BRIDGING COMMUNITY DEVELOPMENT AND ENVIRONMENTAL EDUCATION: RURAL WATER CONSERVATION IN JORDAN

By

Lexine Tallis Hansen

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ABSTRACT

BRIDGING COMMUNITY DEVELOPMENT AND
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International community development is a fertile area of research for environmental education scholars and practitioners. Although the community development field is well established, there is relatively little focus on education and learning in community development literature, especially in developing country settings. Particularly, environmental education scholars' growing focus on adult learning in nonformal programs can help address challenges to learning in community development contexts. In this three-paper format dissertation, I examine Jordan's water conservation programs from three perspectives relevant to the environmental education and community development literature.

The first paper, *Professional assumptions and community experiences: Rural conservation education in Jordan*, examines Jordanian water conservation programs. Both environmental education and community development scholars argue that for programs to be effective, their design needs to reflect an accurate understanding of the rural contexts in which they are implemented. Thus this paper explores professionals' assumptions when framing programs and the implications for programs when the assumptions do not match reality. I argue that program planners must understand participants' assumptions and experiences to craft relevant nonformal conservation education programs.

The second paper, *Social networks framing resource distribution*: *Inequitable water conservation education in rural Jordan*, applies a community development lens to the water conservation programs. Researchers and practitioners of community development recognize that social structures frame how

resources in a community are distributed. For community development programs, social structure influences who participates in and benefits from it. This paper explores the social structures framing participation in Jordan's water conservation programs, using social networks to explain how participants' relations impact their participation in and benefit from programs. I find that women primarily relate in kinship networks which shape water resource access and contend that program planners must understand how resources flow through social networks to assist those most affected by water scarcity.

The third paper, *Critical learning processes in rural water conservation in Jordan*, investigates the process of learning that takes place in the two study villages. Learning is an integral component of community development activities, so practitioners and scholars can benefit from applying environmental education approaches to their work. In this paper, I examine how learning approaches in rural water conservation programs impact participants' attitude and behavior change. I introduce Bawden's Critical Learning Cycle model to frame the learning process in two case study programs. I find that because programs do not include complete and repeated experiential learning cycles, participants lack attitude and behavior change in both programs.

In all three papers, I bring community development and environmental education scholarship together to suggest ways to improve the implementation of community-based initiatives. In these water conservation programs, I find implications which apply to other community programs and educational efforts: 1) that assumptions by planners impact program success and thus planners must take care in adapting to local contexts; 2) that planners must understand how rural community organization impacts program participation and design programs accordingly; and 3) that learning processes must be understood, and programs carefully designed and fully supported in order to create meaningful attitude and behavior changes.

To my parents, Lynne Hardey and Terry Hansen,
who gave me the freedom to follow my dreams
and the skills to achieve them.

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I was supported by the many Jordanians whom I met during the course of my studies. Water scarcity is just one of the challenges Jordanians confront yet they are a warm and hospitable nation. Families welcomed me into their homes so I could learn how to speak Arabic. Professionals introduced me to their colleagues. Program staff took extra time to explain confusing issues to me. They made this research possible in all practical ways. I only hope that it may be useful to them in return.

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INTRODUCTION

Water scarcity is a growing problem around the world, affecting health, development, and social opportunities (Derman and Ferguson 2000; Montaigne 2002; Allen et al. 2004; Kirby 2004). Although scarcity may be a national problem as in Jordan, one of the world's most water-scarce nations, it impacts individuals differently (Potter and Darmame 2010). Attempts to alleviate scarcity and its impacts span from the international to the individual and address both supply and demand. National-level approaches include increasing supply through large-scale projects and privatizing management of water supply systems (Komives et al. 2005; Hellmuth et al. 2006). Jordan's geographical constraints limit the scope for increasing the national water supply, so the government is also pursuing local-level opportunities.

Local-level approaches focus on individual or household water use. Although we can differentiate between programs which work toward reducing overall use or on increasing reuse and rainwater harvesting, for the purpose of this paper all of these efforts fall under water conservation. Economic incentives, regulations, and conservation education all try to reduce consumption from the national water system; since larger-scale pricing and regulations have proved politically infeasible and difficult to enforce, Jordan is expanding conservation education while considering other options. Thus we need to understand how conservation education can help Jordanians cope with and ameliorate Jordan's water scarcity crisis.

Scholars have recognized that conservation education programs need to address not only participants' knowledge about the environmental issue but also the attitudes, emotions, and beliefs

underlying that knowledge in order to foster behavior change (Pooley and O'Connor 2000). It is unclear how Jordanians conceptualize water resources because scholarly research about their attitudes and beliefs is lacking. This paper aims to uncover these attitudes, revealing how rural Jordanians and professionals understand water scarcity and how they believe it could be ameliorated.

Professionals plan conservation programs based on their assumptions about rural people and their water problems. Scholars of participatory development have long understood that when incorrect assumptions frame program planning, program success is curtailed and problems can even be exacerbated (Chambers 1997; Bandiaky 2007). Thus, as conservation education encompasses experiential and participatory learner-centric perspectives (Palmer 1998), the field would benefit by incorporating the lessons learned by others doing participatory work.

This paper seeks to uncover professionals' assumptions to examine how they frame the programs seeking to help rural people deal with water scarcity in Jordan. I compare how professionals and rural people perceive Jordan's water situation, and what they see as the problems and solutions. Most importantly, I examine how differences in these perceptions impact water conservation programs and those who participate in them.

LEARNER-CENTRIC CONSERVATION EDUCATION AND BEHAVIOR CHANGE

Water is a key resource for supporting human life and a common pool resource that must be managed collectively, yet with modern water networks, individuals usually consume water in their homes and far from the public view. In some countries, community water resource management approaches have had success in improving water quality and access for the poor in small rural communities (Knox et al. 2001; Maan et al. 2006; Menon et al. 2006). This approach is gaining some hold in agricultural areas of Jordan where water-user associations have been formed to collectively manage irrigation supplied by the central government. However, many of Jordan's agriculturalists are spread over large distances and use privately-maintained wells to pump groundwater for crops. Thus

far, organizing these users has proved difficult, according to informants in Jordan's Ministry of Water and Irrigation. Moreover, the government tightly controls and rations domestic supply, and there has been little movement to decentralize that network or to give communities control over local resources (Potter and Darmame 2010). Because local-level control is not forthcoming, Jordan's other micro-level programs focus mainly on conservation behavior.

Water conservation behavior is like other environmental behaviors, such as recycling or conserving energy, in that individual behavior has collective consequences. Scholars suggest that people with pro-environment attitudes would behave in pro-environmental ways, and Pooley and O'Connor (2000) argue that behavior change requires not just new information, but also new attitudes, emotions, and beliefs. However, further studies have shown that pro-environmental behavior is influenced by more complex factors such as barriers to and incentives for participating in pro-environmental behaviors, including supporting or constraining social norms (Hines et al. 1986; Kollmuss and Agyeman 2000; Carlson 2001; Meinhold and Malkus 2005). To improve pro-environmental behaviors, educators are advancing education approaches focusing on learning processes rather than learning content and on building learners' ability to address their own environmental issues (Palmer 1998; Leal Filho 2000). This emphasis on learner-centric education mirrors the participant-centric focus of participatory development approaches; thus, conservation education can benefit from the lessons of participatory development.

In all, conservation programs must affect people's attitudes, emotions, and beliefs as well as the social norms framing their behaviors; learner-centric, problem-driven education approaches may achieve many of these goals. Not only can these approaches share the content of new information, they can create motivation, develop pro-environmental social norms, and shift individual values (Leal Filho 2000). Education may not directly address structural barriers to conservation, but when it is based on a local context and driven by learners, it can include learning about barriers and

determining how to overcome them (Palmer 1998). However, before education efforts can attempt this, the current attitudes which shape how people receive educational messages and how professionals design conservation programs must be explored.

METHODS

This paper details findings from exploratory, qualitative, case study research conducted during 18 months over three years from 2006 to 2009. Other studies have examined water consumption behavior in Jordan using large- and small-scale surveys focused on urban areas (Middlestadt et al. 2001; Potter and Darmame 2010), yet these investigated neither the multitude of programs for alleviating scarcity, nor how Jordanians think about their water problems, nor why they behave as they do. Thus, this study requires an exploratory qualitative approach both to elicit participants' perspectives and to inductively follow emerging themes. Qualitative methods are used to explore open-ended research questions, allowing themes to emerge from participants' perspectives (Maxwell 1996; Patton 2002). Maxwell notes that one of the strengths of qualitative research is its unique ability to uncover "cognition, affect, intentions and anything else that can be included in...the 'participants' perspective" (1996, 17), which is exactly what this research aims to elicit.

This study also included a case study component. Because the research focused on the experiences of participants in water conservation programs, I examined two community programs in depth. These case studies followed each program and its impacts on the lives of participants, what Reinharz describes as analyzing "the relation among parts of a phenomenon" (1992, 164). Case studies are not limited to one particular method of data collection or analysis but instead use multiple sources to converge on the issue in question; they can be understood qualitatively or quantitatively (Yin 1998). This study used two cases to understand the implementation of rural water conservation programs and their impacts on rural women participants.

I examined participants' attitudes about water issues as well as professionals' perceptions of rural people and program participants. These attitudes and perceptions underlie the programs implemented in rural communities. I asked both professionals and participants what they considered to be Jordan's overall water problems and solutions. I also asked the same questions regarding the problems in the villages. Moreover, some professionals stated what community members thought. I examined all these responses qualitatively, uncovering the perceptions of each group. These data and the data about conservation programs reveal how professionals' assumptions about water problems and about community members frame conservation programs and how such programs meet some community needs but neglect other key rural problems.

Sampling

Because the study examined participants' perspectives and the reasons they behaved as they did, I used qualitative, semi-structured interviews (Rubin and Rubin 1995). These interviews followed a flexible and open-ended interview guide (Appendix 1.1), to elicit the perspectives of professionals designing and implementing water conservation programs. Thus I used purposive snowball sampling to locate my informants (Patton 2002). I spoke with members of Jordan's water sector who then recommended others to whom I should I talk. After about three months, I had exhausted all the informants directly involved in local-level water conservation programs and had met with people from across Jordan's government, non-governmental, and private sectors involved in water issues. In all, I interviewed 38 professionals. These discussions were all in English, the professional language in Jordan.

I located my case studies through program professionals. I visited eight programs which worked in rural communities on household-level water conservation. In these site visits, I asked participants how they dealt with water scarcity, what they did with the program, and what might have changed due to their participation (Appendix 1.2). Based on these site visits and interviews, I

found two rural community programs which exemplified the variety of Jordanian conservation efforts. I chose one village in each program as case studies for a thorough examination of the programs and their impacts on participants. The first program, which I call the Badia program[1], implemented conservation education workshops across Jordan. I studied it in Rolling Hills, a growing community on the plains of Jordan near the city of Madaba. The second, which I name the Ghor program, worked in the Jordan Valley to improve villager access to water resources. I studied it in Three Springs, a poor agricultural area north of the Dead Sea.

My informants in the case studies were women program participants, because domestic water conservation programs in Jordan focus on women as key domestic consumers. I conducted individual and group interviews with sixteen women in the two villages, using the same interview guide as for site visits (Appendix 1.2), but gained much of my data from ethnographic observations. I lived with participants' families for about eight weeks in each community, participating in their daily lives and in program activities. I particularly took note of how they consumed water and often questioned why they were using water in that way or another. I also explored the villages, meeting many families who did not participate in the programs and observing their behaviors as well. In Rolling Hills, neighborhoods were spread out so I met individuals from many families. In Three Springs, two major family groups were separated; though I lived with one family, I intentionally developed relationships with women in the other family and spent a great deal of time with them as well. In my interactions with these families and with other community members, we used Arabic or mixed Arabic and English to communicate; during semi-structured interviews, I sometimes had a translator to ensure clear communication.

[1] I replace these and all other names with pseudonyms to protect the confidentiality of research informants. Badia is simply the Jordanian word for high desert and Ghor for the Jordan Valley region.

Data Handling and Analysis

I used multiple sources of data, including printed materials from water conservation programs, semi-structured interviews with program professionals, group and individual semi-structured and unstructured interviews with program participants, and observation notes. With informant permission, I recorded semi-structured interviews digitally and, with the help of Jordanian translators, transcribed them. I also wrote detailed observation notes during my stay in the villages. Finally, I collected printed materials from the programs which I summarized, describing each program and the professionals engaged with it.

I analyzed these data using qualitative analysis tools. First, I developed emergent thematic codes from a subset of the data which included all types of data, written notes, transcripts, and program documents (Miles and Huberman 1994). Codes are ways of categorizing data by the topics, or themes, which they address. From these, I created a coding glossary with the name of the code theme, definition, rule for application, and examples (see Table 1 for an example). To check the coding glossary, two other researchers and I used it to code another five documents. We compared our coding, clarified the glossary and ensured that I was applying the codes consistently. With the improved code glossary, I recoded the first sample and coded the remaining 90 documents.

After coding was complete, I used Atlas.ti to separate key themes which applied to the research questions, developed summary matrices to analyze them, and categorized responses. For example, to make sense of all the data about the 22 water conservation programs in Jordan, I first selected all data coded "Program Description." I created a table which listed each program, the sector(s) on which it focused, its goals, activities and outcomes, and other notes (Table 2). I also determined the scale at which the program acted, the approach it used, where it was implemented, how the program addressed gender issues, and its priority focus. These I compiled in a summary

display which I could compare across the programs (Table 3). The results from this process of analysis are presented in following sections of this paper.

Reliability and Validity

I addressed issues of reliability and validity for both my data and my interpretations. To ensure accuracy of the data, each interview transcript was reviewed by two transcriptionists. All Arabic transcriptions were also reviewed by two Jordanians translators to ensure the translation was accurate. The consistency of coding analysis was validated with peer review: two other researchers tested the coding glossary to ensure that the codes were defined clearly and that important information was selected. Finally, member-checking validated the findings in two ways. First, I often discussed my observations with informants, clarifying my interpretations and honing my comprehension. Second, I presented the results of the interviews at a public meeting attended by 11 of the professional informants. The presentation was followed by a detailed discussion. I recorded the discussion and took notes and from these sources created a summary memo which was shared with meeting attendees and did not generate any disagreements. These community critiques were analyzed and woven into the final research results.

Table 1.1: Coding Glossary Example

Name	Definition	Rule	Meets Rule	Does Not Meet Rule
Program descript-tion	The description of a water program, including activities, goals, staff, outcomes, implementation, etc.	Used when an informant describes the water program for which s/he works or in which s/he participates.	"We all went to the treatment plant."	"We hosted an exposition so members could sell their crafts." [Though this is describing a program, it is not describing a water-related program so is not eligible for this code.]

Table 1.2: Program Description Matrix Example*

Program name	Sector(s)	Goals	Activities	Outcomes	Notes
Program x	Agriculture Domestic Integrated	Reduce groundwater use (P04/PD30:97)*; Develop water communities (P04/PD 30:95); Reduce illegal water use (P04/PD30:173)	Started community groups to manage groundwater (P04/PD30:155)	Some water management is being given to community members (P04/PD30:191)	Traditional water management groups did not succeed in new programs (P04/PD30:155-157)

*When citing data from the field work, citations are in the following format: "X##/PD#:#. The first letter denotes the category of informant, Professional (P), from the Badia program (B) or from the Ghor program (G) as well as an assigned number for that informant. The PD## signifies the document number from which it was found and the number following the colon is the paragraph number of the citation. For example, this citation (P04/PD30:97) means that professional contact four said this in document 30, paragraph 97.

WATER CONSERVATION EDUCATION IN JORDAN

Conservation education programs encourage conservation of natural resources; in Jordan, water is a critical natural resource so Jordan's water conservation programs encourage residents to conserve water. Some water conservation efforts have focused on Jordanian school children (Middlestadt et al. 2001), and a basic water conservation curriculum is now a standard part of Jordan's K-12 education. Nationwide, public awareness campaigns to encourage conservation have been tried, in particular the 2000-2005 Water Efficiency and Information for Action (WEPIA) program, but they have not resulted in widespread behavior change (Academy for Educational Development 2005). By contrast, non-governmental organizations (NGOs) have developed conservation programs in rural communities that appear to increase conservation behaviors. These programs vary in their approaches, goals, and activities. This research focuses on those programs which worked at the community-level in rural Jordan to help residents address their water scarcity.

In my 38 interviews and eight site visits with professionals, I found 22 programs which aimed to reduce water consumption around Jordan but only 15 programs focusing on household or individual consumption. There were likely more programs dealing with agriculture or working at various other levels, including large-scale infrastructure programs and those directed at the government's management of water systems, but these were not the focus of this research. Using purposive sampling, I searched out community-level programs until my respondents could no longer tell me of any new ones and were repeating programs and organizations I had already met. There was only one organization doing rural work that I was unable to contact. So I am confident that for rural community-level programs in water conservation and management, I have a comprehensive list. I categorized the programs by the sector in which they worked, their targeted scale (e.g., household, regional, national, or international), their approach to doing their work, and the number of sites or locations in which they worked. I also noted their stated attitude toward gender issues and

their primary focus for change—what they wanted to affect. Because some programs work in more than one of each of these categories, the numbers of programs in each do not equal 15, but by doing this simple inventory, I could describe the sorts of programs available in Jordan (Table 1.3).

The 15 community-level conservation programs approach communities in different ways. Community-based approaches that aimed to address the problems of community members in their local contexts were used in 12 programs. Of these 12, six were specifically working to build collaborative actions within communities and trust between communities and governing agencies. In contrast, only one program focused on technical expertise. Four programs focused on research, three on education, and two each on planning and management. The 15 programs also varied in their scope, from one program which focused on a region to another which focused on multiple sites in multiple nations. Most commonly, four programs supported multiple sites spread across Jordan, and nine worked in multiple sites across a region or district in Jordan. Eight programs did not specify their approach to gender, meaning they did not explicitly address the issue of gender roles in the program. Three programs separated women in domestic programs and men in agriculture ones, two focused on women specifically and one on children. Only one program, the Ghor program, specifically required that participant groups be mixed gender. The fifteen programs also varied in what they wanted to change. Seven focused on developing infrastructure, five on behavior change, and three on policy change. Three programs focused on raising awareness and one each focused on management and development. From these 15 programs, I selected the Ghor and Badia programs for deeper case study investigation because these programs had different approaches, activities, and objectives to address villagers' water scarcity.

Table 1.3: Water Conservation Program Inventory

Program	**Sector**	**Scale/level**	**Approach**	**Spread** [abbr. in Totals]	**Gender**	**Priority** [abbr. in Totals]
Badia Program	Domestic	Local	▪ Community-based ▪ Education	5 rural and semi-urban communities around Jordan [MSMG]	Women leaders and recipients	▪ HH water use efficiency [B]
Ghor Program	Integrated	Local	▪ Community-based ▪ Collaboration ▪ Planning	6 communities in one governorate[MSOG]	Specific inclusion of both men and women on community teams	▪ Building collaborative capacities [B] ▪ Integrating water management [M]
Program A	Agriculture	Local Agriculture	▪ Community-based ▪ Research	Across Badia [OR]	Not specified	▪ Improving agriculture [I] ▪ Research initiatives [R]
Program B	Sanitation Domestic	Local	▪ Education	Across Jordan [MSN] Jerash area [MSOG]	Children and women	▪ Spread information to reduce pollution [A]
Program C	Integrated	Local	▪ Community-based ▪ Collaborative ▪ Planning	2 governorates [MSMG]	Not specified but includes both	▪ Infrastructure [I] ▪ Policy change [P]
Program D	Integrated Sanitation	Local International	▪ Community-based ▪ Collaborative	17 communities in Jordan, Palestine, and Israel [MSMN]	By sector	▪ Tourism development [M] ▪ Policy change [P]
Program E	Agriculture Domestic	National Local Agriculture	▪ Community-based ▪ Collaborative ▪ Management	Across Jordan, focused on agriculture communities [MSN]	By sector (irrigation-male, domestic female)	▪ Improving management in Ministries [M] ▪ Policy change [P] ▪ Increasing local management [M]

Table 1.3 cont.

Program F	Agriculture Domestic	Local Agriculture	▪ Community-based ▪ Collaborative	Multiple rural communities in JRV area [MSOR]	Not specified	▪ Building capacity [B]
Program G	Domestic	Local	▪ Community-based ▪ Financial	About 10 CBOs in each of 10 governorates [MSMG]	Not specified	▪ Household water projects [I] ▪ CBO loan management [B]
Program H	Agriculture	Local Agriculture	▪ Research ▪ Expertise	Agricultural areas [MSN]	Not specified	▪ Research [R] ▪ Technology transfer [I] ▪ Information transfer [A]
Program I	Agriculture	Local Agriculture	▪ Community-based ▪ Education	Multiple farms in Ghor area [MSOR]	Male farmers	▪ Technology transfer [I]
Program J	Sanitation Agriculture	Local Agriculture	▪ Community-based ▪ Research	2 communities in rural Badia [MSOR]	Not specified	▪ Research [R] ▪ Pilot studies [R] ▪ Technology development and transfer [I]
Program K	Domestic Agriculture	Local Agriculture	▪ Research	Across Jordan Multiple [MSN]	Not specified	▪ Technology development and transfer [I]
Program L	Domestic	Local	▪ Community-based ▪ Management	Multiple [MSN] Across Jordan	Not specified	▪ Improving delivery infrastructure [I]
Program M	Integrated	Local	▪ Community-based ▪ Collaborative	One governorate [MSOG]	Not specified	▪ Agriculture development [A;B]

Table 1.3 cont.

TOTALS	Agriculture—7 Domestic/potable water—7 Integrated—4 Sanitation/wastewater—3	Local—15 National—1 International—1 Agriculture—7	Community-based—12 Collaborative—6 Research—4 Education—3 Expertise—1 Planning—2 Management—2	One region [OR]—1 Multiple sites in one governorate [MSOG]—3 Multiple sites in multiple governorates [MSMG]—3 Multiple sites in one region [MSOR]—3 Multiple sites nationwide [MSN]—4 Multiple sites in multiple nations [MSMN]—1	Not specified—8 Male-Agriculture/Female Domestic—3 Women-focused—2 Children-focused—1 Specifically mixed—1	Policy—3 Behavior—5 Infrastructure—7 Management—2 Awareness—3 Research—3

PROGRAMS AND OUTCOMES: THE CASE STUDIES

In this section, I will detail the case study programs and communities. First, I describe what each program aimed to achieve and what it did. Then, I examine program outcomes, documenting to what extent they met planners' goals or addressed community members' needs. I find that the programs accomplished some of their goals but missed others, and that they did not address rural women's stated needs and I examine why this was so. I show that the assumptions with which professionals frame programs do not always match with rural people's experiences, and that this mismatch limits the ability of programs to improve rural people's water conservation behaviors.

Case 1: Water Conservation Education in the Badia Program

Badia Program Goals and Outcomes

The Badia program aimed to raise community awareness of water scarcity in Jordan and increase household efficiency in water consumption. Thus the primary goals of the program were educational—changing ideas and changing behaviors. A committee of professionals from multiple NGOs and government agencies led the program design at the national level, and a Jordanian NGO implemented the program in five communities around Jordan. The implementation staff consisted of five women extension agents and a male manager with more than ten years of experience in the water sector. The extensionists trained 13-17 local women in each village as "Water Leaders," women who were to spread conservation information to 20 other women and lead by example. "The main objectives [were] to transfer the knowledge locally [so] that the women transfer their knowledge to their people" (P26/PD47:98). This research focused on the 12 women they trained in the Rolling Hills community. In workshops and field trips, Water Leaders learned about water scarcity, efficient use and other water-related topics and were expected to share the information they learned with other women in their community. During summer and fall of 2008, the participants

completed a baseline survey, learning what their friends and family think about water in the local community. The results of the surveys were presented to participants in late 2008.

In Rolling Hills, the program has resulted in some attitude and behavior change among participants. In an early group interview with me, participants stated that while rural people know they lack water, they don't understand why there is a wider shortage, but participating in this program has helped them understand the overall scarcity. While most women in Rolling Hills were already quite careful with their water allotment, some have become more conservation-oriented since the program. Said one woman leader, "Of course, from before I liked to save water, but now even more so.... I am harder on the kids than I was before.... When they are going to open the water, the kids show me, saying 'Can you see, I'm just opening a little, I'm not wasting.'... We fixed all the taps, we don't leave the tap dripping" (B02/PD03:29-32). Moreover, the participants were enthusiastic about learning water conservation behaviors and all voiced that they would like to learn more. However, behavior changes were not uniform among all participants and the new information did not spread through the community due to mismatches between what program planners assumed about rural livelihoods and villagers' own lived experiences.

Behavior Change Assumptions and Realities

Badia program staff members believe that rural Jordanians suffer from water scarcity and designed this program to encourage women to use their household water allotment more efficiently. Though participants do say that they suffer from water scarcity, they stated that they do not receive all of their water allocation from the government due to poor infrastructure and that this is their biggest problem. One participant asked me to talk to the Ministry of Water and Irrigation and get her farm connected to the supply network (B01/PD82:07-09). The manager of the NGO implementation team noted that even when people blame the government and want more water supplied to them, they can learn how to use water more efficiently which will make a difference in

their lives. Participants do not disagree with this, and they do want to learn more about water conservation. However, though efficiency might help, it will not solve the problem of families living on 1 or 2 cubic meters of water per week because of poor infrastructure, or buying private supplies for agriculture because they have no other access to irrigation. Moreover, community members also complain about drinking water quality, i.e. bad tastes and odors. Other professionals noted that poor water quality in the pipes is due to leaks of sewage or other contamination in the supply network. Program staff included hygiene in the curriculum to teach women how to keep their own storage clean and to treat the incoming drinking water. Yet they did not address the issue of insufficient and damaged infrastructure. Rural communities have many problems with infrastructure, yet education programs alone cannot address those issues.

Program planners assumed that behavior changes would be easy, they did not realize that the cost of some behavior changes was a problem for community members. Though participants voiced great enthusiasm about grey water reuse systems,[2] they noted that it was very expensive to alter the piping systems in their home to separate black and grey water. They asked for more financial support for such changes. They also hoped to gain income from participation because professionals said they were planning income-generating projects around water conservation, yet nothing had been implemented when I returned in 2009. It is difficult to align conservation with personal financial gain; one participant said she'd like to make money but "how, how, tell me, hopefully, but how?" (B01/PD1:521). Participants hoped to be trained in plumbing skills so they could be paid by neighbors to repair plumbing problems, but the international organization contracted to develop a plumbing unit in the curriculum never finished it. Staff, however, were clearly frustrated with the

[2] Grey water reuse refers to water which has already been used for one purpose, usually for cleaning, being reused for another purpose. For example, water that has been used to rinse clothes can be then used to wash clothes, just add more soap. Then the soapy water could be used to water plants. Black water refers to water which has human waste in it, i.e. water from toilets, showers, and sinks. Black water should not be reused without treatment.

participants' desire for financial help, stating that money does not have to be generated for the project to be a success (P02-P26-27/PD47:406-410). Though program staff said they would continue to help the women leaders as they go on to teach others in their communities, they did not see financial support as necessary to the behavior changes they were advocating.

Information Spread

Program planners made numerous assumptions about how information would spread through Rolling Hills. The program leader assumed that when participants benefit from a program, others in the community will see the benefits and will change their behavior to benefit as well (P02/PD28:11). In this case, he believed that women would start talking to their family and friends and then might branch out to the rest of the community (P02/PD47:224). Nevertheless, women in the village spread information through their family kinship networks, regardless of the distance of those relationships physically. Thus, program information specific to the situation in Rolling Hills is shared with sisters in Amman, where it may not be appropriate and vice versa. For example, the program taught women to reuse dish and laundry water on garden plants but one participant had been told by her cousin that such water had too many detergents in it to be used on food plants. The participant was unsure, but she trusted her cousin so did not follow the Badia program.

Other program planners suggested that the program focus on women who are already teachers based on the assumption that these women would already know how to transfer information and would have a ready-made audience. In this case, two of the participants were teachers, but how well they knew how to transmit information was unclear. One was professionally trained but was now doing volunteer literacy teaching weekly. A second worked at the local women's center teaching girls handcrafts. I observed her classes and found that she was condescending and rude to her students, and that they did little of the work on their own. She also did not talk to them about water issues. Despite what programmers think about how information should spread from the

program, teachers may not be better at spreading information than other women, and information may not spread throughout the local community.

Badia program professionals designed the program to address the problems they assumed affected rural women, and assumed program information would spread through the community. These assumptions, however, did not reflect the reality of women's lives in Rolling Hills. First, while professionals are concerned about water efficiency and waste, participants are more concerned with debilitated networks and poor water quality. The education-focused program could not address network infrastructure or water quality problems. Second, though the program did generate some behavior change in women participants who want to use their small water allotments more efficiently, professionals neglected community members' needs for financial support to make expensive infrastructure changes to their homes. Third, professionals assumed that women would share new information with their neighbors and that information would blanked Rolling Hills, yet information did not spread evenly through the community, it flowed through women's family networks to other communities where it might be inappropriate and contradicted by others. Finally, professionals assumed that women teachers would be better skilled to share the information, but in reality, teachers may not be any better equipped to share information than anyone else in the village.

Case 2: Water Management in the Ghor Program

Ghor Program Goals and Outcomes

The Ghor program aimed to build strong collaborative networks for improving marginalized people's access to water resources. With these networks, program planners assumed the community would continue to address shared problems after the end of the program. The overall program took place in three countries over four years: the first two years focused on developing national and international collaboration, determining tools to use, training implementation staff and similar tasks; the second two years it was implemented in six villages in a central Jordan Valley district, as well as

in at least six villages in the West Bank and in Egypt. At the district level in Jordan[3], participants included community members, district government officials, and national program staff who made frequent visits to the villages and district. In each village, the program created collaborative community teams to investigate community water issues, including about four women and eight men, and then funded two pilot projects to address them. Official support of the project ended in 2007, and the collaborative project team no longer meets. My case study research focuses specifically on the program as it was implemented in the village of Three Springs, in the middle Jordan Valley, north of the Dead Sea. This community team grew from the only local community-based organization, the Three Springs Women's Association (TSWA). The team added men, yet women were key leaders of the program in the community.

The program had four main outcomes. First, the program focused on bringing men and women together to address shared water problems. This integrated approach was unique in the nation. Second, it implemented a rolling loan fund to help families pay for improvements to the water infrastructure in their homes, such as building grey water facilities or storage tanks. The fund is managed by the TSWA. Third, it purchased a tanker truck to deliver water supplies to those underserved in the community. The district's water ministry office now manages this project. Finally, the program worked to develop collaborative partnerships both within the community and between the village and government agencies. Currently there are no collaborative projects, but new relationships have developed between some community members and government officials. Each of these outcomes were due to professionals' assumptions about gender roles, causes and solutions to water scarcity, distrust between villagers and government agencies, and program continuity.

[3] For governing purposes, Jordan is divided into 12 governorates, each of which is divided into smaller districts.

Gender

The Ghor program was the only water education program I found in Jordan which accounted for overlapping gender roles and insisted that men and women work together accordingly. Internationally and in Jordan, water consumption is assumed to be a gendered activity in that men control irrigation water systems and women are responsible for household water use (Shiva 1989; Leach 2007; Potter and Darmame 2010). Because water supply is roughly divided by sectors, in that the potable and irrigation networks are separated in Jordan, professional informants tend to address them separately. Thus some programs work specifically with irrigation while others work with domestic supply, explicitly or implicitly targeting men for irrigation projects and women for domestic programs. In Three Springs, however, men and women manage both sources of water together to meet their dynamic water needs; few community members saw them as separate issues. Rather, I found that women were highly concerned with the lack of irrigation water. One of my neighbors there worried that the lack of rain was destroying her family's crops: "Without water, there is no life in the fields!" (G101/PD68:24). When husbands work at an office or other jobs, as most of the participants' husbands did, women and children are responsible for the home agriculture. A woman in another Ghor village said that because her village relied so heavily on farming, "Irrigation is the most important issue" (G5/PD109:12). She was advocating for more grey water reuse and to connect home gardens to the irrigation network. The Ghor program was the only one I found in Jordan that required both genders to participate collaboratively and only one of four to address both irrigation and domestic water supply in one program. This approach was supported by participants. One, a man in a village neighboring Three Springs, specifically supported including men and women on the community teams to address shared water issues because both have much to contribute to the discussion (PD109:82). In Three Springs, the Women's Association was the only active community association, so it was the foundation of the community's collaborative team.

Professionals said that it was difficult to include men there since the women's group had established such strong leadership (P28/PD48:323-327). Thus the dynamic of men and women working together made the Ghor program unique in the country.

Scarcity: Causes and Solutions

Like those in Rolling Hills, the residents of Three Springs are impacted by problems with the network infrastructure. Three Springs is situated on steep inclines; many families who live high up the hillsides do not get water due to low pressure in the system. Program officials, however, assumed that household inefficiencies were the primary problem. They encouraged participants to install water saving devices on the faucets and storage tanks, and to use rain-water harvesting, grey water reuse, and other techniques to augment their allocation. To help villagers make expensive changes to their household infrastructure, the program created a revolving loan fund. Using small loans, households were to build grey water reuse systems, new water storage tanks or rainwater harvesting cisterns (program documents). The TSWA continues to run the revolving loan fund and borrowers are making their payments. The association has also received additional funds from other organizations to augment their loan capacity. However, the TWSA already had a loan program to help women with small income-generating projects before participating in the Ghor program. Program officials say that the loans funded by the Ghor program should be used to improve water infrastructure in the home, yet TWSA staff, including the president and loan manager, discuss the Ghor fund as if it is the same as all the other loan programs, just a loan program to help women. I witnessed multiple people requesting loans to buy air conditioners and refrigerators, for example, and my contacts said these were loans made through the program. In fact, the Ghor program created revolving loans in all six communities in Jordan yet in Three Springs' strategic plan, neither household infrastructure nor loan programs were even discussed. Thus the appropriateness of the loan program to solving Three Spring's water problems is questionable. Moreover, the loan funds

are not used to improve the supply network. If the supply network is the government's responsibility, perhaps it could be addressed in collaboration between government agencies and the villagers.

Government Collaboration and (Dis)Trust

Program professionals assume that the main problem in Jordan and in Three Springs is a lack of trust between government and community members. Said one, "This is one of the challenges that we faced in the beginning, there is no trust between them [community members] and [government] planners" (P06/PD31:232). Thus they developed collaborative teams to link these groups with the hope of building the community's capacity to initiate change. Said one, "It's more about in the dialogue and enhancing the decision making process" (P06/PD31:150). Professionals argued that the communities learned how to develop strategic plans and noted in program documents[4] that "local community-based organizations' commitment to their strategic plans seemed stronger than that of government employees." They expected that villagers could use them to negotiate with other funders for new projects, but the Three Springs participants, including the TWSA, did not even have a copy of their plan. The TWSA did negotiate with other agencies for more funds for the rolling loan programs, but they used their current loan programs not their water strategy plans and the new loans were for income-generation, not water infrastructure.

Even without the strategic plans, professionals claimed that the program taught local communities to access their rights: "knowledge is power. Having that knowledge improves their [communities'] negotiation and claim making power. They are able to attain their rights better" (P28, PD48: 194). One of the other Ghor villages was able to negotiate with local water authorities to build irrigation network connections to their community, but in Three Springs there was no discussion of rights or of negotiating with the government. Because the government would not or

[4] Document citations withheld to protect informant confidentiality.

could not improve the supply infrastructure in Three Springs, the Ghor program purchased a tanker truck which the government was to use to deliver weekly rations to underserved households. However, community informants did not know when the truck was supposed to deliver supplies to the village. In the eight weeks I spent in the village, I never saw the truck though I did see private tankers frequently distributing water to village households. The community did not have a way to hold the government accountable for the project; they did not develop a capacity to collectively demand their rights.

While the program aimed to build community capacity to negotiate with the government, community participants gained access to government services by making personal connections with government agents. Said the president of the TSWA:

> This connection between the members of the local community and the association members and the managers of the governmental departments was really good because I developed the ability to see the problem and to see who can help me solve it. I can go to these contacts in the government departments and get the solution from them without any obstacles (G02/PD15:502).

This statement highlights two troubling outcomes: the personal nature of the connections, and the perception that the government remains the center of solutions. First, program participants developed connections with individuals in the government. In every discussion with the TWSA president, she mentioned the importance of her "relations and connections with government officials." However, these individual relationships took the form of traditional personal connections, called "*wasta*." *Wasta* denotes linking with someone who has access to resources, similar to nepotism or favoritism (Loewe et al. 2008). This means that if the government official moves offices, or the community member moves from the village, the connection with that agent is lost and new connections must be forged with new government agents.

Second, program participants gained these personal connections but the community as a whole did not develop the capacity to collaboratively solve shared problems. Rather, they continued

to perceive the government as the primary actor to solve problems. This might be based on earlier community problem-solving techniques: said another participant, "When people have a problem, people would gather...they would go to the head of the area and tell him about the problem and he would solve it *for them*" (G04/PD19:393, emphasis mine). So traditionally it seems that problems were solved by those in powerful positions. Only one woman participant, the treasurer of the TSWA, thought that community members themselves could achieve something: "If I know that there are certain people in the community that have the ability to work together and to solve the problem, I would form a group and solve it with them" (G03/PD18:499). However, there were no examples of such capacity or collaboration in the community. So participants still view the government or connected leaders as the main actors in solving problems. Clearly, problems with the network infrastructure are not addressed by these weak collaborations or household loans; they can only be addressed by improving the water supply infrastructure. Yet the Ghor program neither strengthened community relations with the government enough to address these concerns nor addressed network insufficiencies directly.

Program Continuity

Program officials assumed that after successfully collaborating on two pilot projects, the community would have gained the capacity to continue to collaborate on solving shared problems. Program documents envisioned "continued collaboration and negotiation between government and local communities." However, after the program ended, the collaborative team no longer met and there have been no further collective actions. The program did not successfully build collective empowerment to encourage further action. For example, because individual participants connected with government officials, the community now can only rely on those connections and does not have a way to hold the government as a whole accountable for delivering the water supplies through the tanker truck. Moreover, pre-existing inequities between two kinship groups within the

community, discussed in depth in Hansen (2010b), were not overcome by two quick pilot projects. Rather, existing leaders, including the leaders of the TSWA, took control of program resources when the program ended. Also, when determining whether to continue the program, Ghor officials decided to leave Three Springs because of these internal divisions, according to one program staff member. Finally, some professionals admitted that a weakness in this program was that it required strong government buy-in which was very difficult to attain and to maintain over time. Said one, "The community organizations, they lack support from and advice from governmental institutions" (P20/PD43:185). Participants, on the other hand, note that people cannot continue without financial support and that they need more help with developing the capacity to manage more projects (G101/PD109; G102/PD109). Thus the program has not resulted in Three Springs' residents developing the capacity to collaboratively address their shared challenges in the long-term.

Overall, the Ghor program case illustrates that professionals' assumptions about rural people and their problems still frame programs that are meant to be participatory. Because professionals assumed the main problem was a lack of connection between government and local people, they attempted to create collaborative teams, yet the government was still regarded as controlling the resources and community members as supplicants for assistance. Moreover, the program did not develop lasting community collaboration. Instead participants in the program increased their personal connections with government agencies, their *wasta*. The program aimed to develop water resources strategy plans which could be used to develop further projects once the program ended. Yet the plans were ignored by Ghor programmers who created a loan fund rather than addressing Three Springs' insufficient network; thus it is easy to understand why participants did not place much stock in their strategic plan. Finally, the Ghor program did uncover the gendered assumptions of other programs and recognized that men and women in Three Springs manage both potable and

irrigation supplies jointly. Thus it also demonstrates that examined and corrected assumptions can strengthen a program.

CONCLUSION

In this paper, I have established that conservation education scholars and practitioners can learn from the challenges faced by participatory community-based development work when using community-based conservation education to address local needs and create behavior change in rural communities. Using two case studies in rural Jordan, I explored the ways that professionals' assumptions about community members and their problems framed community-based conservation education. Like previous scholars of participatory community development efforts, I found that when incorrect assumptions underlie programs, they do not succeed in meeting community needs (Chambers 1997). In the education-focused Badia program, information-sharing did not result in many changed behaviors because the information was focused on issues that local people did not consider to be major problems, like household waste and hygienic water storage. This information-only approach neglects what Pooley and O'Connor find are the keys to behavior change: changing attitudes, emotions, and beliefs (2000). Professionals designing the program also ignored those issues which concerned local women the most: cost and poor supply networks. Yet costs and poor infrastructure are the kinds of structural barriers that environmental scholars argue limit people's ability to act in environmentally responsible ways (Kollmuss and Agyeman 2000). Moreover, information did not spread across the community as expected because professionals did not recognize how women in the community relate to each other. This critical misunderstanding affects not only the Badia program, but also the Ghor program and other community-based development efforts (Hansen 2010b).

In the participatory Ghor program, loans addressed household infrastructure problems, seen as important by professionals, but not the network supply problems experienced by community

members. Again, professional assumptions about villagers' problems over-shadowed people's life experiences (Chambers 1997). Rather than improving infrastructure, the program created a rolling loan fund. Additionally, despite the promise of experiential and community-based education efforts (Palmer 1998), Three Springs did not build a long-term capacity to negotiate or collaborate with governing agents and rather continued to see government or well-connected leaders as responsible for solving shared problems. Moreover, pre-existing community divisions undermined the collaborative team, revealing how professional assumptions of community cohesiveness enforces status quo power dynamics (Chambers 1997; Bandiaky 2007; Hansen 2010b). However, the Ghor program revealed that assumptions should be challenged by real experience, such as accounting for women and men's shared use of both domestic and irrigation water, to help program planners design and implement water conservation programs suited to local community contexts. In both cases, just as Chambers (1997) critiqued community development programs, so too in these water conservation programs did professional's assumptions guide program designers, frame what programs could accomplish and result in marginalizing community members needs.

Further Studies

These cases demonstrate how professional assumptions frame programs and their outcomes. This is an introductory and exploratory study, however, and suggests additional avenues for further research. First, the kinship divisions in Three Springs suggest that village power structures may impact programs. A deeper study of the social organization of these villages was part of this research project and will be presented in a later paper (Hansen 2010b). Second, if learner-centric conservation education and participatory community development are similar approaches, scholars can apply learning theories to conservation education work. Such a study would assist community-based programs with not only spreading new information but also with creating lasting change in targeted communities. I will begin investigating this issue in another paper (Hansen 2010a). Third, gender

concerns are highlighted by how Jordan, and international water experts, separate women and men when they create binary programs, e.g. separating irrigation and domestic water programs. Although women and men in Three Springs work together to address their household needs, a study of how programs work with men in irrigation would help compare how program staff treat men and women differently, and uncover biases before they can be replicated in gender-integrated programs. Finally, we are just beginning to understand Jordanian attitudes and behaviors regarding water and other environmental issues. To see how attitudes and behaviors change over time, further work should focus on longitudinal studies across populations which can assist program professionals in determining the most effective ways to reach specific Jordanians.

For conservation education programs to assist those who suffer the most from Jordan's water scarcity, staff must learn vital lessons from these cases and from participatory programs. They must understand the challenges facing community members to better design conservation education to meet the needs of community members. Participatory approaches to experiential learning can challenge such assumptions, but only if programs include all social actors, focus on local concerns, and are driven by community members.

APPENDIX 1

APPENDIX 1.1

Interview Guide for Professionals in Jordan's Water Sector

Good morning and thank you for talking with me today. As I mention in the consent form I just read, I am interested in understanding whether community development and environmental education may strengthen each other in water conservation programs in Jordan. So first I'd like to talk about your organization's conservation program, then I'd like to ask you what you think about environmental education and community development. If we have time, I would also like to learn what you think about water issues in Jordan. Is that alright?

- **Please describe your organization's water conservation program. What do you do?**

[Probing Questions—listed so that we are sure they are covered]

- What are the main objectives of your program?
- Where do you work?
- How do you choose where to work?
- Who participates in the programs?
- How do you select participants?
- What material is given to participants?
- Why do you give them _____ materials?
- What do you teach participants?
- How do you teach that?
- What activities do you implement?
- Why do you do those activities and not something else? Have you tried anything that worked really well? Have you tried anything that didn't work? Why do you think it didn't work?
- Are there people who seem willing to do what you'd like? Are there some who are not? Do you know why people seem unwilling to [change/learn etc.]?
- What has been challenging about working with these communities?
- What has been easy or exciting about this work?
- Have you been surprised by anything in your work? What has been unexpected?

- **Please, tell me about the participants in your programs. Are they interested in conservation and your organization's goals?**

[Probing Questions]

- Are participants learning? Is it hard to convince them that [reducing water use] [or other goal] is important?
- What about non-participants, have they learned from the participants? Has this program spread beyond just those involved? In what ways?
- How do people learn best? Do some participants learn better than others? If so, how do you deal with that?
- Are some participants more involved than others? Why do you think they get more involved?
- Are some participants difficult to work with? In what way?

- **In the places where you work, what is the most important water issue or concern? Is this the same as what your funders/organization think is the most important water issue? (If not, how do you deal with that?)**

Now I'd like to discuss what you think about **water conservation**

- What do you think about how **Jordan** uses water? Is conservation the best way to address water shortages in Jordan? What else might work? Do you try to conserve water personally? What kinds of things do you do to conserve water?
- What would an **ideal water conservation program** look like to you?

Before I go, can you help me find others to talk to?

- What other organizations do water conservation work in Jordan? Can you tell me who I might contact at these organizations? May I tell them you told me to contact them?

APPENDIX 1.2

Interview Guide for Initial Site Visit Conversations with Community Members

I'm so happy to be visiting your community today, thank you for talking with me.

- **Please tell me about the water conservation program in your community.**

[Probing Questions—listed so that we are sure they are covered]

- What do you have to do for the program?
- What kinds of activities does the program have in your community?
- Who participates in the activities?
- Are there people who don't participate? Who are they?
- Who is impacted by the program?
- Who is most involved in the program? Who is in charge?
- How did you join the program?
- How many other community members are involved?
- Do you feel like you've learned something from the program? What have you learned? Is there anything you'd like to learn that you haven't yet?
- Have you changed anything you THINK since you started the program? What do you think about differently now?
- Have you changed anything you DO since you started the program? What do you do differently now? Is there anything you'd like to do differently but you can't? What is that and why?
- Have you had any ideas to change the program? What happened?
- Have you had any problems with the program in your community? What happened?

I would like to learn more about your **community**.

- What would you like to be **different** in your community in 10 years?
- What is your **biggest concern** for the future?
- Has this program given you anything you can use to address the concerns?
- Do you think this program has helped you **improve your community or your lives** here? [If yes] in what ways, can you tell me more?

Now I'd like to ask you some general questions about **water** and how it's used in your community.

- What are the things that **water is used** for in your whole community?
- Do people every **conflict** over how to use water, or is there enough for everyone to use it? How do you **decide** who uses the water and what they use it for?
- What are the most important water **issues** in your community?

Do you think **water conservation** is important? Will it help with the [most important water issues] here? Are there other things that can help with your community's water issues?

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Paper 2

Social Networks Framing Resource Distribution:

Inequitable Water Conservation Education In Rural Jordan

INTRODUCTION

Environmental education scholars call for sustainability education approaches (Palmer 1998; Leal Filho 2000) to help people cope with scarce resources and environmental challenges. Yet, individuals are embedded in social contexts which constrain their access to and use of resources (Ostrom et al. 1993; Brosius et al. 1998; Leach et al. 1999). Thus, sustainability education programs are also shaped by the social contexts of the communities in which they are implemented. When program planners are unaware of the social structures in local communities, they may inadvertently provide some community members preferential access to resources and program benefits. Scholars of participatory development programs now focus attention on the community structures which frame their work. As environmental education focuses increasingly on learner-centric approaches, educators can learn from the lessons of participatory community development.

Participatory development scholars have argued that participation is not a guarantee of fair access to programs because powerful community members may control the process and the resources distributed by programs (Chambers 1997; Cooke and Kothari 2001). As different levels or types of participation have been described, scholars have also shown that who decides who participates is a key determinant of who benefits (Cornwall and Gaventa 2000). Particularly, underlying social constructs of gender can marginalize women even in ostensibly participatory programs (Cornwall 1998; Bandiaky 2007). Social network scholars describe how people interact and thus can reveal the social structures which frame their participation in community life (Barnes 1969;

Bott 1971; Taylor 2004). Participatory community development scholars have recognized these and other challenges, and their insights can apply to community-based environmental education programs. This paper examines participants' places in their community structure, especially their position as women, and how their positions influence their participation in and ability to benefit from water conservation programs.

SUSTAINABILITY EDUCATION AND PARTICIPATORY DEVELOPMENT APPROACHES

As environmental concerns are incorporated into development initiatives, sustainability has become a leading mandate. The Bruntland Commission argued for sustainable development which "meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Commission on Environment and Development 1987). Development and environment scholars debate what that means in operational terms and develop strategies to achieve sustainable development in the field (Ekins 1996; Peet and Watts 1996; Tientenberg 2000; Dresner 2002; Morito 2002). "The sustainable society, by definition, will be a learning society" (Sterling 1996a, 210) because sustainability requires constant learning, reflection, and action. Therefore, environmental education scholars are investigating *sustainability education* to meet the needs of this movement (Huckle and Sterling 1996; Palmer 1998; Leal Filho 2000; Oliver 2000; Nkosi 2002; UNESCO 2007). This perspective echoes other environmental education scholars advocating for experiential learning (Palmer 1998; Shelhas 2000; Slangen 2000; Niesenbaum 2001; Clover 2002), a process-focused approach which recognizes that people learn most from their own experiences and in their own contexts (Kolb 1984; Bawden 1998)..

Sustainability education is similar to participatory development in multiple ways: it is participant-focused, collaborative, and action-oriented. Sustainability education focuses on the learner, and aims to develop the learner's capacity to grow as a whole person (Sterling 1996b). Like collaborative participatory development processes, sustainability education often brings groups of

learners together to investigate and address common concerns (Grundy and Simpkin 1996; Bachiorri et al. 2000; Shelhas 2000; Slangen 2000; Van de Laar et al. 2000). It is also action-oriented, "Education for sustainable development aims to help people to develop the attitudes, skills and knowledge to make informed decisions... and *to act* upon these decisions" (UNESCO 2007, emphasis added). Like participatory development processes, in sustainability education "the process of learning and action is owned by participants and it's up to them to determine when/if/how to act" (Fagan 1996, 140). Thus sustainability education parrallels participatory development in multiple ways.

Because sustainability education is learner-centric, the lessons that scholars have learned about participatory development may be applicable to new sustainability education initiatives. Critiques of participatory approaches have found that while such approaches may incorporate local actors, they do not empower them equally; rather, those who hold social power in local communities often gain more than those who are marginalized in the community structure (Rahnema 1992; Nelson and Wright 1995; Cooke and Kothari 2001). In part, this is due to what Rahnema calls the participatory dilemma:

> No form of social interaction or participation can ever be meaningful and liberating, unless the participating individuals act as free and un-biased human beings; and all societies hitherto have developed commonly accepted creeds (religions, ideologies, traditions, etc.) which, in turn, condition and help produce inwardly un-free and biased persons (Rahnema 1992, 126).

Yet Rahnema's "creeds" are dynamic: as societies change and adapt to external pressures, individuals and their socially structured relations also change. Moreover, "local people do understand the social and political conditions under which they live" (Brett 2003, 9). Thus while they may be "inwardly un-free and biased," they are aware of biases against themselves. Regardless of internal biases, inequality in participation is something that practitioners can overcome, yet rarely do (Chambers 1997). For example, when participatory approaches emphasize consensus, they "can exacerbate

existing forms of exclusion, silencing dissidence and masking dissent.... The voices of the more marginal may barely be raised, let alone heard, in these spaces," particularly those of women (Cornwall 2003, 1328).

Gender is "a constitutive element of all social relationships and [signifies] a relationship of power" (Cornwall 2003, 1326). How gender is structured and understood has been shown to marginalize women even in participatory programs which aim to empower them (Guijt and Shah 1998). This is because women's needs are often perceived essentialized within their gendered roles as carers in a family, so program address them only in that capacity and ignore larger strategic needs (Kabeer 1997; Cornwall 2003). Moreover, gender is only one constitutive element of social relationships so assuming women's solidarity is also problematic. Cornwall (2003) notes that women may identify primarily with kin or others rather than with other women, so gender analyses must also incorporate other lines of difference. Because "one of the most powerful barriers to women's inclusion is entrenched attitudes and taken-for-granted assumptions among fieldworkers" (Cornwall 2003, 1333), gender critics of development argue that practitioners need to examine "how women and men participate in local political and economic structures, whether (and why) some women are able to use them to their advantage, while others are silenced and marginalized" (Parpart 2002, 54).

A case study by Bandiaki (2007) illustrated how simply including women does not automatically overcome gendered power inequities. Bandiaky describes how a community-based natural resource management program replicated the marginalization of women despite participatory rhetoric and method. "[I]n the name of participation, the village social hierarchy is not being challenged; rather, existing structures and dynamics of gendered power and exclusion are being reproduced" (Bandiaky 2007, 9). In her case, new institutions were created based on existing ones, women were only marginally included and held secondary positions of power. "Furthermore, the positions that women occupy on the committees are frequently only on paper....[W]omen are often

unaware of their supposed memberships" on new village committees (Bandiaky 2007, 10). At other times, women are aware of their own powerful connections. Often a few connected women held multiple positions of power: "[t]he same women who occupy leadership positions within the village associations also sit on the [program] committees. The wives and other female family members of [community] leaders hold position of authority over other women" (2007, 11). Thus, a gendered analysis "does not only imply power relations between men and women, but imbalances in power relations among women as well" (Bandiaky 2007, 15). In Bandiaky's case, because the participatory programs only replicated village power relations, the program "reproduce[d] inequity and exclusion by privileging the social and cultural rules and codes through which power relations operate" in the program community (Bandiaky 2007, 16).

SOCIAL STRUCTURES AND NETWORKS

One instance in which participatory programs end up benefitting powerful people at the expense of others in communities is when program staff do not understand the social structure of communities, including gendered social relations. Social structure scholars contend that the concept of bonded groups, wherein people are members of a group and behave according to the norms of that group, blinds us to the complex and multifaceted ways that humans interact (Wellman and Berkowitz 1988c). The concept of a network of social ties between people and groups of people allows scholars and program practitioners to examine the actual relations between community members which affect resource access and flow (Wellman 1988; Wellman and Berkowitz 1988a; Crow 2004). Scholars of social structures "are primarily concerned with how relationships structure resource allocation under conditions of scarcity and how these often asymmetrical relationships concatenate into complex, hierarchical and quasi-hierarchical networks of power and dependency" (Wellman and Berkowitz 1988a, 6). The concept of network can be applied at a variety of levels, from kinship ties between individuals to institutional ties between corporations (Wellman and

Berkowitz 1988c). Networks can be analyzed quantitatively, to measure the number and scope of ties, and qualitatively, to understand the meaning and significance of ties (Wellman 1988). When we understand how people are connected to others, then we can uncover how resources flow through a community and who is excluded from resources (Phillipson et al. 2004). The reverse is also true: we can see how social networks work by tracing how resources from a program flow through a community. In this paper, I use the social network frame to examine village structures and how participants' position within them impact their access to water conservation program resources.

SOCIAL STRUCTURES AND PARTICIPATORY CONSERVATION EDUCATION PROGRAMS IN RURAL JORDAN

As Jordan faces a crisis of water scarcity, rural water conservation education programs focus on water use efficiency, helping rural women use their scarce water supplies to accomplish more tasks (Hansen 2010). Although these programs evaluate whether participants learn or apply their ideas, program staff do not examine who participates and how participation impacts them nor who is excluded nor how program resources are distributed. To understand which people participate and why, we not only need to examine individual motivations but also "patterns of social relations that render more or less likely their holding certain attitudes and taking certain actions" (Brym 1988, 373). Moreover, to understand how benefits flow through a community, we need to understand how it is structured, particularly the social networks framing resources access and flow.

Overall, social networks in Jordan are not much studied, nor more generally is social structure of the Middle East discussed in the literature (Singerman 1995; Stanley 2005; El-Said and Harrigan 2009). Though scholars have argued that Jordanian society is highly kinship-focused or "tribal" (Layne 1989; Gregg 2005), only recently have scholars examined how social organization in the nation impacts resource flows (Loewe et al. 2008; El-Said and Harrigan 2009). El-Said and Harrigan (2009) found that during economic and political crises, tightly-knit groups, such as kinship

groups, became stronger but the bonds between such groups broke down. Intergroup bonds, examples of what Granovetter (1973) called "weak ties," are vital for distribution of information or resources across a society. Because such weak ties dissolve during crises, El-Said and Harrigan found that in difficult times, Jordanians' "social networks, which are characterized by resource and power asymmetry, can lead to further social divisions, isolation, and exclusions" (2009, 1245). This paper carries the social network resource allocation focus to two water conservation programs in rural Jordan to understand whether such programs strengthen intergroup connections. I focus specifically on the women who participate in water conservation education programs and their personal networks to understand why some are able to participate and uncover who is excluded.

METHODS

This paper details findings from exploratory, qualitative, case study research conducted during 18 months over three years from 2006 to 2009. Because previous studies have not investigated how social networks frame community-based programs in Jordan, the research required an exploratory, qualitaitive approach to elicit participants' perspective of their social organization and to inductively follow emerging concepts. Qualitative methods are used to explore open-ended research questions, allowing themes to emerge from participants' perspectives (Maxwell 1996; Patton 2002). Maxwell notes that one of the strengths of qualitative research is its unique ability to uncover "cognition, affect, intentions and anything else that can be included in...the 'participants' perspective" (1996, 17), which is what this study aims to elicit.

This study also included a case study component. Because the research focused on the experiences of participants in water conservation programs and in their communities, I examined two community programs in depth. These case studies followed each program, its participants, and their social structure, what Reinharz describes as analyzing "the relation among parts of a phenomenon" (1992, 164). Case studies are not limited to one particular method of data collection

or analysis but instead use multiple sources to converge on the issue in question; they can be understood qualitatively or quantitatively (Yin 1998). This study used two cases to understand the implementation of rural water conservation programs and their impacts on rural women participants. Using this open design, I first uncovered the different ways that communities are perceived, both as bonded groups and as disparate networks, and then determined how these different perceptions impact program participation

Sampling

Because the study examined participants' perspectives and the reasons they behaved as they did, I used qualitative, semi-structured interviews (Rubin and Rubin 1995). These interviews followed a flexible and open-ended interview guide (see Hansen 2010), to elicit the perspectives of those professionals most involved in water conservation programs and those community members who participated in the programs. Thus I used purposive snowball sampling to locate my informants (Patton 2002). In all, I interviewed 38 professionals. These discussions were all in English, the professional language in Jordan. I located my community informants through program professionals. I visited eight program sites with program staff and was introduced to community members. Based on these site visits and interviews, I selected two rural community programs as case studies.

My informants in the case studies were women program participants. I conducted formal individual and group interviews and meetings with 16 women in the two villages, but gained much of my data from ethnographic observations (Schensul et al. 1999; DeWalt and DeWalt 2002). I lived with participants and their families for about eight weeks in each community, participating in their daily lives and in program activities. I particularly took note of the people with whom they spent their time and the kinds of things they did in the community. In my interactions with community members, we used Arabic or mixed Arabic and English to communicate.

Communities and Social Networks

Early in the research, the concept of "community" quickly emerged as a problematic concept. During qualitative interviews with water sector professionals, a coherent understanding of program "communities" emerged: professionals saw communities as the residents of the village where programs took place. This view of community matched the English understanding of a community as a group of people who both share a common space and have a sense of belonging together through that space. However, in one interview with a foreign water sector professional, and in conversations with other professionals, I was also told

> This isn't a community. These are individual families and clans and refugees who are here the third generation and still call themselves Palestinians.... I have the impression [that] you live only within your own family or relatives and they don't live necessarily beside you.... That makes [community-based programs] very difficult...because for me community means you live in the same geographical location and you have the same issues which you like to address (P37/PD54:167).

Professionals saw this "lack of a sense of community" as a challenge to doing participatory work, but they did not adapt their programs to this structure. During my site visits and observations in my case study communities, I began to see that women seemed more connected to their families than to their neighbors, but I did not assume that made participatory work untenable; rather, I investigated how women perceived their own organization. Some of the women I met did not know the women who lived in other apartments in their own buildings. They would not even speak to their neighbors, but they would travel hours each week to visit their sisters, cousins, or in-laws in other parts of the country. The program staff, however, assumed that women would work within their local village context. It was clear I needed to understand first how the village community was structured and how the participants were situated within that structure. Then I could investigate the effects of program participation within this context. This is in line with Wellman and Berkowitz's argument that scholars must "trace the flow of resources through [social structures], and discover what effects they have on individuals who are or are not connected into them in specific ways" (1988b, 16).

Social networks were a metaphor appropriate to this context because they can be used to describe relations at different levels, including between individuals, between individuals and groups, and between groups (Wellman and Berkowitz 1988c). They also reveal the indeterminate boundaries between groups or cliques in a village and highlight what Granovetter (1973) calls "weak ties," the less-intimate ties that bind people from different tightly-knit groups and through which resources and information might flow between groups. Moreover, they can also describe the kinship relationships in which respondents were enmeshed (Bott 1971). To understand how participants perceive of their social netowrks, I developed qualitative, conceptual interviews for program participants (Rubin and Rubin 1995). In these interviews (Appendix 2.1), I explored not only how women participating in the water conservation programs perceived their "personal communities," i.e. their ego-centered networks, but also their wider village community (Wellman et al. 1988; Pahl and Spencer 2004). This, however, is not a social network mapping study as previous scholars have done in other contexts (Bott 1971; Wellman et al. 1988; Pahl and Spencer 2004). Rather, I focused on a broader understanding of how women perceive of their networks and their village structure.

Data Handling and Analysis

I used multiple sources of data, including printed materials from water conservation programs, semi-structured interviews with program professionals, semi-structured group and individual interviews with program participants, unstructured interviews with participants and other villagers, and observation notes. With informant permission, I recorded the semi-structured interviews digitally and, with the help of Jordanian translators, transcribed them. I also wrote detailed notes during my stay in the villages, recording both observations and unstructured interviews. Finally, I collected printed materials from the programs which I then summarized, describing each program and the professionals and organizations engaged with it.

I analyzed these data using qualitative analysis methods. To understand how particpants' communities were structured, I developed emergent thematic codes from a subset of the data, seven documents which included all types of data (Miles and Huberman 1994). Codes are a way of categorizing data by the topics, or themes, which they address. From these, I created a coding rubric with the name of the code theme, definition, rule for application, and examples (Table 2.1).[1] With two other researchers, I used the coding glossary to code five more documents, another sample including all document types. We clarified the rubric and ensured that I was applying the codes consistently. With the improved code glossary, I recoded the first sample and coded the rest of the documents.

After coding was complete, I used Atlas.ti software to separate key themes and developed summary matrices to analyze them by program. For example, to understand how each community was organized, I first selected all data coded "community structure" and related codes. I created a table which listed each respondent who had discussed community structure, her statement, and then a summary of each statement (Table 2.2). I then separated the table into three tables, one addressing each case study and a third which applied to other programs discussed by respondents. Using each table separately, I summarized how the professionals involved in each case program envisioned the communities in which they worked, looking for discrepancies among them. I then summarized how community members described community organization. I compare these perspectives in the findings section below.

For the social network data, I used a slightly different analysis process. The women naturally divided their networks into groups such as family, friends, and neighbors, and this was the level at which I focused my research. After consolidating all the data regarding women's social networks, I

[1] Because these tables get very large, with dozens of coded paragraphs in each, I demonstrate in Table 1 and other tables only brief examples of each type of table.

developed a table for each informant and each group about which she talked (Table 2.4 in Appendix 2.2). I then summarized each woman's social network in an analytical narrative document, called a memo, shown in Appendix 2.3 (Miles and Huberman 1994). Finally, to compare responses across informants, I used the memo to craft a summary table (Table 2.3) which showed each respondent, each group she mentioned, and the activities she did and relations she had with the women in each group. These data are the core of the findings reported below.

Reliability and Validity

I addressed issues of validity for both my data and my interpretations (Miles and Huberman 1994; Patton 2002). To ensure accuracy of the data itself, two Jordanian translators transcribed and reviewed each Arabic interview, though translated during the interview, to ensure the translation was accurate. The consistency of coding analysis was validated with peer review: two other researchers tested the coding glossary to ensure that the codes were defined clearly and that important information was selected (Miles and Huberman 1994). I also validated my interpretations using member checking in two ways. First, I often discussed my observations and inferences with informants, clarifying my interpretations and honing my comprehension (LeCompte and Schensul 1999). Second, I presented the results of the interviews at a public meeting attended by 11 of the professional informants (Kruger and Casey 2000). The presentation was followed by a detailed discussion. I recorded the discussion and took notes; from these sources, I created a summary memo which I shared with meeting attendees who supported the conclusions. These community critiques were analyzed and woven into the final research results.

Table 2.1: Community Structure Coding Rubric

Name	Definition	Rule	Examples (+ & -)*
Community Structure	Hierarchical or power organization of a community or village.	Informant mentions how the community is organized or structured. Not formal groups within the community, but the social hierarchies and divisions.	(+) Our family is stronger than that one, my father is in the army and my grandfather was in the Ministry of Education (-) My sisters and I go to the women's association when we need help.
Network Members	The people with whom one interacts socially.	Informant details who is in her social network.	(+) I see my sisters every day and my mother at least every week. (-) The other program participants and I went on a field trip. [Informant is not talking about who is in her network but what they do—this would be "network activities" instead]
Network Activities	The things people in a social network do together.	Informant details what she does with her social groups.	(+) We eat together every Friday. (-) I visited a craft exposition.

***** (+) indicates that the example meets the coding rule and (–) indicates that it does not.

Table 2.2: Community Structure Summary Matrix

Respon-dent	Full Statement	Summary
P06/PD 31:226-228*	L: In the communities, do you have a leader for program activities? P06: Not in all the villages. In some villages, we find leader there, a sheikh we call it, and some village no, there is not one. But we have some dominant people in the village who receive us in the beginning, the dominant people, because they want all these benefits.... They thought that we have money and we implement something and they need to draw us to their farms and things. But in the end we get all of them together because we are working with the community not with certain people. [32:07]	In the Ghor project, in some villages, they start with the dominant people then add others: "In some village we find leader there, a sheikh we call it, and some village no, there is not. But we have some dominant people in the village who receive us in the beginning... because they want all these benefit and because they thought that we have money and we implement something and they need to draw us to their farms and things. But in the end we get all of them together because we are working with the community not with certain people" (P06/PD31:228).

*When citing data from the field work, citations are in the following format: "X##/PD#:#. The first letter denotes the category of informant, Professional (P), from the Badia program (B) or from the Ghor program (G) as well as an assigned number for that informant. The PD## signifies the document number from which it was found and the number following the colon is the paragraph number of the citation. For example, this citation (P06/PD31:228) means that professional contact six said this in document 31, paragraph 228.

Table 2.3: B02 Personal Network Summary Chart

Respondent	Family	In-laws	Neighbors	Friends
B02	Large family (+13, 8 sibs) scattered across Jordan and Gulf. Very close to her youngest sister. They stay overnight, celebrate, and spend free time together. Keeps problems in the family	More scattered, in U.S., Gulf, Palestine, not as personally close. Gather for special occasions	2 large families on adjoining land (not too close to other neighbors). Formal relations, not close. Worked collectively to repair local school. Sees water as shared problem should work on it together.	Neighbor B03, good friend. Also wife of husband's friend who lives in Madaba. "My real friends are my daughters, I tell them everything!" Also close friends are her sisters. Will ask for advice if they are "knowledgeable." Attend center activities. Met many new in the Badia program.

FINDINGS AND IMPLICATIONS

From interviews with 38 program staff, I found that water conservation education programs in Jordan are designed as if the villages in which they work are home to homogenous groups. Program staff see women as natural teachers, especially about water conservation, because they are primarily concerned with child-rearing and household chores which consume the household's water. These two assumptions, that communities are homogenous and women are primarily concerned with domestic roles, frame how water conservation programs are implemented. However, the communities in the case study were not homogenous; they were internally diverse and varied in how they were organized. Also, women may be responsible for household chores in many homes, but they are by no means limited to that role. Because program planners made faulty assumptions about women's roles and community structure, they benefitted those who control resource flows and excluded important water user groups in each community.

Heterogenous Communities

As discussed in a previous paper (Hansen 2010), water conservation education professionals design programs based on their assumptions about water issues, community structures, and gender relations. Specifically, programs are designed as if rural villages are "communities" in the sense that they are bounded groups which share group identity around their location of residence. One professional noted that many communities are made up of family groups: "[village projects are] a mutual interest for people who live in a certain neighborhood, you know he's my cousin...and we have each a mutual, an interdependence so I should not be actually damaging his interests" (P01/PD27:150). However, professionals also admit that village residents are not always family-based groups and that cooperation within heterogeneous villages is challenging. For example, one professional native to Jordan who works in multiple communities across the country complained that cooperation is not part of Jordanian culture, "they are just anti cooperation by itself. Jordanian

[to] Jordanian they don't like to see any cooperation because they have problems" (P07/PD28:128). Others said the same thing, "Either one tribe doesn't want to work with another, or someone wants to be the leader of one group or another" (P36/PD53:38). Yet these same professionals still design the programs as if communities were locally-bounded and tightly-knit homogenous groups.

There appear to be three reasons that programs treat community as bounded groups when they are internally contentious. First, program designs are often prescribed by the requirements of donors who use the locally-based community definition and require "participation" of community members in program decisions. Said one Jordanian professional, the funders

> care about having the methodology: the approach participatory, so... that community is heard. But what is community? I mean you invite 100 people and you have 60, [do] they represent the community?... And when you talk about participatory you talk about key individuals, key institutions... and key CBOs [community-based organizations] in the region or in the area (P31/PD49:252).

In other words, many professionals recognize the challenges of such hierarchical community divisions, but they use the Westernized rhetoric and methods of participation as required by donors rather than locally and contextually relevant practices.

Second, professionals, both foreign and Jordanian, see this sense of locally-bounded community as the ideal, so they work to generate a cohesive community culture. As one foreign professional explained,

> Jordan is a very small country that is more or less supported by less than 50 families. So the clan thinking, the tribal thinking, the clientelist thinking is pervading still.... I find another type of community building interesting and important for the development of the state of Jordan, that is... not based on clans, but which is interculturally joining people on a joint platform of interest [such as water resources] (P04/PD30:275-277).

He believes that as Jordan grows in population, this kinship-based structure will decline and a more location-specific sense of community will replace it. In areas where geographically-bounded and shared resources can be a collaborative platform, this might work. Historically, however, Jordanians have distributed shared resources along kinship-lines and El-Said and Harrigan (2009) found that in

times of scarcity, kinship becomes more entrenched, not less. So it is not necessarily true that as population increases, increasing stress on water and other resources, that kinship groups will diminish in importance.

Third, even when professionals recognize that some communities are internally diverse and contentious, they still see community members as homogenously vulnerable, poor, and marginalized. Thus even the powerful members of a rural community are seen as poorly-off. Said one professional, "all the village [is] the same.... If you find a problem, you will find it with all the people" (P06/PD31:264). Another who works with rural Bedouin communities stated, "those people in the northeastern [desert]...are very marginal people. It is far from Amman and far from the whole services...so they [have] never participated in any kind of project" (P13/PD38:94). For that professional, not having other government programs means one is marginalized, and the entire community is dropped into that category. Similarly, another professional, who works in all but the two most urban districts, argued that

> The other ten [districts] are ignored and they need attention. And they are not participating and voicing out their ideas and their point of views in regards to development, whether it's water or agriculture, all types of development. And that's why we want to involve them so that they could be part of it (P31/PD49:78).

Thus despite understanding that there are conflicts within rural communities, professionals view them homogenously, as poor and vulnerable.

In short, professionals design programs using participatory techniques which address communities as if they are homogenous, marginalized, and vulnerable despite the fact that they recognize that rural villages are rarely homogenous. The professionals behave in a way that seems contradictory for three reasons: 1) donors, no matter where they are from, use the concept of community and participation in the sense of locally-bounded groups and programmers must follow donor guidelines; 2) locally-bounded groups are seen as ideal and programmers want to move

communities away from kinship-groups as dominant social structure; and 3) even if villages are internally hierarchical, professionals see them as universally poor and marginalized.

Gender Roles in Water Conservation Education

In addition to generalized assumptions about rural communities, program designers also make assumptions about gender roles which frame how programs are designed and implemented. Hansen (2010) noted that women and men are usually separated as users of domestic and irrigation water supplies. Moreover, women are seen as suffering more from water scarcity than are men. One professional echoed the sentiments expressed by most: "But actually who [is] now suffering from the water shortage and the scarcity? Mainly the women not the men, because they are housewives and they work... washing everything is done by the women" (P06/PD31:222). Thus program planners focus on women in domestic conservation education, assuming women are primarily concerned with domestic chores and thus impacted most by scarcity.

Other gender roles underlie this focus as well. Professionals stated repeatedly that women teach children and thus they should be targeted as sharing with the coming generation. Yet a recent study suggested that this education duty was shared by men and women (Potter and Darmame 2010). One woman professional revealed the complexity of women's roles in the family and relations with their husbands. First, women are the primary caretakers and they teach children: "She is definitely the main decision-maker when it comes to the lives of the children, their education, and even their marriages" (P34/PD52:72). However, women are also limited by their husbands, and the men must be convinced to make any large-scale household changes, such as building new cisterns for rain water harvesting. Yet women still have influence. Said the same woman professional, "It is a woman's job to give her husband credit for making decisions within the family, even if she is really the one who is making or pushing the decisions" (P34/PD52:72). Another echoed this idea, saying women are key because "they run the households... The men are allowed to jump up and show that

they are the lions but the one who is truly managing are the women, so if you teach them how to do things, you would change something" (P37/PD54:149). All of the programs which focused on women in domestic supply and/or men in agriculture based this separation on these gendered assumptions. The complexity of these roles belies the simplicity of assuming men work with agriculture and women with potable water.

Case 1: the Ghor program in Three Springs

The Ghor[2] program aimed to build a strong community team to improve "marginalized" people's access to water resources in the short term and to address other community concerns in the longer term. Said one program staff member, "It's more about the dialogue and enhancing the decision making process" in the village (P06, PD31:150). Moreover, the program experimented with a variety of tools and methods to encourage "a culture of communication and change to enable local people—especially women and the poor—to be involved and empowered in planning and decision-making over the use of resources on which they depend."[3] The overall program took place in three countries over four years. During the first two years it focused on developing national and international collaboration, determining tools to use, training implementation staff and similar tasks. The second two years it was implemented in six villages in and near the central Jordan Valley, as well as in at least six villages in the West Bank and in Egypt. District level participants included community members, regional government officials, and national program staff who made frequent visits to the village and district. In each village, the program created collaborative community teams of approximately eight local men and four local women to investigate community water issues and then funded two small pilot projects to address them. Official support of the project ended in 2007

[2] I replace these and all names throughout with pseudonyms to protect the confidentiality of research informants. Badia is simply the Jordanian word for high desert and Ghor for the Jordan Valley region.

[3] To protect the confidentiality of respondents, all program documents will have citations withheld.

and the collaborative project team no longer meets. My case study research, conducted during the summer and fall of 2008 and the summer of 2009, focused specifically on the program as it was implemented in one of those villages, Three Springs. Here, the community team grew from the only local community-based organization, the Three Springs Women's Association (TSWA). The team added men, yet one woman was a key leader in the community. The two pilot projects funded in this community were 1) a revolving fund created to help families pay for improvements to the water infrastructure in their homes, such as building grey water facilities or storage tanks; and 2) the purchase of a tanker truck to deliver water supplies to those underserved in the community. I chose Three Springs specifically because the loan fund is now fully the responsibility of the village women's cooperative, so the nuances of relations among women could be examined.

Three Springs Community Structure

Three Springs, a pseudonym, is a village of approximately 3000 residents in the fertile north central Jordan River Valley. Crops are tightly packed into the flat valley floor and houses nestle in the steep hills above the fields. Until 15-20 years ago, the entire area, the village of Three Springs and multiple nearby villages, were called Al-Omar because all of the land was owned by Ait Omar. However, when the government built a new civic center a few kilometers away, the Ait Hakim were relocated to the hillsides above the Omar fields. Statistics used by Ghor program planners suggest that 75-80 percent of the people in Three Springs are unemployed and "the village represents one of the poorest areas of the Jordan Valley" (citation withheld). Those who are employed work mainly in the Army, manage small family agriculture plots or livestock, or work in Amman or other areas for the government or in the private sector. Moreover, the village is ranged over steep hillsides. Although potable water reaches lower dwellings two or even three days a week, pressure is insufficient to reach higher households, many of whom must buy potable water from private

sources. Moreover, only those who live near the fields have access to irrigation for their fields; home gardens are watered with the same limited potable supply.

Through observations and conversations with village residents, I found that the community contains four main groups: two kin groups, the Ait Omar, or 'Omar's Kin,' and the Ait Hakim, Egyptian laborers, and people from Amman who own land in the village. Ait Omar residents are clearly powerful in the village; they own most of the land, their homes border the fields at the base of the hills, they hold the major leadership roles in the area, and they are well-connected both to local and national government. Ait Hakim residents, on the other hand, who I estimate to be at least twice as numerous, have little power in Three Springs; most do not own land, their houses are farther up the steep hillsides, and they often do not have access to resources outside of the community, i.e., through local or national government positions. Moreover, the members of Ait Hakim are poorer than those of Ait Omar and few of their youth attend high school or institutions of higher education.

Egyptian migrant workers also live in Three Springs. These laborers, including men, women and children, live in tents or shacks near the fields they tend. They are not represented in any of the local or national governing agencies and I found no conservation education programs which involved them, despite the understanding among professionals that laborers manage daily water use on many farms. Finally, some people from Amman have purchased land or homes in the community that they use either for business ventures or vacation spots. They may have some political sway in the village due to their connections in Amman, but they generally stay out of local issues.

Participants and their social networks

Three women were originally included on the nine-member community team for the Ghor program. One of these women married and left the village so only two were available to participate in my study. A third woman, a staff member of the Three Springs Women's Association (TSWA), is

now involved in implementing the loan program. The social networks of these women reveal both community divisions and centralization of program resources. Two of the three women on the community team were Ait Omar, Fatiha Ait Omar and Layla Ait Omar. Layla married and left the village but Fatiha remains. The third woman, Rania Ait Hakim, runs a small store out of her home and is very busy with it and multiple other regional associations. Fatiha Ait Omar, on the other hand, represented Three Springs at all of the Ghor program workshops and seminars. She also is president of the TWSA and responsible for its daily functioning because she is the only full-time employee there. Rania's daughter is Fatiha's assistant at the TWSA and also helps administer the TWSA loan programs.

Fatiha, like other Ait Omar, grew up in the area and married another Ait Omar in Three Springs. Early in her life she was a teacher and eventually became a school principal. She maintains her contacts with education officials in the area and many of the people in Three Springs ask for her help when dealing with school administration. Rania, on the other hand, was born with other Ait Hakim about 15 kilometers away. Her family one of the first Ait Hakim families the government moved to Three Springs. While she is a member of a number of rural women's and agricultural associations, all the friends she lists are Ait Hakim and either sisters or cousins. Her neighbors are Ait Hakim and thus even the people who come to her store are relatives.

The division between the families was first explained to me by one of the Ait Omar women in the village. She said that the members of Ait Hakim had a "slave" mentality and were lazy and would not work. Another Ait Omar separately told me that the Ait Hakim family do not send their children to school "because they are ignorant." Yet Rania, though she did not advance past 6th grade, was clearly intelligent and hard-working. Her husband also was well-educated and because he had a job outside the community, the family fared quite well when uprooted to Three Springs. Most Ait Hakim who depended on agricultural labor for their livelihoods, however, lost that employment

when they were moved to Three Springs, and the influx of Egyptian migrant labor continues to supplant them. To understand how this might play out for women specifically, I asked each of the participant women specifically if they felt there was a difference between the two families. Fatiha said that the Ait Hakim and Ait Omar are the same family, that they differ only in name. Rania, on the other hand, stated that the families "do not marry each other," a strong phrase which is often used to show the difference between major ethnic groups, such as Christians and Muslims. She sees the families as separate, but otherwise admits no difference in power between them.

Implications

The women participants in semi-structured interviews both argues that there is no difference in power between the two families, however, neither woman considers any women from the other family as a close friend. Women in Three Springs seem quite enmeshed in their family and kinship group. What I was told and observed is not different from what Ghor program staff later told me. One, who attended my public workshop, said that because the two families did not work well together, the organization did not do more programs within the village and were working in other villages in the region instead. Moreover, when examining how the Ghor program impacted the community, the family hierarchies have great significance in how program resources were allocated.

Program professionals, including the international donors and national NGO partners in Amman, determined what community teams would look like, how many members they would have, and what their role would be. Ghor program staff treated Three Springs residents as if they were all of similar social standing, so they worked with local leaders, like the village mayor and local government officials, all Ait Omar, to plan and implement programs, select participants, and evaluate progress, thereby enforcing the status quo power relationships in the community. The community team had six men and three women: two women were Ait Omar as were three of the men; the other three men and one woman were Ait Hakim. Thus, the team was a majority Ait Omar

despite the fact that, from my observations, they appear to constitute about one-third of the village's population, with the Ait Hakim making up almost two-thirds. Moreover, the team did not include any Egyptians though such workers are responsible for a great deal of agricultural water consumption in the region. Not surprisingly, this unrepresentative community team, although aimed at helping the marginalized and poor, did not distribute program resources equitably.

The rolling fund enforces traditional hierarchies of kinship and gender while illustrating the complexities of both. At the end of the program, the Three Springs Women's Association took over responsibility for the fund. Four Ait Omar are on the community board for this association and the president of the association is Fatiha, who sat on the community team. While Ait Omar women have significant social and economic resources, Ait Hakim male team members lacked such social power or economic resources. So it is now Ait Omar women, and the TSWA president specifically, who determine whether an applicant is eligible for a loan or capable of paying it off, for what the money may be used, and how much to lend. Moreover, during meetings and observations at the TSWA office, it was rare that a woman requested a loan. Rather Ait Hakim husbands and brothers asked for and were given loan funds. In short, not only do Ait Omar women continue to hold the reins of opportunities in the community, but Ait Hakim women rarely directly access resources. This is additional evidence that program staff members saw all villagers as a homogenous group; they did not recognize the community social hierarchies. So while they were attempting to empower locals, they in fact further marginalized the Ait Hakim and its women, and completely excluded Egyptians.

Other problems which face the Ait Hakim are marginalized by the program. The community team "discovered," as Fatiha noted, that many Ait Hakim, who live highest up the mountainsides, had no access to piped municipal water because the water pressure was insufficient to reach their homes. To address this concern, the donors purchased a water tanker to deliver government potable water to those houses. However, it was unclear who the tanker served, whether it delivered water

regularly, or who maintained it. Moreover, in eight weeks in the village, I never saw this tanker, though private tankers delivered water supplies regularly to off-network houses. The community team had no lasting authority to get the water from the government or to ensure timely delivery. The team was also a majority Ait Omar: Fatiha was not concerned that the Ait Hakim might still lack water supplies.

Finally, though the Ghor program aimed to address those most marginalized and vulnerable, the process according to staff members, did not address the internal village hierarchies. In their own documents, they recognized this challenge:

> A participatory approach cannot be achieved unless suitable skills are being acquired such as facilitation, negotiation, appreciation of information, the art of dialogue and acceptance of others. These skills can be acquired during the process but need a lot of patience and *understanding of the local customs and of power relations*. It needs a good level of trust and respect in the working team (emphasis added).

Yet there was no time in the program for the development of such skills, nor to explicitly investigate and take into account local customs and relations.

This case demonstrates what Cornwall contended in 2003, that participatory methods "can be used in processes that provide opportunities for poor women to empower themselves. Yet, used by facilitators who lack a concern with process, power and difference, it can exacerbate exclusion and cement existing relations of inequality" (Cornwall 2003, 1332). The team was formed using community leaders with connections to local and national government—in short, Ait Omar. Despite their being a minority in numbers, they constituted a majority of the community team. Moreover, since the program was working with government officials, they did not invite Egyptians to participate nor did they address the struggles these families face without potable water access at all. While the Ghor staff was focusing on developing the dialogue necessary to help Three Springs collaborate with government officials and gain access to water resources, the process did not help marginalized Three Springs residents address their own exclusion. Thus, the program reinforced the

current status quo, and the Ait Omar gained control of more resources in the village than they'd had before the Ghor program.

Case 2: The Badia program in Rolling Hills

The Badia program aimed to raise community awareness of water scarcity in Jordan and increase household efficiency in water consumption. Thus the primary goals of the program were educational—changing ideas and changing behaviors. While a committee of professionals led the program design at the national level, a Jordanian NGO implemented it. The NGO staff consists of five women extension agents and a male manager with years of experience in the water sector. The extension agents trained 13-17 local women in each of five districts as "Water Leaders." "The main objectives [were] to transfer the knowledge locally [so] that the women transfer their knowledge to their people" (P26/PD47:98). In all, the program trained about 80 women in five districts across Jordan using the unique curriculum the Badia staff created. This research focused on the 12 women they trained in the Rolling Hills village. In workshops and field trips, Water Leaders learned about water scarcity, efficient use and other water-related topics and were expected to share the information they learned with other women in their community.

Rolling Hills Community Structure

On the outskirts of one of Jordan's medium-sized cities, Rolling Hills used to be an agricultural village but in the past decades has grown as a major housing area for urban workers and their families. Rather than being made up of two or three key families, the community includes a mix of agricultural families and newly arrived suburban homeowners; the socio-economic diversity is staggering. For example, I lived with a family of seven on a quarter-acre farm and homestead while just 100 yards down the road, an Amman official's brand-new five-story mansion abutted the small, three-room cinder block home of another farmer. The mix of families in Rolling Hills suggests that tightly-knit kin groups are less likely to be the key form of social organization in the community.

Moreover, women seem less likely to live near to kin and family groups than do the Ait Hakim and Ait Omar of Three Springs. Some neighborhoods are made up of kinship groups; about one-third of the program participants lived in such a neighborhood but most are hodge-podges. Finally, few Egyptian laborers in Rolling Hills, but numerous Iraqi refugees reside in the village and region.

Participants and their social networks

The Badia program planners wanted water conservation information to blanket Rolling Hills through the Water Leaders' networks; however, they did not have an accurate picture of these networks. First, women primarily interact with their kin. My research revealed that ten of the participants have extensive kinship networks. They spend most of their time with other members of their family or with their in-laws, and they have few intimate relationships with women outside of their kinship groups. This focus on kin is seen as normal, "This is the social system in our country [and] in Rolling Hills" (B06/PD8:87). Some women note that developing other friendships is too time-consuming: "I have my friend Amal.... but [I don't see her] that much because I don't have much time...I do everything, I am tired!" (B09/PD10:594-606). Moreover, women were primarily engaged with kinship networks even when few members of their family lived nearby. For example, one woman traveled every weekend to her father's house, more than an hour away, to assist with large farm chores, such as caring for livestock and olive crops. Thus most of the Badia program participants are members of tightly-knit kinship-based social groups.

Second, women may have some friends outside of their kin groups, but these friendships are often formal relationships and not the close intimate ties of extended family. These are the weak ties that Granovetter (1973) emphasized as key to resource allocation and information spread. The Rolling Hills Women's Center (RHWC) was the main locus for meeting women outside of their kin groups for ten of the Badia participants. Four of the women teach other courses at the RHWC, such as fitness and diet, literacy, and hand crafts. Six additional participants made friends at the RHWC.

Only two respondents did not specifically mention meeting friends at RHWC, though they were friends who chose to participate in the Badia program together. These same two agreed that "even though we value friends, [it's] not in a way that we would let them interfere with our problems" (P09/PD10:650). In other words, friendships are limited:

> For example if my cousins came to my house while I am in the kitchen,...there is no problem, they would come and sit in the kitchen. If I am cooking, they would help me. I would not care what I am wearing, this is normal. If it is my friend, I would not, no matter what, I won't let her go inside the kitchen. I should be expecting her [the visit should be planned], there is a kind of formal relationship between us (PD6:985).

Thus, friendship is a formal, not an intimate, relationship for women in Rolling Hills.

Third, women's relationships with their neighbors were not only formal but often non-existent. One participant, who lives in a neighborhood mostly occupied by her in-laws, stated, "The people who live outside this land [in-law's property], even if they live only ten meters away, I don't have that strong relation with them. But my relatives, I go with them, eat, drink and share everything" (B03/PD5:301). Many women rarely spoke to their neighbors yet would travel frequently to see family in other regions of the country. One participant, with whom I resided, did not speak to the other women who shared her apartment building and she did not like them. But she did travel to Amman to see her family as often as possible, and they came to see her as well. The sharp distinction that participants described between their families and their neighbors suggests that even as weak ties, neighbor relations were not significant.

Because the Rolling Hills Women's Center (RHWC), which hosted the Badia program, seemed to be a key network for participants, I also examined how this organization links to the rest of the community. The RHWC is the largest non-kinship resource for women in the community and offers a variety of programs and classes for women of all ages, children, and occasionally men. The director and other center staff members have a great deal of power in the community through their control of center resources, including choosing who may participate in center programs such as

childcare and children's education, small-business training, and loans. Participants could only name three other community groups in the area; none were in Rolling Hills and the closest was about 20 minutes away by public transportation.

Implications

While the Badia program agents wanted women to share their information with others in the community, participants were actually spreading it within their kinship networks with two negative results. First, the Badia program information was specific to the context of the Rolling Hills region so it caused confusion when its messages differed from those in other areas. For example, the Badia program taught women to reuse dish and laundry water on garden plants but one participant had been told by her cousin in Amman that such water had too many detergents in it to be used on food plants. The participant was unsure, but she trusted her cousin so did not follow the Badia program. Second, only some women in the community were told of the program by center staff. Three non-participants I met at the center were not even aware of the program despite being active in the center for years. Since staff chose which women could participate, the Badia program gave information and other program benefits, such as trips to other communities, to women already connected to the center staff. The program neglected those women who might have wanted to participate but were not close to staff members. Moreover, Iraqi women, who arguably most need water scarcity and conservation information because they are new to the area, also were excluded.

CONCLUSION

These cases illustrate challenges to participatory programming similar to those found in participatory development and gender literature. Gender is shown to be a "constitutive element of all social relationships" in both Three Springs and Rolling Hills (Cornwall 2003, 1326). Water conservation program professionals view community women "as mothers, wives, and carers within the family" as Kabeer (1997) argued, assuming that women are concerned only with domestic

priorities, such as potable water. Moreover, the case studies showed that participatory methods do not necessarily result in the empowerment of women, even when they are the focus. In Three Springs, women's kinship networks primarily frame their resource access, as Cornwall (2003) argued, and the participatory program did not create female solidarity. In the Ghor and Badia cases, women are primarily engaged in kinship relations, not in idealized women's collectives which necessarily reach across kin divides. Thus Cornwall is correct in arguing that we need to look beyond simply gender to understand the marginalization within the villages where programs are implemented.

The Ghor program in particular revealed that a gendered focus must look beyond simple contrasts of men and women and supports Bandiaky's (2007) conclusions. In the Ghor case, women were enmeshed in ties of kinship, with one family group, the Ait Omar controlling the TSWA and other community resources. In fact, because the Ghor program invited participation from community associations, "[t]he same women who occupy leadership positions within the village associations," i.e. the Ait Omar, "also sit on the [program] committees" (Bandiaky 2007, 11). Moreover, these Ait Omar women "hold position of authority over other women" (Bandiaky 2007, 11). In this case, Ait Omar women hold positions of authority not only over other women, but over Ait Hakim men who must apply to them for loans. Thus, the gendered analysis shows that, despite the participatory rhetoric, "the village social hierarchy is not being challenged; rather, existing structures and dynamics of gendered power and exclusion are being reproduced" (Bandiaky 2007, 9). Without understanding and challenging how the community is structured, the program "reproduce[d] inequity and exclusion by privileging the social and cultural rules and codes through which power relations operate" in the program community (Bandiaky 2007, 16).

Future Studies

These cases detail the importance of understanding the social structures framing community-based programs. This is an introductory and exploratory study, however, and suggests multiple

directions for further study. First, a more detailed understanding of social networks in rural Jordan could provide a general basis upon which program planners could begin to shape future community-based conservation efforts. Moreover, understanding how social networks differ between men and women, or between people marked by other hierarchies such as ethnicity or age, would reveal how people access different resources and suggest appropriate intervention strategies. Second, since these programs were conservation education programs, the particular impacts of social organization in networks on how information moves through the community is vital to understanding learning in the villages. Third, and finally, the challenges for community program planners to understand and adapt to multiple local social structures are immense. Thus, scholars and practitioners should collaborate to devise useful means by which field staff can begin to uncover the social networks which frame program resource distribution before implementing programs.

The findings of these two case studies suggest that sustainability education programs should take into account the existing social networks of the communities in which they work, particularly into how such community structures link individuals and groups and distribute resources because "[s]ustainability is a global imperative, demanding reverence for the earth and an *equitable resource distribution* for all its inhabitants and subsequent generations" (Slangen 2000, 283, emphasis added). The kinship focus of women's relationships in Jordan are similar to those described in the patron and client relationships of people across the Mediterranean (Gellner and Waterbury 1977; Bodemann 1988; Gregg 2005). However, program planners create programs which ignore how communities are actually organized and therefore result in *inequitable* resource distribution. In the Ghor case, the program attempted to create a collaborative community team but did not address inherent power inequalities between and among participants and decision makers. In the Badia case, programmers assumed information would spread throughout a community yet it only reached those who were connected to participants through social networks. If "[b]ringing the marginalized and the

poor into discussion, encouraging and facilitating local knowledge and analytical skills is crucial" not only to development but to sustainability education (Parpart 2002, 52), then we have to understand how local communities are structured, who is marginalized and how they are excluded, and how to incorporate their empowerment into such programs. Moreover, donors must recognize these challenges and fund longer-term programs which can uncover and address such inequalities. By focusing on how communities are organized, program designers could locate and target those marginalized in the current community hierarchies, ensuring that program resources reach those who most need assistance with their water scarcity struggles.

APPENDIX 2

APPENDIX 2.1

Social Network Interviews

Participant Interview

Informant #_____

1. What groups of people do you spend time with?
2. Who is in that group?
   a. Is she/he related to you? [If so,] How is she/he related to you? [If not] How do you know her/him?
   b. Does she/he belong to your family (i.e. tribe)?
   c. Where does she/he live? When you visit, how do you get there? How long does it take?
   d. How often do you see her/him [if not already mentioned by informant]?
3. Do people in the group do things as a group? What kinds of things do they do and about how often?
4. Are there certain people in the group with whom you spend more time? Who are those people? What kinds of things do you do together? How often do you get to see each other?
5. Are there any other groups to which you belong?
6. Do you spend more quality time with some of these groups than others? Which ones and what do you like to do with them?
7. If you have a problem and you want some help or advice, who are the people you go to for ideas? Does anyone come to you for advice or help when they have a problem? Why is that?
8. It sounds to me that you really value [group name] and [group name]. In general, do you think these groups are more important to you than your [name the other groups]?
9. You've told us about the groups to which you belong. When you think about your village, what other groups exist here? What are the cliques of people in this town? Who are the people who work together most often, and around what issues?
10. Please think about communal problems that you share with others around you. Some people think that the best way to address these kinds of problems is to work within the social groups in your life, like the ones we talked about today. Other people think that you should form new groups of people who share the problem and work together to address them. What do you think? What is the best way to try to address problems you share with other people?

APPENDIX 2.2

Table 2.4: Group Membership Chart for Participant "B02"

Group name & description: Family

#	Name	Relationship	Family	Age	Location
1	Mohammad (and kids)	Husband (family)	Ait Hassan	57	Home
2	Farid (wife, 3 kids)	Brother	Ait Hassan	49	Amman, Jebel Qsoor
3	Hamid (wife, 3 kids)	Brother	Ait Hassan	45	Amman, Um Asoma'
4	Rania (husband, 5 kids)	Sister	Ait Hassan	43	Saudi Arabia
5	Alia (husband, 5 kids)	Sister	Ait Hassan	41	Saudi Arabia
	Faraz (wife, 3 kids)	Brother	Ait Hassan	39	Emirates
	Layla (husband, 2 kids)	Sister	Ait Hassan	37	Amman, Khalda
	Habib (wife, 2 kids)	Brother	Ait Hassan	35	Amman, Jebel Qsoor

Group name & description: In-laws

#	Name	Relationship	Family	Age	Location
1	Khalil (wife, 4 kids)	Brother-in-law	Mou'ad	62	West Bank
2	Sharif (wife, 4 kids)	Brother-in-law	Mou'ad	60	Amman, Taborbour
3	Mustafa (wife, 3 kids)	Brother-in-law	Mou'ad	55	Jerusalem
4	Fatiha (husband, 6 kids)	Sister-in-law	Mou'ad	50	Saudi Arabia
5	Ouada (husband, 4 kids)	Sister-in-law	Mou'ad	45	U.S., California

Group name & description: Neighbors

#	Name	Relationship	Family	Age	Location
1	Najia (12kids?)	Neighbor	Nour	50s	Rolling Hills
2	Samira	Neighbor	Salim	40s	Rolling Hills

Table 2.4 cont.

Group name & description: Friends

#	Name	Relationship	Family	Age	Location
1	Abir	Neighbor and friend	Hajami		Rolling Hills / 1 kilometer
2	Tala	Met through husband	Hassaneh	37	Madaba

APPENDIX 2.3

Example Summary Memo

Family (1-most important group)

All and important members (13/3—13 members listed, 3 are "most important" members)

Lists her household, and all her sisters and brothers and their spouses and families—long list, she's one of 8 sibs! Half of her sisters live overseas and they only see them during the summer.
Some of her in-laws still live in Palestine/West Bank, but others in Saudi, and the US.

Relations and activities

With her family, they visit frequently and eat together, they gather for special occasions, like weddings, etc. They also visit overnight and other "sisterly things like that" (B02/PD4:311).
She gets to spend the most time with the ones who live in Amman, the others only when they come home for the summer.
"My real friends are my daughters, I tell them everything" (PD4:373)

Advice and Help

Keeps family problems in the family.
She asks her friends and sisters for advice if they are knowledgable about the thing she wants advice about (example of the decorating, from PD4:349-351).

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Paper 3

Critical Learning Processes

in Rural Water Conservation Programs in Jordan

INTRODUCTION

Environmental education focuses on improving people's understanding of and interactions with the human and non-human environment (Leal Filho 2000b). Knowledge-deficit models of education argue that people will change their behavior if they learn new information (Schultz 2002). In contrast, environmental behavior change scholars note that new information is not enough to change people's behaviors, but that other factors, such as social norms or incentives and community and cultural contexts, also play a role in behavior change (Hines et al. 1986). To address these factors, environmental education scholars and practitioners are creating and improving informal and community-based learning approaches that empower individuals and groups both to understand and address local environmental issues. These community-based approaches focus "on generating positive actions" and are applicable to other related fields (Andrews et al. 2002, 163). For example, sustainability education is developing adult-focused and experiential learning approaches (Palmer 1998; Leal Filho 2000a; UNESCO 2007). These educational approaches offer much to community development practitioners, particularly in developing collaborative and experiential learning opportunities to encourage attitude and behavior change. Bawden's Critical Learning Cycle is an analytical framework to understand learning in community contexts (Bawden 1998; Hansen 2010a) and provides guidance for examining people's learning processes in a practical way.

This paper takes an exploratory approach to understand how learning takes place in rural water conservation programs in Jordan, and how learning contexts and program approaches such as

experiential learning impact women's learning. In addition the paper addresses the implications of learning processes for the success of community development programs. First, I describe the development of sustainability education as a bridge between environmental education and community development paradigms, contrasting content-driven education with process-focused approaches. I then introduce Bawden's Critical Learning Cycle as a concrete process-based framework for understanding learning in practice. Following this comparison, I detail the research process which revealed the need to examine learning process and content. I also introduce the qualitative methods which I used both to elicit and analyze learning process data. Next, I describe two water conservation education case studies in rural Jordan, exploring the ways each approached learning. Finally, I find that participatory, local- or community-based initiatives, whether focused on education, development, or conservation, must understand and account for participant learning processes. I recommend that practitioners develop and test innovative learning approaches and adapt to community contexts to more effectively empower community members to address their shared development challenges.

SUSTAINABILITY EDUCATION

Since the Bruntland commission argued in 1987 for a sustainable development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Commission on Environment and Development 1987), environmental issues have become a common theme in community development programs. Although sustainable development has proven difficult to operationalize, the concept that "economic development and improved management of natural resources are complementary activities" is widely supported (Martinussen 1997, 152). For humans to respond to dynamic environmental contexts, we will all have to learn quickly about our local environments; thus, "the sustainable society, by definition, will be a learning society" (Sterling 1996, 210). Sustainability

education, then, is a branch of environmental education which supports and spreads the ideas of sustainable development (Huckle and Sterling 1996a; Leal Filho 2000a). In short, "[e]ducation for sustainable development aims to help people to develop the attitudes, skills and knowledge to make informed decisions for the benefit of themselves and others, now and in the future, and to act upon these decisions" (UNESCO 2007). In addition, to behave sustainably, they need a variety of supporting social norms, incentives, community and cultural contexts, and other factors (Hines et al. 1986; Carlson 2001; Payne 2002). Moreover, increasingly urgent social and environmental challenges to development mean that we cannot wait for students to become adults and solve environmental problems in twenty years; we must educate and reach adult populations now (Salner 1986; Ellis 2000; Clover 2002).

One way that practitioners are addressing the multiple factors affecting people's learning and actions is by using learner-centric, community-based approaches. These approaches encourage participatory and collaborative community groups to investigate environmental issues in their own communities and devise strategies to address them (Andrews et al. 2002). The North American Association for Environmental Education (NAAEE) sets out specific guidelines for adult education which highlights learner-centric educational experiences (NAAEE 2004). In learner-centric education approaches, learners are respected equals with educators, participation is voluntary, and learners choose what topics or issues to explore (NAAEE 2004). Moreover, such programs focus on adults in nonformal community settings, rather than formal education settings, such as classrooms (Palmer 1998; Shelhas 2000; Slangen 2000; Niesenbaum 2001; Andrews et al. 2002; Clover 2002). These nonformal, community-based approaches parallel community development's growing participatory, community-driven development approaches (Martinussen 1997; Cornwall and Gaventa 2000; Stiglitz 2002). Thus insights about learning emerging from community-based education apply to other community-based development approaches.

CONTENT-FOCUSED AND PROCESS-FOCUSED EDUCATION

Although sustainability education and participatory development use similar community-based, adult-focused, and informal approaches, they require consideration of the goals and means of educating adults. Environmental education scholars argue that development experts "repeatedly point to education as a key policy instrument for bringing about a transition to sustainable development, but there is little discussion about the radical challenge this poses for education" (Huckle and Sterling 1996b, xiii). One of these challenges is a shift from education focused on content to one focused on process.

Conventional education often uses the *knowledge-deficit* model which focuses on "disseminating information about the topic or about the behavior, with the goal of motivating people to act" (Schultz 2002, 68). Thus, experts or professionals determine the appropriate content or messages to be transmitted to targets, and devise curriculum or training sessions in which the learning will take place. The student or learner is seen as an empty vessel to be filled with knowledge from experts. For decades, environmental experts developed curricula which educators taught to students, usually in school (Palmer 1998). This knowledge-deficit model, however, is a content-focused approach and does not meet the requirements for adult education initiatives: it does not treat learners as equals nor does it build capacity in learners to investigate their own environmental concerns. Thus sustainability education is moving toward other educational approaches.

Rather than a focus on content, an alternative education approach focuses on "the processes of thinking and learning" (Palmer and Birch 2005, 121). Process-focused approaches are learner-centric; the learner directs the process, focusing on the specific issues which she experiences in her life. "[A]t its center, the process of learning and action is owned by participants and it's up to them to determine when/if/how to act" (Fagan 1996, 140). Moreover, the learning takes place in real life situations, not in classrooms. Focusing on the learning process, rather than the content, allows

programs to adapt to and account for the way context influences learning and behavior (Palmer 1998). The concept of process-based education may be unfamiliar, although we naturally engage in it every day. A process-based model will help clarify how it works.

BAWDEN'S CRITICAL LEARNING CYCLE MODEL

A common process-focused learning approach is experiential learning, an approach which recognizes that people learn most from their own experiences and in their own contexts (Kolb 1984; Bawden 1998). Thus, experiential learning is not focused on the content that one learns, but rather on the process *through which* one learns. Bawden (1998) has developed an excellent cyclical model of learning which expands Kolb's (1984) original model to include multiple sources of understanding. Thus understanding is achieved through real-world experiences, conceptual meaning-making, and internal inspiration. The inspirational aspect of learning is neglected in experiential and conceptual community-based programs yet innovation in community development is necessary to address complex environmental and developmental struggles.

Bawden unites a systemic understanding of complex natural and social systems with the need for "a learning process, which appreciates and accommodates its own complexity, in addition to that of the main problematical matters to hand. The central feature of the approach is therefore the design, establishment, maintenance and development of self-referential, or critical, learning systems" (1998, 45). Placing the learner central to the analysis, Bawden conceives of learning more broadly than simply the transfer of information. Learning is *making meaning*, the process by which one understands one's world. "Meaning is a property which is emergent in both individuals and communities, through the interactions of different 'ways of knowing,'" the interactions of two processes, experiential learning and inspirational learning (Bawden 1998, 45). These processes include "the concrete world of experiences, the spiritual world of insights, and the abstract world of concepts at the interface" (Bawden 1998, 46).

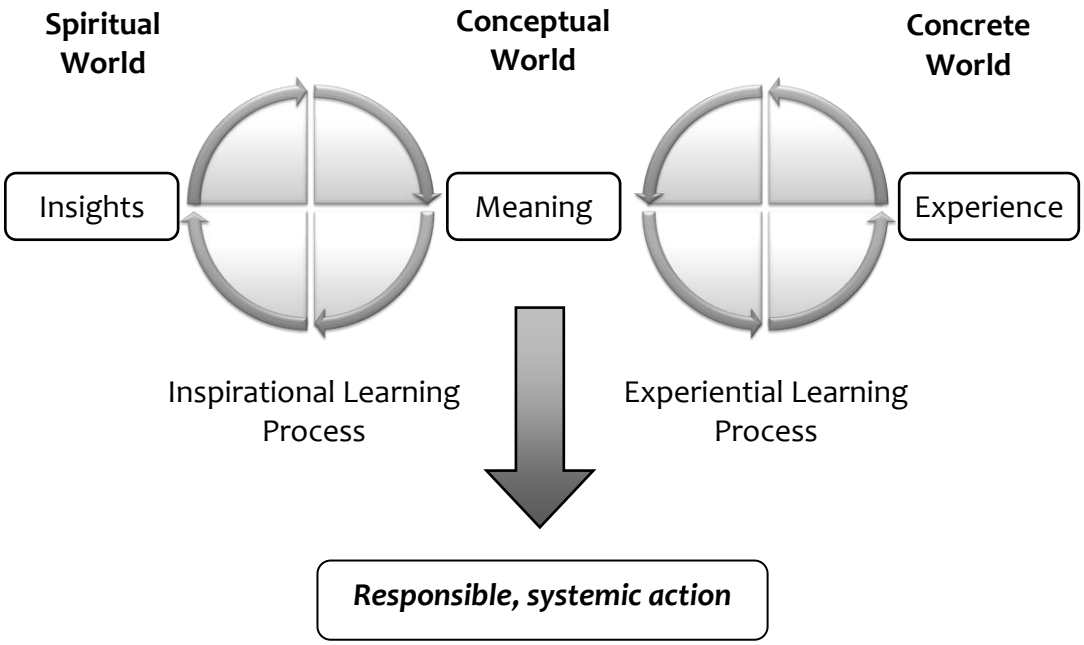
This Critical Learning Model encompasses the inner spiritual world (the deep recesses of the mind), the concrete world (one's experiences) and the conceptual world, where the first two come together and one understands the world and creates a meaningful whole (Figure 3.1).

> As this model illustrates, a dynamic is established between the processes of experiential and inspirational learning, through which concepts derived from the transformation of experience are qualified by insights derived from inspirational learning in the creation of meaning as a prerequisite for responsible, systemic action (Bawden 1998, 46).

In content-focused education, little attention is paid to either what happens in the "real" world or to an individual's own inner wealth of knowledge. Bawden's model focuses on the learner herself, revealing a richer understanding of learning that does not depend on expert teachers and blank-slate students.

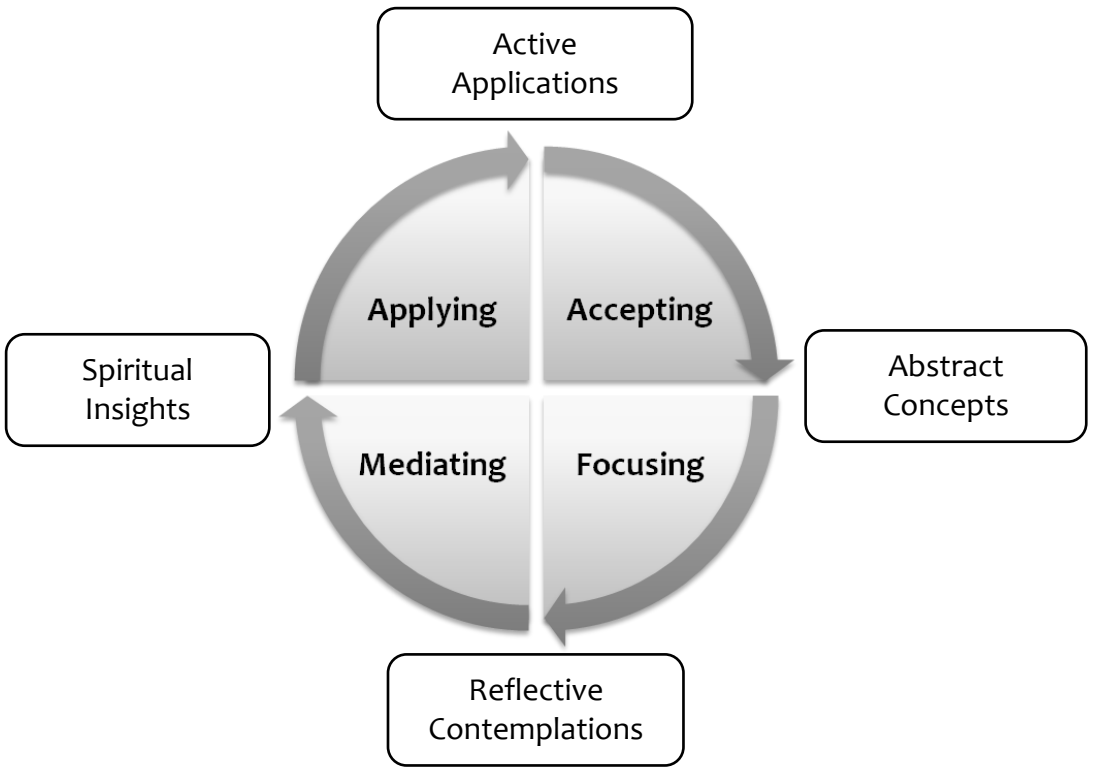
Inspirational Learning Process

Figure 3.1: Critical Learning Cycle (Bawden 1998, 46)



Bawden's inspirational learning process recognizes and validates the inner insights humans bring to the learning process (Figure 2). This cycle integrates two sources of understanding, concepts and insights, and two ways of transforming them, contemplation and application. In this process, one first disengages from one's conceptual mind, for example, through meditation, thereby freeing the mind for open reflective contemplation. One then engages with or focuses on what Bawden calls the "innermost being" (Bawden 1998, 53). Here, one finds insight. Finally, one accepts insight and integrates it into one's understanding of the world. The community programs I studied in Jordan did not include inspirational components, so I will not more fully explore these internal aspects of the learning process here. However, the model does suggest additional ways of learning that I will discuss later in the paper.

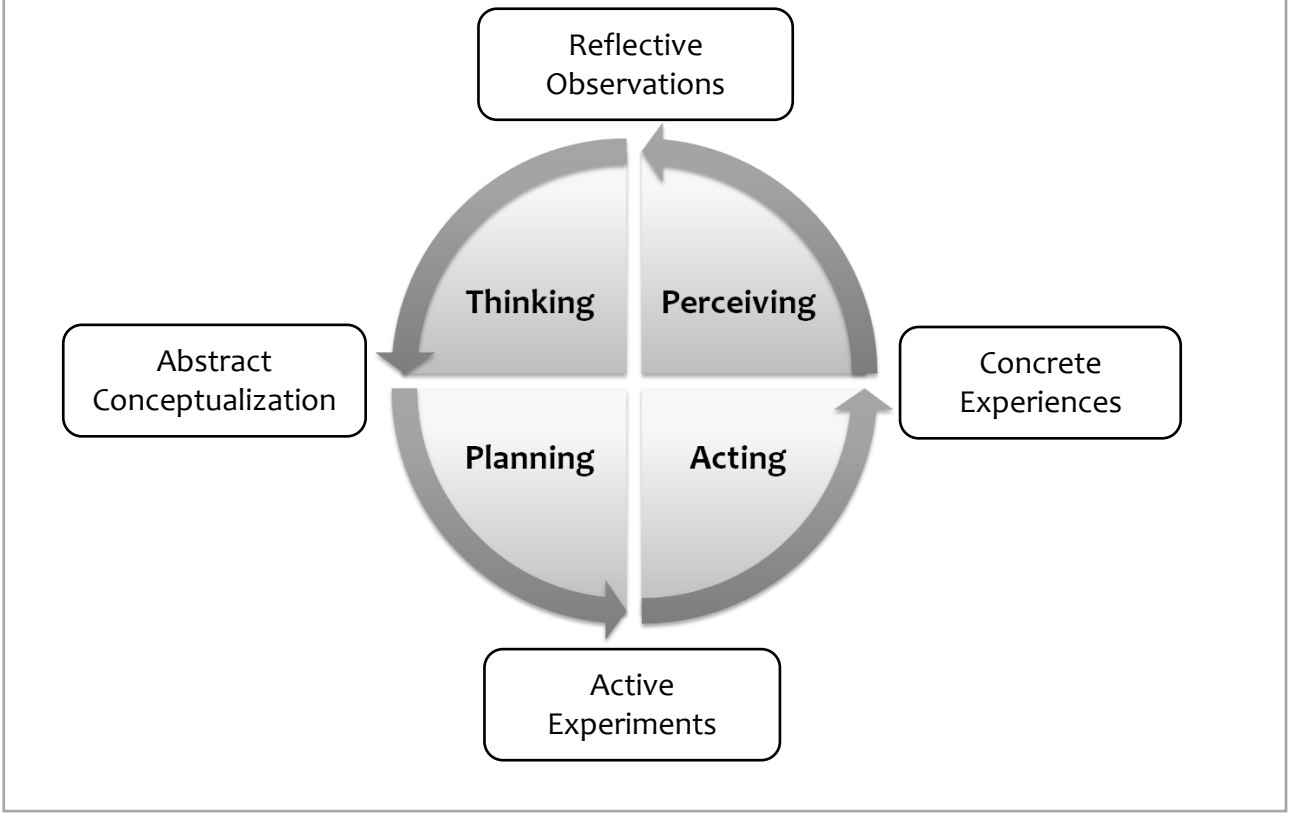
Figure 3.2: Inspirational Learning Process (adapted from Bawden 1998)



Experiential Learning Process

The experiential learning process is what Kolb described as the creation of meaning through a process of transformation (1984), which will be the main analytical frame for this study (Figure 3). Experiential learning is the process by which we understand our worldly experiences, the things that happen to us, and transform that understanding into action (Bawden 1998). The process incorporates two different ways of "grasping" reality, concrete experiences and abstract conceptualizations, and two ways we transform "what we have grasped," reflective observations and active experimentations (Bawden 1998, 47). First, one experiences something external to oneself and perceives that experience through the filter of one's worldview. Bawden explores different worldviews and their impacts on how one interprets the world, but for the purposes of this paper, what is important is that one's previous understandings of the world, one's learned ontology and

Figure 3.3: Experiential Learning Process (adapted from Bawden 1998)



epistemology, frames the way that one interacts with external experiences. Thus interpretation of the experience is affected by preconceived notions. Next, one then reflects on the experience, interprets it, and sees where it fits and/or does not fit with one's notions of "how things are." This is how one determines what the experience means. Often, one then plans a response, acts on that, and in some way affects the experience itself. Now one is interacting with a changed experience so the cycle begins again: perceive, understand, respond. "Experiential learning is thus a recurrent process of adaptation to change, based on a rigorous process of transformation" (Bawden 1998, 48). The Critical Learning Cycle describes how new information, whether experienced outside of an individual or inspired from within, is made meaningful to the individual.

WATER CONSERVATION EDUCATION IN JORDAN

As described in a previous paper (Hansen 2010b), Jordan is increasingly focused on rural community-based water conservation education programs to help citizens cope with drastic water shortages. Early water conservation efforts focused on Jordanian school children (Middlestadt et al. 2001), and water conservation education is now a standard part of Jordanian's K-12 education. For adults, nation-wide public awareness campaigns were implemented to encourage conservation, in particular the 2000-2005 Water Efficiency and Information for Action (WEPIA) program, but these have not resulted in widespread behavior change (Academy for Educational Development 2005). By contrast, non-governmental organizations (NGOs) have developed conservation programs in rural communities that appear to have resulted in behavior change. These programs encompass the spectrum of content- to process-based approaches. This study examines two different rural community-based programs in detail. The Badia[1] program is driven by content, delivering new information to women participants. The Ghor program, on the other hand, developed collaborative

[1] I replace these and all other names with pseudonyms to protect the confidentiality of research informants. Badia is simply the Jordanian word for high desert and Ghor for the Jordan Valley region.

learning processes to empower local communities to uncover and address their needs. In interviews, program staff clearly articulated what they were trying to teach participants (the content), but rarely how they did this (the process). The education approaches of these community-based programs are the focus of this paper.

METHODS

This study examined learning processes in two conservation education programs in rural Jordan. In previous papers, I described both the variety and scope of water conservation programs across Jordan (Hansen 2010b) and the social structures which frame who participated in and benefitted from the programs (Hansen 2010c). Previous studies have examined whether Jordanians have changed behaviors after exposure to large-scale public awareness campaigns (Academy for Educational Development 2005; Potter and Darmame 2010) and to school-based initiatives (Middlestadt et al. 2001); no studies, however, have examined learning in community-based rural conservation programs which are expanding in the country. Therefore, this study required an exploratory qualitative approach both to elicit participants' perspectives and to inductively follow emerging themes. Qualitative methods are used to explore open-ended research questions, allowing themes to emerge from participants' perspectives (Maxwell 1996; Patton 2002). This study also included a case study component. Because the research focused on the experiences of participants in water conservation programs, I examined two community programs in depth. These case studies follow each program and its impacts on the lives of participants, what Reinharz describes as analyzing "the relation among parts of a phenomenon" (1992, 164). Case studies are not limited to one particular method of data collection or analysis but instead use multiple sources to converge on the issue in question; they can be understood qualitatively or quantitatively (Yin 1998). This study uses two cases to understand different approaches to community-based water conservation education.

Learning Content and Process

In addition to understanding the learning content, or new information learned in the program, I also investigated the process by which participants made messages meaningful. For the purpose of this study, learning content included the messages and topics addressed by the programs, such as rain water harvesting, grey water reuse, and household water conservation. Learning process, on the other hand, included the techniques used to design and spread the content, and the ways that participants found such techniques useful to understanding. I wanted to understand how participants experienced the programs, so I used qualitative techniques which uncover "cognition, affect, intentions and anything else that can be included in...the 'participants' perspective'" (Maxwell 2005, 17). Thus, I designed interviews to explore participants' learning, investigating what they learned from the programs and how they made new information meaningful.

Sampling

Because the study examined participants' learning and behaviors, I used qualitative, semi-structured interviews (Rubin and Rubin 1995) described in more detail in Hansen (2010b). I interviewed both those professionals most involved in water conservation programs and those community members who participated in the programs using purposive snowball sampling to create my sample (Patton 2002). In all, I conducted formal interviews with 38 professionals and had informational meetings with six others. These discussions were all in English, the professional language in Jordan. I located my community informants through program professionals. I visited eight program sites with program staff and discussed the program informally with participants. Based on these site visits and interviews, I selected two rural community programs as case studies for a thorough examination of the programs and their impacts on participants.

My informants in the case studies were women program participants. I conducted formal individual and group interviews and meetings with sixteen women in the two villages (see a sample

interview guide in Figure 4), but I gained much of my data from ethnographic observations (Schensul et al. 1999; DeWalt and DeWalt 2002). I lived with families for about eight weeks in each community, participating in their daily lives and in program activities. I particularly took note of what and how they learned about water issues. In addition, I designed specific interviews to explore where they get new information about water issues and with whom they share such information (Figure 5). In my interactions with community members, we used Arabic or mixed Arabic and English to communicate.

Data Handling and Analysis

I used multiple sources of data, including written materials from water conservation programs, formal interviews with program professionals, group and individual interviews with program participants, and observation notes. With informant permission, I recorded the formal interviews digitally and, with the help of Jordanian translators, transcribed them. I also wrote detailed observation notes during my stay in the villages. Finally, I collected written materials from the programs which I consolidated into memos describing each program and the professionals and organizations engaged with the program.

I analyzed all these data using qualitative analysis tools. To understand the learning process and content, I developed emergent thematic codes from a subset of the data, seven documents which included all types of data (Miles and Huberman 1994). Codes are a way of categorizing data by the topics, or themes, which they address. From these, I created a coding rubric with the name of the code theme, definition, rule for application, and examples (see Table 1 for an example). With two other researchers, I used the coding glossary to code five more documents, another sample including all document types. We clarified the rubric and ensured that I was applying the codes consistently. With the improved code glossary, I recoded the first sample and coded the rest of the documents.

After coding was complete, I used Atlas.ti to separate key themes which applied to the research questions, developed summary matrices to analyze them, and categorized responses. For example, to make sense of all the data about learning content and process in Jordan, I first selected all data coded "learning content." I created a table in which I summarized each informant's views about learning content and process (Table 2). These I then summarized for each of the two case study programs. The results of this data analysis process are presented in the following sections of the paper.

Reliability and Validity

I addressed issues of validity for both my data and my interpretations (Miles and Huberman 1994; Patton 2002). To ensure accuracy of the data, two transcriptionists reviewed each interview transcript. Two Jordanian translators also reviewed all Arabic transcriptions to ensure the translation was accurate. The reliability of coding analysis was validated by peer review: two other researchers tested the coding glossary to ensure that the codes were defined clearly and applied consistently as well as check that important information was not neglected (Miles and Huberman 1994). Finally, member checking validated the findings in two ways. First, I often discussed my observations with informants, clarifying my interpretations and honing my comprehension (LeCompte and Schensul 1999). Second, I presented the results of the interviews at a public meeting attended by 11 of the professional informants (Kruger and Casey 2000). The presentation was followed by a detailed discussion. I recorded the discussion and took notes; from these sources, I created a summary memo that I shared with meeting attendees who supported the conclusions. These community critiques were analyzed and woven into the final research results.

Table 3.1: Learning Coding Rubric

Name	Definition	Rule	Meets Rule	Does Not Meet Rule
Learning Content	The topics of the information spread in learning or education initiatives.	Informant discusses the topics of the learning, what s/he learned or taught, etc. Not HOW it was taught or what came after the lesson.	"What did I learn? How to clean the tanks, to save the water."	"I did experiments and saw I could use less water that way." [The point is she learned with experiments—that is process.]
Learning Process	The means by which one learns new information; educational techniques and strategies, the format of the learning experience (as opposed to the learning content).	Informant mentions the process of learning seen or in the program as well as the techniques used to spread information.	"We used demonstrations and lectures." "I could taste that the water was cleaner, so I always clean my tank now."	"I reuse grey water now." [Because there is no reason why, we cannot see the process, only the outcome.]
Learning Outcomes	The results of the learning process: behavior or attitude change or lack of change.	Used when informant discusses how her learning has changed her or what has been the result of participation.	"I learned to reuse grey water and I reuse it now to water my plants."	"People can't change because it's too expensive." [This is more generally about barriers to change, not about learning outcome].

Table 3.2: Learning Content and Process Matrix Example

Respondent	Full	Summary	
		Learning Content	**Learning Process**
*P04/PD30:133-135)**	L.: Do you find when you're working with these groups that you need to teach them new things? Is there education going on, do you bring materials, do you do training workshops? P04: Yes, yes right. We do on-the-job training, we do so called "soft skills" training about communication, about leading discussions, reporting, making minutes of meetings, and so on. But also technical trainings, like for example, understanding about hydraulics in the infrastructure of the water distribution network. A lot of them, the training is on-the-job training, that means we have a very intensive contact with the communities. We have regular excursions, visits of the irrigation lines during irrigation water distribution, visits of the single farmers by the farmers committee so that they learn from each other, where shortcomings are or where difficulties are, and how farmers express a certain shortcoming, while each has a different view of things. It's very important to understand that.	Soft skills or "on the job" training: Communication Leading discussions Reporting Meeting minutes Technical training: Hydraulics in water network	Process: intensive contact, regular excursions, farmer visits for mutual learning, farmer perspectives.

*****When citing data from the field work, citations are in the following format: "X##/PD#:#. The first letter denotes the category of informant, Professional (P), from the Badia program (B) or from the Ghor program (G) as well as an assigned number for that informant. The PD## signifies the document number from which it was found and the number following the colon is the paragraph number of the citation. For example, this citation (P04/PD30:133-135) means that professional contact four said this in document 30, paragraphs 133-135.

THE BADIA PROGRAM: CONTENT-FOCUSED LEARNING

The Badia program aimed to raise community awareness of water scarcity in Jordan and increase household efficiency in water consumption. The primary goals of the program were educational, changing ideas and changing behaviors. A committee of professionals from multiple NGOs and government agencies leads the program design at the national level, and a Jordanian NGO is implementing the program in five communities around Jordan, training 13-17 local women in each as "Water Leaders." The NGO staff included a male manager and five female extension agents, or trainers, who interacted with members of the community. My research study focused on this program in the village of Rolling Hills and on the 12 women participants there. Planners said "the main objectives are to transfer the knowledge locally [so] that the women transfer their knowledge to their people" (P26/PD47:98) and participants "were supposed to visit their relatives, their neighbors, the community around them" (P26/PD47:224). Professionals in Amman determined that rural women needed to learn more about the water situation in Jordan to encourage them to use water more efficiently, i.e. use less water to accomplish more tasks.

> Mainly, in most of the governorates where we're working, there is really limited water supply for [residents], so they already don't have enough water and they're not wasting any water. They learned how to use it effectively, how to make use of every drop of water, without being wasted (P26/PD47:264).

In this case, program planning staff met with village women to determine what they already knew about water and what sort of information the women would like to learn. With this content in mind, a consultant then researched previous water education efforts in Jordan and compiled all the materials and curricula these had produced. Material relevant to the program was then edited and re-organized into an eight-module curriculum, with partners responsible for completing the final version. For example the health module was finalized by consultants from John Hopkins University (P34/PD52:11). During the course of this study, the first seven modules had been completed and implemented, but the eighth, a unit on plumbing and water storage, had not been completed by the

international partner funding that portion. The curriculum was perfected by the professionals in Amman and then the extensionists were taught to teach the information to the participants. Now trainers themselves, the extensionists presented one topic about every month in one or two day-long workshops in each community.

I examined the content and process of the workshops. For example, the first unit began with an outline of the water situation in Jordan, including water sources, the reasons for increasing demand, and the reasons supply projects alone cannot address the deficit. After a break for snacks and tea, the trainers addressed conservation behaviors as one way that participants could both address their own shortage and help remedy the national scarcity problem, including a demonstration of how water saving devices are installed and work. The workshop also covered what water is used for in the household and how even simple chores could be altered to conserve it. Finally, extensionists acknowledged the problems and possible solutions about which local women had told the consultant. Then the workshop concluded with a group meal, which one staff member said was "because it was a long day and the women were hungry." This workshop took about five hours.

In this program, planners used a knowledge-deficit model but included components of participatory feedback. Based on the assumption that professionals or experts could determine what participants should be taught, i.e. water conservation, information flowed in one direction: from the expert curriculum developers, to the extensionists, to the participants. In this case, however, participants had some feedback into the creation of the curriculum. The early work with program planners to discuss what participants already know and would like to learn was what Cornwall would call instrumental participation: the reason for including participants in the planning process is to "make projects or interventions run more efficiently" (Cornwall 2003, 1327). Badia program expert

partners tailored the information to the local participants' situations but without giving participants the ability to design or implement the program themselves.

Overall program planning used some participant feedback, but educational events, the workshops, were designed to engage the adult participants and included many of the NAAEE's guidelines for adult learning (NAAEE 2004). The main vehicle for learning in the Badia programs, workshops presented material in an discussion formant, using "direct participation" where participants were encouraged to raise issues and ask questions (NAAEE 2004, 30). "So it was not like lecturing, you see, they were not receivers for the information, they were participating, they were seeing what is wrong" said one trainer (P26/PD47:202). Additionally, the women felt "physically and mentally comfortable during learning experiences" (NAAEE 2004, 30). In a group interview, five of the participants said that the trainers were always smiling and made the learning fun. Because the extension agents were all women, they felt comfortable engaging with them in spirited discussions that for cultural reasons would have been more difficult with male trainers. The participants were also mentally comfortable because the content was presented clearly: "[w]hen they told us something they kept asking, 'Do you understand? Do you have any questions? What do you understand from this session?'... They made a big effort for everyone to understand" (B02/PD3:91). Moreover, since adults "bring considerable and diverse life and learning experiences" to community programs (NAAEE 2004), participants were invited to share "if their ancestors used some water [conservation] techniques" that could still be effective now (P26/PD47:98). For example, when participants argued that drip irrigation was too expensive, trainers asked them to brainstorm: "For irrigation, what can we do in case we don't have the money for drip irrigation? They came up with a plastic bottle, they pierce it in the bottom and fill it with water so it was dripping regularly" (P26/PD47:246). Thus the Badia program workshops used some of the educational methods that the North American Association for Environmental Education recommends for adult learners.

The knowledge-deficit model worked in that participants did learn some new information, and in line with program officials' goals, they shared water learning. Said one participant, "I like this program because they helped us bring it all together, gave us the tools to teach it to others" (B02/PD20:20). Because of their participation, program participants were more interested in talking to people about water conservation than previously. In my first site visit to Rolling Hills, participants in an interview told me that they talk about water use and conservation, even when they are socializing. Said one during a later interview, "Wherever I go, I tell people what I was taught, not just here in [Rolling Hills] but in Amman too. I tell people how to use water and if I go as a guest and hear a tap dripping, I'll tell them that the tap should be fixed" (B02/PD3:71). Even when they were spreading the information, however, they did not do so in the ways that program planners envisioned (Hansen 2010b, c). Rather than going house to house in their local community, they talked to their immediate female relatives, so that only people who were related to program participants learned the new information (Hansen 2010c). Moreover, though one of the workshops did teach participants how to "teach" others, they did not practice how to talk to other women nor did they even discuss any of the adult education techniques that the extension agents had learned.[2] Thus, as one program participant put it, "I read the brochures I was given to the women I talk to. I explain my points to them just like the trainers did, I am like a professor" (B01/PD1:415). Thus participants are spreading information, but not using the methods or talking to people in the way that program staff had planned.

The Badia program was designed so that "awareness would lead to behavior change" (P34/PD52:5). However, although women felt they learned new information, they did not necessarily change their attitudes or behaviors; I observed both ideas about and uses of water

[2] For example, they did not learn about the importance practical experiences and doing demonstrations, they did not learn about other adult education techniques.

contradictory to the messages in the program. First, despite the fact that participants had some input into the content planning, their major concerns, including water quality and poor infrastructure, were not part of the curriculum (Hansen 2010b). Second, and more important, scholars argue that this type of education, focusing on content, does not automatically motivate attitude or behavior change (Schultz 2002). Badia program planners also argue the "just raising awareness isn't enough" to create real change (P34/PD52:24). Even when they include participants' input, content-focused approaches may still fail to address underlying emotions, beliefs, social norms or structural barriers affecting behavior change. For example, during my stay, I saw one of the participants help three other families repair leaking taps in their homes. Nevertheless, that same participant had a leaking tap in her own house which she did not repair. When I asked her why, she replied, "We rent our house, it is the landlord's job to repair it and he won't come." While she agreed that leaks were a problem, fixing the leak was contrary to social norms about who should be responsible for rental household repairs. A learning process which encouraged her to examine these social norms or other behavior barriers could address this issue. Perhaps the issue is one of funding where she does not want to spend money improving the rental home, so the program could assist her in negotiating with her landlord or it could provide economic incentives to cover the cost of repairs. As environmental education shifts to an emphasis on learner-centric and experiential processes, it can be more open to these wider social forces (Bawden 1998; Palmer 1998).

The Badia program catered to adult learners, but it was content-focused and not experiential learning. Participants were not encouraged to test different conservation efforts. For example, they did not experiment with the bottle drip irrigation method to see if it works, if it actually saved water, if the plants survived. Only one of the women participants used this bottle drip method of irrigation. She said she was using less than half as much water as she had used before she tried this method—a significant savings when you have to purchase irrigation water privately. However, she had two

teenage sons to fill the bottles so the time and energy expended to fill them regularly was not her own. Returning to Bawden's model, the process stalled at the conceptual phase; participants were confronted with new experiences through the workshops and occasional field trips, and they interpreted these experiences, discussed them, and came to understand them. There, however the process ended with no active experimentation. Thus, the information learned in this program was just new data in each learner's conceptual realm, but without practical experiences, it did not become meaningful to participants

Interestingly, participants want more experiential learning activities, as do program staff. Participants requested hands-on practical training in plumbing. They wanted to be certified as plumbers so that they could get paid to make repairs around the village. Not only did they want to find a way to make money, but they wanted the social authority that would come from being certified plumbers. Professionals also felt the program needed more experiential sessions. Said one extension agent, "I think it's always more important, or is easier to understand when you are practicing rather than only seeing or hearing....We need more practical sessions" (P26/PD47:566). Another official from one of the program's funding agencies argued that the program should increase opportunities to "teach hands-on" (P37/PD54:149).

In addition to experiential learning, Bawden's Critical Learning Model reveals an entire new realm which is neglected in the Badia program. Bawden recognizes that internal factors are also important for learners to make new information and experiences meaningful. This was demonstrated when Badia program participants took a field trip to see a large water treatment plant in a neighboring community. At the plant, engineers described the whole process to clean water for the drinking water system. Then participants toured the facility and watched a video repeating the information about water treatment which the engineer had introduced. After the trip, one participant said she would never drink water from that plant while another woman said she now

trusted the drinking water. If two participants who shared the same experience and information came to opposite conclusions, it is clear that information becomes meaningful through additional, individual and internal processes. One of the Badia program planners even noticed this, arguing that learning is a "step-by-step process [that] comes from inside the individual" (P34/PD52:70). Thus incorporating Bawden's inspirational learning process in program planning should improve participants' learning.

The Badia program demonstrates that the knowledge-deficit model, even when including participant feedback in planning stages and using participatory education methods, does not create consistent behavior change. Experiential learning, on the other hand, has the potential to build not only consistent behavior change, but also participants' capacity to learn. I contrasted the Badia program with one that used a process-focused experiential approach, the Ghor program in Three Springs.

THE GHOR PROGRAM: PROCESS-BASED LEARNING

The Ghor program aimed to build strong collaborative networks for improving marginalized people's access to water resources (Hansen 2010b). It took place in three countries over four years: the first two years focused on developing national and international collaboration, determining tools to use, training implementation staff and similar tasks; during the second two years it was implemented in six villages in and near the central Jordan Valley, as well as in at least six villages in the West Bank and in Egypt. Official support of the project ended in 2007 and the collaborative project team no longer meets. My study focused specifically on the program as it was implemented in one of those villages, Three Springs.

Unlike the Badia program discussed above, the Ghor program developed an experiential learning process in Three Springs. First, the program created collaborative community teams to investigate community water issues. In Three Springs, the community team grew from the only local

community-based organization, the Three Springs Women's Association (TSWA). The team added men, yet women were key leaders of the program in the community (Hansen 2010c). This program was guided by trained staff who brought the community team together with local government agencies to dialogue about local water issues. At first, the program was content-driven. One program staff member said "We needed to first raise the awareness for the local community to let them understand the water situation" (P19/PD43:107). In early stages, professional staff discussed the problems of water scarcity in Jordan using knowledge-deficit methods, they lectured to the participants and women's association members about water conservation and other topics the professionals thought were important.

> For example, the Ministry of Environment... gave a lecture [to] the women [about] the project goal to improve the water situation and then the environmental situation. With the Water Authority, [the lectures were about] water conservation.... [T]hey made the women more aware of how to work on water conservation in several ways (G02/PD15:398).

The authorities developed these lectures, however, before the local team had an opportunity to examine their water situation (Hansen 2010b).

In these early dialogs, the professionals' perspectives did not always match community members' lives. For example, a staff member told me that the water authority claimed it was pumping an average of 100 liters/day/capita to the village, yet village members insisted they received less than that. To find out, the local team needed to examine and document the water situation. Program reports note that

> There is a general lack of capacity, for the collection and assessment of data, for their transformation into useful information and for their dissemination. There is also a need for improved coordination among environmental, demographic, social and developmental data [so the program taught participants how to] collect, analyze, store and share useful information.

Thus, the professional staff trained the collaborative local team to study their water situation using participatory assessment tools, including rapid appraisal methods from participatory community development approaches as well as water resource-specific tools adapted by international agencies.

Participants gathered data about the local water situation: they measured water flow rates, volume, and days of water received, they surveyed residents, and they consulted geological studies. Then, the collaborative team prioritized their challenges and determined that unequal water distribution and overall water shortages were the most important problems. They developed a Water Resources Strategy, a plan for current and future water use. Collaborating with program staff and government officials, they then planned and implemented the two pilot projects to practice project management.

When the local team looked at water, they found quite a diversity in problems and concerns. First, they found that in some areas, water is more abundant than in much of Jordan (Hansen 2010b) but in other areas, shortages are a weekly crisis. For low-lying homes, water flows two or three days a week and families have multiple storage tanks. Moreover, many also have irrigation network connections for their farms, so they have additional water for kitchen gardens. The leader of the TSWA is one of these fortunate residents: "I always had water, the water was available so I thought that the water is available in the whole area." Those in higher-lying areas, however, had no access to either potable or irrigation supplies because of low water pressure in the system.[3] To address this problem, the program purchased a tanker truck to deliver water supplies to those who were underserved in the community. Second, they found that lack of monetary resources was a barrier to households improving their own infrastructure. Thus, a revolving fund was created to help families pay for improvements to the water infrastructure in their homes, such as building grey water facilities or storage tanks. The efficacy of the program and its outcomes are discussed elsewhere (Hansen 2010b, c).

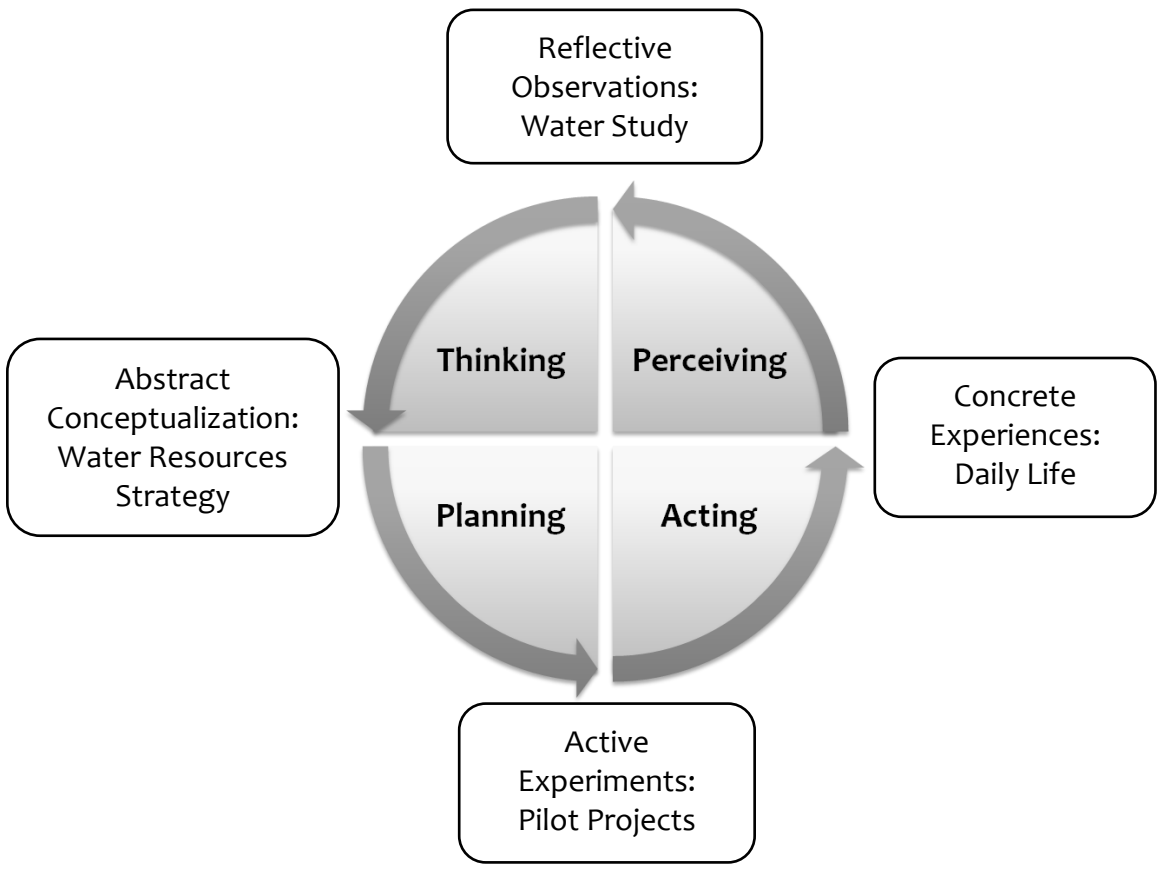
[3] Egyptian migrant workers, including women and children, also reside in Three Springs. They live in make-shift shelters with no water or sanitation connections. They often use irrigation water for domestic purposes, even drinking, since bottled water is expensive. However, the local team did not include any workers nor did the program investigate their water concerns.

The Ghor program cycle exemplified the Experiential Learning Process in Bawden's Critical Learning Model (Figure 6). Program reports stated

> The idea of a cycle reflects the reality that good local water governance is about a continuous process of experimentation, adaptation and learning, which makes it possible to find locally appropriate solutions. Long-term visions and strategies need to be updated regularly based on new information and the impacts of activities on the ground.

First, participants experienced water scarcity in their daily lives. These were concrete individual experiences. To more fully understand the situation in the village, the team conducted the participatory water study. This kind of study was a collaborative *reflective observation*. One participant said "all our work was on the analysis of the information" gathered in the study (G02/PD15:542). They were individually and collectively conceptualizing what the study meant. This process of

Figure 3.4: Experiential Learning Process in Ghor Program



abstract conceptualizing led them to consider possible solutions to these prioritized problems in line with their long-term strategy. Unlike the Badia program, the Ghor program completed the experiential learning process through the pilot projects. The projects were *active experiments* not only in addressing water concerns, but also in the collaborative experiential learning process.

Program planners hoped to create a sustained community team for learning and change. "What we tried to do was to develop tools for planning so that when we leave and the project ends, these tools can stay and the way of thinking can stay with the local people, and make and apply it, whichever way they want" (P28/PD48:144). Unfortunately, there has not been a continuing process of such reflection and action in Three Springs. After the pilot projects ended, the community team has not continued to meet and does not even monitor the water tanker to assure it is still delivering water supplies. In this case, even an experiential process did not result in behavior change. In previous papers, I found that the program did not engender behavior change because the process further entrenched community power structures which distribute community resources inequitably (Hansen 2010c), and because program participants connected personally with government and other officials rather than collectively (Hansen 2010b). Bawden's Critical Learning Cycle model, however, provides additional insight into why behaviors did not change.

First, the experiential component of Bawden's model is illuminating. The experiential learning process is a continual cycle, with multiple recursive opportunities for people to experience, reflect, understand, and act. While Ghor program staff state that the learning process is continual, the Ghor program only went through one cycle. There was no evaluation of or adjustment made to the pilot programs and no continuing program support in Three Springs. Without project assessment and adjustment, community team members did not practice their project management skills and instead gained only the capacity to implement rolling loan funds. Lacking continuing support, participants did not develop the collaborative skills necessary to continue to work together

and overcome the challenges posed by unequal resource allocation (Hansen 2010c). Finally, because they only went through one cycle, the community team members did not learn how to respond to changed experiences, or to uncover additional challenges once those most evident had been addressed. Program reports note:

> A participatory approach cannot be achieved unless suitable skills are being acquired such as facilitation, negotiation, appreciation of information, the art of dialogue and acceptance of others. These skills can be acquired during the process but need a lot of patience and understanding of the local customs and of power relations. It needs a good level of trust and respect in the working team.

To engage community members in this type of a learning process, learners would have to practice these processes repeatedly, actively experiment themselves, and be given enough control that they could address the issues that primarily concern them.

Second, the inspirational learning process in Bawden's model is also informative. In the Ghor program, opportunities for inspiration and creativity were lacking. To open space for inspiration, learners could have been encouraged to engage in culturally-appropriate forms of self-reflection. The active experimentation phase in the experiential process could also serve as an opening for radical creativity. Rather than two community-wide pilot projects, Three Springs could have implemented multiple innovative proposed projects in a few households each to be compared by the team and adjusted over time. Moreover, creative ways of using new forms of social interaction, from the internet to cell phones, could have been investigated to address larger-scale concerns, such as making up-river users more accountable to down-river villagers. Many participants told me that they use the internet to research information about water and conservation so they clearly have the capacity to begin to explore such technology.

Overall, the Ghor program demonstrates that experiential learning processes are more successful in creating behavior change than content-focused approaches such as the Badia program. Although the Ghor program did allow participants to implement pilot projects, it did not continue

to support further adaptations and learning. Bawden's Critical Learning Model suggests that longer-term programs would allow both for multiple cycles of "experience, reflect, understand, and act" as well as provide space for inspiration.

Experience is Learning

One last issue emerges as critical here in both the Ghor and the Badia cases: that experience is the best teacher. Despite the nation- and community-wide discussions of the water crisis in Jordan, observations and interviews revealed that the residents of Three Springs do not think they have a water problem in the community. One professional from the area summed up local feeling: "We are suffering in the rural area and all the investment [is] now in Amman, the rich people [are] in Amman" (P06/PD31:248). Not only do they believe that the water in the region is their water and that shortages are due to pumping it to other regions (Hansen 2010b), but they also do not experience scarcity in their daily lives. This demonstrates that experience is more instructive than knowledge transfer. Women in Rolling Hills conserved much more water before the Badia program than the women in Three Springs did after the Ghor program, because they have to. Moreover, even in Rolling Hills, experience is very important, the trainers argued "we need more practical sessions" (P26.PD47:566). One Badia participant's cousin visiting from Palestine discussed how much more grey water they recycle there. This sparked increased interest in more grey water use among the participants, and the module on grey water harvesting was expanded to address it more deeply. nevertheless, few of the women actually engage in much grey water harvesting because it is labor-intensive. Imagine every time you wash and rinse dishes that you did so in buckets and carried each one out to the garden to water plants. Even if it will save you some water or money, would you do it? What if you live on the second or third story and had to carry those bucket up and down stairs? To save labor, one can build separate sanitation lines for sewage waste and for grey water, but that is very expensive. Comparing Three Springs where water is locally abundant, and Rolling Hills, where

it is scarce, calls into question whether education can cause significant reduction in water consumption at the household level. From the Three Springs case, it would appear that the only recourse Jordan has to reduce household consumption is to reduce supplied water or make it drastically more expensive, neither of which has significant political or social support.

CONCLUSION

This paper argues that scholars and practitioners of participatory community development should consider and implement innovative process-focused learning approaches to reach targeted communities and encourage them to change their behaviors. First, I differentiate content-focused and process-focused education approaches. Content-focused approaches, such as the knowledge-deficit model, are primarily concerned with transmitting specific messages or content to learners. In contrast, process-focused approaches, such as experiential learning, empower learners to explore issues most important to them in multiple cycles of experiencing, reflecting, understanding, and acting. Although knowledge-deficit approaches may transmit information to learners, the Badia program shows that such information alone does not lead to changed behaviors. As suggested by environmental behavior change scholars (Hines et al. 1986; Carlson 2001; Payne 2002; Schultz 2002), the Badia program did not address the social norms, structural barriers, or incentives for behavior change in Rolling Hills. Though the Badia program included many of the methods suggested by the NAAEE to reach adult learners, participants did not begin the many actions encouraged by the program, such as grey water reuse, drip irrigation, and rainwater harvesting. The Badia program exemplifies the weaknesses of knowledge-deficit methods in motivating behavior change. Though sustainability education scholars emphasize learner-centric and community-based approaches for creating behavior change, such as experiential learning (Palmer 1998; Andrews et al. 2002); the Ghor program case demonstrates some of the challenges to these approaches. For

example, since multiple cycles of reflection and adaptation to changing circumstances are necessary, programs must make longer-term commitments to local communities.

Additionally, I introduce Bawden's (1998) Critical Learning Cycle as a framework to analyze learning processes in community-based programs and to help program planners improve educational efforts. Defining learning as *meaning making*, Bawden demonstrates what practitioners already knew: that some parts of learning are still internal to the individual learner. However, Bawden suggests that encouraging experiential *and* inspirational opportunities for learning and action can motivate learners to change their actions, and also their ways of knowing. For practitioners and scholars, including experience and inspiration will be the next boundary for such programs. First, both the Badia and Ghor program demonstrate where the learning cycle is interrupted. In the case of the former, the program stops short of active experimentation whereas in that of the latter it halts after just one cycle. Thus program staff can increase support at these critical junctures and commit to working with communities as they experiment, learn, and try again. Second, incorporating inspiration into programs starting early on is certainly possible. Participants in both programs noted that their faith, Islam, strongly supports responsible and efficient use of water resources. Thus religious experiences of prayer may be useful to freeing participants from their conceptual minds and opening avenues for creativity and value judgments. Bawden's Critical Learning Cycle is a framework which values inner reflection and encourages practitioners to uncover the role of inspiration in making meaning and also to validate such internal processes, building individual and community capacities to envision and enact innovative change.

Further Studies

These two case studies detail the importance of understanding learning processes in community-based programs. Mine is an introductory and exploratory study, however, and suggests multiple directions for further study. First, in a previous paper (Hansen 2010c), I found that social

networks frame who participates in and benefits from such programs. But what impacts do social networks have on how information moves through a community? An investigation of the learning and information networks in these communities would clarify not only which processes are effective, but also how to ensure that information reaches those who most need it. Second, as experiential learning processes increase in community-based programs, scholars can continue to learn from and refine them. Scholars can explore and compare rubrics and other planning tools to find ways to incorporate time for reflection and action. Both scholars and practitioners can collaborate with those in the arts and humanities to investigate other community-based initiatives which include inspirational components. Moreover, such collaborations can also investigate the norms and values which encourage and frame critical reflection. Finally, participants are not the only people learning from community-based programs. Additional studies can examine how program staff and planners learn in and from the programs they implement. Introducing process-focused models of program planning can then encourage program planners to better include and adapt to local community contexts.

APPENDIX 3

APPENDIX 3.1

Example Program Participant Interview Schedule

- **Water in Your Community**
  - What is water used for here?
  - Do you think there is a problem with water in your community? What is that problem? Does it affect you?
  - Have you been able to improve that problem after working on this program?
  - Have you changed your behaviors regarding water use? Are you changing how you use water? In what ways, what are you doing differently now?
  - Have you seen a difference since you changed? Is your water bill decreasing? What difference have you noticed?
- **Water in Jordan**
  - In Jordan, what are the biggest problems with water?
  - Who/what causes them?
  - What are the solutions to these problems in your view? Can you help solve them, do you have a role in the solution?
  - Do you think water conservation will help solve the water problems in Jordan and here? Do you think you should be asked to use less water?
- **Training Sessions**
  - What did you learn? Is there anything you didn't know before that you know now? Have your ideas about water changed from before the training?
  - Was there anything that was difficult to learn?
  - Was it easy to learn?
  - What about how the trainings were done, who did the trainings?
  - What kinds of activities did they do with you?
  - What activities help you understand difficult things?
  - What activities didn't help?
  - Is there anything you'd change if you could?
  - Why did you join this program? Why didn't other women join; is there something about you that is different from women who didn't join?
- **Larger impacts**
  - Have you personally changed after participating in this program?
  - Have you learned new skills that you can use in other community situations?
  - Are there any that you think you would like to learn more about? Which ones?
  - Have you changed what you think about yourself after this program? Do you think you are smarter than you were before?
  - Did you worry about your ability to learn before the program?

APPENDIX 3.2

Example Learning Process Interview Schedule

1. In your life, where and from whom have you learned about water? Rank by amount you've learned (quantity) and who is most knowledgeable/trustworthy.

Source	**Qty**	**Trust**

2. When you learn something new, who do you tell/pass the information to? Why?

3. Have you recently learned something new about water? What did you learn? Did you tell anyone else? Who? Why?

4. Do you remember a time when you learned something new and it changed your ideas about water? Tell me about that, what did you learn, from whom, what changed in your mind, who did you tell about it?

5. Do you remember a time when you learned something new and changed your behaviors? Tell me about that, what did you learn, from whom, what changed in your mind, who did you tell about it?

6. If you have a question about water (conservation), who do you ask? Where do you find the answers? How do you know where to go? If that doesn't work, where do you go next?

7. Has the water situation in your house changed in the last 10 years? What has changed? Do you use water differently than you used to? In what ways?

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