EMPOWERS Project in Egypt: An Example of a Learning Alliance Approach

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Abstract

EMPOWERS stands for "Euro – Med Participatory Water Resources Scenarios". It is a four –year regional project that works in three MEDA zone countries: Egypt, Jordan, and West Bank & Gaza. As the project is focusing on local water resources management, it works in Beni Suef Governorate in Egypt, the second poorest governorate in the country.

This paper presents and discusses the project processes while focusing on how they may be used as an example for learning alliance around water resources management. The paper will specifically address three tools namely: problem tree, Bayesian Networks/ belief networks (BN), and Geographic Information system (GIS). it will describe how the tools would work to enhance dialogue and build alliance among implementing team, stakeholders and end users.

The whole process of developing the problem trees at the various levels and in the communities created new awareness of the problems, and their causes. Important question associated with BN and GIS is how to communicate the results of the analysis (BN, GIS etc.) to other stakeholders. For some, the BN/GIS itself is appropriate. For others, it needs to be mediated through other channels. Another question is the role of the 'expert' in the overall process.

Background

EMPOWERS stands for "Euro – Med Participatory Water Resources Scenarios". It is a four –year regional project that works in three MEDA zone countries: Egypt, Jordan, and West Bank & Gaza. As the project is focusing on local water resources management, it works in Beni Suef Governorate in Egypt, the second poorest governorate in the country. The potable water and sewage water conditions in Beni Suef Governorate have the same characteristics as most of the other governorates of Egypt. Within Beni Suef, Ehnasia District was selected as the main focus for to build up management capacity within Beni Suef Governorate. EMPOWERS' overall objective is to improve long- term access to water by vulnerable populations through more effective local integrated water resource management. The project purpose is to strengthen the horizontal and vertical flows of information and influence between stakeholders in integrated water resource management in MEDA zone.

The situation in which the project works is one of fragmented structures consisting of nearly isolated agencies and departments with a stake in water in the governorate: irrigation, agriculture, potable water, sewage water, health, environment, and local administration in addition to the different end users. Therefore, as a first step the project team surveyed each agency and department individually to specify their duties and responsibilities, the flow of information, and how their work is affected by other agencies and departments. Accordingly, steering committees of relevant stakeholders were established at national and governorate levels. All the project activities are shared between the project team and representatives of all stakeholders through working groups and workshops. It can be concluded that currently the project sharing and learning processes are widely accepted by all stakeholders both on national and governorate levels.

This paper presents and discusses these project processes while focusing on how they may be used as an example for learning alliance around water resources management. The paper will specifically address three tools namely: problem tree, Bayesian Networks/ belief networks (BN), and Geographic

Information System (GIS). It will describe how the tools would work to enhance dialogue and build alliance among implementing team, stakeholders and end users.

EMPOWERS Project

EMPOWERS uses stakeholder platforms and opens channels of communications both horizontally (among users) and vertically (between users and officials) to achieve its objectives. EMPOWERS also uses a planning cycle as a methodology for realizing different tasks and expected results of Integrated Water Resources Management (IWRM). This paper will focus on some of the tools used in the planning cycle. The planning cycle is composed of six distinct steps: visioning, assessment, strategizing, planning, implementing, and reflecting. Due to the complex nature of the project, a learning period was deemed necessary before committing full resources to implementation. The light start was to address the above mentioned complexity and allow learning time for all country teams, develop working relationships between country teams, local stakeholders and end users and to build a coherent regional working strategy (see figure 1).

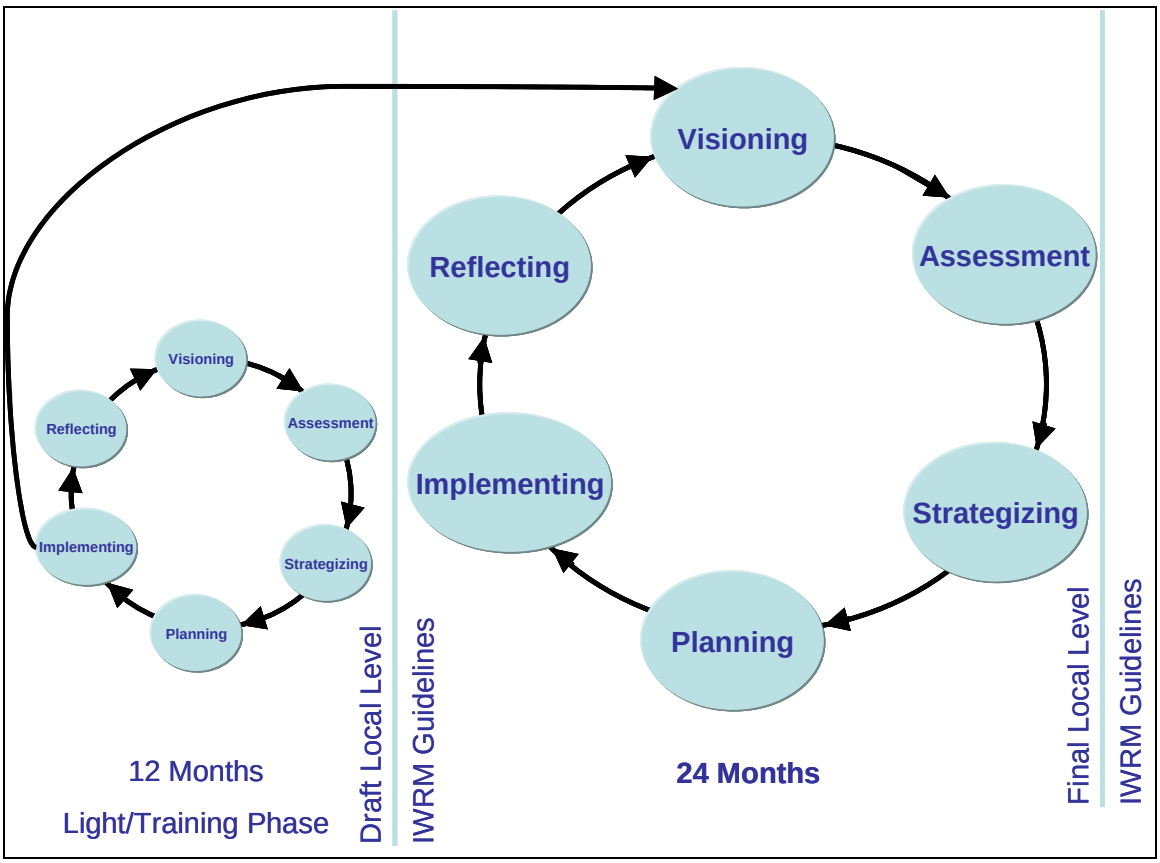

Figure 1: EMPOWERS phases of planning cycle

Each of the planning cycle steps would logically lead to one another and would use range of tools and methods to achieve its output. For example to create an initial vision of what the community would like to achieve about its water resources problems we would first have to develop a water resources problem tree specific to the community. Such problem tree can serve to focus data collection on the identified problems. As part of the assessment BNs and GIS can and are used to further analyze each problem and to determine its impact and place within the whole problem tree. In this paper description of how each of these three tools would work to enhance dialogue and build alliance among implementing team, stakeholders and end users will be provided.

Water resources in the target communities

The water resources in Egypt (total of 73 Billion M3/year based on water diversion) are the Nile water system which includes water available from Lake Nasser, ground water in the Nile Valley and Delta, drainage water, and treated wastewater; ground water in the desert areas; rainfall and flash floods in wadis; and desalination of seawater or brackish water. Water diversion means water entering or leaving the system in addition to recycling within the system (planning sector of MWRI, Egypt, and NFA, Netherlands, 2003.)

The Nile water system represents nearly 97 % of the Egyptian water resources. It can be therefore concluded that Egypt depends totally on the Nile water to fulfill all its requirements for different water consumption sectors agriculture, municipal and industry, fishery, and navigation. At this national level the main stakeholders are the Ministry of Water Resources and Irrigation (MWRI), Ministry of Agriculture and Land Reclamation (MALR), Ministry of Industry and Mineral Wealth (MIMW), Ministry of Housing, Utilities and New communities (MHUNC), Ministry of Health and Population (MHP), Ministry of Environmental Affairs (MEA), Ministry of Interior (MI), and Ministry of Local Government (MLG). Other stakeholders include governmental agencies and authorities, non-governmental organizations, donors, research institutes, universities, and training providers.

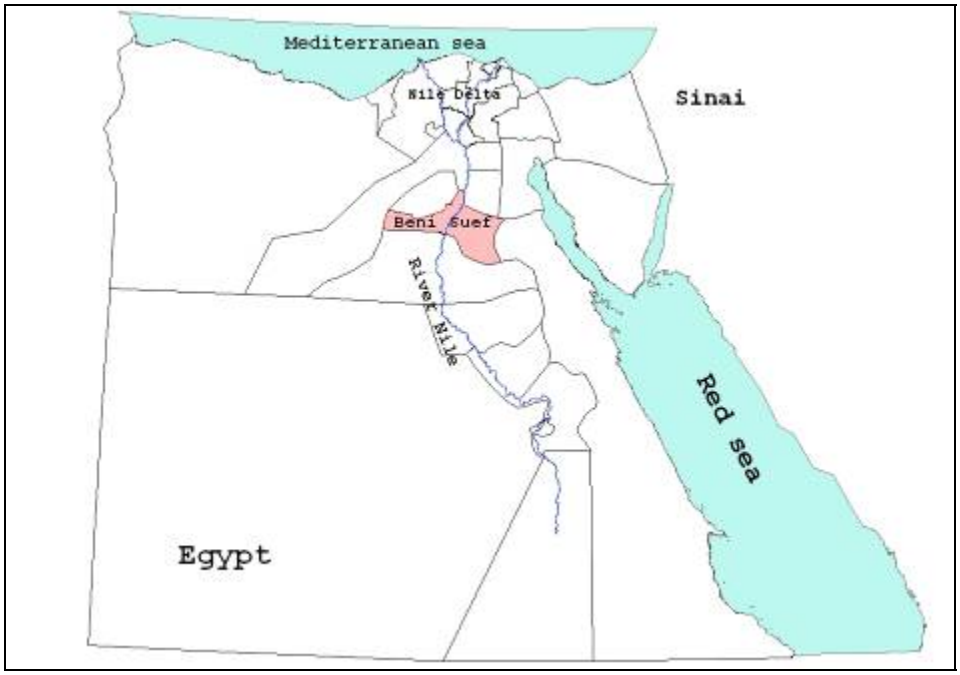

Figure 2: Location of Beni Suef Governorate

The population of Beni Suef Governorate in 2002 was 2,112,000 (representing 3.2% of Egypt's total population) (CAPMAS), (2002). The total area of Beni Suef Governorate is 10,954 km2. It is located at the northern end of the Nile Valley to the South of Cairo as shown in figure (2). It's total share of Nile water resources are on average 2.11 billion m3 /year. The total domestic supply was 61.1 million m3 in 2000, CAPMAS (2002), while the capacity of the wastewater system is only 9.49 million m3 in the same year.

Ehnasia District is one of seven districts that constitute Beni Suef Governorate, Figure (3). Based on data form the Agency for Building and Development of Egyptian Villages (ABDEV), the population of Ehnasia District was approximately 275,033 in 2003 (ABDEV, 2003). The district consists of a city (population 38,453) and five local communities made up of a number of villages (population 236,580). There is no definite figure for how much water is available for Ehnasia District.

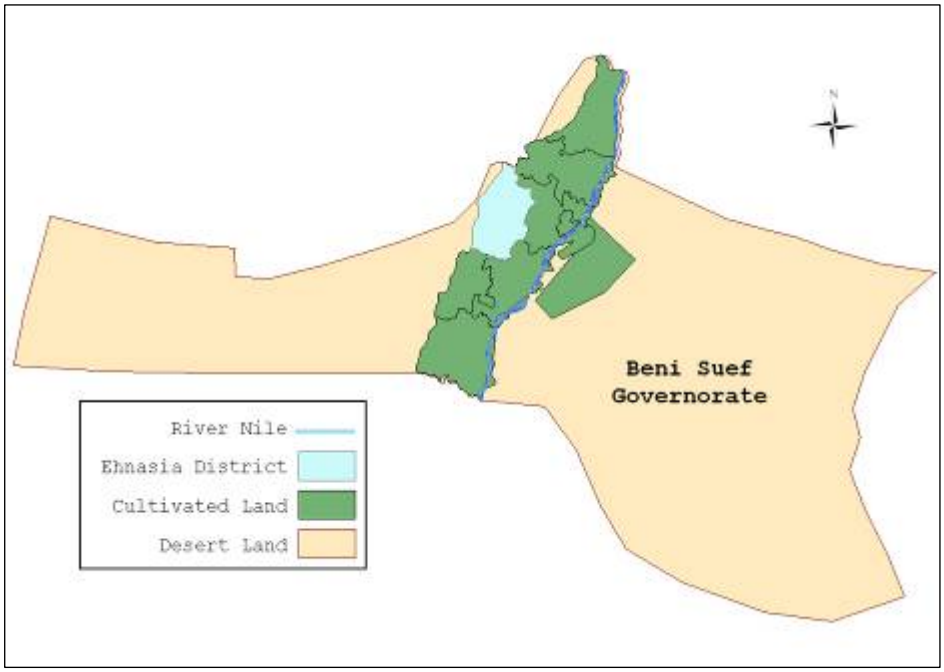

Figure 3: Location of Ehnasia District within Beni Suef Governorate

The town of Ehnasia and two villages were selected in consultation with the governorate level stakeholders for implementation of the program. A reconnaissance survey with all stakeholders led to a list of water related problems at governorate, district and village level.

EMPOWERS Project in Beni Suef

All the national stakeholders represented by the ministries mentioned in the last section have representatives in Beni Suef Governorate, as is the case in every governorate of Egypt. Both MWRI and MALR are represented by an undersecretary of the minister. For example the Beni Suef MWRI undersecretary would coordinate among different ministry departments and overall water distribution decisions within the governorate. While the General Economic Agency for Potable Water and Sanitation (GEAPWS) currently represents the MHUNC although it is in the process of becoming an independent economic company. GEAPWS is normally divided into two sectors one for potable water and the second for sewage drainage.

According to meetings conducted by EMPOWERS staff, the potable water sector has the following relations with other sectors provided in table (1). The table lists the sectors relevant to the potable water sector and indicates the type of information or processes of interaction either fed to (In) the potable water sector or going out from the sector (Out). For example Governorate authority would feed plans and instruction to the potable water sector and the sector would issue reports of progress to the governorate. The sewage drainage water sector has the relations given in table (2). The same procedure was followed for all other sectors in the governorate.

Table 1: Relations of potable water sector in Beni Suef Governorate

Sector	In	Out
Irrigation	Permits	
Governorate	Plans and Instructions	Reports
Health	Periodical monitoring	
Local units	Plans, funding, and projects	Needs
Donors	Plans, funding, and projects	
Roads	Permits	Plans
Other agencies	Plans, funding, and projects	Needs

Table 2: Relations of sewage drainage sector Beni Suef Governorate

Sector	In	Out
Irrigation	Permits and monitoring	
Roads, railways, electricity, gas, etc	Permits	Plans
Governorate	Requests and funding	
Environment	Monitoring	
Consultants	Studies and information	

After that the EMPOWERS team started collecting and collating the secondary data from different sources. Analysis of such data revealed that the data are not consistent. There was a large discrepancy between the data not only from different sectors but also from different sources within the same sector. It was apparent that there is no efficient flow of information within the same sector and between the different sectors. For example, one potable water station in Ehnasia District has its intake on a canal that experience fluctuations in water levels at certain times and this led to cutting the water completely to the station or feeding the station with poor quality water full of mud. This example shows the lack of proper coordination among agencies (potable water sector and irrigation department in Beni Suef). Ideally the potable water sector should have discussed its plans with the irrigation department and not seek only permits to construct. Irrigation department in turn could have pointed out the operational nature of the canal proposed as a water source and to redirect the position of the source to a place where no significant water level fluctuations occur. Also In general there is no apparent link with civil society as a whole. The relationships among government agencies do not reflect joint planning or coordination among themselves let alone with community end users. Below are some of the actions, and associated tools, that were used to address these problems and create a better environment for both horizontal and vertical cooperation.

Tools for planning and Dialogue.

Within the planning process proposed by EMPOWERS a number of tools were used to support the planning and the dialogue process. This section examines three of them, namely: Problem trees, Belief Networks and Geographical Information System.

The first step of the process was a governorate level meeting with the Ministry of Water Resources and Irrigation (MWRI) to identify the scope for action at the governorate level and in particular to identify key stakeholders at the governorate level. In the mini-workshop the participants identified water problems in Beni Suef as follows:

- Water equity and efficiency of distribution networks.
- Water pollution from wastewater and solid wastes.

Initial Stakeholder identification led to identification of the stakeholders mentioned above.

Problem Trees

As a result of the mini-workshop, several interviews were conducted with key agencies to get a quick feel of water issues and to map decision making within the governorate. Results from interviews and team deliberation were further used to hold a governorate level stakeholders workshop. During the workshop the stakeholders identified water problems in Beni Suef and organized those under a problem tree format (Figure 4). The participants were also consulted on data needs and criterion for civil society representation (selection of NGOs.)

Following the stakeholder workshop EMPOWERS team contacted stakeholders at the district of Ehnasia to introduce the project and to formulate their perspectives on water problems in the district, select target areas and identify other potential stakeholder. A one day workshop was held to formalize district level stakeholder opinions and to draw a problem tree at this level. This workshop was followed by a meeting between district level stakeholders and governorate level key stakeholders. The meeting was used to select the target villages and town, and to match opinions about water problems at

both governorate and district level. A comparison of the governorate and district problem trees was carried out to identify problems that were present at one level and not the other.

A one day meeting was held at Ehnasia City with official stakeholders at governorate and district levels to review both problem trees. A mood of self defense dominated the discussions and was reconciled by changing words such as "lack of …" by "inadequate…" However, stakeholders at both levels held end-users responsible for some problems such as overuse of potable and irrigation water or using water channels for disposal of solid waste. At the end of the session, two villages were selected as EMPOWERS sites, Monshat Kassab and Nazlet El Masharqa villages, in addition to Ehnasia city,

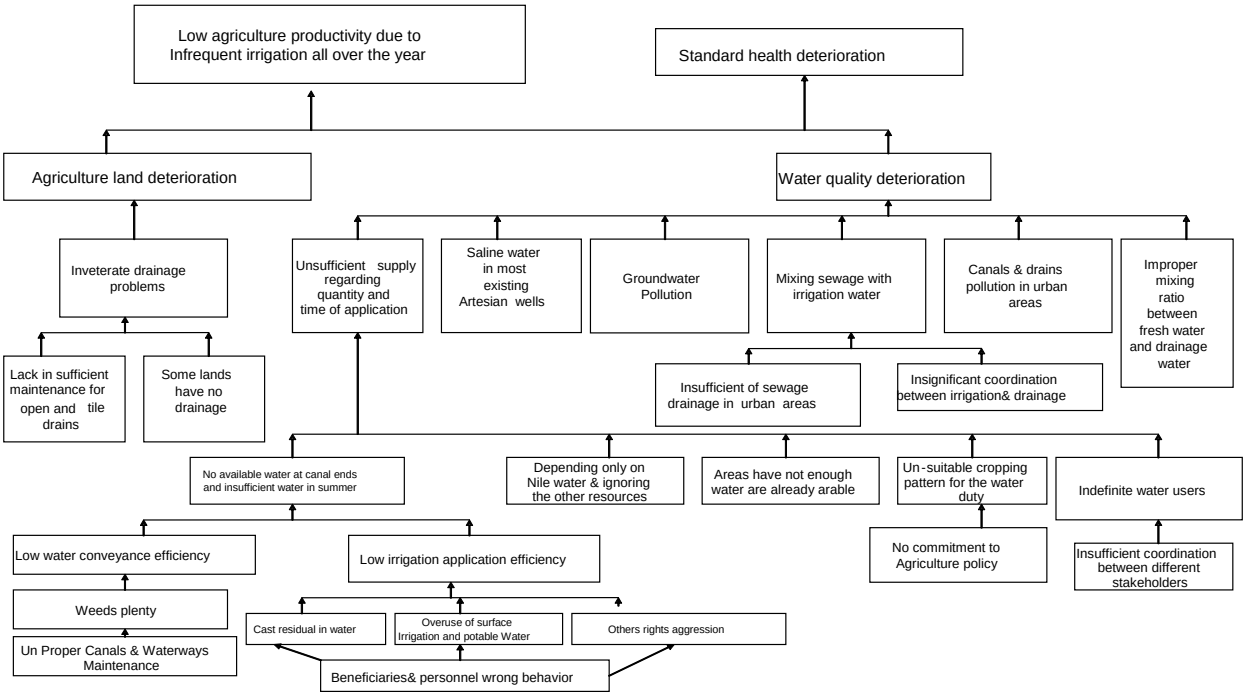

Figure 4: Water Problems Tree for BENI SUEF Governorate

Following these initial workshops with governorate level stakeholders, the EMPOWERS team then started contacting end-users at the village and town level. A social survey was conducted to identify well being in all three communities, to create social map and to determine socioeconomic groups in each place (Figure 5). The survey results were then used to select a representative group of stakeholders to share their vision about water resources and to identify water problems in the specific village or city. In each community the social mapping was followed by a one day workshop for representatives of the community to draw a problem tree specific to their local conditions. Following this, a full day was dedicated to bringing together representatives from the two villages and the town with both governorate and district level officials. The meeting was an opportunity to exchange perspectives and match ideas about water issues in the target community. People started to see the value of the project as they communicated vertically with governorate level officials and horizontally with their peers. Good and effective use was made of problem analysis thus linking causes and effects. Discussions were structured around these problem trees which further enhanced their understanding of the issues and possible future solutions.

Figure 5: Social Map of Nazlet El Masharqa Village

The whole process of developing the problem trees at the various levels and in the communities created new awareness of the problems, and their causes. The discussions around the trees and the problems identified helped all stakeholders to see that they are part of the problem. Water problems were very similar in the two villages and the city, and were also typical of the governorate and district level problems. The issues can be summarized as:

1. Quantity, reliability and quality of potable water delivered to end-users.
2. Lack of sewage collection and treatment systems.
3. Some canals suffer from tail-end water shortages (especially during the summer).
4. High water tables (especially perceived in residential blocks).
5. Waterways are used as dump sites for garbage.
6. Irrigation Improvement Project is poorly executed[14].

At the end of the all-levels meeting, one of the participating end-users commented that he now can see what we meant by opening information channels and that he take us seriously. Mr. Atta M. Abdel Tawab said: “Seeing government officials coming to listen and talk to us made me believe that you are serious”.

Bayesian Networks

Bayesian Networks (BN) can be defined as a tool for decision support system. It is a tool to bring together quantitative and qualitative aspects of a model that is structured around a problem. BN can help structure decision processes and support analysis of the consequences of possible decision choices by making data easily accessible and allowing “what-if” analysis (Cain, 2001). They combine probabilities of actions taking place creating a final probability estimates for their combined effect. One may think of BN as a way to create a quantified problem tree. The model can then test the effect of a specific intervention. For example if one of the causes of low water quality is poor participation by end-users (because they hold officials accountable), a BN can allow a probabilistic estimate of the

[14] Irrigation improvement project is a program which rehabilitates irrigation ditches at filed levels and create water user associations to mange the improved system by the farmers themselves.

potential effect of increased participation on the overall goal of increasing water quality in the village, based on the beliefs of those involved in the process. Significant data gathering and verification must take place for the whole model to be able to depict reality before it can be used to test effect of possible interventions. Figure 6 shows an example BN created by project team and verified with stakeholders for irrigation water issues in Ehnasia City. BN can be used in the assessment, strategizing and planning steps of the proposed EMPOWERS planning cycle.

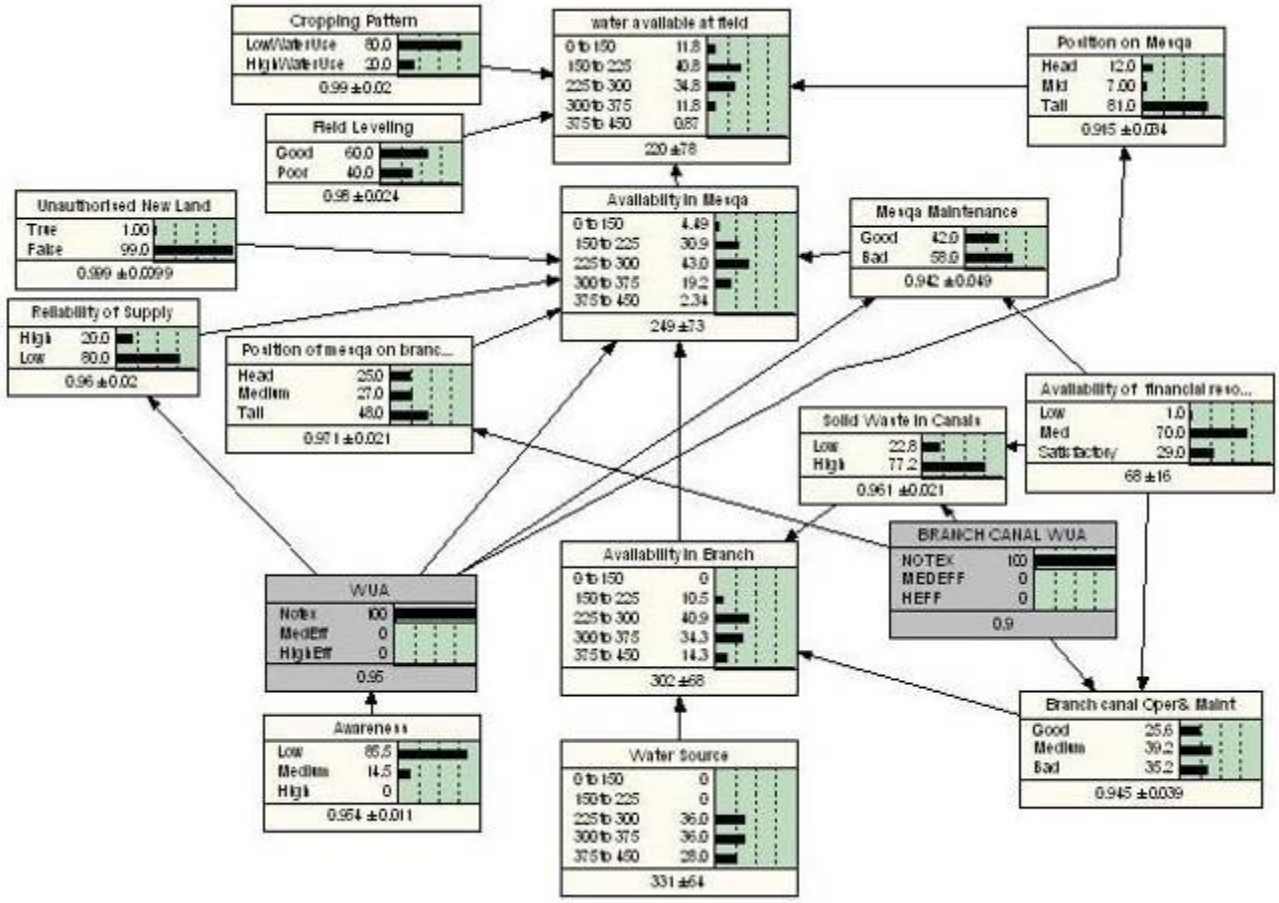

Figure 6: Bayesian Network for Irrigation issues in Ehnacia City

Based on the analysis of the water problem trees, and the similarities found in the three selected communities the project team, stakeholders and end users in Beni Suef Governorate decided to combine related problems in the abovementioned list. Such combinations were to reduce the complexity of the analysis and the time required to reach reasonable results. As a result the sewage water problem is combined with the groundwater level rise problem (item 2 and 4). The water shortage at canal tail-ends problem is combined with solid wastes disposal in canals and poor execution of irrigation improvement project problems (items 3, 5 and 6). Reducing the number of focus problems into three per community produced nine Belief Networks. Although data used to build the networks were collected using participatory approaches, the development of the BNs themselves was done first by EMPOWERS partners and team of experts. Each network was presented to the different stakeholders and end users in Beni Suef Governorate at different levels: district, city, and villages. As a result modified versions were obtained. Although the discussions around the BNs and its modification were very productive and allowed for a better understanding of the causal and effect relations and problem elements, it was felt that initial development had to be done by the team of EMPOWERS.

In the case of Irrigation problem the discussions helped all participants to learn about the infrastructure system of canals operation at the same time as helping to link socioeconomic and institutional aspect to the problem management. Belief networks were also used to do preliminary testing of alternative

interventions. Such testing was performed and demonstrated to end users in a stakeholder consultation to decide on pilot projects in the target communities. However it is to be noted that in the coming stages of the project, these BNs will be modified based on acquiring more knowledge about the model capabilities, collecting more accurate data, and consultations with stakeholders and experts. There is a question to what extent BNs can be developed in isolation from end users and yet used with them to produce decisions on their water problems. If one can leave the technical development in the hand of experts (perhaps through middle level NGOs) but develop the logic of the model with officials as well as end users we would be able to create a valuable tool for the alliance. Are "good alliance" with all stakeholders (including the poor) may be found when employing sophisticated concepts such as BNs. Perhaps the question is how to communicate the results of all sorts of analysis (BN, GIS etc.) to other stakeholders. For some, the BN/GIS itself is appropriate. For others, it needs to be mediated through other channels. Another question is the role of the 'expert' in the overall process. EMPOWERS team will be exploring the answers to these questions in the second cycle of program implementation (Figure 1).

Water Management Information Systems

The vision of the governmental staff concerns the increase of the efficiency of the management and planning processes, by adopting Information Systems (IS) as the main tool for archiving, data transfer horizontally and vertically, planning, management, decision support, operation, and maintenance. The most powerful information system is the Geographic Information System (GIS), which integrates spatial and attribute data in one robust database, capable of performing all required major common tasks. GIS is the most advanced technology for data acquisition, verification, compilation, storage, updating, management, exchange, retrieval, processing, combination, analysis, and presentation (Burrough, 1986). Although implementing this information system as a pilot project at the level of Ehnasia District, the information system discussed here should largely a part of the assessment step within the abovementioned planning cycle.

In meetings and discussions after the stakeholders' consultation, various issues were addressed, studied and scheduled, including the conceptual design of the GIS in the near and far future. At the same time a capacity assessment of involved governmental sectors and authorities was made and the action plan was discussed to implement the GIS pilot project. The action plan of the proposed GIS pilot project is provided hereafter.

The conceptual design of Beni Suef GIS database includes the definition of the database layers, data description, and data model development. The selected GIS database layers from 1: 50000 maps are: Raster maps, Maps, Grids, Roads, Railways, Urban areas, River, Canals, Drains, Wells, Bridges, Tunnels, and Culverts. Other layers are required from other authorities and they are already available in a GIS ready format, including: Districts, Main potable water pipelines, Potable water ground wells and treatment stations. Figure 7 shows sample of the spatial and attribute data of some database layers.

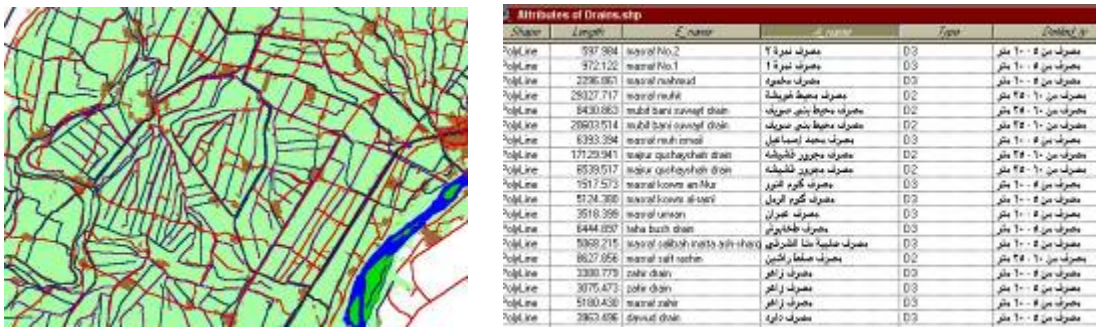

Figure 7: Samples of the spatial and attribute data In the GIS database of Beni Suef

The GIS could be implemented for the whole of Beni Suef governorate, Ehnasia district, and or Monshat Kasab and Nazlet El Masharqa villages. The variation in the geographic extent is huge which affects the time, process, and cost of the implementation procedure. GIS data collected from various sources vary in the level of details (data type) from general, intermediate, to detailed data. GIS functions & applications range from archiving to planning, up to management and decision support tools, associated with data transfer mechanism horizontally among different involved sectors and vertically within the same sector. Beneficiary sectors include water resources management sectors (government, local government, irrigation, potable water, sewage, environment, agriculture). They might accommodate other sectors, such as Non-Governmental Organization (NGO), political parties, other utility sectors (electricity, telephone, gas), roads, highways, and citizens.

After holding meetings and comprehensive analysis, it was agreed that the GIS should be implemented for governorate and district levels using general data to satisfy the functions of archiving, management and pilot project coverage. Monshat Kasab and Nazlet El Masharqa will be using detailed data for the functions of archiving, planning, and management. The GIS will be designed, figure 8, aand implemented as an open system that can easily accommodate any kind of data, serve any other sector or party, include further functionalities and tools, and cover new geographic extent. The village level data will be maintained by the Community Development Association (CDA) and it will be fed to the appropriate official agency to further enhance communication and coordination between end users and that agency.

The planning and management functionality must satisfy daily and periodic activities carried out by the involved sectors (e.g. water balance, utility network management, maintenance scheduling, repair follow up ... etc.)

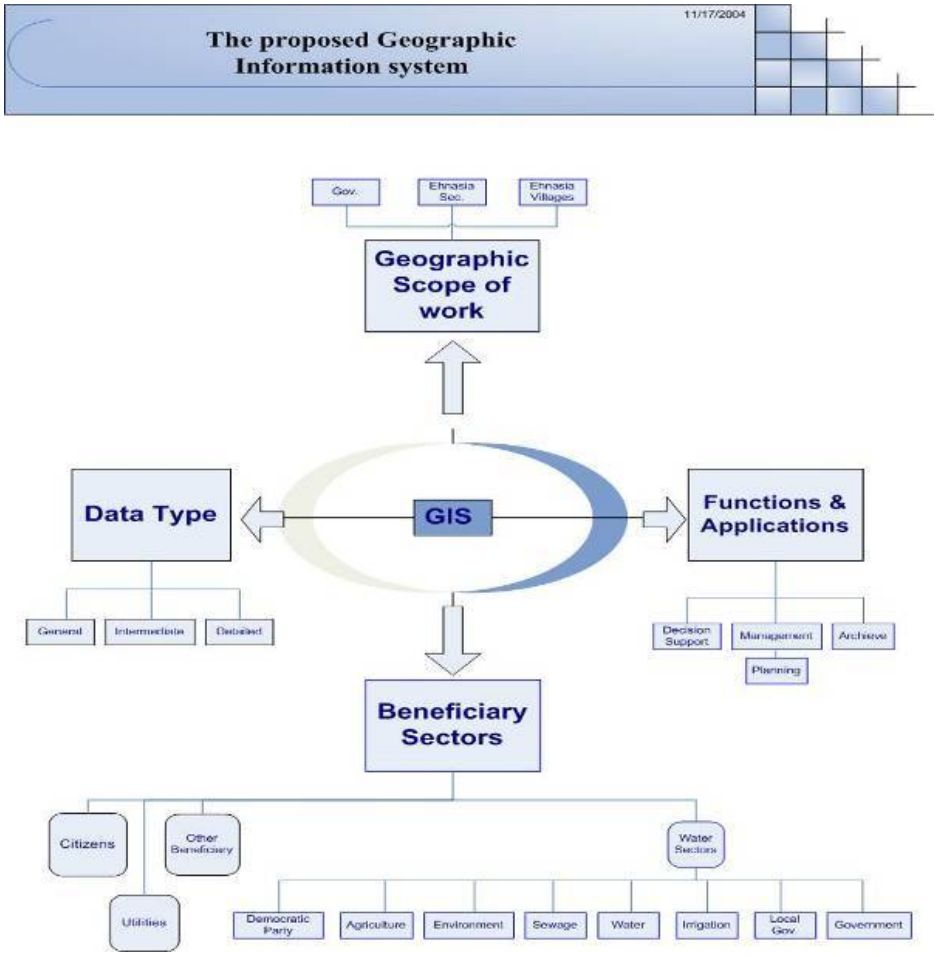

Figure 8: preliminary GIS design for district level pilot project

Thus far the proposed information system has been an activity to help build alliances among government officials and not to link them directly with end users. They have realized the importance of timely access to accurate and comprehensive data. They see that end users in the communities would have to contribute to data collection. EMPOWERS team hopes to get the officials to value contributions by "end users" and to include them as full participants in the design of various system functions. At least all would like the information system to be able to answer questions that are relevant not only to government officials but to end users as well. EMPOWERS team will use this tool to create working relationships between end users and officials to collect and update community level data. The system will be made available publicly for local NGOs to use for their planning and in their dialogue with government officials. Although end users may have limited capacity to fully participate in the technical design discussions of the system, but their needs and perspectives on what the system may provide would be incorporated. For example the farmer may not know GIS analysis in details but can decide if a periodic report on total irrigated land and amount of water per acre is essential information to maintain his/her own water rights.

Lessons learned

Acceptance of the key concepts of EMPOWRS, particularly greater participation and information sharing and communication, has taken significant time and has faced scepticism from end users and government officials. Communities (end users) remain interested, primarily, in a physical benefit (physical infra structure) that should materialize before they begin to appreciate concepts such as planning or dialogue. Government officials may accept concepts such as improved planning or related to it, the importance of good data and information, more easily than communities. But they remain sceptical as to how realistic it is to activate community participation or to how many resources all of this may need.

Addressing these issues in an explicitly 'learning' mode at the same time as building alliances with and between officials, end users and EMPOWERS team has proved to be a good approach. Tools and concepts are introduced as they are practiced and applied. Learning by doing makes tools much more practical and people can easily see results accumulate and build up to more abstract concepts. For example learning how to develop a problem tree can serve as an output by itself, but more importantly it is an opportunity to become more aware of water resources problems in the community and even better to create a relationship between officials and end users and to make both see the importance of communication. Several simple issues that exist due to weak communication can be resolved or begin to be addressed simply through holding community meetings and working along side officials on developing a water resources problem tree.

During workshops in Ehnasia District at all levels (city and villages), the EMPOWERS team brought together end-users with governmental officials. At the beginning of the meeting government officials argued that they do their best and blamed the end users for improper use of the system. At the same time the end users did not trust the government officials and blamed them for poor system performance. Simply working together and talking constructively about the issues can clarify a lot of misunderstandings. Box (1) provides an example for the

Box 1: Potable water sector in Ehnasia District

End users stated that the chlorine dose in the water they drink is sometimes higher than necessary and has an unpleasant taste, especially when drinking tea. They thought that there is a technician who was responsible for applying and controlling the chlorine dose and that he sometimes applies a higher dose and leaves the station unattended. The potable water sector general manager explained that the chlorine dose is determined according to the quality of the raw water and according to the condition of the networks. There is a device that controls this dose automatically. The technician's responsibility is to assign this dose value according to orders based on the mentioned aspects of raw water quality and network condition. Also the necessary dose must cover the whole network till its end and the people who use water just near the station may feel higher chlorine dose than the people using water at the end of the network. He also explained that the chlorine dose even for the people near the station is within the standards of the Egyptian code and it has no health drawbacks. Didn't he explain that if you want it to taste better you should just leave it to stand for a few hours or a day??

potable water sector while box (2) provides an example for the sewage drainage sector. People need information and explanation from the government officials and it is the right start to gain their trust.

Box 2: Sewage drainage sector in Ehnasia District

End users complained to the claimed that the water consumption bill includes fees for sewage collection although until that time there was no connection with the sewage network. They believe that the government is stealing from them. The sewage drainage general manager explained that the cost of connections to the network is high. They prefer to get regular small installment from the users instead of calling for total charge at the time of actual connection. All payments are registered for each beneficiary and after he connects to the network he will be charged only for the remaining cost which will be within his means. Also this will accelerate the construction process as the government can use collected fees to pay contractors.

It is however still on the agenda to create not only a sense of partnership between government officials and end users but to have that partnership built on trust, respect and appreciation of roles, responsibilities and rights of all parties. It is also important to have true empowerment of the community and lower level officials to perform their work and to reach their rights of water in equitable form.

Although BNs is extremely powerful tool but significant data gathering and verification must take place before it depicts reality or before it can be used to test effect of possible interventions. Important question associated with BN and GIS is how to communicate the results of the analysis (BN, GIS etc.) to other stakeholders. For some, the BN/GIS itself is appropriate. For others, it needs to be mediated through other channels. Another question is the role of the 'expert' in the overall process.

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