From Joint Experimentation to Laissez-faire: Transdisciplinary Innovation Research for the Institutional Strengthening of a Water Users Association in Khorezm, Uzbekistan

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From Joint Experimentation to Laissez-faire: Transdisciplinary Innovation Research for the Institutional Strengthening of a Water Users Association in Khorezm, Uzbekistan

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ABSTRACT Purpose: This article assesses a participatory action and innovation research experience, in which project researchers, farmers and staff members of a local water users association (WUA) came together to: (a) jointly test and adapt a social mobilization and institutional strengthening approach according to the local context, and by doing so, to (b) develop a locally embedded approach to the institutional strengthening of WUAs in Uzbekistan. Design/methodology/approach: The process of interaction and innovation development was one of joint experimentation, which over time and to avoid a disproportionate dependency on external social mobilizers increasingly adopted aspects of a laissez-faire approach, eventually relying fully on members of the local community. Findings: The findings show that the cooperation style is highly influenced by institutional and structural causes and effects in the specific context of rural Uzbekistan. Participatory approaches to the institutional strengthening of WUAs in Uzbekistan should consequently allow for a high degree of flexibility to adjust key activities and their timeframe. Practical implications: The research findings are relevant to the lowland irrigated areas of post-Soviet Central Asia where the strengthening of WUAs is still lacking, resulting in limited participation of water users and insufficient operation and maintenance of the slowly eroding infrastructure. Originality/value: The transdisciplinary innovation and action research experience pays special attention to the change in the style of cooperation, its institutional and structural causes and effects with regard to the ‘localizing’ of the innovation, namely a social mobilization and institutional development (SMID) approach for strengthening water users associations (WUAs) in Uzbekistan.

KEY WORDS: Transition country, Transdisciplinary research, Follow the Innovation, Action research, Innovation development

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1. Introduction

After the breakup of the Soviet Union in 1991, agricultural land reforms in Uzbekistan implied the subdivision of large-scale state and collective farms (sovkhозes and колхозes respectively) into large numbers of smaller private farms (Veldwisch and Spoor, 2008). However, farmlands have remained state property leased to farmers for up to 50 years. To ensure proper water management serving the increased number of farms in the early 2000s, the government, inspired by an international donor-driven discourse on integrated water resources management, established water users associations (WUAs) responsible for the operation and maintenance (O&M) of inter-farm canals previously under колхоз and совхоз management (Abdullaev et al., 2009). Tertiary and below-level irrigation canals were assigned directly to farms (Abdullaev and Mollinga, 2010). Yet, the participation of water users actually running the WUAs continues to be limited, resulting in overdue payments and insufficient maintenance of a slowly eroding physical and social infrastructure (Ul-Hassan and Hornidge, 2010; Hornidge et al., 2011b).

With the aim to develop a localized approach to institutionally strengthening WUAs in Uzbekistan, a German-funded project on land and water management in the Khorezm province (henceforth ‘the project’) in 2008 included a social mobilization and institutional development (SMID) approach in its innovation research component ‘Follow the Innovation’ (FTI).

SMID approaches have been deployed to create bottom-up driven WUAs in South Asia (Ul-Hassan et al., 1999) as well as within Central Asia’s Fergana Valley of Kyrgyzstan, Tajikistan and Uzbekistan (Ul-Hassan et al., 2005), but so far not yet in the lowland irrigated areas of the Amudarya, where the project site is located. These donor-funded projects in Uzbekistan were able to establish WUAs that performed better compared to those which were created by the central government in a top-down manner. However, the implementation of SMID by external experts tended to create dependencies within the respective WUAs, negatively impacting long-term sustainability as soon as the external experts left.

Jointly with WUA staff, the project thus decided to test a slightly adapted version of SMID in Khorezm. The explicit aim of this transdisciplinary research component was: (a) to test and adapt an existing SMID approach to the local needs and requirements of an Uzbek WUA, and by doing so, (b) to develop a locally-embedded approach to strengthening WUAs in Uzbekistan. Thus, the process of interaction and innovation development chosen by the team of researchers, farmers and staff members of a WUA, Ashirmat, at the tail end of the irrigation canal system, was one of joint experimentation, which, over time, and with the aim of avoiding the above mentioned dependency trap, increasingly adopted aspects of a льщез-файр approach, eventually relying fully on members of the local community and the WUA as social mobilizers and facilitators of community driven water management.

This article outlines and assesses the transdisciplinary innovation and action research experience of ‘the WUA team’, as called by its members, paying special attention to the change in the style of cooperation, its institutional and structural causes and effects with regard to the ‘localizing’ of the innovation at hand. The assessment of the encountered process challenges consequently aims to empirically
and conceptually contribute to an emerging body of literature on transdisciplinary action research and practice.

Methodologically, the article draws on three years of fostering the participatory process of SMID, documented in qualitative field research diaries, meeting protocols, workshop reports and monthly reports on work performance by the WUA itself.
2. Key Characteristics of the Research Location

Since independence in 1991, Uzbekistan has actively restructured its agricultural sector, with the government remaining strongly involved in agricultural decisions at farm, district, regional and national scales. As part of this, state farms (sovkhozes) were turned into collective farms (kolkhozes), then into joint-stock enterprises (shirkats), which in the early 2000s were completely dismantled and divided into private farms. In the onset private farms in Khorezm ranged between 10 and 25 ha, since 2008 they have been consolidated back into 75–150 ha farms (Djanibekov et al., 2010).

Similarly to these changes in land governance, the system of water governance has been restructured. From 2000 onwards, water management on the local level was transferred to newly established WUAs (Abdullaev et al., 2009). In July 2003, the administrative system of water management was reorganized into an irrigation basin water management system based on hydrological borders. Despite the change in water management, the increase in the number of farms has resulted in a decline of water use discipline, that is, inobservance of water use turns, ‘water theft’ and wasteful water application (Oberkircher, 2011), and widespread disruption of water delivery, especially around the tail-ends of the irrigation system (Abdullaev et al., 2009). In addition, the physical delivery of water is severely hampered by an inadequate human, financial and technical infrastructure (Hornidge et al., 2011a).

Furthermore, the state procurement system, with a production target on cotton and wheat and compulsory harvest sales to the state at fixed prices and centrally set agricultural standards, determines local agricultural practices. Consequently, the prioritized water allocation for cotton compromises timely and sufficient water delivery to other crops (Veldwisch and Spoor, 2008). This is further enforced by WUAs that share formal responsibility for fulfilling the cotton production targets and thus have to deliver water to cotton fields irrespective of whether farmers did or did not pay for water services. Informally, this is guaranteed by the local administration which in practice exercises full control over WUA decision-making (Abdullaev and Mollinga, 2010). Consequently, farmers continue to perceive WUAs as state organizations. This in turn negatively affects the degree of farmers’ ownership and participation in WUAs and the above mentioned difficulties in payment collection. The farmers’ interest in strengthening WUAs in the fulfillment of their legal responsibilities through performance-based payments consequently stands in direct contrast to their interest in a weak, non-functioning WUA, opening the space for WUA-independent water management arrangements.

3. ‘Joint Experimentation’ versus ‘Laissez-faire’

Conceptually, the transdisciplinary innovation research experience of the WUA team turns against linear approaches to innovation diffusion as represented by the ‘Transfer-of-Technology’ approach (Chambers and Jiggins, 1987) or the ‘Diffusion of Innovations’ approach (Kline and Rosenberg, 1986; Rogers, 2003). Instead, a social constructivist perspective on science and technology, as well as innovation development was taken, summarized by Bijker and Law (1997), underlining that innovation is about simultaneously shaping technology and building society. Based on Douthwaite et al.’s (2001) concept ‘Follow-the-Technology’, we consequently
developed the FTI approach, by widening the former and incorporating technical as well as institutional innovation packages. As a participatory approach to technology development and innovation, the ‘Follow-the-Technology’ approach comprises a set of steps assuming that once there is an innovation with a ‘plausible promise’ that may raise the interest of users, innovators engage in a process in which the innovation is experimented with in real-life situations by a group of users (‘product champions’ and ‘partners’). The process itself is one of trial and selection, leading finally to a point where the innovation is sufficiently robust to be released more widely or abandoned due to being unsuitable for local conditions. The methodology ‘follows the technology, using this intervention as the entry point into a complex situation, and then allowing what is discovered to determine what is important’ (Douthwaite et al., 2001: 11). As such, the FTI team identified the following main steps for its overall innovation research component: (a) selection of ‘plausible promises’, meaning innovations that bear the scientific potential to contribute to improved land and water management in the region as well as make sense in the specific local agricultural context, developed by the project; (b) interdisciplinary FTI team formation; (c) stakeholder identification and selection; (d) transdisciplinary team formation and role division; (e) continuous testing and modification of each particular innovation together with the stakeholders through processes of joint experimentation, which allow the stakeholders to maintain the space for their own ideas and inputs (laissez-faire). Here a repetitive validation loop is thought to ensure that local knowledge and partners’ concerns are included in the design of the innovations; (f) assessment of whether the revised innovation continues to hold its ‘plausible promise’ or has to be shelved through a participatory monitoring and evaluation process; (g) in the case of the former, further research would be required to understand the entire innovation system and eventually form recommendations for extension and technical assistance agencies for further out-scaling. In the case of the later, the enabling conditions that are a precondition to the successful implementation of the respective innovation should be identified as a basis for respective policy recommendations (Ul-Hassan and Horndicke, 2010).

The WUA team jointly decided to structure the process of interaction between the project staff and the local stakeholders in the beginning along the lines of ‘joint experimentation’, meaning that in the first one and a half years each step taken to experiment with the innovation was taken jointly by the project staff and local stakeholders. Yet, after the initial phase of ‘joint experimentation’ the process of interaction should increasingly take on the character of a ‘laissez-faire’ approach to avoid heavy dependence on project staff. The local stakeholders planned to continue experimenting, using and potentially even spreading the innovation. The project staff would only sporadically return and discuss the modifications made by the stakeholders to the innovation, thus acting as a back-stopper and advisor when asked for. The decision to start with a ‘joint experimentation’ style of interaction and then move towards an increased style of ‘laissez-faire’ was inspired by the concept of the S-shaped ‘diffusion curve’, illustrated in Figure 1.

According to diffusion theory, the adoption of an innovation generally starts slowly until finally reaching its maximum. An innovation that fits the local context requires the least time to achieve the highest rate of adoption. If it conflicts with the local context, commonly captured as ‘lack of fit’ (Biggs, 1978, 1980; Rhoades and
Booth, 1982; Richards, 1985) and/or unforeseen events intrude, the innovation adoption curve shows a lower slope. In the case of the outlined experience, unforeseen events such as the high degree of staff fluctuation and thus loss of human capacity (knowledge and experience), ongoing land reforms, WUA internal conflicts and water scarcity had an impact. Consequently, in agreement with the diffusion curve theory, potential users only partly accepted the innovation during the envisaged time frame.

Consequently, the WUA team decided on a participatory approach to innovation development, by identifying ‘joint experimentation’ as the dominant style of interaction in the first half of the process and a successive decrease of the external influence on the WUA in the second half (‘laissez-faire’ approach), avoiding imbalanced dependencies (Hornidge and Ul-Hassan, 2010).

4. The SMID Approach

The objective of the selected SMID approach is to institutionally strengthen an existing, but malfunctioning WUA through a participatory social mobilization and capacity building process. To avoid a disproportionately high dependence on external social mobilization, SMID hinged upon social mobilization by local residents and the resultant institutional development with additional capacity building and technical support by the project. The expected outcome of this process was the generation of ownership, social, monetary and labour support from water users to the WUA. The process was expected to lead to the inclusion of the majority of water users in the WUA into the decision-making processes of the WUA.

4.1. Social Mobilization

Social mobilization of water users and other stakeholders involved in water resources management took place through intensive meetings and discussions with water users and the clarification of the WUA’s and the water users’ role in improving water
management in their territory. The objective of this process was to create awareness among the water users, accepting the WUA as an organization of their own, with its members being chosen by them, and the WUA representing the interests of the water users to other water authorities. This awareness creation aimed at motivating water users to take the necessary steps to actively contribute to the WUA.

4.2. Institutional Development

The expected outcome of the institutional development was the formation of an effective management and a governance branch within the WUA. The effective management branch was understood as a group of capable personnel, hired by the WUA Council and paid from the service fees collected from water users. The main task of the WUA management was to plan and distribute water according to agreed rules, monitor water use, plan and take care of the operation and maintenance of the irrigation and drainage network, and generate enough revenue to cover the WUA's costs. The WUA governance branch consisted of elected representatives of water users with full authority over all activities of the WUA. As such, the governance branch was thought to be able to represent the WUA outside; discuss, prepare and sign the contract with the water management organization for water delivery; supervise the management branch in fulfilling functions and producing financial reports; manage conflicts regarding water management, and present short- and long-term perspectives and plans with regard to WUA activities and resources.

While some members of the WUA conducted social mobilization activities among water users, the project staff assisted in identifying training needs and provided training on water management, organizational, financial and legal aspects for the staff and council members of the WUA. The trainings were prepared according to a manual developed by the Asian Development Bank (ADB, 2006).

5. Process Implementation

5.1. FTI Team Organization

In early 2008, the project staff (hydrologists, soil scientists, agronomists, economists and social scientists) formed an interdisciplinary team to validate the idea of strengthening a WUA through SMID (Hornidge et al., 2011b). By design, the team comprised a core group of senior researchers and a support group of PhD students and research assistants. A senior researcher with experience in SMID in other parts of Uzbekistan was elected as the 'group leader'. The team chose the WUA Ashirmat of Kushkupir district in Khorezm as a partner for the joint experiment, based on the following four criteria: (a) remoteness from the river; (b) relative water scarcity per unit of irrigated land; (c) poorer socio-economic conditions of water users; and (d) no previous history of external support from an international organization (Abdullaev and Mollinga, 2010).

WUA Ashirmat was established in 2005 within the boundaries assigned during Soviet times for two kolkhozes. It is located in the downstream part of the Khorezm irrigation system in the lower reaches of the Amudarya river basin and about 100 km from the river (Figure 2).
Ashirmat receives water through the Zeu Yop canal, which also serves three upstream WUAs. The WUA comprises two large settlements of 11,000 people with the majority engaged in agriculture. The total area of Ashirmat is about 88 km², of which about 2100 ha are irrigated. As of 2010, almost 86% of the irrigated land was leased to 20 farms of 80–100 ha each. The rest was cultivated by 2384 rural households, and one fishery farm of 224 ha occupied about 9% of the farmland in the form of a lake and smaller fishponds. The remaining 5% was leased to livestock, gardening and silkworm producing farms with an average size of 6 ha. About 50% of irrigated farmland was allocated for cotton, 13% for wheat and the remaining for fodder crops, vegetable crops, melons and fruit trees.

Due to the team’s focus on bottom-up WUA empowerment, the FTI team decided to engage initially with direct and indirect stakeholders in Ashirmat, such as WUA staff, the chair of the local rural council (Uzbek shuro) and water users. With the involvement of these stakeholders, the interdisciplinary team consequently evolved into a transdisciplinary team, with all sides explicitly formulating their interest in equal partnership. Ashirmat established a Core Contact and Partnership Group (CCPG) in charge of the process of locally mobilizing water users and jointly with the project testing SMID. It comprised the shuro, an informed and influential farmer, and the six staff members of Ashirmat. During the first one and a half years, the joint character of the experimentation involved regular interaction, as captured in Table 1 and outlined below.

5.2. Confidence Building and Experimental Planning

Following the initial engagements with the stakeholders, the project team carried out a problem identification workshop in July 2008 with the Ashirmat staff and shuro to
understand why water users were not satisfied with their WUA’s water management, did not pay their water bills, or take interest in the WUA’s activities. During the workshop, the participants identified key water-related problems, coupled with a set of potential solutions (Table 2).

### 5.3. Social Mobilization

As the lack of awareness and interest of water users in Ashirmat was identified as an important part of the problem, the WUA chair formed a group of community mobilizers (CM) to conduct the social mobilization activities. The main criteria used to select the CM team members were (a) visibility and respect within the community; (b) good knowledge of the territory and water and agricultural issues; and (c) flexibility and motivation to commit to SMID. The CM team comprised local volunteers, WUA staff, shuro and a representative of the governmental water management organization. The main function of the CM team was the establishment of grass-roots Water Users Groups (WUGs) along each tertiary canal or along other appropriate water distribution sub-units. As a starting point of institutional strengthening, the CM proposed conducting regular general meetings, and meetings of the executive council and its various commissions.

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### Table 1. A chronological list of activities undertaken by the WUA team in 2008–2009.

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2008</strong></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>Workshop for joint situation and problem analysis, bringing together project FTI team, WUA staff &amp; farmers.</td>
</tr>
<tr>
<td>July</td>
<td>Presentation by project FTI team to WUA staff and farmers on WUA’s legal responsibilities, followed by a discussion on the existing gaps between WUA’s legal mandate and actual functioning.</td>
</tr>
<tr>
<td>July–September</td>
<td>Individual visits to WUA by FTI team members to identify, refine and agree on a series of capacity development activities.</td>
</tr>
<tr>
<td>October</td>
<td>Ceremony for supplying WUA with bicycles.</td>
</tr>
<tr>
<td>November</td>
<td>Study tour of CCPG members to well functioning WUAs in Fergana Valley under a Swiss-funded project.</td>
</tr>
<tr>
<td>December</td>
<td>Training on social involvement and water resources management for WUA, CCPG and Water Management Organisation (WMO).</td>
</tr>
</tbody>
</table>

| **2009**  |          |
| January   | WUA General Assembly 2009, 12-step plan approved. |
| April     | Meeting in WUA on 12-step work plan. In April–December, CCPG head undertakes social mobilization in public events. |
| June      | CCPG members visited the project’s conservation agriculture site. |
| June      | Round table of Zey-Yop canal WUA chairmen and cross-checking of WUA works with water users. |
| July      | Meeting on WUA performance and learning farmers’ opinions regarding whether the FTI team is taking the right approach in developing WUA. |
| September | WUA perception survey. |
| September | WUA approached the FTI team to assist in preparing a proposal for acquiring canal cleaning equipment through a grant. |
| October   | Visit to WUA to agree on meeting day with WUA staff and farmers for discussing the results of perception survey and WUA performance in general. |
5.4. Institutional Development and Capacity Building

Following the formation of the CM team, the transdisciplinary team jointly designed a 12-step improvement plan comprising timing, inputs, budget and the division of responsibilities. The project was assigned responsibilities for providing WUA staff trainings, organizing an expedition to well-functioning WUAs in Uzbekistan, partially sponsoring office repairs and purchase of hardware (a personal computer, printer and bicycles), and collecting hydrological and other monitoring data (Hornidge et al., 2011b). Ashirmat was responsible for identifying social mobilizers and undertaking social mobilization, carrying out its routine O&M functions, establishing and maintaining contacts with higher level authorities for the provision of canal cleaning equipment, and monthly progress reporting on the project.

In January 2009, Ashirmat organized its first ever general assembly where the aim of strengthening the WUA was publicly discussed and the 12-step plan was approved by water users. Furthermore, the following additional measures were decided: (a) nominating water masters (that is, hydro-technicians, a term formerly depicting the person responsible for water distribution in kolkhozes and sovkhozes) according to the hydrographic layout of the infrastructure thus making them responsible for a group of farmers within their hydrological jurisdiction; (b) approving the budget and the

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**Table 2. Joint problem analysis with farmers and WUA members.**

<table>
<thead>
<tr>
<th>Problems</th>
<th>Ways to improve situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water scarcity</td>
<td>The area receives insufficient water to irrigate it</td>
</tr>
<tr>
<td></td>
<td>Mirobs (officers for water distribution) should prepare more equitable water distribution</td>
</tr>
<tr>
<td></td>
<td>schedule and implement it</td>
</tr>
<tr>
<td></td>
<td>Clearer and stricter water turns must be established. Khokim (governor), shuro and WUA staff</td>
</tr>
<tr>
<td></td>
<td>should check this. Farmers should follow the agreed or approved water distribution rules</td>
</tr>
<tr>
<td>Water turns are not followed</td>
<td>Even if water reaches the WUA, only a few farmers and peasants irrigate their land; water is very unequally distributed throughout the WUA</td>
</tr>
<tr>
<td>Problems with inputs for pumps</td>
<td>Few diesel pumps for irrigation; no diesel quotas are allocated; electricity is not reliable</td>
</tr>
<tr>
<td>High cost of pumping for irrigation</td>
<td>Most farmers and other water users cannot afford to pay for the electricity and pump maintenance</td>
</tr>
<tr>
<td>Inadequate land preparation for water delivery</td>
<td>When water arrives, not all fields are yet prepared for irrigation and the water flows into the drainage</td>
</tr>
<tr>
<td></td>
<td>Better coordination of water releases/turns and readiness of land for irrigation; extension of the irrigation time allocated for the WUA</td>
</tr>
<tr>
<td>Mismanagement of drainage water</td>
<td>Water accumulation in drainage system, as a result, during water scarcity, groundwater levels drop, leaving no water in wells</td>
</tr>
<tr>
<td></td>
<td>Infrastructure to control water levels should be constructed and, when water is scarce, the drainage canal can be blocked so as to raise groundwater</td>
</tr>
</tbody>
</table>

proposed water plan; (c) appointing a conflict resolution committee and a water inspector; (d) shifting the informal responsibility for the operation and maintenance of pumps to the farmers thus addressing the problems in recovering electricity bills; and (e) rotating the water supply in case of water scarcity.

5.5. Participatory Monitoring and Evaluation

As the overall transdisciplinary innovation research experience aimed at mutual learning and innovation adaptation to local contexts, it explicitly provided space for individual and group monitoring mechanisms (in the FTI design named ‘the validation loop’). First, the head of the CM team was assigned the responsibility to prepare and share monthly progress reports for the initial six months with Ashirmat and the project. Second, to jointly assess the effects of the programme on WUA performance, the financial and water management records were prepared and analyzed. Third, performance evaluation meetings with farmers and WUA staff and a water user perception survey were carried out in September 2009. The perception survey included questions about the level of awareness about the WUA, its functionaries, functions and perceived performance. Overall, the survey showed a limited awareness of water users about the WUA and its functions. The majority of the respondents were aware of the WUA as an irrigation service provider, but considered other state organizations responsible for the maintenance of irrigation and drainage canals. Most water users believed that the local administration supervised the WUA and helped during times of water scarcity. Based on their experience of attending WUA meetings, the majority believed that the purpose of meetings was to sign contracts for services, to request payments and to share information on WUA plans, but not about involving their voice in the planning and implementation of WUA activities.

Fourth, and focusing on the impact of SMID on the WUA performance, a participatory impact assessment was carried out with four WUA staff, three commercial farmers and three households. First, the participants selected questions for the performance assessment (Table 3).

Table 3. Water user’s assessment of WUA performance (out of potential score of 50).

<table>
<thead>
<tr>
<th>WUA’s performance indicators</th>
<th>2008 (Prior FTI)</th>
<th>2009 (Year1)</th>
<th>2010 (Year2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Timely information on water availability</td>
<td>36</td>
<td>44</td>
<td>49</td>
</tr>
<tr>
<td>2. Reliability of information on water availability</td>
<td>33</td>
<td>42</td>
<td>44</td>
</tr>
<tr>
<td>3. Provision of the amount of water needed</td>
<td>26</td>
<td>34</td>
<td>44</td>
</tr>
<tr>
<td>4. Timely provision of water</td>
<td>32</td>
<td>42</td>
<td>49</td>
</tr>
<tr>
<td>5. Equity in water distribution</td>
<td>35</td>
<td>44</td>
<td>47</td>
</tr>
<tr>
<td>6. Following the mutual agreement with water users</td>
<td>37</td>
<td>39</td>
<td>44</td>
</tr>
<tr>
<td>7. Ability to solve water conflicts</td>
<td>38</td>
<td>42</td>
<td>46</td>
</tr>
<tr>
<td>8. Benefits of attending WUA meetings</td>
<td>43</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>9. Access to equipment for serving water users</td>
<td>28</td>
<td>34</td>
<td>39</td>
</tr>
<tr>
<td>10. Ownership of WUA by water users</td>
<td>41</td>
<td>43</td>
<td>44</td>
</tr>
<tr>
<td>11. Overall performance compared to nearby WUAs</td>
<td>39</td>
<td>42</td>
<td>43</td>
</tr>
<tr>
<td>12. WUA contribution to fulfilling production targets</td>
<td>31</td>
<td>36</td>
<td>40</td>
</tr>
</tbody>
</table>
The responses were anonymously recorded by every participant on the performance scale from 1 to 5, and then written on a board visible to all. The performance assessment ratings (Table 3) indicate that the WUA's performance improved in almost all areas since the start of SMID. The improvements were more pronounced between 2008–2009 and relatively less in 2009–2010. The areas of greatest improvement were service provision, information sharing and respect for agreements by the WUA with water users and their respective contribution to fulfilling cotton production targets.

6. Assessment of Challenges

During its implementation, the outlined transdisciplinary process of innovation development faced several challenges with the most crucial ones related to WUA location, FTI team/group fluctuations and land consolidation. Besides affecting the joint learning process, these challenges contributed to low payments to the WUA.

6.1. Location of WUA

Ashirmat is located at the desert margin in the downstream portion of irrigated lands and its canals are part of a lift irrigation system. Due to its downstream location, water scarcity in Ashirmat was very severe. For instance, during the water scarcity experienced in 2008 Ashirmat received only half of its planned water. As a result, 200 hectares of irrigated land were left fallow. Water abundance also had a reverse effect due to the rise of groundwater and water logging. In 2009, the upstream WUAs spilled their excess water to Ashirmat, which ended up receiving 275% of planned water. Having no place to discharge the excess water, Ashirmat diverted water to small lakes in its area resulting in a groundwater rise that adversely affected crop yields.

6.2. Staff Fluctuation and Conflicts among the Major Players within the WUA

One of the most important challenges faced by the team was the high level of membership replacements. Most of the initial key members left the project during the first year of the FTI process, creating a capacity gap. The number of project staff involved in FTI in 2008 was 10 and reduced to five by the end of 2009 (Hornidge and Ul-Hassan, 2010).

This was further exacerbated by high WUA staff fluctuation. In 2009, following the abnormally water scarce years, the district governor replaced the WUA chairman. Despite the new chairman's experience in agriculture, he was unfamiliar with SMID and the FTI process and instead chose his own strategy in managing Ashirmat. Following this, the leader of the Core Contact and Partnership Group, with a long experience in farm management and intricate knowledge of the social fabric, also left the transdisciplinary team in favour of another job. As a result, the level of enthusiasm and energy among the WUA hydro-technicians significantly declined.

6.3. Land Reconsolidation

In late 2008, the government of Uzbekistan reversed the on-going farm restructuring process, cancelled land leases and reconsolidated farmland (Djanibekov et al., 2010). The total number of cotton and wheat farms in Ashirmat declined from 93 to 21.
The remaining farmers anticipated the possibility of another round of consolidation and thus were unwilling to invest in long-term water-use planning (Hornidge et al., 2011a), including WUA payments. Furthermore, debts of no-longer existing farms had to be re-assigned to the remaining farms that were unwilling to take up these debts. Consequently, in 2009 Ashirmat could recover only a small share of farm debts.

7. Concluding Discussion

The approach to innovation development and adaptation to the local context followed by the transdisciplinary team comprised a gradual move from initial ‘joint experimentation’ to an increased adoption of a ‘laissez-faire’ approach and a respective decrease of the project involvement from being an active co-experimenter and partner in the first half of the process to a back-stopper and external advisor function in the second half. As such, the first half of the process was shaped by several events focusing on building individual and institutional capacities, institutional strengthening and the organization of social mobilization efforts. The second half in comparison was characterized by increased self-governance of the process by WUA staff and water users, including internal developments and conflicts leading to a restructuring of the WUA and its functions, as well as external events which added further challenges to the process.

The challenges encountered during this participatory transdisciplinary process to innovation development and diffusion ranged from administrative challenges, such as staff fluctuation and the relatively short life-span of the process (three years), to challenges caused by specific local developments, namely the process of farmland consolidation and the interest and motivation of local stakeholders and project researchers. Yet, the above illustration also underlines the necessity for transdisciplinary, participatory innovation research for locally embedded innovation research.

In the case of Ashirmat, the SMID activities implemented through the process of joint experimentation initially resulted in an increased awareness of the WUA staff and leadership about core business functions of operation, maintenance, resource mobilization and conflict resolution. The WUA leadership, which at the beginning of the joint experimentation process acted as an institution to serve the governmental objectives, realized during the exposure trips and capacity building workshops that its main task was to effectively manage and distribute water among water users. Yet, while the WUA staff followed the 12-step improvement plan, fee collection remained difficult (Hornidge and Ul-Hassan, 2010). The perception survey conducted in 2009 showed that despite raising awareness among water users, the aspired feeling of ownership and identification of the WUA as an organization by its water users had not been achieved (Hornidge and Ul-Hassan, 2010). Realizing this crucial problem of non-collectable payments for WUA services, the WUA aimed at reducing the O&M costs. The major part of these costs was related to old pumps inherited from Soviet times, the O&M of which the WUA transferred to the WUGs (Abdullaev and Mollinga, 2010). This created sub-WUAs around the pumps with a leading large farm, several smaller farms and many rural households deciding collectively on water scheduling as subject to the distribution plan within their WUA. This implies that the farmers have started to implicitly contribute to the WUA budget by taking over part of its costs. While this transfer of the O&M responsibility seems most effective for
sustaining the quality of O&M and reducing WUA costs, it also contributes further to the low level of ownership of water users in WUA activities and instead strengthens the farmers’ own organization around pump management. While it successively weakens the WUA’s role in local water management further, the outsourcing of O&M costs resulted in formation of very active WUGs, with a high level of interest in managing ‘their’ water and maintaining irrigation infrastructure.

With regard to the innovation process itself, this means that while the gradual move from joint experimentation to laissez-faire meant that local stakeholders locally interpreted and redefined the innovation in ways that the project researchers had not envisioned, it also contributed to local embedding of the innovation, promising sustainability also after the project’s leaving. The intended transition from joint experimentation to laissez-faire nevertheless did not happen as planned, due to changes in the WUA’s internal and external environment. The changes in the internal environment arose from local power dynamics between local administration and the WUA management. The changes in the external environment were related to the reconsolidation of farmland, the years of water scarcity and abundance, and the state production targets on cotton and wheat implicitly weakening the WUA’s only enforcement mechanism: the non-provision of water. The unforeseen events, such as the high degree of staff fluctuation and thus experienced loss of human capacity, knowledge and experience, ongoing land reforms, WUA internal conflicts and water scarcity, contributed to increasing the lack of innovation fit.

Despite these drawbacks, the fostered process of participatory and transdisciplinary innovation research in the context of rural Uzbekistan nevertheless led to a bottom-up reflection on the top-down created WUA as a locally responsible water management institution with little means of actually fulfilling this responsibility. Consequently, the overall task of local water management was divided amongst the main stakeholders, that is, the water users, and merely a smaller but more manageable part was left to the WUA. As such, the externally induced concept of the WUA was in fact localized, meaning adjusted to the local limitations, while at the same time capacities (on the side of the project just as much as on the side of the local stakeholders) were built.

Notes

1 The research was conducted under the ZEF/UNESCO Khorezm project (http://www.khorezm.zef.de).
2 ‘Transdisciplinary’ is defined here as a mutual learning approach between an interdisciplinary group of researchers and local stakeholders, as also discussed by Cristóvão et al. (2009).

References


