

ACTION RESEARCH: AN APPROPRIATE RESEARCH METHODOLOGY TO DEVELOP ON-FARM DRAINAGE SYSTEMS WITH FARMERS WITH REFERENCE TO THE NRAP PROJECT, PAKISTAN

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ABSTRACT

In the period up till 2000 the Netherlands Research Assistance Project (NRAP) ran an Action Research programme to develop a drainage system together with farmers in an area suffering from salinity and waterlogging. Executing parties of NRAP were the International Waterlogging and Salinity Research Institute (IWASRI), Pakistan's main research institute in salinity and waterlogging research, and International Institute for Land Reclamation and Improvement (Alterra-ILRI), based in the The Netherlands. The Action Research was an approach to establish an on-farm collective drainage system together with farmers, while at the same time learning how this is done best. This latter aim is achieved by systematically analysing the actions taken by all involved in the drainage development process. Action Research is unique in the sense that conclusions from the analyses are fed back into, and can lead to changes in, the process. The experiences with Action Research in case of the NRAP project lead to the conclusion that the approach has potential for other irrigation and drainage development projects as well.

Keywords: drainage, participatory, research methodology, action research

1 WHY ACTION RESEARCH WAS NEEDED (INTRODUCTION)

The Netherlands Research Assistance Project (NRAP) was a collaboration between the International Waterlogging and Salinity Research Institute (IWASRI), Pakistan, and the International Institute for Land Reclamation and Improvement (Alterra-ILRI), The Netherlands. The project was funded by the Governments of Pakistan and The Netherlands. NRAP embarked on an Action Research in the period 1995-2000. The aim of the Action Research was to realise a drainage system in a research area (112 ha) and to systematically analyse how this was achieved with maximum participation by the farmers concerned.

To undertake an Action Research was seen as the most appropriate method of working. For decades Pakistan had worked on the development of drainage systems to combat the related problems of waterlogging and salinization. Initially the emphasis had been on the design and construction of drainage systems by the government without much consultation with the farmers, but gradually a shift in focus occurred into the direction of more participatory drainage development. This was visible in a change in policy to involve farmers in drainage design and construction and to delegate management responsibilities to them. The multi-year National Drainage Programme, which was started in 1997, intensified this trend. The NRAP research programmes evolved along the same path (NRAP existed from 1988 till 2000). So it happened that the NRAP project decided to study the mechanisms of working with farmers in the development of drainage. However, examples of farmers actually participating in drainage development did not yet exist. The issue was entirely new to Pakistan at the time. The best way for the research project NRAP to proceed was to self-initiate the implementation of a drainage system, to invite and encourage farmers to participate, and to study the process of participatory drainage development simultaneously.

This method of working – running a process of change and analysing the process at the same time – is known as Action Research (see below for a more comprehensive account on the method). For NRAP to work in this way had several advantages:

as examples on farmers' participation in drainage development did not yet exist, it was practically the only way to quickly improve understanding on the issue, not only research results would be acquired, but also a drainage system would be constructed, the method is not expensive and good value for money

As can be seen, the advantages serve the interests of both the researchers (NRAP) as well as the research objects (the farmers). The latter are provided with a drainage system, which will help them to solve acute problems of waterlogging and salinization. This was important to the researchers as well, as they wanted to do research that would have immediate practical value. Also the donors – Government of Pakistan and Government of The Netherlands – were pleased with the approach. For comparatively little money results in the field were achieved, as well as improved understanding on how to do things. It is for such reasons as these that donor institutions today also increasingly ask for the Action Research approach in their programmes.

2 AGRICULTURAL PRODUCTION, WATERLOGGING AND SALINIZATION: A FEW FACTS

For a better understanding of the background of the Action Research a short introduction to agricultural production and the problems of waterlogging and salinization in Pakistan is in place.

The agricultural sector is one of the main pillars of Pakistan's national economy. In 1992-1993, the sector contributed 24 percent to the Gross Domestic Product, making it the largest contributing sector (Economic Adviser's Wing, 1993). Today, ten years later, this is not much different. (Economic Survey 2002-03). Undoubtedly agriculture will continue to play an important role in the future, as the other sectors - industry and services – show little evidence of growing disproportional. In absolute figures 48.4 percent people are directly employed in agriculture (Economic Survey 2002-03).

Without irrigation agricultural production would not be as important. Great canal systems cover 18 million hectares of Pakistan's part of the Indus Basin. At the same time they are a cause of concern. Seepage of water from canals, watercourses and irrigated fields, in combination with lack of natural and artificial drainage and the semi-arid climate, are at the root of waterlogging and salinity problems that are said to compromise production on roughly one-seventh of all irrigated land (Planning Commission, 1997a/b). Loss of production can range from 25 to 60%; in severe cases there is no production at all (Planning Commission, 1997a).

Installing proper drainage is essential to combat waterlogging and salinization. In the past decades huge investments have been done in drainage development. Lately policies have been formulated that require the farmers who are to benefit from the drainage systems to be more directly involved in the management of the systems.

3 ACTION RESEARCH: WHAT IS IT?

According to the literature, Action Oriented Research, or Action Research, stands for a theoretical and methodological approach to the understanding of social processes. The guiding analytical concepts are the human agency and social actor; notion of multiple realities and arenas of struggle; and the idea of interface, relating discontinuities of interests, negotiation, values, knowledge and power (Long and Long, 1992). Farmer Participatory Research stands for a people centred process of purposeful and creative interplay between communities and outsiders with formal knowledge. It is about empowerment, local knowledge, interface between formal and informal knowledge systems, rural livelihood systems and sustainable land and water resources utilisation (Okali et al, 1994) ^[4].

Action Research in case of NRAP is somewhat different. It did not solely serve the purpose to understand social processes, but also to realise exactly the thing that triggered the Action Research in the first place: a drainage system. This was a well-functioning, tertiary drainage system, installed with the users of the system playing their role in design, construction and management of the system. Keywords like empowerment, arenas of struggle, values, knowledge and power do not describe adequately the Action Research as it took place in the case of NRAP. And for that matter, the Action Research that appears to be asked for today in land and water development projects.

The Action Research as it was undertaken by NRAP has different qualities. Most important is that while the 'process' (of installing drainage) was ongoing it was documented what was exactly happening. In NRAP terminology this is called 'process documentation'. It was the task of a person who was especially appointed for the purpose. This person was also involved in the drainage development itself, but stood as it were at some distance from this when occupied with the process documentation task.

A further characteristic of the Action Research by NRAP is that it was highly flexible. It worked with a set of objectives, a team of professionals, an office and means of transport, a budget and a final date at which the project would have to be completed. The research did not start with a hypothesis, a set of research questions, a detailed research methodology plan, formats to record all kind of data, etc. A detailed action plan was never written, hence, money was not allocated to activities described in detail beforehand. Only a simple list of steps to be taken was produced. This allowed the researchers to take the best decision given the circumstances each time that a decision had to be taken, while at the same time forcing them to think and convene. We will come back to this later.

4 SELECTION OF THE STUDY AREA

To further focus the discussion, we give the objectives that NRAP wanted to realise through the activities in the field:

- to develop and implement a well-functioning on-farm drainage system with full participation of the beneficiary farmers
- to ensure that the beneficiary farmers fully operate and maintain the drainage system upon termination of the action research
- to develop guidelines for the replication of the pilot study at a much wider scale (IWASRI, 1995; IWASRI, 1997).

Fieldwork was started up in an area near Bahawalnagar, Province of Punjab. The study area is one of the most poverty stricken areas in the Punjab, with a high incidence of land degradation caused by waterlogging and salinity. The research area is located at about one day drive from Lahore, near to the Indian border. It concerns an area of 112 ha between two watercourses: watercourse 18 and 20 on Yarwah Distributary. Farmers of three adjacent villages, Rehman Toghera, Nikka Bair and Khawja Buksh Bodla, cultivate land in the area. Ninety-two farmers belong to Rehman Toghera, four to Nikka Bair and three to Khawja Buksh Bodla.

The area was selected out of several because of a number of qualities that improved chances on success:

- the occurrence of severe problems of waterlogging and salinity, which were local problems in the sense that they could be addressed in a geographically restricted area small enough for NRAP to be feasible
- existing possibilities to evacuate excess drainage water from the area (an outfall drain was planned that would make this even better possible)
- availability of irrigation water for land reclamation purposes
- drainage solutions to be manageable by the farmers
- land tenure situation of small landholders without dominating feudal families
- expected co-operation of local community and line agencies

As can be seen the selection criteria were a mix between geo-physical, sociological and cultural qualities.

5 SOCIO-ECONOMIC AND CULTURAL CONDITIONS

In the course of the project NRAP collected socio-economic data, and data on the social fabric and culture of the villages. The aim was to better understand:

- differences in access to land (the most important asset in the villages)
- other sources of income and absolute levels of income, also in comparison to poverty levels
- distribution of power, and social build-up of the villages
- cultural characteristics, in particular the relations between groups and the role and position of men and women

A summary of the main findings is presented here. One conclusion from the socio-economic analyses was that the average farmer owns 12.1 acre of land and only 2.7 acre of this land is situated within the research area. It follows that the activities of the project were of interest to the farmers, but a positive result would increase their income with one-fourth at best. This conclusion may add to other explanations (discussed below) why farmers were not all participating fully in the project.

Landlessness does not seem to occur much in the villages. About half of the population has less than 8 acre. Although exact figures are not available, the project assumed that 12 acre – the average area of land owned by households – would be sufficiently productive to provide the average family with enough income to live from. The conclusion was drawn that generally the households in the area earn enough to contribute with cash to the operation and maintenance costs of the drainage system. Another interesting finding concerned the location of plots affected by waterlogging and salinity and their owner's willingness to contribute to the project. It showed that owners of land suffering more from these problems were actually contributing more. Analyses of this kind helped the researchers to understand farmers' reactions to propositions from the project.

In rural Punjabi society conflicts are endemic and, as a result, co-operation on a long-term basis is rare (Merrey, 1979). The project needed to understand this phenomenon better, as obviously it would have implications for the drainage institutions that were needed to manage the drainage system to be constructed. It drew a diagram depicting existing conflicts between potential beneficiaries of the project. It could be concluded that conflicts existed within villages, rather than between villages, and occurred between as well as within kinship groups. The sociological data also provided insight into the castes and kinship groups that prevail in the villages. Notwithstanding the endemic occurrence of conflicts, examples of villagers from different castes and kinship groups working together on activities of mutual importance also exist. For example, a mosque has been built and villages cooperated in cleaning watercourses.

A further important conclusion was that the village did not have one leader, in the sense that there was not one person who could be trusted to speak in the name of all villagers, or who could instruct villages what to do. The *Numberdar* ^[5] of Rehman Toghera is the only formal leader in this village. Nevertheless, he has hardly succeeded to mobilise the beneficiaries to contribute towards the

drainage system. Initially, this could have been caused by the *Numberdar* doubting himself that the drainage system would really be implemented, as a result of which he did not try very hard. After the installation of the drainage system however, he was very eager to get the system functioning, but still did not really manage to motivate the other beneficiaries to co-operate and contribute. The informal leaders of the different caste and kinship groups have not shown to have much influence over their people when contribution towards drainage is concerned. Also these conclusions were important to the project. They were acknowledged when efforts were made to set up an effective Farmers' Drainage Organisation.

6 HOW IT WAS DONE: THE 'PROCESS'

It was already said that the Action Research by NRAP was characterised by the 'process' on the one hand and 'process documentation' on the other.

With process is meant all actions related to the realisation, with the farmers concerned, of a drainage system in a previously selected area. It includes setting up drainage management institutions. A simple list of the actions taken followed by a short explanation may suffice to provide the reader with insight on how this was done (Table 1).

NRAP started working with a NGO. The idea was that all work with farmers could better be contracted out to an organisation specialised in this type of work, rather than the project doing it itself. After some time the contract with the NGO was terminated. The NGO appeared to operate with an agenda that was not only broader in scope – community development – but that also asked for more time than was available. As alternatives were not available NRAP decided to charge the tasks involved to its own staff, which was trained for the purpose as intensively as possible. In the table, it can be seen that an NRAP Social Organiser was appointed in September 1997. The table further speaks of a FDO; this is the Farmers' Drainage Organisation.

An interesting detail is further that the project organised a number of formal trainings for the farmers of the research area. The training subjects were decided upon with the farmers and concerned many practical issues related to both implementation and management of the drainage system. All trainings took place in the villages. Also important is that the project took special efforts to involve the women from the villages in the project. They were approached by female researchers, as the culture of the villagers does not allow men who are not family to communicate directly with women.

Important to remark is that the sequence of activities and the activities themselves do not deviate essentially from those in other drainage or irrigation projects that work in a similar intensive way with farmers. These approaches are known under the term 'participatory irrigation development' or 'participatory drainage development'. Those involved in those kinds of projects will recognise many if not all of the activities described in the table. Depending on the circumstances, things may be organised just a little bit different or the order in which they occur deviates. In other words, there is nothing special about this side of Action Research.

7 HOW IT WAS DONE: 'PROCESS DOCUMENTATION'

The process was documented at all those moments that activities were being planned or implemented. Thus, it consisted of

- the preparation of minutes of the NRAP Progress Meetings
- the preparation of minutes of other meetings concerning the action research
- monitoring of the contribution (cash, kind, or labour) of individual beneficiary farmers towards the installation and operation and management of the drainage system
- monitoring of the attendance of individual beneficiary farmers in Farmers' Drainage Organisation (FDO) meetings and FDO Executive Body meetings
- monitoring of the participation of individual beneficiary farmers in training sessions
- recording of information and experiences by field staff
- preparation of field reports, and
- preparation of reports on training conducted

Table 1 Actions taken in the course of the development of the Bahalwanager drainage system

Date	Event
June '95	Selection of area with potential sites for implementation of the action research
Dec. '95/Jan. '96	Participatory Rural Appraisal in 6 <i>mozahs</i> in selected area

March '96	Selection of action research area: area between watercourse 17 and 20 on Yarwah Distributary
March '96	First meetings with farmers cultivating land in the research area
1st quarter '96	Establishment of a Community Management Structure
April/May '96	Technical surveys
3rd quarter '96	Redefinition of research area as the area between watercourse 18 and 20 on Yarwah Distributary
October '96	Preparation of preliminary design (surface drainage)
2nd half '96	Exposure visit for farmers to Malik Branch
Dec. '96/Jan. '97	Construction of sump
March '97	Farmers' training on Digging of Open Drains
April '97	Acknowledgement that installation surface drains is not possible and that the system has to be installed by machine
2nd half of '97	Preparation of a new design for the drainage system, with 6 additional laterals
June '97	Termination of the formal partnership between NRAP/IWASRI and the NGO
July '97	Technical training for staff of the NGO and line agencies
3rd quarter '97	Transportation of drainage pipes to the study area and purchase of pump by farmers
September '97	Appointment of NRAP Social Organiser
October '97	Establishment of FDO and FDO Executive Body
October '97	Discussion of draft agreement between project, farmers and the NGO with farmers
March '98	Arrangements made for trenching machine to install the system in the research area
March '98	Exposure visit for farmers to Trail Site 1
April/May '98	Installation of drainage system
June '98	Assessment of farmers' training needs
June '98	Opening of FDO bank account
June '98	Training of Trainers for staff of NRAP/IWASRI, the NGO and line agencies
June '98	Farmers' training on Pump Operation and Maintenance
June/July '98	Project does not allow the pump to be operated as it is of the opinion that the farmers should first fulfil their promises
June-Dec. '98	Implementation of Gender Program
July-Sept. '98	Operation of pump for irrigation purposes by farmers
Aug./Sept. '98	Farmers' training on Project Approach and Government Policy
October '98	Operation of pump for drainage purposes and appointment of pump operator
Oct./Nov. '98	Construction of pump house
Oct./Nov. '98	Farmers' training on Financial Management of the System
November '98	Farmers' training on Functioning of the Drainage System
February '99	Farmers' workshop on Social Organisation
February '99	Farmers' training on Irrigation and Drainage Management
Feb./Mar. '99	Project does not allow the pump to be operated due to non-co-operation from the side of the farmers
April/May '99	Pumping is not required due to a low water table

Yet, process documentation was more than only registering the details of each separate activity. In fact, process documentation by NRAP entailed two far more essential tasks: systematically analysing of what is happening, and ploughing back the conclusions of the analyses into the process. It is in these two ways that Action Research is different from participatory drainage system development.

As was said, the information on the process that was collected in the systematic way described above was analysed by a specially appointed staff member. This person also set up a socio-economic Base Line Survey and at other occasions collected information on different aspects of life in the villages. Thus data was collected on:

- farmers' landholdings, both in total and outside the research area
- the extent of waterlogging and salinity on plots within the research area
- the possibility for each farmer to use drainage effluent for irrigation purposes
- farmers' occupations other than agriculture

- conflicts between farmers
- leadership among farmers, and
- farmers' attitude of dependence

These data served not only to make more rational choices about the direction that NRAP should take (see above). The data also helped in demystifying ideas why farmers sometimes did not respond to challenges or to beneficial propositions by the project. To give an example, based on the data collected it could be established that the farmers who were most interested in cooperation and most willing to actively participate were those with large holdings and with land that would benefit most from the drainage system constructed by the project. The project had always been worried about the low number of farmers who participated and who were willing to contribute with cash, other inputs, or their labour. Farmers' landholding, the extent of waterlogging and salinity on their plots, and the possibility to use drainage effluent for irrigation were put forward as reasons to explain the response of the farmers. The in-depth researches that were organised helped to create clarity on this matter.

The conclusions of the analyses of the process itself and of the data collected were brought in the meetings that regularly took place. They became part of the data sets that the NRAP project staff used to decide on further steps. And not even NRAP staff only. The conclusions were also shared with the farmers of the research area.

To sum it all up, process documentation consisted of the following four elements:

- systematically recording what was actually happening
- setting up supportive research into socio-economic, social and cultural conditions in the field
- analysing the findings of these two previous steps
- feeding the conclusions of these analyses back into the process

In the NRAP experience these four elements are at the core of the Action Research approach.

8 CONDITIONS FOR SUCCESS

At a number of occasions NRAP staff had to make conscious decisions in order to secure the success of the Action Research. These will be explained below, albeit in more general terms.

The success of Action Research depends to a large degree on the understanding of the method by all involved. This is true for the farmers, but also for the staff of the project. If not, the success of the Action Research itself is at stake. For example, if project staff starts to question the conclusions from process documentation and are reluctant to integrate them into decision-making, the very reason to do Action Research is compromised.

Special care must be taken to direct the communication with the farmers. Preferably this is done by, or on the advice of, experts with training in rural sociology and with an intimate knowledge of social relations in the villages concerned. Keywords in communications with the farmers are 'consistency' and 'transparency'. Consistency is necessary in order to avoid confusion among farmers and to avoid that earlier decisions are being questioned again or can be re-negotiated. NRAP also learned that it is essential that all project staff speak the same language that the same messages are passed to the farmers. If this is not the case three problems arise: i) farmers will be confused, ii) the negotiation position of the project vis-à-vis the farmers will be weakened, and iii) tensions may arise among the project staff. Transparency increases the possibility that farmers and all project staff know, or are in the position to acquire information, about what is actually going on and decided in the project. These are all common sense management techniques. The point is that they apply to working with farmers as well, and more importantly, that special actions must be taken to realise them.

Also farmers need to understand how Action Research works. At the very least Action Research requires continuous communication and co-ordination between farmers as the clients and the researchers and project as the suppliers of a service. If the question is asked whether the client or the supplier determines the dimensions of the service that is rendered, the answer is that it must be the client. This implies that many of the major decisions are to be taken by the farmers.

By definition Action Research is a flexible way of working. Directions of the project can change because of new facts or conditions. This disadvantage of flexibility is that it creates uncertainty. For example, initially a surface drainage was envisaged. Later a sub-surface drainage system appeared to be the only technical possibility. This was not understood by the NGO and as a result created confusion. All partners participating in an Action Research have to understand that this is all in the nature of the approach, and in fact special efforts have to be made to make them accept this.

A serious problem that NRAP experienced, which is not unique to the NRAP research area, is that the farmers are not one group. As we have seen above, farmers in the project area belong to different fractions and castes. They are not joined in a type of organisation or institution that binds them. To further complicate matters there appeared not to be one or a group of leaders who had sufficient authority to make farmers cooperate. To set up Farmers' Drainage Organisations under these conditions is difficult, as the NRAP researchers experienced. NRAP began to have the Farmers' Drainage Organisations formally registered. This meant that the authority that was lacking in the village was sought for at other levels. NRAP came to this solution after having analysed the situation in the field. This serves to explain that in-depth studies are important in projects of this kind and indeed are a condition to success.

The attentive reader will have noted in Table 1 that the farmers did not always act as NRAP expected. Sometimes the farmers did not do what they had promised to do at an earlier occasion. In the table it says that the 'project does not allow the pump to be operated as it is of the opinion that the farmers should first fulfil their promises', and later 'project does not allow the pump to be operated due to non-co-operation from the side of the farmers'. In both cases the argument was about the money and other contributions that the farmers were expected to rise in order to operate the pump and pay for the operator. Apparently this way of dealing with farmers worked, because later the farmers did arrange for the inputs for the pump to be available. Such tensions did exist in the project. They must be seen as part of the process, and not as proof of strained relations, because that certainly was not the case.

9 ACTION RESEARCH: AN APPROPRIATE TOOL (CONCLUSIONS)

The Action Research approach certainly proved its worth in the case of the NRAP project. The farmers received the drainage system which they themselves helped to develop. In the process they learned to understand the technical qualities of the system, which is essential for proper operation and maintenance, and organised their forces to run the system. An evaluation carried out in 2002 by the Government of Pakistan and The Netherlands established that yields in the project area had increased as a result of improved drainage. The project, thus IWASRI and ILRI, collected valuable information and experience on how to develop on-farm drainage systems with the active participation of farmers. Much of this information was disseminated during national workshops organised by NRAP. And the governments of Pakistan and The Netherlands gained insight in how to set up participatory drainage development projects.

Action Research essentially consisted of two parallel activities: the development of the drainage system together with farmers, which is called the 'process', and the systematic collection and analysing of data on how this is done, called 'process documentation'. The 'process' is much similar to other participatory irrigation and drainage development activities. 'Process documentation' is more unique. In NRAP it consisted of:

- systematically recording what was actually happening
- setting up supportive research into socio-economic, social and cultural conditions in the field
- analysing the findings of these two previous steps
- feeding the conclusions of these analyses back into the process

Action research is an approach that needs to be carefully managed. Its success depends among others of the understanding of the approach by all parties involved (senior and junior project staff, farmers, government agencies, and other partners, like NGO's). This includes accepting that sometimes fundamental changes of previously agreed lines of action are possible. Such changes are of course taken together. Good communication is essential to keep everyone on board. This requires transparency and consistency of speech towards farmers.

Sometimes reality forces one to accept less than optimal results. The NRAP project faced the problems that the Farmers' Drainage Organisations appeared not to be functioning as successful as expected, and not all farmers appeared to participate in the process. The Action Research approach contains the element to study the reasons of such unexpected developments and to feed back the conclusions of these studies into the process.

Undoubtedly Action Research is an appropriate approach to use in irrigation and drainage development projects. It is especially useful in all those situations that the active participation of farmers is required and the ways in which this is best achieved are not yet fully understood. Many will agree that this is still the case in the majority of the participatory irrigation and drainage development situations.

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[1] Paper No 090. Presented at the 9th International Drainage Workshop, September 10 – 13, 2003, Utrecht, The Netherlands.

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[4] This paragraph is copied from an unpublished NRAP report: Ruiter (2001). The present paper draws on much of the material written in this report.

[5] The *Numberdar* collects the land revenue and irrigation fees for the government and acts as the intermediary between villagers and the government officials.