VACOAS

Observed hydro-climatic and biophysical indicators for Vacoas (1961 - 1990)

Geo-location

Longitude: 57.5°

Latitude: -20.3°

Altitude: 300m

Vegetation period information

Vacoas has one of the best climates in Mauritius that favour vegetation growth all year round. The vegetation period and growing season lengths for both the humid and moist period are shown in figure 1. The corresponding values for the lengths, start and end dates of the total (sum of humid and moist) and humid are given in table 1. This indicates the absence of a dry period and year round rain-fed farming potential.

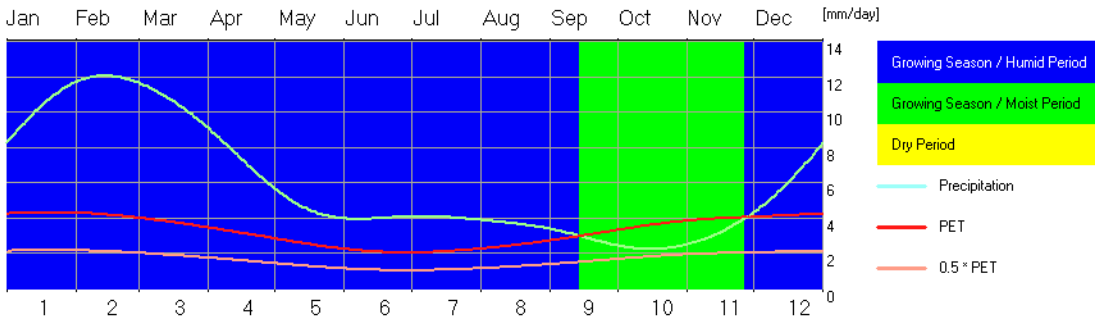

Figure 1: The vegetation period showing the growing season length, the humid and moist period.

	Length	Begin Date	Begin Day	End Date	End Day	T_Mean °C	T_Min °C	T_Max °C	Precip. mm/day	PET mm/day	Wind Speed km/h	Sun fract. %	Vapor Pressure hPa
Moist+ Humid	365	1 JAN	1	31 DEC	365	21.1	17.5	24.6	5.9	3.3	2.8	57.7	19.9
Humid	291	27 Nov	331	13 SEP	256	21.3	17.8	24.8	6.7	3.2	2.7	58	20.4

Table 1: Growing season period and related information

Hydro-Climatic Information

Hydro-climatic indicators provide a measure of how the soil, vegetation and the atmosphere interact and particularly impacts on the hydrological cycle and general ecology. The hydro-climatic indicators for this assessment constitute Koeppen, Budyko, aridity, net primary production and the Gorczynski Continentality indices that are summarized in tables 2 and 3 below. These indicators enable the characterization of the climate and biophysical processes of a given area and provide a basis for environmental and development planning. As climate change gathers pace, it is envisaged that these indicators will also change and thus could be useful entry point for adaptation planning and development strategies. For example, precipitation deficit is -947 mm/year indicating a surplus of 947 mm/year; an evaporation ratio of 59% and 41% runoff ratio indicate majority of the rainfall is lost through evaporation. This information can be used to develop adaptation strategies to minimize evaporation so that more water is made available for both residential and industrial use.

Koeppen Class: Cfa
C = Warm Temperate Climate
f = fully humid
a = hot summer

Budyko Climate: Forest
Radiation index of Dryness: 0.755
Budyko Evaporation: 259 mm/year
Budyko Runoff: 876 mm/year
Budyko Evaporation: 59 %
Budyko Runoff: 41 %

Aridity: humid
Aridity Index: 1.8
Moisture Index: 80 %.
DeMartonne Index: 69
Precipitation Deficit: -947 mm/year

Climatic net primary production: 2273 g(DM)/m2/year

NPP(Temperature): 2300 g(DM)/m2/year
NPP(Precipitation): 2273 g(DM)/m2/year
NPP is precipitation limited.

Gorczynski Continentality Index: 11.5

Table 2: Climate and vegetation classification

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
Effective Rain [mm]	158	158	158	143	106	100	99	89	77	61	87	129	1363
Effective Rain Ratio [%]	48	48	48	65	78	80	80	83	86	89	83	71	64
Rainy Days	24	22	24	19	14	14	14	13	11	9	12	17	198

Table 3: Annual hydrological indicators of rainfall and its effective use for land surface processes.

Data and information source: FAO Climate Locator Software (NewLoclim).

PLAISANCE

Observed hydro-climate and vegetation characteristics of Plaisance

Vegetation period and growing season characteristics

The vegetation and growing seasons of Plaisance is shown in figure 2 and tables 4 and 5. It is characterized by a short dry period of 9 days in length and a long humid and moist periods/growing season of duration 356 days of which 254 days constitute a humid period. The Climatic Net Primary Production (NPP) is precipitation limited with a value of 2088 g(DM)/m2/year. The Koeppen classification indicates an Equatorial climate with full humid rain forest and the Budyko Climate for the area is classified as forest. Plaisance therefore is suitable for agricultural and plantation related activities.

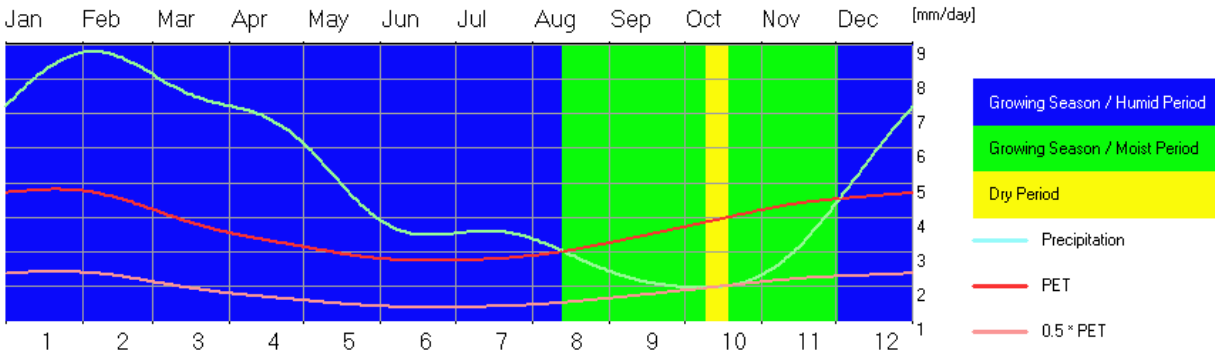

Figure 2: Vegetation periods and growing season characteristics of Plaisance.

	Length	Begin Date	Begin Day	End Date	End Day	T_Mn °C	T_Mx °C	Precip. mm/day	PET mm/day	Wind Speed km/h	Sun fract. %	Vap. Pres. hPa
Dry	9	10 OCT	283	18 OCT	291	18.7	18.7	26	3.9	14	55.7	21.4
Moist+ Humid	356	19 OCT	292	9 OCT	282	20.1	26.9	5	3.7	14.1	54.6	23.8
Humid	254	2 DEC	336	12 AUG	224	20.7	27.4	6	3.6	13.9	54.6	24.8

Table 4: Vegetation periods and growing season characteristics of Plaisance.

Hydro--Climatic Classification

The hydro-climatic indicators are given in tables 5 and 6. With an evaporation of 1186 mm/year (66.2%), runoff of 607 mm/year (33.8%) and precipitation deficit of -446 mm/year (surplus), Plaisance climate provides a conducive environment for agricultural activities.

Koeppen Class: Af
A = Equatorial Climate
f = full humid rain forest

Budyko Climate: Forest
Radiation index of Dryness: 0.917
Budyko Evaporation: 1186 mm/year
Budyko Runoff: 607 mm/year
Budyko Evaporation: 66.2 %
Budyko Runoff: 33.8 %

Aridity: humid
Aridity Index: 1.33
Moisture Index: 33 %.
DeMartonne Index: 54
Precipitation Deficit: -446 mm/year

Climatic net primary production: 2088 g(DM)/m2/year,
NPP(Temperature): 2442 g(DM)/m2/year
NPP(Precipitation): 2088 g(DM)/m2/year
NPP is precipitation limited.

Gorczynski Continentality Index: 5.9

Table 5: Hydro-climatic classification and indicators in Plaisance.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
Effective Rain [mm]	150	149	142	143	113	85	93	76	55	60	76	132	1274
Effective Rain Ratio [%]	60	61	65	65	76	84	82	86	90	89	86	70	71
Rainy Days	20	18	18	18	15	11	12	10	7	8	9	16	162

Table 6: Mean monthly Indicators of effective rainfall and rainy days in Plaisance.

RODRIGUES

Observed hydro-climate and vegetation characteristics of Rodrigues

Vegetation period and growing season characteristics

The vegetation and growing season dynamics of Rodrigues is illustrated in figure 3 and table 7. It is characterize by two clearly distinguished seasons of rainy and dry seasons as well as three vegetation periods of humid and moist periods (growing season/period) where rain-fed farming is possible and a dry period where rain-fed agriculture is not feasible. The humid growing season length is 68 days and starts from 28 January and ends on 5th April. The total growing season length of both moist and dry periods is 257 days with a starting date of 6 December and ending date of 19 August.

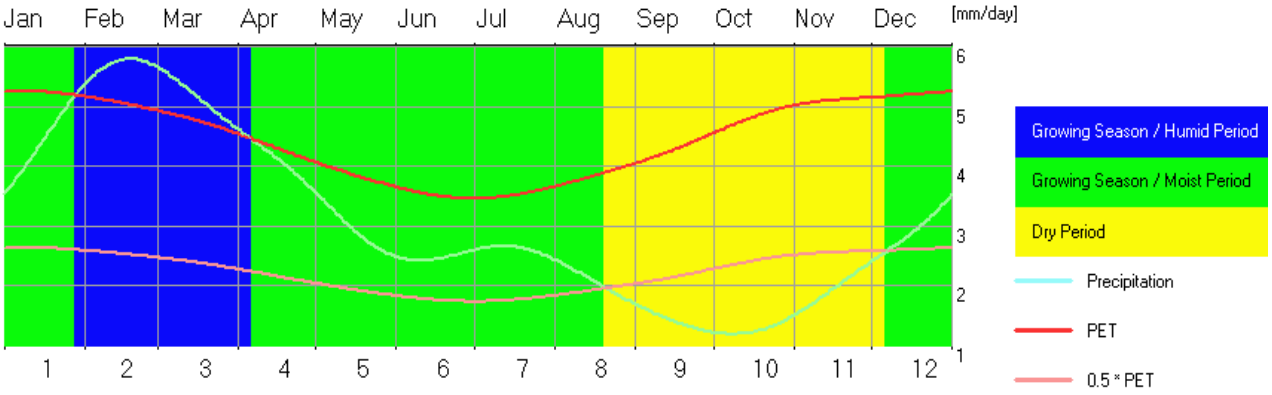

Figure 3: Vegetation periods and growing season characteristics of Rodrigues.

	Length Days	Begin Date	Begin Day	End Date	End Day	T_Mn °C	T_Mx °C	Precip. mm/day	PET mm/day	Wind Speed km/h	Sun fract. %	Vap Pres hPa
Dry	108	20 AUG	232	5 DEC	339	20	26.1	1.6	4.7	17.8	69.2	20.9
Moist+ Humid	257	6 DEC	340	19 AUG	231	21.9	27.4	3.7	4.4	17.6	68.2	24.1
Humid	68	28 JAN	28	5 APR	95	23.7	29.2	5.3	4.9	17.9	67.6	27.6

Table 7: Vegetation periods and growing season characteristics of Rodrigues.

Hydro--Climatic Classification

Rodrigues is characterized by an equatorial climate and savannah with dry winter. Tables 8 and 9 provide details on hydro-climatic indicators of the hydrological and biophysical processes. It has a high evaporation rate of 84.4%, precipitation deficit of 510 mm/year and a low run-off rate of 15%. As a result, it is prone to water shortages. Based on these indicators an adaptation strategy could be developed to

enable Rodrigues to meet its water needs. One approach is to reduce the high evaporation by adopting water storage and rainfall harvesting strategies.

Koeppen Class: Aw
A = Equatorial Climate
w = savannah with dry winter

Budyko Climate: Steppe
Radiation index of Dryness: 1.621
Budyko Evaporation 943 mm/year
Budyko Runoff 174 mm/year
Budyko Evaporation 84.4 %
Budyko Runoff 15.6 %

Aridity: subhumid
Aridity Index: 0.69
Moisture Index: -31 %.
DeMartonne Index: 33
Precipitation Deficit: 510 mm/year

Climatic net primary production: 1571 g(DM)/m2/year,
NPP(Temperature): 2476 g(DM)/m2/year
NPP(Precipitation): 1571 g(DM)/m2/year
NPP is precipitation limited.

Gorczynski Continentality Index: 5.9

Table 8: Hydro-climatic classification and indicators in Rodriques.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
Effective Rain [mm]	104	123	114	102	75	64	73	55	38	36	57	77	919
Effective Rain Ratio [%]	79	73	76	79	86	88	86	90	93	94	90	86	82
Rainy Days	12	14	13	12	9	8	10	7	5	5	7	9	111

Table 9: Mean monthly Indicators of rainfall efficiency and rainy days in Rodriques.