Scenario building in local-level water resource management – experience from the EMPOWERS project with reference to a case study in Jordan

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Abstract

The core of Integrated Water Resource Management (IWRM) is decision making, which in turn requires planning. The EMPOWERS project is working in water-stressed areas of Egypt, Jordan and Palestine on the development of tools and methodologies to support better planning and improved water governance. The approach that is being piloted is based on a management cycle that has been developed to give structure to a governance process that has a high-level of stakeholder participation. Scenario building is one of several tools or methodologies that are being piloted by EMPOWERS for use within this cycle, specifically to better deal with uncertainty within the decision making process. Experience to date is that scenario building, when used as part of a management cycle has the potential to improve water-related planning for the following reasons: 1) It provides a good starting point and opportunity for discussion between specialists and non-specialists and between stakeholders at several levels (e.g. governorate, district and village); 2) if facilitated well, it can be both enjoyable and cost-effective in terms of time and other resources; 3) it helps stakeholders to come to grips with the inherent uncertainty involved in planning for both water resource management or water service delivery; and, 4) arguably the most important, it improves level of ownership that stakeholders or their representatives have over management decisions. This paper sets out the conceptual background to the approach to scenario building that EMPOWERS is using. Outputs from a scenario building process that took place in a village in Balqa Governorate are presented as example of how scenario building is done within EMPOWRES, and what can be achieved.

Introduction

In recent years, the use of scenario building in water-related planning and decision making has become increasingly popular (Warwick et al 2003). One reason being that there is almost always considerable uncertainty in water resource availability and demand and that scenario building provides a relatively simple means of taking account of this uncertainty in management. This ensures that all possible outcomes, "worst case" as well as more probable or hoped for "best case" outcomes are explicitly recognised. Scenario building contrasts with more traditional approaches to planning and decision making in water resource development and supply that are usually based on "best guess" trend projections of key factors such as resource availability, condition of infrastructure and societal demand.

Although there are many definitions and descriptions of scenario building, in the context of the EMPOWERS project, scenario building is best considered as a tool whose aim is to help support good decision making based on an explicit recognition

of uncertainty in key trends. In the EMPOWERS project, scenario building is based on a systematic and consistent examination of possible future trends, and the impact these trends are likely to have on the possibility of achieving a shared vision. Or put another way, scenario building is not about 'knowing the future', or always being right; it is about trying to minimize the chances of being seriously wrong. In the EMPOWERS project, scenario building is also about recognising that there are often many routes to achieving a shared vision, but that these routes will have different attributes (e.g. level of risk, economic, social or environmental cost, level of potential benefit etc).

Involvement of stakeholders in the management and planning of water services and resources is recognized as a key element in obtaining a balanced and sustainable utilization of water (GWP, 2000). Whilst the involvement of stakeholders or their representatives in planning processes is clearly desirable, experience has shown that such involvement can be time consuming and fraught with difficulties. These difficulties arise because stakeholders often have conflicting interests and objectives in relation to solving water-related challenges. Difficulties can also arise as a result of factors that are not directly related to the water sector as a result of, for example, political tensions, antagonism between different social groups or a lack of respect between specialists and non-specialists. Hence, wide-scale involvement of stakeholders in water resource planning and management is highly desirable but only if methods and tools are used that are: cost effective, lead to conflict resolution, identify tradeoffs between different objectives and produce outcomes that are measurably better than existing approaches. Scenario building is being used increasingly as a means of promoting participation in water resource planning, to the extent, that some researchers now regard scenario building as being one of the key means of building group identity, evaluating potential conflicts and fostering "out of the box" thinking about complex issues (e.g. Warwick et al, 2003).

The EMPOWERS project is working in Egypt, Jordan and the West Bank and Gaza (WBG) on the development and piloting of methodologies and tools for improved development and management of local-level water resources and water services. This paper focuses on the use of scenario building and within the EMPOWERS project generally and with particular reference to a case study in Balqa Governorate, Jordan. More detail about the overall approach being adopted by EMPOWERS can be found in Moriarty et al. 2005. The paper is divided into three sections: a brief introduction to the EMPOWERS approach to structuring local water planning; an overview of the scenario building methodology used; the method and outcomes of scenario building in Rweha village in Jordan; and lessons learned in the application of the process so far in all three EMPOWERS countries.

Using project cycle management to structure processes of project planning and implementation

Processes of project planning and implementation need to have structure, particularly if there is to be a high-level of stakeholder participation. The EMPOWERS approach to improved local water resource management uses project cycle management (PCM) that is based, to some extent, on approaches to water management promoted by the European Commission in the late 1990s (EC, 1998) . PCM incorporates two

important ideas: the concept of a project or programme proceeding through various logical and sequential stages; and, the need for active management of the project cycle through all its various stages. Central to PCM is the idea of managing a process, rather than contributing to a one-off event. The EMPOWERS cycle (see Figure 1), in common with most project cycles emphasizes the need to put decision making regarding water based actions within a clearly defined set of steps that ensure that the decision reached are based on a clear and logical flow of thought and actions.
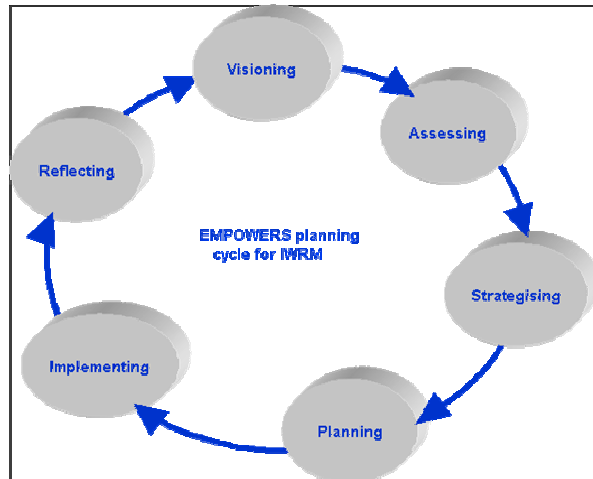

Figure 1: The EMPOWERS Planning cycle for IWRM

In the EMPOWERS approach, the scenario building process takes place throughout the *Visioning*, *Assessing*, *Strategising* and *Planning* steps of the cycle. The logic being that the scenario building itself can only be effective if stakeholders have already developed a common vision and a water resource assessment has helped to identify and quantify the causes of water-related problems as well as the opportunities for improving service delivery. In the strategising and planning steps, scenario building can be used iteratively by stakeholders to home in on strategies and plans that have an acceptable probability of achieving a vision within constraints such as limited finances or unacceptable tradeoffs.

Scenario building process methodology

The phases of the EMPOWERS scenario building process are summarised below. Although the phases have been listed as a sequence, EMPOWERS staff have adopted a flexible approach in practice, with alteration of the sequence of phases or repetition of phases where they feel that this will improve the process.

1. **Establishing a shared vision.** An important element of EMPOWERS work is the use of vision development as the basis of the entire process. The objective is to help stakeholders to think beyond the day-to-day reality of problem solving, and to imagine an achievable medium to long-term future towards which they can plan. Visions are by definition forward looking and involve thinking about a possible future that takes account of how things may have changed at the end of the targeted period. The visions developed in EMPOWERS consist of a clear description of the desired future state for all water resources and services within the domain of interest (e.g. village, town, governorate). Given the highly-political nature of water-related visions in water-stressed areas visions should ideally be based on consensus between all stakeholders (although in practice this may be difficult to achieve). Local-level visions should reflect key elements of regional or national water management policies, modified to take account of specific local-level challenges and opportunities. Ideally local-level visions should be developed iteratively over a period of time and be refined as new information

becomes available. Finally, in EMPOWERS vision are made to be SMART, that is Specific, Measurable, Acceptable, Realistic and Time bound.

2. Scenario **building.** The approach to scenario building used by EMPOWERS owes most to the business-based approach set out by management thinkers such as Schwarz (1991) and refined by van der Heijden (2005). Scenarios are built up by identifying key factors and ranking them according to their importance (to the vision) and the uncertainty of them achieving a certain outcome. This is done in a participatory exercise using the matrix

> **Some simple definitions**
>
> A vision is a desired future state
>
> A scenario is a description of a possible future environment, based on extrapolation of existing trends
>
> A strategy is a planning framework aimed at achieving a vision

shown below (Figure 2). Factors that are beyond the control of planners (external factors) are used to develop scenarios, factors that are within the control of planners (internal factors) to develop strategies. Not all approaches to scenario building make the strong separation between scenarios and strategies adopted by EMPOWERS. However, we have found this to be a useful and important distinction – allowing stakeholders to concentrate first on that which they cannot effect (the external environment) and only then on what they can.
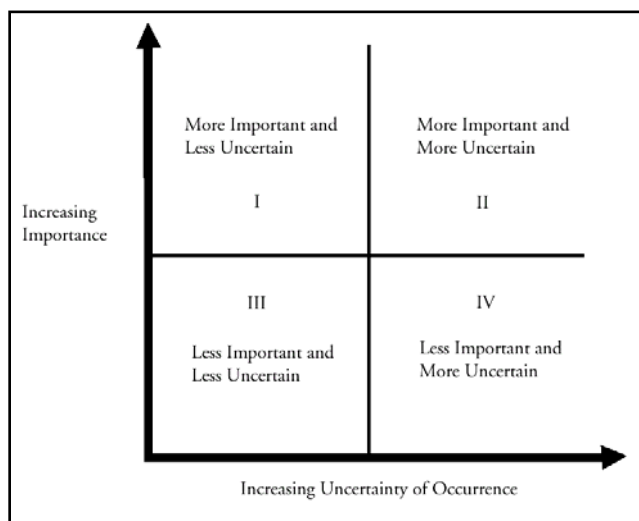

Figure 2   Ranking factors for narrative scenarios (After Schwartz, 1991)

In EMPOWERS scenario building takes place in at least two distinct phases within the planning cycle. Initial scenario building takes place in the *Visioning* step, along with initial vision development, and problem tree analysis. This helps to focus the *Assessing* step during which data is collected and assumptions about key trends and cause-and-effect relationships are examined more closely. Following the *Assessing* step, a second phase of more detailed (and quantified) scenario building

then takes place in the Strategising step, during which the Vision is also finalised. It is again emphasised that the key to the entire approach is flexibility – therefore in reality scenario building may actually take place throughout all of the first four steps of the cycle.

A key objective of the EMPOWERS approach has been to encourage stakeholders – at both governorate (district) and end-user levels to move beyond the normal processes of project implementation or troubleshooting on existing schemes, and towards a more integrated approach to planning. For this to work well, a thorough

understanding of the severity, scale and location of existing problems and their root causes is absolutely critical. A thorough understanding is also required of status of water resources and trends of both water supply and demand by different sectors, as is illustrated by the story in the box. Identification of external and internal factors is therefore a crucial part of the work, and one where the support of the facilitation team is essential.

Once the factors have been identified and assigned to the four different quadrants of the matrix, they are used to develop the different scenario story lines. Essentially this is done by combining the factors in the 'important and uncertain' quadrant in four to five different combinations. For example, if 'population growth' and 'rainfall' were identified as the two most important/uncertain factors then scenarios of 'high-population, high rainfall', 'high population, low rainfall', 'low population, high rainfall', 'low population, low rainfall' could be developed. Ideally then the important/uncertain factors

> **Data and information can empower**
> As part of EMPOWERS, the villagers of Rweha were visited by a senior representative of the Jordan Valley Authority (responsible for irrigation water supply). They explained to him that through their surveys they had identified a need for $3m^3$ of water per dunum, and asked about possibilities to increase their allocation. The director said that they already received more than this amount. Normally that would have been the end of the discussion. But now the villagers were able to stand her ground, and explain why they knew that they received no more than $2m^3$ per dunum. A hot discussion followed, and in the end the official left the meeting, surprised that the villagers were so clear in their understanding of their problem and not prepared to back down in discussions.

should be limited to two, however where this is not possible the scenario facilitators should still ensure that the total number of diverging story-lines does not exceed five – as the differences become too subtle and complex to address. Once the diverging storylines have been identified, the remaining external factors are used to create what, in EMPOWERS, is referred to as a background story. This is the stable part of the future. Taken together, the background story, and the diverging story-lines are the basic narrative scenarios.

3. **Developing strategies that are most likely to achieve the vision**. Based on the different scenarios, strategies and plans are then developed to allow the vision to be met, if this is possible. In practice, initial visions tend to be over-optimistic and have to be adjusted in the light of scenario building. Figure 3 shows this process diagrammatically, showing how scenarios represent a range of possible future circumstances against which plans to achieve the vision must be assessed. The diagram also highlights the iterative nature of the scenario building approach, under which it may be necessary to adjust the vision if it is found to be unrealistic given some scenarios. This diagram illustrates well why scenario building has been described as 'divergent thinking about convergent futures' (Schwartz, 1991).
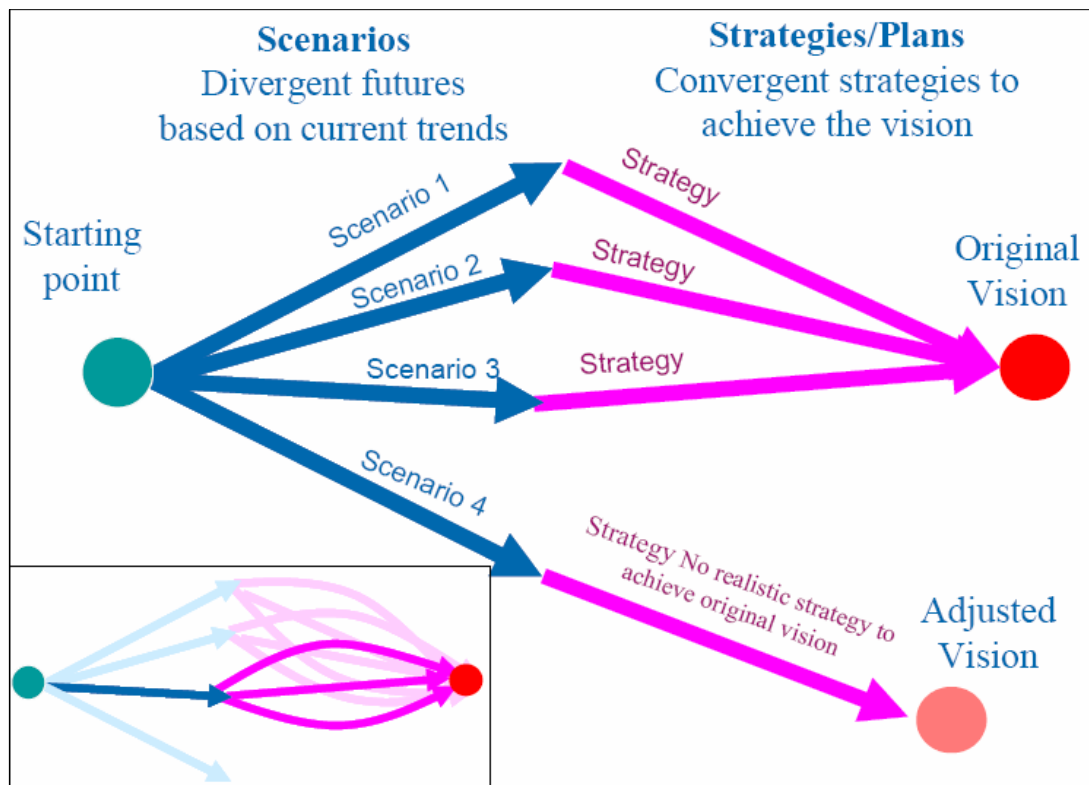
Figure 3   **The problem analysis, visioning, scenario building and strategising process**

4. **Iteration involving testing of visions, narrative scenarios and strategies.**   In practice, because of the broad nature of the scenarios, there are often multiple strategies that could help to address the vision (as illustrated in the inset in Figure 3). Once the broad lines of visions, scenarios, and strategies have been developed in the workshop, they are assessed by specialists using various analytical or modelling techniques with the aim of assessing the internal logic of the strategy and likelihood of it achieving the vision. The outcomes of this analysis are then reported back to stakeholders leading to subsequent iterations. Based on this process, a number of activities that seem likely to contribute to the vision are identified for further development and detailed planning.

Rweha Village Scenario Building

In this section the method followed, and main outputs of a scenario building carried out as part of EMPOWERS in Rweha Village in Balqa Governorate, Jordan are presented. The vision, scenarios and strategies presented are the outputs of an approximately three month process. This was the second scenario building exercise in which villagers had taken part, a first having been organised in late 2004. The scenario building took place between July and September 2005. The main work was carried out during two workshops, with further analysis and writing up of scenarios being done by the EMPOWERS team and the village water resource management committee. The process was supported by data collected partly in response to the earlier exercise in 2004, and including PRA data collected with the participation of all

stakeholders (the process was carried out by a village youth group, the local water resource management committee and government officials).

Those involved in the workshops included representatives of major water user groups, and key social grouping – including women, poorer people, and youth. The meetings brought together representatives of these different groups from the community with staff from Balqa governorate (Ministries of Agriculture, Social Development, Water Authority, Environment and Health) and the EMPOWERS project.

The principal workshops held during this process were:
- A one day workshop in July held in the governorate offices in Balqa, and involving participants from three villages, government stakeholder (MOA, MOSD, MOI, WMI, MOH[1]), and EMPOWERS. During this meeting the EMPOWERS team worked as facilitator and helped the villages to revise their vision and update earlier problem trees based on the results of water resource assessments
- A second one day workshops in August, this time in the village, in which end-users were joined by government stakeholders. This meeting started by identifying key external and internal factors, and ranking them according to certainty and importance. Following this villagers develop outline scenarios, and based on these strategies to help them achieve their vision. This workshop was led by the stakeholders themselves, with the support and facilitation of the EMPOWERS team.

Based on these meetings, the scenarios were finalized and written up by the EMPOWERS team together with the village's water resource management committee. What is presented below is the vision, scenarios and strategies developed for Rweha village during this process. These, together with the information collected during the water resources assessment will serve as the basis for more detailed planning of some of the activities identified in the strategies listed.

The Vision
By 2012, access to potable water of a quality that meets Jordanian standards will increase from 45 to 70l per capita per day. Access to irrigation water will increase from 2 to 3m^3 per dunum per day. There will also be improvements in environmental and agricultural conditions in the village and enhanced cooperation among villagers

Main Factors Affecting achievement of the Vision attainment
- **Old water network:** According to surveys, the water supply network is old and corroded. As a consequence, water quality is poor and losses are more than 50% (of which a high but undetermined proportion is due to illegal water extraction). However, there is a national programme underway throughout the kingdom to upgrade the entire water supply network.
- **Low and variable pressure in water-supply pipelines:** Due to the limited availability of good quality water in the governorate, and the increasing demand

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[1] MOA: ministry of agriculture; MOSD: ministry of social and development; MOI: ministry of interior; WMI: ministry of water and irrigation; MOH: ministry of health.

on water especially in summer, water is only pumped to Rweiha once or twice a week. One consequence is that there is very uneven distribution of supply particularly at higher elevations.

- **Inefficient agricultural marketing:** This factor has a great impact on the villages' vision because low prices for agricultural products reduce the incentive for farmers to invest in more efficient irrigation methods.
- **High agricultural production costs:** This factor also has a strong impact on the vision as it reduces the ability of farmers to make good returns from agricultural investment.
- **The availability of loans:** Because most villagers work in low income jobs (in **government** and farming), it difficult for them to obtain loans for improvements in irrigation systems.
- **Lack of Public Awareness:** The PRA indicated a low level of hygiene awareness and/or an appreciation of the importance of maintaining cesspits.
- **Cooperation among villagers:** Promoting effective community-level cooperation is one of the biggest challenges in Rweha village. A first EMPOWERS pilot project established a community-based organization (CBO), however, this organization has yet to become well established.
- **Sharing the network with other villages:** This factor contributes to unequal distribution of water, particularly through illegal use.
- **Illegal water use:** As a consequence of the high costs of irrigation and drinking water and low pumping pressure especially in summer and in the farming season, many villagers take water illegally by opening taps or making holes in pipes.
- **Population Growth rate:** The number of the population in Rweha village is nearly (3,500) inhabitants, with approximately are six people per family. Given the population growth rate in Balqa Governorate (2.5%) the demand for water is increase steadily, rising to an estimated 4,160 by 2012.

Identification of the most important and most uncertain factors

Discussions during the one-day workshop resulted in Figure 4, which was used to develop the following background story and main scenario lines.

Figure 4. Identification and ranking of factors from one-day workshop
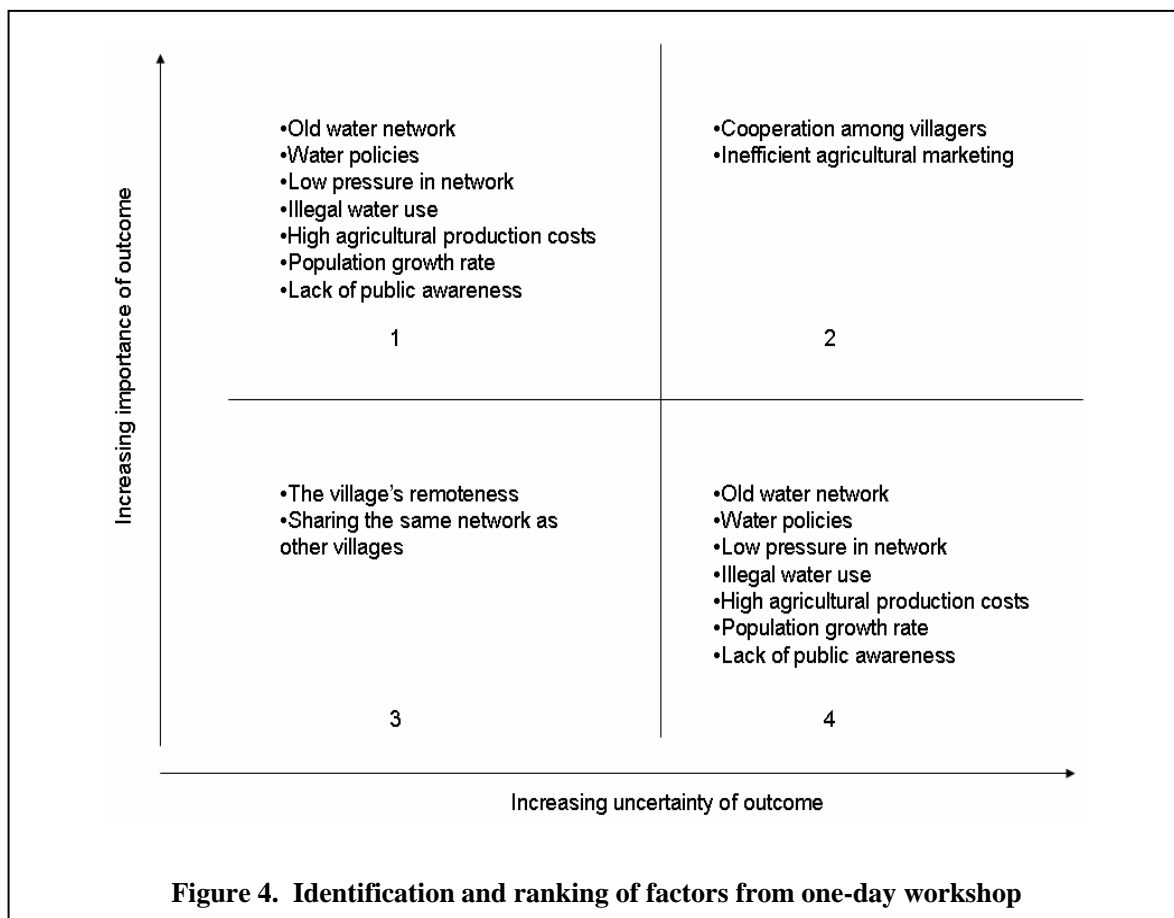
Background story

The factors that were identified as being important but certain related primarily to: 1) The status of the village water-supply network; 2) Agricultural production and other factors that influence uptake of improved irrigation methods; 3) Illegal use of water; 4) Public awareness; and, 5) High population growth rate. Based on this, a description of the expected situation in the year 2012 is as follows:

By 2012 the village water network will be in the process of being renewed as part of a national strategic plan to renew water networks throughout the Kingdom, resulting in the village receiving sufficient water to meet its domestic water vision. Old iron pipes will have been replaced with a new polyethylene pipes, leading to reduced water losses and improved quality. This network will provide cleaner water free from rust and dust residues caused by old rusty worn-out pipes. The new network will also help to alleviate the water pressure/volume problem. However, the significant increase in population (expected population is 4,160) will have increased demand for water.

People will be more aware of water policies and regulation as a result awareness campaigns that have been conducted by the relevant ministries. These campaigns will have also led to a reduction in illegal use of water. Awareness programs will have also dealt with issues of how to optimize the use of water in farming and water harvesting methods in addition to leading to the adoption of new plants and crops that don't need a lot of water.

The Scenarios

To this 'background story' which describes the relatively more certain trends, must be added the following descriptions of possible divergent futures based on the more uncertain trends.

Scenario # 1: Good level of Cooperation among villagers along with an efficient
       marketing of agricultural produce

This scenario is considered the "best case" scenario, as it allows the most scope for quickly and easily achieving the vision. The scenario represents the solution to some of the current problems in the village, and it is assumed that if this scenario occurs as described, combined with increasing networking with government agencies, that access to irrigation water will increase as will the efficiency of irrigation water use. Linked to this there will be improvement in the overall economic situation of the villagers. However, this scenario while considered the ideal is also considered to be relatively unlikely to occur – at least in the short to medium term.

Scenario # 2: Good level of Cooperation among villagers, and an inefficient
       marketing of agricultural produce

This scenario is considered as a second best scenario with respect of finding a solution to the existing situation. The scenario assumes the successful establishment of a cooperative society that can aid farmers in accessing various government level stakeholders, and provide access to agricultural inputs at reduced prices (fertilizers, seeds, farming machine parts, etc). This will lead to potential for increased production.

However, despite improved cooperation among villagers and enhanced communication with different actors concerned with developing agricultural methods (and the related reduction in input costs), poor marketing will mean that income is still not sufficient to cover the costs of the workers and implementing new agriculture techniques

Scenario # 3: Lack of cooperation among villagers, together with efficient marketing
       of agricultural produce

This scenario is ranked third in terms of desirability, but still reflects an improvement on the current situation. However, because of lack of cooperation among villagers who work as individuals, it is assumed that they will not be able to benefit from the access to reduced cost inputs and expertise that improved cooperation would bring, and would thus despite improvements in marketing still not benefit to the extent possible. They will also lose opportunities to work with different GO's, NGO's and donors who could develop their capacities in different areas.

Scenario # 4: There is no Cooperation among villagers along with an inefficient
       marketing of agricultural produce

This scenario is considered to be the "worst-case" scenario, with no change in key factors currently affect the villages' condition. If the new cooperative in the village doesn't work effectively and doesn't develop it will not increase the cooperation and will lead to a reduction in key development indicators in the villages, especially those relating to agricultural techniques and irrigation water. This scenario is thought to be the most likely to occur based on the research and analysis of the villages conditions

Strategies and Activities related to each scenario

Scenario # 1: Good level of Cooperation among villagers along with an efficient
marketing of agricultural produce

The Strategy: in order to benefit from the situation described in this scenario, a comprehensive plan to improve agricultural practices will be prepared along with increasing the capacity of the cooperative.

- Conducting awareness campaigns in the fields of water conservation, the importance, value and scarcity of water and awareness of the need to decrease illegal water such as using it in irrigation (especially in summer time and drought season).
  This activity is considered of great important since it is included in any scenario, and it has clear reflections in the vision.
- Awareness raising programs encouraging farmers to adopt drought tolerant plants and crop pattern and to enhance their marketing skills.
- Establish small scale projects to improve collective work (agriculture demonstrations for new agriculture practices)
- Build the capacity of the cooperative and conduct training programs in management and finance.
  This activity is assumed to be as a basic activity for the success of any project.
- Create a good communication network between the cooperative and different stakeholders to help in improving the village's conditions.

Scenario # 2: Good level of Cooperation among villagers, and an inefficient
marketing of agricultural produce

The strategy:

- Conduct Public awareness programs in cooperation with concerned government. agencies to increase the confidence in water quality. As explained in scenario # 1.
- Participatory training program for the farmers to adopt new cropping patterns and new agricultural practices.
- Conduct participatory research (involving members from local community and government officials) using participatory technology development (PTD) to develop new knowledge among villagers.
- Establish small scale projects to improve collective work (agriculture demonstrations for new agriculture practices) according to the results of the PTD approach.
- Create a good communication network as explained in scenario # 1

Scenario # 3: There is no Cooperation among villagers, and an efficient marketing of
agricultural produce

This strategy aims at improving collective work among villagers and maintaining the good marketing practices through:

- Conduct public awareness. as explained in scenario # 1
- Apply participatory planning among villagers
- Enhance the role of the cooperative in the village by starting participatory activities and projects.
- Promote voluntary work among young people and women in the village (increase their participation in the cooperative).

- Establish small scale projects to improve collective work (agriculture demonstrations for new agriculture practices) according to the results of the PTD approach.
- Create a good communication network as explained in scenario # 1

Scenario # 4: There is no Cooperation among villagers along with an inefficient
       marketing of agricultural produce
The strategy:
- Conduct intensive public awareness and lectures programs as explained in the strategy for scenario # 1
- Participatory training program for the farmers to adopt new cropping patterns and new agricultural practices.
- Conduct participatory research (involving members from local community and government officials) using PTD to develop new knowledge among villagers.
- Exchange experience with other successful CBO's in the areas.
- Promote voluntary work among young people and women in the village (increase their participation in the cooperative).
- Establish small scale projects to improve collective work (agriculture demonstrations for new agriculture practices) according to the results of the PTD approach.
- Create a good communication network as explained in scenario # 1
- Conduct training programs for local water resources committee in the village in writing projects proposals according to needs assessment

Discussion of the Rweha case study

The outputs of the Rweha process (in terms of the vision and strategies developed) are of reasonable quality, although clearly there remains room for improvement. Given that this paper is focused on the methodology of scenario building as practiced in EMPOWERS, we have not included a detailed discussion of the specifics of the scenario building in Rweha, however, it may be useful to make a number of points:
1) The outcome suggests that the combined attitude of the stakeholders is one of a village that is dependent on government, particularly for domestic water supply. This is partly based on promises that villagers have received (from governorate stakeholders involved in the process) that the upgrading of their system will happen sooner rather than later.
2) Although irrigation appears in the vision, there is little mention of how access to irrigation water might be increased – in either scenarios or strategies. Again, there seems to be an assumption that 'improved networking with government' will lead to an increased allocation of water.
3) There is confusion in the separation between what are truly external factors (such a population grown rate) and those that are essentially internal (such as the level of cooperation between villagers).

Nonetheless, the recommendations for strategies, as well as the factors identified are clearly relevant, and perhaps more importantly show signs of careful thought and weighing of different alternatives. While the exercise has not yielded a clear 'decision' in terms of water resource allocation it has, in its attention to creating the

mechanisms for enhanced cooperation amongst villagers, gone to the heart of where problems are perceived to lie. What the case study also illustrates clearly is that scenario building processes do more than just develop scenarios. They lead to discussions amongst stakeholders and consideration of a wide range of internal and external factors. As discussed earlier, it is this type of dynamic dialogue that is so clearly needed in local-level water resources management. As such, it is important to view the scenario building exercise and the results presented here as the beginning of what will be a long journey towards improved management of water services and resources.

Overall experiences and lessons learned by EMPOWERS to date

Processes similar to those reported above have been carried out in villages, towns and governorates in all three EMPOWERS countries. At this mid-way stage in the project a number of important lessons have already been learned and will be incorporated into subsequent work during the next two years of the project. These include:

Scenarios building processes can support and enable structured discussions leading to improved decision making: When used as part of a participatory process, and when well facilitated, scenario building helps to provide focus and structure to discussions that involve stakeholders with different backgrounds and different levels of specialist knowledge. It was notable that scenario building group work provides a relaxed forum in which stakeholders were willing and able to discuss many sensitive issues quite openly. It is also striking that the strategies identified by villagers are often not those typically associated with 'water projects'.

Scenarios building leads to inclusion and consideration of external factors. An important part of the structured discussion supported by scenario building is that stakeholders are forced to consider and discuss external factors that are often ignored during planning processes, but that are often central to the success or failure of interventions or activities aimed at solving water supply problems.

"SMART" visioning avoids the risk of visions becoming wish lists. There is a risk in many more conventional approaches to planning and decision making that a visioning process will produce little more than a long and poorly thought-out 'wish list'. This can be avoided by ensuring that visions are SMART (Specific, Measurable, Acceptable, Realistic and Time bound). SMART visions also help to focus the collection of information in such a way that problems and their causes are more easily identifiable. Equally, including visioning as part of a process of scenario building and strategising backed by expert analysis encourages stakeholders to think through the implications of their vision.

Need to separate initial scenario building from strategising. It is best if visioning, scenario building and strategising are carried out iteratively over a period of time rather than in one concentrated effort. This gives stakeholders time to reflect on the outputs from each stage and, if relevant, to ask for changes to be made. It is also important to emphasise the separation between 'external' and 'internal' factors, and to make sure that scenarios address the former and strategies the latter.

Consensus on causes, scale and severity of water-related problems is crucial. It is advisable that scenario building does not start until problem-tree analysis, participatory water resource assessments and subsequent awareness-raising has produced a high-level of consensus about key problems amongst stakeholders. Only once this shared understanding has been created can genuinely shared solutions be sought.

Scenarios building calls for highly capacitated facilitation. It has been mentioned elsewhere that scenarios building is often more art than science (Schwarz, 1991) Facilitating scenario building processes calls for a range of skills including: good facilitation skills; technical and analytical skills; and writing skills. The latter is particularly important as documenting the outputs from a scenario building exercise and, in particular, recording narrative scenarios that help to highlight choices and decisions that have to be made, requires good analytical and writing skills, as well as considerable practice.

Scenario building needs to be mainstreamed into existing planning practices. There is always a risk that scenario building is used a one-off exercise as a token participatory exercise or that is used to rubber stamp decisions that have been made using more traditional approaches. An important lesson of EMPOWERS is that it is the embedding of the scenario building process within the larger planning cycle that has anchored it and allowed it to have the positive results reported.

Conclusions

The experience of the EMPOWERS project so far is that scenario building, if used appropriately, has a considerable potential for both improving stakeholder dialogue at the local-level and improving the quality of water resource planning and management. Although it is too early to report improved outcomes from planning exercises that used scenario building, it is expected that stakeholder involvement will have resulted in better ownership of interventions and activities that are currently being implemented. It is also anticipated that strategies and plans that have resulted from the scenario building should be more adaptable to external factors and less likely to fail than would have been the case if more traditional methods had been used. Finally, there is still much to do to streamline the scenario building exercises so that they are cost effective, provide high quality outputs, and do not become repetitive.

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