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ABBREVIATIONS

BMBF	German Ministry of Education and Research
bpb	Federal Agency for Civic Education
CIA	Central Intelligence Agency
CW	Constructed Wetland
DWWT&R	Wastewater Treatment and Reuse
DWWTP	Wastewater Treatment Plant
Eawag	Swiss Federal Institute of Aquatic Science and Technology
EPA	US Environmental Protection Agency
GIS	Geographic Information System
GoJ	Government of Jordan
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
GDP	Gross Domestic Product
HCES	Household Centered Environmental Sanitation
IWRM	Integrated Water Resources Management
JD	Jordanian Dinar
JISM	Jordan Institution for Standards and Metrology
JVA	Jordan Valley Authority
m ³	Cubic meter
MCM	Million Cubic Meters
MBR	Membrane Bio Reactor
MWI	Ministry of Water and Irrigation
NAWCO	Nabil Ayoub Wakileh & Co
NICE	National Implementation Committee for Effective Decentralized Wastewater Management in Jordan
NGO	Non Governmental Organization
O&M	Operation and Maintenance
SBR	Sequencing Batch Reactors
SMART	Integrated Water Resources Management in the Lower Jordan Rift Valley – Sustainable Management of Available Water Resources with Innovative Technologies
UASB	Up flow anaerobic sludge blanket digestion
UFZ	Helmholtz Center for Environmental Research - UFZ
USAID	United States Agency for International Development
WAJ	Water Authority of Jordan
WHO	World Health Organization

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TASK 7.10: PARTICIPATORY PLANNING

This report was prepared in the context of the research project “Integrated Water Resources Management in the Lower Jordan Rift Valley - Sustainable Management of Available Water Resources with Innovative Technologies” (SMART) funded by the German Ministry of Education and Research (BMBF). The project aims at developing and implementing Integrated Water Resources Management Approaches in the study region and in particular at generating additional water supply by, among others, decentralized wastewater treatment and reuse (DWWT&R) technologies on pilot scale. This report focuses on participatory planning for implementing decentralized WWT&R on pilot scale and represents deliverable 7-12 according to project task 7.10: ‘Report on Methodology and Evaluation of the Participatory Planning Process’ within work package 7 ‘Socio-economic Analysis’.

Several project deliverables contributed to this deliverable: 7.03 (part I) ‘The Role of the Institutional Setting for Decentralized Wastewater Treatment and Reuse – A Case Study of Jordan’ (report in SMART phase I), 7.01 ‘Valuing the benefits of decentralized wastewater treatment’, 7.03 ‘Assessing the impacts of different water qualities/quantities on farmer income and their economic situation’, 7.04 ‘Cost Benefit Analysis of decentralized wastewater treatment and re-use in Jordan’, work package 3.1. ‘Decentralized Wastewater Treatment and Reuse’ and the associated deliverables 301: ‘Delivery of sites/Model Village with an existing sewer system for approx. 650 (three plants)’, 302 ‘General Design of the wastewater treatment and reuse units in the villages and/or suburban community’, and work package 10 ‘Implementation-Office Amman’.

Participatory planning is an important prerequisite for successful implementation of water management measures, especially those involving the reuse of treated wastewater. At present, households in Jordan are yet not closely involved in water management planning processes. A first step towards participatory planning was taken through the focus group discussions with end-users in Phase I of the community of Maghareeb. The community was selected for its suburban character. It was intended to expand these efforts in Phase II, i.e. to conduct consecutive workshops with affected households, decision-makers, and technicians to discuss and find solutions to a number of unresolved issues and concerns identified in Phase I (e.g. select a technology tailored to end-users’ needs, develop a financial plan for the construction and operation of the plant or clarify the role municipalities and end-users play in operating the plant). However, while close cooperation with the people concerned throughout the entire planning process is important in order to attain acceptance, an enabling environment, i.e. framework conditions should be in place beforehand, which sets requirements for implementation, performance, and management of decentralized wastewater solutions on a systemic level (e.g. legal provisions, technical standards, health and environmental standard, assessment of macro-economic impacts, feasibility, etc.). Based on the institutional analysis in phase I, on experiences from implementing the pilot sites for decentralized wastewater management (SMART II work packages 3.1 and 10), a concept for a participatory planning process was developed and discussed with respective stakeholders. It is recommended here to also discuss and, if deemed appropriate, to further develop the participatory planning proposal in the context of the framework setting process of the National Implementation Committee for Decentralized Wastewater Management in Jordan (NICE).

1 INTRODUCTION

1.1 PARTICIPATORY PLANNING: DEFINITION AND IMPLICATIONS FOR IWRM IN JORDAN

1.1.1 DEFINITION OF PARTICIPATORY PLANNING

In constitutional nation states the engagement of the public in matters of resource allocation and management is generated by devolution from governmental entities to local bodies and citizens. The different ways and degrees of local or citizen involvement in public decision-making are governance processes and are in general referred to as 'public participation'.

Participatory planning can be understood as a measure to facilitate public participation. According to *'Participatory Planning for Sustainable Communities: International Experience in Mediation, Negotiation and Engagement'* (OBDPM, 2003, p.8) participatory planning *"is a set of processes through which diverse groups and interests engage together in reaching for a consensus on a plan and its implementation. [...] The process is rooted in the recognition that society is pluralist and there are legitimate conflicts of interest that have to be addressed by the application of consensus-building methods. Participatory planning is culturally aware and sensitive to differences in power, and seeks to ensure that these do not pre-determine outcomes. The different parties need to exchange information to explore areas of common ground and compromise and to find ways of reducing the extent and intensity of disagreements. No party should lose out entirely."*

Hence, participatory planning can be understood as a *"systematic process of preparing for the future by setting goals, selecting strategies, choosing activities, making schedules or budgeting resources for a period of time"* (CIFOR, 2007) on community level. It is a process that aims at giving people the rights to participate in decisions that can affect their quality of life. For this, it is organized in ways that promote achieving consent among the different stakeholders in the solution design for a particular issue, e.g. wastewater disposal. The challenge for such a participatory planning process is to generate empowerment on community level while involving political leaders and public administration on national level. Participatory processes typically produce the following outcomes (USAID 2005: 23):

- Community understanding of the problem and potential solutions and, therefore, the risks and benefits
- Community understanding of the problem and the chosen solutions so that citizens can contribute to its implementation and sustainability
- Exchange of ideas with the public for better general acceptance
- Financial, moral, and intellectual contribution of the community for the benefit of all
- Involvement of the private sector, i.e. investments on behalf of the community

- Clarification of roles and relationships among the different parties involved in implementing and maintaining the solution
- Day-to-day involvement of the community (including NGOs and community-based organizations) in various aspects of the implementation of the solution.

1.1.2 PARTICIPATORY PLANNING AND INTEGRATED WATER RESOURCES MANAGEMENT

The concept Integrated Water Resources Management (IWRM) can be traced back to the UN's Mar del Plata conference of 1977, and the principles adopted in Dublin in preparation for the 1992 'Earth Summit' held in Rio de Janeiro (Butterworth et al. 2010: 69). IWRM seeks to operationalize the principles, that 1) water is a public good with social and economic values and that 2) good water resources management requires a broad holistic perspective as well as the appropriate involvement of users at all levels (Butterworth et al. 2010: 69, Lenton/Muller 2009).

“Almost all definitions of IWRM stress that it is an approach to improve efficiency in water use (the economic rationale), promote equity in access to water (the social or developmental rationale) and to achieve sustainability (the environmental rationale)” (Butterworth et al. 2010: 69).¹

IWRM requires acquiring extensive knowledge, including scientific expertise, and having access to the practical know-how of the relevant actors. Measures must be developed on the basis of this knowledge that are suitable for achieving water management goals (Petersen et al. 2009: 2062). According to Butterworth et al. (2010: 69) several authors have critiqued the way IWRM has been interpreted and implemented as a relatively standard 'package' of reforms regardless of the context. A major criticism of IWRM approaches in 'developing' and 'transitional' countries, is that it often gives the impression of being externally imposed or adopted to please donors (Butterworth et al. 2010: 69). Furthermore, they emphasize (2010: 72) that the *“gap between policymaking and implementation, underestimated in the best of situations, increases if policies are made at abstract scales. While policy has to be made at a large, comprehensive scale, policy implementation takes place at the local level. The closer one gets to the concrete intervention situation, the more conflicts one can expect, and here coordination becomes harder rather than easier but is more realistic.”*

Participation in decision-making is political because it implies a genuine sharing of power in the development of policies and measures. This form of power sharing is, however, limited and involves a new role of the state that can also generate a real dilemma for the state.

¹ Molle (2008, according to Butterworth et al. 2010: 69) finds that it is often pretended that all these different objectives can be maximised simultaneously, when in reality there will nearly always be trade-offs and, at best, only a balance can be achieved.

1.1.3 INTEGRATED WATER RESOURCES MANAGEMENT, GOVERNANCE, PARTICIPATION, AND THE DILEMMA OF THE STATE

Two prerequisites are necessary in order to implement measures effectively. On the one hand, state power has to ensure compliance. In water policy, compliance is a crucial point, since it involves not only law-abiding but also voluntary cooperation and both are urgently needed for successful implementation (Petersen et al. 2009: 2062). On the other hand, government has to render possible the coordination of various governmental institutions. Water interventions are prone to fail if, for example, water policy is systematically thwarted by agricultural policy (Petersen et al. 2009: 2062). However, state can promote and facilitate stakeholder cooperation and cross-sector coordination, but cannot enforce them (Petersen et al. 2009: 2063).

This fundamental condition is widely recognized in debates on water governance. The term 'governance' refers to political processes in different institutional settings and forms of cooperation between different public and private actors (Petersen et al. 2009: 2063). Governance is associated with non-hierarchical, decentralized governing and with the participation and voluntary cooperation of all actors involved (ibid). Hence, the notion of governance is important in the debate on alternative instruments in water policy (ibid). Governance shall contribute to the achievement of ambitious policy goals by facilitating cooperation, initiating collective enterprises, and fostering individual as well as cooperative voluntary commitment (ibid.). Governance and respective instruments, such as e.g. participatory planning, have the potential to improve the effectiveness and efficiency of state policy. Specifically, through participation in politics, relevant actors, e.g. on the local level, can be induced to cooperate voluntarily and to share their knowledge (Petersen et al. 2009: 2063).

Petersen et al. (2009: 2063), find that there is a specific hazard that emerges from governance processes: If policy objectives and political purposes depend on voluntary cooperation, and negotiation and bargaining among different governmental and non-governmental actors, none of these actors will be able to assume ultimate responsibility for these purposes and objectives. This leads to a paradoxical conclusion: Governance processes may substantially facilitate achieving complex and ambitious water development objectives such as Integrated Water Resources Management. However, they typically also produce contingent and arbitrary elements since they involve different actors with particular interests, knowledge, and capacities. Thus, government has to create and facilitate participation and cooperation of non-governmental actors in political decision-making while it continuously monitors and evaluates these processes so to assess whether and how they contribute to achieving water policy objectives. If governance processes fail, authorities must make use of their capacity to intervene. Since such interventions are costly, statecraft is geared towards preventing 'governance failures'. Capacities required to effectively monitor and evaluate such processes usually are traditionally found in business management and consulting rather than in water engineering and public administration (Petersen 2009: 2064).

Discussions on governance sometimes suggest that governmental activity could be reduced to a 'lean state' or a 'minimal state' by distributing responsibilities and mobilizing resources. Petersen et al. (2009: 2064) find that the opposite is the case.² The implementation of governance processes is more likely to produce **extension and augmentation of governmental activity** than its reduction (Petersen et al. 2009: 2064).

1.1.4 POTENTIAL OF DECENTRALIZED WASTEWATER MANAGEMENT IN JORDAN

With annual per capita water availability of below 200 m³ per year Jordan is one of the most water scarce nations in the world (WHO 2005). Management of water resources is a key issue for economic prosperity, food security and social freedom and therefore a national priority for the country. One major measure of mitigating water scarcity is the implementation of decentralized wastewater treatment and reuse solutions. Based on Jordan's Water Strategy 2008-2022 the Jordanian Ministry of Water and Irrigation is considering the introduction of decentralized wastewater treatment and reuse (DWWT&R) infrastructure on a regional scale, in the years to come (MWI 2009, van Afferden et al. 2010: 3118). The strategy explicitly specifies that decentralized treatment plants shall be built to serve suburban and rural communities and that they shall also be explored for new urban settlements (MWI 2009). It also puts forward that treated wastewater shall be fully reused by 2022 and that the full range of possible applications of treated wastewater shall be considered, including reuse in irrigation, industry, landscaping and groundwater recharge (ibid.).

Decentralization means that the collection, treatment and reuse take place near its point of generation (Crites/Tchobanoglous 1998 cf. Dombrowsky et al. 2010: 2). One of the main objectives of decentralization is to improve resource allocation and service provision by bringing decision-making processes closer to those citizens who are affected (ibid.).

The potential for decentralized wastewater treatment and reuse (DWWT&R) in Jordan is significant. In the Jordanian part of the Jordan River Basin, for instance, lives in total a rural population of about 660,000 that are not connected to centralized treatment and are unlikely to be connected in the future because of their distance to the next centralized treatment plant and intermediate variation of land surface elevation (van Afferden et al. 2010, Dombrowsky et al. 2010b, cf. van Afferden et al. 2009). Together with the settlements in other rural and suburban areas they currently produce roughly 190 MCM/year of wastewater that could be treated and reused in a decentralized manner.

In 2007 100 MCM of reclaimed water in Jordan were available for reuse (MWI 2009). Jordan's National Water Master Plan stipulates that by 2022 this amount shall increase to 256 MCM/year (MWI 2009). This accounts for nearly 15 percent of the total renewable water resources available (van Afferden et al. 2010).

² It should be noted here that Petersen et al. (2009) refer to environmental policy and more specifically to the case of the EU Water Framework Directive.

Many experts, however, share the traditional viewpoint that in order to deal with wastewater, centralized treatment and reuse systems are the best solution, technically as well as economically, as they are considered to be most reliable and easiest to operate, maintain and monitor. But due to several factors the advantages of centralized treatment can often not be capitalized. Centralized structures are, for instance, not conducive to incremental development. The dynamics of fast growing conurbations generates large uncertainties for a long-term urban planning. Due to this, accurate calculation of future capacities needs and thus reliable planning of large infrastructure investments is virtually impossible (Tjandraatmadja et al. 2005, Gikas and Tchobanoglous 2009b, cf. van Afferden et al. 2010). In remote rural areas with dispersed settlement, the implementation of centralized wastewater treatment facilities is typically uneconomical due to disproportional high investment costs for site development and infrastructure, in particular with respect to the sewer network. Under such conditions decentralized wastewater treatment facilities may indeed be a more appropriate solution since they have shorter depreciation times, often lower and in general well determinable investment costs, and do only require a local sewerage network (Werner et al. 2005, Maurer et al. 2005, Engin and Demir 2006, cf. van Afferden et al. 2010).

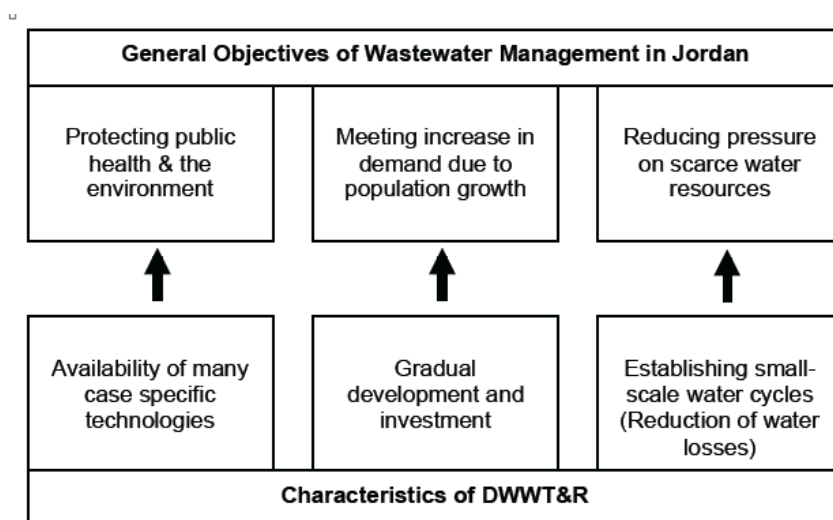


Figure 1: General objectives of wastewater management in Jordan and characteristics of DWWT&R (based on Massoud et al. 2009)

1.1.5 SMART II PILOT FACILITIES FOR DECENTRALIZED WASTEWATER MANAGEMENT IN JORDAN

With the aim to assess the impacts of decentralized wastewater treatment and reuse in Jordan, the SMART II project is implementing three treatment facilities on pilot scale, which serve between 50 and 300 population equivalents (deliverables 301: 'Delivery of sites/Model Village with an existing sewer system for approx. 650 (three plants)' and 302 'General Design of the wastewater treatment and reuse units in the villages and/or suburban community').

Pilot Site Profiles SMART II

SMART name	Location & GPS	No. of households served (future total)	Size in EP	Total min. and max flow per day (acc. to projected population)	Reuse option (reuse entity, crops)	Technology	Company
Huber site	Maghareeb phase III 32° 2'14.64"N 35°42'1.35"E	16 built (+ another 15 yet to be built)	150 (300)	15 m ³ – 30m ³ /d	Landscaping, olive trees	MBR	Huber Technology
Nursing home	Fuhais 32° 1'8.99"N 35°45'59.06"E		50-85	5 - 8.5 m ³	Olive and fruit trees	SBR	ATB
Small wetland site	Al-Balqa College n.d.	School	250	n. d.	Landscaping of college area	Wetland (sand filter)	NAWCO

Figure 2: Profiles of Pilot Sites implemented under the SMART II project

All three facilities are located in Wadi Shueib in the Balqa Governorate, near the city of Al-Salt (see Figure 3: SMART II Study Area). The technologies implemented, Membrane Bio Reactor technology, Sequencing Batch Reactor technology and Constructed Wetland technology, are well established in many developed and developing countries and are generally considered to be highly reliable and suitable technologies for decentralized wastewater solutions.

1) Membrane Bio Reactor (MBR) technology provides a biological treatment by filtering the biomass through a membrane (solid-liquid separation) which achieves a water quality that is significantly higher than that generated by conventional treatment. The commercial potential of MBR technology is considerable and applications in municipal and industrial wastewater treatment are increasing with a growth rate of 10.9 percent on average (Judd 2007). MBR technology is also becoming more cost-effective as the cost for membrane and membrane process continue to fall and environmental regulations become more stringent (ibid.). Additional advantages of MBR technology are smaller space requirements and less sludge generation. Therefore, it is an excellent option for wastewater treatment where space is limited (EPA 2008).

2) Sequencing Batch Reactor (SBR) technology provides a treatment method in which all treatment phases occur sequentially within the same tank (Slater 2006). The various treatment phases typically comprise the following (ibid.): Wastewater enters the SBR tank and mixes with activated sludge mixed with liquor solids within the tank. Influent wastewater and activated sludge are mixed together to produce anaerobic conditions for biological nutrient removal. The tank contents are then aerated and biological reactions occur until the desired degree of treatment has been achieved. The aeration is stopped and activated sludge solids settle to a blanket on the base of the reactor vessel, leaving an over-layer of treated effluent. The clarified treated effluent is then removed from the tank without disturbing the sludge blanket. SBR technology systems are considerably undemanding in terms of civil structures and process equipment and can thus generate significant savings in capital and operating costs (ibid.). Because SBR operates with a single tank it is also an excellent option for wastewater treatment with limited space availability.

3) Vertical Soil Filter (constructed wetland) technology is commonly used for the treatment of domestic wastewater. It is a technology designed to employ ecological processes found in natural

wetland ecosystems. Vertical Soil Filter systems utilize soils and associated microorganisms to remove contaminants from wastewater. Similar to a natural wetland it performs functions of conventional wastewater treatment trains, such as sedimentation, filtration, oxidation, etc. These processes occur sequentially as wastewater moves through the wetland, with wastewater constituents becoming comingled with detritus (EPA 1999). Compared to conventional wastewater treatment technologies, wetlands offer many advantages. Their operation costs are comparatively low, they are simple to operate, and can be constructed out of locally-available materials. These factors have led to the widespread use of treatment wetlands in particular in areas for which centralized sewage treatment is not a cost-effective option.

These technologies were chosen for this pilot implementation, in order to demonstrate decentralized wastewater treatment under Jordanian conditions. They do, however, not cover the range of marketable technologies that are suitable for decentralized solutions under arid and semi-arid conditions. Other technologies may also be appropriate such as e.g. up flow anaerobic sludge blanket digestion (UASB) or fixed bed reactor systems and others.

The treated effluent from the pilots that are currently being implemented by the SMART II project in Jordan will be reused locally for agricultural or landscaping purposes. While, reuse practices as well as decentralized wastewater treatment have already been introduced to Jordan separately, their combination in small to mid-sized rural and suburban communities is a novelty. The introduction of such community-based decentralized wastewater and reuse infrastructure systems may involve some decentralization of institutional and managerial arrangements such as budgeting, planning, and operation & maintenance responsibilities, i.e. the transfer of functions, responsibilities, and finances in varying degrees to local bodies and citizens (Thomas/Bendapudi n.d.). Therefore, participatory planning will play an essential role in preparing communities for the implementation and operation and management of such systems.

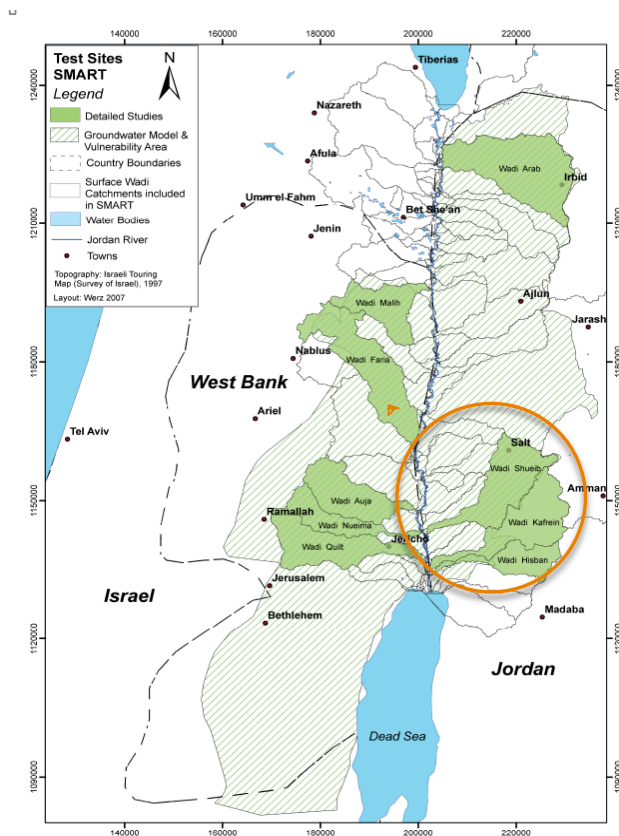


Figure 3: SMART II Study Area

1.2 MODIFICATION OF OBJECTIVES OF PROJECT TASK 7.10

1.2.1 RATIONALE FOR MODIFICATION OF PROJECT TASK 7.10

This task was designed against the background of the SMART II IWRM approach so as to combine socio-economics (work package 7) with technical and infrastructural applied research in order to support the implementation of pilot facilities for decentralized wastewater treatment and reuse (work package 3.1). These facilities were planned in order to demonstrate on pilot scale decentralized wastewater treatment and reuse in a real-life context in Jordan. According to the design of work package 3, the sites, including permission for construction of the planned pilot systems, were to be provided by the Jordanian Ministry of Water and Irrigation (MWI) by month 5 of the SMART II project period. In practice, this procedure implied that MWI clarified all questions for the local stakeholders concerned regarding the implementation of the pilot plant prior to their implementation in order to achieve consent of the respective municipality and its villagers, so that the pilot system could be implemented and research could be conducted at them throughout the SMART II project duration. Within the SMART II project plan the participatory planning process was scheduled to start on month 10, involving 8 person months. This plan and allocation of resources does not comply with the main principles of participatory planning, in particular with the principles of open outcome of the process and the readiness to respond to unforeseeable choices of the

community. Participatory planning is problem-driven, meaning that for a specific problem, e.g. dysfunctional local wastewater management, which affects villagers by causing health risks, odor and comparatively high disposal cost, the community, its citizens and their representatives, try to develop a suitable common solution. This requires several stages of fact-finding, joint learning, deliberation and decision-making. Within the SMART II time frame and given the pre-selected pilot technologies, this flexibility was not possible. It was rather the case that for a specific project design pilot sites were to be selected for the specific decentralized treatment and reuse solutions that had been devised by the SMART consortium.

Although Jordan has established reuse of municipal wastewater from central treatment in its agricultural sector, combining reuse with decentralized treatment is a novelty in the Jordanian context and entails some adaptation with regards to institutional and managerial arrangements as well as changes across a number of areas, such as environmental protection, water management, agricultural production and spatial planning. Thus, accurate evaluation of the economic, managerial, and natural conditions of DWWT&R combined with a proactive management are necessary in order to anticipate and effectively master those changes.

Furthermore, implementing a participatory planning process would have required having a framework in place that regulates the states responsibilities and general technical standards of decentralized wastewater treatment and reuse systems within the overall Jordanian wastewater management system. Such a framework would have enabled communities and decision-makers on the local and the national level to compare different feasible solutions to their specific problem (e.g. centralized treatment, decentralized treatment, different standard treatment technologies, etc.). Such a framework is currently under way, but yet not in place. Yet it is essential to operational security and risk prevention (health, environment) and cost-efficiency (technology pre-selection) and needs to be based on technical and legal expertise so that different local Jordanian conditions (e.g. Highlands, Jordan Valley, etc.) and different uses of reclaimed water (agriculture, managed aquifer recharge, forestry, landscaping) are taken into account.

Intensive discussion among the SMART project members at MWI, WAJ and UFZ lead to the consensual decision that task 7.10 should work on the methodology of a participatory planning process for Jordan and develop a concept of participatory planning for implementing DWWT&R solutions in Jordan. Participatory Planning workshops should be implemented at a later stage when different option of complementing centralized wastewater management in Jordan are more clear and specific implementing options that are technically and economically feasible are understood. There were several reasons and circumstances that lead to this decision: One concern was that a premature participatory planning process could produce expectations among citizens of being connected to treatment before a respective 'enabling environment' was in place (Lüthi et al. 2010: 53).

"An 'enabling environment' can be seen as the set of interrelated conditions that impact on the potential to bring about sustained and effective change [...]. This includes the political, legal, institutional, financial and economic, educational, technical and social conditions that are created to encourage and support certain activities. An enabling environment is

important for the success of any investment programme; without it the resources committed to bringing about change will be ineffective” (Eawag 2005: 16).

Such an enabling environment consists of elements that are provided nationwide frame conditions of a planning process (Lüthi et al. 2010: 53, Eawag 2005: 16):

- Government support, in terms of political support and favorable national policies and strategies
- The legal framework, with appropriate standards and codes at national and municipal levels
- Institutional arrangements that suit a decentralized approach
- Credit and other financial arrangements that facilitate household participation and community involvement
- Effective training and communications, ensuring that all participants understand and accept the concepts through possessing the required skills

Ideally such an enabling environment should be in place before the participatory planning process (Eawag 2005: 16). It is a prerequisite for infrastructure investments in general and in the case of decentralized wastewater management in Jordan. In response to this, the Ministry of Water and Irrigation and the SMART II project team of work package 3.1 have acquired BMBF-funding for the project ‘Implementation-Office Amman’ and established the ‘National Implementation Committee for Effective Wastewater Management in Jordan’. The Committee has just resumed its work beginning of 2013 and it is intended to have the most important elements of such a framework by May 2015.

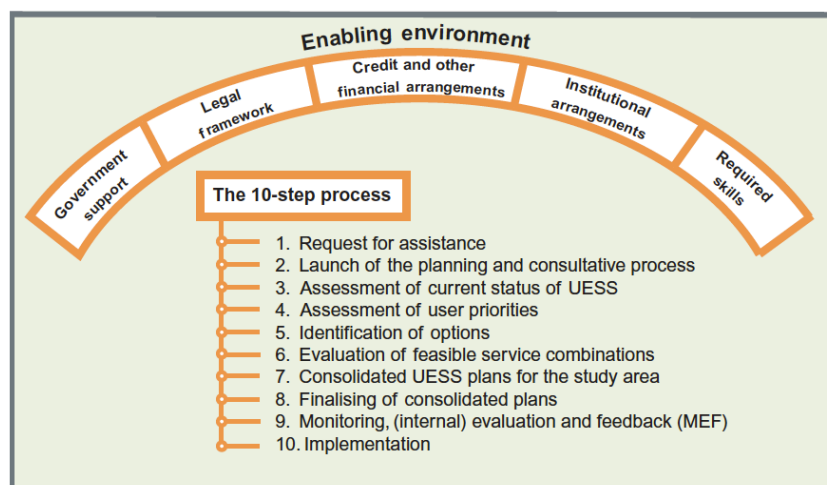


Figure 4: Defining Elements of the HCES Approach: Enabling Environment Framework and the 10-step Planning Process, source: Lüthi et al. 2010

Another aspect that influenced this decision was the general political climate in Jordan since beginning of 2011. SMART II partners in Jordan and Germany were careful not to contribute to the latent community resistance that was being nurtured by ongoing Arab Spring uprisings in the region and that also affected Jordan.

1.2.2 IMPLICATIONS OF THE ARAB SPRING FOR JORDAN

Between January and April 2011 several demonstrations and even violent conflict took place in the mainly in the capital Amman and Jordan's major cities. The demonstrations were largely motivated by a widespread desire for political and economic reform which would end corruption, provide higher salaries, lower oil and food prices, tackle inflation and unemployment, and facilitate more freedom and more political participation.

The protests in Jordan since 2011 are largely a result of its economic issues. Jordanians' demands are increasingly economic particularly for jobs and efficient public services (Barari/Satkowski 2012: 51). The country relies heavily on foreign assistance and is seriously challenged by chronic high rates of poverty, unemployment, inflation, and a large budget deficit (CIA 2013). Unemployment stands officially at more than 11 percent, but unofficial estimates suggest it is as high as 30 percent. The global economic slowdown and regional turmoil, have depressed Jordan's GDP growth, impacting export-oriented sectors, construction, and tourism (CIA 2013). In addition, Jordan's finances have been strained by a series of natural gas pipeline attacks in Egypt, causing Jordan to substitute more expensive diesel imports to generate electricity (CIA 2013).

In response to the call for political and economic reform promoting public participation and participatory planning seems to be a fitting approach. However, it should be prepared thoroughly and the time of intervention should be chosen in accordance with overall policies, strategies and implementation measures rather than according to a specific project schedule.

2 PARTICIPATORY PLANNING IN JORDAN

2.1 ATTITUDES AND EXPERIENCES OF DECISION-MAKERS IN JORDANIAN WATER AUTHORITIES TOWARDS PARTICIPATORY PLANNING

Albeit these difficulties in the context of the Arab Spring, decision-makers in Jordanian water authorities consider participation an essential element of successful and effective water management and participation is nowadays implemented frequently in the context of many projects in collaboration with the Ministry of Water and Irrigation, the Water Authority of Jordan and the Jordan Valley Authority (several discussions on water resources management in Jordan with decision-makers in the Jordan's water authorities 2012-2013). The projects implemented in the frame of the German-Jordanian Development Cooperation, for instance, strongly focus on participation, empowerment and capacity development, most notably the projects 'Use of treated wastewater in agriculture in the Jordan Valley', the 'Highland Water Forum', 'Water Wise Women' and others (see <http://www.giz.de/themen/de/18151.htm>) as well as many EU water projects (e.g. 'Euro-Med Participatory Water Resources Scenarios' (EMPOWERS) 2003-2007) and USAID projects ('Water Reuse Implementation Project' (WRIP) 2002-2004, 'Reuse for Industry, Agriculture and Landscaping' (RIAL) 2004-2007, the small communities wastewater project, etc.) (see <http://jordan.usaid.gov/en/>

OurWork/ProgramAreas/Pages/Water.aspx). These projects provide very valuable groundwork for the concept of participatory planning that is tailored to the Jordanian context.

Within the SMART project research activities that aim at understanding the needs and preferences of stakeholders and end-users were performed in the context of deliverables 7.03 (part I) 'The Role of the Institutional Setting for Decentralized Wastewater Treatment and Reuse – A Case Study of Jordan' (report in SMART phase I), 7.01 'Valuing the benefits of decentralized wastewater treatment', 7.03 'Assessing the impacts of different water qualities/quantities on farmer income and their economic situation', and 7.04 'Cost Benefit Analysis of decentralized wastewater treatment and reuse in Jordan: An application in Maghareeb and Ma'addi'.

The results of these studies were enhanced with the experiences made during the selection of the SMART II wastewater treatment pilot sites. Valuable experiences were in particular the attitudes and responses of potential pilot plant owners, public representatives, and other concerned parties, i.e. farmers, landowners, and citizens who would receive improved wastewater services.

2.2 OBJECTIVES OF PARTICIPATORY PLANNING FOR WASTEWATER MANAGEMENT

Besides the general benefits of participatory planning (see section 1.1.1), there exist specific approaches to participatory planning for wastewater related community solutions. Such participatory planning processes should include also the following components and benefits (USAID 2005: 23):

- Site selection for wastewater treatment facility
- Acceptance of treatment facility
- Choice of reuse activities, e.g. irrigation, landscaping, forestry, managed aquifer recharge and local regulation of distribution of reclaimed water
- Clarification on responsibilities for design, operation and management and monitoring of treatment facilities and reuse activities

2.3 EXPERIENCES FROM IMPLEMENTING PILOT SITES FOR DECENTRALIZED WASTEWATER TREATMENT AND REUSE IN JORDAN

2.3.1 SITE IDENTIFICATION AND SELECTION

A main difficulty experienced in the site selection process occurred due to the technical criteria and the scope of the pilot plants in work package 3.1. 'wastewater treatment and reuse', that did not match Jordanian conditions. The population requirement for the SMART II pilot sites was defined to be around 250 inhabitants and proved to be a major obstacle. With households consisting of 10-12 people on average and typically two families living in one building, villages in Jordan are normally more densely populated than in Europe or North America so that a scope of 500 or more would have been more appropriate for wastewater pilot sites on village scale in Jordan. A second major obstacle was generated within this project because no funds were assigned to the construction of a sewer

network meaning that only villages with sewer could be selected as pilot site. As there are very few villages in rural and suburban Jordan that have sewer network already in place, this posed a strong limitation to finding a feasible pilot location. The size and the cost of the pilot systems were not planned and designed accurately, which posed challenges to the local partners, who had to go through their networks in order to find the appropriate sites.

2.3.2 INVOLVEMENT OF LOCAL STAKEHOLDERS

The involvement of local stakeholders was a challenging issue due to conditions of historical, structural and circumstantial nature.

2.3.2.1 HISTORICAL CONDITIONS

Historically, the image of wastewater treatment in Jordan is not favorable. In the 1990 due to the high increase in wastewater flows most of the waste stabilization ponds plants in Jordan became overloaded which reduced their efficiencies. Public acceptance of these plants has not been favorable. For instance, odor was reported for several treatment plants in the, e.g. Al-Balqa treatment plant (Myszograj/Qteishat 2011: 12), Al-Samra Treatment Plant (Al-Nakshabandi et al. 1997:88) and others, impacting neighboring communities. Starting in the early 2000s WSP were being replaced by mechanical treatment systems. Concern about odor and other environmental affects such as flies among local stakeholders in Jordan, however, persisted in the context of Deliverable D703, Part I (Dombrowsky et al. 2010: 39) and were also voiced by residents during the site selection process.

Participatory planning in the area of wastewater management is yet not widely established and practiced in Jordan. Traditional wastewater projects, often implemented as part of donor projects, did in many cases not account for local stakeholder interests and many local communities have yet to adapt their expectations and to assume an active role in planning processes.

Jordan has worked to manage irrigation with reclaimed water for several decades. Since the early 1980s the general approach has been to treat the wastewater and discharge it to the environment where it mixes with freshwater flows and is indirectly reused downstream in the Jordan Valley. A major consideration in the use of reclaimed water in Jordan is the potential impact of regulations on the export market of fresh fruit and vegetables, and the possibility of restrictions placed by importing countries. The export market for food crops grown in Jordan had suffered from restrictions imposed by some of the importing countries of the Arabian Peninsula and Persian Gulf because wastewater (USAID 2005).

Cultural and religious factors influence how people view the reuse of wastewater in agriculture. It is important to know, for instance, that the *Council of Leading Islamic Scholars in Saudi Arabia* (13th session, decision no. 64, dated 25/10/1398H) issued a Fatwa in 1978 concerning the use of treated

wastewater. It concludes that treated wastewater can be used even for ritual washings and drinking, provided that it presents no health risks (Marschner et al. 2008: 44). In 2002 another Fatwa encouraged the reuse of treated wastewater as a method of cleaning and preservation (ibid.).³

The attitudes of the public and policy makers towards the perceived risks to public health are also key to the adoption of wastewater management systems in which treated wastewater is used for irrigation (Parkinson/Tayler 2003: 88). In order to address this and the technical issues involved, GIZ (formerly GTZ), among others, has implemented three consecutive participatory projects (from 2003 to today) on the safe and sustainable reuse of reclaimed water for irrigation in the Jordan Valley where approximately 66% of Jordan's WWTP effluent is used for irrigation (see also Salman et al. 2008).

2.3.2.2 STRUCTURAL CONDITIONS

One major problem of stakeholder involvement in Jordan is the case of **absentee landowners**, who typically own large properties in the rural and suburban areas, but live in Amman or elsewhere. Their participation and support for participatory planning processes can be decisive when their consent is needed, e.g. for use of the land or for implementing a treatment facility close to their property. During a progressed SMART II site selection process for a pilot treatment plant in a suburban community of Al-Salt, which is heavily impacted by dysfunctional wastewater disposal (wastewater overflow, insects, diseases, smell, etc.), a single absentee landowner employing his powerful connections in Jordan's government, forced cancellation of the pilot implementation, in order to prevent potential loss of market value of his land.

2.3.2.3 CIRCUMSTANTIAL CONDITIONS

The pilot site selection coincided with the **Arab spring** and the associated turmoil peaks in Jordan in the years 2011 and 2012 (see section 1.2.2). The atmosphere between the central government and its authorities on the one hand and communities on the other was strained which complicated the site selection.

Since decentralized wastewater treatment is yet not an established approach in Jordan's water sector, the required standards and regulations for such systems along with arrangement for ownership, responsibilities for operation and maintenance are yet not in place. During the site selection process this circumstance resulted in protracted and extremely time-consuming negotiation between national and local representatives. The SMART II project team members of work packages 3.1, 7 and 10 facilitated the negotiation. At that the local team members, namely Bassim Abbassi and Nabil Wakileh, were primarily involved and held meetings with the concerned representatives on average once every week over a period of two and a half years. **Persistence and dedication to the project goal** over a time much longer than was planned was essential to the success of the site selection.

³ However, opposing statements of Islamic scholars, strongly restricting or even prohibiting the reuse of treated wastewater also exist, such as the Fatwa on reuse of treated wastewater by the Grand Mufti of Jordan in 2003 (ibid.).

Eventually negotiation resulted, in an agreement on centralized management of the community pilot plant by the Water Authority of Jordan. In order to render this possible, the ownership of public land that is used for the treatment pilot site in this community had to be transferred to the Water Authority of Jordan.

2.3.3 LESSONS LEARNT AND RECOMMENDATIONS

There are a number of lessons learnt from the site selection process, which constitute valuable information for preparing a future participatory planning process.

2.3.3.1 INVOLVEMENT OF LOCAL STAKEHOLDERS

In Jordan Municipalities, i.e. the locally elected community representatives, play a central role in engaging citizens in participatory planning processes. They are the level of government with administrative and financial independence that is closest to the citizens. Its objective is *“to draft, implement and follow-up plans and programmes to achieve sustainable development with the participation of the local communities and to [...] manage all local services, facilities and projects assigned to it by itself and through participation with the private sector and/or civil society organization”* (Municipalities Law 2007, Art. 3.A). They should be considered the key to a successful participatory process. This means that the relationship between the central and regional offices of the water authorities on the one hand, and the respective community representatives on the other will need to be given careful attention. This concerns in particular the potential for transfer of competences and resources to the local authorities will need to be given careful attention and consideration in order to establish close cooperation.

2.3.3.2 DEALING WITH HISTORICAL CONDITIONS

In Jordan there exist a general association of the public between wastewater treatment and continuous odor and flies possibly impacting communities nearby the treatment plant. This concern originates from the period when wastewater stabilization ponds were the primary treatment technology in Jordan. In order to tackle the citizens' concern, numerous visits of concerned parties at the Research, Demonstration and Training Site for DWWT&R at Fuheis (Al-Salt) were organized to prove to stakeholders, that with the technologies employed there neither odor nor flies occur. In future those visits should be extended to the SMART II pilot treatment plants.

2.3.3.3 DEALING WITH STRUCTURAL CONDITIONS

A major circumstance of the site selection was the influence of absentee landowners in rural and suburban Jordan. In the case of the pilot site selection in the SMART II project the landowner involved was concerned with the market value of his land rather than with the wastewater issues of the villagers. For future implementation projects it is important to involve this stakeholder group early in the process. Gaining the attention and involvement of non-resident landowners, who may only be present for short periods if at all, may be a major challenge. Different potential solutions and

ways to involve them in local wastewater solutions should be devised. Those may involve lease arrangements and other compensatory agreements, engaging them in the production of fodder and alfalfa or forestry and in particular communicating and marketing water protection and conservation needs to them.

2.4 METHODOLOGY: THE HCES APPROACH TO PARTICIPATORY PLANNING

Household-centered environmental sanitation (HCES) is an approach to inclusive planning and implementation of environmental sanitation services. It is an attempt to operationalize the so-called Bellagio Principles, a framework that balances the needs and demands of people with those of the environment (Eawag 2005: 49, see also Annex 1):

- Human dignity, quality of life, and environmental security of the individual are at the center of this approach, which is responsive and accountable to the needs and demands of people in the community setting.
- Decision-making involves participation of all stakeholders, especially the consumers and providers of services.
- Waste is considered a resource (to be diluted as little as possible), and its management forms part of an integrated water resource, nutrient flow, and waste management process.
- Solutions to environmental sanitation problems are sought first in households and communities, working into larger domains if solutions cannot be found (e.g. town, district, catchment, city).

The special characteristics of HCES approach is that attempts to avoid the problems arising from ‘top-down’ or ‘bottom-up’ approaches, by employing elements of both in an integrated framework. This is also characterized by being (a) multi-sector: accounting for water supply, sanitation, storm drainage and solid waste management and (b) multi-actor: emphasizing the participation of all stakeholders, beginning at the household/neighborhood or community level, in planning and implementing sanitation services (Eawag 2005: 7).

The HCES approach belongs to the group of communicative planning frameworks that focus on participatory, bottom-up methodologies where planners solicit the participation of a variety of stakeholders in a democratic planning process (Lüthi et al. 2010: 52). It aims at providing stakeholders at every level, but particularly at the household and neighborhood level, with the opportunity to participate in the planning, implementation and operation of their local water resources management (Eawag 2005: 10).

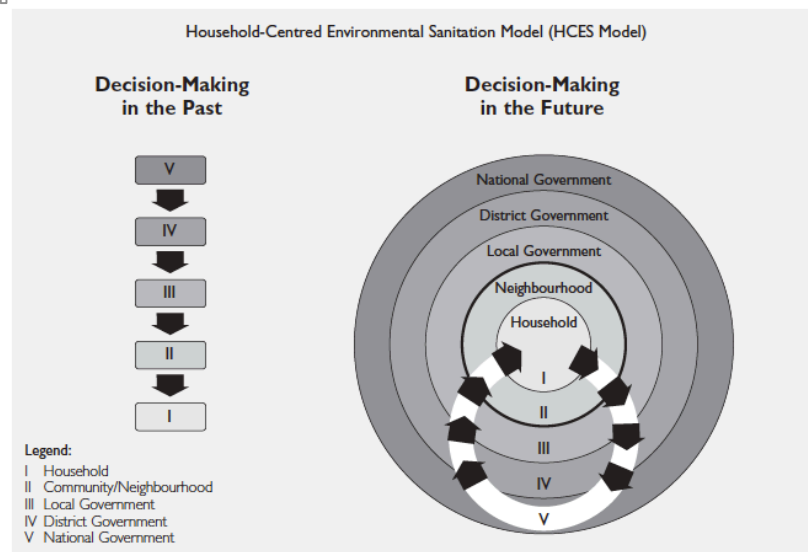


Figure 5: Household Centered Environmental Sanitation Model (HCES), source: Eawag 2005: 7

Focusing on un-served or underserved areas in urban and peri-urban settings, field-testing of HCES began in 2007 in selected cities in Burkina Faso, Costa Rica, Kenya, Laos, Nepal, the United Republic of Tanzania and Mongolia (Lüthi et al. 2010: 60).⁴

The HCES approach is chosen here because its basic principles are in accordance with the approach to decentralized wastewater management in the SMART II project. These are (c. f. Eawag 2005: 10):

- People and their quality of life should be at the center of any environmental sanitation system.
- All environmental sanitation systems must be designed in such a way as to balance economic and environmental goods.
- Solutions of environmental sanitation problems should take place as close as possible to the place where they occur.
- 'Wastes', whether solid or liquid, should be regarded as resources.
- Environmental sanitation systems should be 'circular' – designed in such a way as to minimize inputs and reduce outputs.
- Problems relating to environmental sanitation should be handled within an integrated framework, and this framework should itself be part of a wider system of integrated water resources, waste management and food production.

One specific characteristic of the HCES approach is the so-called 'zoning'. It means that problems are solved as near as possible to the point where they occur. This is done by establishing zones: The household (zone I), the neighborhood (zone II), the community (zone III), a political subdivision such as a city ward (if appropriate) (zone IV), the community itself (city, village, etc.) (zone V), and

⁴ For an assessment of these field tests see Lüthi et al. 2010.

ultimately the wider environment (such as a river basin catchment or some other larger regional area) (Eawag 2005: 12).

Problems relating to the management of water management and sanitation services, for example sewage, should be addressed at the smallest appropriate zone, initially the household. If a problem cannot be solved in this smaller zone or if it is more cost-effective to deal with it on a larger scale, and the larger zone agrees, the problem is transferred to the next largest zone. However, even when it is agreed that the problem can be transferred, the smaller zone has to negotiate with the larger zone and reach an agreement on key parameters. Such parameters include, for instance, volume and strength of sewage and peak flow. Appropriate financial arrangements, such as disposal and treatment fees, may have to be agreed between the zones (see figure 6) (Eawag 2005: 12).

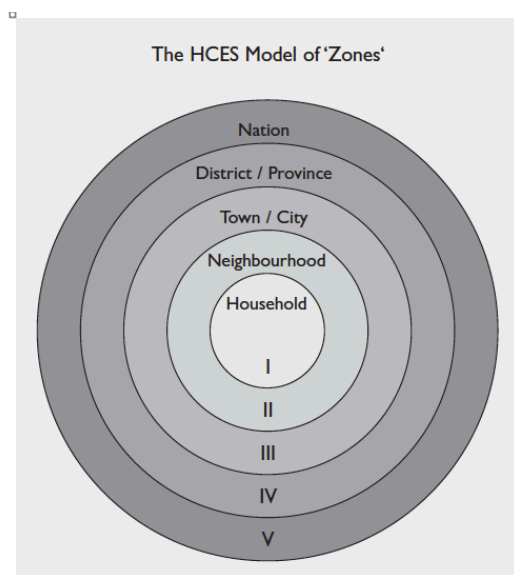


Figure 6: The HCES Model of 'Zones' (Eawag 2005: 13)

2.5 CONCEPT: APPLYING THE HCES APPROACH TO JORDAN

The HCES approach is designed to assist the people who will initially have to take the decision on whether and how to conduct a participatory planning process. Those are municipal, provincial and government officials and in particular municipal planners, who are responsible for planning community services and civic officials, such as mayors and community managers (Eawag 2005: 15). They are also the ones who will implement and support the process and who will be responsible for the results (ibid.).

In order to provide a concept tailored to the Jordan context, firstly the requirements for the enabling environment are outlined and secondly, the 10-step process is developed (see figure 7).

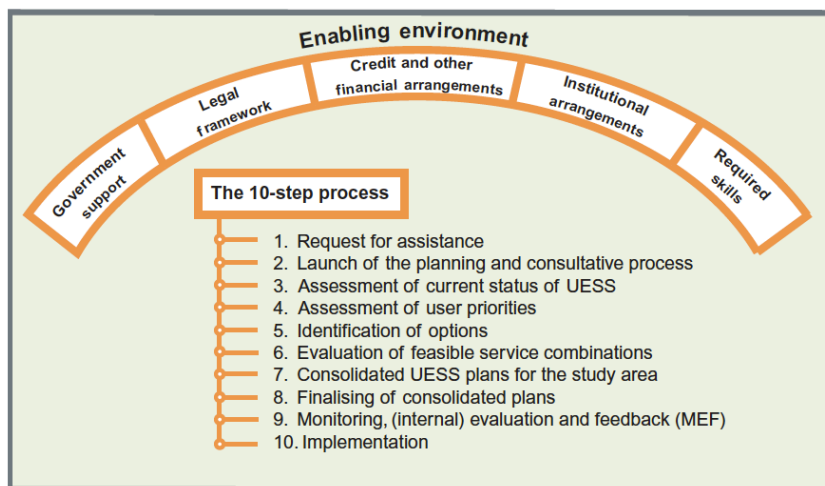


Figure 7: Defining Elements of the HCES Approach: Enabling Environment Framework and the 10-step Planning Process, source: Lüthi et al. 2010

2.5.1 ENABLING ENVIRONMENT FOR LOCAL WASTEWATER PROJECTS

The HCES approach specifically addresses the need for an enabling environment that should be in place, at least in broad terms, prior to starting the actual consultative and planning process. This environment enables local planners and citizens to take and implement decisions on how to improve their current situation (Eawag 2005: 16).

1. Government support, in terms of political support and favorable national policies and strategies
2. The legal framework, with appropriate standards and codes at national and municipal levels
3. Institutional arrangements that suit the highly decentralized and zone-by-zone approach used in HCES
4. Effective training and communications, ensuring that all participants understand and accept the concepts through possessing the required skills
5. Credit and other financial arrangements that facilitate household participation and community involvement
6. Information and knowledge management; providing access to relevant information, sharing of experiences, training and resource materials, the development of new approaches and the dissemination of findings (c.f. Eawag 2005: 16)

In the case of local, decentralized wastewater management in Jordan, such an enabling environment may include the following items:

1. A national wastewater policy that supports participatory planning processes and – in the case of wastewater management – embraces the necessary scales of solutions, e.g. on-site, decentralized, semi-centralized, and centralized treatment systems
2. A national wastewater master plan that defines wastewater projects including also the allocation of funds

3. Definition of 'on-site', 'decentralized', 'semi-centralized', and 'centralized' wastewater treatment for Jordan
4. Standards for effluent quality that allow for cost-efficient decentralized solutions for different reuse purposes as well as an adequate number of parameters for monitoring compliance to these standards that are in accordance with all concerned sector competences (Ministry of Health, Ministry of Environment, Ministry of Water and Irrigation, Jordanian Institution for Standards and Metrology, etc.)⁵
5. Arrangements for transferring competences and where required respective funds to local and/or regional authorities and communities
6. Provision of funds (e.g. development bank loan or grant) that will enable communities to realize wastewater projects
7. Provision of facilitators and trainers to develop the skills on the part of municipal and regional representatives required for implementing the HCES approach.

However, for initial application of the approach, i.e. a **field test**, it will not be practical or desirable to implement general changes in sector procedures, such as changes in legislations or standards. What is necessary is the approval of concerned authorities to make a temporary adjustment to appropriate standards and procedures to the extent needed so as to allow an initial implementation to HCES. This may be a simple matter of providing a policy statement that the HCES approach should be tried out and to obtaining **temporary waivers** which allow it to proceed. Experience from such field tests will then help to determine what permanent changes should be introduced. (Eawag 2005: 16f).

2.5.2 STATUS OF ENABLING ENVIRONMENT IN JORDAN

As for the enabling environment for decentralized wastewater solutions, Jordan is currently on a promising path.⁶ The Jordanian Water Strategy 2008-2022 states a decisive policy shift to decentralized wastewater treatment in rural and suburban areas where it is often more appropriate and economically feasible than centralized treatment. The Water strategy also puts emphasis on the enforcement of wastewater related regulation, an issue that had practically been absent in the 1998 Wastewater Management Policy. Standards for wastewater and sludge treatment and reuse for different users shall be updated (p. 3-5) and standards for the use of septic tanks in rural areas shall

⁵ Many existing standards are based on those developed in industrialized countries, under conditions very different from those applying today in developing countries, and so they are often inappropriate. Even where they are appropriate, in theory, they often cannot be applied because they turn out to be too expensive to comply with (Eawag 2005: 17). This is the case in Jordan, for instance, for the standard values of Total Nitrogen (TN) content in treated effluent for reuse in agriculture.

⁶ This paragraph is a citation of Dombrowsky et al 2010: 6ff.

be issued (p. 6-3). Effluent quality from WWTPs shall be regularly monitored (p. 6-3). Monitoring is also foreseen for crops irrigated with treated wastewater (p. 6-6) and the groundwater quality near plants shall be observed (p. 6-6). The institutional capacity for enforcing wastewater regulations shall be established (p. 6-5). For industries, incentives shall be provided to meet the standards set for wastewater reuse (p. 6-3). Water quality laboratories shall be upgraded and staff be trained (p. 6-6). A key element of the 1997 strategy and 1998 set of policies was the promotion of private sector participation (PSP).

With regards to standard and regulations for decentralized wastewater management, the Ministry of Water and Irrigation in cooperation with the Helmholtz Center for Environmental Research and have set out to develop an implementation strategy for decentralized wastewater management for rural and suburban areas in Jordan, over the next two years.⁷ For this purpose, the Ministry of Water and Irrigation has established a cross-sectorial Committee, the so-called “National Implementation Committee for Effective Decentralized Wastewater Management Solutions in Jordan” (NICE). The committee will be working on important issues such as technical and reuse standards, the definition of ‘decentralized’ systems for Jordan and on defining option for managing decentralized wastewater and reuse systems in rural and suburban communities.

2.5.3 10-STEP PARTICIPATORY PLANNING PROCESS

In the following the 10-steps of conducting a HCES participatory planning process that should be based on an enabling environment and is tailored to Jordan is developed. As stated earlier, the approach should be conducted initially only in parts of a community in order to gain experience and test the technique before it is applied comprehensively (Eawag 2005: 6).

2.5.3.1 STEP 1: REQUEST FOR ASSISTANCE

The HCES process should start in response to a request for assistance from communities. Such a request typically could be made by local representatives, such as the mayor, or by citizens or, in the case of Jordan, by the governor.

In the present case, it may be advisable to have Jordanian communities pre-assessed where decentralized wastewater management would be economically and technically feasible and environmentally sustainable as an alternative to centralized treatment and to tanker solutions. Subsequently, one alternative to waiting for a community request, would be **tendering a planning**

⁷ The project is funded by the German Federal Ministry of Education and Research and the Ministry of Water and Irrigation (Project-ID 02WM1212).

process for implementing local wastewater management among the positively assessed communities.⁸

2.5.3.2 STEP 2: LAUNCH OF THE PLANNING AND CONSULTATIVE PROCESS

This step should result in two main outputs: (1) a workshop with stakeholders on the consultative and planning process and (2) a written agreement endorsing the common planning HCES process also indicating the time frame and general procedures.

The workshop serves to explain the HCES and its implications in details. After the workshop stakeholders should understand and accept the implications, in particular intensive user involvement and close collaboration between different authorities and a commitment to an **open outcome** of the planning process, in particular the comprehension that the results of the planning process may not correspond with the solution the authorities had envisaged (Eawag 2005: 24).

The consultative meeting serves to define the **physical boundaries** of the HCES process. At that it is important to reach a consensus among the stakeholders, recognizing among other things, that it is possible that different parts of a community will in the future also need different solutions that are associated to different stakeholders, management options, and responsibilities (ibid.).

At this stage municipal officials also need to carefully assess the following capacities and conditions (Eawag 2005: 24):

- A community's capacity (i.e. time, knowledge, resources) to participate in a HCES planning process and to implement solutions
- The ability of local public and private sector organisations to supplement and support community services including training and specific (technical) support services.
- Compliance and possible conflict prevention of the HCES process with national policies and strategies, in this case the Jordanian Water Strategy and the National Water Master Plan and whether changes or modifications are required at least temporarily to make implementation of HCES feasible.

And finally, all parties at the planning and consultative meeting should agree on how the process will be carried out and who will be responsible for what. It is particularly important to agree on who will be responsible for the overall management and coordination (program manager). Such a programme manager should be a respected and neutral professional and should be provided with adequate staff and budget (Eawag 2005: 24f).

From the very beginning on participatory tools should be established in the planning process. Those tools, such as visualization with (mind) mappings and GIS, simulations, and traditional moderation and metaplan techniques with cards, pin wall, and flip chart. In the context of Jordan, it may also be

⁸ This was a suggestion by Dr. Philippe Bergeron of the International Bureau at BMBF that was originally made in the context of the pilot site selection. It was not feasible then, but should be given serious consideration for future implementation of decentralized wastewater management projects in Jordan.

conducive to introduce indirect communication and informal information sharing opportunities such as prolonged breaks, brainstorming techniques, role plays, and others.

2.5.3.3 STEP 3: ASSESSMENT OF CURRENT STATUS

This step in the development of the process is a comprehensive, participatory assessment of the current level of water and sanitation services in order to understand how services are provided and used within the particular social context of the participating community. The assessment should be carried out by an interdisciplinary team, which includes specialists from concerned sectors (water, health, environment, agriculture, etc.) and social and community workers together with local residents and other key informants (Eawag 2005: 25). At that residents are the source of information with the most intimate knowledge about the current state of water supply and sanitation, such as the status of infrastructure, operation and maintenance issues, and on the local perception of services. Hence, residents should not only be consulted, but should also participate in making the assessment (Eawag 2005: 25). Furthermore, the assessment should be made on the local, the municipal and the city level (ibid.).

For the present purpose at least the following information is essential: status of sewer networks if present and type and status of household connections to local sewer / on-site septic tank, disposal infrastructure (cesspools, septic tanks, etc.), number of households and population, frequency of water supply, experiences with wastewater disposal (health and environmental impacts), cost for wastewater disposal, reuse opportunities (irrigation, managed aquifer recharge, forestry, etc.) and interest in reuse, willingness and ability to pay for improved wastewater services, local risks and hazards for surface and groundwater bodies from wastewater, hydrological profile and natural drainage, land use and owner information on potential service plots, seasonal production of wastewater (summer, winter), peak flow, etc.

For this assessment tools that structure, and visualize the process and the findings should be applied, such as mapping, GIS, and others (see figure 8). They will not only help to organize the data, but will also provide some playful character to the process. Focus group meetings can be conducive to accelerating data mining.

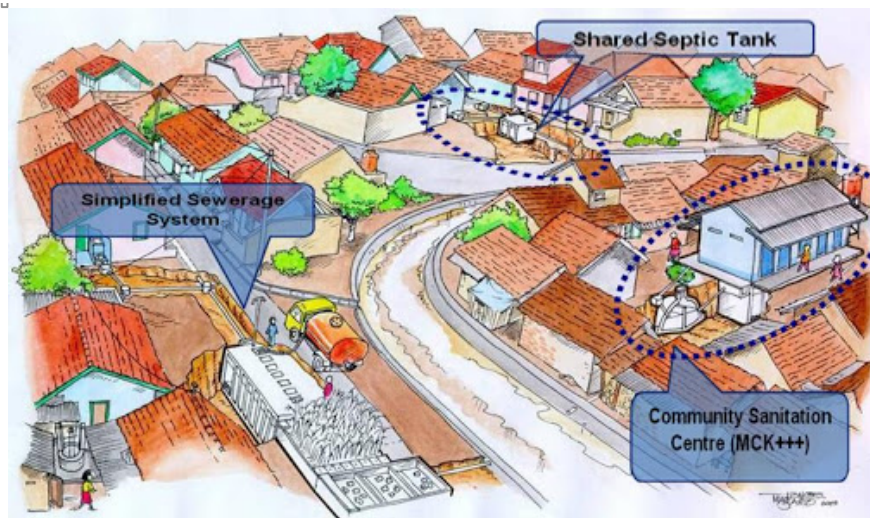


Figure 8: Example of visualization of participatory assessment, source: <http://www.borda-sea.org/news/borda-sea-news/article/1st-bnss-dewats-cbs-in-the-philippines.html>

2.5.3.4 STEP 4: ASSESSMENT OF RESIDENTS' PRIORITIES

Here residents are informed about the results of the assessment through, e.g. a focus group meeting. This gives the HCES process team the opportunity to present their findings and to correct possible factual errors in their assessment and provided background to assessing the priorities of and by the residents. This means, that they decide which deficiencies should be given priority, such as e.g. what levels of service should be considered as regards to quality of sanitation and reuse options and what institutional arrangements would be acceptable, e.g. local or clustered management of decentralized treatment facilities? How much fresh water should be saved by substitution with reclaimed water? How important is groundwater protection?

2.5.3.5 STEP 5: IDENTIFICATION OF OPTIONS

This step should result in a report on identified options, requirements and implications. This means that for each option the technical, institutional, financial and social feasibility is assessed as well as their impact on the environment. At this HCES neither imposes limits on the choice of technologies (i.e. treatment systems), nor on the institutional or financial arrangements (e.g. micro credits). The report should include the social issues associated to each option including user perceptions as well as the institutional and management arrangements, the operation & maintenance requirements, roles and responsibilities, technical design including linkages to wider infrastructure (e.g. cluster solutions, connection to centralized treatment) and the financial cost and revenues for each option (Eawag 2005: 28-31).

2.5.3.6 STEP 6: EVALUATION OF FEASIBLE SERVICE COMBINATIONS

The output of this step is a detailed and revised description of the preferred options, i.e. wastewater management solutions. The report should include the preferred option embedded in a complete and

revised frame of option requirements (institutional and management arrangements, operation & maintenance, roles and responsibilities, technical design, etc.). (Eawag 2005: 31).

2.5.3.7 STEP 7: CONSOLIDATED PLANS FOR IMPLEMENTATION

The options identified during step 6 are now integrated to one implementation plan for the community and its linkages to a wider infrastructure or management clusters. This can be a challenging task since putting multiple options together to one plan can be a rather complex. The process manager has to be careful during steps 6 and 7 to not allow for too many options so as not to confuse the analysis (Eawag 2005: 31). Also, iterations between steps 6 and 7 are likely in order to reconsider alternative that may have been ruled out earlier (ibid.).

2.5.3.8 STEP 8: FINALISING OF CONSOLIDATED IMPLEMENTATION PLANS

During this step a workshop or a number of them will provide a platform for consultation among the local, provincial and national stakeholders. Planners present the options and consult with representatives, sector agencies, the municipality, regulatory bodies etc. who will be able to explain what and how their institutions can and cannot assist the implementation, clarify technical issues and explain the implications of the community's plan. This consultation may result in further modifications and amendments but it will help ensure that the final implementation plan will be approved and implemented (Eawag 2005: 34).

2.5.3.9 STEP 9: MONITORING, (INTERNAL) EVALUATION AND FEEDBACK (MEF)

Monitoring, evaluation and feedback (MEF), i.e. tracking closely what is occurring during implementation. This means, finding out the causes of delays or discrepancies and to devise and put into effect remedial action so as to not generate unbalanced and unsustainable development or wasted investments and disappointed residents (Eawag 2005: 36).

MEF on an HCES implementation project has to determine whether the approaches and solutions adopted during the planning phase were appropriate in the light of events, or should be adjusted (Eawag 2005: 36). HCES puts emphasis on a continuing dialogue with the implementing communities throughout the entire implementation phase. During implementation approaches will be refined in the light of experience and at that MEF is an essential measure.

Therefore, a comprehensive MEF plan, including the design of evaluation process and mechanism for feedback, has to be developed prior to starting implementation along with a proper budget and staff for working on MEF. Furthermore, measurable monitoring indicators will be needed, such as e.g. such as the number of water connections completed.

2.5.4 PRACTICAL ISSUES AND COMPLICATIONS

There are a manifold issues and complications that may occur during planning and implementation. For this concept a selection of the most important issues and complications rather than a complete list of possible problems is provided.

2.5.4.1 LACK OF PLANNING CAPACITY

Lack of planning capacity of local authorities and community is one of the main complications characterized by weak institutional settings. At the same time, participatory planning rather increases complexity due to enhanced information and a multiple stakeholder interest. This circumstance needs to be addressed prior to the actual planning and implementation process (Lüthi et al. 2010: 54). On the part of the process manager it is important to not allow for too many information and options (see steps 6 and 7) so as not to confuse the process (Eawag 2005: 31). Besides, many groups and organizations will need training and orientation such as government and municipal officials very early on in or before initiating the process, so that they can understand and support the planning. Households, for example, will need to understand the implications of the possible options and will also be able to exert quality control over local builders. Other concerned professionals and companies should be aware of and familiar with legal frameworks, regulations and standards and the range of technical options available. Communities that will undertake construction, O&M and/or management will need training on technical matters, simple financial management, basic monitoring and reporting procedures, and so forth (Eawag 2005: 26).

Experience at different pilot sites has shown that **capacity development deserves significantly more attention and resources than are usually provided** (Lüthi et al. 2009, Lüthi et al. 2010).

2.5.4.2 DISCREPANCIES BETWEEN PLANNING AND REALITY

Lüthi et al (2010: 55) report discrepancies between planning and implementation on the part of the residents, who were reluctant to pay the planned sanitation improvements – in the reported case – despite an established microcredit scheme. The reluctance was not recognized early enough and also not well addressed in community consultation and awareness campaigns. In the reported case, issues such as the financial contribution by households or the cost sharing for the retrofitting of buildings had to be settled by the negotiation committee. (Lüthi et al. 2010: 55).

Even in cases where willingness to pay has been positively assessed (e.g. Lienhoop et al. 2012), during the planning process, this need to be reconfirmed, possibly, by exemplarily calculating the impacts on disposable household income.

2.5.4.3 LACK OF COMMUNICATION

Its indirect stakeholders should also understand a participatory planning process. Indirect stakeholders are central government and regulatory officials, academic and educational

representatives, and concerned professionals, companies, organizations and national level institutions.

Therefore, municipal officials should devise a communications strategy to reach stakeholders on all levels (from household to central government). This strategy may include e.g. texts, flyers, radio or even TV broadcasting, as well as meetings and workshops. As such skills are not to be expected to exist on municipal level, they need to be brought in (Eawag 2005: 27).

3 CONCLUSION AND OUTLOOK

A participatory planning process is complex, time intensive, requires financial and human resources and well developed soft skills (facilitation, moderation, negotiation, and communication with indirect stakeholders on the part of the process manager or project management team). Where implemented successfully it generates local ownership of the solution and hence sustainability. The latter is indispensable for cost-efficient and environmentally sound systems. In Jordan, where centralized treatment is not always the most cost-efficient option, decentralized solutions should be explored and where feasible and socially integrated they should be implemented. Their sustainability and effectiveness, however, will be out of the hands of the central government and will depend on the local and regional actors. At that a participatory planning will be one of the keys to successful implementation. It is recommended to discuss and, if deemed appropriate, to further develop this participatory planning proposal in the context of the framework setting process of the National Implementation Committee for Decentralized Wastewater Management in Jordan (NICE).

SOURCES

- Afferden van M., Cardona J., Rahman K., Daoud R., Headley T., Kilani Z., Subah A. and Müller R. 2010. A step towards decentralized wastewater management in the Lower Jordan Rift Valley, *Water Science & Technology* 61.12: 3117-3128.
- Al-Nakshabandi G.A., Saggar M.M., Shatanawi M.R., Fayyad M., Al-Horani H. 1997. Some environmental problems associated with the use of treated wastewater for irrigation in Jordan. *Agricultural Water Management* 34(1). July 1997: 81-94.
- Baggett S., Jeffrey P. and Jefferson B. 2006. Risk perception in participatory planning for water reuse. *Desalination* 187: 149–158.
- Butterworth J., Warner J., Moriarty P., Smits S., and Batchelor C. 2010. Finding practical approaches to Integrated Water Resources Management. *Water Alternatives* 3(1): 68-81
- Center for International Forestry Research (CIFOR). 2007. http://www.cifor.org/sourcebook/part_two_tools/pp_what_is_pp.html, retrieved 7th of May 2013.

- Dalameh S., Assayec M. and Suleiman W. 2009. Themes of stakeholder participation in grey water management in rural communities in Jordan. *Desalination* 243: 159-169.
- Dombrowsky I., Scheumann W., Lienhoop N., Al Assad T., Zaater S., and Daoud R. 2010. The Role of the Institutional Setting for Decentralized Wastewater Treatment and Reuse - A Case Study of Jordan.
- Eawag: Swiss Federal Institute of Aquatic Science and Technology, June 2005. Household-Centred Environmental Sanitation (HCES) - Implementing the Bellagio Principles in Urban Environmental Sanitation. Provisional Guideline for Decision-Makers.
- Lienhoop N., Dombrowsky I., Zaater S., Daoud R. 2008. Demand for and interest in Decentralised Wastewater Treatment and Re-use: An empirical analysis of stakeholder views. University of Karlsruhe, Karlsruhe, Germany, 26 p, available at: <http://www.ufz.de/index.php?en=19308>.
- Lüthi C., McConville J., Kvarnström E. 2010. Community-based approaches for addressing the urban sanitation challenges, *International Journal of Urban Sustainable Development* 1(1-2): 49-63.
- Marschner, C., Schomaker R., Janosch M. 2008. Wasser als religiös-kulturelles Gut im Islam. In: Meike Janosch and Rahel Schomaker (Hrsg.), *Wasser im Nahen Osten und Nordafrika - Wege aus der Krise.*, pp. 33-50.
- Moriarty P., Batchelor C., Laban P. and Fahmy, H. 2010. Developing a practical approach to 'light IWRM' in the Middle East. *Water Alternatives* 3(1): 122-136.
- Myszograj, S. and Qteishat, O. 2011. Potential and Limitations of Wastewater Reuse in the Hashemite Kingdom of Jordan. *Civil and Environmental Engineering Reports* (6).2011: 6-17.
- OBDDPM (Office of the Deputy Prime Minister UK) (2003): Participatory Planning for Sustainable Communities: International Experience in Mediation, Negotiation and Engagement, retrieved at <http://www.chs.ubc.ca/archives/?q=node/677> on 8th of May 2013.
- Parkinson, J. and Tayler, K. 2003. Decentralized wastewater management in peri-urban areas in low-income countries. *Environment and Urbanization* 2003/15: 75-90.
- Petersen T., Klauer, B. and Manstetten, R. 2009. The environment as a challenge for governmental responsibility - The case of the European Water Framework Directive. *Ecological Economics* 68(2009): 2058–2065.
- Renn O., Webler T., Rakel H., Dienel P., and Johnson B. 1993. Public participation in decision-making: A three-step procedure. *Policy Sciences* 26: 189-214.
- Salman A., Al-Karablieh E., Regner H., Wolff H., and Haddadin M. 2008. Participatory irrigation water management in the Jordan Valley. *Water Policy* 10 (2008) 305–322
- The World Health Organization (WHO). 2006. Guidelines for the Safe Use of Wastewater, Excreta and Greywater. Volume II. Wastewater Use in Agriculture.

<http://www.guardian.co.uk/world/2011/apr/07/jordan-self-immolation-protest-amman>, retrieved on June 17, 2013.

USAID. Reuse for Industry, Agriculture and Landscaping; (RIAL) Project Reclaimed Water Reuse in Agriculture, Third Seasonal Progress Report, July - December 2005

ANNEXES

Annex 1: Bellagio Principles

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- 1. Human dignity, quality of life and environmental security at household level should be at the centre of the new approach, which should be responsive and accountable to needs and demands in the local and national setting.**
 - solutions should be tailored to the full spectrum of social, economic, health and environmental concerns
 - the household and community environment should be protected
 - the economic opportunities of waste recovery and use should be harnessed.
- 2. In line with good governance principles, decision-making should involve participation of all stakeholders, especially the consumers and providers of services.**
 - decision-making at all levels should be based on informed choices
 - incentives for provision and consumption of services and facilities should be consistent with the overall goal and objective
 - rights of consumers and providers should be balanced by responsibilities to the wider human community and environment.
- 3. Waste should be considered a resource, and its management should be holistic and form part of integrated water resources, nutrient flows and waste management processes.**
 - inputs should be reduced so as to promote efficiency and water and environmental security
 - exports of waste should be minimised to promote efficiency and reduce the spread of pollution
 - wastewater should be recycled and added to the water budget.
- 4. The domain in which environmental sanitation problems are resolved should be kept to the minimum practicable size (household, community, town, district, catchment, city) and wastes diluted as little as possible.**
 - waste should be managed as close as possible to its source
 - water should be minimally used to transport waste
 - additional technologies for waste sanitisation and reuse should be developed.

Source: Eawag 2005: 40