

Rudh Kohi system in Pakistan – Achievements, Prospects and Issues: Sharing DI Khan Experience

Workshop background note: 23rd – 24th April 2013 – DI Khan



Water for Livelihoods in Collaboration with:
The Livelihoods Programme (LP, Intercooperation)
Pakistan Agriculture Research Council, DI Khan
Spate Irrigation Network, Pakistan
Veer Development Organization (VDO)
Strengthening Participatory Organizations (SPO)

Khyber Pakhtunkhwa has 15% of the total land area under agriculture, of which only 23% is irrigated and the rest is rainfed or under some sort of spate irrigation system. Lack of access to sufficient water for drinking and irrigation is a key driver of poverty in water scarce areas such as DI Khan. Most of the people live in a state of uncertainty with regard to water. People's vulnerability is attached with either too much water that they cannot manage or when water does not come at all and nothing can grow. These people face risks everyday and are always in search of coping strategies to face these risks. In the absence of reliable drinking water supply, the ordeal of women and children even increases. Droughts are common in spate areas. Such events can cause hardship and even the temporary migration.

DI Khan is the southern-most district of KP with the Suleiman Mountains in the west. There are three major Zams¹ in DI Khan namely Draban, Chowdhan, Shaikh Haider and two Major Zams in district Tank namely Tank Zam & Gomal Zam. Total land in three Zams in DI Khan is 136,547 Hectares. Of this 81,521 Hectares is Rudh Kohi, 40241 Hectares is uncultivable and rainfed area includes 14,785 Hectares. Life of 14,827 households and over 134,755 people depends on this resource. There has been an acute shortage of freshwater for both domestic and livestock use. Farmers build earthen reservoirs which were filled by either rain or runoff water for drinking from spate. Often the humans and animals share drinking water from the same ponds leading to health hazards. The ponds dry up during scorching summer due to high temperatures. People have to travel long distances fetching water for daily needs and only migrate when the last drop of water evaporates. Major source of water for irrigation in the foothills comes from the Rudhs or hill torrents. There are 30 Rudhs in DI Khan and Tank that carry both perennial flows and flood water in five main Zams called Gomal, Tank, Sheikh Haider, Daraban and Chaudhwan. The Chashma Barrage is constructed on the River Indus and canal irrigated areas have been developed on the banks of the river. Chashma Right Bank Canal irrigates 260,000 acres of land in DI Khan, however, Spate irrigation continues to be important in DI Khan for the remaining above-canal areas.

Rudh Kohi is not just specific to DI Khan but it prevails in several others parts of the country. It is termed differently in different areas (Rudh Kohi in KP and Punjab, sailaba in Balochistan and nai in Sindh). This workshop aims to bring together the major stakeholders from Rudh Kohi development in DI Khan. A few experts from other regions have also been invited to share their experiences and participate in the mutually beneficial discussion.

Workshop Objectives, Methodology, Expected outcomes and Documentation

The workshop is to explore the potential for up-scaling successful practices by various development actors in DI Khan in a manner that these actors can find common grounds with what is essential for Rudh Kohi development. In this context, we aim at the following in the workshop:

- Identifying existing good local practices in DI Khan and other Rudh Kohi areas in Pakistan and exchange
- Identify common grounds on issues pertaining to Rudh Kohi development in DI Khan (and elsewhere in the country).

We will use several methods during the workshop: Presentations of various examples, group exercises on key questions and information market. Selected community representatives will be present in the workshop and share their practical experience. The workshop is expected to achieve the following:

- Knowledge sharing on Rudh Kohi from DI Khan – and other Rudh Kohi areas.
- A common understanding on key issues faced in Rudh Kohi areas.
- Deliberation on dimensions of issues, explore related actors, possible solutions/options and means/synergies
- Identify strategic elements for future planning and material for discussion at second workshop on capitalization of experiences W4L.

A complete documentation will be distributed among the participants and will be available with Intercooperation and Meta Meta Spate Irrigation Network for future reference.

A brief introduction to the Rudh Kohi system

Rudh is a hill torrent emerging from uphill (Kohi) and therefore the system is called Rudh Kohi in DI Khan. These hill torrents emerge after rainfall in the hills and the farmers do their best to intercept these torrents to their field and irrigation. Farmers build an earthen bund to divert water to irrigate their fields and breach the bund after the irrigation is over so that downstream farmers can irrigate their fields. The farmers construct gandies² in the main rudh to divert flood water for irrigation through Kas³. Farmers construct wakrha⁴ in Kas to divert water in to the specific field through field inlet. These fields are walled all around with earth. After irrigating the field, the farmer closes the inlet, breach the wakrha and allow water to the next field. In some cases the level of the field is above the Kas. At times water flows in one direction and

¹Source of water; watershed of a hill torrent

²Gandies are earthen bands raised to divert water from the main Rudh

³Kas is the secondary channel artificially created due to Gandies. Gated structures have been introduced to regular water in the Kas

⁴Wakrha is the obstruction in Kas to regulate flow of water into the field.

Water for Livelihoods Project

(Collaboration: The Livelihoods Programme (LP), PARC, relevant District departments, Veer Development Organization Strengthening Participatory Organizations)

Rudh Kohi development initiatives include two levels of initiatives:

- Within a specific village addressing problems faced by the villagers / farmers regarding water: Construction of protection wall / bund around villages, filed inlet/ outlet, drinking water pond etc. Our programme has touched 61 villages (53%) in three Zams.
- At the level of rudh kohi water management system: Construction of gated diversion structures to improve conveyance, rehabilitation of the earthen bunds and strengthening of the permanent critical points at different locations of the Rudhs. Such initiatives benefit almost all the villages in three Zams directly or indirectly. However there is a large scope of up-scaling.

does not irrigate the opposite side. Sometimes the farmers cannot repair the field embankments and at times the water reaches before 'the farmers' preparation. All these issues are faced by the farmers in his struggle to ensure a successful interception to floods. Usually the farmers repair the field embankment through tractors now-a-days, which is expensive. It is full of risk since it is not certain that the farmers will get the water. Manually the field embankments are raised using bullocks, which is heavily labour intensive putting a lot of pressure on family labour (men and women).

PARC introduced a number of techniques that helped better management of water in Rudh Kohi irrigation system both at rudh level and field level in the areas, e.g. steel gated structures to reduce the drudgery and unreliability associated with the construction of these earthen bunds, field inlet/ outlet to manage water in the field. Development projects have replicated these methods in the field at a larger scale. Each zam has perennial water flow from springs but the quantity varies. The quantity is measured in connection with land holding in local units in each Zam e.g. in Draban Zam, Nullahs, Anaas and pai. 1 nullah is equal to 16 Anaas, 1 Anaa is equal to 4 paisa and 1 paisa is equal to 3 pai. In Chodwan Zam local unit e.g. Boli and vel are used, 1 boli is equal to 30 vels. For management of perennial streams at zams, well established water rights and distribution system exist for distribution of water; however, yield of major crops in the area is less than their potential yield.

Poverty

It is a typical quasi-feudal and patriarchal society. Peasant families make up the bulk of what is known as the 'rural poor' in the three Zams. Poverty is directly linked with the availability of water in Rudh Kohi area. Natural causes of poverty include low and erratic rainfall, poor soil quality, erosion and flash floods which take away the limited assets of already poor communities. The mechanism of production and reproduction of poverty includes tenure arrangement of share cropping, the access to markets, or loans needed for production. Labour migration, often strong and sturdy men in a household, is seasonal and triggered by non-availability of water for irrigation purposes. Major cause of the disputes in the Rudh Kohi area is water rights. Legal provisions are often limited and the main mediation services are extended by the Extra Assistant Commissioner (EAC) Rudh Kohi based in Revenue Department. Tenants also take their water issues for resolution to social institutions such as Hujra, Chownk and Salis. Since Rudh Kohi system of irrigation is labour-intensive, exchange marriages take place within the biradary (kinship) at rather early ages. Women are expected to produce many children during their child bearing ages, putting a lot of burden on health of women and children but also on the well-being of the entire family trapped in poverty.

Water rights in Rudh Kohi

Water rights in larger systems in Suleiman Range in Pakistan (DI Khan and D.G. Khan) have been documented by the British Revenue administration in registers called the Kulyat Rodwar. These registers are still consulted and contain the lists of all the villages responsible for the labour on each bund. A special functionary was responsible for the enforcement of these rules, exhorting farmers to plug gullies and rebuild their bunds in that era. The Riwayat and Kulyat are followed (locally called Saroba Piana, upstream-downstream water shares) in the streams and in the command areas. One cannot claim that all the farmers are following water rights. Most often downstream farmers are relatively less satisfied and consider themselves on a losing end. Kulyat & Riwayat e Abpashi are documented in the era when there was no or less technology available for the construction of Gandies (earthen bunds) and field embankment. With the introduction of dozers and tractors for earthen work farmers can construct stronger Gandies. The role of traditional Pathi Dari system / Water User Association is to supervise / monitor the water distribution effectively. Their role should be proactive to devise a plan before the flood season rather to act on the basis of the event.



Land/crop tenure

After two land reforms (1962, 1973), almost all the farmers have land holding (minimum 12 acre). The tenancy is Qabza tenancy (by occupancy) while some land owners give their tenancy on specific time renewal basis. In tenancy, 3 shares go to the tenant and 2 to the owner. The tenant gets a larger share because he is responsible for the field management like repair, seed, etc. In case of trees the tenants have no share. In Kharif crop, the grain share remains the same while in straw/fodder 7 shares goes to tenant and 1 share goes to owner. In case of perennial water, 1 share goes to the tenant and 3 to the owner. Owners provide for all the expenses. The tenant is not responsible for harvesting.

Disaster risks and climate change

DI Khan is highly prone to disasters such as droughts and flash floods. During 2010 floods, DI Khan was the second most severely hit district of KP after Swat. Apart from this, there are debates about gradual climatic changes building the case for a long term and suitable adaptation strategy in agriculture. A study was conducted by Intercooperation and Pakistan Meteorological Department gathers that rainfalls in the upstream as well as within the catchment will have an erratic pattern directly influencing hydro-meteorological balance of the Rudh Kohi area and causing stress for the farmers. Farmers' perception also confirms that rainfall has gradually decreased over the last 30-40 years and the floods have become less regular and more unpredictable. The villagers' knowledge of early signs of opportunities and disasters has also been documented in DI Khan. This knowledge is precious and when combined with scientific knowledge, it may become easier to predict risks and opportunities and plan accordingly.

What are the key issues for the future course?

Based on our experiences, a holistic approach is required to develop these spate irrigation areas. There is considerable scope to improve people's livelihoods on many fronts such as: improved water management and diversified crop production, improved access to drinking water, improved livestock production and quality (rather than quantity) and forest cover for sustainable supply of fuel. There is a large scope for improved service delivery in many areas such as agriculture extension for farmers (both men and women), input supply, education and health.

<p>Water management strategy & techniques Rudh Kohi area has a special feature due to the soil structure and nature of floods. Therefore a simple application of engineering practices may not bring success to the investment. It is not about the money, it is about the right technique in the right place to secure investment from failure. We need to agree on a menu of major activities, broadly understand their relevance and effectiveness, and clearly bring out what did not work in the field so that we can avoid such mistakes. A few best practices, case studies and failures on ground will help understand these questions.</p>	<p>Water user associations Water management in Rudh Kohi area demands intensive involvement of farmers since they are knowledgeable, and they are the ones who will sustain the system. Farmers collect and manage funds for earth moving to rehabilitate and maintain the earthen bunds. They also take their problems and feuds to the Rudh Kohi department for ensuring upstream-downstream benefit sharing and equity in water distribution. How to strengthen WUAs and make sure that these are recognized by major actors in the area and are capable of governing just water flows and resolve conflicts. How WUAs are made to function more effectively. Are water rights adequate or need</p>	<p>Hazards Risks and climate scenario Flash floods originating from Koh-i-Suleman are regular phenomena and the farmers turn these floods into opportunity under the traditional Rudh Kohi system. There are however no reliable hydrological data that can help assessing the quantum of water received in the catchment. The extreme variability in any year however cannot be managed by traditional irrigation system and needs greater measures for preparing the area against risks. Unprecedented and erratic rainfalls pose a risk to local livelihoods. In DI Khan, a most common method to protect villages from flood is to establish protection spurs (bund, shehr panah) to divert water from the villages.</p>
<p>Water or safe drinking water? Historically, people excavate shallow and largely spread ponds in certain locations where rain water is collected. This water is used by humans as well as animals for drinking and other purposes. These ponds dry up in summer when heat increases. These ponds have become better with plastic lining in the bottom, a few are deeper and even lined. Sand filters have also been introduced but they are short-lived and do not assure complete safety which enhances quality but not safety. How to improve quality and safety of drinking water for humans when there are not many options?</p>	<p>The water use efficiency One can use water use efficiency as a criterion for selection of crops. Now a days it is replaced with water productivity and that has same unit e.g. kg/m³ of water. Normally the farming system in DI Khan consists of wheat and gram while sorghum, millet, melon and mustard are also common in the farming system. Other minor crops such a guar, medicinal plants, mushrooms, sesame, forest trees and local vegetables can also be supported, yet there is a little knowledge on this.</p>	<p>Preparing future champions Incorporate spate irrigation in the relevant college and university curricula to broaden the limited pool of experts. In case of DI Khan, there is an opportunity in the face of Gomal University where students can be practically oriented to the unique Rudh Kohi system in the district.</p>
<p>Better networking We as development agencies working in Rudh Kohi areas have to speak the same language and follow complimentary approaches for ensuring better impact. This can be done through partnerships and better networking of all those that work in spate irrigation in Pakistan.</p>		

Participants

The participants include the following:

- Project staff and partners including government line agencies from DI Khan
- Selected experts on Rudh Kohi subject from other parts of Pakistan
- Academia: Selected seniors from Gomal University and Agricultural University Peshawar, Barani University Rawalpindi
- Representative of knowledge networks and other projects working in Rudh Kohi area in DI Khan
- Representatives of SDC and Intercooperation

Collaboration for this workshop

This workshop will be hosted by Water for Livelihoods Project (W4L) in collaboration with the Livelihoods Programme (LP) and other partners. The Organizers have ensured pre-workshop consultation with the following stakeholders:

1. Planning and Development Department, KP where the W4L and LP are institutionally anchored
2. Highest representatives of district administration
3. Pakistan Agriculture Research Council (PARC)
4. Partner NGOs (Veer and SPO)
5. Spate Irrigation Network Pakistan
6. Sustainable Land Management Project (SLMP) UNDP GEF
7. International Centre for Integrated Mountain Development (ICIMOD)
8. Notable members of community in DI Khan.

Examples of development initiatives

Swiss Agency for Development and Cooperation (SDC) and Intercooperation (IC)

1. SDC launched its first project in the south called Project for Horticulture Promotion (PHP) in 2000 which focused on improving crops and vegetables in DI Khan.
2. Project for Livelihoods Improvement (PLI: 2003-2007) focused on Rudh Kohi area (Draban and Chowdwan Zams) in improving water conveyance and management for enhancing people's livelihoods. PLI worked for equitable access to water (drinking and irrigation) through initiation of a multi-stakeholder dialogue, strengthening of water users associations, demonstrating judicious water use practices in the upstream and revive a just system of historical Rudh Kohi management. PLI also worked on promoting successful varieties of crops, certified seed production and of grain storage. Men and women improved livestock management through Farmer Field Schools. An effort was also made to establish a cadre of local facilitators and service providers in agriculture/livestock. This project was implemented together with two highly competent local partners: Veer Development Organization (VDO) and Strengthening Participatory Organizations (SPO).
3. PLI was taken over by SDC funded Livelihoods Programme. LP (2008 ongoing) upheld PLI's focus on equitable access to irrigation water and expanded its focus on disaster risk reduction. Gated structures, protection bunds and technical assistance in spate agriculture / livestock management have been the main focus of the project.
4. Water for Livelihoods project up-scaled Rudh Kohi development in formal collaboration with Pakistan Agriculture Research Council. This project is also working on development of water resources in Karak district in KP, where mini dams and other water storage techniques are being applied, apart from supporting communities in converting flood water into irrigation facilities (instead of mini disasters).

UNDP GEF –GoP: Sustainable Land Management Project (SLMP)

1. SLMP initiated pilot scale activities in 2009 in the Sheikh Haider Zam, DI Khan under a title "conservation of soil and water in the Rudh Kohi area with the involvement of local communities". The project outcomes included enabling grassroots community institutions, revival/strengthening of Rudh Kohi system, rehabilitation of degraded rangelands, establishment of farmer plant nurseries, rainwater harvesting, promotion of dryland afforestation and introduction of alternate livelihoods (fruit orchards). Some of the activities aiming at strengthening of Rudh Kohi system were earthen and cemented structures for improved conveyance and control of flood water, control of en-route, and on/off-farm soil erosion and water diversion bunds and dykes.
2. The project has introduced village based participatory land use plans and Rudh Kohi Management Fund (RKMF) at zam level which are two unique aspects of the project. The village land use plans provide a platform for interplay between farmers, government institutions and CSOs to evolve comprehensive solutions to land based problems. The idea of establishment of fund is rather new, however it enhances perspectives of greater community involvement and empowerment on water management issues at zam level. The fund is established with matching grants from project, and managed by a capacitated Fund Management Committee represented by village committees and the SLMP implementing partners. The project is currently working with the provincial government and research institutions to identify the Rudh Kohi problems and solutions and devise a comprehensive strategy for development of the system.

Other initiatives in the offing

Apart from small and large scale initiatives taken by several humanitarian organizations after floods of 2010, there are a few development initiatives in the pipeline. One of those is the PPAF's Livelihood support and promotion of small Community Infrastructure Project (LACIP) with the co-financing from German Development Bank (KfW) and technical support from Intercooperation. LACIP aims to reduce the poverty levels by increasing economic opportunities in the Project region. DI Khan is one of its districts where support in small infrastructure and livelihoods will be extended through local NGO partners of PPAF. Disaster Preparedness and Mitigation will be a major focus of the Project

What is available at hand?

1. The villagers' knowledge of early signs of opportunities and disasters documented in DI Khan (Intercooperation).
2. A study of temperature and rainfall projection for the future (Pakistan Meteorology department and Intercooperation)
3. Calendar of farmers' activities in Rudh Kohi areas (Veer Development Organization, Strengthening Participatory Organizations)
4. Assessment of water availability and evaluation of traditional Rudh Kohi irrigation system in DI Khan. (Intercooperation)
5. Effect of different water depth application on the yield of wheat in Rudh Kohi area of DI Khan. Thesis Agricultural University Peshawar
6. Development and testing of low cost sand filter for purification of pond water at household level. Thesis Agricultural University Peshawar
7. Directory of terms in Rudh Kohi (Intercooperation, Veer Development Organization, Strengthening Participatory Organizations)
8. Case studies on specific examples (Intercooperation, SLMP)
9. A detailed map indicating high risk locations in terms of Rudh Kohi floods (Intercooperation, GIS lab Forest Department)
10. Institutional mapping – who is involved in Rudh Kohi DI Khan and with what roles?
11. Village land use planning (SLMP) Sheikh Haider Zam
12. Livelihood assessment and household typology (Intercooperation)
13. Economics of Rudh Kohi – examples (Intercooperation)
14. Several briefing notes, review papers (Spate Irrigation Networks)
15. Ample background material / literature at <http://www.spate-irrigation.org/resource-documents>
16. An introduction to village based Rudh Kohi Management Funds – SLMP
17. Study on "Action Research on rainfed agriculture in Rudh Kohi, DI Khan" (Intercooperation)
18. Study on "Review of the existing policy and operational framework of Rudh Kohi Irrigation system in DI Khan and scope for its strengthening" (SLMP)



Note by:

Dr. Arjumand Nizami

Munawar Khan Khattak

with inputs from:

Dr. Shahid Ahmad, Muhammad Usman Qazi, Allah Bakhsh, Sardar Noman Latif, Sahibzada Irfanullah Marwat,
Dr. Frank van Steenberg, Maj. Retd. Aminullah Khan Gandapur, Herman Mulder, Syed Nadeem Hussain Bukhari, Dr. Asghar Ali

and Faheem Iqbal

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