

REPUBLIQUE TUNISIENNE

INAT

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SPATE IRRIGATION PROFILE OF TUNISIA

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INTRODUCTION

➤ *The location of Tunisia and its topography are responsible for its limited water resources. Its total surface area is 164 150 km², the agricultural land is only 28% of this total area, i.e., about 4.5 million ha.*

➤ *The climate varies from Mediterranean to semi-arid and arid; it is characterized by hot and dry summers and mild winters receiving the major part of the annual precipitation.*

➤ *Average annual rainfall is around 594 mm in the North, 289 mm in the Centre, and 156 mm in the South; it is ranging from 1500 mm in the extreme North to less than 100 mm in the extreme South.*

➤ *The annual precipitation in Tunisia is on average equal to*

INTRODUCTION

- *37 billion m^3 and is ranging from 11 to 90 billion m^3 .*
- *Average annual evapotranspiration is also high and water deficit is particularly significant from May to October.*
- *The annual evaporation varies between 1300 mm in the north to about 2500 mm and even more in the south.*
- *The water resources are about 4.67 billion m^3 of which 2.7 billion m^3 are from surface water and 2 billion m^3 from groundwater*

Definition of SPATE irrigation in Tunisia

- *Water shortage is a critical problem in the center and the south of Tunisia*
- *Several water harvesting methods have been initiated to alleviate this problem*
- *Floods have positive aspects for irrigation , roots soil layers Recharge and water table recharge*



Definition of SPATE Irrigation in Tunisia

- *SPATE irrigation is a type of water management, that is unique to semi arid environment*
- *SPATE irrigation was practiced by riparian in order to control the water flood use. The local name is “Mgoud”,*

Advantages of SPATE irrigation

- *It improves the crops yield (especially cereals and fodder crops).*
- *It contributes in the maintenance of the hydrologic system equilibrium.*
- *It improves the soil quality.*

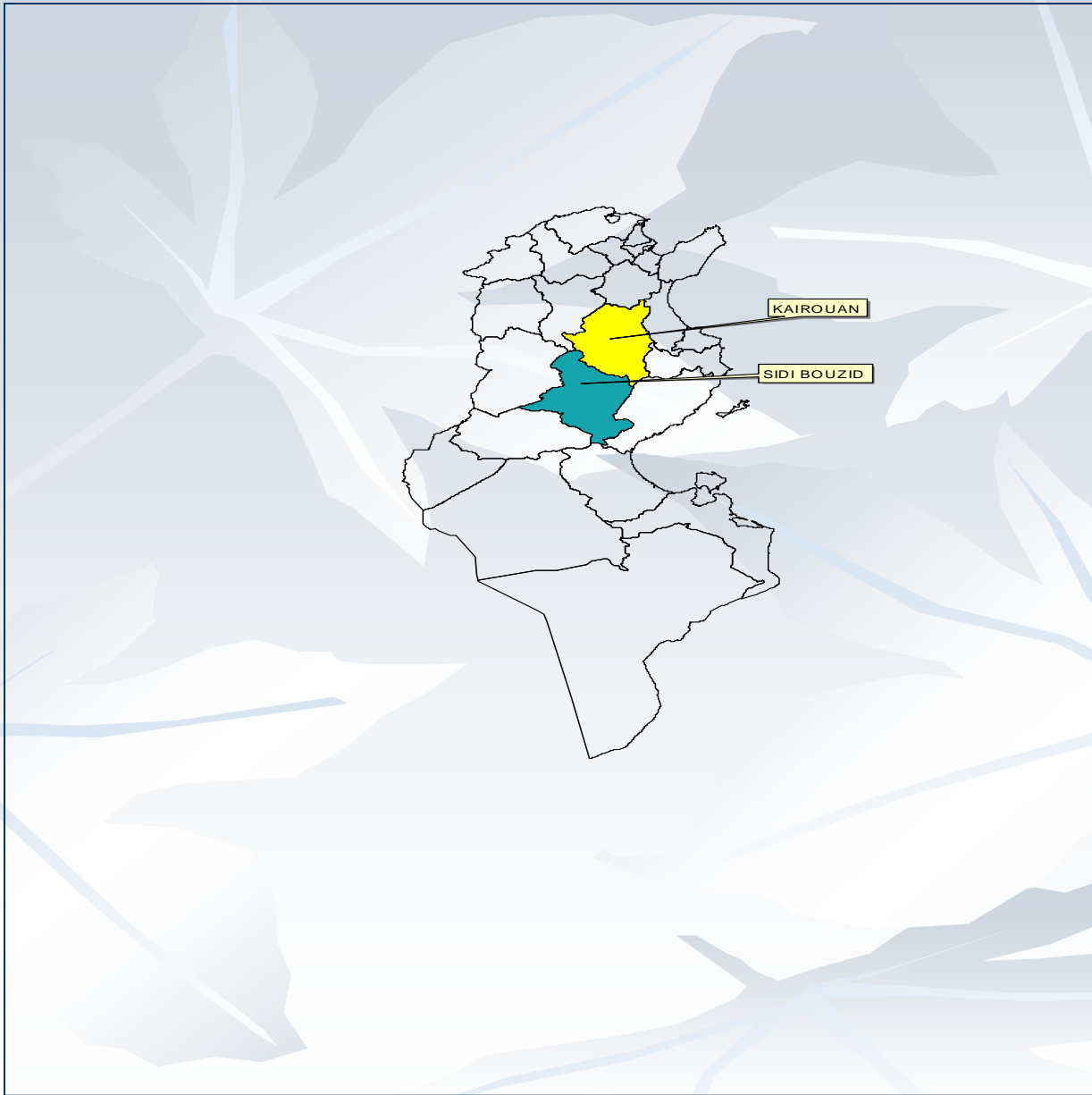
Cultivated area under SPATE irrigation

The irrigated perimeters surface (400000 ha)



*The potential of SPATE cultivated area (20 000 ha) located in
the centre*

Sidi Bouzid et Kairouan



- *Irrigation depends on the floods generated by non-perennial rivers such as Wadi Kebir, Wadi sisi Aich, Wadi Fekka, Wadi sisi Ali ben Jeballah, Wadi El Hachim and Wadi Sahha.*
- *During the last 5 years, the SPATE cultivated areas are about 16 000 ha.*

Administrative state of SPATE irrigation

- *SPATE perimeters in Tunisia are mostly public.*
- *SPATE system is managed and maintained by the CRDA.*
- *There are few farmers who spread water floods on their perimeters independently.*

Size of SPATE irrigation systems

➔ **SPATE irrigation systems size depends on :**

- * The extent of the river from where flood waters are arrived.**
- * The agrarian state of perimeters**

SPATE System Category	SPATE Perimeter Size (Ha)
Small (S)	< 50
Medium (M)	50-150
Large (L)	> 150

Water sources for SPATE irrigation

➔ *In Tunisia, the common source of SPATE irrigation systems is only SPATE flow (there is no use of ground water or base flows)*

Water distribution methods

The most used methods in Tunisia are :

- *Individual field*
- *Field-to-field*
- *Extensive*
- *Intensive by cluster*

Gender and SPATE irrigation

- ➔ *Women are integrated in almost all the different economic sectors in Tunisia*
- ➔ *Women represent 32% of the agriculture sector (2004).*
- ➔ *in SPATE irrigation, women are involved in agricultural practices, harvesting.*
- ➔ *they are also involved in infrastructure only with studies.*
- ➔ *About marketing, the role of men is generally more important.*

Water diversion

➔ *SPATE irrigation in Tunisia is divided into two types :*

** **Traditional SPATE irrigation** : by derivation of the river part using a structure which begins from the middle of the river.*

** **Modernized SPATE irrigation** : based on theoretical calculation, they allow :*

- To resist to strong floods*
- To derivate a pet of the strong floods*
- To better control the admitted discharge*
- To minimize the solid transport into the network*

➡ *The system is composed from :*

- * A derivation dam, located across the river, in the upstream of the perimeter to irrigate.*
- * A network of channels, inside each parameter.*

Bank protection and wadi training

The used materials are :

** Earth (clay) and stones*

** Reinforced concrete*

Water distribution rules and rights

There is only AIC (Association of Collective Interest) whose the role is the management of water floods and their distribution between farmers

Maintenance of SPATE systems

***The maintenance of the SPATE system is among
the roles of the AIC***

Enforcement of water distribution rules

***A management contract of a three years length
must be signed between the administration
and every AIC***

Soil moisture conservation utilized in SPATE irrigation

We utilize the same technics used for the other irrigation systems :

- * Ploughing after irrigation*
- * Conservation tillage*
- * Breaking crusts prior to irrigate depends of the existence of rocks or not in the soil.*

Risks in SPATE irrigation and cropping strategies

*The SPATE system is a kind of conservation of water and soil.
It is a complementary way to increase the economic yield.*

Crops and productivity under SPATE irrigation

- *The center of Tunisia (Sidi Bouzid) is known by its cerealiculture and fodder crops.*
 - *recently, watermelon is introduced in SPATE perimeters.*
 - *the intercropping is also practiced between fruit trees.*
- NB :** *the government of Sidi bouzid become one of the main agricultural regions of the country.*
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- *This irrigated sector produces 291 000 quintals of cereal products, 320 000 tons of vegetables and 4 350 tons of arboreal per year = 50% of agricultural production and use 55% of the mainpower working in the agricultural sector.*

SPATE irrigation constraints

- ***There are some problems of water management between farmer***
- ***Sometimes strong floods destroy the SPATE structure***
- ***Old structures are becoming very weak***

List of SPATE irrigation systems

Structures are situated in the plain of Sidi bouzid on the oued Al fakka.

Structures of Nouael, in the intersection of the Tunis-Gafsa road with oued Al fakka.

Those of Zaafrica constitute a good example of the possibility to put back today the old techniques of SPATE by new process

Costs of SPATE irrigation projects

The table below indicates the importance of reserved investissements in the 10th plan :

<i>Activities</i>	<i>2002-2006</i>		<i>2002-2011</i>	
	<i>Cost (million \$)</i>	<i>Area (ha)</i>	<i>Cost</i>	<i>Area</i>
<i>Units of SPATE flows and watertable refill (units)</i>	<i>27,95</i>	<i>1265</i>	<i>6,63</i>	<i>3 000</i>

Farm incomes

The strong variability of rainfall and the dynamic of the economy in the market makes very difficult the assessment of farm income.





Thank you for your attention