Oasis Water Project – Water Care for Life

Mara MORBIN, Italy

Key words: Land Management, Land Distribution, Urban Renewal, Water, Water Source

SUMMARY

In broad geographic regions of the world the persistent shortage of water or its poor management has a mainly impact on the health of populations and their social development.
Among the desirable and sufficiently decisive solutions, it is interesting to illustrate the "Oasis Water Project."
This project aims to promote the resolution of the problem through treatment and proper management of spring water and through optimization of management (cultivation, etc..) of land situated around.
The project was born from my mind and is technically and logistically possible thanks to a company that gave me useful instructions and information on purifying water and related equipment.
This type of actions interested also UN which this company cooperate with for humanitarian shipments.
Oasis Water Project was born and works around any water source (new well, existing dam, river, lake, sea, ocean) not only to make it drinkable and accessible to people but also to create, around this vital source of human life, a true community, providing a cost-effective land management and all the additional infrastructure that lead to an economic and social development of the territory concerned.
The water is properly treated through effective water purifying equipments and reverse osmosis filtration, making it drinkable. The surrounding area of water distribution, specifically detected and identified by careful measurements, is urbanized and appropriately divided according to specific intended uses, including homes, cultural, health and worship centers, stores and equipment products from local crops, fences for pets, etc...
The treatment and water supply system provides a modular system of containers, one for current generator, one for water treatment, one for storage and one for distribution. This modular fragmentation also allows the implementation of other structures and other components useful for the development of the area, such as wind power and/or solar energy stations, medical centers, etc. ..
Once you find the area and the specific needs of the interested community, it is essential to identify appropriate partners including local and financing authorities to ensure the correct and transparent implementation of the project, sharing the goals and strategies in compliance with all standards.

The equipment, construction of the works and their management involve also a significant employment contribution of local communities, so that they can acquire additional growth and development opportunities.

The project, already known and tested with positive feedback on behalf of both international charitable associations and civil society organizations, is focused to create a self sustainable community and territory with the utmost respect for the environment and people.

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1. WATER, THE SOURCE OF LIFE

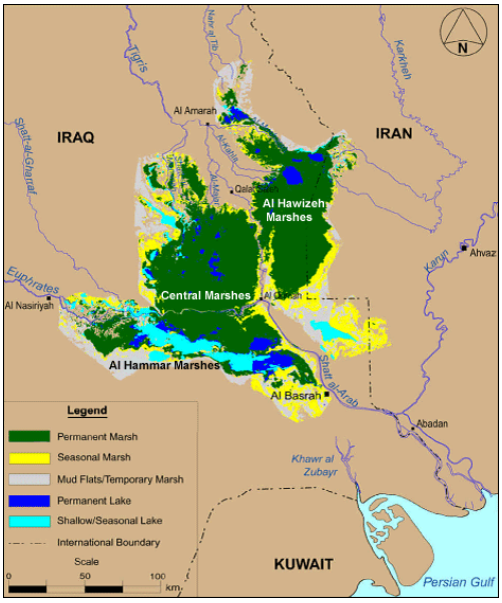
Water has been the source of life and the cradle of civilisation since ancient times.
Water is vital for human beings. Since ancient times it has favoured the birth of diverse civilisations and cultures, with their integration and the establishment of commerce between them, it has enabled the development of farming and it has been a means of defence in prehistoric times for lake-dwellers and in mediaeval times with fortifications surrounded by deep moats.

2. PROJECT AND AIMS

The Oasis Water Project is created and develops around any source of water (new or existing wells, dams, rivers, lakes, seas, oceans) and it does not limit itself to making water drinkable and accessible to inhabitants, but also seeks to create a true and proper community around this absolutely essential asset for human life, by providing all the additional infrastructures which lead to an economic and social development of the area in question.
In this way, a new stable society will develop, which is self-sufficient and sustainable over time.

3. LOCATION

The project is aimed at all those large geographical regions of the world characterised by a persistent lack of or poor regulation of water, characteristics which have adverse affects on the health of the population and its social development.



4. RECIPIENTS

The project is aimed towards populations who have been evacuated due to famine, disease, pollution, natural disasters or wars, who wish to find a balanced way of life elsewhere, and nomads who live in climatically difficult territories and who migrate from one place to another in search of their basic needs.

5. EXAMPLE OF A POSSIBLE PROJECT APPLICATION

In order to better understand this important phase, it is worth referring to a project aimed at bringing drinking water to the Iraqi marshlands which are supplied by water from the Tigris and Euphrates Rivers.

6. HISTORICAL AND CULTURAL ASPECTS OF PROJECT AREA

The projects aimed at making the marshes liveable were started in Iraq by the USA in 2003, with the aim of restoring a culture based on fishing, harvesting of sugar cane and reeds, as well as the raising of water buffalo. Water is currently present in these marshes, even if not in great quantities and it is not a homogeneous propagation. The water is not at all potable and it may not be used by the local inhabitants for personal hygiene or for cooking, and it should be noted that the water often does not reach areas which could be cultivated. In order to meet the needs for drinking water and to carry it where it is not currently available, the important UN project has introduced drinking water to the Iraqi marshlands and, consequently, repopulated the areas.

7. PROJECT TIMELINE

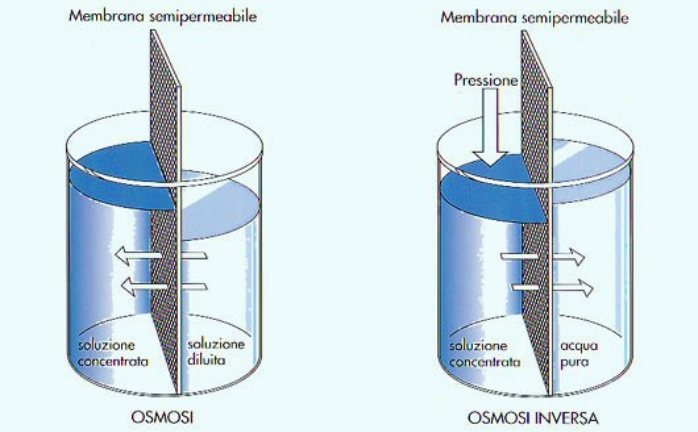
The project is prepared after having identified the water source and its type (river, well etc), ascertained its organoleptic characteristics, its degree of potability and whether its flow rate is more or less sufficient to satisfy the requirements. The project will concern the choice of the type of water treatment plant and its size for correct treatment and management of the waters and, at the same time, the planning and management of the lands surrounding the water source. These two aspects (which are covered in detail below) are fundamental since they enable an initial cost estimate to be prepared for submission to the aid organisations and, if necessary, private bodies (credit institutions, major industries...) which are active in social aid projects.

8. TREATMENT AND CORRECT MANAGEMENT OF WATERS

After identifying the water source and carrying out suitable analyses, the water is drawn by means of vertical submersible suction pumps.
It is necessary to analyse the water in order to understand whether pre-treatment is necessary or not, before proceeding with the reverse osmosis water treatment mechanism. The collection of extraneous materials from the water (such as iron or silt particles) on the surface of the membrane and on the feed device and the deposit inside the system of poorly soluble salts (including calcium carbonate, barium sulphate, calcium sulphate, strontium sulphate and calcium fluoride) could cause operational problems for the treatment plant and the membrane.
THE REVERSE OSMOSIS WATER TREATMENT PLANT is split into in 4 MODULES-CONTAINERS, each of which has a particular function:

MODULE 1 water treatment: water suction by means of a submersible pump and water treatment firstly by filtering and then with a reverse osmosis system, all managed by a sophisticated control panel.

Reverse osmosis is the process in which the passage of the solvent molecules is forced from the more concentrated solution to the less concentrated solution by applying a pressure to the more concentrated solution which is greater than the osmotic pressure. Traditional osmosis, as may be seen in the first figure below, takes place when there are two solutions, one concentrated and the other diluted, which are in communication through a membrane. The diluted solution subjected to osmotic pressure moves towards the concentrated solution and the two solutions will equalise their water-dissolved substances ratio: the diluted solution reduces in quantity and the concentrated solution increases. Reverse osmosis, on the other hand, takes place by applying a pressure to the latter concentrated solution which is greater than the osmotic pressure. The membrane, in this case semi-impermeable, will treat the concentrate and the pure filtered water may be used. This process represents the finest water filtration technique which makes use of tangential filtration where the solute retained by the membranes is cyclically removed and carried to the drain. In this way, the membrane always remains efficient and clean. Reverse osmosis is used in water treatment and desalinisation plants both for the removal of traces of phosphates, calcium and heavy metals, as well as pesticides, radioactive materials and almost all pollutant molecules. Membranes are used in the reverse osmosis process (formed by thin films) made from polyamides, which are selected mainly due to their water permeability and the fact that they are relatively impermeable to the various dissolved impurities, including saline ions and other small molecules which cannot be filtered.



Legenda:

Membrana semipermeabile
soluzione concentrata
soluzione diluita
OSMOSI

Semi-impermeable membrane
concentrated solution
diluted solution
OSMOSIS

Membrana semipermeabile
pressione
soluzione concentrata
acqua pura
OSMOSI INVERSA

Semi-impermeable membrane
pressure
concentrated solution
pure water
REVERSE OSMOSIS

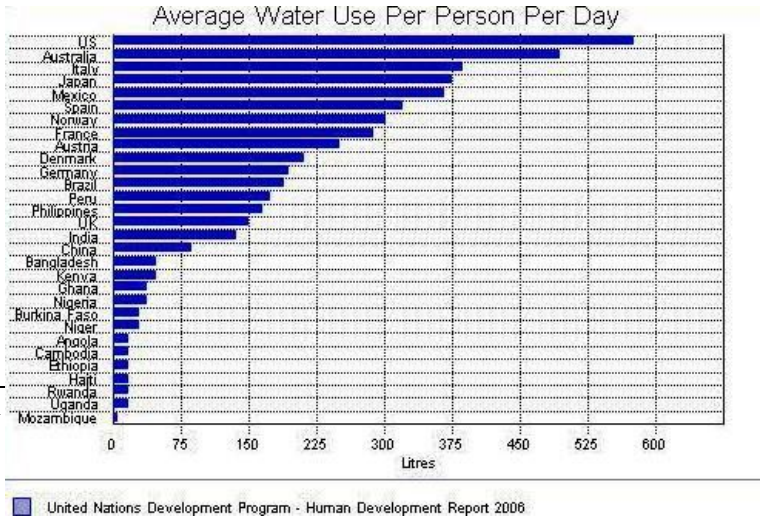
MODULE 2 Treated water storage tank;
MODULE 3 Tank for storage of water which is supplied by distribution pumps;
MODULE 4 Container for electricity generator for the treatment plant, with a diesel fuel storage tank: the generator will activate when the photovoltaic system exceeds its run time. A small photovoltaic system for the use of clean energy has been designed and installed on the top of each module to meet the electricity requirements of the treatment plant.
As well as the distribution of water in-situ, a 30 km long distribution network has also been set up with water taps every 500 m.
A number of people may be trained in situ, and they will then be able to manage the entire system. Making the inhabitants of the village responsible for the system will make them feel that they form part of the community and in this way the phenomena of nomadic ways of life will be reduced.



Fig. a: drawing of water, in this case from a river;
Fig b: storage and treatment tank, treated water storage tank and electricity generator container;
Fig c: water supply points, to be carried to distant villages by tankers.

9. SIZE OF VILLAGE

The village is established by bringing together two large groups of people living in the Iraqi marshlands and a third group of refugees who might decide to move and join with them.
The first group consists of approximately 300 families (approximately eight people per family is estimated) located on both sides of the River Gurmet Hassan (tributary of the Euphrates River).
The second group consists of approximately 120 families currently located at 3 km from the first group, close to a tributary of the above-mentioned River Gurmet Hassan, called Jigair Um. The third group, of refugees, consist of 350 people who could return to the area if water were guaranteed throughout the year.
GROUP 1
2,400 people (300 families of 8 people)



GROUP 2
960 people (120 families of 8 people)
GROUP 3
350 people
TOTAL No. of PEOPLE 3,710
It is therefore considered that approximately 4,000 people would form part of the village and they would need to be supplied with drinking water throughout the entire year.
Assuming the average water consumption per day per person to be 50 litres (for drinking, cooking and washing), the optimum production of drinking water for this location would be 200 m3/day (200,000 litres/day).
A reverse osmosis water treatment plant would therefore be sufficient with a capacity of 200 m3/day.

10. PLANNING AND MANAGEMENT OF SURROUNDING LAND

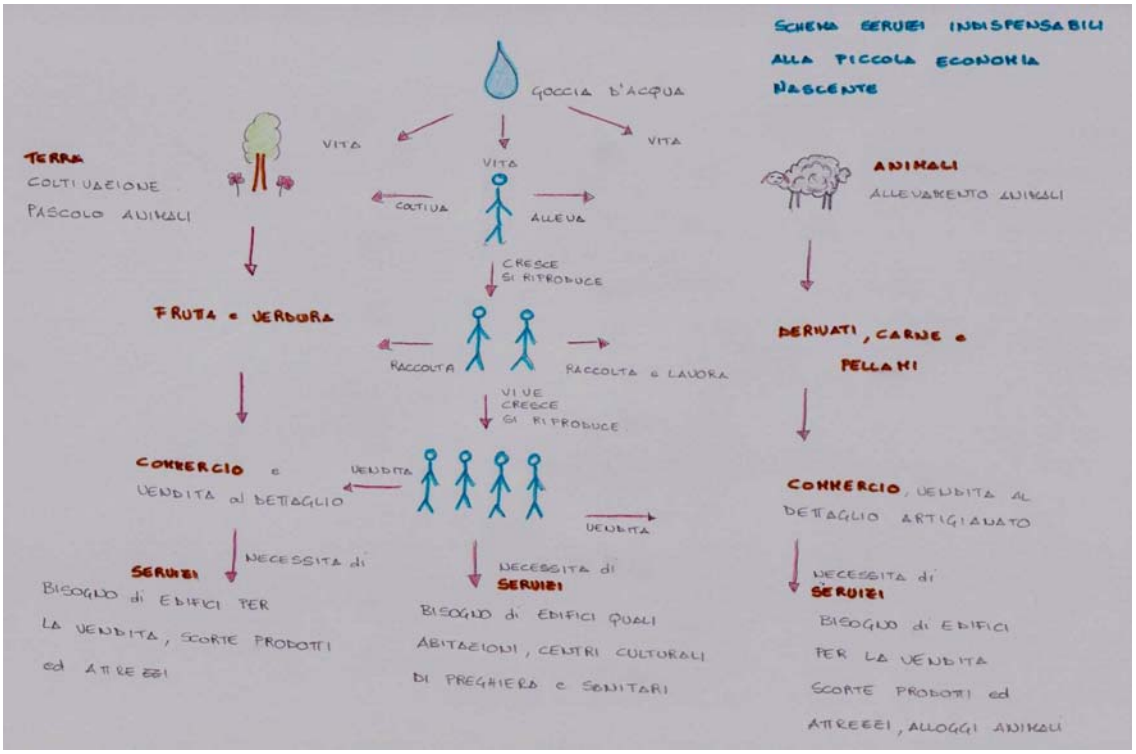
The territory surrounding the area for extraction, treatment and distribution of the water will be carefully studied and analysed in order to have a thorough outline of the status of the locations. This will be followed by:

- identifying the geomorphological characteristics of the land;
- determining the climatic characteristics/variations during the year;
- observing the temperature excursions between day and night;
- studying the solar exposure;
- study of rainfall;
- checking flora and fauna as well as animals in captivity present in the adjoining areas which can have an adverse affect on persons, animals and crops.

After preparing this current outline, the project area for the Oasis project will be identified. Detailed surveys will be carried out in order to prepare the layouts for the area and they will be subdivided in accordance with specific intended purposes depending on the uses and the gradually increasing needs.
Obviously, the dimensions will vary depending on the number of people, but the territories are so vast that there is no problem of finding sufficient space. However, it is right to consider the following aspect as it allows for an understanding of which areas are necessary.
It is well known that everything gravitates around precious water sources, which are indispensable for people for drinking, cooking and washing requirements (see above diagram of global water consumption/day); it is also necessary as drinking water for animals as well as watering the land. This is where a small economy starts, in which crops yield fruit and vegetables and animals provide meat and hides. This leads to small businesses, the exchange of products and small commercial and craft activities. In the meanwhile, all this generates wellbeing and the population increases, which results in the need for services such as health, education, churches and meeting places, as well as a growing number of dwellings. Consequently, there will be:

- water distribution area, with relative shaded areas;
- small commercial/craftsman enterprises and exchange activities;
- small cultural, meeting, religious and health centres;
- dwellings; animal sheds and tool stores;

- green areas and cultivated areas;
- water extraction and treatment areas with relative containers and a water drawing point so that it may be transported by tankers to inhabitants who, due to the relative distance, are unable to reach the source. However, many systems create a small drinking water network which carries the water to a tap placed at a maximum distance of 30 km.



LEGENDA	
SCHEMA SERVIZI INDISPENSABILI ALLA PICCOLA ECONOMIA NASCENTE	LAYOUT OF ESSENTIAL SERVICES FOR A SMALL COMMUNITY
TERRA	LAND
COLTIVAZIONE PASCOLO ANIMALI	FARMING PASTURE ANIMALS
VITA	LIFE
GOCCIA D'ACQUA	WATER DROPLETS
COLTIVA	FARMING
ALLEVA	ANIMAL RAISING
ANIMALI	ANIMALS
ALLEVAMENTO ANIMALI	REARING ANIMALS
CRESCE, SI RIPRODUCE	POPULATION INCREASES
FRUTTA E VERDURA	FRUIT AND VEGETABLES
RACCOLTA	HARVESTING
RACCOLTA E LAVORA	HARVESTING AND WORKING
VIVE, CRESCE, SI RIPRODUCE	POPULATION INCREASES
DERIVATI, CARNE e PELLAMI	BY PRODUCTS, MEAT AND HIDES
COMMERCIO e VENDITA AL DETTAGLIO	COMMERCE and RETAIL SALE
VENDITA	SELLING
COMMERCIO, VENDITA AL DETTAGLIO ARTIGIANATO	COMMERCE, RETAIL SALE, CRAFTS
NECESSITA di SERVIZI	NEED for SERVICES
BISOGNO di EDIFICI PER LA VENDITA, SCORTE PRODOTTI ED ATTREZZI	NEED for BUILDINGS FOR SELLING, STOCK of PRODUCTS and TOOLS
NECESSITA di SERVIZI	NEED for SERVICES
BISOGNO di EDIFICI QUALI ABITAZIONI, CENTRI CULTURALI DI PREGHIERA E SANITARI	NEED for BUILDINGS such as DWELLINGS, CHURCHES and MEDICAL CENTRES
NECESSITA di SERVIZI	NEED for SERVICES
BISOGNO di EDIFICI PER LA VENDITA SCORTE PRODOTTI ed ATTREZZI, ALLOGGI ANIMALI	NEED for BUILDINGS FOR SELLING, STOCK of PRODUCTS and TOOLS, ANIMAL BARNS

Fig d: layout of essential services for a small community.






Fig. e: current condition of dwellings for first group of people;
Fig. f: construction of small drinking water network;
Fig. g: water drawing point, one every 500 m outside village.
Fig. h: Oasis water project concept – animal fencing;
Fig. i: Oasis water project concept– treated water drawing area;
Fig. l: Oasis water project concept–panoramic view.

Once the technical containers reach the destination, after subdividing them as previously described, the following activities will be carried out:

- installation of the systems with training of the on-site personnel for management and correct operation;
- handing over of the water Oasis to the new local community which is set up after a co-management period, that is, the technical supplier will work alongside the on-site personnel for management of the system.

11. PROJECT COSTS

The position of each Oasis will have an impact on the construction costs since the main factors for an increase in costs are the transport of materials and instrumentation with the relative government taxes and customs duties. The total project cost will also depend on the quality of the water available which will determine the type of treatment technologies necessary for its improvement as well as the type of modules required for additional services (special medical centres, orphanages, etc). Financial aid from the various bodies is absolutely essential in order to implement the entire OASIS project.

12. CONCLUSIONS

The Oasis project is a simple and modular project which will grow and be modified in line with the needs of the community, which, living with it and having been involved in its management from the very beginning, will make it their own. In addition to the points made previously, the Oasis project will contribute towards:

- improving the living standards of the inhabitants;
- improving the health of the community thanks to the supply of better quality water and the setting up of small medical centres;
- improving health conditions, as poverty and famine will be stopped;
- improving the social wellbeing, with an increase in births;
- reducing infant mortality and HIV, malaria and other serious diseases;
- reducing the number of nomadic populations, since, as they find themselves in areas which satisfy all their needs, they will remain there permanently;
- social development by means of the grouping together and expansion of the community;
- economic development by means of the growth of small commercial and craftsman activities, extensive farming and animal rearing in order to achieve economic self-sufficiency;
- integration of women and children with their relative rights within the society so they will no longer be forced to seek and collect water and supplies;
- reduction of cultural and economic differences with rural and urban areas and surrounding developing and developed countries;
- achievement of a level of sustainability and, therefore, financial and environmental sustainable by the use of alternative energy sources and thanks to its own micro-economy.

CONTACTS

Mara Morbin
Via Monache, 5
35040 Grumolo delle Abbadesse (VI) Italia
Mob: +393406787042
E-mail: maramorbin@gmail.com