4	8.4	0.0	0% - 20%
EB1202480-011	TPAirport Suai V-1m1m	EA002: pH Value	----	0.1	pH Unit	8.6	8.6	0.0	0% - 20%
<b>EA002 : pH (Soils) (QC Lot: 2147995)</b>									
EB1202480-021	TPNB East IV-0.5m	EA002: pH Value	----	0.1	pH Unit	8.3	8.3	0.0	0% - 20%
EB1202480-031	TPLNG III-0.5m	EA002: pH Value	----	0.1	pH Unit	8.3	8.3	0.0	0% - 20%
<b>EA002 : pH (Soils) (QC Lot: 2148008)</b>									
EB1202480-041	TPNC I-1.5m	EA002: pH Value	----	0.1	pH Unit	8.8	8.8	0.0	0% - 20%
EB1202480-051	TPNV I-0.5m	EA002: pH Value	----	0.1	pH Unit	9.2	9.2	0.0	0% - 20%
<b>EA002 : pH (Soils) (QC Lot: 2148014)</b>									
EB1202480-061	TPNV V-1m	EA002: pH Value	----	0.1	pH Unit	8.4	8.4	0.0	0% - 20%
EB1202480-071	TPLNG II-Topsoil	EA002: pH Value	----	0.1	pH Unit	8.2	8.1	0.0	0% - 20%
<b>EA010: Conductivity (QC Lot: 2147988)</b>									
EB1202480-004	TPSS II-0.39m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	278	280	0.7	0% - 20%
EB1202480-011	TPAirport Suai V-1m1m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	241	242	0.4	0% - 20%
<b>EA010: Conductivity (QC Lot: 2147996)</b>									
EB1202480-021	TPNB East IV-0.5m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	117	113	3.5	0% - 20%
EB1202480-031	TPLNG III-0.5m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	87	88	1.1	0% - 20%
<b>EA010: Conductivity (QC Lot: 2148010)</b>									
EB1202480-041	TPNC I-1.5m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	378	384	1.6	0% - 20%
EB1202480-051	TPNV I-0.5m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	258	263	1.9	0% - 20%
<b>EA010: Conductivity (QC Lot: 2148015)</b>									
EB1202480-061	TPNV V-1m	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	141	139	1.4	0% - 20%
EB1202480-071	TPLNG II-Topsoil	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	82	85	3.6	0% - 20%
<b>EA055: Moisture Content (QC Lot: 2149129)</b>									
EB1202480-004	TPSS II-0.39m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	23.4	24.1	3.1	0% - 20%
EB1202480-011	TPAirport Suai V-1m1m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	24.4	25.1	2.6	0% - 20%
<b>EA055: Moisture Content (QC Lot: 2149130)</b>									
EB1202480-024	TPNB East V-1m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	25.7	26.1	1.5	0% - 20%
EB1202480-031	TPLNG III-0.5m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	2.2	1.9	15.4	No Limit
<b>EA055: Moisture Content (QC Lot: 2149131)</b>									
EB1202480-044	TPNC III-0.5m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	8.0	8.1	1.3	No Limit
EB1202480-051	TPNV I-0.5m	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	16.5	16.6	0.6	0% - 50%
<b>EA055: Moisture Content (QC Lot: 2149132)</b>									
EB1202480-064	TPSS III-Topsoil	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	31.6	31.4	0.6	0% - 20%



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EA055: Moisture Content (QC Lot: 2149132) - continued</b>									
EB1202480-071	TPLNG II-Topsoil	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	<1.0	0.0	No Limit
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QC Lot: 2149208)</b>									
EB1202480-001	TPSS I-0.5m	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	250	680	91.4	0% - 20%
EB1202480-009	TPSS IV-1.5m	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	<200	0.0	No Limit
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QC Lot: 2149209)</b>									
EB1202480-021	TPNB East IV-0.5m	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	550	820	38.9	0% - 20%
EB1202480-029	TPLNG II-1m	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	<200	0.0	No Limit
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QC Lot: 2149210)</b>									
EB1202480-041	TPNC I-1.5m	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	230	270	17.6	0% - 20%
EB1202480-049	TPNC V-1m	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	<200	0.0	No Limit
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QC Lot: 2149212)</b>									
EB1202480-061	TPNV V-1m	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	310	44.2	0% - 20%
EB1202480-069	TPNB East IV-Topsoil	ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	810	830	1.6	0% - 20%
<b>ED042T: Total Sulfur by LECO (QC Lot: 2151794)</b>									
EB1202480-001	TPSS I-0.5m	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.0	No Limit
EB1202480-010	TPAirport Suai V-0.5m	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.0	No Limit
<b>ED042T: Total Sulfur by LECO (QC Lot: 2151796)</b>									
EB1202480-021	TPNB East IV-0.5m	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.0	No Limit
EB1202480-030	TPLNG II-1.5m	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.0	No Limit
<b>ED042T: Total Sulfur by LECO (QC Lot: 2151798)</b>									
EB1202480-041	TPNC I-1.5m	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.0	No Limit
EB1202480-050	TPNC V-1.5m	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.0	No Limit
<b>ED042T: Total Sulfur by LECO (QC Lot: 2151800)</b>									
EB1202480-061	TPNV V-1m	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.0	No Limit
EB1202480-070	TPNB West V-Topsoil	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.01	0.01	0.0	No Limit
<b>EK055: Ammonia as N (QC Lot: 2147775)</b>									
EB1202480-002	TPSS I-1m	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
EB1202480-010	TPAirport Suai V-0.5m	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
<b>EK055: Ammonia as N (QC Lot: 2147777)</b>									
EB1202480-022	TPNB East IV-1m	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
EB1202480-030	TPLNG II-1.5m	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
<b>EK055: Ammonia as N (QC Lot: 2147778)</b>									
EB1202480-042	TPNC II-0.5m	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
EB1202480-050	TPNC V-1.5m	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
<b>EK055: Ammonia as N (QC Lot: 2147787)</b>									
EB1202480-062	TPSS I-Topsoil	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
EB1202480-070	TPNB West V-Topsoil	EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	<20	0.0	No Limit
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 2147989)</b>									



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 2147989) - continued</b>									
EB1202480-004	TPSS II-0.39m	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB1202480-011	TPAirport Suai V-1m1m	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 2147998)</b>									
EB1202480-021	TPNB East IV-0.5m	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB1202480-031	TPLNG III-0.5m	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 2148012)</b>									
EB1202480-041	TPNC I-1.5m	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB1202480-051	TPNV I-0.5m	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 2148016)</b>									
EB1202480-061	TPNV V-1m	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB1202480-071	TPLNG II-Topsoil	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	0.4	0.4	0.0	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2147990)</b>									
EB1202480-004	TPSS II-0.39m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	0.2	0.0	No Limit
EB1202480-011	TPAirport Suai V-1m1m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	0.2	0.0	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2147999)</b>									
EB1202480-021	TPNB East IV-0.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.4	0.4	0.0	No Limit
EB1202480-031	TPLNG III-0.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	2.1	2.4	9.8	0% - 20%
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2148013)</b>									
EB1202480-041	TPNC I-1.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	0.2	0.0	No Limit
EB1202480-051	TPNV I-0.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2148017)</b>									
EB1202480-061	TPNV V-1m	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB1202480-071	TPLNG II-Topsoil	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	8.7	9.0	3.3	0% - 20%
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2147950)</b>									
EB1202480-001	TPSS I-0.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	100	140	27.5	No Limit
EB1202480-011	TPAirport Suai V-1m1m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	460	460	0.0	0% - 20%
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2147951)</b>									
EB1202480-021	TPNB East IV-0.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	920	990	7.0	0% - 20%
EB1202480-031	TPLNG III-0.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	420	430	0.0	0% - 20%
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2147960)</b>									
EB1202480-041	TPNC I-1.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	450	460	0.0	0% - 20%
EB1202480-051	TPNV I-0.5m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	460	420	8.6	0% - 20%
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2147961)</b>									
EB1202480-061	TPNV V-1m	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	510	460	10.5	0% - 20%
EB1202480-071	TPLNG II-Topsoil	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	740	740	0.0	0% - 20%
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QC Lot: 2147788)</b>									
EB1202480-001	TPSS I-0.5m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	22	15	37.8	No Limit
EB1202480-010	TPAirport Suai V-0.5m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	6	6	0.0	No Limit





Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QC Lot: 2147789)</b>									
EB1202480-018	TPRB III-0.5m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	<2	<2	0.0	No Limit
EB1202480-027	TPLNG I-1.5m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	2	<2	0.0	No Limit
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QC Lot: 2147790)</b>									
EB1202480-035	TPLNG IV-1m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	28	23	19.6	0% - 50%
EB1202480-044	TPNC III-0.5m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	15	13	14.3	No Limit
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QC Lot: 2147791)</b>									
EB1202480-052	TPNV I-1m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	5	<2	85.7	No Limit
EB1202480-061	TPNV V-1m	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	<2	<2	0.0	No Limit
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QC Lot: 2147792)</b>									
EB1202480-069	TPNB East IV-Topsoil	EK080: Bicarbonate Ext. P (Colwell)	----	2	mg/kg	54	61	12.2	0% - 20%
<b>EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 2151795)</b>									
EB1202480-001	TPSS I-0.5m	EP003: Total Organic Carbon	----	0.02	%	0.08	0.08	0.0	No Limit
EB1202480-011	TPAirport Suai V-1m1m	EP003: Total Organic Carbon	----	0.02	%	0.38	0.37	0.0	0% - 50%
<b>EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 2151797)</b>									
EB1202480-021	TPNB East IV-0.5m	EP003: Total Organic Carbon	----	0.02	%	0.87	0.89	2.4	0% - 20%
EB1202480-031	TPLNG III-0.5m	EP003: Total Organic Carbon	----	0.02	%	0.31	0.30	0.0	0% - 50%
<b>EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 2151799)</b>									
EB1202480-041	TPNC I-1.5m	EP003: Total Organic Carbon	----	0.02	%	0.56	0.56	0.0	0% - 20%
EB1202480-051	TPNV I-0.5m	EP003: Total Organic Carbon	----	0.02	%	0.47	0.45	4.3	0% - 20%
<b>EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 2151801)</b>									
EB1202480-061	TPNV V-1m	EP003: Total Organic Carbon	----	0.02	%	0.28	0.28	0.0	0% - 50%
EB1202480-071	TPLNG II-Topsoil	EP003: Total Organic Carbon	----	0.02	%	0.77	0.74	3.6	0% - 20%





### Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
<b>EA002 : pH (Soils) (QCLot: 2147987)</b>								
EA002: pH Value	----	0.1	pH Unit	----	5.2 pH Unit	100	94	103
<b>EA002 : pH (Soils) (QCLot: 2147995)</b>								
EA002: pH Value	----	0.1	pH Unit	----	5.2 pH Unit	100	94	103
<b>EA002 : pH (Soils) (QCLot: 2148008)</b>								
EA002: pH Value	----	0.1	pH Unit	----	5.2 pH Unit	100	94	103
<b>EA002 : pH (Soils) (QCLot: 2148014)</b>								
EA002: pH Value	----	0.1	pH Unit	----	5.2 pH Unit	99.6	94	103
<b>EA010: Conductivity (QCLot: 2147988)</b>								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	196 µS/cm	92.8	83	110
<b>EA010: Conductivity (QCLot: 2147996)</b>								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	196 µS/cm	95.4	83	110
<b>EA010: Conductivity (QCLot: 2148010)</b>								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	196 µS/cm	92.8	83	110
<b>EA010: Conductivity (QCLot: 2148015)</b>								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	196 µS/cm	91.3	83	110
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QCLot: 2149208)</b>								
ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	----	----	----	----
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QCLot: 2149209)</b>								
ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	----	----	----	----
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QCLot: 2149210)</b>								
ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	----	----	----	----
<b>ED021: Bicarbonate Extractable Potassium (Colwell) (QCLot: 2149212)</b>								
ED021: Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	----	----	----	----
<b>ED042T: Total Sulfur by LECO (QCLot: 2151794)</b>								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	100 %	104	70	130
<b>ED042T: Total Sulfur by LECO (QCLot: 2151796)</b>								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	100 %	97.3	70	130
<b>ED042T: Total Sulfur by LECO (QCLot: 2151798)</b>								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	100 %	98.4	70	130
<b>ED042T: Total Sulfur by LECO (QCLot: 2151800)</b>								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	100 %	103	70	130
<b>EK055: Ammonia as N (QCLot: 2147775)</b>								



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
<b>EK055: Ammonia as N (QCLot: 2147775) - continued</b>									
EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	500 mg/kg	102	90	110	
<b>EK055: Ammonia as N (QCLot: 2147777)</b>									
EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	500 mg/kg	105	90	110	
<b>EK055: Ammonia as N (QCLot: 2147778)</b>									
EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	500 mg/kg	102	90	110	
<b>EK055: Ammonia as N (QCLot: 2147787)</b>									
EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	500 mg/kg	102	90	110	
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2147989)</b>									
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	88.6	81	127	
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2147998)</b>									
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	99.4	81	127	
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2148012)</b>									
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	96.0	81	127	
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2148016)</b>									
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	96.0	81	127	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2147990)</b>									
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	100	72	124	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2147999)</b>									
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	90.0	72	124	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2148013)</b>									
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	92.3	72	124	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2148017)</b>									
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	108	72	124	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147950)</b>									
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	534 mg/kg	80.5	70	118	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147951)</b>									
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	534 mg/kg	81.3	70	118	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147960)</b>									
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	534 mg/kg	78.6	70	118	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147961)</b>									
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	534 mg/kg	78.8	70	118	
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 2147788)</b>									
EK080: Bicarbonate Ext. P (Colwell)	----	100	mg/kg	<100	----	----	----	----	
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 2147789)</b>									
EK080: Bicarbonate Ext. P (Colwell)	----	100	mg/kg	<100	----	----	----	----	
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 2147790)</b>									



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 2147790) - continued</b>									
EK080: Bicarbonate Ext. P (Colwell)	----	100	mg/kg	<100	----	----	----	----	
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 2147791)</b>									
EK080: Bicarbonate Ext. P (Colwell)	----	100	mg/kg	<100	----	----	----	----	
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 2147792)</b>									
EK080: Bicarbonate Ext. P (Colwell)	----	100	mg/kg	<100	----	----	----	----	
<b>EP003: Total Organic Carbon (TOC) in Soil (QCLot: 2151795)</b>									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	98.6	70	130	
<b>EP003: Total Organic Carbon (TOC) in Soil (QCLot: 2151797)</b>									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	101	70	130	
<b>EP003: Total Organic Carbon (TOC) in Soil (QCLot: 2151799)</b>									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	103	70	130	
<b>EP003: Total Organic Carbon (TOC) in Soil (QCLot: 2151801)</b>									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	99.1	70	130	



## Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
<b>EK055: Ammonia as N (QCLot: 2147775)</b>							
EB1202480-001	TPSS I-0.5m	EK055: Ammonia as N	7664-41-7	100 mg/kg	101	70	130
<b>EK055: Ammonia as N (QCLot: 2147777)</b>							
EB1202480-021	TPNB East IV-0.5m	EK055: Ammonia as N	7664-41-7	100 mg/kg	108	70	130
<b>EK055: Ammonia as N (QCLot: 2147778)</b>							
EB1202480-041	TPNC I-1.5m	EK055: Ammonia as N	7664-41-7	100 mg/kg	101	70	130
<b>EK055: Ammonia as N (QCLot: 2147787)</b>							
EB1202480-061	TPNV V-1m	EK055: Ammonia as N	7664-41-7	100 mg/kg	101	70	130
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2147989)</b>							
EB1202480-005	TPSS III-0.5m	EK057G: Nitrite as N (Sol.)	----	2.0 mg/kg	103	70	130
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2147998)</b>							
EB1202480-022	TPNB East IV-1m	EK057G: Nitrite as N (Sol.)	----	2.0 mg/kg	98.0	70	130
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2148012)</b>							
EB1202480-042	TPNC II-0.5m	EK057G: Nitrite as N (Sol.)	----	2.0 mg/kg	100	70	130
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 2148016)</b>							
EB1202480-062	TPSS I-Topsoil	EK057G: Nitrite as N (Sol.)	----	2.0 mg/kg	103	70	130
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2147990)</b>							
EB1202480-005	TPSS III-0.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.0 mg/kg	122	70	130
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2147999)</b>							
EB1202480-022	TPNB East IV-1m	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.0 mg/kg	89.0	70	130
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2148013)</b>							
EB1202480-042	TPNC II-0.5m	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.0 mg/kg	94.1	70	130
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 2148017)</b>							
EB1202480-062	TPSS I-Topsoil	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.0 mg/kg	# Not Determined	70	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147950)</b>							
EB1202480-002	TPSS I-1m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	103	70	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147951)</b>							
EB1202480-022	TPNB East IV-1m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	104	70	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147960)</b>							
EB1202480-042	TPNC II-0.5m	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	81.7	70	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 2147961)</b>							
EB1202480-062	TPSS I-Topsoil	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	102	70	130

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>EB1202480</b>	Page	: 1 of 18
<b>Client</b>	: <b>WORLEY PARSONS - INFRASTRUCTURE MWE</b>	<b>Laboratory</b>	: Environmental Division Brisbane
<b>Contact</b>	: GRANT HICKSON	<b>Contact</b>	: Customer Services
<b>Address</b>	: LEVEL 3/600 MURRAY STREET WEST PERTH WA, AUSTRALIA 6005	<b>Address</b>	: 32 Shand Street Stafford QLD Australia 4053
<b>E-mail</b>	: grant.hickson@worleyparsons.com	<b>E-mail</b>	: Brisbane.Enviro.Services@alsglobal.com
<b>Telephone</b>	: +61 08 9278 8111	<b>Telephone</b>	: +61 7 3243 7222
<b>Facsimile</b>	: ----	<b>Facsimile</b>	: +61 7 3243 7218
<b>Project</b>	: 301012-01504-Timor Leste-Environmental Impact Assessment	<b>QC Level</b>	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
<b>Order number</b>	: ----		
<b>C-O-C number</b>	: Teimor Leste EIA	<b>Date Samples Received</b>	: 27-JAN-2012
<b>Sampler</b>	: Joana Fernandes	<b>Issue Date</b>	: 09-FEB-2012
<b>Site</b>	: Timor Leste-Environmental Impa		
<b>Quote number</b>	: EN/034/11	<b>No. of samples received</b>	: 78
		<b>No. of samples analysed</b>	: 77

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with  
ISO/IEC 17025.

### Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Stephen Hislop	Senior Inorganic Chemist	Brisbane Inorganics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY



### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting





## Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Client sample ID	TPSS I-0.5m	TPSS I-1m	TPSS I-1.5m	TPSS II-0.39m	TPSS III-0.5m
				Client sampling date / time	19-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00
					EB1202480-001	EB1202480-002	EB1202480-003	EB1202480-004	EB1202480-005
<b>EA002 : pH (Soils)</b>									
pH Value	----	0.1	pH Unit		9.0	8.5	8.6	8.4	8.3
<b>EA010: Conductivity</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm		64	88	81	278	1320
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1.0	%		4.2	15.9	10.1	23.4	26.2
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		250	230	210	340	230
<b>ED042T: Total Sulfur by LECO</b>									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	0.02	0.02	0.18
<b>EK055: Ammonia as N</b>									
Ammonia as N	7664-41-7	20	mg/kg		<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N (Sol.)	----	0.1	mg/kg		0.8	0.8	0.8	0.2	0.3
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.8	0.8	0.8	0.2	0.4
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		100	260	200	760	580
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>									
Total Nitrogen as N	----	20	mg/kg		100	260	200	760	580
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>									
Bicarbonate Ext. P (Colwell)	----	2	mg/kg		22	22	11	123	30
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%		0.08	0.16	0.10	0.61	0.32



## Analytical Results

Sub-Matrix: SOIL

Client sample ID  
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TPSS III-1m	TPSS IV-0.5m	TPSS IV-1m	TPSS IV-1.5m	TPAirport Suai V-0.5m
				19-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00	20-DEC-2011 15:00
				EB1202480-006	EB1202480-007	EB1202480-008	EB1202480-009	EB1202480-010
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	7.9	8.4	8.4	8.5	9.4
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	2400	104	109	89	426
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	27.5	19.0	8.4	6.0	25.6
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	230	230	250	<200	250
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	0.16	0.01	0.02	0.01	0.02
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	0.1	0.2	0.1	0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	0.4	2.0	1.0	0.5	0.4
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.5	2.2	1.1	0.6	0.4
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	580	460	570	280	580
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	580	460	570	280	580
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	4	23	20	34	6
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.32	0.40	0.54	0.24	0.66



## Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				TPAirport Suai V-1m1m	TPRB I-0.5m	TPRB I-1m	TPRB I-1.5m	TPRB II-0.5m
				20-DEC-2011 15:00	21-DEC-2011 15:00	21-DEC-2011 15:00	21-DEC-2011 15:00	20-DEC-2011 15:00
Compound	CAS Number	LOR	Unit	EB1202480-011	EB1202480-012	EB1202480-013	EB1202480-014	EB1202480-015
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.6	7.7	8.5	8.9	8.6
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	241	16	121	64	89
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	24.4	9.0	22.5	4.2	16.9
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	260	250	820	<200	590
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	<0.01	0.01	<0.01	<0.01
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.3	<0.1	0.2
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	0.9	0.9	0.2	0.6
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	0.9	1.2	0.2	0.8
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	460	320	450	110	240
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
^ Total Nitrogen as N	----	20	mg/kg	460	320	450	110	240
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	27	36	16	17	<2
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.38	0.24	0.31	0.09	0.20



## Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Client sample ID	TPRB II-1m	TPRB II-1.5m	TPRB III-0.5m	TPRB III-1m	TPRB III-1.5m
				Client sampling date / time	20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00
					EB1202480-016	EB1202480-017	EB1202480-018	EB1202480-019	EB1202480-020
<b>EA002 : pH (Soils)</b>									
pH Value	----	0.1	pH Unit		8.4	8.6	8.7	7.9	8.5
<b>EA010: Conductivity</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm		165	123	83	19	110
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1.0	%		18.8	20.0	17.8	10.2	24.7
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		310	230	920	790	670
<b>ED042T: Total Sulfur by LECO</b>									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01
<b>EK055: Ammonia as N</b>									
Ammonia as N	7664-41-7	20	mg/kg		<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N (Sol.)	----	0.1	mg/kg		0.1	0.2	0.2	<0.1	0.2
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N (Sol.)	----	0.1	mg/kg		0.4	0.3	0.7	1.1	0.3
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.5	0.5	0.9	1.1	0.5
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		560	430	320	380	560
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>									
Total Nitrogen as N	----	20	mg/kg		560	430	320	380	560
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>									
Bicarbonate Ext. P (Colwell)	----	2	mg/kg		37	34	<2	9	10
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%		0.45	0.26	0.17	0.40	0.46



## Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	TPNB East IV-0.5m	TPNB East IV-1m	TPNB East V-0.5m	TPNB East V-1m	TPLNG I-0.5m
				20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00	10-DEC-2011 15:00
				EB1202480-021	EB1202480-022	EB1202480-023	EB1202480-024	EB1202480-025
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.3	8.3	8.3	8.3	8.8
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	117	115	118	128	66
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	16.7	20.2	24.4	25.7	2.0
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	550	770	<200	<200	<200
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	<0.01	0.03	0.02
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	0.4	0.5	0.2	0.1	2.4
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.4	0.6	0.2	0.1	2.4
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	920	1020	700	520	170
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	920	1020	700	520	170
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	6	9	14	16	23
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.87	1.18	0.45	0.38	0.13



## Analytical Results

Sub-Matrix: SOIL

Client sample ID  
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TPLNG I-1m	TPLNG I-1.5m	TPLNG II-0.5m	TPLNG II-1m	TPLNG II-1.5m
				10-DEC-2011 15:00	10-DEC-2011 15:00	10-DEC-2011 15:00	10-DEC-2011 15:00	10-DEC-2011 15:00
				EB1202480-026	EB1202480-027	EB1202480-028	EB1202480-029	EB1202480-030
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.8	9.0	8.6	9.0	9.0
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	57	57	72	54	54
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	2.0	3.0	3.5	1.3	<1.0
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	<200	<200	<200	<200
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	<0.01	<0.01	<0.01
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	0.3	<0.1	1.3	0.1	<0.1
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.3	<0.1	1.3	0.1	<0.1
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	60	60	220	50	40
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	60	60	220	50	40
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	10	2	10	4	4
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.05	0.04	0.12	<0.02	<0.02





## Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	TPLNG III-0.5m	TPLNG III-1m	TPLNG III-1.5m	TPLNG IV-0.5m	TPLNG IV-1m
				10-DEC-2011 15:00	10-DEC-2011 15:00	10-DEC-2011 15:00	10-DEC-2011 15:00	10-DEC-2011 15:00
				EB1202480-031	EB1202480-032	EB1202480-033	EB1202480-034	EB1202480-035
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.3	8.9	9.0	7.4	7.5
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	87	54	53	13	12
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	2.2	1.4	3.1	5.5	3.1
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	<200	<200	250	<200
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	<0.01	<0.01	<0.01
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	2.1	<0.1	<0.1	0.3	0.3
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	2.1	<0.1	<0.1	0.3	0.3
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	420	60	40	550	220
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	420	60	40	550	220
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	4	<2	<2	<2	28
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.31	0.02	<0.02	0.57	0.17



## Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				TPLNG IV-1.5m	TPLNG V-0.5m	TPLNG V-1m	TPNC I-0.5m	TPNC I-1m
				10-DEC-2011 15:00	10-DEC-2011 15:00	10-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00
Compound	CAS Number	LOR	Unit	EB1202480-036	EB1202480-037	EB1202480-038	EB1202480-039	EB1202480-040
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.7	8.2	8.4	9.1	8.7
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	64	117	139	455	217
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	3.2	13.0	13.8	22.7	16.8
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	380	250	210	240
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	<0.01	<0.01	<0.01
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	0.5	0.2	1.1	1.1
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	0.5	0.2	1.2	1.1
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	120	1330	540	460	630
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	120	1330	540	460	630
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	<2	<2	27	<2	5
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.08	1.56	0.53	0.52	0.72



## Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Client sample ID	TPNC I-1.5m	TPNC II-0.5m	TPNC II-1m	TPNC III-0.5m	TPNC III-1m
				Client sampling date / time	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00
					EB1202480-041	EB1202480-042	EB1202480-043	EB1202480-044	EB1202480-045
<b>EA002 : pH (Soils)</b>									
pH Value	----	0.1	pH Unit		8.8	8.8	8.7	8.6	9.0
<b>EA010: Conductivity</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm		378	354	874	104	102
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1.0	%		20.9	17.2	17.4	8.0	8.4
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		230	<200	270	<200	<200
<b>ED042T: Total Sulfur by LECO</b>									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01
<b>EK055: Ammonia as N</b>									
Ammonia as N	7664-41-7	20	mg/kg		<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N (Sol.)	----	0.1	mg/kg		0.2	0.3	0.2	0.4	0.2
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.2	0.3	0.2	0.4	0.2
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		450	490	330	450	220
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>									
Total Nitrogen as N	----	20	mg/kg		450	490	330	450	220
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>									
Bicarbonate Ext. P (Colwell)	----	2	mg/kg		<2	<2	36	15	<2
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%		0.56	0.73	0.25	0.42	0.21



## Analytical Results

Sub-Matrix: SOIL

Client sample ID  
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TPNC IV-0.5m	TPNC IV-1m	TPNC V-0.5m	TPNC V-1m	TPNC V-1.5m
				12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00
				EB1202480-046	EB1202480-047	EB1202480-048	EB1202480-049	EB1202480-050
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	9.0	8.8	9.0	8.9	9.1
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	273	1230	233	1050	1040
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	15.0	19.2	15.6	16.6	22.5
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	270	410	<200	<200	220
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.02	<0.01	0.02	0.02
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	0.1	0.1	0.8	0.6
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	0.1	0.1	0.8	0.6
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	460	270	600	330	260
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	460	270	600	330	260
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	5	<2	12	<2	<2
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.32	0.18	0.48	0.18	0.15



## Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Client sample ID	TPNV I-0.5m	TPNV I-1m	TPNV I-1.5m	TPNV II-0.5m	TPNV II-1m
				Client sampling date / time	11-DEC-2011 15:00	11-DEC-2011 15:00	11-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00
					EB1202480-051	EB1202480-052	EB1202480-053	EB1202480-054	EB1202480-055
<b>EA002 : pH (Soils)</b>									
pH Value	----	0.1	pH Unit		9.2	8.6	9.0	9.0	8.9
<b>EA010: Conductivity</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm		258	1840	1220	222	3140
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1.0	%		16.5	25.1	24.2	13.4	12.8
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		<200	300	250	250	<200
<b>ED042T: Total Sulfur by LECO</b>									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	0.16	0.03	<0.01	0.56
<b>EK055: Ammonia as N</b>									
Ammonia as N	7664-41-7	20	mg/kg		<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	1.2	0.8	0.4	0.2
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	1.2	0.8	0.4	0.2
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		460	340	420	550	190
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>									
Total Nitrogen as N	----	20	mg/kg		460	340	420	550	190
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>									
Bicarbonate Ext. P (Colwell)	----	2	mg/kg		34	5	9	17	<2
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%		0.47	0.22	0.20	0.38	0.19



## Analytical Results

Sub-Matrix: SOIL

Client sample ID  
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TPNV III-0.5m	TPNV III-1m	TPNV IV-0.5m	TPNV IV-1m	TPNV V-0.5m
				12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00
				EB1202480-056	EB1202480-057	EB1202480-058	EB1202480-059	EB1202480-060
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.8	9.3	8.5	9.0	8.4
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	803	996	456	865	130
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	15.8	17.5	14.5	17.8	11.3
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	360	490	240	280	<200
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.02	0.02	<0.01
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	0.2	0.2	<0.1	0.2
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	0.2	0.2	<0.1	0.2
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	340	210	1040	380	460
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	340	210	1040	380	460
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	<2	46	<2	19	<2
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.14	0.10	0.89	0.24	0.28





## Analytical Results

Sub-Matrix: SOIL

Client sample ID  
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TPNV V-1m	TPSS I-Topsoil	TPSS II-Topsoil	TPSS III-Topsoil	TPNS IV-Topsoil
				12-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00	19-DEC-2011 15:00
				EB1202480-061	EB1202480-062	EB1202480-063	EB1202480-064	EB1202480-065
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.4	8.4	8.5	8.2	8.4
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	141	81	500	603	222
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	13.1	10.0	30.5	31.6	20.1
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	230	340	1020	1100
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.01	0.05	0.08	0.03
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	30	60	40
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	3.2	15.7
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	14.9	<0.1	17.3	16.5
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	14.9	<0.1	20.5	32.2
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	510	680	3320	4520	2590
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	510	690	3320	4540	2620
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	<2	6	23	22	85
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.28	0.62	3.61	4.91	3.09



## Analytical Results

Sub-Matrix: SOIL

Client sample ID  
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TPRB I-Topsoil	TPRB II-Topsoil	TPRB III-Topsoil	TPNB East IV-Topsoil	TPNB West V-Topsoil
				20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00	20-DEC-2011 15:00
				EB1202480-066	EB1202480-067	EB1202480-068	EB1202480-069	EB1202480-070
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	7.7	8.2	8.0	8.3	8.3
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	133	150	185	142	117
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	20.0	23.1	28.8	28.8	24.7
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	710	770	980	810	550
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.01	0.02	0.01
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	<20	<20	<20
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	0.7	<0.1	1.4	0.7	0.2
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	38.5	20.2	33.7	14.9	15.6
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	39.2	20.2	35.1	15.6	15.8
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	1910	1840	2120	2380	1640
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	1950	1860	2160	2400	1660
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	97	22	15	54	15
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	2.18	2.01	2.14	3.17	1.85



## Analytical Results

Sub-Matrix: SOIL

Client sample ID  
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TPLNG II-Topsoil	TPLNG V-Topsoil	TPNC I-Topsoil	TPNC II-Topsoil	TPNC III- Topsoil
				10-DEC-2011 15:00	10-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00	12-DEC-2011 15:00
				EB1202480-071	EB1202480-072	EB1202480-073	EB1202480-074	EB1202480-075
<b>EA002 : pH (Soils)</b>								
pH Value	----	0.1	pH Unit	8.2	7.7	8.3	8.2	8.2
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	82	360	168	234	169
<b>EA055: Moisture Content</b>								
Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	4.7	19.8	15.2	21.3
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	<200	640	890	380	460
<b>ED042T: Total Sulfur by LECO</b>								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.02	<0.01	0.01	0.02
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	20	mg/kg	<20	<20	80	<20	40
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N (Sol.)	----	0.1	mg/kg	0.4	4.9	0.3	1.1	0.3
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N (Sol.)	----	0.1	mg/kg	8.3	43.4	10.6	26.3	25.1
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	8.7	48.3	10.9	27.4	25.4
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	740	3660	1750	2800	2370
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>								
Total Nitrogen as N	----	20	mg/kg	750	3710	1760	2830	2400
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>								
Bicarbonate Ext. P (Colwell)	----	2	mg/kg	60	32	16	11	19
<b>EP003: Total Organic Carbon (TOC) in Soil</b>								
Total Organic Carbon	----	0.02	%	0.77	3.11	1.93	3.10	2.41



## Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID	TPNC IV-Topsoil	TPNC V-Topsoil			
				Client sampling date / time	12-DEC-2011 15:00	12-DEC-2011 15:00	----	----	----
				EB1202480-076	EB1202480-077				
<b>EA002 : pH (Soils)</b>									
pH Value	----	0.1	pH Unit		<b>7.9</b>	<b>8.3</b>	----	----	----
<b>EA010: Conductivity</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm		<b>111</b>	<b>128</b>	----	----	----
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1.0	%		<b>28.0</b>	<b>16.8</b>	----	----	----
<b>ED021: Bicarbonate Extractable Potassium (Colwell)</b>									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		<b>570</b>	<b>310</b>	----	----	----
<b>ED042T: Total Sulfur by LECO</b>									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	----	----	----
<b>EK055: Ammonia as N</b>									
Ammonia as N	7664-41-7	20	mg/kg		<20	<20	----	----	----
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N (Sol.)	----	0.1	mg/kg		<b>0.2</b>	<0.1	----	----	----
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N (Sol.)	----	0.1	mg/kg		<b>34.5</b>	<b>4.2</b>	----	----	----
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<b>34.7</b>	<b>4.2</b>	----	----	----
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		<b>1710</b>	<b>1280</b>	----	----	----
<b>EK062: Total Nitrogen as N (TKN + NOx)</b>									
Total Nitrogen as N	----	20	mg/kg		<b>1740</b>	<b>1280</b>	----	----	----
<b>EK080: Bicarbonate Extractable Phosphorus (Colwell)</b>									
Bicarbonate Ext. P (Colwell)	----	2	mg/kg		<b>11</b>	<b>17</b>	----	----	----
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%		<b>1.71</b>	<b>1.38</b>	----	----	----





**WorleyParsons**

resources & energy

**TIMOR GAP, E.P.**  
TIMOR GÁS & PETRÓLEO



REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX E





# AIR CANISTER CHAIN OF CUSTODY

If sourced from an ALS Laboratory, please tick  →

Client Supplied Canisters? **Y / N**

1 Sydney 477 Victoria Rd, North Sydney, NSW 1585  
44 Victoria Rd, East Sydney, NSW 1585  
1 Newcastle Rd, Roseburn, NSW 1585  
10/12 Bank St, Crows Nest, NSW 1585



Standard TAT may be extended for multiple clients &/or suites

CLIENT: <b>Worley Parsons</b>	TURNAROUND REQUIREMENTS: <input checked="" type="checkbox"/> Standard TAT (List due date): <b>16/1/2012</b> <input type="checkbox"/> Non Standard or urgent TAT (List due date):	<b>LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Rec Lab Y/N NE Y/N N/A Valve closed on Receipt? Rec Lab Y/N NE Y/N N/A Canister/Sample Complete and Not Damaged Yes No	
OFFICE: <b>Level 7, QV1 Building 250 St Georges Terrace Perth WA 6000</b>	PROJECT NO.: <b>301012-01504</b>	ALS QUOTE NO.: <b>BN / 734 / 11</b>	COC SEQUENCE NUMBER (Circle) COC: (1) 2 3 4 5 6 7 OF: (1) 2 3 4 5 6 7
PROJECT: <b>Timor Leste EIA</b>	PURCHASE ORDER NO.: <b>301012-01504-PS</b>	COUNTRY OF ORIGIN: <b>Timor Leste</b>	Other comment:
CANISTER REQUEST NO:	CONTACT PH: <b>+61 (0)8 6311 6380</b>	RELINQUISHED BY: <b>[Signature]</b>	RECEIVED BY: <b>[Signature]</b>
PROJECT MANAGER: <b>Anthony Faulkner</b>	SAMPLER MOBILE: <b>0447 150 964</b>	RECEIVED BY: <b>[Signature]</b>	RECEIVED BY: <b>[Signature]</b>
SAMPLER: <b>Gasper De Costa / Grant Hickson</b>	EDD FORMAT (or default):	RECEIVED BY: <b>[Signature]</b>	RECEIVED BY: <b>[Signature]</b>
COC Emailed to ALS? ( YES / NO)	Email Reports to (will default to PM if no other addresses are listed): <b>Grant.Hickson@worleyparsons.com</b>	RECEIVED BY: <b>[Signature]</b>	RECEIVED BY: <b>[Signature]</b>
Email Invoice to (will default to PM if no other addresses are listed): <b>Anthony.Faulkner@worleyparsons.com</b>		RECEIVED BY: <b>[Signature]</b>	RECEIVED BY: <b>[Signature]</b>

COMMENTS/SPECIAL HANDLING/REPLACEMENT OR RETURN INSTRUCTIONS:

GAS SAMPLE CONTAINER INFORMATION					Canister Gauge Pressures (PSI)			ANALYSIS REQUIRED					Additional Information			
LAB ID	SERIAL NO.	CLIENT SAMPLE ID	DATE / TIME SAMPLED	MATRIX (eg Air)	Dispatch	Post Sampling	Receipt	Analysis		Dilution (Calc)	TO-14	TO-15	TO-15X	SO <sub>x</sub>	NO <sub>x</sub>	Comments on LORs required, potential hazards, likely contaminant levels, or samples requiring specific QC analysis etc. (LOR defaults to return method - LOR after dilution)
								Analysis	Dilution							
	4994	Betamo CSD	5/1/2012 11:51am	Air	-30	0					X			X	X	*All canisters were inflated over a 2 hour period.
	4995	Vigueque Square	6/1/2012 09:49am	Air	-30	0				X			X	X		
	4994	Suai Market	4/1/2012 10:23am	Air	-30	0				X			X	X		
	4993	Beaco CSH	20/12/2011 05:33pm	Air	-30	0				X			X	X		

Job Specific Instructions:

## SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

<b>Work Order : EN1200380</b>	
<b>Client : WORLEY PARSONS - INFRASTRUCTURE MWE</b> <b>Contact : GRANT HICKSON</b> <b>Address : LEVEL 3/600 MURRAY STREET WEST PERTH WA, AUSTRALIA 6005</b> <b>E-mail : grant.hickson@worleyparsons.com</b> <b>Telephone : +61 08 9278 8111</b> <b>Facsimile : ----</b> <b>Project : 301012-01504TIMOR LESTE EIA</b> <b>Order number : 301012-01504-CNT-051211A-MW</b> <b>C-O-C number : ----</b> <b>Site : ----</b> <b>Sampler : GD/GH</b>	<b>Laboratory : Environmental Division Newcastle</b> <b>Contact : Carsten Emrich</b> <b>Address : 5 Rosegum Road Warabrook NSW Australia 2304</b> <b>E-mail : carsten.emrich@alsenviro.com</b> <b>Telephone : +61 7 3243 7123</b> <b>Facsimile : +61 7 3243 7218</b> <b>Page : 1 of 2</b> <b>Quote number : EB2012WORPAR0273 (BN/734/11)</b> <b>QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</b>

### Dates

<b>Date Samples Received : 31-JAN-2012</b> <b>Client Requested Due Date : 14-FEB-2012</b>	<b>Issue Date : 31-JAN-2012 16:33</b> <b>Scheduled Reporting Date : <b>09-FEB-2012</b></b>
--	---

### Delivery Details

<b>Mode of Delivery : Carrier</b> <b>No. of coolers/boxes : ----</b> <b>Security Seal : N/A</b>	<b>Temperature : ----</b> <b>No. of samples received : 4</b> <b>No. of samples analysed : 4</b>
---	---

### General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.



## Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EN1200380-002 : 06-JAN-2012 09:49 : 4995 - VIQUEQUE SQUARE

## Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: AIR

Laboratory sample ID	Client sampling date / time	Client sample ID	AIR - EP101-14 VOCs in Air by USEPA TO14ar	AIR - EP101-14-MV VOCs in Air by USEPA TO14ar (µg/m³)	AIR - GAS-AIR (Subcontracted) Permanent Gases and Hydrocarbons in Air	AIR - MISC-AIR (Subcontracted) Miscellaneous Subcontracting
EN1200380-001	05-JAN-2012 11:59	4994 BETANO CSO	✓	✓	✓	✓
EN1200380-002	06-JAN-2012 09:49	4995 VIQUEQUE SQUARE	✓	✓	✓	✓
EN1200380-003	04-JAN-2012 10:23	4984 SUAI MARKET	✓	✓	✓	✓
EN1200380-004	20-DEC-2011 17:33	4993 BEACO CSH	✓	✓	✓	✓

## Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: AIR

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method	Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
					Date	Evaluation	Date	Evaluation
<b>EP101-14: Volatile Organic Compounds</b>								
	4993	Summa Canister	----	19-JAN-2012	31-JAN-2012	✗	----	----
<b>GAS-AIR: Fixed Gases and Hydrocarbons</b>								
	4984	Tedlar bag	----	11-JAN-2012	31-JAN-2012	✗	----	----
	4993	Tedlar bag	----	27-DEC-2011	31-JAN-2012	✗	----	----
	4994	Tedlar bag	----	12-JAN-2012	31-JAN-2012	✗	----	----
	4995	Tedlar bag	----	13-JAN-2012	31-JAN-2012	✗	----	----

## Requested Deliverables

### GRANT HICKSON

- \*AU Certificate of Analysis - NATA ( COA ) Email grant.hickson@worleyparsons.com
- \*AU Interpretive QC Report - DEFAULT (Anon QCI Rep) ( QCI ) Email grant.hickson@worleyparsons.com
- \*AU QC Report - DEFAULT (Anon QC Rep) - USEPA ( QC-USEPA ) Email grant.hickson@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental HT ( SRN ) Email grant.hickson@worleyparsons.com
- Attachment - Report ( SUBCO ) Email grant.hickson@worleyparsons.com
- Chain of Custody (CoC) ( COC ) Email grant.hickson@worleyparsons.com
- EDI Format - ENMRG ( ENMRG ) Email grant.hickson@worleyparsons.com
- EDI Format - XTab ( XTAB ) Email grant.hickson@worleyparsons.com

### MR ANTHONY FAULKNER

- A4 - AU Tax Invoice ( INV ) Email anthony.faulkner@worleyparsons.com

## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>EN1200380</b></p> <p><b>Client</b> : <b>WORLEY PARSONS - INFRASTRUCTURE MWE</b></p> <p><b>Contact</b> : GRANT HICKSON</p> <p><b>Address</b> : LEVEL 3/600 MURRAY STREET WEST PERTH WA, AUSTRALIA 6005</p> <p><b>E-mail</b> : grant.hickson@worleyparsons.com</p> <p><b>Telephone</b> : +61 08 9278 8111</p> <p><b>Facsimile</b> : ----</p> <p><b>Project</b> : 301012-01504TIMOR LESTE EIA</p> <p><b>Order number</b> : 301012-01504-CNT-051211A-MW</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : GD/GH</p> <p><b>Site</b> : ----</p> <p><b>Quote number</b> : BN/734/11</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Environmental Division Newcastle</p> <p><b>Contact</b> : Carsten Emrich</p> <p><b>Address</b> : 5 Rosegum Road Warabrook NSW Australia 2304</p> <p><b>E-mail</b> : carsten.emrich@alsenviro.com</p> <p><b>Telephone</b> : +61 7 3243 7123</p> <p><b>Facsimile</b> : +61 7 3243 7218</p> <p><b>QC Level</b> : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p><b>Date Samples Received</b> : 31-JAN-2012</p> <p><b>Issue Date</b> : 06-FEB-2012</p> <p><b>No. of samples received</b> : 4</p> <p><b>No. of samples analysed</b> : 4</p>
--	---

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

Accredited for compliance with  
ISO/IEC 17025.

WORLD RECOGNISED  
ACCREDITATION

### Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Peter Keyte	Newcastle Manager	Newcastle



## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **Analysis of Nitrogen Oxides was conducted by DTI Thornton, NATA Accreditation No.2325, Report No T12-00059/0001-0004 dated 03-Feb-2012.**
- **EP101: Results reported in  $\mu\text{g}/\text{m}^3$  are calculated from PPBV results based on a temperature of 25°C and atmospheric pressure of 101.3 kPa.  $\mu\text{g}/\text{m}^3$  results should be corrected to account for actual conditions during sampling.**
- **EP101: Sample canisters were received at sub-ambient pressures and may have required dilution in the laboratory prior to analysis. Where applicable, LOR values have been adjusted accordingly.**
- **Samples were received outside of recommended ALS holding times for TO14 and gas analysis. Results should be scrutinised accordingly.**
- **Sulfur Dioxide analysis will be reported separately.**





## Analytical Results

Sub-Matrix: AIR

Client sample ID

Client sampling date / time

				4994	4995	4984	4993	----
				BETANO CSO	VIQUEQUE SQUARE	SUAI MARKET	BEACO CSH	----
				05-JAN-2012 11:59	06-JAN-2012 09:49	04-JAN-2012 10:23	20-DEC-2011 17:33	----
Compound	CAS Number	LOR	Unit	EN1200380-001	EN1200380-002	EN1200380-003	EN1200380-004	----
<b>EP101: VOCs by USEPA Method TO14 (Calculated Concentration)</b>								
^ Freon 12	75-71-8	2	µg/m³	4	4	4	4	----
^ Freon 114	76-14-2	4	µg/m³	<4	<4	<4	<4	----
^ Vinyl chloride	75-01-4	1	µg/m³	<1	<1	<1	<1	----
^ Bromomethane	74-83-9	2	µg/m³	<2	<2	<2	<2	----
^ Chloroethane	75-00-3	1	µg/m³	<1	<1	<1	<1	----
^ Freon 11	75-69-4	3	µg/m³	<3	<3	<3	<3	----
^ 1.1-Dichloroethene	75-35-4	2	µg/m³	<2	<2	<2	<2	----
^ Dichloromethane	75-09-2	2	µg/m³	<2	<2	<2	<2	----
^ Freon 113	76-13-1	4	µg/m³	<4	<4	<4	<4	----
^ 1.1-Dichloroethane	75-34-3	2	µg/m³	<2	<2	<2	<2	----
^ cis-1.2-Dichloroethene	156-59-2	2	µg/m³	<2	<2	<2	<2	----
^ Chloroform	67-66-3	2	µg/m³	<2	<2	<2	<2	----
^ 1.2-Dichloroethane	107-06-2	2	µg/m³	<2	<2	<2	<2	----
^ 1.1.1-Trichloroethane	71-55-6	3	µg/m³	<3	<3	<3	<3	----
^ Benzene	71-43-2	2	µg/m³	<2	5	3	<2	----
^ Carbon Tetrachloride	56-23-5	3	µg/m³	<3	<3	<3	<3	----
^ 1.2-Dichloropropane	78-87-5	2	µg/m³	<2	<2	<2	<2	----
^ Trichloroethene	79-01-6	3	µg/m³	<3	<3	<3	<3	----
^ cis-1.3-Dichloropropylene	10061-01-5	2	µg/m³	<2	<2	<2	<2	----
^ trans-1.3-Dichloropropene	10061-02-6	2	µg/m³	<2	<2	<2	<2	----
^ 1.1.2-Trichloroethane	79-00-5	3	µg/m³	<3	<3	<3	<3	----
^ Toluene	108-88-3	2	µg/m³	<2	13	7	2	----
^ 1.2-Dibromoethane (EDB)	106-93-4	4	µg/m³	<4	<4	<4	<4	----
^ Tetrachloroethene	127-18-4	3	µg/m³	<3	<3	<3	<3	----
^ Chlorobenzene	108-90-7	2	µg/m³	<2	<2	<2	<2	----
^ Ethylbenzene	100-41-4	2	µg/m³	<2	<2	<2	<2	----
^ meta- & para-Xylene	108-38-3 106-42-3	4	µg/m³	<4	6	<4	<4	----
^ Styrene	100-42-5	2	µg/m³	<2	<2	<2	<2	----
^ 1.1.2.2-Tetrachloroethane	79-34-5	3	µg/m³	<3	<3	<3	<3	----
^ o-Xylene	95-47-6	2	µg/m³	<2	<2	<2	<2	----
^ Total Xylenes	1330-20-7	6	µg/m³	<6	8	<6	<6	----
^ 1.3.5-Trimethylbenzene	108-67-8	2	µg/m³	<2	<2	<2	<2	----
^ 1.2.4-Trimethylbenzene	95-63-6	2	µg/m³	<2	<2	<2	<2	----
^ 1.3-Dichlorobenzene	541-73-1	3	µg/m³	<3	<3	<3	<3	----
^ 1.4-Dichlorobenzene	106-46-7	3	µg/m³	<3	<3	<3	<3	----





## Analytical Results

Sub-Matrix: AIR

Client sample ID

Client sampling date / time

				4994	4995	4984	4993	----
				BETANO CSO	VIQUEQUE SQUARE	SUAI MARKET	BEACO CSH	----
				05-JAN-2012 11:59	06-JAN-2012 09:49	04-JAN-2012 10:23	20-DEC-2011 17:33	----
Compound	CAS Number	LOR	Unit	EN1200380-001	EN1200380-002	EN1200380-003	EN1200380-004	----
<b>EP101: VOCs by USEPA Method TO14 (Calculated Concentration) - Continued</b>								
^ 1,2-Dichlorobenzene	95-50-1	3	µg/m³	<3	<3	<3	<3	----
^ 1,2,4-Trichlorobenzene	120-82-1	4	µg/m³	<4	<4	<4	<4	----
^ Hexachlorobutadiene	87-68-3	5	µg/m³	<5	<5	<5	8	----
<b>Subcontracted Analysis</b>								
Nitrogen Dioxide	10102-44-0	0.0001	%	<0.0001	<0.0001	<0.0001	<0.0001	----
Nitric Oxide	----	0.0001	%	<0.0001	<0.0001	<0.0001	<0.0001	----
<b>USEPA Air Toxics Method TO14ar</b>								
Freon 12	75-71-8	0.5	ppbv	0.8	0.8	0.9	0.9	----
Freon 114	76-14-2	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Vinyl chloride	75-01-4	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Bromomethane	74-83-9	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Chloroethane	75-00-3	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Freon 11	75-69-4	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1,1-Dichloroethene	75-35-4	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Dichloromethane	75-09-2	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Freon 113	76-13-1	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1,1-Dichloroethane	75-34-3	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
cis-1,2-Dichloroethene	156-59-2	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Chloroform	67-66-3	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1,2-Dichloroethane	107-06-2	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1,1,1-Trichloroethane	71-55-6	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Benzene	71-43-2	0.5	ppbv	<0.5	1.7	1.0	<0.5	----
Carbon Tetrachloride	56-23-5	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1,2-Dichloropropane	78-87-5	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Trichloroethene	79-01-6	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
cis-1,3-Dichloropropylene	10061-01-5	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
trans-1,3-Dichloropropene	10061-02-6	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1,1,2-Trichloroethane	79-00-5	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Toluene	108-88-3	0.5	ppbv	<0.5	3.4	1.8	0.6	----
1,2-Dibromoethane (EDB)	106-93-4	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Tetrachloroethene	127-18-4	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Chlorobenzene	108-90-7	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	1.0	ppbv	<1.0	1.3	<1.0	<1.0	----
Styrene	100-42-5	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----



## Analytical Results

Sub-Matrix: AIR

Client sample ID

Client sampling date / time

				4994	4995	4984	4993	----
				BETANO CSO	VIQUEQUE SQUARE	SUAI MARKET	BEACO CSH	----
				05-JAN-2012 11:59	06-JAN-2012 09:49	04-JAN-2012 10:23	20-DEC-2011 17:33	----
Compound	CAS Number	LOR	Unit	EN1200380-001	EN1200380-002	EN1200380-003	EN1200380-004	----
<b>USEPA Air Toxics Method TO14ar - Continued</b>								
1.1.2.2-Tetrachloroethane	79-34-5	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	ppbv	<0.5	<b>0.5</b>	<0.5	<0.5	----
4-Ethyltoluene	----	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1.3.5-Trimethylbenzene	108-67-8	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1.2.4-Trimethylbenzene	95-63-6	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1.3-Dichlorobenzene	541-73-1	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1.4-Dichlorobenzene	106-46-7	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1.2-Dichlorobenzene	95-50-1	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
1.2.4-Trichlorobenzene	120-82-1	0.5	ppbv	<0.5	<0.5	<0.5	<0.5	----
Hexachlorobutadiene	87-68-3	0.5	ppbv	<0.5	<0.5	<0.5	<b>0.8</b>	----
<b>USEPA Air Toxics Method TO14ar</b>								
4-Bromofluorobenzene	460-00-4	0.1	%	<b>83.7</b>	<b>87.8</b>	<b>87.0</b>	<b>86.1</b>	----



### Surrogate Control Limits

Sub-Matrix: AIR		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>USEPA Air Toxics Method TO14a</b>			
4-Bromofluorobenzene	460-00-4	60	140

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: EN1200380</b>	<b>Page</b>	<b>: 1 of 7</b>
<b>Client</b>	<b>: WORLEY PARSONS - INFRASTRUCTURE MWE</b>	<b>Laboratory</b>	<b>: Environmental Division Newcastle</b>
<b>Contact</b>	<b>: GRANT HICKSON</b>	<b>Contact</b>	<b>: Carsten Emrich</b>
<b>Address</b>	<b>: LEVEL 3/600 MURRAY STREET WEST PERTH WA, AUSTRALIA 6005</b>	<b>Address</b>	<b>: 5 Rosegum Road Warabrook NSW Australia 2304</b>
<b>E-mail</b>	<b>: grant.hickson@worleyparsons.com</b>	<b>E-mail</b>	<b>: carsten.emrich@alsenviro.com</b>
<b>Telephone</b>	<b>: +61 08 9278 8111</b>	<b>Telephone</b>	<b>: +61 7 3243 7123</b>
<b>Facsimile</b>	<b>: ----</b>	<b>Facsimile</b>	<b>: +61 7 3243 7218</b>
<b>Project</b>	<b>: 301012-01504TIMOR LESTE EIA</b>	<b>QC Level</b>	<b>: NEPM 1999 Schedule B(3) and ALS QCS3 requirement</b>
<b>Site</b>	<b>: ----</b>	<b>Date Samples Received</b>	<b>: 31-JAN-2012</b>
<b>C-O-C number</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 06-FEB-2012</b>
<b>Sampler</b>	<b>: GD/GH</b>	<b>No. of samples received</b>	<b>: 4</b>
<b>Order number</b>	<b>: 301012-01504-CNT-051211A-MW</b>	<b>No. of samples analysed</b>	<b>: 4</b>
<b>Quote number</b>	<b>: BN/734/11</b>		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

Accredited for compliance with  
ISO/IEC 17025.

WORLD RECOGNISED  
ACCREDITATION

### Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Peter Keyte	Newcastle Manager	Newcastle



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### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :            Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot  
                  CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
                  LOR = Limit of reporting  
                  RPD = Relative Percentage Difference  
                  # = Indicates failed QC



### Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: AIR

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>USEPA Air Toxics Method TO14ar (QC Lot: 2151284)</b>									
EN1200380-001	4994 BETANO CSO	EP101-14: Freon 12	75-71-8	0.5	ppbv	0.8	0.8	0.0	No Limit
		EP101-14: Freon 114	76-14-2	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Vinyl chloride	75-01-4	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Bromomethane	74-83-9	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Chloroethane	75-00-3	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Freon 11	75-69-4	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,1-Dichloroethene	75-35-4	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Dichloromethane	75-09-2	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Freon 113	76-13-1	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,1-Dichloroethane	75-34-3	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: cis-1,2-Dichloroethene	156-59-2	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Chloroform	67-66-3	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,2-Dichloroethane	107-06-2	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,1,1-Trichloroethane	71-55-6	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Benzene	71-43-2	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Carbon Tetrachloride	56-23-5	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,2-Dichloropropane	78-87-5	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Trichloroethene	79-01-6	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: cis-1,3-Dichloropropylene	10061-01-5	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: trans-1,3-Dichloropropene	10061-02-6	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,1,2-Trichloroethane	79-00-5	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Toluene	108-88-3	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,2-Dibromoethane (EDB)	106-93-4	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Tetrachloroethene	127-18-4	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Chlorobenzene	108-90-7	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Ethylbenzene	100-41-4	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Styrene	100-42-5	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,1,2,2-Tetrachloroethane	79-34-5	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: ortho-Xylene	95-47-6	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,3,5-Trimethylbenzene	108-67-8	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,2,4-Trimethylbenzene	95-63-6	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,3-Dichlorobenzene	541-73-1	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,4-Dichlorobenzene	106-46-7	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,2-Dichlorobenzene	95-50-1	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: 1,2,4-Trichlorobenzene	120-82-1	0.5	ppbv	<0.5	<0.5	0.0	No Limit
		EP101-14: Hexachlorobutadiene	87-68-3	0.5	ppbv	<0.5	<0.5	0.0	No Limit



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 Work Order : EN1200380  
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE  
 Project : 301012-01504TIMOR LESTE EIA



Sub-Matrix: **AIR**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
<b>USEPA Air Toxics Method TO14ar (QC Lot: 2151284) - continued</b>									
EN1200380-001	4994 BETANO CSO	EP101-14: meta- & para-Xylene	108-38-3 106-42-3	1.0	ppbv	<1.0	<1.0	0.0	No Limit



### Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control terms Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (DCS) refers to certified reference materials, or known interference free matrices spiked with target analytes. The purpose of these QC parameters are to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS and DCS.

Sub-Matrix: AIR

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report							
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)		
						LCS	DCS	Low	High	Value	Control Limit	
<b>USEPA Air Toxics Method TO14ar (QCLot: 2151284)</b>												
EP101-14: Freon 12	75-71-8	0.5	ppbv	<0.5	10 ppbv	108	106	70	130	1.0	25	
EP101-14: Freon 114	76-14-2	0.5	ppbv	<0.5	10 ppbv	104	105	70	130	0.7	25	
EP101-14: Vinyl chloride	75-01-4	0.5	ppbv	<0.5	10 ppbv	102	104	70	130	2.2	25	
EP101-14: Bromomethane	74-83-9	0.5	ppbv	<0.5	10 ppbv	101	103	70	130	2.0	25	
EP101-14: Chloroethane	75-00-3	0.5	ppbv	<0.5	10 ppbv	100	105	70	130	4.6	25	
EP101-14: Freon 11	75-69-4	0.5	ppbv	<0.5	10 ppbv	109	106	70	130	3.1	25	
EP101-14: 1.1-Dichloroethene	75-35-4	0.5	ppbv	<0.5	10 ppbv	106	106	70	130	0.1	25	
EP101-14: Dichloromethane	75-09-2	0.5	ppbv	<0.5	10 ppbv	106	104	70	130	1.5	25	
EP101-14: Freon 113	76-13-1	0.5	ppbv	<0.5	10 ppbv	105	104	70	130	0.8	25	
EP101-14: 1.1-Dichloroethane	75-34-3	0.5	ppbv	<0.5	10 ppbv	106	108	70	130	1.9	25	
EP101-14: cis-1.2-Dichloroethene	156-59-2	0.5	ppbv	<0.5	10 ppbv	103	89.2	70	130	14.6	25	
EP101-14: Chloroform	67-66-3	0.5	ppbv	<0.5	10 ppbv	108	105	70	130	3.1	25	
EP101-14: 1.2-Dichloroethane	107-06-2	0.5	ppbv	<0.5	10 ppbv	113	107	70	130	5.0	25	
EP101-14: 1.1.1-Trichloroethane	71-55-6	0.5	ppbv	<0.5	10 ppbv	109	106	70	130	2.6	25	
EP101-14: Benzene	71-43-2	0.5	ppbv	<0.5	10 ppbv	99.5	101	70	130	1.7	25	
EP101-14: Carbon Tetrachloride	56-23-5	0.5	ppbv	<0.5	10 ppbv	110	107	70	130	3.4	25	
EP101-14: 1.2-Dichloropropane	78-87-5	0.5	ppbv	<0.5	10 ppbv	104	103	70	130	1.4	25	
EP101-14: Trichloroethene	79-01-6	0.5	ppbv	<0.5	10 ppbv	91.5	101	70	130	10.2	25	
EP101-14: cis-1.3-Dichloropropylene	10061-01-5	0.5	ppbv	<0.5	10 ppbv	106	105	70	130	1.3	25	
EP101-14: trans-1.3-Dichloropropene	10061-02-6	0.5	ppbv	<0.5	10 ppbv	88.9	87.9	70	130	1.2	25	
EP101-14: 1.1.2-Trichloroethane	79-00-5	0.5	ppbv	<0.5	10 ppbv	105	102	70	130	3.5	25	
EP101-14: Toluene	108-88-3	0.5	ppbv	<0.5	10 ppbv	94.5	105	70	130	10.8	25	
EP101-14: 1.2-Dibromoethane (EDB)	106-93-4	0.5	ppbv	<0.5	10 ppbv	109	107	70	130	2.1	25	
EP101-14: Tetrachloroethene	127-18-4	0.5	ppbv	<0.5	10 ppbv	105	103	70	130	2.4	25	
EP101-14: Chlorobenzene	108-90-7	0.5	ppbv	<0.5	10 ppbv	99.5	98.0	70	130	1.6	25	
EP101-14: Ethylbenzene	100-41-4	0.5	ppbv	<0.5	10 ppbv	101	99.1	70	130	1.7	25	
EP101-14: meta- & para-Xylene	108-38-3 106-42-3	1	ppbv	<1.0	20 ppbv	103	101	70	130	1.6	25	
EP101-14: Styrene	100-42-5	0.5	ppbv	<0.5	10 ppbv	88.2	86.8	70	130	1.6	25	
EP101-14: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	ppbv	<0.5	10 ppbv	103	100	70	130	2.3	25	
EP101-14: ortho-Xylene	95-47-6	0.5	ppbv	<0.5	10 ppbv	101	99.2	70	130	1.8	25	
EP101-14: 1.3.5-Trimethylbenzene	108-67-8	0.5	ppbv	<0.5	10 ppbv	102	97.1	70	130	4.8	25	
EP101-14: 1.2.4-Trimethylbenzene	95-63-6	0.5	ppbv	<0.5	10 ppbv	101	98.6	70	130	2.3	25	
EP101-14: 1.3-Dichlorobenzene	541-73-1	0.5	ppbv	<0.5	10 ppbv	100	96.9	70	130	3.4	25	
EP101-14: 1.4-Dichlorobenzene	106-46-7	0.5	ppbv	<0.5	10 ppbv	98.4	98.7	70	130	0.4	25	



Sub-Matrix: AIR		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report							
		LOR	Unit	Result	Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)		
Method: Compound	CAS Number				Concentration	LCS	DCS	Low	High	Value	Control Limit	
<b>USEPA Air Toxics Method TO14ar (QCLot: 2151284) - continued</b>												
EP101-14: 1,2-Dichlorobenzene	95-50-1	0.5	ppbv	<0.5	10 ppbv	104	99.5	70	130	4.6	25	
EP101-14: 1,2,4-Trichlorobenzene	120-82-1	0.5	ppbv	<0.5	10 ppbv	95.1	94.6	70	130	0.6	25	
EP101-14: Hexachlorobutadiene	87-68-3	0.5	ppbv	<0.5	10 ppbv	104	96.0	70	130	8.4	25	



### ***Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report***

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**
-

## INTERPRETIVE QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: EN1200380</b>	<b>Page</b>	<b>: 1 of 5</b>
<b>Client</b>	<b>: WORLEY PARSONS - INFRASTRUCTURE MWE</b>	<b>Laboratory</b>	<b>: Environmental Division Newcastle</b>
<b>Contact</b>	<b>: GRANT HICKSON</b>	<b>Contact</b>	<b>: Carsten Emrich</b>
<b>Address</b>	<b>: LEVEL 3/600 MURRAY STREET WEST PERTH WA, AUSTRALIA 6005</b>	<b>Address</b>	<b>: 5 Rosegum Road Warabrook NSW Australia 2304</b>
<b>E-mail</b>	<b>: grant.hickson@worleyparsons.com</b>	<b>E-mail</b>	<b>: carsten.emrich@alsenviro.com</b>
<b>Telephone</b>	<b>: +61 08 9278 8111</b>	<b>Telephone</b>	<b>: +61 7 3243 7123</b>
<b>Facsimile</b>	<b>: ----</b>	<b>Facsimile</b>	<b>: +61 7 3243 7218</b>
<b>Project</b>	<b>: 301012-01504TIMOR LESTE EIA</b>	<b>QC Level</b>	<b>: NEPM 1999 Schedule B(3) and ALS QCS3 requirement</b>
<b>Site</b>	<b>: ----</b>	<b>Date Samples Received</b>	<b>: 31-JAN-2012</b>
<b>C-O-C number</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 06-FEB-2012</b>
<b>Sampler</b>	<b>: GD/GH</b>	<b>No. of samples received</b>	<b>: 4</b>
<b>Order number</b>	<b>: 301012-01504-CNT-051211A-MW</b>	<b>No. of samples analysed</b>	<b>: 4</b>
<b>Quote number</b>	<b>: BN/734/11</b>		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



## Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: AIR

Evaluation: \* = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
<b>USEPA Air Toxics Method TO14ar</b>							
<b>Summa Canister (EP101-14)</b> 4984 - SUAI MARKET	04-JAN-2012	----	----	----	02-FEB-2012	03-FEB-2012	✓
<b>Summa Canister (EP101-14)</b> 4994 - BETANO CSO	05-JAN-2012	----	----	----	02-FEB-2012	04-FEB-2012	✓
<b>Summa Canister (EP101-14)</b> 4995 - VIQUEQUE SQUARE	06-JAN-2012	----	----	----	02-FEB-2012	05-FEB-2012	✓
<b>Summa Canister (EP101-14)</b> 4993 - BEACO CSH	20-DEC-2011	----	----	----	02-FEB-2012	19-JAN-2012	*
<b>Subcontracted Analysis</b>							
<b>Tedlar bag (GAS-AIR)</b> 4984 - SUAI MARKET	04-JAN-2012	----	----	----	02-FEB-2012	11-JAN-2012	*
<b>Tedlar bag (GAS-AIR)</b> 4994 - BETANO CSO	05-JAN-2012	----	----	----	02-FEB-2012	12-JAN-2012	*
<b>Tedlar bag (GAS-AIR)</b> 4995 - VIQUEQUE SQUARE	06-JAN-2012	----	----	----	02-FEB-2012	13-JAN-2012	*
<b>Tedlar bag (GAS-AIR)</b> 4993 - BEACO CSH	20-DEC-2011	----	----	----	02-FEB-2012	27-DEC-2011	*





## Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(when) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **AIR**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Analytical Methods	Method	Count		Rate (%)			Quality Control Specification
			QC	Regular	Actual	Expected	Evaluation	
<b>Duplicate Control Samples (DCS)</b>								
	Volatile Organic Compounds in Air by USEPA TO14	EP101-14	1	4	25.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
<b>Laboratory Duplicates (DUP)</b>								
	Volatile Organic Compounds in Air by USEPA TO14	EP101-14	1	4	25.0	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
<b>Laboratory Control Samples (LCS)</b>								
	Volatile Organic Compounds in Air by USEPA TO14	EP101-14	1	4	25.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
<b>Method Blanks (MB)</b>								
	Volatile Organic Compounds in Air by USEPA TO14	EP101-14	1	4	25.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



## Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods			
Canister Sampling - Field Data	CAN-001	AIR	USEPA TO14 / TO15
Volatile Organic Compounds in Air by USEPA TO14	EP101-14	AIR	USEPA TO14ar
VOCs in Air by USEPA TO14 (mass/volume)	EP101-14-MV	AIR	USEPA TO14ar Volatile Organic Compounds in Air by USEPA TO14 (Calculated Concentration)
Fixed Gases and Hydrocarbons in Air	GAS-AIR	AIR	Based on USEPA Method 3 GC-TCD CO <sub>2</sub> , CH <sub>4</sub> , CO by NDIR, O <sub>2</sub> by paramagnetic gas analysis, H <sub>2</sub> , Hydrocarbons by GC-FID Heat of Combustion by calculation
Miscellaneous subcontracting	MISC-AIR	AIR	Miscellaneous subcontracting



## Summary of Outliers

### Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

#### Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

#### Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

### Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: AIR

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
<b>Subcontracted Analysis</b>						
<b>Tedlar bag</b> 4984 - SUAI MARKET	----	----	----	02-FEB-2012	11-JAN-2012	22
<b>Tedlar bag</b> 4994 - BETANO CSO	----	----	----	02-FEB-2012	12-JAN-2012	21
<b>Tedlar bag</b> 4995 - VIQUEQUE SQUARE	----	----	----	02-FEB-2012	13-JAN-2012	20
<b>Tedlar bag</b> 4993 - BEACO CSH	----	----	----	02-FEB-2012	27-DEC-2011	37
<b>USEPA Air Toxics Method TO14a</b>						
<b>Summa Canister</b> 4993 - BEACO CSH	----	----	----	02-FEB-2012	19-JAN-2012	14

### Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



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REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX F

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>EB1208182</b>	<b>Page</b>	: 1 of 3
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: <b>WORLEY PARSONS - INFRASTRUCTURE MWE</b>	<b>Laboratory</b>	: Environmental Division Brisbane
<b>Contact</b>	: GRANT HICKSON	<b>Contact</b>	: Carsten Emrich
<b>Address</b>	: 1 ADELAIDE TCE EAST PERTH WA, AUSTRALIA	<b>Address</b>	: 32 Shand Street Stafford QLD Australia 4053
<b>E-mail</b>	: grant.hickson@worleyparsons.com	<b>E-mail</b>	: carsten.emrich@alsenviro.com
<b>Telephone</b>	: 08 9278 8615	<b>Telephone</b>	: +61 7 3243 7123
<b>Facsimile</b>	: ----	<b>Facsimile</b>	: +61 7 3243 7218
<b>Project</b>	: ----	<b>QC Level</b>	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
<b>Order number</b>	: ----		
<b>C-O-C number</b>	: ----	<b>Date Samples Received</b>	: 23-MAR-2012
<b>Sampler</b>	: ----	<b>Issue Date</b>	: 15-MAY-2012
<b>Site</b>	: ----		
<b>Quote number</b>	: BN/734/11	<b>No. of samples received</b>	: 4
		<b>No. of samples analysed</b>	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with  
ISO/IEC 17025.

### *Signatories*

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jonathon Angell	Inorganic Coordinator	Brisbane Inorganics



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## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **This report has been amended following correction of Depositional Dust results to reflect updated sampling periods.**





## Analytical Results

Sub-Matrix: DUST

				Client sample ID	Suai Airport	Suai Loro	Betano CSH	Beaco CSH	----
				Client sampling date / time	[27-FEB-2012]	[27-FEB-2012]	[27-FEB-2012]	[27-FEB-2012]	----
Compound	CAS Number	LOR	Unit	EB1208182-001	EB1208182-002	EB1208182-003	EB1208182-004	----	
<b>EA120: Ash Content</b>									
Ash Content	----	0.1	g/m <sup>2</sup> .month	0.2	0.5	0.4	0.6	----	
Ash Content (mg)	----	1	mg	6	16	13	21	----	
<b>EA125: Combustible Matter</b>									
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	0.4	0.5	0.4	0.5	----	
Combustible Matter (mg)	----	1	mg	13	16	14	16	----	
<b>EA138: Coarse Particulates</b>									
Coarse Particulates	----	0.1	g	<0.1	<0.1	<0.1	<0.1	----	
<b>EA139: Total Soluble Matter</b>									
Total Soluble Matter	----	0.1	g/m <sup>2</sup> .month	1.5	0.6	0.4	<0.1	----	
Total Soluble Matter (mg)	----	1	mg	45	20	15	2	----	
<b>EA141: Total Insoluble Matter</b>									
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	0.6	1.0	0.8	1.2	----	
Total Insoluble Matter (mg)	----	1	mg	19	32	27	38	----	
<b>EA142: Total Solids</b>									
Total Solids	----	0.1	g/m <sup>2</sup> .month	2.1	1.7	1.2	1.2	----	
Total Solids (mg)	----	1	mg	64	52	42	40	----	

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>EB1208181</b>	<b>Page</b>	: 1 of 3
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: <b>WORLEY PARSONS - INFRASTRUCTURE MWE</b>	<b>Laboratory</b>	: Environmental Division Brisbane
<b>Contact</b>	: GRANT HICKSON	<b>Contact</b>	: Carsten Emrich
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<b>E-mail</b>	: grant.hickson@worleyparsons.com	<b>E-mail</b>	: carsten.emrich@alsenviro.com
<b>Telephone</b>	: 08 9278 8615	<b>Telephone</b>	: +61 7 3243 7123
<b>Facsimile</b>	: ----	<b>Facsimile</b>	: +61 7 3243 7218
<b>Project</b>	: ----	<b>QC Level</b>	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
<b>Order number</b>	: ----		
<b>C-O-C number</b>	: ----	<b>Date Samples Received</b>	: 22-MAR-2012
<b>Sampler</b>	: ----	<b>Issue Date</b>	: 15-MAY-2012
<b>Site</b>	: ----		
<b>Quote number</b>	: BN/734/11	<b>No. of samples received</b>	: 2
		<b>No. of samples analysed</b>	: 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED  
ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with  
ISO/IEC 17025.

### Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jonathon Angell	Inorganic Coordinator	Brisbane Inorganics



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## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- This report has been amended following correction of Depositional Dust results to reflect updated sampling periods.



**Analytical Results**

Sub-Matrix: DUST

Compound	CAS Number	LOR	Unit	Client sample ID	Bentano CSO	Beaco Airport			
				Client sampling date / time	[27-FEB-2012]	[27-FEB-2012]	----	----	----
					EB1208181-001	EB1208181-002	----	----	----
<b>EA120: Ash Content</b>									
Ash Content	----	0.1	g/m <sup>2</sup> .month		0.3	0.8	----	----	----
Ash Content (mg)	----	1	mg		9	24	----	----	----
<b>EA125: Combustible Matter</b>									
Combustible Matter	----	0.1	g/m <sup>2</sup> .month		0.5	0.5	----	----	----
Combustible Matter (mg)	----	1	mg		16	15	----	----	----
<b>EA138: Coarse Particulates</b>									
Coarse Particulates	----	0.1	g		<0.1	<0.1	----	----	----
<b>EA139: Total Soluble Matter</b>									
Total Soluble Matter	----	0.1	g/m <sup>2</sup> .month		1.6	0.5	----	----	----
Total Soluble Matter (mg)	----	1	mg		53	17	----	----	----
<b>EA141: Total Insoluble Matter</b>									
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month		0.8	1.2	----	----	----
Total Insoluble Matter (mg)	----	1	mg		25	40	----	----	----
<b>EA142: Total Solids</b>									
Total Solids	----	0.1	g/m <sup>2</sup> .month		2.3	1.8	----	----	----
Total Solids (mg)	----	1	mg		79	56	----	----	----





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REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX G



## **REGULATION NO. 2000/19**

United Nations Transitional Administration in East Timor  
Administration Transitoire des Nations Unies au Timor Oriental (UNTAET)

UNTAET/REG/2000/19

30 June 2000

### **REGULATION NO. 2000/19 ON PROTECTED PLACES**

The Special Representative of the Secretary-General (hereinafter: Transitional Administrator),

Pursuant to the authority given to him under United Nations Security Council Resolution 1272 (1999) of 25 October 1999,

Taking into account United Nations Transitional Administration in East Timor (UNTAET) Regulation No.1999/1 of 27 November 1999 on the Authority of the Transitional Administration in East Timor (hereinafter: UNTAET Regulation No. 1999/1),

After consultation in the National Consultative Council,

For the purpose of protecting designated areas, endangered species, coral reefs, wetlands, mangrove areas, historic, cultural and artistic sites, conservation of biodiversity and protection of the biological resources of East Timor,

Promulgates the following:

#### **Section 1 Applicable Law**

All laws which have effect in East Timor by virtue of Section 1 of (UNTAET) Regulation No. 1999/1 and which may provide greater protection of the natural environment of East Timor than the protections contained in this or any other regulation shall remain in effect.

#### **Section 2 Protected Wild Areas**

**2.1** Under the present regulation "protected wild areas" shall mean areas of land constituting islands, beaches, mountains, sanctuaries, reserves and any other areas. For the purposes of the present regulation, the following areas of land shall be designated as protected wild areas as delineated in the attached Schedule:

- (a) the total land area of Jako Island together with surrounding rocks, reefs, and other surface and sub-surface features;
- (b) Tutuala Beach together with forest adjacent to the beach;
- (c) Cristo Rei Beach and the hinterland;
- (d) the summit of Tata Mailau Mountain, all elevations on Tata Mailau Mountain above 2,000 meters and the surrounding forest;
- (e) the summit of Sadoria Mountain, all elevations on Sadoria Mountain above 2,000 meters and the surrounding forest;
- (f) the summit of Malobu Mountain, all elevations on Malobu Mountain above 2,000 meters and the surrounding forest;
- (g) the summit of Mount Diatuto and the surrounding forests;

- (h) the summit of Mount Fantumasin and the surrounding forests;
- (i) the Riverlet Clere Sanctuary;
- (j) the Tilomar Reserve;
- (k) the Lore Reserve;
- (l) the Monte Mundo Perdido and the surrounding forest;
- (m) the summit of Monte Matebian and all elevations on Monte Matebian above 2,000 metres and the surrounding forest;
- (n) the Monte Cablaque and the surrounding forest; and
- (o) the Manucoco Reserve.

**2.2** In addition to specified protected wild areas under section 2.1, the Transitional Administrator may designate in a directive other terrestrial or marine areas of exceptional importance:

- (a) for their scenic and natural qualities,
- (b) for their biological resources including rare or threatened animals and plants; or
- (c) as habitats of endangered species.

**2.3** Protected wild areas shall be managed in order to maintain and enhance their wild and natural character and so as to preserve endemic animals and plants within the protected wild area. Subject to section 2.4 of the present regulation, within a protected wild area:

- (a) the erection of a temporary or permanent structure in any form,
- (b) the building of a road or other access place for vehicles and transportation,
- (c) the hunting, trapping, taking or disturbing of animals,
- (d) the taking or disturbing of plant life,
- (e) the use of a protected wild area for agricultural purposes and the grazing of animals, and
- (f) the pollution of a protected wild area, shall be prohibited.

**2.4** Under the present regulation, the following activities conducted in accordance with local law and tradition by local communities living close to the areas, specified under section 2.1 may constitute permitted uses:

- (a) the harvesting of non-forest products;
- (b) the selective grazing of animals;
- (c) the use of non-endangered animals and plants for religious and cultural ceremonies;
- (d) the traditional hunting of non-endangered species;
- (e) the traditional cutting of trees at elevations below 2,000 meters in places other than Jako Island provided such cutting and transport of wood within the protected areas is done in a sustainable manner and without use of machinery; and
- (f) any other traditional purpose consistent with the intent of the present regulation.

**2.5** Protected wild areas shall be managed in accordance with directives issued by the Transitional Administrator. The Transitional Administrator may issue further directives to limit or control access by persons and legal entities to wild protected areas.

### **Section 3**

#### **Endangered Species**

**3.1** For the purposes of the present regulation, "endangered species" shall mean a species of animal or plant at risk of extinction within East Timor. The following species of animal shall constitute endangered species within East Timor:

- (a) Sea tortoises;
- (b) Sea turtles;
- (c) Marine mammals, including bottlenose dolphins, whales and dugongs;
- (d) Wallabies;
- (e) Crocodiles;
- (f) All animal and plant species listed in Appendix I or Appendix II of the Convention on the International Trade in Endangered Species; and
- (g) Any other plant or animal species designated as endangered by the Transitional Administrator.

**3.2** Endangered species and the habitats of endangered species shall be protected throughout the terrestrial and marine territory of East Timor. Under the present regulation:

- (a) the killing, injuring, harming, taking or disturbing of any endangered species;
- (b) the destruction in any way of the habitat of an endangered species;
- (c) the selling of an endangered species or the selling of any product made from an endangered species; and
- (d) the export of an endangered species or any product made from an endangered species, shall be prohibited.

**3.3** A person or legal entity wishing to conduct scientific research by taking samples from an endangered species or its habitat shall apply to the Transitional Administrator for an exemption from the operation of section 3.2.

**3.4** The form of an application for an exemption shall be prescribed by directive.

**3.5** The granting of an exemption may be subject to conditions. No exemption shall be granted in respect of research that imperils the survival of an endangered species in East Timor.

## **Section 4**

### **Coral Reefs**

The coral reefs present in the waters of East Timor shall be protected. For the purposes of the present regulation:

- (a) the intentional killing, damaging, or destruction of coral or coral reef;
- (b) the use of explosives or poisons for fishing which results in the killing, damaging, or destroying of coral or coral reef;
- (c) the buying or selling of coral or products made from coral; and
- (d) the export of coral or products made from coral, shall be prohibited.

## **Section 5**

### **Wetlands and Mangroves**

**5.1** Wetlands and mangrove areas shall be protected in East Timor. For the purposes of the present regulation:

- (a) the pollution,
- (b) the draining, or
- (c) the destruction, of a naturally existing wetlands and mangrove areas shall be prohibited.

**5.2** For the purposes of the present regulation:

- (a) the cutting,
- (b) the damaging, or
- (c) the removing, of a mangrove, shall be prohibited.

## **Section 6**

### **Historic, Cultural and Artistic Sites**

**6.1** Under a directive, the Transitional Administrator may designate monuments, buildings, and other sites as property of cultural, artistic or historic significance to the people of East Timor.

**6.2** For the purposes of the present regulation, the damaging or destruction of the property or the removal of objects from a property as outlined under directive, shall be prohibited.

**6.3** In order to preserve architectural, artistic, cultural, or historic features of a property, the Transitional Administrator shall issue directives on the management of places.

## **Section 7**

### **Penalties**

**7.1** All civil and criminal penalties under current law for damaging the natural environment remain in effect.

**7.2** A person who commits an offence as set out in Sections 2.3, 3.2, 4, 5 and 6 of the present Regulation shall, in addition to any other applicable civil and criminal penalties be liable:

- (a) to a penalty not exceeding US \$5,000, to be determined by the Transitional Administrator;
- (b) to removal of any animals, plants, coral or other animate or inanimate objects subject to the provisions of the present regulation; and
- (c) confiscation of any tools, equipment and vehicles used for committing the offence or for the transportation of animals, plants, coral or other animate or other inanimate objects subject to prohibition under the present Regulation.

**7.3** A legal entity, other than a business registered pursuant to UNTAET Regulation No. 2000/4, which commits an offence as set out in Sections 2.3, 3.2, 4, 5 and 6 of the present Regulation shall be liable, in addition to any other applicable civil and criminal penalties:

- (a) to a penalty not exceeding US \$500,000, to be determined by the Transitional Administrator;
- (b) to removal of any animals, plants, coral or other animate or inanimate objects subject to the provisions of the present regulation; and
- (c) confiscation of any tools, equipment and vehicles used for committing the offence or for the transportation of animals, plants, coral or other animate or other inanimate objects subject to prohibition under the present Regulation.

**7.4** A business registered pursuant to UNTAET Regulation No. 2000/4, which commits an offence as set out in Sections 2.3, 3.2, 4, 5 and 6 of the present Regulation shall be liable, in addition to any other applicable civil and criminal penalties:

- (a) to a penalty not exceeding US \$500,000, to be determined by the Transitional Administrator;
- (b) the cancellation of the registration of that business;
- (c) to removal of any animals, plants, coral or other animate or inanimate objects subject to the provisions of the present regulation; and

- (d) confiscation of any tools, equipment and vehicles used for committing the offence or for the transportation of animals, plants, coral or other animate or other inanimate objects subject to prohibition under the present Regulation.

**7.5** A person who, or legal entity which, commits an offence as set out in section 3.2 of the present regulation shall also be subject to the cancellation of the exemption granted pursuant to section 3 of the present Regulation.

**7.6** A financial penalty imposed by the present Section shall accrue to the East Timor Consolidated Budget, as provided for under UNTAET Regulation No. 2000/1.

**7.7** For the purposes of the present regulation, the Transitional Administrator may authorise:

- (a) the power of investigation to designated parties in respect of offences purported to be committed;
- (b) the power of designated parties to serve notices in respect of offences committed;
- (c) the legal procedure to be followed where a notice as specified under section 7.7 (b) is served.

In the absence of specific provisions detailing the powers of investigation and the authority of designated parties, section 1 of the present regulation shall apply.

## **Section 8**

### **Review**

**8.1** A person against whom, or a legal entity against which, a decision has been made pursuant to the present Regulation may apply in writing to the Deputy Transitional Administrator for a review of that decision.

**8.2** An application for review pursuant to Section 8.1 of the present Regulation shall only be considered if it is made within thirty (30) days of the date of the contested decision.

**8.3** The Deputy Transitional Administrator shall, within thirty (30) days of the date of an application submitted in accordance with this Section, either uphold or overturn the original decision, and shall notify, in writing, the person or legal entity of the reasons for doing so.

**8.4** Pending the establishment of adequate judicial procedures for administrative matters, a person or legal entity may challenge a decision of the Deputy Transitional Administrator to uphold the original decision adverse to their interests with the competent judicial authorities in East Timor.

**8.5** In any court proceeding arising out of or in connection with the present regulation against UNTAET or a servant of UNTAET, the court shall apply the same substantive norms as would be applicable under the procedures for administrative matters.

## **Section 9**

### **Definitions**

Wherever used in the present regulation, the following terms shall have the following meanings:

- (a) "Coral reef" means areas of coral and coral species within the territorial waters of East Timor;
- (b) "Wetlands" means, areas which may be seasonally or permanently inundated by water and supports a range of flora and fauna which is representative of a wetland ecosystem;
- (c) "Mangrove areas" means, an area within the intertidal zone of the coastal region recognised by a range of tropical mangrove plant species; and

(d) "Pollution" means, the entry or the entering into of living creatures, substances, energy, and/or other components into the environment by human activities with the result that its quality decreases to a certain level which causes the environment not to be able to function in accordance with its allocation.

## **Section 10**

### **Entry into force**

The present regulation shall enter into force on 1 July 2000.



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# Law Number 23/1997 on Environmental Management

With the Blessing of Almighty God

President of the Republic of Indonesia

## Considering:

- a. that Indonesian environment as a gift and blessing of the Almighty God given to the Indonesian people and nation constitutes a space for life in all its aspects and dimensions in accordance with the Archipelagic Concept;
- b. that in utilising natural resources to enhance public welfare as stipulated in the 1945 Constitution and to achieve happiness of life based on the Pancasila, it is necessary to implement environmentally sustainable development guided by an integrated and comprehensive national policy which takes into account the needs of present as well as future generations;
- c. that there is a need to implement environmental management to preserve and develop environmental capacity in a harmonious, coordinated and balanced manner to support the implementation of environmentally sustainable development;
- d. that the implementation of environmental management in the scheme of environmentally sustainable development should be based on legal norms taking into account the level of community awareness and global environmental developments as well as international law instruments related to the environment;
- e. that the awareness and life of the community in relation to environmental management has developed to such an extent that the substance of Law No. 4 of 1982 regarding Principles of Environmental Management (State Gazette 1982 Number 3215) needs to be perfected to achieve environmentally sustainable development;
- f. that in relation to the above points a, b, c, d, and e, it is necessary to enact a Law regarding Environmental Management.

## Recalling:

Article 5(1), Article 20(1), and Article 33(3) of the 1945 Constitution.

With agreement the House of Representatives of the Republic of Indonesia Decides to enact: The Law Regarding Environmental Management

## CHAPTER I - GENERAL PROVISIONS

### Article 1

In this Law what is meant by:

1. The **environment** is the spatial unity of all materials, forces, situations, and living creatures, including humans and their behaviour, which influences the continuance of the life and welfare of humans and other living creatures;
2. **Environmental management** is an integrated effort to preserve environmental functions which covers planning policy, exploitation, development, maintenance, reparation, supervision and

control of the environment;

3. **Environmentally sustainable development** is a conscious and planned effort, which integrates the environment, including resources, into the development process to ensure capability, welfare, and quality of life of present and future generations;
4. An **ecosystem** is an ordering of an element of the environment which constitutes a whole and complete unit which interacts to produce environmental balance, stability, and productivity;
5. **Preservation of environmental functions** is a set of efforts to maintain the continued supportive and carrying capacities of the environment;
6. **Environmental supportive capacity** is the capacity of the environment to support humans and other living creatures;
7. **Preservation of environmental support capacity** is a set of efforts to protect environmental viability against pressures for change and/or negative impacts that arise because of an activity, so that it can continue to support the life of humans and other living creatures;
8. **Environmental carrying capacity** is the capability of the environment to absorb substances, energy, and/or other components that enter or are discharged into it;
9. **Preservation of environmental carrying capacity** is a set of efforts to protect the capability of the environment to absorb substances, energy, and/or other components which are discharged into it;
10. **Resources** are environmental elements that consist of human resources, natural resources, biological as well as non-biological, and artificial resources;
11. **Environmental quality standards** are the threshold limits or levels of living creatures, substances, energy, or components that exist or must exist and/or polluting elements the existence of which in a certain resource as an element of the environment is set at a certain level;
12. **Environmental pollution** is the entry or the entering into of living creatures, substances, energy, and/or other components into the environment by human activities with the result that its quality decreases to a certain level which causes the environment not to be able to function in accordance with its allocation;
13. **Standard environmental damage criteria** are threshold limits of physical and/or biological changes in the environment which can be measured;
14. **Environmental damage** is an action which gives rise to direct or indirect changes in the physical and/or biological characteristics of the environment which causes the environment to no longer be able to function to support sustainable development;
15. **Conservation of natural resources** is the management of non-renewable natural resources to ensure their prudent utilization, and renewable resources to ensure their continued availability through maintaining and improving quality levels and diversity;
16. **Waste** is the residue of a business and/or activity;
17. **Hazardous and toxic material** is every matter which due to its nature or concentration, both directly and indirectly, can pollute and/or damage the environment, health, the continuation of human life and of other living creatures;

18. **Hazardous and toxic waste** is the residue of a business and/or activity that contains hazardous and/or toxic material which due to its nature and/or concentration and/or amount, directly as well as indirectly, can pollute and/or damage the environment, and/or endanger the environment, health, the continuation of human life and of other living creatures;
19. An **environmental dispute** is a disagreement between two or more parties which arises as a result of the existence of or suspected existence of environmental pollution and/or damage;
20. **Environmental impact** is the influence for change on the environment which is caused by a business and/or an activity;
21. **Environmental impact analysis** is a study of large and significant impacts of a planned business and/or activity which is needed in the decision making process regarding business and/or activity implementation;
22. An **environmental organization** is a group of persons formed of their own volition and desire in the midst of the community, with its objectives and activities in the environmental field;
23. An **environmental audit** is an evaluation process performed by those responsible for a business and/or activity to assess the level of compliance with applicable legal conditions and/or policy and standard set by the party responsible for the business and/or activity concerned;
24. A **person** is an individual person, and/or a group of people, and/or legal body;
25. **Minister** is the Minister who has been given the task of managing the environment.

## **Article 2**

The scope of the Indonesian environment covers space, the location of the United Indonesian State with an Archipelagic Outlook in performing its sovereignty, sovereign rights, and jurisdiction.

## **CHAPTER II - BASIS, OBJECTIVE, AND TARGET**

### **Article 3**

Environmental management which is performed with a principle of national responsibility, a principle of sustainability, and a principle of exploitation, aims to create environmentally sustainable development in the framework of the holistic development of the Indonesian human and the development of an Indonesian community in its entirety which is faithful and devoted to God the Almighty.

### **Article 4**

The targets of environmental management are:

- a. achievement of harmony and balance between humans and the environment;
- b. formation of the Indonesian person as an environmental being disposed toward and acting to protect and foster the environment;
- c. guaranteeing the interests of present generations and future generations;
- d. achievement of preservation of environmental functions;
- e. prudent control of the exploitation of resources;

- f. protection of the Unitary Indonesia Republic against impacts of business and/or activity outside the national region which causes environmental pollution and/or damage.

### **CHAPTER III - COMMUNITY RIGHTS, OBLIGATIONS AND ROLE**

#### **Article 5**

1. Every person has the same right to an environment which is good and healthy.
2. Every person has the right to environmental information which is related to environmental management roles.
3. Every person has the right to play a role in the scheme of environmental management in accordance with applicable laws and regulations.

#### **Article 6**

1. Every person is obliged to preserve the continuity of environmental functions and protect and combat environmental pollution and damage.
2. Every person who carrying out a business or other activity must provide true and accurate information regarding environmental management.

#### **Article 7**

1. The community has the same and the broadest possible opportunity to play a role in environmental management.
2. Implementation of the stipulation in (1) above, is carried out by:
  - a. increasing independence, community empowerment, and partnership
  - b. giving growth to community capability and initiative;
  - c. increasing community responsiveness in carrying out social supervision;
  - d. providing suggestions;
  - e. conveying information and/or conveying reports.

### **CHAPTER IV - ENVIRONMENTAL MANAGEMENT AUTHORITY**

#### **Article 8**

1. Natural resources are controlled by the state and are utilized for the greatest possible public welfare, and the arrangements thereof are determined by the Government.
2. To implement the stipulation provided for in (1) above the Government:
  - a. regulates and develops policy in the scheme of environmental management;
  - b. regulates the supply, allocation, use, [and] management of the environment, and the reuse of natural resources, including genetic resources;

- c. regulates legal actions and legal relations between persons and/or other legal subjects as well as legal actions regarding natural resources and artificial resources, including genetic resources;
- d. controls activities which have social impact;
- e. develops a funding system for efforts to preserve environmental functions.

3. The stipulations provided for in (2) above are further regulated by Government Regulation.

#### **Article 9**

1. The Government determines national policies on environmental management and spatial management whilst always taking into account religious values, culture and traditions and the living norms of the community.

2. Environmental management is performed in an integrated manner by government institutions in accordance with their respective fields of tasks and responsibilities, the public, and other agents of development while taking into account the integratedness of planning and implementation of the environmental management policy.

3. Environmental management must be performed in an integrated manner with spatial management, protection of non-biological natural resources, protection of artificial resources, conservation of biological natural resources and their ecosystems, cultural preservation, bio-diversity and climate change.

4. The integratedness of planning and implementation of national environmental management policy, as provided for in (2) above, is coordinated by the Minister.

#### **Article 10**

In the scheme of environmental management the Government must:

- a. form, give growth to, develop and increase awareness and responsibility of decision makers environmental management;
- b. form, give growth to, develop and increase awareness of community rights and responsibilities in environmental management;
- c. form, give growth to, develop and increase partnership between the community, business and the Government in the effort to preserve environmental supportive capacity and carrying capacity;
- d. develop and apply environmental management policy which ensures the maintaining of environmental supportive and carrying capacity;
- e. develop and apply instruments of a pre-emptive, preventive and proactive nature in the effort to prevent decreases in environmental supportive and carrying capacity;
- f. exploit and develop environmentally sound technology;
- g. carry out research and development in the environmental field;
- h. provide environmental information and disseminate it to the community;
- i. give awards to meritorious people or foundations in the environmental field.

#### **Article 11**

1. Environmental management at the national level is implemented integratedly by an institutional instrument which is coordinated by the Minister.

2. Stipulations on task, function, authority, and organizational arrangement as well as institutional working procedures as provided for in (1) above are regulated further by Presidential Decision.

#### **Article 12**

1. To create integratedness and harmony in the implementation of national policy regarding environmental management, the Government based on legislation can:

- a. delegate certain environmental management authority to local Central Government offices;
- b. give a role to Local Government to assist the Central Government in the implementation of environmental management in the regions.

2. Further stipulations as provided for in (1) above are regulated by laws and regulations.

#### **Article 13**

1. In the scheme of the implementation of environmental management, the Government can transfer part of its affairs to Local Government to become part of its general affairs.

2. Transferring of affairs as provided for (1) above is determined by Government Regulation.

### **CHAPTER V - PRESERVATION OF ENVIRONMENTAL FUNCTIONS**

#### **Article 14**

1. To guarantee the preservation of environmental functions, every business and/or activity is prohibited from breaching quality standards and standard criteria of environmental damage.

2. Stipulations on environmental quality standards, prevention of and coping with pollution and restoration of its carrying capacity are regulated by Government Regulation.

3. Stipulations on standard criteria of environmental damage, prevention and coping with damage along with restoration of its supportive capacity are regulated by Government Regulation.

#### **Article 15**

1. Every plan of a business and/or activity with the possibility that it can give rise to large and important impact on the environment, must possess an environmental impact analysis.

2. Stipulations concerning business and/or activity plans that give rise to a large and important impact on the environment, as is meant in (1) above, and the method for arrangement and evaluation of environmental impact analysis are determined by Government Regulation.

#### **Article 16**

1. Every party responsible for a business and/or activity must carry out management of wastes produced by their business and/or activity.

2. The responsible party for a business and/or activity as provided for in (1) above can transfer such waste management to another party.

3. Stipulations on the implementation of this article are regulated further by Government Regulation.

#### **Article 17**

1. Every party responsible for a business and/or activity must carry out management of the hazardous and toxic materials.

2. Management of hazardous and toxic materials covers: producing, transporting, distributing, storing, using and/or disposing.

3. Stipulations concerning management of hazardous and toxic materials are regulated further by Government Regulation.

### **CHAPTER VI - ENVIRONMENTAL COMPLIANCE REQUIREMENTS**

#### **Part I - Licensing**

#### **Article 18**

1. Every business and/or activity which gives rise to a large and important impact on the environment must possess an environmental impact analysis to obtain the license to conduct a business and/or activity.

2. The license to conduct a business and/or activity as provided for in (1) above is conferred by the official who has authority in accordance with laws and regulations.

3. In the license provided for in (1) above is included conditions and obligations to carry out environmental impact control efforts.

#### **Article 19**

1. In issuing a license to carry out a business and/or activity it is compulsory to take into account:

- a. spatial management plans;
- b. public opinion;
- c. considerations and recommendations of authorized officials who are involved with such business and/or activity.

2. The license to conduct a business and/or activity decision must be made public.

#### **Article 20**

1. Without a licensing decision, every person is prohibited from disposing of waste to an environmental medium.

2. Every person is prohibited from disposing of waste which originates from outside Indonesian territory to an Indonesian environmental medium.

3. The authority to issue or refuse a licensing application as provided for in (1) above lies with the Minister.

4. Waste disposal to an environmental medium as provided for in (1) above may only be carried out at a disposal site which is determined by the Minister.



5. Implementing provisions for this Article are regulated further by government regulation.

#### **Article 21**

Every person is prohibited from importing hazardous and toxic wastes.

### **Part II - Supervision**

#### **Article 22**

1. The Minister carries out supervision of the compliance of those responsible for a business and/or activity to stipulations which have already been applied in the laws and regulations in the environmental field.

2. To carry out the supervision provided for in (1) above, the Minister can appoint officials with authority to carry out supervision.

3. Where supervisory authority is transferred to Local Government, the Regional Head appoints officials authorized to carry out supervision.

#### **Article 23**

Environmental impact control as a supervisory instrument is carried out by an institution formed especially for that by the Government.

#### **Article 24**

1. To implement its task, the supervisor provided for in [Article 22](#) has authority to conduct monitoring, request an explanation, make copies of documents and/or make notes which are needed, enter certain places, take samples, inspect equipment, inspect installations and/or transportation equipment, and request an explanation from the party responsible for a business and/or activity.

2. The party responsible for a business and/or activity which has been requested to provide an explanation as provided for in (1) above, must fulfill the request of the supervisor official in accordance with stipulations of applicable laws and regulations.

3. Each supervisor must show a letter of instruction and/or proof of identity and must be attentive to the situation and conditions prevailing at such place of supervision.

### **Part III - Administrative Sanctions**

#### **Article 25**

1. The Governor/Head of the Level I Region has the authority to carry out administrative sanctions against the party responsible for a business and/or activity to prevent and end occurrence of an infringement, and to deal with the consequences given rise to by an infringement, carry out safeguarding, mitigating and/or remedial measures at the expense of the party responsible for a business and/or activity, except where otherwise stipulated based on Law.

2. Authority as provided by (1) above, can be transferred to the District Head/Major/Head of the Level II Region by Level I Region Regulation.

3. A third party who has an interest has the right to submit an application to the authorized official to carry out an administrative sanction, as provided for in (1) and (2) above.

4. Administrative sanctions as provided for in (1) and (2) above, are preceded by an order from the authorized official.

5. Safeguarding, mitigating and/or remedial measures as provided for in (1) above can be replaced with the payment of a certain sum of money.

#### **Article 26**

1. The procedure for determining expenses as provided for in [Article 25\(1\) and \(5\)](#) above and their retribution is determined by laws and regulations.

2. Where laws and regulations as provided for in (1) above are not yet formed, its implementation uses legal efforts according to applicable laws and regulations.

#### **Article 27**

1. Sanctions in the form of revocation of business and/or activity licenses can be imposed upon certain infringements.

2. The Regional Head can submit a proposal for the revoking of a business and/or activity license to an authorized official.

3. A party which has an interest can submit an application to the authorized official to revoke a business and/or other activity license because their interests are adversely affected.

### **Part IV - Environmental Audits**

#### **Article 28**

In the scheme of improving business and/or activity performance, the Government encourages the party responsible for a business and/or activity to conduct an environmental audit.

#### **Article 29**

1. The Minister has the authority to order the party responsible for a business and/or activity to conduct an environmental audit if the party concerned indicates their non-compliance with stipulations arranged in this law.

2. The party responsible for a business and/or activity which is ordered to conduct an environmental audit must execute the order as provided for in (1) above.

3. If the person responsible for a business and/or activity does not execute the order as provided for in (1) above, the Minister can execute or instruct a third party to execute an environmental audit as provided for in (1) above, at the expense of the party responsible for the business and/or activity concerned.

4. The total expense as provided for in (3) above is determined by the Minister.

5. The Minister publicises the results of an environmental audit provided for in (1).

### **Chapter VII - ENVIRONMENTAL DISPUTE SETTLEMENT**

#### **Part I - General**

#### **Article 30**

1. Environmental dispute settlement can be reached through the court or out of court based on the voluntary choice of the parties in dispute.
2. Out of court dispute settlement as provided for in (1) above does not apply to criminal environmental actions as regulated in this law.
3. If an out of court dispute settlement has already been chosen, legal action through the court can only be undertaken if such effort is declared to have not succeeded by one or several of the parties in dispute.

## **Part II - Out of Court Environmental Dispute Settlement**

### **Article 31**

Out of court environmental dispute settlement is held to reach agreement on the form and size of compensation and/or on certain actions to ensure that negative impacts on the environment will not occur or be repeated.

### **Article 32**

In out of court environmental dispute settlement as provided for in [Article 31](#) the services of the third party can be used, both which do not possess decision making authority and which possess decision making authority, to help resolve an environmental dispute.

### **Article 33**

1. The Government and/or community can form environmental dispute settlement service providing agency which has a free and impartial disposition.
2. Stipulations on an environmental dispute settlement service provider are regulated further by Government Regulation.

## **Part III - Environmental Dispute Settlement Through the Court**

### **Paragraph I Compensation**

#### **Article 34**

1. Every action which infringes the law in the form of environmental pollution and/or damage which gives rise to adverse impacts on other people or the environment, obliges the party responsible for the business and/or activity to pay compensation and/or to carry out certain actions.
2. As well as the burden of carrying out certain participatory actions provided for in (1) above, the judge can determine compulsory monetary payment to be made for every day of lateness in completion of such certain actions.

### **Paragraph II Strict Liability**

#### **Article 35**

1. The party responsible for a business and/or activity which gives rise to a large impact on the environment, which uses hazardous and toxic materials, and/or produces hazardous and toxic waste, is strictly liable for losses which are given rise to, with the obligation to pay compensation directly and immediately upon occurrence of environmental pollution and/or damage.
2. The party responsible for a business and/or activity can be released from the obligation to pay compensation provided for in (1) above if those concerned can prove that environmental pollution and/or

damage was caused by one of the following reasons:

- a. the existence of a natural disaster or war; or
- b. the existence of situation of coercion outside of human capabilities; or
- c. the existence of actions of a third party which caused the occurrence of environmental pollution and/or damage.

3. Where losses occur which have been caused by a third party as provided for in (2)(c) above, the third party is responsible for paying compensation.

### **Paragraph III Time Limits for Bringing Legal Actions**

#### **Article 36**

1. The limitation period for bringing legal actions to court follows the periods set out in the applicable Civil Procedures Law, and is calculated from the moment the victim knows of the existence of environmental pollution and/or damage.

2. Stipulations on the limitation period for bringing legal actions as provided for in (1) above do not apply to environmental pollution and/or damage which is caused by a business and/or activity which uses hazardous and toxic materials and/or produces hazardous and toxic waste.

### **Paragraph 4 Right of the Community and Environmental Organization to Bring Legal Actions**

#### **Article 37**

1. The community has the right to bring a class action to court and/or report to law enforcers concerning various environmental problems which inflict losses on the life of the community.

2. If it is known that the community suffers as a result of environmental pollution and/or damage to such an extent that it influences the basic life of the community, the governmental agency which is responsible in the environmental field can act in the community's interest.

3. Further stipulations as to what is intended by (2) above are regulated by Government Regulation.

#### **Article 38**

1. In the scheme of implementing responsibility for environmental management consistent with a partnership principle, environmental organizations have the right to bring a legal action in the interest of environmental functions.

2. The right to bring a legal action as provided for in (1) above is limited to a demand for a right to carry out particular measures without the presence of a demand for compensation, except for expenses or real outlays.

3. Environmental organizations have the right to bring a legal action as provided in (1) above if they meet the following conditions:

- a. they have the form of a legal body or foundation;
- b. in the articles of association of the environmental organization it is stated clearly that the goal of the founding of the organisation concerned was in the interests of the preservation of environmental functions;

- c. activities consistent with its articles of association have already been carried out.

#### **Article 39**

Procedures for the submission of legal actions in environmental problems by individuals, the community, and/or environmental organisations refers to the applicable Civil Procedures Law.

### **CHAPTER VIII - INVESTIGATION**

#### **Article 40**

1. As well as Republic of Indonesia National Police Investigators, certain Civil Government Officials associated with the government agency whose scope of functions and responsibility are in the environmental management field, are given special authority as investigators as is provided for in Laws appropriate with applicable Criminal Procedures Law.

2. Civil Investigator Officers as provided for in (1) above have the authority to:

- a. carry out examination of the correctness of a report or explanation in relation to a criminal action in the environmental area;
- b. carry out examination of people or legal bodies who are suspected of criminal actions in the environmental field;
- c. request an explanation and evidence from individuals or legal bodies in relation to a criminal incident in the environmental field;
- d. carry out examination of account-keeping, notes and other documents which are relevant to a criminal action in the environmental field;
- e. carry out examination at certain places which are suspected of containing evidence, accounts, notes, and other documents along with carrying out confiscation of materials resulting from infringements which can be used as evidence in criminal cases in the environmental field;
- f. request experts assistance in the scheme of the implementation of the function of investigation of criminal actions in the environmental field.

3. Civil Investigator Officers provided for in (1) above inform the Republic of Indonesia National Police Investigators of the commencement and the results of their investigation.

4. Civil Investigator Officers provided for in (1) above convey the findings of investigation to the Public Prosecutor through Republic of Indonesia National Police Investigators.

5. Investigation of environmental crimes in Indonesian waters and the Exclusive Economic Zone is carried out by investigators according to applicable laws and regulations.

### **CHAPTER IX - CRIMINAL PROVISIONS**

#### **Article 41**

1. Any person who in contravention of the law intentionally carries out an action which results in environmental pollution and/or damage, is criminally liable to a maximum imprisonment of 10 (ten) years and a maximum fine of Rp.500,000,000 (five hundred million rupiah).

2. If a criminal action as provided for in (1) above causes the death or serious injury of a person, the person who carried out the criminal action is criminally liable to a maximum imprisonment of 15 (fifteen)

years and a maximum fine of Rp.750,000,000 (seven hundred and fifty million rupiah).

#### **Article 42**

1. Any person who due to their negligence performs an action that causes environmental pollution and/or damage, is criminally liable to a maximum imprisonment of three years and a maximum fine of Rp.100,000,000 (one hundred million rupiah).

2. If a criminal action as provided for in (1) above causes the death or serious injury of a person, the person who carried out the criminal action is criminally liable to a maximum imprisonment of five years and a maximum fine of Rp.150,000,000 (one hundred and fifty million rupiah).

#### **Article 43**

1. Any person who in violation of applicable legislation, intentionally releases or disposes of substances, energy and/or other components which are toxic or hazardous onto or into land, into the atmosphere or the surface of water, imports, exports, trades in, transports, stores such materials, operates a dangerous installation, whereas knowing or with good reason to suppose that the action concerned can give rise to environmental pollution and/or damage or endanger public health or the life of another person, is criminally liable to a maximum of six years imprisonment and a maximum fine of Rp.300,000,000 (three hundred million rupiah).

2. Criminally liable in the same way as provided for in (1) above, is any person who intentionally provides false information or destroys or conceals or damages information which is needed in its connection with an action as is meant in (1) above, whereas knowing or with good reasonable to suppose that the action concerned can give rise to environmental pollution and/or damage or endanger public health or other people's life.

3. If the criminal action as provided for in (1) and (2) above causes the death or serious injury of a person, the person who carried out the criminal action is criminally liable to imprisonment for a maximum of nine years and a maximum fine of Rp.450,000,000 (four hundred and fifty thousand rupiah).

#### **Article 44**

1. Any person who in violation of applicable legislative provisions of the effective legislation, because of their carelessness performs an action as in Article 43 is criminally liable to imprisonment for a maximum of three years and a maximum fine of Rp.100,000,000 (one hundred million rupiah).

2. If the criminal action provided for in (1) above causes the death or serious injury of a person, the person who carried out the criminal action is criminally liable to a maximum of five years and a maximum fine of Rp.150,000,000 (one hundred and fifty million rupiah).

#### **Article 45**

If a criminal action as is provided for in this Chapter is done by or in the name of a legal body, company, association, foundation, or other organisation, criminal liability to a fine is increased by a third.

#### **Article 46**

1. If a criminal action as is provided for in this Chapter is done by or in the name of a legal body, company, association, foundation or other organisation, criminal charges are made and criminal sanctions along with procedural measures as provided for in Article 47 are imposed both against the legal body, company, association foundation or other organisation concerned and against those who give the order to carry out the criminal action concerned or who act as leaders in the carrying out of it and against the two of them.

2. If a criminal action as is provided for in this Chapter is done by or in the name of a legal body, company, association, foundation or other organisation, and is done by persons, both based on work relations and based on other relations, who act in the sphere of a legal body, company, association, foundation or other organisation, criminal charges are made and criminal sanctions imposed against those who give orders or act as leaders regardless whether the people concerned, both based on work relations and based on other relations, carry out the criminal action individually or with others.

3. If charges are made against a legal body, company, association, foundation or other organisation, the summons to face court and submission of the warrants is directed to the management at their place of residence, or at the fixed place of work of the management.

4. If charges are made against a legal body, company, association, foundation or other organisation, which at the time of the bringing of the legal action is represented by someone who is not a manager, the judge can make an order so that the management face the court in person.

#### **Article 47**

Apart from criminal stipulations provided for in the Criminal Code and this Law, against those who carry out an environmental crime can also be imposed procedural measures in the form of:

- a. seizure of profits which were received through the criminal action; and/or
- b. closure of all or part of a business; and/or
- c. reparation of the consequences of a criminal action; and/or
- d. requiring that what was without right neglected be carried out; and/or
- e. destroying what was without right neglected; and/or
- f. placing the business under administration for a maximum of three years.

#### **Article 48**

Criminal acts as provided for in this Chapter are crimes.

### **CHAPTER X - TRANSITIONAL PROVISIONS**

#### **Article 49**

1. At the latest 5 (five) years from the promulgation of this Law every business and/or activity which already possesses a license, must have complied with the conditions based on this Law.

2. From the enactment of this Law it is prohibited to issue a license for a business and/or activity which uses imported hazardous and toxic waste.

### **SECTION XI - CLOSING PROVISIONS**

#### **Article 50**

Upon enactment of this Law all existing laws and regulations which are involved with environmental management shall continue to apply to the extent that they do not conflict with and are not replaced based on this Law.

#### **Article 51**



With the coming into effect of this Law, Law No. 4 of 1982 regarding Main Principles of Environmental Management (State Gazette of 1982 Number 12, State Supplement Number 3215) is declared no longer to be in force.

## **Article 52**

This Law comes into force on the date it is promulgated.

In order that every person knows of it, the promulgation of this Law is ordered with its placement in the State Gazette of the Republic of Indonesia.

Authorised in Jakarta on 19 September 1997

President of the Republic of Indonesia  
(signed) Soeharto

Promulgated in Jakarta on 19 September 1997

Minister of State Secretary of State, Republic of Indonesia  
(signed) Moerdiono

State Gazette of the Republic of Indonesia Year 1997 Number 68

Cabinet Secretariat Republic of Indonesia  
Head of Bureau of Law and Legislation  
(signed) Lambock V. Nahattands

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## **EXPLANATION ON LAW REGARDING ENVIRONMENTAL MANAGEMENT**

### **A. GENERAL**

1. The Indonesian environment which was bestowed by the Almighty God upon the Indonesian community and people constitutes God's gift and blessing the capacity of which must be preserved and developed so that it continues to be a resource and life support for the community and people along with living creatures in Indonesia for the continuation and increase of the quality of that life itself.

Pancasila, as the basis and philosophy of the nation, constitutes a whole and complete unity which gives the conviction to the Indonesian community and people that contentedness will be attained if it is based on harmony and balance both in the relationship of humans with the Almighty God and humans with humans, humans with nature, and humans privately, in the scheme of achieving external progress and spiritual happiness. There are reciprocal relations between humans, the community and the environment, which must always be fostered and developed so that a dynamic harmony, proportion and balance is maintained.

The 1945 Constitution as the constitutional basis makes it mandatory that natural resources are used for the greatest possible prosperity of the community. This prosperity must be enjoyed sustainably by current and future generations.

Development as a conscious effort in processing and exploiting natural resources for increasing community prosperity, both for achieving external prosperity as well as spiritual satisfaction. Therefore, the use of natural resources must be harmonious and balanced with environmental functions.

2. The environment in ecological terms recognises neither national region nor administrative region borders. However, the environment which is involved with management must have clear regional demarcation for the management authority. The environment which is meant is the Indonesian

environment.

Legally, the Indonesian environment covers the space in which the nation of the Republic of Indonesia carries out sovereignty and the right to sovereignty along with its jurisdiction. In this respect the Indonesian environment is none other than the region, which occupies a cross position between two continents and two oceans with a tropical climate and weather and seasons which confers natural conditions and a position with a highly valuable strategic role as the place the Indonesian community and people carry out community life, be a nation and be a state in all its aspects. In this way, the concept in carrying out Indonesian environmental management is the Archipelagic Concept.

3. The Indonesian environment as an ecosystem consists of various subsystems, which have social, cultural, economic and geographic aspects with differing features which cause a varying supportive and carrying capacity of the environment. Such a condition requires the building and developing of the environment based on the fact that the presence of supportive and carrying capacity of the environment increases harmony and balance of subsystems, which also means an increase in the endurance of the substance of that very subsystem. In this way, the building and development of one subsystem will influence other subsystems, which finally will influence the endurance ecosystems in their entirety. Therefore, environmental management demands the development of a system with integratedness as its primary feature. Needed, then, is a national environmental management policy which must be implemented in strict accordance with principles and consequences from the centre to the regions.

4. Development continuously exploits natural resources for increasing community prosperity and quality of life. Meanwhile, the supply of natural resources is limited and uneven, both in quantity and quality, while requests for such resources accelerate as a result of the increase in development activities to satisfy accelerating and increasingly diverse needs of the population. On the other hand, the environmental supportive capacity can be interfered with and the environmental carrying capacity can decline.

Accelerating development activities carry environmental pollution and damage risks with the result that the structure and function of the ecosystem which acts as a support to life can be damaged. This environmental pollution and damage will become a social burden, the cost of reparation of which will ultimately be borne by the community and the government.

The maintenance of the sustainability of environmental functions constitutes a community interest, so that it demands responsibility, openness, and a role for members of the community, which can be channelled by people individually, environmental organisations, such as non-government organisations, traditional community groups, and others, for maintaining and increasing environmental supportive and carrying capacity which becomes a mainstay of sustainable development. Development which incorporates the environment, including natural resources, is a medium for attaining sustainable development which is a guarantee of prosperity and quality of life of present and future generations. Therefore, Indonesian environment must be managed by a principle of preserving environmental functions which are harmonious and balanced for supporting environmentally sustainable development for the increase in prosperity and quality of life of present generations and future generations.

5. The long range direction of Indonesian development is toward economic developed based on industrial development, which among other things uses various types of chemical materials and radioactive substances. As well as producing products which benefit the community, industrialisation also gives rise to excesses, among others the production of hazardous and toxic waste, which if disposed of to an environmental medium can threaten the environment, health, and the continuation of human and other forms of life.

Globally, knowledge and technology has increased the quality of human life. In reality, lifestyles of industrial society marked by the use of products based on chemicals has increased the production of hazardous and toxic wastes. This matter constitutes a large challenge to a method of disposal which has a small risk toward the environment, health, and the continuation of human and other forms of life.

Conscious of this matter, hazardous and toxic materials need to be well-managed. What needs to be given attention is that the area of the Unitary Republic of Indonesia must be free of disposal of hazardous and toxic wastes materials from outside the Indonesian area.

6. The acceleration of development efforts causes an accelerating impact on the environment. This situation boosts an increasing need for efforts to control environmental impacts, such that the risk to the environment is held down as much as possible.

Efforts to control environmental impacts are inseparable from supervisory measures to ensure compliance with stipulations of laws and regulations in the environmental field. A legal instrument of a preventive nature is a license to carry out a business and/or other activity. Therefore, a license must explicitly contain conditions and obligations which must be complied with and implemented by the party responsible for a business and/or other activity. What has been put forward above implies the participation of various agencies in environmental management such that there is a need to clarify the limits of authority for every agency which participates in the environmental management field.

7. Appropriate with the essence of the Unitary Republic of Indonesia as a legal state, the development of a system of environmental management as a part of environmentally sustainable development must be given a legal basis which is clear, explicit and comprehensive to ensure legal certainty for environmental management efforts. This legal basis is underlaid by a basis of environmental law and the compliance of every person to the norms of environmental law which is in its entirety based on Pancasila and the 1945 Constitution.

Law Number 4 of 1982 regarding Basic Principles of Environmental Management (Number 12 of the State Gazette of 1982, Supplement to State Gazette Number 3215) was an early sign of the development of legal instruments as a basis of Indonesian environmental management efforts as an integral part of the effort of environmentally sustainable development. In the more than one decade since the promulgation of this Law, environmental awareness of the community has rapidly increased, as indicated among other things by the increasingly many types of community organisations other than non-government organisations which are active in the environmental field. Also evident is the increasing community initiative in preservation of environmental functions such that the community does not merely participate, but is also able substantially to play a role. Meanwhile, the set of problems of environmental law which have emerged and developed in the community require regulation in the form of law for the guarantee of legal certainty. On the other hand, global environmental development and international aspirations will increasingly influence Indonesian environmental management efforts. In reflecting this situation, it is regarded as necessary to perfect Law Number 4 of 1982 regarding Basic Principles of Environmental Management.

This Law contains the norms of environmental law. Apart from this, this Law will be a foundation for evaluating and adapting all laws and regulations which contain stipulations on the environment, that is laws and regulations regarding irrigation, mining and energy, forestry, biological and ecosystem resource conservation, industry, human settlement, spatial ordering, land use, and others.

Increase in the effectiveness of various legal stipulations, including administrative law, civil law and criminal law, and efforts to give effect to alternative methods of dispute settlement, namely out of court dispute settlement to achieve agreement amongst the parties in dispute [*sic*]. Apart from this, there is also a need to open the opportunity for the bringing of class actions. With such a method of settlement of environmental dispute settlement it is hoped that the compliance of the community to the system of values regarding the importance of preservation and development of environmental capacity in present and future human life will be increased.

As a support to administrative law, application of criminal law continues to attend to subsidiary principles, namely that criminal law should be used if sanctions in other fields of law, such as civil and administrative sanctions, and alternative environmental dispute settlement are not effective and/or the level of blameworthiness of the party concerned is relatively serious and/or the results of the activity are relatively large and/or the action gives rise to uneasiness in the community. In anticipation of the possibility of

increasing emergence of criminal actions carried out by a corporation, this Law also regulates the responsibility of corporations.

In this way, all such laws and regulations mentioned above can be included in one system of Indonesian environmental law.

## **B. ARTICLE BY ARTICLE**

### **Article 1**

Number 1: Sufficiently clear

Number 2: Sufficiently clear

Number 3: Sufficiently clear

Number 4: Sufficiently clear

Number 5: Sufficiently clear

Number 6: Sufficiently clear

Number 7: Sufficiently clear

Number 8: Sufficiently clear

Number 9: Sufficiently clear

Number 10: Sufficiently clear

Number 11: Sufficiently clear

Number 12: Sufficiently clear

Number 13: Sufficiently clear

Number 14: Sufficiently clear

Number 15: Sufficiently clear

Number 16: Sufficiently clear

Number 17: Sufficiently clear

Number 18: Sufficiently clear

Number 19: Sufficiently clear

Number 20: Sufficiently clear

Number 21: Sufficiently clear

Number 22: Sufficiently clear

Number 23: Sufficiently clear

Number 24: Sufficiently clear

Number 25: Sufficiently clear

## **Article 2**

Sufficiently clear

## **Article 3**

Based on a principle of state responsibility, in the one hand, and state guarantees that the use of natural resources will provide the largest possible benefit for the prosperity and quality of life of the community, both present generations and future generations. On the other hand, the state prevents the carrying out of natural resource exploiting activities in its jurisdiction which gives rise to adverse impacts on the jurisdictions of other nations, and protects the state from the impacts of activities outside its area. The sustainability principle contains the meaning that every person bears an obligation and responsibility to coming generations, and to others in the same generation. For the implementation of such obligation and responsibility, environmental capability must, then, be preserved. The preservation of environmental capacity becomes a prop for the continuity of development.

## **Article 4**

Sufficiently clear

## **Article 5**

Subsection (1): Sufficiently clear

Subsection (2): The right to environmental information is a logical consequence of the right to play a role in environmental management based on the principle of openness. The right to environmental information will increase the value and effectiveness of participation in environmental management, as well as opening an opportunity for the community to actualise their right to a good and healthy environment.

Environmental information as provided for in this subsection can be in the form of data, explanation, or other information involved with environmental management which according to its nature and goal is such that it is indeed open to be known by the community, such as environmental impact analysis documents, reports and evaluations on results of environmental monitoring, both monitoring of compliance and monitoring of environmental quality changes, and spatial arrangement ordering plans.

Subsection (3): The role as provided for in this Article comvers the roel in the decision making process, both by lodging objections, and by hearings or other methods which may be stipulated in laws and regulations. Such role is carried out among other areas in the process of evaluation of environmental impact analyses or environmental policy formation. Its implementation is based on the principle of openness. With openness the possibility is allowed for that the community joins in thinking about and providing views and considerations in decision making in the environmental field.

## **Article 6**

Subsection (1): The obligation of every person as provided for in this section is not free of their position as members of the community which reflects human value as individual and social beings. This obligation implies that every person joins in playing a role in efforts to maintain the environment. For example, participation in developing a culture of a clean environment, in explanation and in leadership in the environmental field.

Subsection (2): This information which is correct and accurate is intended for evaluating compliance of those responsible for a business and/or activity to stipulations of laws and regulations.

#### **Article 7**

Subsection (1): Sufficiently clear

Subsection (2):

Letter a: Community independence and empowerment is a pre-condition for the growth of community capacity as an agent in environmental management together with government and other agents of development.

Letter b: The increase in community capacity and initiative will increase the effectiveness of the community role in environmental management.

Letter c: The increase in community responsiveness will increasingly decrease the possibility of occurrence of negative impacts.

Letter d: Sufficiently clear

Letter e: By the increase of the quick perception will increase the speed of information transfer regarding environmental problem, so it can be tackled immediately.

#### **Article 8**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

Letter a: Sufficiently clear

Letter b: Sufficiently clear

Letter c: Sufficiently clear

Letter d: The activity that has social impact is activity that gives effect to general interest, either culturally or structurally.

Letter e: Sufficiently clear

Subsection (3): Sufficiently clear

#### **Article 9**

Subsection (1): In the scheme of arrangement of national environmental management policy and spatial management ordering rational and proportional attention must be given to the potential, aspirations, and needs along with values which emerge and develop in the community. For example, attention toward living traditional communities the life of which is supported by natural resources located in the immediate area.

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

Subsection (4): Sufficiently clear

## **Article 10**

Letter a: What is meant in this stipulation by decision makers is the authorised parties, namely the Government, the community and other agents of development.

Letter b: This activity is carried out through explanation, leadership, and education and training in the scheme of increasing the quality and quantity of human resources.

Letter c: Community participation in this Article covers participation, both in efforts and in the decision making process concerning preservation of environmental supportive and carrying capacity. In the scheme of a community role partnership between agents of environmental management is developed, namely between the government, business world, and community including among others non-government organisations and professional/academic associations.

Letter d: Sufficiently clear

Letter e: In this stipulation what is meant by pre-emptive instruments is action which is undertaken at the decision making and planning level, such as spatial management ordering and environmental impact analysis. Preventive action is at the level of implementation through compliance with waste quality standards and/or economic instruments. Proactive action is action at the level of production with application of environmental standards, such as ISO 14000.

Examples of pre-emptive, preventive and proactive environmental management instruments are the development and application of environmentally sound technology, and the application of environmental insurance and environmental audits which are carried out voluntarily by those responsible for a business and/or activity to increase effectiveness.

Letter f: Sufficiently clear

Letter g: Sufficiently clear

Letter h: Sufficiently clear

Letter i: Sufficiently clear

## **Article 11**

Subsection (1): The scope of implementation of environmental management in principle covers various sectors which are the responsibility of various departments and government agencies. To avoid overlap of authority and clashed of interest there is a need for coordination, integration, synchronization and simplification through institutional devices which are coordinated by the Minister.

Subsection (2): Sufficiently clear

## **Article 12**

Subsection (1):

Letter a: The Unitary Nation of the Republic of Indonesia has a rich of potential biological and non-biological natural resources, characteristic cultural diversity, and aspiration which can become the primary capital in national development. For this, and in order to achieve integration and unity in patterns of thinking, and in actions taken which guarantee the formation of useful and effective environmental management which is based on the Archipelagic Concept, the Central Government can confer certain authority while paying attention to the regional situation and conditions in terms of



both natural potential and regional capability, to central agencies located in the regions in the scheme of the implementation of the principle of deconcentration.

Letter b: The Central Government or the Level I Local Government can entrust the Level II Local Government with playing a role in the implementation of environmental management policy as a co-administration task. Through this co-administration, authority, funding, instruments, and responsibility remains with the government which has given such task.

Subsection (2): Sufficiently clear

### **Article 13**

Subsection (1): While attending to the regional capability, situation and conditions, the Central Government can transfer matters in the environmental field to the regions to become part of the authority, task, and responsibility of Local Government based on a principle of decentralization.

Subsection (2): Sufficiently clear

### **Article 14**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

### **Article 15**

Subsection (1): Environmental impact analysis on the one hand is a part of a feasibility study for implementing a plan for a business and/or activity, and on the other hand is a condition which must be fulfilled to receive a license to carry out a business and/or an activity. Based on this analysis, important and large impacts on the environment can be known in more detail, both positive impacts and negative impacts, which arise from an business and/or activity such that steps can be prepared to cope with negative impacts and maximize positive impacts.

To measure or clarify such large and important impacts among others criteria are used concerning:

- a. the number of people who will be affected by the impact of the business and/or activity plan;
- b. the extent of the area affected;
- c. the intensity and duration of the impact;
- d. the amount of other environmental components which will be affected;
- e. the cumulative nature of the impact;
- f. reversibility or non-reversibility of the impact.

Subsection (2): Sufficiently clear

### **Article 16**

Subsection (1): Waste treatment is a set of activities which covers storage, collection, transport, use, and processing of waste including the stockpiling of the results of such processing.

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

#### **Article 17**

Subsection (1): The obligation to conduct waste management intended is effort to reduce the occurrence of the possibility of risk to the environment in the form of the occurrence of environmental pollution and/or damage, recalling that hazardous and chemical materials has a fairly large potential to cause negative effects.

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

#### **Article 18**

Subsection (1): Examples of the license intended includes the mining license for business in the mining field, and the industry business license for business in the industrial field.

Subsection (2): Sufficiently clear

Subsection (3): The license to carry out a business and/or activity must assert the obligations associated with compliance to stipulations in the environmental management field which must be implemented by the party responsible for a business and/or activity in carrying out their business and/or activity. For a business and/or activity which is obliged to make or implement an environmental impact analysis, the environmental management plan and monitoring plan which must be implemented by the person responsible for the business and/or activity must be included and clearly formulated in the license to carry out the business and/or activity. For example the obligation to treat waste, waste quality conditions for disposal to an environmental medium, and obligations associated with waste disposal, such as the obligation to perform self-monitoring and the obligation to report the results of such self-monitoring to the responsible agency in the field of environmental impact control. If a business and/or activity plan according to applicable laws and regulations is obligated to carry out environmental impact analysis, approval of this environmental impact analysis must be submitted together with the application for a license to carry out a business and/or activity.

#### **Article 19**

Subsection (1): Sufficiently clear

Subsection (2): Publication of the license to carry out a business and/or activity constitutes the realisation of the principle of administrative openness [or good governance]. This public release of the license to carry out a business and/or activity allows public participation, in particular for those who have not used the opportunities available in the objections procedure, hearing, and other aspects of the licensing decision making process.

#### **Article 20**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

Subsection (4): A business and/or activity will produce waste. In general this must be treated before it is disposed of to an environmental medium such that it does not give rise to environmental pollution and/or

damage. In certain cases, waste which is produced by one business and/or activity can be exploited as raw materials for a product. However this process of exploitation will produce waste, as a residue which cannot be reused, which will be disposed of to an environmental medium. Waste disposal as intended in this Article is disposal of waste which is the residue of a business and/or activity and/or other unused materials or which have expired to an environmental medium, including land, water or air. This disposal of waste and/or materials to an environmental medium will give rise to an impact on ecosystems. With the stipulations of this Article, then, it is provided that in principle disposal of waste to an environmental medium is prohibited, with the exception of certain environmental media which have been allocated by the Government.

Subsection (5): Sufficiently clear

#### **Article 21**

Sufficiently clear

#### **Article 22**

Subsection (1): Sufficiently clear

Subsection (2): In the case where an official who has authority from another government agency is appointed to carry out supervision, the Minister carries out coordination with the leadership of the agency concerned.

Subsection (3): This stipulation in this subsection constitutes the implementation of Article 13(1).

#### **Article 23**

Sufficiently clear

#### **Article 24**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

Subsection (3): Being attentive to the situation and conditions at the place of supervision is intended to mean respecting prevailing values and norms both written and unwritten.

#### **Article 25**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

Subsection (4): Sufficiently clear

Subsection (5): Sufficiently clear

#### **Article 26**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

#### **Article 27**

Subsection (1): The seriousness of infringements of environmental regulations can vary, beginning from infringement of administrative conditions and ranging up to infringements that give rise to victims.

What is intended by certain infringements is infringement by a business and/or activity which is regarded as sufficiently serious that the business' activity be stopped, for example where people from the community have had their health impaired as a result of environmental pollution and/or damage.

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

#### **Article 28**

An environmental audit is an important instrument for the party responsible for a business and/or activity to increase their activity efficiency and performance in complying with environmental conditions which have been stipulated by laws and regulations. In this sense, an environmental audit is conducted voluntarily to verify compliance with applicable environmental laws and regulations, and with policy and standards which have been applied internally by party responsible for the business and/or activity concerned.

#### **Article 29**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

Subsection (4): Sufficiently clear

Subsection (5): The results of the environmental audit as intended in this subsection constitutes a document which has the characteristic of being open to the public. It must be publicly available because it is an effort to protect the public.

#### **Article 30**

Subsection (1): The stipulation in this subsection is intended to protect the civil process rights of the parties in dispute.

Subsection (2): Sufficiently clear

Subsection (3): The stipulation in this subsection is intended to prevent occurrence of varying decisions in one environmental case, to ensure legal certainty.

#### **Article 31**

Settlement of environmental cases through out of court discussions is carried out voluntarily by the parties which have an interest, namely the parties which have experienced losses and have caused losses, government agencies with an involvement with the subject in dispute, and also allowing for involvement parties which have a concern for environmental management.

Certain actions here is intended as an effort to restore environmental functions while being attentive to values which live in the local community.

### **Article 32**

To facilitate the course of out of court discussion, the parties which have an interest can request the services of a neutral third party which can be in the form of:

- a. a neutral third party which does not have decision making authority. This neutral third party functions as a party which facilitates the parties which have an interest such that agreement can be reached.

The neutral third party must:

1. be agreed to by the parties in dispute;
  2. not have familial relations and/or work relations with one of the parties in dispute;
  3. possess skill to carry out discussion or mediation;
  4. not have an interest in the process of discussion or its outcome.
- b. a neutral third party which has decision-making authority functions as arbitrator, and all such arbitration decisions have are of a fixed and binding nature on the parties in dispute.

### **Article 33**

Subsection (1): This environmental dispute settlement service providing agency is meant as an agency which is able to facilitate the implementation of the dispute settlement choice mechanism based on principles of impartiality and professionalism.

The service providing agency which is formed by the Government is intended as a public service.

Subsection (2): Sufficiently clear

### **Article 34**

Subsection (1): This subsection constitutes the realization of the environmental law principle that the polluter pays. As well as being obligated to pay compensation, the environmental polluter and/or damager can be burdened by the judge with an order to take certain legal measures, for example orders to:

- install or repair a waste treatment facility such that the waste complies with environmental quality standards which have been applied;
- restore environmental functions;
- remove or destroy the cause of thearising of environmental pollution and/or damage.

Subsection (2): The inflicting of compulsory payments for each day of lateness of executing court orders to carry out certain actions for the preservation of environmental functions.

### **Article 35**

Subsection (1): Strict liability means that the element of fault need not be proved by a person bringing an action as the basis for payment of compensation. The stipulation of this subsection is a *lex specialis* in legal actions regarding actions which infringe the law in general. The size of compensation which can be

imposed upon a polluter or damager of the environment according to this Article is constrained within certain limits.

Subsection (2):

Letter a: Sufficiently clear

Letter b: Sufficiently clear

Letter c: Sufficiently clear

Subsection (3): What is meant by action of a third party in this subsection is an action of unfair competition or a Government fault.

### **Article 36**

Subsection (1): Sufficiently clear

Subsection (2): Sufficiently clear

### **Article 37**

Subsection (1): What is meant by the right to bring a class action in this subsection is the right of small group of the community to act in representing the community in a large number which has had losses inflicted on it according to a basis of sameness of problems, legal facts, and demands which have been given rise to because of environmental pollution and/or damage.

Subsection (2): Sufficiently clear

Subsection (3): Sufficiently clear

### **Article 38**

Subsection (1): Sufficiently clear

Subsection (2): Legal action taken by an environmental organization cannot be in the form of a demand for compensation, but rather is limited to a other legal action, namely:

- a. application to the Court for a person to be ordered to undertake certain legal actions which are involved with the goal of preservation of environmental functions;
- b. asserting that a person has carried out an action in infringement of the law because of their polluting or damaging the environment;
- c. ordering a person which carries out business and/or activity to install or repair a waste treatment unit.

What is meant by expenses or real outlays are expenses of an environmental organization which it can be proved have actually been outlaid.

Subsection (3): Not every environmental organisation can act in the name of the environment; rather they must fulfill certain conditions. With the existence of the conditions as provided for above, environmental organisations are selectively acknowledged to possess *ius standi* to bring a legal action in the name of the environment to court, both in general courts and in administrative courts, depending upon the competency of the court which is involved with investigating and trying the case in question.

Article 39 up to Article 52: Sufficiently clear

Supplement to State Gazette Republic of Indonesia Number 3699

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## **Government Regulation Number 51/1993 ON Environmental Impact Assessment**

**The President of the Republic of Indonesia,**

### **Considering:**

- a. that, within the framework of implementation of environmentally-oriented development as part of deliberate and systematic efforts to wisely manage natural resources for sustainable development in order to improve the quality of life of the people, it is necessary to maintain harmony among various businesses or activities;
- b. that any business or activity will, in principle, generate impacts on the environment which need to be evaluated in the early planning stages so that actions to deal with any negative impacts and to enhance any positive impact can be incorporated as early as possible;
- c. that an assessment of environmental impacts shall be deemed necessary for the decision-making process regarding any proposed business or activity which may have significant impacts on the environment;
- d. that Government Regulation No. 29 of 1986 regarding Environmental Impact Assessment, which was promulgated as a means of implementing the provisions of Article 16 of Act Number 4 of 1982 regarding Basic Principles for Management of the Living Environment, now needs to be improved as a result of various new developments;
- e. that, in keeping with the foregoing, it is deemed necessary to formulate a Government Regulation for the above improvements.

### **In View of:**

1. Article 5, paragraph 2 of the 1945 Constitution;
2. Act Number 4 of 1982 pertaining to Basic Principles for Management of the Living Environment (State Gazette, 1982, Number 12; Supplement to the State Gazette Number 3215).

Has decided by revoking Government Regulation No. 29/1986 on Environmental Impact Assessment (State Gazette 1986 Number 42)

To establish: Government Regulation of the Republic of Indonesia Regarding Environmental Impact Assessment

## **PART I - GENERAL PROVISIONS**

### **Article 1**

For the purpose of this Government Regulation the following terms are defined:

1. **Environmental management** is an integrated effort for the purpose of the utilization, regulation, maintenance, supervision, control, rehabilitation and development of the environment;

2. **Environmental impact assessment (Analysis Mengenai Dampak Lingkungan, or AMDAL)** is the process of studying the significant impact of a proposed business or activity on the environment, which is required as part of the decision-making process;
3. **AMDAL Kegiatan Terpadu/Multisektoral** is the process of studying the significant impacts of a proposed integrated business or activity on the environment, where that business or activity is located in a single ecosystem type and also involves more than one authorized government agency;
4. **AMDAL Kawasan** is the process of studying the significant impacts of proposed businesses or activities located in a single ecosystem type, which are under the authority of a single authorized government agency;
5. **AMDAL Regional** is the process of studying the significant impact of proposed businesses or activities located in a single ecosystem type in a development planning area as defined by the regional spatial plan, which involves more than one authorized government agency as part of the decision-making process;
6. **Kerangka Acuan** is the terms of reference for the scope of the environmental impact assessment (AMDAL) study which results from the scoping process;
7. **Scoping** is the process of focusing the environmental study on the key aspects related to significant impact;
8. An **environmental impact statement (Analisis Dampak Lingkungan or ANDAL)** is a detailed and in-depth research study on the significant impacts of a proposed business or activity;
9. **Significant impacts** are fundamental changes to the environment which result from a proposed business or activity;
10. An **environmental management plan (RKL)** is a document presenting those efforts that will be made to manage the significant environmental impacts which will result from a proposed business or activity;
11. An **environmental monitoring plan (RPL)** is a document presenting those efforts that will be made to monitor the environmental components which will be subjected to significant impacts arising from a proposed business or activity;
12. The **proponent** shall be the person or institution responsible for the proposed business or activity to be undertaken;
13. The **authorized government agency** is the government agency authorized to make decisions on the implementation of a proposed business or activity, with the understanding that the authority shall lie with the relevant minister or the head of the non-departmental government agency which has jurisdiction over the relevant business or activity and with the provincial governor for a business or activity under his jurisdiction;
14. The **Minister** shall refer to the Minister responsible for the management of the environment or the head of the agency which is responsible for control of environmental impacts;
15. The **Agency which is responsible for the control of environmental impacts** is defined as that agency which has as its main duty to assist the President in undertaking the control of environmental impacts, including efforts to prevent environmental pollution and damage, mitigate significant impacts, and restore the quality of the environment;

16. The **environmental impacts assessment commission (Komisi AMDAL)** is the commission established by the Minister/minister or head of a non-departmental government agency at the central level of government, or by the Governor at the provincial level, which has the task of assisting in the implementation of the environmental impact assessment (AMDAL) process as part of the decision-making process.

## **Article 2**

1. The types of businesses or activities which are predicted to have significant impacts on the environment shall include:
  - a. modifications of landforms and the natural landscape;
  - b. exploitation of renewable and non-renewable natural resources;
  - c. processes and activities with the potential to cause waste, damage and a decline in natural resource utilization;
  - d. processes and activities which may affect the social and cultural environment;
  - e. processes and activities which may affect the preservation of natural resource conservation areas and/or the protection of cultural reserves;
  - f. the introduction of new species of plants, animals and micro organisms;
  - g. the production and use of biotic and abiotic substances;
  - h. applications of technology which are predicted to have considerable potential to affect the environment;
  - i. activities having high risks and affecting national security.
2. The Minister shall establish the types of business or activity referred to in paragraph 1, after taking account of the opinions and recommendations of the authorized government agencies.
3. An environmental impact statement (AMDAL) shall be prepared for the types of business or activity as referred to in paragraph 2.
4. The selection of the types of proposed businesses or activities as referred to in paragraph 3 shall be reviewed periodically, at least once in every five years period.

## **Article 3**

1. The significant impacts of a business or activity on the environment shall be determined by:
  - a. the number of people affected;
  - b. the extent of the affected area;
  - c. the duration of the impact;
  - d. the intensity of the impact;
  - e. the number of other environmental components affected;

- f. the cumulative nature of the impact;
- g. the reversibility or irreversibility of the impact.

2 Guidelines concerning criteria for the determination of significant impacts as referred to in paragraph 1 shall be established by the agency responsible for the control of environmental impacts.

#### **Article 4**

1. No environmental impact statement (AMDAL) as referred to in paragraph 3 of article 2, shall be required for any business or activity which is proposed for immediate implementation to cope with an emergency.
2. The minister and/or the head of the non-departmental government agency in charge of the relevant business or activity shall determine that an emergency has occurred, based upon recommendations of the agency responsible for the control of environmental impacts.

#### **Article 5**

The granting of a final operating permit (izin usaha tetap) by the agency responsible for type of business or activity as referred to in Article 2 shall only be done after the implementation of the environmental management plan (RKL) and the environmental monitoring plan (RPL) which have been approved by the authorized government agency.

#### **Article 6**

1. The environmental impact assessment (AMDAL) process shall form part of the feasibility study for a proposed business or activity.
2. The findings of the environmental impact assessment (AMDAL) process shall be used as input for regional development planning.

### **PART II - MANAGEMENT**

#### **Section One - Terms of Reference**

#### **Article 7**

1. A proponent for a proposed business or activity as referred to in Article 2 shall prepare a terms of reference for the preparation of an environmental impact statement (AMDAL).
2. The terms of reference as referred to in paragraph 1 shall be submitted by the proponent to the responsible environmental impact assessment (AMDAL) commission.
3. In the event that within 12 (twelve) working days as of the receipt of said terms of reference, the environmental impact assessment (AMDAL) commission shall have not given a written response, said terms of reference shall be officially adopted as the basis for the preparation of the environmental impact statement (AMDAL), by authority of this Government Regulation.
4. The terms of reference shall be prepared by the proponent based on general or technical guidelines.
5. The general guidelines for the preparation of terms of reference as referred to in paragraph 1 shall be established by the minister or head of the non-departmental government agency responsible for the relevant business or activity.

## **Section Two - Environmental Impact Statement, Environmental Management Plan and Environmental Monitoring Plan**

### **Article 8**

1. The environmental impact statement (ANDAL), the environmental management plan (RKL) and the environmental monitoring plan (RPL) shall be submitted together at the same time by the proponent to the authorized government agency.
2. The authorized government agency shall issue a receipt to the proponent for the document referred to in paragraph 1, stating the date of receipt.
3. General guidelines for the preparation of the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) shall be established by the Minister.
4. Technical guidelines for the preparation of the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) shall be established by the minister or head of the non-departmental government agency responsible for the given business or activity, based on the general guidelines as referred to in paragraph 3.

### **Article 9**

1. The evaluation of the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) documents as referred to in paragraph 3 of Article 17 paragraph 3 of Article 18 and paragraph 1 of Article 19 shall be carried out at the same time.
2. In the event that the environmental impact statement (ANDAL), the environmental management plan (RKL) and the environmental monitoring plan (RPL) documents are considered to have not fulfilled the requirements of the technical guidelines, the proponent shall be obliged to undertake the necessary revisions in accordance with the directives of the responsible environmental impact assessment (AMDAL) commission.
3. Based on the findings of the environmental impact assessment (AMDAL) commission regarding the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) documents submitted by the proponent, the authorized government agency shall issue a decision on the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL).

### **Article 10**

1. The decision on the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) as referred to in paragraph 3 of Article 9 shall be issued by the authorized government agency not later than 4 (forty-five) days after the receipt of the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL).
2. In the event that the decision as referred to in paragraph 1 is a rejection due to the lack of adherence to the technical guidelines for the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL), the decision on the revised environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) shall be issued by the authorized government agency no later than 30 (thirty) days after the submission of the revised environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL).

3. In the event that authorized government agency shall not have issued a decision within the time limits specified in paragraphs 1 and 2, the environmental impact statement (AMDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) shall accordingly be deemed approved by authority of this Government Regulation.

#### **Article 11**

1. In the event that the environmental impact statement (AMDAL) concludes that the negative impacts can not be mitigated based on existing science and technology, or that the mitigation costs are higher than the positive impacts, the authorized government agency shall decide to reject the proposed business or activity.

2. In the event of a decision to reject is referred to in paragraph 1, the proponent may submit an objection there to an authority superior to the authorized government agency, along with a copy to the agency responsible for the control of environmental impacts, not later than 14 (fourteen) days after receipt of said decision.

3. Said authority superior to the authorized government agency shall issue a decision on the proponent's objection as referred to in paragraph 2 after receiving the opinion of the agency responsible for the control of environmental impacts.

4. The decision as referred to in paragraph 3 shall be issued within 30 (thirty) days following receipt of the objection and will constitute the final decision.

#### **Article 12**

1. An AMDAL Kegiatan Terpadu/Multisektoral shall be carried out for any proposed integrated/multisectoral business or activity.

2. The evaluation of the AMDAL Kegiatan Terpadu/Multisektoral shall be carried out by an integrated environmental impact assessment (AMDAL) commission established by the agency responsible for the control of environmental impacts.

3. The commission as referred to in paragraph 2 shall constitute a combined commission of which the membership will be comprised of representatives of the relevant provincial and regional government agencies and institutions as well as non-governmental organizations and other parties deemed necessary, as determined by the Minister.

4. Technical guidelines for environmental impact assessment (AMDAL) for an integrated/multisectoral business or activity shall be established by the agency responsible for THE control of environmental impacts, taking into account the technical guidelines established by the authorized government agencies.

5. The approval of the environmental impact assessment (AMDAL) documents for an integrated/multisectoral business or activity shall be issued by the minister.

#### **Article 13**

1. Criteria for proposed businesses of actives, whether or similar or different types, within a single area (kawasan) which is within the jurisdiction of an authorized government agency shall be established by said agency.

2. Technical guidelines for the implementation of environmental impact assessment (AMDAL) for such proposed businesses or activities shall be established by said authorized government agency.

3. The evaluation of the environmental impact assessment (AMDAL) for such proposed businesses or activities as referred to in paragraph (1) shall be made by the environmental impact assessment (AMDAL)

commission of said authorized government agency.

4. Approval of the documents for AMDAL Kawasan shall be issued by the minister/head of the non-departmental government agency responsible for the relevant business or activity.

#### **Article 14**

Provisions for the implementation of environmental impact assessment (AMDAL) for business and activities proposed for a regional development planning area shall be further established by the Minister, taking into account the recommendations and opinions of authorized government agencies.

### **Section Three - The Expiry and Annulment of the Decision Approving the Environmental Impact Statement, the Environmental Management Plan and the Environmental Monitoring Plan**

#### **Article 15**

1. The decision to approve an environmental impact statement (AMDAL) environmental management plan (RKL) and environmental monitoring plan (RPL) shall be deemed to have expired by authority of this Government Regulation in the event that the proposed business or activity has not been implemented within 3 (three) years of the date of the approval.

2. In the event that an environmental impact statement (AMDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) shall be deemed to have expired as referred to in paragraph 1 then in order to implement the proposed business or activity the proponent shall be required to resubmit an application for the approval of the environmental impact statement (AMDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) to the authorized government agency.

3. Upon application for approval as referred to in paragraph 2, the authorized government agency shall decide that:

- a. the environmental impact statement (AMDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) which have already been approved may be fully utilized again; or
- b. the environmental impact statement (AMDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) shall be resived.

#### **Article 16**

1. In the event of fundamental changes in the environmental due to natural causes or any other reason before and during the implementation of the proposed business or activity, the approval of the environmental impact statement (AMDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) shall be declared null and void by authority of this Government Regulation.

2. The authorized government agency, after consulting the agency responsible for the control of environmental impacts, shall establish the occurrence of said fundamental environmental change as referred to in paragraph 1 at the site originally approved, and this finding shall constitute the basis for the preparation of a revised environmental impact statement (AMDAL), environmental management plan (RPL) and environmental monitoring plan (RPL) based on the new environmental profile, to be prepared in accordance with the procedures set out in this Government Regulation.

3. Criteria for assessing the occurrence of fundamental environmental change shall be established by the minister and/or head of the authorized non-departmental government agency, after consultation with the agency responsible for the control of environmental impacts.



## **Section Four - Commission**

### **Article 17**

1. The minister or head of the non-departmental government agency responsible for relevant businesses or activities shall establish an environmental impact assessment (AMDAL) commission at the central government level consisting of permanent and temporary members.

2. The permanent members shall include those from within the relevant ministry or non-departmental government agency, a representative appointed by the Minister of Home Affairs a representative appointed by the agency responsible for the control of environmental impacts, a representative appointed by the Investment Coordination Board, a representative appointed by the National Land Agency, and experts from relevant fields, while the temporary members shall include those appointed from related ministries or non-departmental government agencies, non-governmental organizations, as well as other members as deemed necessary.

3. The central environmental impact assessment (AMDAL) commission as referred to in paragraph 1 shall:

- a. prepare technical guidelines on the preparation of environmental impact assessment (AMDAL) documents, including the preparation of the terms of reference for the environmental impacts statement (ANDAL), the environmental management plan (RKL) and the environmental monitoring plan (RPL);
- b. evaluate the terms of reference for the preparation of the environmental impact statement (ANDAL);
- c. evaluate the environmental impact statement (ANDAL) document;
- d. evaluate the environmental management plan (RKL) document;
- e. evaluate the environmental monitoring plan (RPL) document;
- f. assist in issuing the decision on the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) document;
- g. perform other duties as stipulated by the minister or head of the non-departmental government agency responsible for the relevant business or activity.

4. In performing its duties, the environmental impact assessment (AMDAL) commission, may be assisted by a technical team assigned to evaluate the environmental impact assessment (AMDAL) documents.

5. Guidelines for the composition of the membership and work practices of the central environmental impact analysis (AMDAL) commission as referred to in paragraph 1 shall be established by the Minister.

### **Article 18**

1. The Governor shall establish an environmental impact assessment (AMDAL) commission at the provincial government level consisting of permanent and temporary members.

2. The permanent members shall include representatives of the Provincial Development Planning Board, the agency responsible for supervising the environment the province, the Provincial Investment Coordinator Board, the provincial office of the National Land Agency, the government agency responsible for the control of environmental impacts in the province and the environmental study centre of the university in the relevant area, while the temporary members shall be appointed from government agencies supervising the relevant sectors in the province, non governmental organizations, and other

members as deemed necessary.

3. The provincial environmental impact assessment (AMDAL) commission as referred to in paragraph 1 shall:

- a. evaluate the terms of reference for the preparation of the environmental impact statement (ANDAL);
- b. evaluate the environmental impact statement (ANDAL) document;
- c. evaluate the environmental management plan (RKL) document;
- d. evaluate the environmental monitoring plan (RKL) document;
- e. assist in issuing the decision on the environmental impact statement (ANDAL), environmental management plan (RKL) and environmental monitoring plan (RPL) document;
- f. perform other duties as stipulated by the Governor.

4. In performing its duties, the provincial environmental impact assessment (AMDAL) commission may be assisted by a technical team assigned to evaluate the environmental impact assessment (AMDAL) document.

5. Guidelines for the composition of the membership and work practices of the provincial environmental impact analysis (AMDAL) commission as referred to in paragraph 1 shall be established by the Minister.

#### **Article 19**

In performing their duties, the central and the provincial AMDAL commissions as referred to in Articles 17 and 18 shall take into account the national policies on environmental management, regional development planning, spatial planning, national security and defense, and environmentally-oriented regional development.

### **PART III - DEVELOPMENT**

#### **Article 20**

Education, training, research and development in the field of environmental impact assessment (AMDAL) in support of sustainable development shall be carried out under coordination of the agency responsible for the control of environmental impact.

#### **Article 21**

Government assistance in the field of environmental impact assessment (AMDAL) for businesses or activities of weaker economic group which produce significant impacts shall be further established by the Minister, taking into account the recommendations and opinions of relevant government agencies.

### **PART IV - SUPERVISION**

#### **Article 22**

1. All proposed businesses or activities for which an environmental impact analysis (AMDAL) must be carried out shall be disclosed to the public by the authorized government agency.

2. The environmental impact assessment (AMDAL) documents for all proposed businesses or activities and the approvals there to shall be open to the public.

3. The openness referred to in paragraph 1 shall be implemented in the form of the participation of the public, which may offer recommendations and opinions orally and/or in writing to the central or the provincial environmental impact assessment (AMDAL) commission referred to in Articles 17 and 18 before the issuance of the decision on the approval of the environmental impact analysis (AMDAL) for a proposed business or activity.

#### **Article 23**

The provisions of Article 22 shall not apply in the case of proposed businesses or activities concerning state secrets.

#### **Article 24**

A copy of the environmental impact assessment (AMDAL) document for a proposed business or activity and of the approvals for said documents shall be submitted by the authorized government agency:

- a. at the central government level, to the agency responsible for the control of environmental impacts, the relevant governmental agencies, the relevant Governor, and the Head of District (Bupati) or Mayor (Walikotamadya); or
- b. at the provincial government level, to the agency responsible for the control of environmental impacts and the relevant agencies concerned.

#### **Article 25**

1. The agency responsible for the control of environmental impacts shall utilize the environmental impact assessment (AMDAL) documents as the basis for examining:

- a. environmental monitoring reports and the evaluation of those results, carried out by the proponent in accordance with the environmental management plan (RKL) and the environmental monitoring plan (RPL);
- b. environmental monitoring reports and the evaluation of those results, carried out by the relevant government agency in accordance with the environmental management plan (RKL) and the environmental monitoring plan (RPL);
- c. reports on the supervision of the implementation of the environmental management plan (RKL) and environmental monitoring plan (RPL) as carried out by the authorized government agency.

2. The results of the examination referred to in paragraph 1 shall be submitted by the agency responsible for the control of environmental impacts to the minister or head of the relevant non-departmental government agency and to the relevant governor.

3. In carrying out this supervision, the agency responsible for the control of environmental impacts may establish measures for coordination in accordance with its tasks and authority.

### **PART V - FINANCE**

#### **Article 26**

The expenses to perform the activities of the central and provincial commissions as referred to in Article 17 and 18 shall be charged to the budget of the authorized government agency.

#### **Article 27**

1. The expenses to prepare the environmental impact assessment (AMDAL) documents shall be included in the budget of the proposed business or activity and shall be borne by the proponent.
2. The environmental management and monitoring costs shall be charged to the operational budget of the relevant business or activity.

#### **Article 28**

The cost monitoring by the government of the implementation of environmental management and monitoring by the proponent shall be borne by the authorized government agency.

### **PART VI - CONCLUDING PROVISIONS**

#### **Article 29**

This Government Regulation shall become effective as of the date enacted. In order to become known to all, it is hereby instructed that this Government Regulation be publicized in the State Gazette of the Republic of Indonesia.

Promulgated in Jakarta on 23 October 1993

The President of the Republic of Indonesia  
(signed) Soeharto

Enacted in Jakarta on 23 October 1993

The State Minister/State Secretary of the Republic of Indonesia  
(signed) Moerdiono

The State Gazette of the Republic of Indonesia of 1993 Number 84

### **EXPLANATION**

#### **GENERAL CONSIDERATIONS**

1. The development which is being undertaken by the people of Indonesia is aimed at improving community welfare and quality of life. The process of development encounters the problems of large population and high population growth rate on the one hand, and limited natural resources on the other. Accelerated development increasing population can result in pressure on natural resources. The exploitation of natural resources to improve community welfare and the quality of life must be accompanied by efforts to preserve the harmony and balance of the environment, in order to support sustainable development. These efforts must be undertaken in compliance with integrated, comprehensive policies as well as taking into account the needs of present and future generations. Such development which aims to improve the welfare and quality of life of the people, both for present and future generations, is environmentally oriented development.
2. The realization of development with an environmental perspective, along with wisely controlled utilization of natural resources, shall constitute the primary objective of environmental management. To this end, any change in the environment due to the creation of new environmental conditions, whether beneficial or adverse, which result from the implementation of a business or development activity shall be

predicted at the outset of planning for the business or activity. Article 16 of Act Number 4 of 1982 regarding Basic Provisions for the Management of the living Environment stipulates that any plan which is foreseen to have significant impact on the environment shall be subject to an environmental impact assessment. The significance of impacts, according to the elucidation of said Article 16, shall be determined by, among others:

- a. the number of people affected;
- b. the extent of the impact;
- c. the duration of the impact;
- d. intensity of the impact;
- e. the number of other environmental components affected;
- f. the cumulative nature of the impact;
- g. the reversibility or irreversibility of the impact.

Based on the above, it is necessary to provide further regulation of those businesses or activities which may have the potential to cause significant impacts on the environment.

3. With the inclusion of environmental impact assessment in the planning process for businesses or activities, decision-makers will have a broader perspective and deeper insight into the various aspects of the business or activity so they can make the best decision from the various alternatives available. Environmental impact assessment is a tool for decision-makers to consider the impacts of a proposed business or activity on the environment, in order to prepare steps to mitigate the negative impact and enhance the positive impacts.

## **ARTICLE BY ARTICLE**

### **Article 1**

The terms **environmental impact assessment** (Analisis mengenai Dampak Lingkungan, or AMDAL) as referred to in item 2, sub paragraph 10 of Article 1 of Act Number 4 of 1982 regarding Basic Provisions for Management of the Living Environment, means the entire consecutive process of the preparation of:

- a. the terms of reference for the preparation of the environmental impact statement (Analisis Dampak Lingkungan or ANDAL);
- b. the environmental impact statement;
- c. the environmental management plan;
- d. the environmental monitoring plan;

The term **AMDAL Kegiatan Terpadu/Multisektoral**, as referred in Item 3 means the entire, consecutive process of the preparation of an environmental impact assessment for various integrated/multisectoral businesses or activities which includes:

- a. the terms of reference for the preparation of an environmental impact statement;
- b. the environmental impact statement;

- c. the environmental management plan;
- d. the environmental monitoring plan.

The criteria for identifying the AMDAL process for integrated/multisectoral businesses or activities include:

- a. various types of business or activity for which the responsibility for the environmental impact assessment process is under the authority of several technical agencies;
- b. various types business or activity which have interrelated planning, management and production process;
- c. the businesses or activities are in the same ecosystem;
- d. the businesses or activities are under the direction of one or more managers.

The term **AMDAL Kawasan** in item 4 is defined as the entire, consecutive process of the preparation of an environmental impact assessment for various businesses or activities, whether similar or not, which are under the jurisdiction of a single authorized government agency, and for which the process includes:

- a. the terms of reference for the preparation of an environmental impact statement;
- b. the environmental impact statement;
- c. the environmental management plan;
- d. the environmental monitoring plan.

The criteria for identifying this AMDAL process are:

- a. various types of business or activity for which the environmental impact assessment process falls under the jurisdiction of a single relevant sector;
- b. the various types of business or activity may or may not be related to each in other in terms or their planning management and production processes;
- c. the various businesses or activities are located in the same ecosystem;
- d. the various businesses or activities may be under the direction of one or more separate managers

The term **AMDAL Regional** as given in item 5 refers to the entire consecutive process of the preparation of an environmental impact assessment for various inter-related businesses or activities which are under the jurisdiction of more than one authorized government agency, and for the process include:

- a. the terms of reference for the preparation of an environmental impact statement;
- b. the environmental impact statement;
- c. the environmental management plan;
- d. the environmental monitoring plan.

The criteria for identifying this AMDAL process include:

- a. various types of business or activity which are interrelated with one another;
- b. each business or activity falls under the authority of more than one authorized government agency;
- c. the businesses or activities are owned by more than one proponent;
- d. the businesses or activities are located in one zone of a regional development planning area which has been defined in accordance with the general spatial plan for the region;
- e. the various businesses or activities may be located in more than one ecosystem type.

The **terms of reference** as referred to in item 6 is the scope of the study for the preparation of the environmental impact statement for the proposed business or activity, which has been agreed between the commission and the proponent.

The **key aspect** as referred to in item 7 are the various aspects of the business or activity and the environmental factors which are considered to be important to study.

The **environmental impact statement**, or ANDAL, as referred to in item 8, is the document which the contains the results of the comprehensive study of the significant impacts.

The **environmental management plan**, as referred to in item 10, is the document which present the efforts which will be made to manage the impacts identified in the environmental impact statement.

The **environmental monitoring plan** as referred to in item 11, is the document which presents those environmental impact monitoring efforts based on the results of the environmental impact assessment process which are required for supervision of compliance.

The **person** referred to in item 12 shall be an individual, a group of individuals, or a corporate body. The **institution** shall include governmental bodies and state-owned companies.

## **Article 2**

Paragraph 1: The term **business** or **activity** as referred to herein means any business or activity which, based on scientific and technological experience and the stage of development, has the potential to cause significant impacts on the environment. The list of the types of business or activity shall not be considered to be limiting, and shall be subject to change in keeping with the development of science and technology. Some examples of businesses or activities are:

- a. the building of road, dams and railways, and forest clearing;
- b. mining and forest. exploitation;
- c. land exploitation unaccompanied by conservation efforts, and the utilization of energy which does not employ efficient technology;
- d. activities resulting in changes or shifts in the value system, perceptions and/or lifestyle of the local people;
- e. activities, processes and products which may cause pollution, damage to nature conservation areas, or affect cultural artifacts;
- f. the introduction of exotic species of plants or micro-organisms which can cause new diseases in existing vegetation, or the introduction of exotic species of fauna which can affect the existing



fauna;

- g. the application of biological and non-biological materials, which may include the concept of mutation;
- h. the application of technologies which may result in negative impacts on health.

Paragraph 2: The minister or head of a non-departmental governmental agency having jurisdiction over the relevant business or activity shall provide input to the Minister responsible for the managing the environment/Head of the agency responsible for the control of environmental impacts, in terms of the list of types of businesses or activities of each sector which have the potential to cause significant impacts. After considering this input, the Minister responsible for managing the environment/Head of the agency responsible for the control of environmental impacts shall then establish the types of business or activity in each sector for which environmental impact assessment must be carried out.

Proposed businesses or activities which have no significant impacts, and/or for which significant impact are able to be controlled through technology, shall be excluded from this category. However, to support environmentally oriented development, such businesses or activities are still required to implement environment management and environmental monitoring in accord with any provisions specified in their permits required under prevailing legislation. For example, these provisions could be in the form of conditions as specified in Article 11, paragraph (1) of the Hindrance Ordinance (Ordonansi Gangguan S. 1926-226), is amended and supplemented by S. 1927-499. S,1940-14 and 450.

Paragraph 3: Self-explanatory

Paragraph 4: The list of businesses or activities established by they Minister or as referred to in paragraph 3 shall be reviewed for improvement as necessary, and at least once in every 5 (five) years period.

### **Article 3**

Paragraph 1: The factors in this paragraph determining the existence of significant impacts are established on the basis of the current state of knowledge. These factors may change in line with developments in science of technology, and so are not considered to be limiting.

Paragraph 2: To establish the parameters of the factors listed in (a) to (9) of paragraph 1, the agency responsible for the control of environmental impacts shall consult with the ministers/heads of the non-departmental government agencies which have responsibility for the relevant businesses or activities.

### **Article 4**

Paragraph 1: Emergency situation shall be defined as those situations or conditions which, in the interest of the public require and immediate action which may have a risk for the environment.

Paragraph 2: The stipulation of the existence of an emergency condition shall take into account the prevailing legislation, and the recommendations referred to shall be in the form of written input from the agency responsible for the control of environmental impacts.

### **Article 5**

Good implementation of the environmental management plan and environmental monitoring plan shall be a prerequisite for the granting of a permit for a proposed business or activity which requires environmental impact assessment.

Said permit shall be the final operating permit (izin usaha tetap) in the case of industrial businesses or activities, which is required before the commencement of commercial production; the mining concession

for businesses or activities in the mining sector; the forest concession (MPH) for forestry activities; and any other permits as provided for in the prevailing legislation.

## **Article 6**

Paragraph 1: A feasibility study generally includes technical economic and financial aspects. Through the provision, the feasibility study for a business or activity having significant impacts on the environment shall include technical! economic, financial and environmental impact assessment components.

Paragraph 2: As the environmental impact assessment is an integral part of the feasibility study for a given ecosystem, it is very important to include the findings of that environmental impact assessment as input in development planning for the area.

## **Article 7**

Paragraph 1: The terms of reference for the preparation of the environmental impact statement shall serve as a reference to improve the efficiency and effectiveness of the environmental impact statement preparation process.

The terms of reference shall, in particular, present those aspects of the business or activity which are predicted to result in significant impacts, as well as those parameters of the environment which will be subjected to those significant impacts.

Paragraph 2: Self-explanatory

Paragraph 3: A written response shall be given by the environmental impact assessment commission of the authorized government agency to the proponent of the proposed business or activity in the event that the terms of reference is considered to have not complied with the prescribed technical guidelines. If a written response is not issued within the time limit of 12 (twelve) days, then the terms of reference is considered to be approved as the basis for the preparation of the environmental impact statement, based on authority of this Government Regulation.

Paragraph 4: The general guidelines for the preparation of a terms of reference shall be applied in the event that technical guidelines for the preparation of a terms of reference for the business or activity in the relevant sector has not been issued.

Paragraph 5: Self-explanatory

Paragraph 6: Self-explanatory

## **Article 8**

Paragraph 1: In addition to assisting those preparing the environmental impact statement, environmental management plan and environmental monitoring plan in providing an integrated and comprehensive analysis of the documents as a unit, the simultaneous filling can also save time and costs in preparing the environmental impact assessment documents.

Paragraph 2: Self-explanatory

Paragraph 3: The provisions in this paragraph shall aim a uniformity in the preparation of the environmental impact statement, environmental management plan and environmental monitoring plan.

Paragraph 4: The activities of each sector are different from those of the others, so that technical guidelines are required to accommodate the specific characteristics of the relevant businesses and activities.

The technical guidelines shall be issued by the minister and/or head of the non-departmental government agency having jurisdiction over the relevant activities, after consulting with the Minister responsible for the management of the environment/Head of the agency responsible for the control of environmental impacts.

#### **Article 9**

Paragraph 1: This procedure is intended to save time and money in the evaluation of the environmental impact statement, environmental management plan and environmental monitoring plan documents.

Paragraph 2: Self-explanatory

Paragraph 3: Self-explanatory

#### **Article 10**

Paragraph 1: The time limit of not later than 45 (forty-five) days as of the receipt of the environmental impact statement, environmental management plan and environmental monitoring plan shall not include holidays/non working days.

Paragraph 2: In the event that the authorized government agency decides to reject the environmental impact statement, environmental management plan and environmental monitoring plan, the agency shall provide directions on the improvement of these documents. In the event that 30 (thirty) working days after the revised or improved environmental impact statement, environmental management plan and environmental monitoring plan have been submitted to the authorized government agency there has been no response received from the commission, the provision referred to in paragraph 3 shall prevail.

Paragraph 3: The approval referred to in this paragraph should take into consideration the results of the evaluation by the environmental impact assessment commission as referred to in Article 17 and 18.

#### **Article 11**

Paragraph 1: For a particular activity, the negative impacts can often be mitigated on the basis of the application of science technology. However, it is also possible that negative impacts cannot be so mitigated, with the result that the proposed business or activity must be rejected and acceptable reasons for this decision must be provided.

Paragraph 2: In the event that the objection to the decision is filed later than 14 (fourteen) days after decision to reject is issued, then the said objection filed by the proponent shall be refused.

Paragraph 3: The authority superior to the minister or head of the non-departmental government agency, as referred to herein, shall be the President For activities under the Governors authority, the higher authority shall be:

- a. the minister or head of the non-departmental government agency having jurisdiction over the relevant activity, for sectoral activities;
- b. the Chairman of the investment Coordinator Board (BKPM), for foreign and domestic investment activities.

The opinions of the agency responsible for the control of environmental impacts shall be required in the framework of integration with national and sectoral policies for environmental impact control.

Paragraph 4: This decision shall be considered "final" in the sense that no further objection can be made.

## **Article 12**

Paragraph 1: For proposed businesses or activities which meet the criteria for AMDAL Kegiatan Terpadu/Multisectoral, as referred to in item 3 of Article 1 and its elucidation, the proponent shall prepare an integrated environmental impact assessment.

Paragraph 2: Self-explanatory

Paragraph 3: Other parties which are considered to be needed can be appointed from experts or the public who will be affected by the impacts.

Paragraph 4: The provisions of this article are intended to achieve uniformity in the application of environmental impact assessment for integrated/multisectoral businesses or activities.

Paragraph 5: Self-explanatory

## **Article 13**

Paragraph 1: The term "kawasan" as used in this Article means any area which has been designated by applicable laws or regulations, for example among others:

Industrial areas (Industrial Estates), according to Presidential Decree No. 53/1989 concerning Industrial Estates: Tourism Areas according to Act No. 9/1990 concerning Tourism.

Paragraph 2: Self-explanatory

Paragraph 3: Self-explanatory

Paragraph 4: Self-explanatory

## **Article 14**

Self-explanatory

## **Article 15**

Paragraph 1: In accordance with the rapid progress in regional development, it is very likely that within a period of 3 (three) years there will be changes in the environment such that the initial environmental profile, which served as the basis for the preparation of the environmental impact statement, will no longer be suitable for predicting the environmental impacts of the proposed business or activity.

Paragraph 2: In this case, it is necessary to review the previous approval given to the environmental impact statement, environmental management plan and environmental monitoring plan.

Paragraph 3: Self-explanatory

## **Article 16**

Paragraph 1: A fundamental environmental change shall be a change which has either positive or negative impacts on the environment so as to either facilitate or complicate the achievement of the objectives of environmental management.

Any changes due to natural causes or to actions taken to respond to an emergency shall be excluded from this definition.

The occurrence of fundamental environmental change means the alteration of the environmental profile, which was used as the basis of the environmental impact statement. This condition shall therefore result in invalidating the approval of said environmental impact statement.

Paragraph 2: The proponent shall revise the environmental impact statement, environmental management plan and environmental monitoring plan documents, on the basis of the new environmental profile.

Paragraph 3: Consultation herein shall mean a discussion between/among relevant parties.

## **Article 17**

Paragraph 1: Self-explanatory

Paragraph 2: The appointment of those experts deemed necessary as permanent members of the central environmental impact assessment commission is to improve the quality of the evaluation of environmental impact assessment documents. The presence as members of the representatives appointed by documents. The presence as members of the representatives appointed by the Minister of Home Affairs and the agency responsible for the control of environmental impacts is to ensure the cross-sectoral integration of environmental management both at the central and at the provincial levels.

The appointment of representatives of relevant ministries of non- department government agencies is meant to ensure that other sectoral inserts which are directly related to the proposed business or activity are considered.

The involvement of representatives of non-governmental organizations is expected to provide inputs regarding the aspirations of the community which is affected by the impacts of said business or activity.

Paragraph 3: The central environmental impacts assessment commission shall evaluate and decide upon the environmental impact assessment documents for proposed businesses or activities which are financed:

- a. by the State Budget, for businesses and activities conducted by the relevant agency;
- b. by the private sector, for which the business permit is issued by an authorized central government agency.

The central environmental impact assessment commission shall also perform any other duties stipulated by the minister or head of a non-departmental government agency, in so far as these are directly related to the duties referred to in items (a) through (g) of paragraph 3.

The results of the evaluation by the central environmental Impact assessment commission of the environmental impact assessment documents shall serve as the basis for the decision-making process by the minister and/or head of the non-departmental government agency.

Paragraph 4: Self-explanatory

Paragraph 5: Self-explanatory

## **Article 18**

Paragraph 1: Self-explanatory

Paragraph 2: The appointment of experts from the university environmental study centres as permanent members of the provincial commission is to improve the scientific quality of the evaluation of the environmental impact assessment. The appointment of members representing the provincial agency

responsible for managing the environment. the provincial Development Planning Board (BAPPEDA), the provincial National Land Agency office, and the provincial agency responsible for the control of environmental impacts is to ensure cross-sectoral integration of regional environmental management.

The appointment of a representative of the government agency supervising the relevant sector in the region is meant to ensure that the interests of the sector most directly related to the relevant business of activity are considered.

The involvement of the representatives of non-governmental organizations is expected to provide inputs regarding the aspirations of the community which is affected by the impacts of said business or activity.

Paragraph 3: The provincial environmental impact assessment commissions shall evaluate and decide on the environmental impact assessment documents for proposed businesses of activities which are financed:

- a. by the Regional Administration Budget;
- b. by the State budget, if the implementation of said proposed business of activity has been delegated to the regional administration;
- c. by the private sector, for which the business permit is issued by an authorized provincial government agency.

The provincial environmental impact assessment commission shall also perform any other duties stipulated by the Governor, is so far as these are directly related to the duties as referred to in items a through f of this paragraph.

The results of the evaluation by the provincial environmental impact assessment commission of the environmental impact assessment documents shall form the basis for the decision-making process by the governor.

Paragraph 4: Self-explanatory

Paragraph 5: Self-explanatory

#### **Article 19**

Integration shall be the primary characteristic of environmental management, so that in evaluating the environmental impact assessment, it is necessary that national policies on environmental management and on regional growth and development are harmoniously integrated.

#### **Article 20**

Education, training, research and development in the field of environmental impact assessment can also be undertaken by private companies on the initiative of communities, with reference to the curriculum prescribed by the agency responsible for the control of environmental impacts.

#### **Article 21**

Self-explanatory

#### **Article 22**

Paragraph 1: Proposed businesses or activities can be publicized, among other means through the mass media and/or through bulletin boards available within the authorized government agency, for the purpose

of enabling the public to offer its recommendation and opinions.

The submission of such recommendations and opinions to the central and provincial environmental impact assessment commissions constitutes public participation in the framework of environmental management, as stipulated in Article 6 Act no. 4 of 1982 pertaining to Basic Provisions for the Management of the Living Environment.

Paragraph 2: Being open to the public shall mean that any person can obtain information and/or a copy of the environmental impact statement, environmental management plan and environmental monitoring plan as well as the decisions issued on these three documents.

These documents shall be available from the authorized government agencies.

Paragraph 3: Those members of the public having such interests will need to be encouraged and given the opportunity to provide their input regarding the proposed business or activity to the relevant environmental impact assessment commission, so that the decision of the commission can take account of the views of the concerned community before the environmental impact assessment documents are approved.

#### **Article 23**

Self-explanatory

#### **Article 24**

This provision is also intended to provide services and access to information on environmental management related to development. In addition, it can also be used to develop a central and provincial documentation and information network.

#### **Article 25**

Paragraph 1: Self-explanatory

Paragraph 2: The purpose of forwarding the examination results to the minister or head of the non-departmental government agency responsible for the relevant sector and to the relevant governor is to enable the results to be used by these parties in performing their supervisory functions. The examination results shall include recommendations for actions required of the authorized agency.

Paragraph 3: The actions as referred to in this paragraph may include, among others, provision of solutions to problems arising from the conflict of interests between the sector in the management of the environment

#### **Article 26**

Self-explanatory

#### **Article 27**

Paragraph 1: The cost as referred to in this article shall be included in the costs of the feasibility study.

Paragraph 2: The result of the environmental management plan and environmental monitoring plan will determine the need for the proponent to provide for the expenses to be incurred in implementing its commitments to environmental management and monitoring. This particularly so for activities within the project boundary, while the costs of monitoring outside the project boundary shall be borne by the government in accord with provisions set out in the prevailing legislation.



**Article 28**

The government has the responsibility to undertake monitoring and inspection of the implementation by the proponent of the environmental management plan and the environmental monitoring plan. To that end, the government shall provide for such cost in the budget of the authorized government agency.

**Article 29**

Self-explanatory

Supplement to the state Gazette of the Republic of Indonesia Number 3538

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**TIMOR GAP, E.P.**  
TIMOR GÁS & PETRÓLEO



REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX H

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000) – Trigger values for tropical waters and sediments.

**Table 3.3.4** Default trigger values for physical and chemical stressors for tropical Australia for slightly disturbed ecosystems. Trigger values are used to assess risk of adverse effects due to nutrients, biodegradable organic matter and pH in various ecosystem types. Data derived from trigger values supplied by Australian states and territories, for the Northern Territory and regions north of Carnarvon in the west and Rockhampton in the east. Chl *a* = chlorophyll *a*, TP = total phosphorus, FRP = filterable reactive phosphate, TN = total nitrogen, NO<sub>x</sub> = oxides of nitrogen, NH<sub>4</sub><sup>+</sup> = ammonium, DO = dissolved oxygen.

Ecosystem type		Chl <i>a</i> (µg L <sup>-1</sup> )	TP (µg P L <sup>-1</sup> )	FRP (µg P L <sup>-1</sup> )	TN (µg N L <sup>-1</sup> )	NO <sub>x</sub> (µg N L <sup>-1</sup> )	NH <sub>4</sub> <sup>+</sup> (µg N L <sup>-1</sup> )	DO (% saturation) <sup>f</sup>		pH	
								Lower limit	Upper limit	Lower limit	Upper limit
Upland river <sup>e</sup>		na <sup>a</sup>	10	5	150	30	6	90	120	6.0	7.5
Lowland river <sup>e</sup>		5	10	4	200–300 <sup>h</sup>	10 <sup>b</sup>	10	85	120	6.0	8.0
Freshwater lakes & reservoirs		3	10	5	350 <sup>c</sup>	10 <sup>b</sup>	10	90	120	6.0	8.0
Wetlands		10	10–50 <sup>g</sup>	5–25 <sup>g</sup>	350–1200 <sup>g</sup>	10	10	90 <sup>b</sup>	120 <sup>b</sup>	6.0	8.0
Estuaries <sup>e</sup>		2	20	5	250	30	15	80	120	7.0	8.5
Marine	Inshore	0.7–1.4 <sup>d</sup>	15	5	100	2–8 <sup>d</sup>	1–10 <sup>d</sup>	90	no data	8.0	8.4
	Offshore	0.5–0.9 <sup>d</sup>	10	2–5 <sup>d</sup>	100	1–4 <sup>d</sup>	1–6 <sup>d</sup>	90	no data	8.2	8.2

na = not applicable

a = monitoring of periphyton and not phytoplankton biomass is recommended in upland rivers — values for periphyton biomass (mg Chl *a* m<sup>-2</sup>) to be developed;

b = Northern Territory values are 5µg L<sup>-1</sup> for NO<sub>x</sub>, and <80 (lower limit) and >110% saturation (upper limit) for DO;

c = this value represents turbid lakes only. Clear lakes have much lower values;

d = the lower values are typical of clear coral dominated waters (e.g. Great Barrier Reef), while higher values typical of turbid macrotidal systems (eg. North-west Shelf of WA);

e = no data available for tropical WA estuaries or rivers. A precautionary approach should be adopted when applying default trigger values to these systems;

f = dissolved oxygen values were derived from daytime measurements. Dissolved oxygen concentrations may vary diurnally and with depth. Monitoring programs should assess this potential variability (see Section 3.3.3.2);

g = higher values are indicative of tropical WA river pools;

h = lower values from rivers draining rainforest catchments.

**Table 3.3.5** Ranges of default trigger values for conductivity (EC, salinity), turbidity and suspended particulate matter (SPM) indicative of slightly disturbed ecosystems in tropical Australia. Ranges for turbidity and SPM are similar and only turbidity is reported here. Values reflect high site-specific and regional variability. Explanatory notes provide detail on specific variability issues for groupings of ecosystem type.

<b>Ecosystem type</b>	<b>Salinity (<math>\mu\text{Scm}^{-1}</math>)</b>	<b>Explanatory notes</b>
Upland & lowland rivers	20–250	Conductivity in upland streams will vary depending upon catchment geology. Values at the lower end of the range are typical of ephemeral flowing NT rivers. Catchment type may influence values for Qld lowland rivers (e.g. $150 \mu\text{Scm}^{-1}$ for rivers draining rainforest catchments, $250 \mu\text{Scm}^{-1}$ for savanna catchments). The first flush of water following early seasonal rains may result in temporarily high values.
Lakes, reservoirs & wetlands	90–900	Values at the lower end of the range are found in permanent billabongs in the NT. Higher conductivity values will occur during summer when water levels are reduced due to evaporation. WA wetlands can have values higher than $900 \mu\text{Scm}^{-1}$ . Turbid freshwater lakes in Qld have reported conductivities of approx. $170 \mu\text{Scm}^{-1}$ .
<b>Turbidity (NTU)</b>		
Upland & lowland rivers	2–15	Low values for base flow conditions in NT rivers. QLD turbidity and SPM values highly variable and dependent on degree of catchment modification and seasonal rainfall runoff.
Lakes, reservoirs & wetlands	2–200	Most deep lakes and reservoirs have low turbidity. However, shallow lakes and reservoirs may have higher turbidity naturally due to wind-induced resuspension of sediments. Lakes and reservoirs in catchments with highly dispersible soils will have high turbidity. Wetlands vary greatly in turbidity depending upon the general condition of the catchment or river system draining into the wetland, recent flow events and the water level in the wetland.
Estuarine & marine	1–20	Low values indicative of offshore coral dominated waters. Higher values representative of estuarine waters. Turbidity is not a very useful indicator in estuarine and marine waters. A move towards the measurement of light attenuation in preference to turbidity is recommended. Typical light attenuation coefficients ( $\log_{10}$ ) in waters off north-west WA range from 0.17 for inshore waters to 0.07 for offshore waters.











Chemical	Trigger values for freshwater (µgL <sup>-1</sup> )				Trigger values for marine water (µgL <sup>-1</sup> )				
	Level of protection (% species)				Level of protection (% species)				
	99%	95%	90%	80%	99%	95%	90%	80%	
1,2-diphenylhydrazine	ID	ID	ID	ID	ID	ID	ID	ID	
Diphenylnitrosamine	ID	ID	ID	ID	ID	ID	ID	ID	
Hexachlorobutadiene	ID	ID	ID	ID	ID	ID	ID	ID	
Hexachlorocyclopentadiene	ID	ID	ID	ID	ID	ID	ID	ID	
Isophorone	ID	ID	ID	ID	ID	ID	ID	ID	
<b>ORGANOCHLORINE PESTICIDES</b>									
Aldrin	B	ID	ID	ID	ID	ID	ID	ID	ID
Chlordane	B	0.03	0.08	0.14	0.27 <sup>C</sup>	ID	ID	ID	ID
DDE	B	ID	ID	ID	ID	ID	ID	ID	ID
DDT	B	0.006	0.01	0.02	0.04	ID	ID	ID	ID
Dicofol	B	ID	ID	ID	ID	ID	ID	ID	ID
Dieldrin	B	ID	ID	ID	ID	ID	ID	ID	ID
Endosulfan	B	0.03	0.2 <sup>A</sup>	0.6 <sup>A</sup>	1.8 <sup>A</sup>	0.005	0.01	0.02	0.05 <sup>A</sup>
Endosulfan alpha	B	ID	ID	ID	ID	ID	ID	ID	ID
Endosulfan beta	B	ID	ID	ID	ID	ID	ID	ID	ID
Endrin	B	0.01	0.02	0.04 <sup>C</sup>	0.06 <sup>A</sup>	0.004	0.008	0.01	0.02
Heptachlor	B	0.01	0.09	0.25	0.7 <sup>A</sup>	ID	ID	ID	ID
Lindane		0.07	0.2	0.4	1.0 <sup>A</sup>	ID	ID	ID	ID
Methoxychlor	B	ID	ID	ID	ID	ID	ID	ID	ID
Mirex	B	ID	ID	ID	ID	ID	ID	ID	ID
Toxaphene	B	0.1	0.2	0.3	0.5	ID	ID	ID	ID
<b>ORGANOPHOSPHORUS PESTICIDES</b>									
Azinphos methyl		0.01	0.02	0.05	0.11 <sup>A</sup>	ID	ID	ID	ID
Chlorpyrifos	B	0.00004	0.01	0.11 <sup>A</sup>	1.2 <sup>A</sup>	0.0005	0.009	0.04 <sup>A</sup>	0.3 <sup>A</sup>
Demeton	ID	ID	ID	ID	ID	ID	ID	ID	ID
Demeton-S-methyl	ID	ID	ID	ID	ID	ID	ID	ID	ID
Diazinon		0.00003	0.01	0.2 <sup>A</sup>	2 <sup>A</sup>	ID	ID	ID	ID
Dimethoate		0.1	0.15	0.2	0.3	ID	ID	ID	ID
Fenitrothion		0.1	0.2	0.3	0.4	ID	ID	ID	ID
Malathion		0.002	0.05	0.2	1.1 <sup>A</sup>	ID	ID	ID	ID
Parathion		0.0007	0.004 <sup>C</sup>	0.01 <sup>C</sup>	0.04 <sup>A</sup>	ID	ID	ID	ID
Profenofos	B	ID	ID	ID	ID	ID	ID	ID	ID
Temephos	B	ID	ID	ID	ID	0.0004	0.05	0.4	3.6 <sup>A</sup>
<b>CARBAMATE &amp; OTHER PESTICIDES</b>									
Carbofuran		0.06	1.2 <sup>A</sup>	4 <sup>A</sup>	15 <sup>A</sup>	ID	ID	ID	ID
Methomyl		0.5	3.5	9.5	23	ID	ID	ID	ID
S-methoprene		ID	ID	ID	ID	ID	ID	ID	ID
<b>PYRETHROIDS</b>									
Deltamethrin		ID	ID	ID	ID	ID	ID	ID	ID
Esfenvalerate		ID	0.001*	ID	ID	ID	ID	ID	ID
<b>HERBICIDES &amp; FUNGICIDES</b>									
<b>Bypyridilium herbicides</b>									
Diquat		0.01	1.4	10	80 <sup>A</sup>	ID	ID	ID	ID
Paraquat		ID	ID	ID	ID	ID	ID	ID	ID
<b>Phenoxyacetic acid herbicides</b>									
MCPA		ID	ID	ID	ID	ID	ID	ID	ID
2,4-D		140	280	450	830	ID	ID	ID	ID
2,4,5-T		3	36	100	290 <sup>A</sup>	ID	ID	ID	ID
<b>Sulfonylurea herbicides</b>									
Bensulfuron		ID	ID	ID	ID	ID	ID	ID	ID
Metsulfuron		ID	ID	ID	ID	ID	ID	ID	ID
<b>Thiocarbamate herbicides</b>									
Molinate		0.1	3.4	14	57	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL <sup>-1</sup> )				Trigger values for marine water (µgL <sup>-1</sup> )			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Thiobencarb	1	2.8	4.6	8 <sup>C</sup>	ID	ID	ID	ID
Thiram	0.01	0.2	0.8 <sup>C</sup>	3 <sup>A</sup>	ID	ID	ID	ID
<b>Triazine herbicides</b>								
Amitrole	ID	ID	ID	ID	ID	ID	ID	ID
Atrazine	0.7	13	45 <sup>C</sup>	150 <sup>C</sup>	ID	ID	ID	ID
Hexazinone	ID	ID	ID	ID	ID	ID	ID	ID
Simazine	0.2	3.2	11	35	ID	ID	ID	ID
<b>Urea herbicides</b>								
Diuron	ID	ID	ID	ID	ID	ID	ID	ID
Tebuthiuron	0.02	2.2	20	160 <sup>C</sup>	ID	ID	ID	ID
<b>Miscellaneous herbicides</b>								
Acrolein	ID	ID	ID	ID	ID	ID	ID	ID
Bromacil	ID	ID	ID	ID	ID	ID	ID	ID
Glyphosate	370	1200	2000	3600 <sup>A</sup>	ID	ID	ID	ID
Imazethapyr	ID	ID	ID	ID	ID	ID	ID	ID
Ioxynil	ID	ID	ID	ID	ID	ID	ID	ID
Metolachlor	ID	ID	ID	ID	ID	ID	ID	ID
Sethoxydim	ID	ID	ID	ID	ID	ID	ID	ID
Trifluralin	B	2.6	4.4	6	9 <sup>A</sup>	ID	ID	ID
<b>GENERIC GROUPS OF CHEMICALS</b>								
<b>Surfactants</b>								
Linear alkylbenzene sulfonates (LAS)	65	280	520 <sup>C</sup>	1000 <sup>C</sup>	ID	ID	ID	ID
Alcohol ethoxylated sulfate (AES)	340	650	850 <sup>C</sup>	1100 <sup>C</sup>	ID	ID	ID	ID
Alcohol ethoxylated surfactants (AE)	50	140	220	360 <sup>C</sup>	ID	ID	ID	ID
<b>Oils &amp; Petroleum Hydrocarbons</b>								
<b>Oil Spill Dispersants</b>								
BP 1100X	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 7664	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 8667	ID	ID	ID	ID	ID	ID	ID	
Corexit 9527	ID	ID	ID	ID	230	1100	2200	4400 <sup>A</sup>
Corexit 9550	ID	ID	ID	ID	ID	ID	ID	ID

**Notes:** Where the final water quality guideline to be applied to a site is below current analytical practical quantitation limits, see Section 3.4.3.3 for guidance.

Most trigger values listed here for metals and metalloids are *High reliability* figures, derived from field or chronic NOEC data (see 3.4.2.3 for reference to Volume 2). The exceptions are *Moderate reliability* for freshwater aluminium (pH >6.5), manganese and marine chromium (III).

Most trigger values listed here for non-metallic inorganics and organic chemicals are *Moderate reliability* figures, derived from acute LC<sub>50</sub> data (see 3.4.2.3 for reference to Volume 2). The exceptions are *High reliability* for freshwater ammonia, 3,4-DCA, endosulfan, chlorpyrifos, esfenvalerate, tebuthiuron, three surfactants and marine for 1,1,2-TCE and chlorpyrifos.

\* = *High reliability* figure for esfenvalerate derived from mesocosm NOEC data (no alternative protection levels available).

A = Figure may not protect key test species from acute toxicity (and chronic) — check Section 8.3.7 for spread of data and its significance. 'A' indicates that trigger value > acute toxicity figure; note that trigger value should be <1/3 of acute figure (Section 8.3.4.4).

B = Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered (see Sections 8.3.3.4 and 8.3.5.7).

C = Figure may not protect key test species from chronic toxicity (this refers to experimental chronic figures or geometric mean for species) — check Section 8.3.7 for spread of data and its significance. Where grey shading and 'C' coincide, refer to text in Section 8.3.7.

D = Ammonia as TOTAL ammonia as [NH<sub>3</sub>-N] at pH 8. For changes in trigger value with pH refer to Section 8.3.7.2.

E = Chlorine as total chlorine, as [Cl]; see Section 8.3.7.2.

F = Cyanide as un-ionised HCN, measured as [CN]; see Section 8.3.7.2.

G = Sulfide as un-ionised H<sub>2</sub>S, measured as [S]; see Section 8.3.7.2.

H = Chemicals for which algorithms have been provided in table 3.4.3 to account for the effects of hardness. The values have been calculated using a hardness of 30 mg/L CaCO<sub>3</sub>. These should be adjusted to the site-specific hardness (see Section 3.4.3).

J = Figures protect against toxicity and do not relate to eutrophication issues. Refer to Section 3.3 if eutrophication is the issue of concern.

ID = Insufficient data to derive a reliable trigger value. Users advised to check if a low reliability value or an ECL is given in Section 8.3.7.

T = Tainting or flavour impairment of fish flesh may possibly occur at concentrations below the trigger value. See Sections 4.4.5.3/3 and 8.3.7.

**Table 3.5.1** Recommended sediment quality guidelines<sup>a</sup>

Contaminant	ISQG-Low (Trigger value)	ISQG-High
<b>METALS (mg/kg dry wt)</b>		
Antimony	2	25
Cadmium	1.5	10
Chromium	80	370
Copper	65	270
Lead	50	220
Mercury	0.15	1
Nickel	21	52
Silver	1	3.7
Zinc	200	410
<b>METALLOIDS (mg/kg dry wt)</b>		
Arsenic	20	70
<b>ORGANOMETALLICS</b>		
Tributyltin ( $\mu\text{g Sn/kg dry wt.}$ )	5	70
<b>ORGANICS (<math>\mu\text{g/kg dry wt}</math>)<sup>b</sup></b>		
Acenaphthene	16	500
Acenaphthalene	44	640
Anthracene	85	1100
Fluorene	19	540
Naphthalene	160	2100
Phenanthrene	240	1500
Low Molecular Weight PAHs <sup>c</sup>	552	3160
Benzo(a)anthracene	261	1600
Benzo(a)pyrene	430	1600
Dibenzo(a,h)anthracene	63	260
Chrysene	384	2800
Fluoranthene	600	5100
Pyrene	665	2600
High Molecular Weight PAHs <sup>c</sup>	1700	9600
Total PAHs	4000	45000
Total DDT	1.6	46
p,p'-DDE	2.2	27
o,p'- + p,p'-DDD	2	20
Chlordane	0.5	6
Dieldrin	0.02	8
Endrin	0.02	8
Lindane	0.32	1
Total PCBs	23	–

a Primarily adapted from Long et al. (1995);

b Normalised to 1% organic carbon;

c Low molecular weight PAHs are the sum of concentrations of acenaphthene, acenaphthalene, anthracene, fluorene, 2-methylnaphthalene, naphthalene and phenanthrene; high molecular weight PAHs are the sum of concentrations of benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene and pyrene.



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REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
SECRETARIA DE ESTADO DOS RECURSOS NATURAIS

# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX I



## Key Informant Questionnaire

### General information

1. Date & Time
2. Location / Settlement Name
3. Name of Interviewee
4. Affiliation and Position in Community (if not Chefe de Suco)
5. Details of any bystanders during key informant interview (e.g. the settlement's 'village council' or 'elders')

### Population, demographics, influx

6. Estimated number of people in this settlement?
7. Has the settlement grown in the last 2 years and last 2 months? Why? Is growth perceived a positive or negative change? Why?
8. Is there regular movement of people in and out of the area or do people live in one area for many years? If the case, why do people leave the area?
9. Approximate number of people per household/family?
10. If you have to divide the population into three categories, what percentage is children (0-15), working class (16-64), and older (65-older)? (*Rough estimation*) Compared to other villages, are this settlement noticeably different e.g. more children or old people, why?
11. Is there a noticeable difference between the number of men and women in the village? Compared to other villages, are this settlement noticeably different e.g. more women or more men, why?
12. How does landownership and tenure work in the settlement?
13. How do new-comers apply for land in the settlement?
14. Which ethnic groups are found in the settlement? (*Rough indication of dominant groups and minority groups*)
15. Which language groups are found in the settlement? (*Rough indication of mostly spoken to least spoken*)

### Social organisation



16. Briefly explain the settlement structure (social organisation), i.e. the relationship between government and traditional structures, and the connection between local, regional and national level governance.
17. Are there community based organisations in the settlement e.g. women's groups, youth groups, farming committees, fishing committees, etc?
18. Are there any NGOs active in the community? Who are they and how are they involved?
19. Are there many vulnerable people in the settlement (*elderly, disabled, orphans, etc.*)?

### **Services and infrastructure**

20. Do households have to pay for government services? (*Indicate which*)
21. Do government provide any assistance to households who cannot afford to pay for these services?
22. Are there any other services provided by government?

### **Education**

23. What are the key challenges as far as education services are concerned?

### **Health**

24. What are the key challenges as far as health services are concerned?

### **Heritage**

25. Are there any important burial sites and sacred sites? (*Obtain GPS point if permitted, otherwise find out in which direction the site is located and distance from settlement*)
26. Are there places of ancestral value (*fountains, rivers, creeks, hills, stones, places of worship*)? (*Obtain GPS points*)

### **Social Issues and Crime**

27. Is crime a problem in the area? What are the main types of crimes (*e.g. serious theft, petty theft, murder, domestic violence*)?
28. How is crime controlled / managed in the area? (*e.g. government or traditional structures*)



## Perceptions about the project

### Methods of engagement

29. Have you been informed and consulted about this project? By whom, how often, method of communication?
30. Have the wider community also been informed?
31. Are you pleased with the way in which project information has been shared previously?
32. If not, what would be the best way to share information about the project going forward? (*E.g. if / when other companies or organisations have interacted with your community, what are the things that you liked about their approach?*)

### Awareness and perceptions about the project

33. What words or things come to mind when you think about this project?
34. Do you have any particular concerns about the project? Please explain.
35. What is your (and your settlement's) expectations from the project?
36. What do you foresee will be the positive impacts of the project? (*Can probe if no response: employment, business opportunities e.g. selling food to newcomers, improved infrastructure and accessibility, etc.*)
37. What do you foresee will be the negative impacts of the project? (*Can probe if no response: Loss of land / fields / dwelling structures, newcomers moving into the area resulting in pressure on infrastructure, change in culture, disrespect to sacred sites (e.g. harm to crocodiles), etc.*)
38. As a whole, do you think this project will make people's lives better or worse? Why do you feel that way?





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# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX J



## Focus Group Meeting Questionnaires

*(Questions in red were additional question covered during the focus group meetings)*

### General information

1. Date & Time
2. Location / Settlement Name
3. Name of Interviewee
4. Affiliation and Position in Community (if not Chefe de Suco)
5. Details of any bystanders during key informant interview (e.g. the settlement's 'village council' or 'elders')

### Population, demographics, influx

6. Estimated number of people in this settlement?
7. Has the settlement grown in the last 2 years and last 2 months? Why? Is growth perceived a positive or negative change? Why?
8. Is there regular movement of people in and out of the area or do people live in one area for many years? If the case, why do people leave the area?
9. Approximate number of people per household/family?
10. If you have to divide the population into three categories, what percentage is children (0-15), working class (16-64), and older (65-older)? *(Rough estimation)* Compared to other villages, are this settlement noticeably different e.g. more children or old people, why?
11. Is there a noticeable difference between the number of men and women in the village? Compared to other villages, are this settlement noticeably different e.g. more women or more men, why?
12. How does landownership and tenure work in the settlement?
13. How do new-comers apply for land in the settlement?
14. Which ethnic groups are found in the settlement? *(Rough indication of dominant groups and minority groups)*
15. Which language groups are found in the settlement? *(Rough indication of mostly spoken to least spoken)*

### Social organisation



16. Briefly explain the settlement structure (social organisation), i.e. the relationship between government and traditional structures, and the connection between local, regional and national level governance.
17. Are there community based organisations in the settlement e.g. women's groups, youth groups, farming committees, fishing committees, etc?
18. Are there any NGOs active in the community? Who are they and how are they involved?
19. Are there many vulnerable people in the settlement (*elderly, disabled, orphans, etc.*)?

### **Communication, language and travel**

20. How do people communicate with one another in the area? (e.g. radio, cell phones, word of mouth)
21. How do people travel between settlements e.g. Dili and between the respective project sites?

### **Economic activities**

22. What are the main forms of livelihood in the settlement? Farming, livestock, fishing, small businesses?
23. Are some people employed? If so, in which sectors, by which companies, and where are these employees located?
24. What are the main sources of cash income in the settlement?

### **Agricultural activities**

25. What are the most common types of crops people farm with?
26. Is farming the main source of food?
27. Do all families farm?
28. Are fields typically located close to the settlement or scattered over a wider area? How far do people travel to reach their fields?
29. What types of livestock are generally found in the settlement?
30. Are the livestock only for subsistence purposes or sold?
31. Do they graze freely or in designated areas close to the settlement?

### **Natural resources**



- 32. Where do people get water?
- 33. Is the water clean and safe for drinking?
- 34. Do people use natural vegetation to produce medicine?
- 35. What are the main sources of energy (wood, gas, paraffin, petrol, electricity)?
- 36. Is there an abundance of natural resources to meet the people’s demand or is there a scarcity? (E.g. land with good farming potential, firewood, medicinal plants, thatching grass)
- 37. Do people fish at specific locations or at scattered fishing spots all along the coast line?

### **Services and infrastructure**

38. What community infrastructure do you have in the settlement? E.g.

Type of infrastructure	Number of facilities in settlement	Number of facilities in other nearby locations	Name of nearest location in other nearby locations	Provided by Government, Church or NGO
Primary schools				
Secondary schools				
Hospital				
Clinic				
Police station				
Churches				
Shops				
Recreation				
Market				
Waste dump				
Other				

- 39. Is there any waste disposal system in the settlement, e.g. communal waste dumps?
- 40. What sanitation system does people use, e.g. pit latrines, flushing toilets?
- 41. Do households have to pay for government services? (*Indicate which*)
- 42. Do government provide any assistance to households who cannot afford to pay for these services?
- 43. Are there any other services provided by government?
- 44. What types of housing do people have? (*Get description of general types e.g. mud with thatch, brick with corrugated iron etc.*)
- 45. Who is responsible for constructing and maintaining roads?



## **Education**

46. Do most children go to school? If no, why?
47. What is the general level of education attained (primary or secondary level)?
48. What are the key challenges as far as education services are concerned?

## **Health**

49. What are the most common diseases in the settlement?
50. Has the levels of health increased or decreased in the last 2 years?
51. Do people consult traditional or modern medical practitioners or both?
52. What are the key challenges as far as health services are concerned?

## **Heritage**

53. Are there any important burial sites and sacred sites? (*Obtain GPS point if permitted, otherwise find out in which direction the site is located and distance from settlement*)
54. Are people buried in the settlement or in remote areas? (*Are graves confined to cemeteries or do you find scattered grave sites?*)
55. Are there places of ancestral value (*fountains, rivers, creeks, hills, stones, places of worship*)? (*Obtain GPS points*)

## **Social Issues and Crime**

56. Is crime a problem in the area? What are the main types of crimes (*e.g. serious theft, petty theft, murder, domestic violence*)?
57. How is crime controlled / managed in the area? (*e.g. government or traditional structures*)
58. Are there problems with drugs and alcohol abuse in the settlement?
59. Is the police / military involved in managing crime? (*Are they helpful? Do they use violence and or intimidation?*)
60. Is there prostitution in the area?

## **Perceptions about the project**



## Methods of engagement

61. Have you been informed and consulted about this project? By whom, how often, method of communication?
62. Have the wider community also been informed?
63. Are you pleased with the way in which project information has been shared previously?
64. If not, what would be the best way to share information about the project going forward? (*E.g. if / when other companies or organisations have interacted with your community, what are the things that you liked about their approach?*)

## Awareness and perceptions about the project

65. What words or things come to mind when you think about this project?
66. Do you have any particular concerns about the project? Please explain.
67. What is your (and your settlement's) expectations from the project?
68. What do you foresee will be the positive impacts of the project? (*Can probe if no response: employment, business opportunities e.g. selling food to newcomers, improved infrastructure and accessibility, etc.*)
69. What do you foresee will be the negative impacts of the project? (*Can probe if no response: Loss of land / fields / dwelling structures, newcomers moving into the area resulting in pressure on infrastructure, change in culture, disrespect to sacred sites (e.g. harm to crocodiles), etc.*)
70. As a whole, do you think this project will make people's lives better or worse? Why do you feel that way?



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# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant

## Strategic Environmental Impact Assessment

### APPENDIX K

## **TIA Content**

17. The content and extent of a TIA will need to reflect the size and complexity of the development proposal, the outcome of the scoping study and whether the submission is for outline or full planning consent. Pages 8 to 10 present a structured approach to the preparation of a TIA including suggested report section headings based on current best practice.
  
18. Most Planning Authorities already seek information on parking provision and traffic projections as part of the standard Planning Application form. It is recommended that the amount of information generally sought by the Planning Authority from developers should be expanded and the format on Pages 11 to 13 is suggested.



## **1. Non-Technical Summary**

- a brief non-technical resume of the projected traffic impact of development.

## **2. Existing Conditions (Section 3.2)**

- description of current transport policies for the area (including DOT, Structure Plan, Local Plan, etc)
- quantification of current traffic flows on links and junctions within the affected area
- examination of historic accident records where appropriate
- quantification of pedestrian flows at critical locations
- identification of critical links and junctions
- identification of committed highway works in the area
- identification of developments with planning consent but not yet implemented

## **3. Proposed Development (Section 3.3)**

- description of current planning policies for the site including parking standards
- description of current use of the site and its recent usage history
- description of proposed use, including site area and development phasing
- specification of size of the development
- provision of site plan for proposed development, where available

## **4. Modal Choice/Trip Attraction (Section 3.4)**

- quantification of current trip attraction of the site
- estimation of projected modal split
- estimation of trip attraction, specified by direction and vehicle type, for
  - weekday
  - peak hour
  - development peakto be specified by direction and vehicle type
- justification for the values used
- identification of times when traffic impact is at its greatest, ie the peak combination of network and development traffic
- for multi-purpose sites, provision of details of each significant element
- specification of trip attraction by phase (if appropriate)
- specification of trip attraction by construction period (if appropriate)

## **5. Trip Distribution (Section 3.5)**

- definition of catchment area
- consideration of competing opportunities
- identification of transfer trips, ie. the trips that had previously been attracted to an alternative site
- identification of non-primary trips, ie. "pass-by" and "diverted" trips that might already be on the network
- distribution of trips to potential opportunities
- justification for the methodology adopted

## **6. Assignment of Development Traffic (Section 3.6)**

- identification of traffic routeing to and from the site
- definition of turning movements at the site entrance
- provision of modified traffic projections at key links and junctions within the affected area

## **7. Assessment Years (Section 3.7)**

- estimation of traffic growth over time for
  - network traffic
  - development traffic
- estimation of traffic flows on the adjacent links and at key links and junctions within the affected area for
  - base year, ie. first year of full operation
  - base year plus 10 yearsor if new or modified highway infrastructure is required
  - year of completion of infrastructure plus 15 years
- inclusion of committed highway and development proposals that would affect local traffic conditions
- possible requirement for additional separate assessments for specific phasing proposals and for construction traffic impacts.

## **8. Highway Impact (Section 3.8)**

- indication of the proposed site access layout
- justification of the design
- traffic assessments on other key links and junctions within the affected area
- identification of reserve capacity and queue lengths where appropriate
- identification of alternative designs for key links and junctions within the affected area which may be necessitated by the increased traffic movements
- identification of any departure from design standards
- safety assessment of all designs

## **9. Environmental Impact (Section 3.9)**

- identification of the environmental impact arising from the traffic consideration of the proposed development
- special consideration required for sensitive and residential areas
- consideration of measures that might be appropriate to mitigate against any environmental disadvantage

## **10. Road Safety (Section 3.10)**

- examination of historical data for accident factors, trends and groups; for example, regular occurrence of one type of accident or involvement of one type of road user
- preparation of a safety audit on any proposed change to the highway layout

**11. Internal Layout (Section 3.11)**

- definition of internal road and circulatory layout with dimensions and plan
- consideration of service and emergency vehicle routes
- definition of aisle widths, road marking, traffic safety, visibility, etc.
- consideration of vehicle speed and control measures

**12. Parking Provision (Section 3.12)**

- determination of level of provision and justification
- consideration of essential operational, visitor, disabled spaces
- specification of bay and aisle dimensions and location of spaces
- verification that vehicles can access each space with adequate turning provision
- determination of service area requirements

**13. Public Transport (Section 3.13)**

- indication of intended public transport provision
- determination of siting of bus stops, routes, etc
- determination of access to bus/rail facilities

**14. Pedestrians/Cyclists/People with Disabilities (Section 3.14)**

- indication of specific provisions
- indication of safety and security provisions
- indication of facilities for disabled

**Part A1**

**To be provided for all developments**

A1.1 Proposed development (brief description)

A1.2 Location

A1.3 Name of applicant/agent/consultant

A1.4 Size of development (sq.m/no. of units)

A1.5 What is the current use of the site and size of existing development (sq.m/no. of units) ?

A1.6 Onto which roads does the site have frontage ? (enclose plan)

A1.7 Where is the existing site access(es)

a)for pedestrians ?

b)for vehicles ?

A1.8 Where is the proposed site access(es)

a)for pedestrians ?

b)for vehicles ?

A1.9 What is the flow on the adjacent roads (source of data) ?

A1.10 Would the development result in

a)new or modified access ? YES/NO

b)closure of existing access ? YES/NO

A1.11 What specific provision is being made for

a)pedestrians ?

b)cyclists ?

c)disabled ?

A1.12 Total number of parking spaces to be provided (with breakdown by operational, residents, visitors, etc. as appropriate)

A1.13 Describe existing public transport facilities. Is there any scope for enhancement or new provision ?

**Part A2**

**To be provided for**

- residential developments in excess of 30 units
- business (B1 and B2) GFA in excess of 1,000sq.m
- warehousing (B8) GFA in excess of 1,500sq.m
- retail GFA in excess of 250sq.m
- other developments irrespective of size

**A2.1 What is the current traffic usage of the site ?**

	<i>weekday</i>	<i>peak hour *</i>	<i>activity peak hour</i>
Cars			
Goods vehs under 1.5 tonnes			
Goods vehs over 1.5 tonnes			
<b>Total</b>			

**A2.2 What is the projected traffic usage of the site upon completion ?**

	<i>weekday</i>	<i>peak hour *</i>	<i>activity peak hour</i>
Cars			
Goods vehs under 1.5 tonnes			
Goods vehs over 1.5 tonnes			
<b>Total</b>			

\* Peak hour is the busiest hour of the week on local road network.

\*\* Activity peak is the peak hourly flow to/from the development on any specific day of the week.

Note: Traffic flows should be recorded as total one-way movements with the timing of the peak hour specified. (Please indicate methodology used to derive these estimates).

**A2.3 What is the net additional traffic using the site ?**

	<i>weekday</i>	<i>peak hour *</i>	<i>activity peak hour</i>
Cars			
Goods vehs under 1.5 tonnes			
Goods vehs over 1.5 tonnes			
<b>Total</b>			

Note: Traffic flows should be recorded as total one-way movements with the timing of the peak hour specified.

**A2.4 Will the traffic be split between different accesses ? If so, provide details**

**Part A3**

**To be provided for**

- residential developments in excess of 200 units
- business (B1 and B2) GFA in excess of 5,000sq.m
- warehousing (B8) GFA in excess of 10,000sq.m
- retail GFA in excess of 1,000sq.m
- other leisure or hotel developments

Development proposals of this size would generally be supported by a Traffic Impact Assessment Report outlining methodology and impact in detail. In addition to the information in A1 and A2, the TIA report would:

A3.1 Provide details of development traffic movements on the surrounding road network.

A3.2 Provide an assessment of the traffic impact of the proposed development on links and junctions in the surrounding road network.

A3.3 Indicate what allowance has been made for future growth in traffic.

A3.4 Describe the potential environmental impact arising from the traffic from the development with particular reference to sensitive or residential areas.



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# Tasi Mane Project – Betano Petroleum Refinery and Beaco LNG Plant Strategic Environmental Impact Assessment

## APPENDIX L



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71      Latitude: -8.56351      Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	21.60	31.40	25.00	64.00	95.50	87.00	16.80	1.52	17.78	4.03
23	21.80	31.90	25.90	54.00	95.50	81.00	0.00	1.64	21.22	4.82
24	22.90	32.10	25.60	56.50	94.00	84.50	31.20	1.30	16.27	3.93
25	21.70	32.70	25.50	56.50	95.50	83.50	1.20	1.27	16.71	3.98
26	22.50	30.90	25.70	62.00	94.00	84.50	1.20	1.08	12.14	3.03
27	22.30	31.90	26.10	57.50	94.50	82.50	51.60	1.44	17.81	4.18
28	22.70	31.50	25.80	61.50	95.50	86.00	8.40	1.16	13.03	3.23
29	22.60	32.00	26.50	55.00	95.50	82.00	0.00	1.24	17.65	4.11
30	22.80	31.80	25.70	58.50	94.50	85.50	93.60	1.17	16.12	3.78
31	23.40	31.90	26.40	56.00	96.00	83.50	14.40	1.19	17.75	4.09
Decade 1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Decade 2	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Decade 3	22.43	31.81	25.82	58.15	95.05	84.00	218.40	1.30	16.65	3.92
MONTH	22.43	31.81	25.82	58.15	95.05	84.00	218.40	1.30	16.65	3.92

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION



MONTHLY METEOROLOGICAL BULLETIN: April 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71      Latitude: -8.56351      Longitude: 126.38389

Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (km/day)	RG (J/cm <sup>2</sup> )	Eto (mm)
1	22.10	30.70	25.90	61.50	93.50	81.50	2.40	1.22	15.47	3.59
2	22.90	30.60	25.60	64.00	93.50	85.00	7.20	1.06	10.71	2.76
3	22.80	30.60	25.50	63.00	94.50	85.50	2.40	1.19	11.41	2.92
4	23.20	31.00	24.70	63.00	94.50	89.50	369.60	1.05	9.67	2.60
5	21.70	31.20	24.40	54.00	96.00	86.50	32.40	1.42	15.96	3.84
6	21.30	30.30	24.40	60.00	94.50	86.50	127.20	1.09	11.73	2.93
7	23.00	30.00	25.70	60.00	94.00	84.00	50.40	1.68	16.82	3.93
8	22.10	30.60	25.70	51.50	96.00	81.50	3.60	1.53	18.87	4.31
9	21.20	31.20	25.30	56.50	96.00	82.00	0.00	1.78	17.44	4.14
10	22.00	31.10	25.70	54.00	96.00	81.00	3.60	1.72	20.64	4.63
11	21.70	30.70	25.40	49.50	96.00	81.00	0.00	1.62	20.59	4.61
12	21.50	30.50	25.50	56.50	96.00	81.00	3.60	1.56	20.27	4.41
13	21.70	30.10	24.90	61.50	95.50	84.50	69.60	1.49	13.81	3.34
14	21.70	29.20	24.80	65.50	96.00	86.50	3.60	1.28	9.93	2.57
15	22.40	31.20	25.90	52.50	94.50	81.00	1.20	1.26	17.66	4.04
16	21.00	30.40	25.40	57.00	95.50	81.00	10.80	1.56	16.86	3.88
17	21.80	30.40	25.20	58.00	93.50	81.50	0.00	1.56	13.39	3.40
18	20.80	31.10	25.50	41.00	95.50	74.00	0.00	1.76	22.09	5.01
19	20.20	30.30	24.80	49.50	96.00	78.00	0.00	1.98	22.14	4.85
20	20.90	30.60	25.00	46.00	96.00	79.50	0.00	1.96	21.24	4.84
21	20.70	31.00	25.40	53.50	96.00	80.50	0.00	1.86	20.44	4.57
22	21.90	31.00	25.90	52.00	96.00	80.00	7.20	1.85	20.99	4.70
23	22.20	30.70	26.00	56.50	95.50	81.00	13.20	1.78	20.44	4.51
24	20.60	31.30	25.40	50.00	96.00	79.50	0.00	1.81	20.69	4.66
25	20.20	31.20	24.90	52.00	96.00	80.00	0.00	1.55	19.97	4.39
26	20.00	30.10	24.40	53.50	95.50	80.00	0.00	1.70	19.77	4.30
27	19.70	31.20	24.60	46.00	95.50	78.00	0.00	1.92	19.36	4.58
28	20.20	31.20	24.70	51.00	96.00	82.00	0.00	1.60	18.02	4.15
29	19.70	30.60	24.40	58.00	96.00	84.00	8.40	1.60	13.73	3.38
30	22.00	32.00	26.00	48.00	95.50	78.00	0.00	1.84	20.87	4.82
31										
Decade 1	22.23	30.73	25.29	58.75	94.85	84.30	598.80	1.38	14.87	3.56
Decade 2	21.37	30.45	25.24	53.70	95.45	80.80	88.80	1.60	17.80	4.10
Decade 3	20.72	31.03	25.17	52.05	95.80	80.30	28.80	1.75	19.43	4.41
MONTH	21.44	30.74	25.23	54.83	95.37	81.80	716.40	1.58	520.98	4.02

RR: rainfall    T min: Air temperature minima value    T max: Air temperature maxima value    T mean: Air temperature average value  
RH min: Air relative humidity minima value    RH max: Air relative humidity maxima value    RH mean: Air relative humidity average value  
WS mean: Wind speed average value    RG: Solar radiation value    ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.50	31.30	24.90	57.00	95.50	85.00	37.20	1.39	11.92	3.11
2	23.20	30.40	25.80	61.50	96.00	85.00	3.60	1.34	13.33	3.17
3	22.00	31.60	25.90	52.50	96.00	80.50	0.00	1.54	20.96	4.52
4	21.80	31.50	25.60	48.50	95.50	78.50	0.00	1.60	18.86	4.32
5	21.30	30.20	25.20	51.00	96.00	78.00	1.20	1.81	15.70	3.82
6	19.40	30.40	24.30	48.00	96.00	77.50	0.00	1.71	19.11	4.25
7	19.40	30.30	23.90	50.50	95.50	77.00	0.00	1.60	16.48	3.81
8	19.20	30.60	24.00	50.00	94.50	78.00	0.00	1.72	15.69	3.81
9	19.60	30.70	24.40	49.50	96.00	78.00	0.00	1.85	16.58	3.99
10	20.20	30.80	24.60	52.00	95.50	78.50	0.00	1.66	17.01	3.92
11	20.00	31.80	24.70	47.50	96.00	78.50	0.00	1.49	18.13	4.13
12	20.90	31.50	25.00	51.00	95.50	80.00	0.00	1.50	14.17	3.56
13	22.20	31.90	25.70	53.50	94.00	80.00	226.80	1.44	13.45	3.43
14	22.30	30.00	24.90	53.50	95.50	83.50	2.40	1.32	13.89	3.29
15	22.00	31.20	25.60	51.50	94.00	79.50	2.40	1.63	16.01	3.85
16	21.30	30.40	25.20	56.50	94.50	81.50	1.20	1.41	13.10	3.19
17	21.60	30.40	24.80	57.50	96.00	85.00	3.60	1.40	13.46	3.21
18	21.80	30.30	25.20	57.00	96.00	82.50	6.00	1.88	16.24	3.77
19	21.90	29.60	24.90	56.00	96.00	81.50	1.20	1.68	10.24	2.88
20	22.10	29.60	25.10	52.00	96.00	79.00	0.00	1.60	15.43	3.59
21	19.50	29.80	23.80	53.50	96.00	82.00	2.00	1.54	14.00	3.33
22	22.50	27.40	23.40	70.50	95.50	91.50	28.00	0.64	3.28	1.20
23	25.10	27.40	25.30	75.00	75.50	75.50	28.00	0.01	0.07	0.50
24										
25										
26										
27										
28										
29										
30										
31										
Decade 1	20.76	30.78	24.86	52.05	95.65	79.60	42.00	1.62	16.56	3.87
Decade 2	21.61	30.67	25.11	53.60	95.35	81.10	243.60	1.53	14.41	3.49
Decade 3	22.37	28.20	24.17	66.33	89.00	83.00	58.00	0.73	5.78	1.68
MONTH	21.34	30.40	24.88	54.59	94.65	80.70	343.60	1.47	14.22	3.42

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	19.30	28.40	23.10	47.50	96.50	77.50	0.00	1.70	16.47	3.66
2	18.70	28.60	22.50	45.00	95.00	77.50	0.00	1.63	18.08	3.87
3	18.20	28.90	22.30	48.50	93.00	77.50	0.00	1.75	15.64	3.63
4	17.90	28.50	22.90	60.50	96.00	82.50	1.20	1.41	12.79	2.86
5	21.80	28.80	24.50	58.00	94.00	84.50	10.80	1.18	9.47	2.47
6	21.70	28.20	24.30	70.50	96.50	89.50	13.20	1.05	10.74	2.37
7	22.20	28.80	24.40	63.50	96.50	91.00	314.40	1.05	9.22	2.28
8	21.30	28.20	23.80	69.00	96.00	90.00	192.00	1.26	6.61	1.90
9	21.80	28.50	24.00	72.50	96.50	92.50	123.60	1.13	8.36	2.05
10	22.40	27.20	24.40	78.00	96.50	91.00	55.20	1.31	6.12	1.66
11	20.70	27.80	23.50	70.00	97.50	90.50	20.40	1.15	7.38	1.91
12	20.90	28.10	23.90	67.50	97.50	86.50	61.00	1.40	11.52	2.58
13	21.00	27.60	23.20	59.50	96.00	87.00	68.60	1.56	9.07	2.46
14	18.40	28.70	23.00	58.50	96.50	84.00	1.20	1.59	14.97	3.22
15	20.60	28.90	24.00	58.00	96.50	84.00	4.80	1.50	16.33	3.42
16	20.60	28.90	23.70	60.00	96.50	85.00	1.20	1.59	16.01	3.38
17	19.80	29.10	23.60	46.00	96.00	81.50	1.20	1.46	13.78	3.30
18	20.50	28.50	23.60	60.50	95.50	83.00	1.20	1.67	17.67	3.57
19	19.50	29.10	23.30	59.50	96.50	83.50	0.00	1.47	15.72	3.30
20	20.00	29.10	23.60	55.00	97.50	83.50	18.00	1.40	16.45	3.43
21	20.90	27.20	23.10	55.00	95.50	81.50	14.40	1.99	10.39	2.86
22	19.60	27.10	22.90	55.00	95.50	80.00	36.00	1.78	12.23	2.96
23	21.20	23.70	22.10	80.00	96.00	93.50	38.40	0.57	2.23	0.91
24	21.80	28.20	23.70	45.50	96.50	84.00	7.20	1.32	11.29	2.89
25	19.20	27.70	22.80	61.00	97.50	84.00	1.20	1.49	13.66	2.93
26	19.50	28.30	22.80	49.50	96.50	80.50	1.20	1.61	15.83	3.48
27	18.40	28.20	22.40	58.00	96.50	85.50	19.20	1.41	11.40	2.71
28	20.00	28.10	23.90	59.50	96.50	83.50	28.80	1.37	13.51	2.94
29	22.00	29.30	24.60	61.00	96.00	84.50	20.40	1.42	15.11	3.26
30	21.10	29.10	24.20	61.00	96.50	87.00	24.00	1.35	12.96	2.92
31										
Decade 1	20.53	28.41	23.62	61.30	95.65	85.35	710.40	1.35	11.35	2.67
Decade 2	20.20	28.58	23.54	59.45	96.60	84.85	177.60	1.48	13.89	3.06
Decade 3	20.37	27.69	23.25	58.55	96.30	84.40	190.80	1.43	11.86	2.79
MONTH	20.37	28.23	23.47	59.77	96.18	84.87	1078.80	1.42	12.37	2.84

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.70	28.40	24.20	65.50	96.50	87.00	8.40	1.25	12.87	2.77
2	20.10	28.20	23.80	65.50	97.50	86.50	1.20	1.84	12.76	2.89
3	18.70	28.20	23.20	61.00	97.50	84.50	5.80	1.53	13.18	2.91
4	19.20	26.90	22.80	67.50	96.50	85.50	1.40	1.28	8.15	2.06
5	17.90	27.70	22.60	54.00	96.50	81.50	1.20	1.64	15.80	3.35
6	20.70	27.30	23.20	57.50	94.50	81.50	0.00	1.31	11.53	2.70
7	19.20	28.00	22.90	57.00	96.00	82.00	1.20	1.62	15.44	3.30
8	18.30	27.50	22.20	49.50	96.50	79.50	1.20	2.04	11.16	3.10
9	17.30	26.90	21.30	54.00	96.50	80.00	8.40	1.93	10.11	2.79
10	19.40	24.40	21.70	73.50	96.00	90.00	31.20	0.81	4.01	1.27
11	20.60	23.90	21.90	81.00	95.50	92.50	7.20	0.81	3.48	1.12
12	19.20	27.30	22.30	63.00	95.50	89.00	15.60	1.04	8.29	2.09
13	19.70	27.70	23.40	63.00	97.50	86.50	1.20	1.41	13.52	2.89
14	19.20	28.30	22.90	57.00	97.50	83.50	1.20	1.45	17.61	3.52
15	18.50	27.90	22.80	63.50	96.50	85.00	1.20	1.49	13.26	2.87
16	19.60	28.70	23.30	59.50	99.50	84.50	1.20	1.46	14.71	3.15
17	18.20	28.40	22.60	58.00	97.50	84.00	2.40	1.60	15.04	3.24
18	17.80	28.30	22.80	61.00	97.00	84.00	0.00	1.81	16.52	3.42
19	20.60	27.80	23.70	66.00	96.00	86.50	1.20	1.16	7.50	2.03
20	22.30	28.20	24.20	63.50	96.00	85.50	4.80	1.32	9.54	2.42
21	21.80	28.50	23.70	58.00	95.50	84.50	20.40	1.23	10.10	2.56
22	20.70	28.10	23.60	61.00	97.50	85.50	0.00	1.08	10.52	2.47
23	21.50	27.90	23.20	61.00	96.00	83.00	46.80	1.70	11.92	2.89
24	18.90	25.10	21.60	65.50	96.50	86.50	0.00	0.94	4.96	1.54
25	18.90	26.60	22.00	58.00	94.50	81.50	0.00	1.45	11.03	2.66
26	17.70	28.20	22.00	50.00	95.00	79.00	1.20	1.35	11.38	2.88
27	16.60	27.90	21.80	51.50	94.50	77.00	1.20	1.64	19.72	3.90
28	17.60	28.10	21.90	54.50	95.00	79.00	1.20	1.68	19.92	3.92
29	15.80	28.40	21.40	54.00	97.00	81.00	1.20	2.00	15.35	3.52
30	17.80	29.20	22.40	47.00	96.50	79.00	1.20	1.60	19.47	4.06
31	16.30	28.40	21.70	51.50	96.50	79.00	1.20	1.93	17.25	3.78
Decade 1	19.15	27.35	22.79	60.50	96.40	83.80	60.00	1.53	11.50	2.71
Decade 2	19.57	27.65	22.99	63.55	96.85	86.10	36.00	1.35	11.95	2.67
Decade 3	18.51	27.85	22.30	55.64	95.86	81.36	74.40	1.51	13.78	3.11
MONTH	19.06	27.63	22.68	59.76	96.35	83.68	170.40	1.46	12.45	2.84

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: August 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	17.00	28.30	22.00	54.00	96.50	79.50	1.20	1.64	17.73	3.68
2	19.10	28.00	27.50	56.50	94.50	60.50	0.00	0.82	7.05	2.00
3	20.70	28.50	23.60	61.00	97.50	85.50	0.00	1.08	10.52	2.51
4	21.80	28.50	23.50	58.00	95.50	84.50	6.00	1.32	9.57	2.56
5	20.60	27.80	23.70	66.00	96.00	86.50	1.20	1.27	7.50	2.09
6	17.70	28.20	22.00	50.00	95.00	79.00	1.20	1.35	11.38	2.91
7	16.60	27.90	21.80	51.50	94.50	77.00	1.20	1.64	19.92	3.98
8	18.90	25.10	21.60	65.50	96.50	86.50	0.00	0.94	4.96	1.56
9	18.90	26.60	22.00	58.00	94.50	81.50	0.00	1.45	11.03	2.70
10	17.60	28.10	21.90	54.50	95.00	79.00	1.20	1.68	19.92	3.98
11	15.80	28.40	21.40	54.00	97.00	81.00	1.20	2.00	15.24	3.56
12	17.80	29.20	22.40	47.00	96.50	79.00	1.20	1.61	19.46	4.13
13	19.40	28.70	23.30	59.50	99.50	84.50	1.20	1.49	13.26	3.05
14	19.40	26.50	21.80	68.50	93.50	88.00	12.00	1.26	5.04	1.71
15	17.80	28.70	22.60	52.50	97.50	81.00	0.00	1.59	17.00	3.69
16	20.60	28.80	23.70	54.00	94.50	78.50	0.00	1.59	14.22	3.41
17	20.60	28.40	23.70	50.00	94.00	74.50	0.00	1.72	16.46	3.80
18	18.20	28.00	22.10	43.50	94.50	73.50	1.20	2.07	15.24	3.90
19	17.20	28.50	22.20	49.00	95.00	74.50	0.00	1.57	15.38	3.57
20	19.70	26.60	22.80	71.50	94.00	85.50	57.60	1.12	6.44	1.81
21	21.00	27.20	23.30	65.50	97.50	87.50	10.80	1.61	10.48	2.59
22	19.40	28.90	23.70	54.50	97.50	83.00	8.40	1.83	16.05	3.70
23	22.50	28.00	24.50	55.00	96.00	81.50	13.20	1.78	10.92	3.01
24	21.50	27.20	23.30	60.00	96.00	84.50	9.60	1.19	9.57	2.45
25	21.50	27.70	23.90	69.50	94.50	86.50	6.00	1.37	9.90	2.45
26	21.50	29.90	24.70	58.50	97.50	85.50	6.00	1.70	13.90	3.40
27	22.90	30.90	25.90	57.00	96.00	80.50	3.60	1.86	20.83	4.59
28	22.10	29.60	24.90	60.50	97.00	85.50	45.60	1.66	15.79	3.61
29	22.20	29.70	25.20	58.50	97.50	83.50	8.40	1.52	17.56	3.86
30	22.40	29.30	25.10	58.50	96.50	84.50	10.80	1.49	17.29	3.81
31	21.30	28.40	24.40	68.50	96.50	86.50	1.20	1.38	11.30	2.68
Decade 1	18.89	27.70	22.96	57.50	95.55	79.95	12.00	1.32	11.96	2.80
Decade 2	18.65	28.18	22.60	54.95	95.60	80.00	74.40	1.60	13.77	3.26
Decade 3	21.66	28.80	24.45	60.55	96.59	84.45	123.60	1.58	13.96	3.29
MONTH	19.80	28.25	23.37	57.76	95.94	81.56	210.00	1.50	13.26	3.12

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.90	29.00	24.50	68.50	97.50	88.00	9.60	1.16	9.97	2.45
2	22.30	27.70	24.40	70.50	97.50	90.00	13.20	1.22	9.30	2.30
3	21.80	28.70	24.70	60.50	96.50	84.50	1.20	1.56	12.73	3.12
4	21.20	29.40	24.60	57.00	96.50	82.00	1.20	1.81	16.84	3.87
5	20.80	31.00	24.70	50.00	96.50	79.50	1.20	1.82	19.72	4.54
6	19.90	30.10	24.10	54.00	96.50	81.50	1.20	1.66	15.24	3.70
7	19.70	29.20	23.90	62.00	96.50	83.00	1.20	1.67	14.41	3.36
8	20.20	30.30	24.50	54.50	95.50	80.00	1.20	1.63	15.25	3.71
9	20.50	31.30	24.70	43.50	96.50	80.00	2.40	1.86	16.62	4.34
10	19.60	31.10	24.40	38.50	97.50	78.00	0.00	1.78	16.56	4.36
11	18.80	30.60	24.00	48.50	95.50	80.00	2.40	1.77	17.73	4.25
12	17.80	29.70	23.80	56.50	95.00	79.00	1.20	1.90	22.27	4.63
13	18.00	31.70	24.50	38.50	93.00	72.50	1.20	1.92	22.58	5.30
14	18.50	31.90	24.70	38.00	93.00	73.00	0.00	1.93	22.63	5.36
15	21.00	31.70	24.70	45.00	93.00	78.00	3.60	1.72	16.08	4.26
16	19.70	32.00	24.90	40.00	94.50	75.00	1.20	2.21	23.07	5.56
17	18.70	30.20	24.40	56.50	93.50	77.00	0.00	1.92	22.03	4.71
18	21.30	32.50	26.00	47.00	94.00	75.00	0.00	1.94	19.52	4.88
19	20.50	32.50	25.70	43.00	93.50	71.50	0.00	1.98	22.68	5.41
20	18.20	33.30	25.10	39.00	92.00	71.50	1.20	2.01	22.51	5.57
21	19.00	33.90	25.60	27.50	92.50	69.50	1.20	2.16	23.26	6.16
22	18.40	32.80	25.00	29.50	93.50	69.00	0.00	2.03	23.56	5.87
23	19.30	32.90	25.20	35.50	91.50	70.00	0.00	2.14	23.33	5.84
24	19.90	31.80	25.40	46.50	93.00	74.00	0.00	2.51	21.97	5.42
25	20.20	32.10	25.50	50.00	95.50	76.00	1.20	2.41	20.96	5.15
26	19.70	31.60	25.30	48.00	93.50	74.00	0.00	2.20	20.89	5.06
27	20.70	30.30	25.30	51.00	94.50	76.50	1.20	2.26	19.21	4.66
28	20.40	31.70	25.20	41.50	95.50	74.00	0.00	1.98	21.47	5.19
29	19.50	31.30	24.90	49.50	93.50	74.50	0.00	2.50	22.69	5.35
30	20.20	32.10	25.60	46.50	93.00	73.50	1.20	2.01	22.24	5.27
31										
Decade 1	20.69	29.78	24.45	55.90	96.70	82.65	32.40	1.62	14.66	3.57
Decade 2	19.25	31.61	24.78	45.20	93.70	75.25	10.80	1.93	21.11	4.99
Decade 3	19.73	32.05	25.30	42.55	93.60	73.10	4.80	2.22	21.96	5.40
MONTH	19.89	31.15	24.84	47.88	94.67	77.00	48.00	1.92	19.24	4.65

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.20	30.80	25.30	53.00	93.00	77.00	0.00	1.70	16.21	4.05
2	19.90	32.00	25.60	49.00	93.50	76.50	1.20	2.20	23.81	5.49
3	21.50	31.70	26.10	51.00	100.50	77.00	0.00	2.08	20.11	4.80
4	20.70	31.70	25.90	53.50	94.00	77.00	1.20	1.84	18.07	4.42
5	21.20	31.70	26.30	51.50	93.50	74.50	0.00	2.01	19.40	4.75
6	22.40	32.30	26.50	53.50	93.50	76.00	0.00	1.79	18.39	4.54
7	22.50	32.60	26.80	55.00	94.00	79.00	14.40	1.86	21.62	5.04
8	23.60	31.50	26.50	54.00	96.00	81.00	6.00	1.91	16.07	4.16
9	21.50	32.30	26.50	52.00	94.50	77.00	1.20	1.81	19.33	4.69
10	23.00	33.60	27.10	47.00	94.50	75.50	1.20	2.27	22.06	5.60
11	22.00	33.20	27.10	50.50	95.50	74.50	0.00	2.35	24.01	5.73
12	22.20	31.90	26.80	53.50	93.50	78.00	0.00	1.90	16.35	4.26
13	22.30	33.30	27.00	45.50	95.50	75.50	1.20	1.99	20.95	5.28
14	22.30	33.20	27.00	51.00	93.50	75.50	0.00	2.33	22.91	5.59
15	22.00	31.80	30.80	60.00	93.50	64.50	0.00	0.88	9.12	2.56
16	23.00	32.10	27.60	56.00	94.00	76.00	0.00	1.78	24.32	5.40
17	22.50	32.30	27.10	53.50	93.00	76.00	0.00	1.92	18.48	4.63
18	23.10	33.10	27.30	44.50	93.50	74.50	7.20	2.36	24.36	6.01
19	22.30	32.40	26.90	46.50	96.00	75.50	1.20	2.70	24.90	6.02
20	22.30	31.40	26.50	53.50	93.50	78.00	0.00	2.25	15.71	4.28
21	21.90	32.40	26.90	55.00	94.50	79.00	4.80	2.31	17.02	4.52
22	23.30	32.20	27.20	54.50	96.00	79.00	1.20	2.18	17.60	4.55
23	21.30	32.90	26.60	48.00	93.50	75.00	0.00	2.11	21.41	5.31
24	22.30	32.40	26.80	51.00	93.50	78.00	1.20	1.98	17.28	4.55
25	21.60	32.70	26.60	46.50	94.00	75.00	0.00	2.06	21.11	5.26
26	21.10	33.70	26.80	39.50	93.00	72.00	1.20	2.13	25.34	6.18
27	20.80	34.40	26.90	21.50	93.00	67.50	0.00	1.92	21.04	5.96
28	20.30	34.40	26.90	20.50	89.50	63.50	0.00	2.26	24.59	6.77
29	21.00	32.30	26.50	41.50	91.00	69.50	0.00	2.52	23.43	5.93
30	22.90	31.90	26.20	53.00	93.50	80.00	99.60	1.32	11.62	3.29
31	22.50	33.00	27.30	44.00	95.50	77.50	1.20	1.81	19.91	5.04
Decade 1	21.75	32.02	26.26	51.95	94.70	77.05	25.20	1.95	19.51	4.75
Decade 2	22.40	32.47	27.41	51.45	94.15	74.80	9.60	2.05	20.11	4.98
Decade 3	21.73	32.94	26.79	43.18	93.36	74.18	109.20	2.05	20.03	5.22
MONTH	21.95	32.49	26.82	48.68	94.05	75.31	144.00	2.02	19.89	4.99

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.30	32.70	27.40	55.50	94.00	77.00	0.00	2.21	24.65	5.64
2	23.20	33.90	27.60	39.00	94.00	73.50	1.20	2.42	26.67	6.62
3	22.10	33.30	27.20	47.50	93.50	76.00	0.00	1.98	17.89	4.81
4	22.40	32.50	27.40	51.00	93.00	73.50	0.00	1.92	26.19	5.86
5	20.20	33.50	26.80	38.00	90.00	69.00	0.00	2.28	26.32	6.43
6	22.30	33.00	27.60	50.00	93.00	72.00	0.00	1.94	23.75	5.58
7	22.90	33.80	27.80	49.00	91.50	73.50	0.00	1.50	18.51	4.69
8	23.80	33.90	28.30	48.50	91.50	73.00	0.00	1.78	22.20	5.45
9	23.20	33.60	28.30	49.00	91.50	73.00	0.00	2.12	25.51	6.06
10	22.40	33.60	27.60	45.50	91.50	71.50	0.00	2.42	19.72	5.44
11	22.50	33.60	27.70	44.50	90.50	72.50	0.00	2.26	21.96	5.71
12	23.00	32.70	27.80	53.50	91.50	75.00	0.00	1.98	17.62	4.61
13	23.60	33.50	28.10	50.00	92.50	73.50	0.00	1.98	21.02	5.28
14	22.40	34.50	28.10	43.50	91.50	71.00	0.00	2.40	25.32	6.39
15	23.00	33.40	28.10	49.00	92.50	72.00	0.00	2.19	20.19	5.26
16	23.30	32.80	27.00	52.50	94.00	79.50	28.80	1.63	13.39	3.80
17	23.30	34.10	28.00	49.00	96.00	76.50	0.00	1.68	19.17	4.88
18	23.40	34.80	27.40	45.50	94.50	78.00	133.20	1.61	17.88	4.80
19	22.90	33.70	27.80	54.00	94.50	78.00	0.00	2.14	23.61	5.62
20	22.40	34.10	28.00	43.50	92.50	73.00	1.20	2.06	25.50	6.17
21	23.30	34.10	28.50	48.00	93.00	73.50	0.00	1.86	23.99	5.77
22	24.10	35.10	28.90	46.00	91.00	72.00	0.00	1.55	20.39	5.21
23	24.20	35.40	28.40	47.00	91.00	73.50	0.00	1.57	17.99	4.87
24	24.40	36.70	29.10	43.50	90.50	71.50	0.00	1.60	20.42	5.47
25	24.60	34.80	27.60	51.50	94.00	80.00	117.60	1.40	13.21	3.83
26	24.30	34.10	26.40	51.50	94.50	85.50	92.40	1.38	13.78	3.85
27	23.70	33.00	26.20	56.00	96.50	88.50	102.00	1.04	11.54	3.11
28	24.20	31.90	26.00	61.00	96.00	88.50	28.80	1.13	10.98	2.94
29	23.70	33.40	25.70	54.00	96.00	89.00	178.80	1.09	12.73	3.39
30	23.50	31.00	25.50	64.00	96.00	89.00	122.40	1.48	12.15	3.16
31										
Decade 1	22.48	33.38	27.60	47.30	92.35	73.20	1.20	2.06	23.14	5.66
Decade 2	22.98	33.72	27.80	48.50	93.00	74.90	163.20	1.99	20.57	5.25
Decade 3	24.00	33.95	27.23	52.25	93.85	81.10	642.00	1.41	15.72	4.16
MONTH	23.15	33.68	27.54	49.35	93.07	76.40	806.40	1.82	19.81	5.02

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2008  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.90	31.80	26.30	60.50	94.50	84.50	8.40	1.60	14.24	3.67
2	23.00	33.40	25.60	52.00	94.50	86.00	103.20	1.70	16.14	4.31
3	23.30	30.70	25.00	66.50	95.50	90.50	73.20	1.19	6.83	2.16
4	23.00	32.30	26.80	58.50	96.50	84.00	1.20	1.48	20.32	4.62
5	23.70	32.40	27.00	59.00	95.50	83.50	4.80	1.50	18.64	4.39
6	23.80	32.80	26.30	58.50	94.50	86.50	175.20	1.52	16.69	4.13
7	23.60	32.80	25.70	53.00	95.50	86.50	112.80	1.22	11.19	3.21
8	23.10	34.90	27.90	46.00	93.50	75.00	0.00	1.45	22.23	5.37
9	23.50	34.60	27.70	50.50	93.50	79.00	1.20	1.35	21.24	5.07
10	23.50	32.30	26.50	62.00	94.50	86.00	2.40	1.30	16.06	3.84
11	23.40	34.00	31.90	51.50	95.50	61.50	1.20	1.19	20.35	4.83
12	23.50	34.00	27.50	51.00	94.00	78.00	100.00	1.60	15.25	4.20
13	23.70	32.00	26.00	58.00	95.00	85.00	0.00	1.46	22.25	4.91
14	23.00	33.00	26.00	58.00	95.00	84.00	1.20	1.18	20.30	4.55
15	23.30	30.60	25.00	66.00	96.00	90.00	73.00	1.18	6.80	2.15
16	24.00	33.00	26.50	52.00	94.00	80.00	0.00	1.46	22.20	5.11
17	24.50	35.00	27.50	54.20	95.00	75.00	0.00	1.30	22.30	5.20
18	22.50	32.20	26.50	52.30	93.00	80.00	1.00	1.50	20.30	4.74
19	23.30	31.50	26.20	60.00	95.50	85.00	2.30	1.35	6.55	2.34
20	23.00	32.00	27.20	56.00	93.50	86.20	0.00	1.40	22.30	4.95
21	24.60	32.90	28.60	54.00	83.00	69.00	0.00	3.91	21.83	6.22
22	24.00	33.10	26.70	52.00	94.50	80.50	69.60	1.48	12.85	3.67
23	22.90	32.60	26.00	54.50	96.00	84.50	178.80	1.48	19.50	4.57
24	23.30	32.70	26.70	53.50	95.50	81.00	0.00	1.85	22.36	5.22
25	24.30	31.40	26.70	64.50	94.50	85.00	4.80	1.25	13.77	3.38
26	23.00	33.60	25.70	53.50	96.50	86.50	282.00	1.69	15.59	4.18
27	22.80	29.20	25.00	74.50	96.50	91.00	2.40	1.30	6.99	2.00
28	23.60	32.40	27.10	53.50	93.50	78.00	0.00	1.49	17.83	4.38
29	23.80	32.70	27.00	56.00	93.50	80.00	18.00	1.46	19.61	4.62
30	23.50	32.20	26.80	53.50	94.00	80.50	168.00	1.34	20.28	4.67
31	23.30	31.90	26.00	60.00	96.00	85.50	205.20	1.20	13.41	3.37
Decade 1	23.44	32.80	26.48	56.65	94.80	84.15	482.40	1.43	16.36	4.08
Decade 2	23.42	32.73	27.03	55.90	94.65	80.47	178.70	1.36	17.86	4.30
Decade 3	23.55	32.25	26.57	57.23	93.95	81.95	928.80	1.68	16.73	4.21
MONTH	23.47	32.58	26.69	56.61	94.45	82.18	1589.90	1.50	16.97	4.19

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.40	32.60	26.10	56.00	96.50	86.50	48.00	1.42	17.60	4.23
2	23.70	31.00	25.10	61.00	96.50	90.50	37.20	1.08	7.96	2.39
3	23.10	33.80	25.80	51.50	96.00	86.00	145.20	1.61	15.96	4.27
4	23.60	33.50	27.50	53.50	96.00	79.50	0.00	2.01	20.16	5.04
5	24.00	33.20	26.60	57.50	94.50	85.50	55.20	1.34	15.31	3.89
6	23.50	33.40	27.30	55.50	96.00	82.50	1.20	1.30	16.43	4.08
7	24.10	31.70	27.00	63.00	96.00	85.50	1.20	1.46	15.18	3.71
8	24.10	33.80	27.40	51.00	95.00	80.50	7.20	1.55	21.11	5.08
9	24.50	33.30	27.00	55.00	96.00	81.00	294.00	2.16	20.04	5.04
10	22.80	33.00	25.60	55.00	96.50	88.00	202.80	1.20	13.34	3.50
11	23.10	32.90	26.20	54.50	96.50	85.50	14.40	2.36	20.35	5.09
12	23.70	33.70	27.70	51.50	96.00	79.00	0.00	1.62	23.75	5.49
13	24.40	32.70	26.60	55.50	95.00	85.00	73.20	1.45	16.39	4.11
14	22.70	33.00	26.70	55.00	96.50	84.50	91.20	1.54	18.51	4.47
15	24.00	33.30	27.60	55.50	96.50	80.50	2.40	1.39	21.26	4.90
16	23.60	33.00	26.80	56.50	96.00	83.50	22.80	1.67	18.23	4.48
17	24.10	33.00	27.00	49.00	94.50	81.00	24.00	1.15	15.19	3.90
18	23.60	32.60	27.90	56.00	92.50	73.00	0.00	3.56	22.30	5.77
19	26.50	33.00	28.50	53.00	94.50	73.00	39.60	4.20	23.14	6.30
20	22.40	33.80	26.40	52.00	96.50	86.00	325.20	1.75	19.03	4.78
21	22.50	33.40	27.40	55.50	97.50	82.50	0.00	1.89	23.78	5.44
22	24.60	31.20	26.10	66.50	95.00	89.00	126.00	1.25	12.31	3.10
23	23.20	31.60	26.40	59.00	96.00	84.50	1.20	1.45	14.62	3.67
24	24.00	32.20	26.50	57.50	96.00	84.50	393.60	1.60	18.26	4.38
25	22.50	32.90	25.40	58.50	96.50	88.00	34.80	1.56	17.17	4.18
26	22.60	33.10	26.90	53.00	96.50	81.50	0.00	1.37	21.85	4.96
27	22.70	33.80	26.50	53.50	94.00	82.50	0.60	1.79	18.33	4.70
28	23.10	33.30	26.70	55.50	94.50	83.00	0.60	2.04	17.40	4.57
29	23.40	33.20	26.00	56.50	95.50	87.50	308.40	1.75	14.12	3.90
30	23.30	33.10	27.50	57.50	95.00	80.00	25.20	2.55	12.37	3.94
31	24.40	32.90	27.00	49.00	97.00	82.50	0.00	1.23	16.51	4.13
Decade 1	23.68	32.93	26.54	55.90	95.90	84.55	792.00	1.51	16.31	4.12
Decade 2	23.81	33.10	27.14	53.85	95.45	81.10	592.80	2.07	19.82	4.93
Decade 3	23.30	32.79	26.58	56.55	95.77	84.14	890.40	1.68	16.97	4.27
MONTH	23.59	32.94	26.75	55.47	95.71	83.29	2275.20	1.75	17.68	4.43

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.80	32.90	26.20	51.50	95.50	84.00	21.60	1.49	18.44	4.51
2	22.80	33.10	25.70	55.50	94.50	86.00	10.80	1.53	15.17	3.97
3	23.80	32.50	26.40	53.50	95.50	83.50	86.40	1.60	15.24	4.02
4	24.50	32.00	27.60	61.50	93.50	76.50	62.40	2.31	15.77	4.19
5	25.20	31.50	27.40	62.00	94.00	76.50	133.20	3.51	15.98	4.50
6	26.50	32.90	28.40	54.50	84.00	69.50	2.40	4.22	21.59	6.36
7	26.10	32.30	28.50	56.50	90.50	67.50	0.00	4.17	16.75	5.26
8	25.40	31.00	28.20	62.50	77.00	69.50	0.00	3.19	10.70	4.05
9	23.60	33.20	26.00	50.50	95.50	84.00	104.40	1.33	14.82	3.92
10	22.80	32.70	26.20	56.50	96.00	85.00	69.60	1.38	15.12	3.83
11	23.20	31.80	27.00	61.00	96.00	79.50	0.00	2.64	16.33	4.30
12	24.60	32.40	28.30	57.00	86.50	72.00	0.00	3.61	22.33	5.91
13	24.50	32.80	27.40	57.00	94.50	77.00	16.80	3.26	16.96	4.90
14	22.60	32.10	25.80	58.00	95.50	86.50	6.00	1.27	13.91	3.52
15	23.90	30.30	26.20	66.50	94.50	85.00	3.60	1.17	12.64	3.09
16	23.90	31.40	26.50	58.50	93.50	80.50	0.00	1.52	12.92	3.47
17	23.10	30.90	25.20	61.50	96.50	87.00	350.40	1.18	9.21	2.62
18	23.00	30.50	25.50	57.50	97.50	87.00	2.40	1.01	10.09	2.71
19	23.00	31.70	25.40	54.50	96.50	88.50	76.80	1.35	13.83	3.58
20	22.70	30.90	25.60	60.50	96.50	87.50	43.20	1.28	13.94	3.41
21	23.50	30.70	25.90	64.50	96.50	87.00	134.40	1.40	16.38	3.77
22	22.90	31.80	26.30	58.50	97.50	85.00	0.00	1.41	18.65	4.28
23	23.20	32.30	27.00	54.00	96.50	81.50	1.20	1.48	22.85	5.10
24	23.10	32.20	26.50	60.00	96.00	85.50	2.40	1.47	17.81	4.19
25	22.60	33.90	26.50	50.00	96.00	83.00	99.60	1.66	19.65	4.88
26	22.90	33.50	26.80	50.50	96.00	82.00	1.20	1.39	17.06	4.30
27	23.50	32.90	27.60	56.00	96.00	79.00	1.20	2.72	19.65	5.08
28	25.10	33.70	27.20	53.00	94.50	78.50	25.20	2.50	17.23	4.90
29										
30										
31										
Decade 1	24.35	32.41	27.06	56.45	91.60	78.20	490.80	2.47	15.96	4.46
Decade 2	23.45	31.48	26.29	59.20	94.75	83.05	499.20	1.83	14.22	3.75
Decade 3	23.35	32.63	26.73	55.81	96.13	82.69	265.20	1.75	18.66	4.56
MONTH	23.74	32.14	26.69	57.25	94.02	81.21	1255.20	2.04	16.11	4.24

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.90	30.80	25.30	66.50	96.00	89.50	142.80	1.40	12.99	3.19
2	23.10	31.40	25.70	62.00	97.00	88.00	435.60	1.39	15.55	3.69
3	22.80	30.60	25.70	64.00	97.50	89.50	51.60	1.45	14.12	3.40
4	23.10	31.30	25.80	63.00	96.50	88.00	8.40	1.42	15.03	3.60
5	23.30	34.10	26.20	53.50	96.50	86.50	121.20	1.31	17.89	4.37
6	24.00	32.40	27.00	59.00	97.00	84.00	0.00	1.27	17.97	4.18
7	22.60	32.90	26.40	57.00	96.00	83.50	43.20	1.60	18.27	4.40
8	22.70	33.50	26.80	53.50	96.50	83.00	0.00	1.41	19.91	4.68
9	23.10	32.30	27.20	55.50	96.50	82.00	0.00	1.59	24.15	5.29
10	22.90	32.00	27.10	54.00	95.50	81.00	0.00	1.57	22.98	5.11
11	22.20	32.20	26.70	53.50	96.00	81.00	0.00	1.77	23.08	5.19
12	22.00	32.60	26.70	54.50	96.00	81.50	0.00	1.72	24.14	5.34
13	22.40	32.40	26.70	57.00	96.50	82.50	0.00	1.61	20.77	4.73
14	22.50	33.20	26.70	57.00	96.50	81.00	0.00	1.62	20.52	4.76
15	22.90	30.30	25.10	62.50	95.50	87.00	0.00	1.26	8.35	2.47
16	21.70	33.50	26.30	52.00	96.50	83.00	1.20	1.39	19.60	4.60
17	22.60	34.00	26.10	53.50	96.50	84.00	0.00	1.42	17.30	4.30
18	23.70	33.80	27.40	52.00	94.50	80.00	1.20	1.67	22.62	5.30
19	23.20	33.20	27.10	52.00	96.50	80.50	1.20	1.78	23.51	5.39
20	20.90	33.40	26.10	32.00	96.50	74.50	1.20	1.96	24.77	6.03
21	21.00	32.70	25.60	45.50	95.50	77.00	1.20	1.84	17.92	4.65
22	20.80	33.50	26.20	40.00	96.00	74.50	0.00	1.89	24.13	5.73
23	20.70	34.80	26.50	42.00	96.00	77.00	1.20	1.84	23.15	5.67
24	22.50	33.60	27.20	53.00	96.00	79.00	1.20	1.76	23.21	5.32
25	21.00	34.30	26.90	49.50	94.50	77.00	14.40	1.83	20.83	5.13
26	21.70	33.50	26.50	40.00	96.00	77.00	0.00	1.79	21.32	5.29
27	22.80	29.20	25.30	66.50	94.00	85.00	1.20	1.41	9.47	2.58
28	22.00	27.70	24.10	69.50	94.00	88.00	22.80	1.48	6.58	2.05
29	21.50	30.70	23.50	59.00	96.50	91.00	183.60	1.30	7.93	2.48
30	22.40	31.30	25.10	58.50	97.50	88.00	13.20	1.30	14.17	3.44
31	22.70	31.20	26.00	61.00	96.50	85.00	12.00	1.48	17.13	3.92
Decade 1	23.05	32.13	26.32	58.80	96.50	85.50	802.80	1.44	17.89	4.19
Decade 2	22.41	32.86	26.49	52.60	96.10	81.50	4.80	1.62	20.47	4.81
Decade 3	21.74	32.05	25.72	53.14	95.68	81.68	250.80	1.63	16.89	4.21
MONTH	22.38	32.34	26.16	54.79	96.08	82.85	1058.40	1.57	18.37	4.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)

**Agro-Meteorological section contact: Raimundo Mau (raibatumanu@yahoo.com)**



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.90	31.00	26.00	63.00	97.00	88.00	37.20	1.10	12.10	2.98
2	22.40	31.70	26.50	48.50	96.50	80.50	1.20	1.77	21.70	4.97
3	21.30	30.30	25.50	64.50	97.50	84.50	1.20	1.88	17.00	3.84
4	22.40	31.40	26.10	50.50	97.50	80.50	1.20	1.92	20.32	4.74
5	21.70	32.50	26.00	41.50	97.50	79.50	2.40	1.92	23.12	5.42
6	21.40	32.20	25.80	50.50	97.50	81.00	1.20	1.90	22.73	5.12
7	21.50	32.20	26.10	48.00	97.50	80.50	0.00	1.90	21.04	4.94
8	22.70	32.40	26.60	51.00	96.00	80.00	1.20	1.82	20.82	4.87
9	22.10	33.30	26.70	54.00	96.50	80.00	1.20	1.76	22.50	5.09
10	22.80	33.70	27.20	51.00	96.00	80.00	1.20	1.79	21.59	5.09
11	24.20	32.80	27.30	61.50	96.00	83.50	135.60	1.74	15.81	3.93
12	23.80	32.50	27.50	55.00	97.00	82.50	0.00	1.85	22.05	5.00
13	23.40	32.30	27.10	57.50	97.50	84.50	14.40	1.77	19.46	4.50
14	23.60	32.60	27.20	57.00	97.50	84.50	3.60	1.72	20.07	4.61
15	23.40	32.00	27.20	60.00	97.00	85.00	2.40	1.38	15.57	3.70
16	22.70	32.90	27.10	56.00	96.50	82.50	0.00	1.66	20.99	4.74
17	25.00	33.60	28.00	53.00	96.50	81.50	68.40	1.53	19.31	4.61
18	25.10	33.10	28.00	59.00	96.50	83.00	0.00	1.56	18.51	4.36
19	23.00	25.70	24.50	90.00	96.50	94.50	44.40	1.23	2.18	0.90
20	22.60	30.90	25.50	60.50	96.50	87.00	1.20	1.42	12.72	3.18
21	22.20	31.90	25.80	57.00	97.50	84.00	4.80	1.77	18.23	4.23
22	20.40	30.40	29.10	62.00	98.00	63.00	1.20	0.88	5.79	4.11
23	22.20	31.80	25.90	57.50	96.50	83.50	2.40	1.59	16.11	3.84
24	21.30	33.00	26.00	52.50	97.50	79.50	1.20	1.77	19.60	4.58
25	20.60	33.70	25.90	47.00	94.50	79.00	1.20	1.84	20.01	4.88
26	20.80	32.10	25.60	52.00	95.50	80.50	1.20	1.85	19.86	4.58
27	20.50	31.80	25.40	54.50	96.50	81.50	1.20	2.11	19.43	4.52
28	21.40	31.50	25.40	61.00	97.50	85.00	6.00	1.70	14.32	3.49
29	22.10	31.30	25.80	53.00	97.50	81.00	1.20	1.74	19.17	4.34
30	20.90	31.60	25.50	50.50	96.50	80.00	1.20	1.96	19.17	4.49
31										
Decade 1	22.22	32.07	26.25	52.25	96.95	81.45	48.00	1.78	20.29	4.71
Decade 2	23.68	31.84	26.94	60.95	96.75	84.85	270.00	1.59	16.67	3.95
Decade 3	21.24	31.91	26.04	54.70	96.75	79.70	21.60	1.72	17.17	4.31
MONTH	22.38	31.94	26.41	55.97	96.82	82.00	339.60	1.69	18.04	4.32

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.90	32.20	25.60	51.00	96.50	80.00	1.20	1.78	17.87	4.28
2	22.40	31.70	25.70	55.50	96.00	84.50	105.40	1.76	14.01	3.63
3	23.30	28.80	24.70	72.50	97.50	92.50	87.80	1.13	10.04	2.36
4	23.30	24.60	23.80	94.00	97.50	96.00	368.80	1.17	1.79	0.75
5	23.00	29.00	24.40	68.00	100.50	94.00	270.80	0.90	7.79	1.99
6	23.00	28.20	25.00	69.00	98.00	89.50	4.80	1.49	10.34	2.51
7	22.70	25.90	23.70	87.50	98.00	95.50	818.00	1.59	5.30	1.38
8	21.70	29.20	24.60	64.00	98.00	88.00	22.00	1.74	14.87	3.32
9	23.00	27.20	24.20	77.00	98.00	93.50	109.20	1.17	7.67	1.88
10	21.10	28.50	24.30	70.50	98.50	90.00	39.60	1.37	11.23	2.55
11	22.40	28.90	24.70	68.00	98.00	88.50	33.60	1.20	13.76	2.95
12	21.70	29.80	24.50	64.50	97.50	88.50	19.20	1.18	10.01	2.50
13	23.00	28.80	24.70	63.00	97.50	88.50	0.00	1.00	6.58	1.93
14	22.30	29.30	24.80	59.50	98.00	82.50	1.20	1.77	15.91	3.56
15	20.50	30.60	24.80	58.00	98.00	84.50	0.00	1.72	15.13	3.53
16	23.90	30.80	26.60	64.50	96.00	85.00	7.20	1.68	17.77	3.87
17	23.00	30.60	26.10	62.50	98.00	86.00	1.20	1.71	18.04	3.89
18	23.00	30.50	26.20	67.00	96.50	85.50	31.00	1.56	17.89	3.76
19	23.30	30.60	25.90	63.50	98.00	87.00	47.00	1.40	17.63	3.72
20	22.80	30.50	25.80	62.50	98.00	87.00	1.20	1.48	18.11	3.81
21	22.30	30.30	25.90	58.50	97.50	82.50	0.00	2.09	16.79	3.87
22	21.80	30.10	25.00	61.50	96.00	85.50	6.00	1.53	10.06	2.70
23	23.00	30.70	25.80	55.00	96.00	82.00	0.00	1.40	16.98	3.76
24	22.60	30.00	25.20	63.00	96.00	85.50	4.80	1.54	13.23	3.11
25	22.00	30.20	25.10	54.50	97.50	82.00	1.20	1.72	18.08	3.96
26	20.50	29.20	24.20	56.50	98.00	83.00	1.20	2.09	16.97	3.78
27	20.40	29.60	24.30	54.00	98.00	82.50	2.40	1.78	15.69	3.59
28	18.20	29.70	23.60	62.00	97.00	84.00	1.20	2.05	16.77	3.62
29	19.60	30.30	24.30	55.50	97.50	83.00	0.00	1.91	17.53	3.88
30	21.30	30.50	25.40	62.50	97.50	84.50	7.20	1.74	16.30	3.57
31	22.10	30.80	25.50	57.50	97.50	84.00	8.40	1.91	17.81	3.97
Decade 1	22.44	28.53	24.60	70.90	97.85	90.35	1827.60	1.41	10.09	2.47
Decade 2	22.59	30.04	25.41	63.30	97.55	86.30	141.60	1.47	15.08	3.35
Decade 3	21.25	30.13	24.94	58.23	97.14	83.50	32.40	1.80	16.02	3.62
MONTH	22.07	29.58	24.98	63.95	97.50	86.61	2001.60	1.57	13.80	3.16

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.80	30.60	25.40	59.00	98.50	84.50	10.80	1.71	17.72	3.82
2	22.20	29.60	25.30	62.50	98.00	86.50	1.20	1.42	14.19	3.14
3	21.80	30.20	25.10	61.00	98.00	85.00	1.20	1.85	16.44	3.63
4	19.70	30.00	24.50	56.00	98.50	84.50	2.40	1.69	15.82	3.53
5	19.40	30.10	24.00	59.00	97.50	84.50	1.20	1.70	16.04	3.51
6	19.50	30.60	24.10	54.50	98.00	83.00	2.40	1.78	17.00	3.79
7	19.30	30.10	23.70	51.50	98.00	83.00	1.20	1.78	15.91	3.67
8	19.20	30.30	24.00	54.00	98.00	81.50	1.20	2.03	17.96	3.97
9	20.00	30.40	24.30	56.50	98.00	83.00	44.40	1.96	16.26	3.71
10	21.50	29.60	24.10	62.00	97.50	87.50	10.80	1.76	12.72	3.04
11	19.50	29.40	23.30	50.50	98.50	81.00	2.40	1.88	18.47	3.96
12	17.10	28.90	22.30	51.00	97.00	80.50	1.20	1.94	17.23	3.76
13	17.70	29.20	22.30	48.00	96.50	78.50	1.20	2.00	17.35	3.92
14	16.20	29.50	22.00	46.00	96.50	79.00	1.20	2.05	19.37	4.20
15	17.60	29.40	26.50	56.50	96.50	69.50	0.00	1.66	18.37	3.76
16	17.60	28.90	23.70	60.00	96.50	85.00	1.20	1.59	16.01	3.33
17	19.80	29.10	23.60	46.00	96.00	81.50	1.20	1.46	13.78	3.30
18	20.50	28.50	23.60	60.50	95.50	83.00	1.20	1.67	17.67	3.58
19	19.50	29.10	23.30	59.50	96.50	83.50	0.00	1.47	15.72	3.30
20	19.00	29.10	23.60	55.00	97.50	83.50	18.00	1.40	16.45	3.41
21	20.90	27.20	23.10	55.00	95.50	81.50	14.40	1.99	10.39	2.86
22	19.60	27.10	22.90	55.00	95.50	80.00	36.00	1.78	12.23	2.96
23	21.20	23.70	22.10	80.00	96.00	93.50	38.40	0.57	2.23	0.91
24	21.80	28.20	23.70	45.50	96.50	84.00	7.20	1.32	11.29	2.89
25	19.20	27.70	22.80	61.00	97.50	84.00	1.20	1.49	13.66	2.93
26	19.50	28.30	22.80	49.50	96.50	80.50	1.20	1.61	15.83	3.48
27	18.40	28.20	22.40	58.00	96.50	85.50	19.20	1.41	11.40	2.71
28	20.00	28.10	23.90	59.50	96.50	83.50	28.80	1.37	13.51	2.94
29	22.00	29.30	24.60	61.00	96.00	84.50	20.40	1.42	15.11	3.26
30	21.10	29.10	24.20	61.00	96.50	87.00	24.00	1.35	12.96	2.92
31										
Decade 1	20.44	30.15	24.45	57.60	98.00	84.30	76.80	1.77	16.01	3.58
Decade 2	18.45	29.11	23.42	53.30	96.70	80.50	27.60	1.71	17.04	3.65
Decade 3	20.37	27.69	23.25	58.55	96.30	84.40	190.80	1.43	11.86	2.79
MONTH	19.75	28.98	23.71	56.48	97.00	83.07	295.20	1.64	14.97	3.34

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: September 2009

AUTOMATIC WEATHER STATION (Enerco 420): Viqueque

Altitude: 71 Meter

Latitude: -8.56351

Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16	32.80	38.40	31.10	63.50	12.50	4.50	398.20	467.42	30.48	28.99
17	21.10	29.10	24.60	63.00	101.00	88.00	1.20	0.00	15.96	3.09
18	19.00	29.40	23.80	62.50	100.50	87.00	22.80	0.00	14.51	2.80
19	21.70	28.50	24.50	62.50	100.00	88.00	1.20	0.00	10.71	2.23
20	20.40	27.60	23.50	71.00	100.50	93.50	31.20	0.00	6.29	1.49
21	22.90	28.70	24.80	65.00	99.00	90.50	49.20	0.00	9.48	2.05
22	22.90	28.60	25.00	67.50	101.00	91.50	96.00	0.00	8.78	1.94
23	23.50	28.50	25.00	76.50	100.00	95.00	265.20	0.00	10.11	2.18
24	23.60	29.50	26.00	65.50	98.50	85.50	48.00	0.00	15.49	3.13
25	20.30	28.60	23.90	66.50	100.50	89.00	1.20	0.00	14.45	2.83
26	20.40	27.30	23.70	75.00	100.50	91.50	12.00	0.00	6.58	1.54
27	22.40	26.20	23.80	95.50	101.00	99.00	334.80	0.00	3.81	1.06
28	22.50	24.40	23.40	99.50	101.50	100.00	943.20	0.00	3.20	0.95
29	22.70	24.80	23.70	101.00	102.00	100.00	377.40	3.68	5.88	0.95
30	23.00	25.30	24.20	89.00	102.50	99.00	324.60	3.87	3.57	1.09
31										
Decade 1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
Decade 2	23.00	30.60	25.50	64.50	82.90	72.20	454.60	93.48	15.59	7.72
Decade 3	22.42	27.19	24.35	80.10	100.65	94.10	2451.60	0.75	8.14	1.77
MONTH	22.61	28.33	24.73	74.90	94.73	86.80	2906.20	31.66	10.62	3.76

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.20	27.20	25.40	80.50	98.00	91.00	21.60	4.94	7.22	2.20
2	24.30	27.40	25.50	80.50	99.00	92.00	16.80	2.30	4.58	1.57
3	24.00	27.10	25.00	85.50	101.00	97.50	97.20	2.08	5.33	1.48
4	23.60	28.20	25.40	76.50	101.00	95.00	4.80	1.42	7.69	2.01
5	22.50	28.60	24.80	76.00	101.50	94.50	63.60	2.99	12.21	2.85
6	24.00	28.80	25.40	73.00	101.00	94.50	93.60	2.75	10.04	2.66
7	23.00	28.10	25.00	78.50	100.00	94.50	58.80	3.04	10.47	2.55
8	23.50	29.20	25.20	68.50	101.00	92.50	10.80	2.35	12.98	3.18
9	23.20	28.20	25.20	72.00	101.00	91.50	3.60	2.62	10.17	2.66
10	21.10	29.20	24.20	67.50	101.50	91.00	1.20	2.65	12.27	3.14
11	23.10	29.20	25.20	58.50	101.50	90.50	37.20	3.14	15.30	3.98
12	22.00	28.70	24.60	65.50	101.00	89.00	21.60	3.17	14.88	3.63
13	21.90	28.50	24.50	67.00	100.00	88.50	30.40	4.12	13.95	3.60
14	21.40	28.20	24.20	70.50	100.50	91.50	99.20	2.52	9.89	2.66
15	23.40	28.10	25.00	69.00	97.50	86.50	10.80	0.37	10.11	2.29
16	22.10	26.80	24.10	78.00	100.50	93.50	18.00	0.19	5.79	1.46
17	22.80	27.20	24.40	79.00	101.00	94.50	9.60	0.06	7.07	1.66
18	20.00	28.40	23.80	66.50	101.50	91.00	2.40	0.00	13.53	2.70
19	21.10	27.60	23.90	68.00	101.00	89.50	1.20	0.01	8.87	1.95
20	21.10	26.60	23.30	69.50	101.00	89.50	1.20	0.00	7.43	1.69
21	20.90	27.40	23.30	64.00	99.50	90.50	42.00	0.00	6.96	1.61
22	22.20	26.90	23.60	81.00	101.00	97.00	315.60	0.00	6.69	1.57
23	23.20	29.00	25.60	70.00	99.50	90.50	252.00	0.00	10.45	2.27
24	23.90	28.80	25.40	75.50	100.00	93.00	73.20	0.00	10.94	2.37
25	23.60	28.30	25.60	75.00	100.00	91.00	36.00	0.00	11.64	2.49
26	23.70	29.90	25.90	63.50	101.00	89.00	4.80	0.00	15.50	3.17
27	23.60	28.90	25.50	72.00	101.00	91.50	1.20	0.00	12.35	2.62
28	22.80	29.10	25.20	66.50	101.50	89.50	1.20	0.00	16.90	3.38
29	22.70	28.50	24.90	74.00	101.00	92.50	70.80	0.00	8.74	1.96
30	23.40	28.20	25.20	77.00	101.50	93.50	178.80	0.00	10.43	2.27
31	23.00	25.00	23.90	97.50	103.00	99.50	762.00	0.00	2.05	0.75
Decade 1	23.34	28.20	25.11	75.85	100.50	93.40	372.00	2.72	9.30	2.43
Decade 2	21.89	27.93	24.30	69.15	100.55	90.40	231.60	1.36	10.68	2.56
Decade 3	23.00	28.18	24.92	74.18	100.82	92.50	1737.60	0.00	10.24	2.22
MONTH	22.75	28.11	24.78	73.10	100.63	92.11	2341.20	1.31	10.08	2.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.90	32.60	26.80	52.00	91.50	73.00	0.00	7.63	22.97	7.08
2	21.10	33.60	26.70	49.00	89.00	72.00	0.00	7.35	24.04	7.73
3	20.90	33.70	27.00	44.00	90.50	71.00	0.00	7.75	25.26	8.31
4	20.90	32.70	26.90	43.00	93.00	72.00	0.00	7.33	24.55	7.83
5	21.70	32.90	27.30	50.00	89.50	70.50	0.00	6.81	22.98	7.19
6	22.60	32.90	27.40	47.00	91.00	73.00	0.00	6.63	19.59	6.96
7	22.70	33.30	27.40	49.00	94.00	75.00	0.00	6.39	19.34	6.70
8	22.50	32.90	28.00	47.00	91.50	73.50	0.00	7.31	23.05	7.47
9	23.10	33.30	27.50	54.00	91.00	76.00	0.00	6.91	16.77	6.31
10	23.50	34.30	28.70	48.50	91.50	74.50	0.00	7.88	21.62	7.71
11	23.10	32.40	27.90	51.50	91.50	75.00	0.00	7.79	20.79	6.91
12	22.60	33.70	27.60	50.50	91.00	73.50	0.00	6.78	23.62	7.37
13	22.20	34.70	27.80	37.00	89.50	71.50	0.00	6.86	24.15	8.79
14	20.30	34.50	27.20	43.00	87.00	67.00	0.00	7.29	25.80	8.63
15	20.30	35.60	27.70	29.00	90.50	68.50	0.00	6.89	25.36	9.76
16	21.70	35.50	28.20	28.50	83.00	62.00	0.00	6.30	21.82	9.35
17	22.80	35.40	28.20	38.50	87.50	69.00	0.00	5.93	19.75	8.05
18	22.70	35.60	29.00	41.50	87.00	71.50	0.00	4.94	20.48	7.44
19	23.60	33.70	28.60	44.50	86.50	69.50	0.00	5.61	18.41	6.95
20	23.30	34.70	28.30	45.00	86.00	67.50	0.00	5.09	20.33	7.18
21	22.60	34.70	28.10	38.50	88.50	70.50	0.00	6.70	24.29	8.65
22	22.70	33.80	28.40	48.50	86.00	68.50	0.00	7.13	24.77	7.93
23	23.10	31.90	27.60	50.50	95.50	78.00	164.40	5.98	18.81	6.06
24	23.20	33.70	26.90	44.50	94.00	79.50	66.00	4.92	17.83	6.43
25	22.50	32.50	26.20	51.50	98.00	85.00	32.40	7.08	20.10	6.48
26	22.80	34.20	27.90	49.00	93.00	77.00	0.00	6.27	20.43	7.01
27	24.00	35.20	29.10	43.50	93.00	75.00	0.00	5.91	26.00	8.15
28	24.30	34.70	29.40	47.00	93.00	73.50	0.00	4.20	26.24	7.24
29										
30										
31										
Decade 1	21.99	33.22	27.37	48.35	91.25	73.05	0.00	7.20	22.02	7.33
Decade 2	22.26	34.58	28.05	40.90	87.95	69.50	0.00	6.35	22.05	8.04
Decade 3	23.15	33.84	27.95	46.63	92.63	75.88	262.80	6.03	22.31	7.25
MONTH	22.42	33.88	27.78	45.20	90.46	72.59	262.80	6.56	22.11	7.56

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2009  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	25.00	34.70	29.60	50.00	93.00	73.50	0.00	3.21	24.69	6.54
2	24.40	35.20	29.10	44.50	87.00	72.50	73.20	5.17	25.12	7.92
3	23.50	34.90	26.70	45.50	95.50	80.50	0.00	5.60	20.59	7.21
4	23.90	33.80	28.90	47.50	94.00	75.50	51.60	4.84	25.14	7.09
5	22.50	34.70	26.30	42.00	93.50	78.00	0.00	5.87	19.58	7.49
6	23.30	34.30	27.90	46.00	93.50	76.00	0.00	5.16	22.37	7.08
7	24.00	33.90	28.60	51.00	93.50	76.00	1.20	5.29	21.76	6.65
8	23.70	35.10	28.90	40.50	90.00	72.50	0.00	4.79	24.41	7.76
9	24.60	36.70	29.70	38.00	91.00	71.50	0.00	4.13	23.65	7.78
10	24.30	36.40	28.50	46.00	93.00	73.50	3.60	4.11	19.97	6.78
11	24.80	37.00	28.80	40.50	91.50	73.00	3.60	4.55	23.22	7.94
12	24.30	36.60	27.80	38.50	94.50	78.50	1.20	3.46	15.18	6.21
13	24.60	27.80	26.70	40.00	94.00	84.50	21.60	2.92	9.05	3.73
14	23.00	33.20	25.90	54.00	93.00	83.50	0.00	3.34	9.35	4.12
15	23.90	35.90	28.50	45.00	91.50	72.50	120.00	3.70	21.09	6.70
16	24.10	31.80	26.50	52.00	96.00	83.00	4.80	5.76	9.63	4.87
17	25.10	34.50	28.50	50.00	87.50	71.50	241.20	5.51	16.07	6.46
18	23.90	34.00	27.00	52.00	96.00	81.50	1.80	5.67	14.32	5.79
19	24.50	33.20	27.50	52.50	96.00	82.50	177.00	4.57	15.82	5.41
20	24.40	33.30	26.70	54.50	96.50	86.50	369.60	3.89	14.73	4.95
21	23.00	33.70	25.90	52.50	98.00	87.50	6.00	4.75	16.43	5.61
22	23.20	33.00	26.70	55.00	93.50	80.00	0.00	4.99	16.35	5.52
23	24.10	33.70	27.80	52.50	92.50	75.50	0.00	5.30	20.38	6.42
24	24.80	31.70	27.40	60.00	94.50	84.50	1.20	3.82	10.82	3.96
25	24.20	33.90	27.80	46.50	95.50	80.50	1.20	3.98	20.94	6.30
26	24.50	35.40	28.60	45.50	93.00	75.00	0.00	4.04	22.99	6.98
27	23.20	33.50	33.10	54.00	97.00	55.00	216.00	4.33	18.91	5.51
28										
29										
30										
31										
Decade 1	23.92	34.97	28.42	45.10	92.40	74.95	129.60	4.82	22.73	7.23
Decade 2	24.26	33.73	27.39	47.90	93.65	79.70	940.80	4.34	14.85	5.62
Decade 3	23.86	33.56	28.19	52.29	94.86	76.86	224.40	4.46	18.12	5.76
MONTH	24.03	34.14	27.98	48.00	93.50	77.20	1294.80	4.55	18.61	6.25

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	20.90	32.60	26.80	52.00	91.50	73.00	0.00	7.63	22.97	7.09
2	21.10	33.60	26.70	49.00	89.00	72.00	0.00	7.35	24.04	7.74
3	20.90	33.70	27.00	44.00	90.50	71.00	0.00	7.75	25.26	8.32
4	20.90	32.70	26.90	43.00	93.00	72.00	0.00	7.33	24.55	7.83
5	21.70	32.90	27.30	50.00	89.50	70.50	0.00	6.81	22.98	7.20
6	22.60	32.90	27.40	47.00	91.00	73.00	0.00	6.63	19.59	6.97
7	22.70	33.30	27.40	49.00	94.00	75.00	0.00	6.39	19.34	6.70
8	22.50	32.90	28.00	47.00	91.50	73.50	0.00	7.31	23.05	7.48
9	23.10	33.30	27.50	54.00	91.00	76.00	0.00	6.91	16.77	6.31
10	23.50	34.30	28.70	48.50	91.50	74.50	0.00	7.88	21.62	7.71
11	23.10	32.40	27.90	51.50	91.50	75.00	0.00	7.79	20.79	6.91
12	22.60	33.70	27.60	50.50	91.00	73.50	0.00	6.78	23.62	7.38
13	22.20	34.70	27.80	37.00	89.50	71.50	0.00	6.86	24.15	8.80
14	20.30	34.50	27.20	43.00	87.00	67.00	0.00	7.29	25.80	8.64
15	20.30	35.60	27.70	29.00	90.50	68.50	0.00	6.89	25.36	9.77
16	21.70	35.50	28.20	28.50	83.00	62.00	0.00	6.30	21.82	9.36
17	22.80	35.40	28.20	38.50	87.50	69.00	0.00	5.93	19.75	8.05
18	22.70	35.60	29.00	41.50	87.00	71.50	0.00	4.94	20.48	7.44
19	23.60	33.70	28.60	44.50	86.50	69.50	0.00	5.61	18.41	6.95
20	23.30	34.70	28.30	45.00	86.00	67.50	0.00	5.09	20.33	7.18
21	22.60	34.70	28.10	38.50	88.50	70.50	0.00	6.70	24.29	8.65
22	22.70	33.80	28.40	48.50	86.00	68.50	0.00	7.13	24.77	7.93
23	23.10	31.90	27.60	50.50	95.50	78.00	164.40	5.98	18.81	6.06
24	23.20	33.70	26.90	44.50	94.00	79.50	66.00	4.92	17.83	6.43
25	22.50	32.50	26.20	51.50	98.00	85.00	32.40	7.08	20.10	6.48
26	22.80	34.20	27.90	49.00	93.00	77.00	0.00	6.27	20.43	7.00
27	24.00	35.20	29.10	43.50	93.00	75.00	0.00	5.91	26.00	8.15
28	24.30	34.70	29.40	47.00	93.00	73.50	0.00	4.20	26.24	7.24
29										
30										
31										
Decade 1	21.99	33.22	27.37	48.35	91.25	73.05	0.00	7.20	22.02	7.34
Decade 2	22.26	34.58	28.05	40.90	87.95	69.50	0.00	6.35	22.05	8.05
Decade 3	23.15	33.84	27.95	46.63	92.63	75.88	262.80	6.03	22.31	7.24
MONTH	22.42	33.88	27.78	45.20	90.46	72.59	262.80	6.56	22.11	7.56

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	25.00	34.70	29.60	50.00	93.00	73.50	0.00	3.21	24.69	6.53
2	24.40	35.20	29.10	44.50	87.00	72.50	73.20	5.17	25.12	7.91
3	23.50	34.90	26.70	45.50	95.50	80.50	0.00	5.60	20.59	7.21
4	23.90	33.80	28.90	47.50	94.00	75.50	51.60	4.84	25.14	7.08
5	22.50	34.70	26.30	42.00	93.50	78.00	0.00	5.87	19.58	7.48
6	23.30	34.30	27.90	46.00	93.50	76.00	0.00	5.16	22.37	7.07
7	24.00	33.90	28.60	51.00	93.50	76.00	1.20	5.29	21.76	6.64
8	23.70	35.10	28.90	40.50	90.00	72.50	0.00	4.79	24.41	7.74
9	24.60	36.70	29.70	38.00	91.00	71.50	0.00	4.13	23.65	7.76
10	24.30	36.40	28.50	46.00	93.00	73.50	3.60	4.11	19.97	6.76
11	24.80	37.00	28.80	40.50	91.50	73.00	3.60	4.55	23.22	7.92
12	24.30	36.60	27.80	38.50	94.50	78.50	1.20	3.46	15.18	6.19
13	24.60	27.80	26.70	40.00	94.00	84.50	21.60	2.92	9.05	3.72
14	23.00	33.20	25.90	54.00	93.00	83.50	0.00	3.34	9.35	4.11
15	23.90	35.90	28.50	45.00	91.50	72.50	120.00	3.70	21.09	6.68
16	24.10	31.80	26.50	52.00	96.00	83.00	4.80	5.76	9.63	4.86
17	25.10	34.50	28.50	50.00	87.50	71.50	241.20	5.51	16.07	6.44
18	23.90	34.00	27.00	52.00	96.00	81.50	1.80	5.67	14.32	5.77
19	24.50	33.20	27.50	52.50	96.00	82.50	177.00	4.57	15.82	5.39
20	24.40	33.30	26.70	54.50	96.50	86.50	369.60	3.89	14.73	4.92
21	23.00	33.70	25.90	52.50	98.00	87.50	6.00	4.75	16.43	5.58
22	23.20	33.00	26.70	55.00	93.50	80.00	0.00	4.99	16.35	5.49
23	24.10	33.70	27.80	52.50	92.50	75.50	0.00	5.30	20.38	6.38
24	24.80	31.70	27.40	60.00	94.50	84.50	1.20	3.82	10.82	3.93
25	24.20	33.90	27.80	46.50	95.50	80.50	1.20	3.98	20.94	6.25
26	24.50	35.40	28.60	45.50	93.00	75.00	0.00	4.04	22.99	6.92
27	23.20	33.50	33.10	54.00	97.00	55.00	216.00	4.33	18.91	5.45
28	24.30	34.10	28.30	53.50	94.50	81.00	12.00	4.46	19.89	6.20
29	24.70	33.70	27.60	55.00	97.00	84.00	1.20	4.71	18.43	5.60
30										
31										
Decade 1	23.92	34.97	28.42	45.10	92.40	74.95	129.60	4.82	22.73	7.22
Decade 2	24.26	33.73	27.39	47.90	93.65	79.70	940.80	4.34	14.85	5.60
Decade 3	24.00	33.63	28.13	52.72	95.06	78.11	237.60	4.49	18.35	5.76
MONTH	24.06	34.13	27.98	48.43	93.66	77.57	1308.00	4.55	18.65	6.21

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: Abril 2010

Altitude: 71 Meter

Latitude: -8.56351

Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.40	34.40	28.60	46.00	93.50	78.50	0.00	4.16	21.21	6.49
2	24.70	33.80	28.40	52.00	97.00	81.50	21.60	4.42	18.64	5.74
3	24.60	34.40	28.20	55.00	93.50	78.00	0.00	4.58	18.22	5.79
4	26.20	29.60	28.00	47.50	97.00	74.00	274.80	5.50	12.75	4.90
5	23.40	32.10	27.70	61.50	90.50	73.00	0.00	8.29	15.24	5.58
6	27.00	35.70	29.50	47.50	77.00	68.50	24.00	7.86	18.46	8.62
7	23.40	34.70	26.80	49.00	93.50	82.00	4.80	4.13	19.13	6.14
8	23.80	32.30	26.30	56.00	95.50	85.00	0.00	4.17	11.53	4.39
9	25.00	33.70	28.70	52.00	91.00	73.50	0.00	6.00	21.66	6.78
10	23.60	33.60	27.20	51.00	94.00	79.00	203.20	5.01	19.75	6.19
11	23.40	33.50	26.70	48.50	100.00	89.50	30.80	5.34	23.94	6.72
12	23.00	34.00	27.60	48.50	98.00	79.00	133.20	3.70	24.90	6.43
13	22.80	34.00	26.60	52.00	96.50	83.00	1.20	4.61	17.67	5.73
14	24.80	32.60	28.40	56.00	89.50	73.00	145.20	5.93	18.61	5.98
15	23.50	32.10	25.80	60.50	98.50	89.50	58.80	4.88	16.92	4.87
16	23.90	30.90	25.60	64.00	98.50	91.00	7.20	3.61	10.49	3.44
17	24.50	32.30	26.80	59.00	91.50	81.50	9.60	4.61	14.59	4.86
18	24.00	31.30	26.40	58.00	95.00	85.00	0.00	3.69	11.96	4.05
19	24.30	31.80	27.40	57.50	94.00	74.50	1.20	8.36	15.80	5.76
20	24.40	31.00	27.40	56.50	93.50	75.50	49.20	10.06	18.91	6.27
21	26.00	32.60	28.10	60.00	80.50	71.00	0.00	9.21	19.02	7.01
22	26.60	33.80	28.70	57.00	77.00	70.50	22.80	7.01	19.08	7.14
23	23.60	32.70	26.90	53.50	98.00	86.00	40.80	3.47	18.49	5.08
24	22.70	32.00	25.50	60.50	98.50	90.00	123.60	4.57	14.63	4.48
25	22.50	33.00	25.60	54.50	99.00	89.00	1.20	4.27	20.73	5.58
26	23.10	32.90	27.30	48.00	97.50	79.00	1.20	4.68	25.35	6.59
27	23.90	33.20	27.80	55.50	95.50	80.00	0.00	3.54	22.25	5.62
28	23.50	33.20	27.60	48.50	94.00	78.00	9.60	3.45	21.62	5.81
29	22.80	33.80	27.10	55.50	96.50	83.00	148.80	4.51	21.23	5.83
30	23.50	32.50	26.20	58.00	98.50	88.00	4.80	3.78	16.79	4.71
31										
Decade 1	24.61	33.43	27.94	51.75	92.25	77.30	528.40	5.41	17.66	6.06
Decade 2	23.86	32.35	26.87	56.05	95.50	82.15	436.40	5.48	17.38	5.41
Decade 3	23.82	32.97	27.08	55.10	93.50	81.45	352.80	4.85	19.92	5.79
MONTH	24.10	32.92	27.30	54.30	93.75	80.30	1317.60	5.25	18.32	5.75

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.60	33.70	27.70	56.50	93.50	79.00	9.60	3.60	16.15	4.90
2	24.20	34.60	27.40	54.50	98.00	84.50	38.40	2.82	18.36	5.01
3	23.40	33.50	27.10	55.00	96.00	82.00	10.80	3.87	17.16	5.11
4	23.90	33.80	27.40	53.50	96.50	81.00	12.00	3.61	17.26	5.13
5	24.40	33.00	27.00	55.50	97.00	84.50	14.40	3.80	14.21	4.60
6	22.80	32.20	26.90	57.50	96.50	82.00	0.00	3.51	21.39	5.20
7	23.60	33.10	27.80	54.00	97.50	81.00	1.20	3.01	25.26	5.86
8	23.00	33.00	26.70	55.50	98.00	83.50	8.40	3.58	24.61	5.80
9	23.00	33.00	27.10	56.50	97.50	82.50	0.00	2.93	22.29	5.26
10	23.00	34.40	27.10	52.00	96.50	81.00	4.80	3.56	21.27	5.75
11	23.00	33.80	27.30	52.50	98.50	84.00	43.20	2.69	22.14	5.36
12	22.70	34.30	26.90	50.50	98.00	85.00	72.00	3.02	22.97	5.75
13	23.10	33.90	26.70	54.50	98.50	86.00	0.00	3.04	18.16	4.92
14	24.10	34.70	28.20	52.00	95.50	80.50	1.20	2.92	22.86	5.76
15	23.70	35.30	27.50	52.50	94.50	81.50	0.00	2.62	19.95	5.31
16	24.80	34.40	28.40	51.50	94.50	80.00	0.00	2.27	18.40	4.85
17	23.90	33.90	27.30	53.50	97.00	83.00	3.60	2.43	15.96	4.42
18	23.50	34.60	27.20	51.50	95.50	82.00	134.40	2.33	16.63	4.62
19	23.40	33.30	26.40	54.50	98.50	87.50	0.00	2.69	19.90	4.92
20	24.40	33.80	27.80	56.00	101.00	83.50	0.00	1.88	18.19	4.36
21	23.50	34.20	28.20	53.50	98.00	83.00	1.20	1.79	21.66	4.93
22	24.60	34.60	28.40	53.50	98.00	81.50	0.00	1.78	19.91	4.74
23	23.70	34.50	27.70	54.00	97.00	80.50	4.80	1.74	15.46	4.03
24	23.80	34.30	26.80	52.00	97.50	85.00	14.40	1.71	16.57	4.21
25	23.70	35.10	28.00	46.50	96.50	80.00	1.20	1.86	20.68	5.06
26	23.60	34.80	27.90	53.00	96.00	80.50	1.20	3.31	23.14	5.87
27	27.60	34.30	29.50	54.00	76.50	69.50	0.00	3.26	15.77	5.35
28	28.20	32.60	29.50	60.00	75.50	69.00	0.00	4.04	14.29	5.13
29	28.00	35.40	30.40	52.50	74.00	66.00	0.00	3.82	21.75	6.71
30	27.30	36.00	30.00	48.00	93.00	68.00	39.60	2.53	17.42	5.19
31	23.30	31.70	31.30	61.00	96.00	62.00	1.20	1.02	4.56	1.73
Decade 1	23.49	33.43	27.22	55.05	96.70	82.10	99.60	3.43	19.80	5.26
Decade 2	23.66	34.20	27.37	52.90	97.15	83.30	254.40	2.59	19.52	5.03
Decade 3	25.21	34.32	28.88	53.45	90.73	75.00	63.60	2.44	17.38	4.81
MONTH	24.15	33.99	27.86	53.79	94.73	79.97	417.60	2.81	18.85	5.03

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: October 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.20	27.20	25.40	80.50	98.00	91.00	21.60	4.94	7.22	2.20
2	24.30	27.40	25.50	80.50	99.00	92.00	16.80	2.30	4.58	1.57
3	24.00	27.10	25.00	85.50	101.00	97.50	97.20	2.08	5.33	1.48
4	23.60	28.20	25.40	76.50	101.00	95.00	4.80	1.42	7.69	2.01
5	22.50	28.60	24.80	76.00	101.50	94.50	63.60	2.99	12.21	2.85
6	24.00	28.80	25.40	73.00	101.00	94.50	93.60	2.75	10.04	2.66
7	23.00	28.10	25.00	78.50	100.00	94.50	58.80	3.04	10.47	2.55
8	23.50	29.20	25.20	68.50	101.00	92.50	10.80	2.35	12.98	3.18
9	23.20	28.20	25.20	72.00	101.00	91.50	3.60	2.62	10.17	2.66
10	21.10	29.20	24.20	67.50	101.50	91.00	1.20	2.65	12.27	3.14
11	23.10	29.20	25.20	58.50	101.50	90.50	37.20	3.14	15.30	3.98
12	22.00	28.70	24.60	65.50	101.00	89.00	21.60	3.17	14.88	3.63
13	21.90	28.50	24.50	67.00	100.00	88.50	30.40	4.12	13.95	3.60
14	21.40	28.20	24.20	70.50	100.50	91.50	99.20	2.52	9.89	2.66
15	23.40	28.10	25.00	69.00	97.50	86.50	10.80	0.37	10.11	2.29
16	22.10	26.80	24.10	78.00	100.50	93.50	18.00	0.19	5.79	1.46
17	22.80	27.20	24.40	79.00	101.00	94.50	9.60	0.06	7.07	1.66
18	20.00	28.40	23.80	66.50	101.50	91.00	2.40	0.00	13.53	2.70
19	21.10	27.60	23.90	68.00	101.00	89.50	1.20	0.01	8.87	1.95
20	21.10	26.60	23.30	69.50	101.00	89.50	1.20	0.00	7.43	1.69
21	20.90	27.40	23.30	64.00	99.50	90.50	42.00	0.00	6.96	1.61
22	22.20	26.90	23.60	81.00	101.00	97.00	315.60	0.00	6.69	1.57
23	23.20	29.00	25.60	70.00	99.50	90.50	252.00	0.00	10.45	2.27
24	23.90	28.80	25.40	75.50	100.00	93.00	73.20	0.00	10.94	2.37
25	23.60	28.30	25.60	75.00	100.00	91.00	36.00	0.00	11.64	2.49
26	23.70	29.90	25.90	63.50	101.00	89.00	4.80	0.00	15.50	3.17
27	23.60	28.90	25.50	72.00	101.00	91.50	1.20	0.00	12.35	2.62
28	22.80	29.10	25.20	66.50	101.50	89.50	1.20	0.00	16.90	3.38
29	22.70	28.50	24.90	74.00	101.00	92.50	70.80	0.00	8.74	1.96
30	23.40	28.20	25.20	77.00	101.50	93.50	178.80	0.00	10.43	2.27
31	23.00	25.00	23.90	97.50	103.00	99.50	762.00	0.00	2.05	0.75
Decade 1	23.34	28.20	25.11	75.85	100.50	93.40	372.00	2.72	9.30	2.43
Decade 2	21.89	27.93	24.30	69.15	100.55	90.40	231.60	1.36	10.68	2.56
Decade 3	23.00	28.18	24.92	74.18	100.82	92.50	1737.60	0.00	10.24	2.22
MONTH	22.75	28.11	24.78	73.10	100.63	92.11	2341.20	1.31	10.08	2.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: November 2010

AUTOMATIC WEATHER STATION (Enerco 420): Viqueque

Altitude: 71 Meter

Latitude: -8.56351

Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	22.60	31.90	26.20	60.00	101.50	88.50	2.40	0.00	19.43	3.87
2	22.20	30.60	24.90	64.00	101.00	94.50	115.20	0.00	12.73	2.64
3	23.00	29.30	25.10	73.00	101.50	95.00	51.60	0.00	12.40	2.61
4	23.20	28.50	24.50	74.50	101.00	95.50	15.60	0.00	8.37	1.88
5	22.70	31.80	25.80	63.00	100.50	89.50	10.80	0.00	20.34	4.03
6	22.30	32.20	26.10	58.00	101.50	88.00	1.20	0.00	20.13	3.98
7	22.00	32.70	26.60	49.00	101.00	84.00	0.00	0.00	23.46	4.50
8	21.80	33.00	26.70	54.00	101.50	82.00	1.20	0.00	25.48	4.91
9	21.80	33.30	26.80	45.50	101.50	82.00	1.20	0.00	26.09	4.93
10	22.30	32.80	26.80	48.00	101.50	82.50	1.20	0.00	25.44	4.86
11	22.40	32.40	27.00	57.50	101.50	85.00	0.00	0.00	23.47	4.62
12	22.50	35.80	27.30	46.50	101.00	81.50	0.00	0.00	24.55	4.79
13	22.50	33.60	27.50	55.00	99.00	82.00	1.20	0.00	25.04	4.92
14	23.10	34.10	27.50	49.00	101.50	81.00	0.00	0.00	25.71	5.01
15	21.80	33.30	27.00	52.00	101.00	82.00	1.20	0.00	24.80	4.80
16	22.60	34.10	27.20	55.00	101.50	83.50	1.20	0.00	22.01	4.39
17	23.30	34.40	28.10	53.50	101.00	83.50	0.00	0.00	22.85	4.60
18	23.40	34.40	27.90	53.00	101.50	83.50	1.20	0.00	23.85	4.77
19	23.00	34.50	27.60	52.50	102.50	82.50	0.00	0.00	23.01	4.59
20	22.50	34.50	27.10	51.00	120.50	83.50	1.20	0.00	20.65	4.19
21	23.00	35.00	27.90	52.00	99.50	81.00	0.00	0.00	23.43	4.67
22	23.40	34.10	27.10	57.00	101.00	85.50	56.40	0.00	18.74	3.83
23	22.60	33.90	27.60	54.00	101.50	83.50	0.00	0.00	24.82	4.90
24	22.80	34.80	28.10	50.50	101.00	82.00	1.20	0.00	23.81	4.73
25	23.40	34.20	28.50	56.50	101.00	82.50	0.00	0.00	24.39	4.93
26	24.10	34.90	28.30	54.00	100.00	83.50	1.20	0.00	20.31	4.17
27	22.10	36.30	27.60	46.50	101.00	81.50	21.60	0.00	23.67	4.65
28	23.20	36.30	26.70	49.00	101.50	87.50	54.00	0.00	17.60	3.58
29	22.40	33.80	27.20	54.00	101.50	84.50	0.00	0.00	18.91	3.82
30	22.80	34.90	26.90	51.50	101.00	87.50	14.40	0.00	20.32	4.06
31										
Decade 1	22.39	31.61	25.95	58.90	101.25	88.15	200.40	0.00	19.39	3.82
Decade 2	22.71	34.11	27.42	52.50	103.10	82.80	6.00	0.00	23.59	4.67
Decade 3	22.98	34.82	27.59	52.50	100.90	83.90	148.80	0.00	21.60	4.33
MONTH	22.69	33.51	26.99	54.63	101.75	84.95	355.20	0.00	21.53	4.27

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: December 2010  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.20	35.30	26.80	49.50	101.50	88.50	1.20	0.00	15.65	3.23
2	23.90	32.00	26.90	63.00	101.50	89.00	1.20	0.00	13.50	2.88
3	23.40	34.90	28.00	51.00	99.50	80.50	0.00	0.00	23.65	4.71
4	23.00	34.90	27.30	49.00	101.00	84.50	21.60	0.00	21.42	4.26
5	22.90	35.50	27.10	48.50	100.50	86.50	127.20	0.00	17.32	3.52
6	22.90	35.00	28.30	52.50	101.00	83.00	1.20	0.00	24.51	4.90
7	23.30	36.00	28.50	51.00	100.00	80.00	3.60	0.00	23.96	4.83
8	23.90	34.70	28.00	54.00	101.00	84.00	1.20	0.00	18.03	3.74
9	23.20	34.10	27.20	57.00	101.00	86.00	10.80	0.00	18.83	3.84
10	23.30	35.50	27.60	49.00	101.50	81.00	3.60	0.00	18.14	3.71
11	24.20	36.20	29.50	46.00	98.50	72.00	0.00	0.00	23.48	4.75
12	23.90	34.70	27.30	53.00	98.50	81.50	1.20	0.00	15.46	3.23
13	23.70	33.90	27.50	52.00	100.00	83.00	0.00	0.00	13.48	2.87
14	23.80	31.40	25.80	69.00	101.00	93.50	58.80	0.00	10.12	2.24
15	23.40	30.10	26.10	64.00	101.50	88.00	28.80	0.00	7.97	1.85
16	23.90	33.90	26.30	46.00	101.50	89.50	81.60	0.00	17.55	3.51
17	23.10	35.30	28.30	50.00	99.50	76.50	0.00	0.00	21.83	4.39
18	24.50	35.60	27.60	51.50	99.00	80.00	46.80	0.00	16.44	3.43
19	23.10	32.50	27.00	62.50	101.00	84.00	1.20	0.00	13.13	2.81
20	24.40	35.00	26.80	50.00	99.00	83.50	29.40	0.00	18.58	3.76
21	23.60	29.80	29.30	68.00	101.50	71.00	23.40	0.00	5.11	1.40
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
Decade 1	23.30	34.79	27.57	52.45	100.85	84.30	171.60	0.00	19.50	3.96
Decade 2	23.80	33.86	27.22	54.40	99.95	83.15	247.80	0.00	15.80	3.28
Decade 3	23.60	29.80	29.30	68.00	101.50	71.00	23.40	0.00	5.11	1.40
MONTH	23.55	34.11	27.49	54.12	100.45	83.12	442.80	0.00	17.06	3.52

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: January 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.50	33.60	26.00	55.00	100.00	85.00	2.30	0.00	16.50	3.36
2	22.30	33.10	25.30	61.20	98.50	65.00	5.20	0.00	17.00	3.42
3	24.20	32.50	24.30	54.30	102.00	89.00	10.20	0.00	18.50	3.62
4	23.60	33.50	26.30	54.50	102.00	89.00	4.80	0.00	19.39	3.89
5	22.60	33.00	26.10	60.00	103.00	91.50	30.00	0.00	17.41	3.54
6	22.70	34.30	26.60	56.00	102.50	90.00	16.80	0.00	19.18	3.87
7	24.00	33.20	26.60	57.00	102.50	87.00	8.40	0.00	11.04	2.74
8	25.60	32.00	28.10	58.50	89.50	73.50	0.00	0.00	18.43	3.79
9	25.40	34.00	28.90	53.00	80.50	68.00	0.00	0.00	20.81	4.20
10	25.90	33.90	28.90	53.50	77.50	69.50	0.00	0.00	18.17	3.73
11	27.40	32.50	29.10	61.00	78.00	71.00	0.00	0.00	15.67	3.33
12	27.30	33.90	28.90	54.00	89.00	72.00	0.00	0.00	13.53	2.95
13	24.10	33.00	27.50	58.00	98.00	80.50	0.00	0.00	14.04	2.99
14	23.50	30.90	26.50	67.50	98.00	87.00	0.00	0.00	12.21	2.63
15	22.80	34.50	26.70	50.50	101.50	85.00	6.00	0.00	16.25	3.33
16	23.00	33.70	25.70	49.00	101.50	90.00	24.00	0.00	14.77	3.01
17	23.10	32.30	26.00	51.50	102.50	87.50	27.60	0.00	12.66	2.66
18	22.70	34.20	26.50	45.50	103.00	87.50	12.00	0.00	19.24	3.80
19	23.60	34.50	26.80	51.50	103.00	87.00	9.60	0.00	14.70	3.08
20	25.30	33.70	28.90	54.00	85.00	70.50	0.00	0.00	23.31	4.68
21	25.10	33.90	27.90	56.00	100.50	79.00	33.60	0.00	15.12	3.22
22	21.30	34.20	25.70	51.50	104.00	90.50	225.60	0.00	16.65	3.34
23	22.70	33.10	25.10	68.50	104.00	97.50	28.80	0.00	13.45	2.83
24	22.30	34.60	25.90	52.00	103.50	90.00	142.80	0.00	17.77	3.57
25	23.40	29.00	26.50	67.50	93.50	77.50	0.00	0.00	10.96	2.39
26	25.20	34.30	27.70	49.50	99.00	73.50	0.80	0.00	20.56	4.17
27	23.00	34.00	27.40	50.50	101.50	83.50	4.00	0.00	21.39	4.26
28	23.40	32.00	25.90	66.50	103.50	93.00	130.80	0.00	11.85	2.56
29	23.30	32.50	26.10	58.00	104.00	87.50	3.60	0.00	19.10	3.84
30	23.30	32.30	26.90	61.50	103.00	87.00	2.40	0.00	19.56	3.98
31	23.40	32.60	26.80	62.50	103.00	89.00	8.40	0.00	19.02	3.89
Decade 1	23.98	33.31	26.71	56.30	95.80	80.75	77.70	0.00	17.64	3.62
Decade 2	24.28	33.32	27.26	54.25	95.95	81.80	79.20	0.00	15.64	3.25
Decade 3	23.31	32.95	26.54	58.55	101.77	86.18	580.80	0.00	16.86	3.46
MONTH	23.84	33.19	26.83	56.44	97.97	83.02	737.70	0.00	16.72	3.44

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: February 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.10	32.80	26.20	58.00	103.50	90.50	16.80	0.00	14.84	3.08
2	23.10	32.00	25.40	60.00	103.50	92.50	6.00	0.00	12.16	2.58
3	23.40	32.10	26.70	60.50	103.50	87.00	0.00	0.00	15.11	3.16
4	22.60	34.10	26.90	52.50	103.50	85.50	0.00	0.00	18.54	3.75
5	23.10	34.30	26.40	53.50	103.50	90.50	72.00	0.00	15.43	3.19
6	23.50	32.30	26.50	63.00	103.00	85.00	0.00	0.00	17.49	3.60
7	24.30	30.90	26.80	66.00	97.00	84.00	7.20	0.00	14.34	3.03
8	23.70	29.40	25.60	68.00	101.50	91.50	12.00	0.00	7.71	2.97
9	23.50	28.90	25.60	68.00	103.50	93.00	1.20	0.00	10.50	2.29
10	22.80	33.10	26.80	53.00	102.50	84.50	262.80	0.00	21.19	4.20
11	23.20	32.50	27.00	58.00	104.00	87.00	4.80	0.00	23.39	4.65
12	22.00	33.40	25.80	51.00	103.50	90.00	62.40	0.00	17.54	3.49
13	22.70	31.80	25.70	63.00	103.50	92.00	115.20	0.00	15.58	3.20
14	21.90	33.30	26.70	56.50	104.00	85.00	0.00	0.00	19.86	3.98
15	23.00	31.90	26.60	63.00	103.00	86.50	0.00	0.00	12.63	2.71
16	23.60	31.40	26.60	59.00	100.00	86.50	14.40	0.00	9.51	2.14
17	22.80	33.30	27.10	55.00	103.50	86.00	4.80	0.00	20.49	4.11
18	22.30	35.00	27.60	45.00	103.50	81.00	7.20	0.00	24.33	4.74
19	22.60	34.80	27.20	47.00	103.50	83.00	57.60	0.00	22.93	4.50
20	22.60	34.80	26.50	53.50	103.50	87.50	86.40	0.00	19.83	3.98
21	23.30	33.90	26.50	56.50	101.50	87.00	26.40	0.00	19.32	3.90
22	22.40	33.10	26.10	61.00	103.50	88.00	16.80	0.00	21.76	4.32
23	23.10	29.30	25.70	72.00	103.00	90.00	19.20	0.00	8.39	1.92
24	23.20	31.30	25.30	59.00	104.00	92.00	180.00	0.00	13.43	2.79
25	22.60	33.40	26.90	58.00	103.00	81.00	122.40	0.00	16.11	3.33
26	25.30	33.00	28.50	55.00	83.00	71.50	0.00	0.00	20.66	4.15
27	26.10	33.70	28.70	55.00	96.00	72.00	0.00	0.00	22.36	4.58
28	24.20	34.10	27.90	54.50	99.50	81.00	9.60	0.00	18.64	3.83
29										
30										
31										
Decade 1	23.31	31.99	26.29	60.25	102.50	88.40	378.00	0.00	14.73	3.19
Decade 2	22.67	33.22	26.68	55.10	103.20	86.45	352.80	0.00	18.61	3.75
Decade 3	23.78	32.73	26.95	58.88	99.19	82.81	374.40	0.00	17.58	3.60
MONTH	23.21	32.64	26.62	58.02	101.80	86.11	1105.20	0.00	16.93	3.51

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: March 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	24.00	34.70	26.90	52.50	103.00	86.50	52.80	0.00	15.48	3.22
2	23.70	33.60	26.10	56.50	104.50	88.50	32.40	0.00	14.26	2.98
3	23.30	32.00	27.20	59.00	101.50	78.50	0.00	0.00	18.82	3.81
4	25.30	33.30	27.60	54.50	81.00	72.50	0.00	0.00	17.44	3.53
5	23.40	33.40	25.80	54.00	103.00	88.50	175.20	0.00	12.92	2.71
6	22.30	32.60	26.30	60.00	104.00	87.00	0.00	0.00	15.17	3.13
7	22.90	34.00	26.90	56.50	103.50	90.50	9.00	0.00	17.77	3.62
8	22.60	35.30	26.50	57.00	102.00	86.50	25.00	0.00	16.50	3.24
9	23.50	35.00	26.00	54.00	104.00	88.00	85.00	0.00	16.00	3.28
10	23.20	35.10	26.40	53.50	103.00	88.50	109.20	0.00	16.33	3.34
11	23.10	33.20	25.90	58.50	103.50	90.50	98.40	0.00	15.04	3.09
12	22.70	34.20	26.50	55.50	103.50	89.00	34.80	0.00	17.34	3.51
13	23.60	35.20	27.90	54.00	104.50	82.50	0.00	0.00	20.93	4.26
14	23.80	35.50	26.80	52.00	103.00	89.00	12.00	0.00	16.75	3.43
15	23.10	34.00	26.20	54.00	103.50	92.00	40.80	0.00	15.23	3.12
16	23.30	32.30	26.50	66.00	104.00	90.50	8.40	0.00	17.97	3.67
17	23.00	32.40	25.80	61.50	103.50	90.50	37.20	0.00	16.96	3.42
18	22.10	32.00	25.70	56.50	104.00	91.50	64.80	0.00	17.24	3.41
19	23.70	32.80	25.70	56.50	104.00	92.00	19.20	0.00	14.37	2.95
20	22.60	33.00	25.40	54.00	104.00	91.50	116.40	0.00	15.75	3.15
21	22.00	33.20	25.80	56.50	104.50	91.50	8.40	0.00	17.60	3.49
22	22.70	33.20	25.90	56.00	104.00	93.00	12.00	0.00	16.10	3.24
23	22.90	33.10	26.50	61.00	104.00	91.00	26.40	0.00	19.03	3.81
24	23.70	31.80	25.80	61.00	104.00	93.00	146.40	0.00	14.12	2.91
25	22.80	29.10	25.40	73.00	104.00	96.00	15.60	0.00	9.53	2.09
26	23.40	31.70	25.30	63.50	103.50	94.00	226.80	0.00	11.24	2.38
27	22.60	31.90	25.20	58.00	104.00	92.00	28.80	0.00	15.83	3.15
28	22.50	31.80	25.60	63.00	104.50	91.50	63.60	0.00	16.60	3.32
29	23.00	32.80	26.60	59.00	104.50	88.50	110.40	0.00	20.23	4.00
30	24.00	30.60	25.40	68.50	104.00	95.50	40.80	0.00	10.29	2.22
31	23.50	30.70	25.40	66.00	104.00	94.50	49.20	0.00	10.03	2.17
Decade 1	23.33	33.87	26.51	55.96	101.38	86.21	621.80	0.00	16.09	3.29
Decade 2	22.99	33.36	26.17	56.70	103.90	90.40	319.20	0.00	16.89	3.40
Decade 3	23.16	31.50	25.69	63.67	104.06	92.89	708.00	0.00	14.10	2.98
MONTH	23.17	33.02	26.16	58.44	102.97	89.50	1649.00	0.00	15.77	3.21

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: April 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	23.90	30.70	26.10	68.00	121.00	92.50	0.00	0.00	8.05	1.85
2	23.20	33.80	27.20	55.00	101.50	85.50	1.20	0.00	17.98	3.60
3	23.00	33.30	27.70	55.00	102.50	79.50	0.00	0.00	20.65	4.08
4	23.50	34.00	28.20	54.50	101.50	80.50	0.00	0.00	20.77	4.14
5	23.40	34.60	26.00	53.00	104.00	92.00	368.40	0.00	14.93	3.02
6	23.00	32.30	25.90	60.50	104.00	92.00	21.60	0.00	16.95	3.37
7	23.80	32.30	25.90	62.50	104.00	93.00	10.80	0.00	16.97	3.39
8	22.50	31.40	25.40	64.00	104.00	93.00	45.60	0.00	13.64	2.77
9	23.20	31.90	26.20	64.00	104.00	90.00	4.80	0.00	13.77	2.83
10	23.80	28.40	24.70	76.00	104.00	99.00	66.00	0.00	6.61	1.55
11	23.20	31.30	25.10	67.50	104.00	94.00	90.00	0.00	11.27	2.36
12	22.90	30.70	25.60	68.00	104.50	94.00	21.60	0.00	14.16	2.87
13	22.80	33.40	27.10	57.00	104.50	86.00	0.00	0.00	19.77	3.88
14	23.00	33.90	26.00	54.00	104.00	94.00	85.20	0.00	14.08	2.84
15	23.30	32.50	26.00	66.50	104.00	92.00	91.20	0.00	14.83	3.01
16	23.10	32.30	26.50	58.50	104.50	89.00	0.00	0.00	15.82	3.16
17	23.10	33.60	27.10	54.50	103.00	82.00	2.40	0.00	14.50	2.94
18	24.00	29.50	25.80	75.50	103.00	93.50	9.60	0.00	9.64	2.09
19	22.30	31.10	25.40	63.00	104.00	94.00	128.40	0.00	12.33	2.51
20	22.90	28.80	24.00	71.00	104.50	99.00	375.60	0.00	5.66	1.36
21	22.80	30.40	24.80	67.00	104.50	95.50	215.20	0.00	12.24	2.48
22	22.30	29.10	24.90	71.00	104.50	93.50	43.00	0.00	9.73	2.06
23	22.80	27.10	24.30	85.00	104.50	99.50	99.40	0.00	5.72	1.37
24	23.00	31.40	26.00	64.00	104.50	90.50	14.40	0.00	18.89	3.65
25	23.50	30.90	25.70	65.50	104.50	93.00	68.40	0.00	16.40	3.22
26	22.30	31.60	25.40	63.50	104.50	91.50	3.60	0.00	16.07	3.12
27	23.40	30.70	25.30	63.00	104.50	94.00	32.40	0.00	10.13	2.12
28	22.60	30.90	25.40	54.00	104.50	88.00	4.80	0.00	18.12	3.38
29	21.30	30.70	25.20	61.50	104.50	89.00	2.40	0.00	19.57	3.63
30	21.90	30.90	25.40	62.50	104.50	87.00	1.20	0.00	17.72	3.35
31										
Decade 1	23.33	32.27	26.33	61.25	105.05	89.70	518.40	0.00	15.03	3.06
Decade 2	23.06	31.71	25.86	63.55	104.00	91.75	804.00	0.00	13.21	2.70
Decade 3	22.59	30.37	25.24	65.70	104.50	92.15	484.80	0.00	14.46	2.84
MONTH	22.99	31.45	25.81	63.50	104.52	91.20	1807.20	0.00	14.23	2.87

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: May 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	19.70	30.80	24.70	59.00	105.50	87.50	1.20	0.00	18.81	3.42
2	21.40	30.60	25.10	63.50	104.50	89.00	1.20	0.00	16.55	3.13
3	23.00	28.00	24.00	74.00	104.50	96.50	15.60	0.00	6.68	1.51
4	21.80	31.10	25.50	55.00	104.50	88.50	97.20	0.00	18.67	3.44
5	22.90	30.40	25.40	63.00	105.00	90.50	19.20	0.00	15.15	2.93
6	22.90	30.90	25.80	56.00	105.00	87.50	0.00	0.00	19.26	3.57
7	23.00	30.40	25.90	70.00	104.50	89.50	0.00	0.00	11.59	2.26
8	23.40	31.70	26.10	66.50	103.50	90.00	1.20	0.00	14.49	2.88
9	21.90	32.00	25.60	63.00	105.50	90.50	1.20	0.00	14.68	2.85
10	22.50	30.80	25.90	57.00	105.00	87.00	0.00	0.00	14.74	2.83
11	23.00	27.20	27.10	77.00	104.00	78.50	0.00	0.00	2.41	0.84
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
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27										
28										
29										
30										
31										
Decade 1	22.25	30.67	25.40	62.70	104.75	89.65	136.80	0.00	15.06	2.88
Decade 2	23.00	27.20	27.10	77.00	104.00	78.50	0.00	0.00	2.41	0.84
Decade 3	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!
MONTH	22.32	30.35	25.55	64.00	104.68	88.64	136.80	0.00	13.91	2.70

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)



MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: June 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1										
2										
3										
4										
5										
6										
7	20.80	26.60	23.30	74.50	105.50	94.50	46.20	0.00	6.68	1.449
8	21.60	28.40	24.10	59.50	102.50	84.50	10.80	0.00	16.36	2.876
9										
10	22.10	28.20	24.30	69.00	104.50	88.00	1.20	0.00	11.31	2.180
11	19.50	28.60	23.50	63.00	105.50	91.00	45.60	0.00	9.83	1.901
12	21.90	24.70	22.40	72.50	104.50	94.50	14.40	0.00	3.66	0.987
13	20.10	25.00	21.90	62.50	105.50	90.00	1.20	0.00	6.83	1.427
14	19.60	26.10	21.60	51.00	104.00	85.00	1.20	0.00	11.19	1.979
15	17.80	26.20	20.70	47.50	104.50	83.00	0.00	0.00	13.02	2.150
16	15.60	27.30	20.70	53.00	105.00	85.00	1.20	0.00	10.96	1.902
17	18.00	26.30	21.90	61.00	104.50	86.50	0.00	0.00	9.54	1.784
18	18.10	27.10	21.60	60.50	104.50	88.50	1.20	0.00	7.88	1.557
19	17.30	27.80	21.80	60.00	105.00	88.00	1.20	0.00	10.67	1.933
20	20.40	27.70	23.30	63.00	106.00	87.00	2.40	0.00	12.90	2.333
21	21.20	27.30	22.90	62.50	104.00	88.00	1.20	0.00	8.02	1.622
22	17.30	27.80	21.60	47.50	105.50	82.50	0.00	0.00	16.59	2.636
23	18.00	28.10	23.00	47.00	100.00	80.50	10.80	0.00	15.22	2.510
24	21.20	28.60	23.50	57.00	105.50	89.00	62.40	0.00	13.35	2.399
25	22.00	25.00	23.20	93.50	105.50	99.50	138.00	0.00	2.98	0.868
26	22.80	29.10	24.60	69.00	105.00	94.00	13.20	0.00	11.39	2.214
27	21.20	28.20	23.80	63.50	106.00	90.00	1.20	0.00	14.41	2.593
28	18.60	28.20	22.50	58.00	106.00	88.50	1.20	0.00	15.23	2.589
29	19.50	27.10	22.40	61.00	105.50	88.00	2.40	0.00	10.70	1.973
30	17.80	28.30	22.60	55.50	106.00	88.00	58.80	0.00	13.36	2.32
31										
Decade 1	21.50	27.73	23.90	67.67	104.17	89.00	58.20	0.00	11.45	1.45
Decade 2	18.83	26.68	21.94	59.40	104.90	87.85	68.40	0.00	9.65	1.87
Decade 3	19.96	27.77	23.01	61.45	104.90	88.80	289.20	0.00	12.13	2.15
MONTH	19.67	27.29	22.66	61.37	104.80	88.41	415.80	0.00	10.96	1.99

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value

RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value

WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





MINISTERIO DE AGRICULTURA, FLORESTA E PESCAS  
AGRO-METEOROLOGY SECTION

MONTHLY METEOROLOGICAL BULLETIN: July 2011  
AUTOMATIC WEATHER STATION (Enerco 420): Viqueque  
Altitude: 71 Meter Latitude: -8.56351 Longitude: 126.38389



Day	T min (°C)	T max (°C)	T mean (°C)	RH min (%)	RH max (%)	RH mean (%)	RR (mm)	WS mean (m/s)	RGm (MJ/m <sup>2</sup> )	Eto (mm)
1	21.00	28.40	24.40	65.00	106.00	87.00	1.20	0.00	13.46	2.48
2	19.10	28.80	23.40	61.00	104.50	86.00	2.40	0.00	17.55	2.99
3	18.50	28.20	22.40	59.50	106.00	90.50	7.20	0.00	13.95	2.42
4	18.30	28.40	22.70	57.00	106.00	86.00	1.20	0.00	17.34	2.88
5	19.20	27.70	22.60	61.00	105.50	88.00	11.40	0.00	12.07	2.18
6	20.80	26.60	23.30	74.50	105.50	94.50	46.20	0.00	6.68	1.45
7	22.30	27.40	23.90	73.00	105.50	96.50	16.80	0.00	6.88	1.50
8	21.80	27.30	23.90	68.50	104.00	87.00	0.00	0.00	8.69	3.36
9	19.90	25.70	22.20	68.00	105.50	91.00	7.20	0.00	5.80	1.30
10	17.90	27.70	22.30	63.00	106.00	90.00	32.40	0.00	9.79	1.85
11	19.70	27.60	23.30	78.00	105.50	96.00	240.00	0.00	11.59	2.20
12	23.10	28.10	25.00	76.00	103.00	92.50	21.60	0.00	13.63	2.61
13	23.80	28.10	25.20	73.00	103.00	91.50	2.40	0.00	11.97	2.35
14	20.10	29.10	24.00	63.00	105.50	90.00	3.60	0.00	16.98	3.00
15	20.60	28.80	24.10	66.00	106.00	92.00	7.20	0.00	13.81	2.55
16	21.90	28.70	24.70	66.00	105.50	90.00	1.20	0.00	13.79	2.59
17	21.80	28.30	24.20	71.50	105.50	93.00	14.40	0.00	10.56	2.09
18	20.10	28.40	23.70	66.50	106.00	92.00	2.40	0.00	12.52	2.34
19	19.30	28.10	23.20	64.00	105.50	89.50	1.20	0.00	14.09	2.53
20	20.40	28.00	23.40	60.00	106.00	88.00	0.00	0.00	13.08	2.39
21	20.40	28.10	23.20	65.00	104.50	87.50	1.20	0.00	14.81	2.66
22	19.30	28.40	23.40	62.00	105.50	87.00	0.00	0.00	16.90	2.95
23	20.80	28.40	23.70	52.50	104.50	85.00	1.20	0.00	13.32	2.42
24	19.20	28.00	23.20	50.50	105.50	85.50	4.80	0.00	14.77	2.58
25	20.80	26.50	22.90	65.50	105.50	93.00	22.80	0.00	7.49	1.58
26	21.20	27.50	23.50	66.00	110.00	90.50	7.20	0.00	13.56	2.52
27	20.10	27.60	23.30	57.50	106.00	86.50	2.40	0.00	15.31	2.71
28	19.50	28.70	23.20	57.00	105.50	86.50	1.20	0.00	16.98	2.95
29	19.70	27.70	23.10	66.50	105.50	90.00	9.60	0.00	13.20	2.44
30	18.40	28.00	22.80	60.00	106.00	87.00	1.20	0.00	16.59	2.88
31	18.70	27.50	22.80	69.50	105.50	91.50	2.40	0.00	8.67	1.76
Decade 1	19.88	27.62	23.11	65.05	105.45	89.65	126.00	0.00	11.22	2.24
Decade 2	21.08	28.32	24.08	68.40	105.15	91.45	294.00	0.00	13.20	2.47
Decade 3	19.83	27.85	23.19	61.09	105.82	88.18	54.00	0.00	13.78	2.50
MONTH	20.25	27.93	23.45	64.73	105.48	89.71	474.00	0.00	12.77	2.40

RR: rainfall T min: Air temperature minima value T max: Air temperature maxima value T mean: Air temperature average value  
RH min: Air relative humidity minima value RH max: Air relative humidity maxima value RH mean: Air relative humidity average value  
WS mean: Wind speed average value RG: Solar radiation value ETo: Reference Evapotranspiration (FAO, 1998)





