IV - Determination of the agronomic vocations of soils perimeters

IV.1 - Six types of agronomic vocation

The agronomic vocation is established on the basis of constraints classification and limiting factors of bio-climate, slope or adapted ground for each great type of speculation, rain field crops, rustic rain arboriculture and market-gardening. 6 classes of vocation were defined to preserve the approach adopted during the development of the Regional Agricultural Maps, namely :

- excellent agronomic Vocation: very favourable physical potentialities, allowing to obtain a very good productivity of the Cultivations without particular installations;
- good agronomic Vocation: favourable physical potentialities, allowing to obtain a satisfactory productivity in spite of some constraints;
- average agronomic Vocation: physical potentialities limited by notable constraints, but with real possibilities for improvements allowing a reclassification in classes 2 or even 1;
- weak agronomic Vocation: physical potentialities limited by significant constraints, with improvements technically rather difficult allowing a reclassification in classes 3 or even 2;
- poor agronomic Vocation: physical potentialities limited by serious constraints, with technically difficult improvements and/or of a reduced profitability;
- marginal agronomic Vocation: physical potentialities limited by serious constraints, with an impossible or a very reduced and random profitability of any improvement.

Table n°IV-1 below presents the determination keys of these 6 classes of vocation according to the constraints and the limiting factors met to the level of the physical potentialities of the environment.

Table n°IV-1 : Keys of determination of the classes of agronomic vocation

Physical potentialities with		Limiting factors		Constraints	
Classes	Agronomic vocation	absolutes	significant	major	minor
S1	excellent	0	0	0	**0 or 1**
S2	good	0	0	0	**2 or more**
S3	average	0	0	**1 or more**	indifferent
S4	weak	0	**1**	indifferent	indifferent
S5	poor	0	**2 or more**	indifferent	indifferent
S6	marginal	**1 or more**	indifferent	indifferent	indifferent

In bold: determining factors

The reading of this **Table n°IV-1** makes it possible to note that the determining factors rise regularly from class of excellent agronomic vocation S1 to the class of marginal agronomic vocation S6, since:

- the physical potentialities of classes S1 to S3 are confronted only with constraints, those of classes S1 and S2 facing only respectively one or more minor constraints and those of class S3 to at least a major constraint;

- the physical potentialities of classes S4 to S6 are confronted with limiting factors, those of classes S4 and S5 facing only with respectively one or more significant limiting factors and those of class S6 to at least an absolute limiting factor.

IV.2 - Quality of the physical potentialities mobilized in the two perimeters

Once crossing the informations about the climate, the slope and the mobilized edaphic resources, some morpho-pedological units could be determined. The level of their physical potentialities is dependent on their assignment by one or more preceding constraints, and the diagnosis of evaluation relates to the appreciation of the importance of this insufficiency and the way in which it appears in the pedological profile.

Once these various constraints inserted in the layers of information of a Geographical Information system (GIS) concerning the perimeter, the methodological approach on the level of this treatment was based on the space analysis of the crossing of these layers of information, for a priorisation multicriterion of the physical potentialities :

i) if the exacting tree vocations are of level S1, the plantations have priority ;
ii) If t he exacting tree vocations are of level S2 or S3, the plantations are secondary ;
iii) If the market-gardening vocations are of level S1, S2, S3 or S4 and lower or equivalent than the vocations field crops, the market gardenings prevail in the rotation ;
iv) If the market-gardening vocations are of level S1, S2, S3 or S4, but of level higher than the vocations field crops, the field crops prevail in the rotation ;
v) If the market-gardening vocations are of level S5 or S6, one is limited to a rotation containing field crops.

V - Theoretical Water Requirements of the suggested cultivations

V.1 - Significant concepts for development by irrigation

To explain the hydrous deficits of the cultivations which the irrigation water will compensate for, two concepts related to climate and two concepts related to considered cultivation are significant to take into account.

V.1.1 - Two climatic concepts

a) Useful rainfalls

Water available for the plants corresponds to the water which the plant is able to draw from the ground, until the water content of the ground at the fading point (HPF). After a supplemented rainfall if needed by irrigation, the ground can be saturated until the humidity rate will have the holding capacity (HCR).

The useful rain corresponds to the quantity of recoverable rain by the root system of the cultures, that is to say what remains after the loss of the rainfall which streamed (heavy grounds) or infiltrated in-depth (light grounds). By considering that these losses account for 20% of the total rain, useful rainfall thus corresponds to 80%.

b) Potential evapo-perspiration

The potential evapotranspiration represents the water losses per evaporation and per transpiration of the plants, of a grassy area (reference evapotranspiration).

It is calculated by various formulas of which most relevant are those which call upon various climatic parameters : temperature, relative humidity, sun exposition and speed of the wind. Insofar as the basic parameters are available, FAO recommends the use of the formula of Penman-Monteith. But, fault of stations with sufficient complete data near the perimeters to use this formula, the PET was calculated by the empirical formula most usually used in Tunisia, namely the formula of Blanney-Criddle.

V.1.2 - Two cultivation concepts

a) Real evapo-perspiration

Calculations of real evapo-perspiration (ETR) of cultivations is made by application to the monthly potential evapo-perspiration values of monthly crop indexes, correcting the reference evapo-perspiration of a grassy area which is equal to ETP.

b) Water Requirements with a good productivity level

The theoretical water requirements for each cultivation are determined from the cultivation ETR, by taking into account the natural contribution of the useful rainfall during the cultivation period. The irrigation water bring to the vegetal the deficit between useful rainfall and its water needs.

V.2 - Cultivations data in equipped perimeters by TS-P7 Project

V.2.1 - Real evapo-perspiration of the suggested cultivations in Nefza and Sejnane perimeters

Table n°V-1 below gives the Real evapo-perspiration calculated for the various cultivations suggested in Nefza perimeter when their productivity level is good, and **Table n°V-2** of page 3 in Sejnane perimeter.

Table n°V-1 : ETR in average year for an output index of 100 in Nefza perimeter

Month / Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Pear tree	26	14	0	0	0	0	0	15	55	107	154	68	**439**
Apple tree	26	0	0	0	0	0	12	37	82	128	103	51	**439**
Citrus fruits	72	28	11	0	0	0	9	22	55	85	103	102	**487**
Wheats	0	0	0	8	19	29	52	71	22	0	0	0	**200**
Barley-grain	0	0	0	8	15	27	49	67	0	0	0	0	**166**
Oats	0	0	0	8	22	31	55	45	0	0	0	0	**161**
Triticale	0	0	0	8	19	27	49	71	16	0	0	0	**190**
Leguminous plants	0	0	11	24	32	37	52	0	0	0	0	0	**156**
Tobacco	0	0	0	0	0	0	0	15	87	149	172	51	**474**
Barley in green	0	0	0	8	15	27	49	71	77	0	0	0	**247**
Bersim	0	0	0	8	19	29	52	75	66	0	0	0	**248**
Hay of Vetch-Oat	0	0	0	8	19	29	52	37	0	0	0	0	**145**
Fodder sorghum	0	0	0	0	0	0	0	0	22	114	189	136	**460**
Carrot	0	0	11	20	26	33	52	37	0	0	0	0	**180**
Turnip	0	0	11	20	26	33	52	37	0	0	0	0	**180**
Potato	33	56	52	45	28	0	0	0	0	0	0	0	**212**
Green onion	0	0	11	18	24	33	49	45	0	0	0	0	**181**
Broad bean in green	0	0	11	24	32	41	55	0	0	0	0	0	**163**
Tomato	0	0	0	0	0	0	0	11	87	142	172	34	**446**
Pepper	0	0	0	0	0	0	0	11	55	114	163	68	**410**
Melon	0	0	0	0	0	0	0	15	77	135	146	51	**423**
Water melon	0	0	0	0	0	0	0	7	55	107	137	34	**340**

Table n°V-2 : ETR in average year for an output index of 100 in Sejnane perimeter

Month / Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Pear tree	27	14	0	0	0	0	0	15	55	108	158	69	**447**
Apple tree	27	0	0	0	0	0	11	38	83	130	106	52	**446**
Citrus fruits	73	28	12	0	0	0	9	23	55	87	106	104	**495**
Pomegranates	47	14	0	0	0	0	0	11	33	79	114	95	**394**
Wheats	0	0	0	8	18	28	51	73	22	0	0	0	**200**
Barley-grain	0	0	0	8	15	27	48	69	0	0	0	0	**166**
Oats	0	0	0	8	22	30	54	46	0	0	0	0	**160**
Triticale	0	0	0	8	18	27	48	73	17	0	0	0	**190**
Leguminous plants	0	0	12	24	31	36	51	0	0	0	0	0	**154**
Tobacco	0	0	0	0	0	0	0	15	88	152	176	52	**483**
Barley in green	0	0	0	8	15	27	48	73	77	0	0	0	**247**
Bersim	0	0	0	8	18	28	51	76	66	0	0	0	**248**
Hay of Vetch-Oat	0	0	0	8	18	28	51	38	0	0	0	0	**144**
Fodder sorghum	0	0	0	0	0	0	0	0	22	115	194	138	**470**
Carrot	0	0	12	20	26	32	51	38	0	0	0	0	**179**
Turnip	0	0	12	20	26	32	51	38	0	0	0	0	**179**
Potato	33	56	52	44	27	0	0	0	0	0	0	0	**213**
Green onion	0	0	12	18	24	32	48	46	0	0	0	0	**180**
Broad bean in green	0	0	12	24	31	40	54	0	0	0	0	0	**160**
Tomato	0	0	0	0	0	0	0	11	88	144	176	35	**455**
Pepper	0	0	0	0	0	0	0	11	55	115	167	69	**418**
Melon	0	0	0	0	0	0	0	15	77	137	150	52	**431**
Water melon	0	0	0	0	0	0	0	8	55	108	141	35	**346**

V.2.2 - Theoretical water requirements of the suggested cultivations for a good productivity level

Table n°V-3 below gives the unit water requirements in average year expressed in mm for the various cultivations suggested in Nefza perimeter when their productivity level is good, and **Table n°V-4** of page 4 in Sejnane perimeter.

Table n°V-3 : Water requirements in average year for an index output of 100 in Nefza perimeter

Month / Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Pear tree	0	0	0	0	0	0	0	0	24	96	152	60	**332**
Apple tree	0	0	0	0	0	0	0	0	51	117	100	43	**312**
Citrus fruits	34	0	0	0	0	0	0	0	24	74	100	94	**327**
Wheats	0	0	0	0	0	0	0	19	0	0	0	0	**19**
Barley-grain	0	0	0	0	0	0	0	15	0	0	0	0	**15**
Oats	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Triticale	0	0	0	0	0	0	0	19	0	0	0	0	**19**
Leguminous plants	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tobacco	0	0	0	0	0	0	0	0	57	138	169	43	**407**
Barley in green	0	0	0	0	0	0	0	19	46	0	0	0	**64**
Bersim	0	0	0	0	0	0	0	22	35	0	0	0	**57**
Hay of Vetch-Oat	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Fodder sorghum	0	0	0	0	0	0	0	0	0	103	186	128	**417**
Carrot	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Turnip	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Potato	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Green onion	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Broad bean in green	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tomato	0	0	0	0	0	0	0	0	57	131	169	26	**383**
Pepper	0	0	0	0	0	0	0	0	24	103	160	60	**347**
Melon	0	0	0	0	0	0	0	0	46	124	143	43	**356**
Water melon	0	0	0	0	0	0	0	0	24	96	135	26	**280**

Table n°V-4 : Water requirements in average year for an index output of 100 in Sejnane perimeter

Month / Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Pear tree	0	0	0	0	0	0	0	0	25	99	156	62	**343**
Apple tree	0	0	0	0	0	0	0	0	53	121	104	44	**322**
Citrus fruits	39	0	0	0	0	0	0	0	25	77	104	96	**342**
Pomegranates	12	0	0	0	0	0	0	0	3	70	112	88	**286**
Wheats	0	0	0	0	0	0	0	24	0	0	0	0	**24**
Barley-grain	0	0	0	0	0	0	0	20	0	0	0	0	**20**
Oats	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Triticale	0	0	0	0	0	0	0	24	0	0	0	0	**24**
Leguminous plants	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tobacco	0	0	0	0	0	0	0	0	58	142	174	44	**419**
Barley in green	0	0	0	0	0	0	0	24	47	0	0	0	**71**
Bersim	0	0	0	0	0	0	0	28	36	0	0	0	**64**
Hay of Vetch-Oat	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Fodder sorghum	0	0	0	0	0	0	0	0	0	106	192	131	**429**
Carrot	0	0	0	0	0	0	0	1	0	0	0	0	**1**
Turnip	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Potato	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Green onion	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Broad bean in green	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tomato	0	0	0	0	0	0	0	0	58	135	174	27	**395**
Pepper	0	0	0	0	0	0	0	0	25	106	165	62	**359**
Melon	0	0	0	0	0	0	0	0	47	128	148	44	**368**
Water melon	0	0	0	0	0	0	0	0	25	99	139	27	**291**

V.3 - Cultivations data on equipped perimeter by TS-P11 Project

V.3.1 - Real evapo-perspiration of the suggested cultivations in Goubellat perimeter

Table n°V-5 of page 5 gives the Real evapo-perspiration calculated for the various cultivations suggested in Goubellat perimeter when their productivity level is good.

Table n°V-5 : ETR in average year for an output index of 100

Month / Practised Cultivations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Pear tree	27	14	0	0	0	0	0	15	56	110	162	70	**453**
Apple tree	27	0	0	0	0	0	11	38	84	132	108	52	**452**
Peach tree	27	0	0	0	0	0	14	46	101	102	72	70	**432**
Apricot tree	20	0	0	0	0	0	17	57	101	88	63	61	**407**
Pomegranates	47	14	0	0	0	0	0	11	34	80	117	96	**399**
Wheats	0	0	0	8	18	28	51	72	22	0	0	0	**199**
Barley-grain	0	0	0	8	14	26	49	68	0	0	0	0	**165**
Oats	0	0	0	8	21	30	54	46	0	0	0	0	**159**
Triticale	0	0	0	8	18	26	49	72	17	0	0	0	**189**
Leguminous plants	0	0	11	23	30	36	51	0	0	0	0	0	**151**
Barley in green	0	0	0	8	14	26	49	72	79	0	0	0	**247**
Bersim	0	0	0	8	18	28	51	76	67	0	0	0	**248**
Hay of Vetch-Oat	0	0	0	8	18	28	51	38	0	0	0	0	**143**
Fodder sorghum	0	0	0	0	0	0	0	0	22	117	198	139	**477**
Carrot	0	0	11	19	25	32	49	49	0	0	0	0	**185**
Turnip	0	0	11	19	25	32	51	38	0	0	0	0	**176**
Potato	33	55	50	43	26	0	0	0	0	0	0	0	**207**
Green onion	0	0	11	17	23	32	49	46	0	0	0	0	**177**
Broad bean in green	0	0	11	23	30	39	54	0	0	0	0	0	**158**
Tomato	0	0	0	0	0	0	0	11	90	146	180	35	**462**
Pepper	0	0	0	0	0	0	0	11	56	117	171	70	**425**
Melon	0	0	0	0	0	0	0	15	79	139	153	52	**438**
Water melon	0	0	0	0	0	0	0	8	56	110	144	35	**352**

V.3.2 - Theoretical water requirements of the suggested cultivations for a good productivity level

Table n°V-6 of page 6 presents the unit requirements in average year expressed in mm for the various cultivations suggested in Goubellat perimeter when their productivity level is good.

Table n°V-6 : Water requirements out in average year for an index output of 100

Month / Practised Cultivations	Sep	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Pear tree	2	0	0	0	0	0	0	0	38	98	159	63	**361**
Apple tree	2	0	0	0	0	0	0	10	66	120	105	46	**349**
Peach tree	2	0	0	0	0	0	0	17	83	91	69	63	**326**
Apricot tree	0	0	0	0	0	0	0	29	83	76	61	54	**303**
Pomegranates	22	0	0	0	0	0	0	0	15	69	114	89	**311**
Wheats	0	0	0	0	0	0	16	44	4	0	0	0	**65**
Barley-grain	0	0	0	0	0	0	14	40	0	0	0	0	**54**
Oats	0	0	0	0	0	0	19	17	0	0	0	0	**37**
Triticale	0	0	0	0	0	0	14	44	0	0	0	0	**58**
Leguminous plants	0	0	0	0	0	0	16	0	0	0	0	0	**16**
Barley in green	0	0	0	0	0	0	14	44	0	0	0	0	**58**
Bersim	0	0	0	0	0	0	16	48	0	0	0	0	**64**
Hay of GOES	0	0	0	0	0	0	16	10	0	0	0	0	**26**
Fodder sorghum	0	0	0	0	0	0	0	0	4	106	195	133	**438**
Carrot	0	0	0	0	0	0	14	21	0	0	0	0	**35**
Turnip	0	0	0	0	0	0	16	10	0	0	0	0	**26**
Potato	0	0	0	0	0	0	28	51	0	0	0	0	**81**
Green onion	0	0	0	0	0	0	14	17	0	0	0	0	**31**
Broad bean in green	0	0	0	0	0	0	19	0	0	0	0	0	**19**
Tomato	0	0	0	0	0	0	0	0	71	135	177	28	**412**
Pepper	0	0	0	0	0	0	0	0	38	106	168	63	**375**
Melon	0	0	0	0	0	0	0	0	60	128	150	46	**384**
Water melon	0		0	0	0	0	0	0	38	98	141	28	**306**

V.4 - Cultivations data on equipped perimeter by TS-P13 Project

V.4.1 - Real evapo-perspiration of the suggested cultivations in Fernana and Hammam Bourguiba perimeters

Table n°V-7 of page 7 gives the Real evapo-perspiration calculated for the various cultivations suggested in Fernana perimeter when their productivity level is good, and Table n°V-8 of page 7 in Hammam Bourguiba perimeter.

Table n°V-7 : ETR in average year for an output index of 100 in Fernana perimeter

Month / Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Walnut tree	40	9	0	0	0	0	0	15	49	100	141	104	**457**
Pear tree	26	14	0	0	0	0	0	15	54	107	159	69	**444**
Apple tree	26	0	0	0	0	0	11	37	81	128	106	52	**441**
Citrus fruits	73	27	11	0	0	0	8	22	54	86	106	104	**491**
Olive tree for oil	26	9	0	0	0	0	0	7	22	36	53	43	**196**
Olive tree for table	46	14	0	0	0	0	0	15	27	50	71	78	**300**
Wheats	0	0	0	8	17	27	50	70	22	0	0	0	**193**
Barley-grain	0	0	0	8	14	25	47	66	0	0	0	0	**160**
Oats	0	0	0	8	21	29	53	44	0	0	0	0	**154**
Triticale	0	0	0	8	17	25	47	70	16	0	0	0	**183**
Leguminous plants	0	0	11	23	29	34	50	0	0	0	0	0	**147**
Tobacco	0	0	0	0	0	0	0	15	86	150	176	52	**479**
Barley in green	0	0	0	8	14	25	47	70	76	0	0	0	**239**
Bersim	0	0	0	8	17	27	50	73	65	0	0	0	**240**
Hay of Vetch-Oat	0	0	0	8	17	27	50	37	0	0	0	0	**139**
Fodder sorghum	0	0	0	0	0	0	0	0	22	114	194	138	**468**
Carrot	0	0	11	19	24	31	50	37	0	0	0	0	**172**
Turnip	0	0	11	19	24	31	50	37	0	0	0	0	**172**
Potato	33	55	50	42	26	0	0	0	0	0	0	0	**205**
Green onion	0	0	11	17	22	31	47	44	0	0	0	0	**173**
Garlic	0	0	11	17	22	29	39	18	0	0	0	0	**137**
Vegetables with leaves	0	0	11	17	22	33	50	51	0	0	0	0	**184**
Strawberry	40	0	0	0	0	0	0	11	38	100	168	156	**511**
Tomato	0	0	0	0	0	0	0	11	86	143	176	35	**451**
Pepper	0	0	0	0	0	0	0	11	54	114	168	69	**416**
Melon	0	0	0	0	0	0	0	15	76	135	150	52	**428**
Water melon	0	0	0	0	0	0	0	7	54	107	141	35	**344**

Table n°V-8 : ETR in average year for an output index of 100 in Hammam Bourguiba perimeter

Month / Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Walnut tree	40	9	0	0	0	0	0	15	50	103	146	107	**471**
Pear tree	27	14	0	0	0	0	0	15	56	110	164	71	**458**
Apple tree	27	0	0	0	0	0	11	38	84	132	110	53	**456**
Olive tree for oil	27	9	0	0	0	0	0	8	22	44	64	53	**228**
Olive tree for table	47	14	0	0	0	0	0	15	28	52	73	80	**309**
Wheats	0	0	0	8	17	27	50	73	22	0	0	0	**197**
Barley-grain	0	0	0	8	14	25	47	69	0	0	0	0	**163**
Oats	0	0	0	8	21	29	53	46	0	0	0	0	**156**
Triticale	0	0	0	8	17	25	47	73	17	0	0	0	**187**
Leguminous plants	0	0	11	23	29	34	50	0	0	0	0	0	**148**
Tobacco	0	0	0	0	0	0	0	15	90	155	183	53	**495**
Barley in green	0	0	0	8	14	25	47	73	78	0	0	0	**245**
Bersim	0	0	0	8	17	27	50	76	67	0	0	0	**246**
Hay of Vetch-Oat	0	0	0	8	17	27	50	38	0	0	0	0	**140**
Fodder sorghum	0	0	0	0	0	0	0	0	22	118	201	142	**483**
Carrot	0	0	11	19	24	31	50	38	0	0	0	0	**174**
Turnip	0	0	11	19	24	31	50	38	0	0	0	0	**174**
Potato	34	55	50	42	26	0	0	0	0	0	0	0	**207**
Green onion	0	0	11	17	22	31	47	46	0	0	0	0	**175**
Broad bean in green	0	0	11	23	29	38	53	0	0	0	0	0	**154**
Tomato	0	0	0	0	0	0	0	11	90	147	183	36	**466**
Pepper	0	0	0	0	0	0	0	11	56	118	173	71	**430**
Melon	0	0	0	0	0	0	0	15	78	140	155	53	**442**
Water melon	0	0	0	0	0	0	0	8	56	110	146	36	**356**

V.4.2 - Theoretical water requirements of the suggested cultivations for a good productivity level

Table n°V-9 below gives the unit requirements in average year expressed in mm for the various cultivations suggested in Fernana perimeter when their productivity level is good, and Table n°V-10 of page 9 in Hammam Bourguiba perimeter.

Table n°V-9 : Water Requirements out in average year for an index output of 100 in Fernana perimeter

Month / Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Walnut tree	6	0	0	0	0	0	0	0	9	86	138	97	**337**
Pear tree	0	0	0	0	0	0	0	0	8	94	161	63	**326**
Apple tree	0	0	0	0	0	0	0	0	36	116	106	45	**304**
Citrus fruits	39	0	0	0	0	0	0	0	14	72	103	97	**326**
Olive tree for oil	0	0	0	0	0	0	0	0	0	22	50	36	**109**
Olive tree for table	13	0	0	0	0	0	0	0	0	37	68	71	**188**
Wheats	0	0	0	0	0	0	0	1	0	0	0	0	**1**
Barley-grain	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Oats	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Triticale	0	0	0	0	0	0	0	1	0	0	0	0	**1**
Leguminous plants	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tobacco	0	0	0	0	0	0	0	0	47	136	173	45	**402**
Barley in green	0	0	0	0	0	0	0	1	36	0	0	0	**37**
Bersim	0	0	0	0	0	0	0	5	25	0	0	0	**30**
Hay of Vetch-Oat	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Fodder sorghum	0	0	0	0	0	0	0	0	0	101	191	132	**423**
Carrot	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Turnip	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Potato	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Green onion	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Garlic	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Vegetables with leaves	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Strawberry	6	0	0	0	0	0	0	0	0	86	165	149	**406**
Tomato	0	0	0	0	0	0	0	0	47	129	173	28	**377**
Pepper	0	0	0	0	0	0	0	0	14	101	165	62	**342**
Melon	0	0	0	0	0	0	0	0	36	122	147	45	**350**
Water melon	0	0	0	0	0	0	0	0	14	94	138	28	**274**

Table n°V-10 : Water Requirements in average year for an output index of 100 in Hm Bourguiba perimeter

Month Practised Speculations	Sept	Oct.	Nov.	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	**Total**
Walnut tree	0	0	0	0	0	0	0	0	3	87	143	99	**331**
Pear tree	0	0	0	0	0	0	0	0	8	94	161	63	**326**
Apple tree	0	0	0	0	0	0	0	0	36	116	106	45	**304**
Olive tree for oil	0	0	0	0	0	0	0	0	0	28	60	45	**134**
Olive tree for table	7	0	0	0	0	0	0	0	0	35	69	72	**184**
Wheats	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Barley-grain	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Oats	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Triticale	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Leguminous plants	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tobacco	0	0	0	0	0	0	0	0	42	139	179	45	**405**
Barley in green	0	0	0	0	0	0	0	0	31	0	0	0	**31**
Bersim	0	0	0	0	0	0	0	0	19	0	0	0	**19**
Hay of Vetch-Oat	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Fodder sorghum	0	0	0	0	0	0	0	0	0	102	197	134	**433**
Carrot	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Turnip	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Potato	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Green onion	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Broad bean in green	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tomato	0	0	0	0	0	0	0	0	42	131	179	27	**379**
Pepper	0	0	0	0	0	0	0	0	8	102	170	63	**343**
Melon	0	0	0	0	0	0	0	0	31	124	152	45	**351**
Water melon	0	0	0	0	0	0	0	0	8	94	143	27	**273**

VI - SONEDE Action Plan

To meet the requirements out of drinking water for the large urban poles starting from Northern waters, SONEDE has established an action plan whose objective is to reinforce its water processing and distribution capacities. This program comprises the realization of treatment and pumping stations, the construction of new tanks, ...

To use water available in supplement thanks to the doubling of the control of transfer between the Sejnane stopping and the Mejerdah-Cape-Bon canal, SONEDE urged a whole series of work to fill the requirements out of water for all the coastal cities starting from Water for the North, whose bill books are as follows :

- the realization of two treatment stations to meet the water requirements out for Large Tunis to the near of 2010 :
  - Station ST3 of 2 m^3 /S carried out between 1993 and 1995 to meet the needs up to 2002 ;
  - Station ST4 of 1 m^3 /S carried out between 2004 and 2005 to meet the needs for expiry 2010.

- the realization of a new pumping station (SP' 1) of flow equal to 3 m^3 /S similar to the old station (3,5 m^3 /S). Work of this station will be spread out on two phases :
  - a first phase 1997-1998 engineering + equipment+ position of the conducts between pumping station and treatment station ;
  - a second phase of reinforcement of the equipment to satisfy the needs of Large Tunis to the horizon of 2010.

Works to fill the water requirements out of for the Sahel, Sidi Bouzid, Kairouan and Sfax starting from Northern Water spread out on 3 phases :

- Phase 1 (1994-1996) :
  - installations of 2 boosters (SS1 and SS2) with a capacity of 2,4 m^3 /S each one on the supplying pipe for the Sahel ;
  - construction of the pumping station of Kerker (SP4) with a capacity of 1 m^3 /S.

- Phase 2 (1997-2000) :
  - Doubling the water pipe Belli Sousse (length : 103 km ; diameter : 1,4 m) ;
  - Execution of a pumping station (SP2) of 2,9 m^3 /s on double control Belli Sousse pumping of MCB canal ;
  - Realization of a storage reserve of 20 $M.m^3$ capacity supplied with SP2
  - Execution of a station of recovery (SR2) of 2,9 m^3 /s to the downstream of reserve
  - Realization of a new station of treatment of 2,3 m^3 /s capacity nourished starting from the station of recovery SR2.

- Phase 3 (2005 – 2006) :
  - installation of two boosters on the doubling Belli-Sousse (SS5 and SS6) of 2,9 m^3 /S each one ;
  - Extension of the new treatment station on the doubling Belli Sousse of 0,6 m^3 /S ;
  - Realization of the overpressure station of Bougrine (SP3) with a capacity of 1,2 m^3 /S on the section Sousse Sfax ;