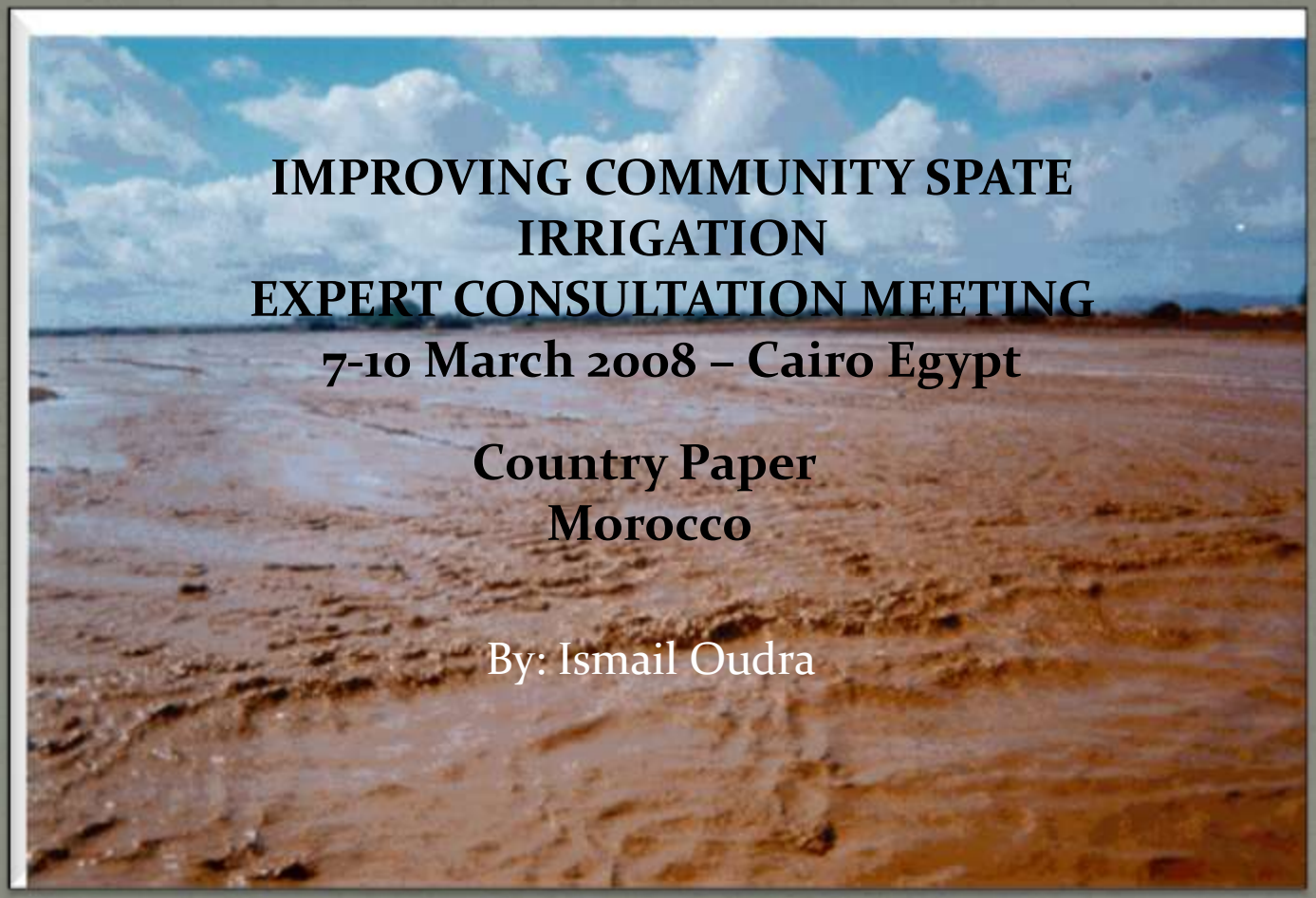
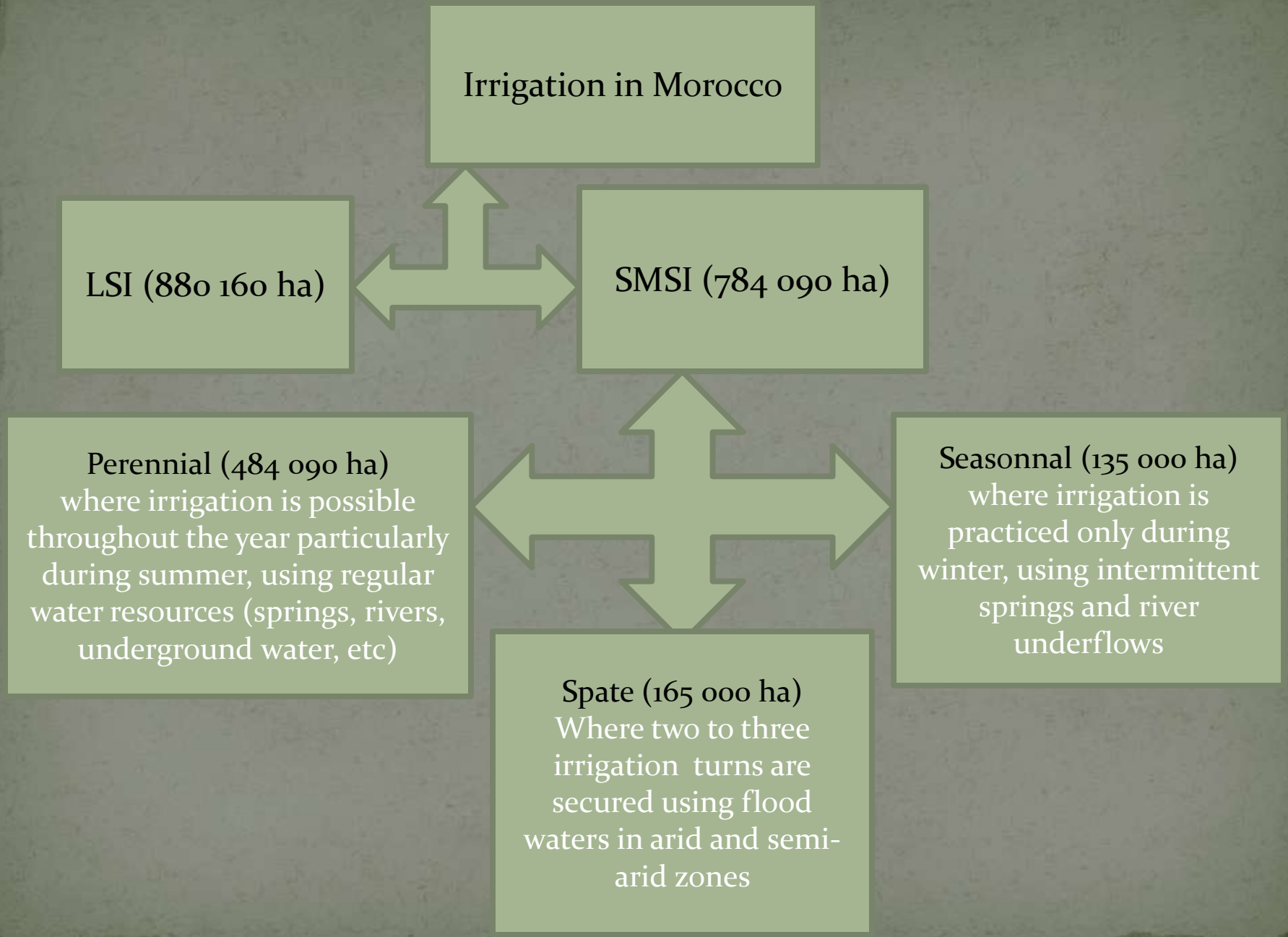
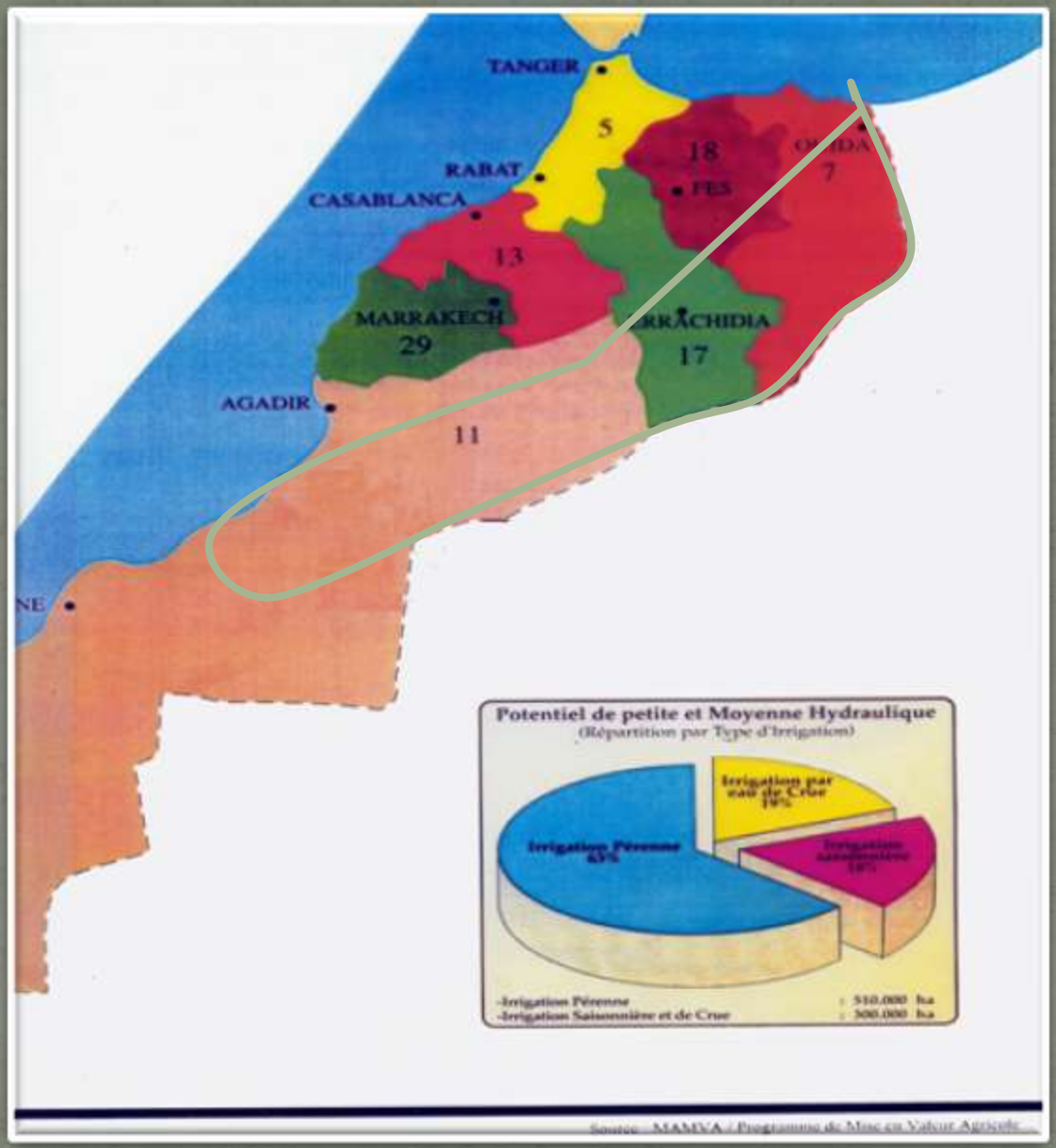


IMPROVING COMMUNITY SPATE IRRIGATION
EXPERT CONSULTATION MEETING
7-10 March 2008 – Cairo Egypt

Country Paper
Morocco

By: Ismail Oudra


Irrigation in Morocco
LSI (880 160 ha)
SMSI (784 090 ha)
Perennial (484 090 ha) where irrigation is possible throughout the year particularly during summer, using regular water resources (springs, rivers, underground water, etc)
Seasonnal (135 000 ha) where irrigation is practiced only during winter, using intermittent springs and river underflows
Spate (165 000 ha) Where two to three irrigation turns are secured using flood waters in arid and semi-arid zones


TANGER
5
RABAT
18
FES
7
CASABLANCA
13
MARRAKECH
29
17
AGADIR
11
Potentiel de petite et Moyenne Hydraulique
(Répartition par Type d'Irrigation)
Irrigation par eau de Crue
10%
Irrigation Pérenne
45%
-Irrigation Pérenne : 510.000 ha
-Irrigation Saisonnière et de Crue : 500.000 ha
Source : MAMVA / Programme de Mise en Valeur Agricole

- The traditional diversion systems (earthen, stone or brushwood structures; and many small intakes with short canals) still dominate in Morocco
- Communal development is the main characteristic of spate diversion in general !
- Around 80 000 ha are under spate irrigation !?
- Spate irrigation perimeters are concentrated in southern Atlas basins and oriental highlands
- Equipped areas receive public support through the government's regional development agencies. This concern mainly assisting with maintenance by providing earthmoving machinery.
- Around 37 000 ha are equipped for spate irrigation

- Damming floods, and consequently, inundating the valley bottom of the flood plain is considered as part of spate irrigation
- Many perimeters which used to be irrigated with spate water are today irrigated with perennial water secured by newly constructed dams mainly in the Ziz and Draa valleys
- Some perimeters use a combination of spate water and intermittent springs or river underflows, while others use only one type of resource. However, figures are generally available for the combined area under spate and seasonal irrigation, and as a result, it is difficult to distinguish these two types of irrigation.

- At the national level, all activities related to spate irrigation are under the control and responsibility of the Directorate for the Development of Agricultural Hydraulic Infrastructures (DAHA) which is under the authority of the Agricultural Administration of the Ministry of Agriculture.
- At provincial level, the administration in charge of such activities is the Provincial Directorate of Agriculture (DPA), or in some areas, the regional development agency called ORMVA.
- Under law N° 2-84, related to the water users' association (WUA), local beneficiaries became an essential partner.

- Spate water flow remains the main source irrigation
- Groundwater resources in the plains has for centuries allowed the development of a range of techniques to exploit this resource and supplement spate water
- Exploitation of groundwater through Khettaras was mainly concentrated in the south eastern part of Morocco. But actually the exploitation of groundwater in combination with spate water has spread everywhere with the development of technology.

- Spate irrigation is mainly developed on a small scale as most of these areas range between few hectares to 500 ha.
- Rare are the perimeters having medium size (from 500 to 4000 ha), and they are for the most part concentrated in Guelmim lowland.
- Land tenure is characterized by small holders (micro-farms). Average farm size is almost 1 ha divided into 3 plots. Ninety percent of the farmers own less than 5 ha.
- Private ownership represents 95% of land tenure. The remaining 5% are part of religious holdings called “Habous”
- The main farming system under spate irrigation is represented by a combination of cereals, fallow and livestock.

- Programs were limited to emergency intervention.
- Starting 1980s, more focus on integral rehabilitation.
- Starting in the 1990s, spate irrigation projects registered more interest among international funding institutions
- Actually greater focus is given to the development of an integrated approach for the rehabilitation of spate irrigation

Projects	Perimeters	Provinces	Areas in ha	Costs	Implementation year
Italian Cooperation & UNFAO	Oum Laachar	Guelmim	2.000	2,33 Million US$	1995-2002
Belgian Cooperation	P. Tiznit	Tiznit	2.585	90,00 Million FB	2001-2002
Tafilalet and Dades Rural Development Project (PDRT)	Seven perimeters	Errachidia & Ouarzazat	9.170	52,5 Million US$	1995-2005
Taourirt-Tafoughalt integrated rural development project	P. Oued Isly & others	Taourirt & Oujda	2.237	381 Million MAD	1998-2005

- Diversion dams / weirs
- Settling basin
- Sediments excluder constructed between the dam and the distribution system
- Rejection spillway,
- Reinforced gated or un-gated intakes
- Guide walls
- Protection works
- Flood discharge regulating dams

- Villages often have a physically different distribution system for floodwaters, which run through much larger canals than those handling normal or base flows.
- In the newly launched projects, design of spate distribution structures aimed at ensuring a minimum water level of 20 cm flowing with an average speed of 0.50 m/s to cause an authentic flood in the plots without any erosion in the field.
- The flood water is channeled through a network of primary, and sometimes secondary or even tertiary flood channels.
- These large canals end with a dissipation structure of triangular form at the upstream part of each irrigation sector. This increases the irrigated area and improves spate water distribution.

- This traditional water management system aimed to secure on average two irrigation turns at the earliest time of the flood/irrigation season.
- Spate water exploitation is in general guided by the community water rights where the priority is given to the upstream farmers.
- Some exception can be noticed, particularly in Tafilalete plain, where the distribution of spate water between different perimeters was regulated through an agreement made by the concerned farmers and each perimeter receives part of spate flow from Oued Ziz.
- Ultimately, when more floods occur, it also promotes fair flood water sharing within and among the upstream, midstream and downstream irrigated areas.

- For cereals, yields are in average around 15 q/ha for wheat, 9 q/ha for maize and 15 q/ha for barley.
- Yields for wheat are around 15 quintals per hectare for a good year when at least two floods occur at the beginning and the end of cropping cycle.
- If the plants receive only one irrigation turn, yields decrease to reach on average 5 to 10 quintals per hectare.

- earthmoving machinery call for different organization: managerially, financially and technically
- farmers are engaged in another struggle; this time not for water but against sand
- for several reasons, most big projects have not reached their anticipated results
- Many perimeters which used to be irrigated exclusively by spate water are today using most exclusively groundwater, encouraging by the same way the installation of modern farms producing high value crops with the risk that represents for a sustainable development in these zones.

- Newer technologies have been designed to deliver greater quantities of water, and may provide a more reliable source of water that is less susceptible to natural fluctuations in water regimen. But 'out with the old and in with the new' has long been a trend everywhere, and must be as economies develop and populations expand, increasing the need for more water and other resources.

- Simple systems / complicate farmers
- Complicate systems / simple farmers