

On the way towards water stewardship – experience from Pakistan

Water Stewardship means that all water users within a catchment context work collaboratively for sustainable water management. The Water and Productivity Project (WAPRO) has been bringing together stakeholders from various countries for this purpose since 2015. Their engagement and motivation is crucial to the success of these projects, as our example from Pakistan demonstrates.

By Jawad Ali and Arjumand Nizami

For an agrarian country like Pakistan, water is a lifeline of the economy. Pakistan produces a variety of crops including cotton and rice, both with a high water demand. Rice, which is an important staple and revenue generation crop, places Pakistan among the top-ten rice exporting countries in the world. It is the third largest crop in terms of area sown and the second most important economic crop after cotton. All in all, 80 per cent of the country's exports depend on water. But with a growing population and increasing water shortage, competition for this resource among users and uses has increased over time.

Glaciers and snow, monsoon rains and groundwater are the main sources of water in Pakistan. Groundwater meets more than 40 per cent of irrigation water requirements. About 1.2 million tube wells are extracting groundwater. However, this is done without any scientific planning, keeping this natural resource under severe stress. At the same time, the government manages a huge

irrigation system stretching to 1.6 million kilometres irrigating about 14.2 million acres. But despite significant investment in irrigation and agriculture sectors, water productivity – the amount of food produced in comparison to the water consumed – is still reported to be very low (see Table). In addition to poor agronomic practices, this is above all because of insufficient irrigation practice: an outdated and deteriorated irrigation infrastructure, a centuries-old supply-driven irrigation water distribution system (*warabandi* in Urdu: turn system in English) which is based on allocation to land size and not on the type of crop being cultivated, elite capture depriving poor users especially at the tail of channels, lack of user participation, including the private sector, in decision-making related to water governance, and lack of awareness on how much irrigation the crops actually need.

The irrigation revenue system is also fee-based, charged on land size and not on the type of crop being cultivated. Irrigation water

is provided on highly subsidised rates. Even these fees are not systematically collected leaving room for irregularities and corruption. The water management and governance systems are highly centralised. Irrigation water is distributed to four provinces by the Indus River System Authority (IRSA). The Irrigation department is responsible for managing irrigation water and related infrastructure, whereas the On-farm Water Management department under the Agriculture Ministry observes improved irrigation at the farm level. Another actor is the Revenue department, dealing with irrigation theft cases and irregularities. The rest of the three departments have no role in mediating disputes and addressing theft at this level. Coordination among these actors is lacking. Climate change further complicates water availability for Pakistan's agriculture. According to Germanwatch ranking in 2019, Pakistan is the fifth most vulnerable country to climate change in the world.



Women transplanting rice in Sheikhpura, Punjab.

Photo: Tahir Salim

AGRICULTURE AND WATER AVAILABILITY IN PAKISTAN

- Pakistan's geographical area is 97.3 million hectares. Its irrigated and rainfed areas constitute 22.1 million hectares.
- Pakistan is one of the world's most water-stressed countries. In the last 70 years, per capita water availability has dropped from 5,260 cubic metres to 935 cubic metres. However, in comparison to many other countries in the world with far better economies, it is in a much better position (e.g. Netherlands: 642 m³ water/capita; Israel: 282 m³). So it is not physical water scarcity that Pakistan is predominantly suffering from but low water productivity.

- The water available at the farm gate for the farmers is about 144 billion cubic metres (BCM). The water that feeds into the canal system is about 125 BCM, whereas 5 BCM goes to urban and industry use. Nearly 31 BCM of water is reportedly lost during conveyance due to seepage and evaporation, and 49 BCM goes into the sea, whereas the losses from the rivers are 14 BCM. To augment surface water, Pakistan heavily relies on abstraction of groundwater for drinking and irrigation. This adds to another 59 BCM.
- Pakistan is the fourth largest user of groundwater after India, United States and China.

A multi-stakeholder approach for more water efficiency

With support from the Global Programme for Food Security of the Swiss Agency for Development and Cooperation (SDC), a multi-sectoral group of actors led by Helvetas Swiss Intercooperation is currently implementing a project to address inefficient irrigation practices in smallholder farming of cotton and rice in a number of countries, including Pakistan. The Water and Productivity Project (WAPRO) is based on a push, pull & policy approach. The push component refers to technological support for farmers to save water, and the pull component pertains to better conditions for marketing of high standard rice produced with water efficiency, while policy is about efforts to ensure up-scaling and sustainability of good practices. A crucial ingredient of good water governance is awareness of stakeholders on rights and obligations. The policy component contributes to this end through facilitating discussions among multi-stakeholders (push and pull actors as well as up-takers) in workshops and meetings and documenting success stories.

Punjab is the largest rice-producing province in the country. Here, more than 1.2 million farmers cultivate rice on over 1.76 million hectares. Out of the 23 rice districts in Punjab, nine top rice districts were chosen to participate in the project, which is being implemented by a multi-sectoral group of actors from the private sector, civil society and standard bodies (see Box on page 30). The project aligns with the water stewardship approach, which aims to bring water users and managers together to agree on negotiated and joint action and a water use plan. For this purpose, it uses the International Water Stewardship Standard of the Alliance for Water Stewardship (AWS), the goals of which contain good water governance and a sustainable water balance. The aims of water stewardship practices include advancing gender mainstreaming by encouraging assessment of the implication for women and men of any planned action in all areas and at all levels. For example, the project has conducted a study on

Comparison of water productivity in Pakistan with other countries

Country	Productivity (kg/m ³)	Efficiency
Cereal commodities average		
EU	1.59	If EU=100
USA	1.26	79.2 %
China	0.78	49.1 %
India	0.39	24.5 %
Pakistan	0.13	8.2 %
World average	0.60	37.7 %

the impact of alternative technology to replace manual transplanting, which is mainly done by women. The results of the study could be used to develop proposals to support the transplanters in acquiring new skills that could help them in finding alternative on- and off-farm jobs.

Achieving water security requires adopting inclusive and participatory approaches and a high degree of collaboration among all stakeholders. In the case of WAPRO, key private sector partners of the project are the Pakistani companies Rice Partners Limited (RPL) as well as Galaxy Rice Mills and national supply partners of food manufacturers Mars Food and Westmill (respectively). In addition to the rice farmers, other stakeholders include public sector departments (Agriculture and Irrigation), several companies engaged in rice milling and sourcing, service providers in rice sectors (including machinery providers, technology vendors) and researchers. The Sustainable Rice Platform (SRP) and the Alliance for Water Stewardship provide guidance to farmers and companies on sustainable production and water stewardship.

Rice Partners Limited and Galaxy Rice Mill procure their rice from two types of farmers: contract farmers who sign an agreement with the company to comply with the SRP Standard and source rice to the companies after due diligence, and farmers who are not contracted by the companies but participate in training programmes regardless of where they

sell their rice. Together with the rice farmers in their area of operation the two companies have prepared Water Stewardship Plans to improve water productivity.

So far, 1,150 master trainers and 4,140 farmers in 50 villages have been trained to promote water productivity in line with the principle set by SRP, and 175 demonstration plots of 250 acres were established to demonstrate technologies with which water efficiency can be improved: laser land levelling, alternate wetting and drying und direct seeding of rice. Furthermore, the farmers were trained in using reduced amounts of agro-chemicals. Land levelling of 9,000 acres was completed with the farmers and the rice millers each sharing 50 per cent of the cost. 9,000 alternate wetting and drying (AWD) tubes were distributed among 861 famers for the area of 11,450 acres. Farmers used these tubes to determine if the crop needed irrigation so that over-irrigation could be avoided. Training is organised by the rice miller under the WAPRO project. It is provided by experts working with the millers and the public extension departments. There is no special focus on women since male representatives of the farming families represent their family in public and most of the farming work is also performed by male family members.

Overall, 20,000 famers were approached through different trainings, seminars, field days and IT-based awareness campaigns. A total of 1,650 contracts have been signed with farmers. Over 35,000 tons of paddy produced in 2019 following SRP principles was procured from contract farmers. The good news is that more millers are willing to participate in this endeavour. Five new millers have applied for the registration of SRP.

Promising results at all levels

Compared to conventional rice growing methods, the technologies employed, when combined with better agronomic practices, resulted in saving 30 per cent of irrigation wa-

ter. A study conducted by Helvetas in 2019 based on a comparative cost-return analysis with 21 sampled farmers to compare the impact of change of practices showed promising results. The study assessed net revenue gain per acre (1 acre = 0.405 hectares) for all three categories of farmers – head, middle and tail of the channels. The average per acre increase in net revenue recorded in comparison from the baseline was 122 per cent at the head, 154 per cent at the middle and 190 per cent at the tail of the channel. The increase in revenue is mainly attributed to irrigation-efficient techniques and improved agronomic practices, e.g. the use of mechanical transplanters. In the past, the farmers, especially those at the tail of the channel who were receiving less irrigation water used more money to run tube wells for longer durations. Alternate wetting and drying tubes and laser land levelling technologies have proved to be very useful for improving irrigation efficiency. However, the results of direct sowing were mixed, with most farmers complaining of more weeds and inconsistent results in yield. Flood irrigation suppresses weeds. What also became apparent was that in comparison to selling to middle-men, increases in revenue and in time payments to the farmers improved in contractual farming, where millers and international buyers approach farmers directly.

Coincidentally a number of developments took place since the start of the WAPRO project. The most crucial change in the context of the project has been the approval of National Water Policy 2018 in Pakistan. In connection with the Charter, the Government of Pakistan has launched a number of projects on water efficiency. For example, the Punjab Irrigated Agriculture Productivity Improvement project in Punjab province is now ongoing. And the KP Irrigated Agriculture Improvement Project is to be initiated in Khyber Pakhtunkhwa province in 2020. Both projects are financed by the Government of Punjab and the World Bank. Moreover, the Supreme Court of Pakistan has asked the bottled water industry to pay for abstracting groundwater. This indicates an overall shift and realisation in the country on the importance of sustainable water management as opposed to the highly-subsidised, supply-driven model operational for the last seven decades. The National Water Policy is highly supportive to promoting the concept of "more crop per drop". There is also more awareness at grassroots level among farmers regarding the roles of different agencies in water management. And they have learnt that, in contrast with the traditional view that more irrigation is beneficial for yield, more can be produced

THE WATER AND PRODUCTIVITY PROJECT IN PAKISTAN – SOME LESSONS LEARNT

The following conclusions can be drawn for successful water stewardship from the experiences gained in Pakistan's rice sector with regard to the individual stakeholders:

- Water productivity has to be promoted as a business case. Farmers will participate in sustainable rice production if they see benefits in water saving.
- As farmers have a low risk-taking ability and willingness, it is important that techniques are thoroughly studied and analysed for their relevance in various contexts. Moreover, it is easier to motivate farmers if the technology is locally available and economical.
- The use of mechanical transplanters as an alternative to manual transplanting proved to be very useful and should be promoted for water efficiency. However, the introduction of mechanical transplanters will

result in women transplanters losing jobs. Support in finding alternative employment opportunities for this community is crucial.

- Participation of the relevant public sector players in the project activities is instrumental in achieving interest to upscale WAPRO practices.
- A motivated private sector is absolutely essential to achieve the water efficiency agenda by providing the much needed conditional pull to the farmers. This also holds for competence building of local service providers with regard to the push component.
- Local companies change their ways if they have export connections and related obligations. However, a strategic focus has to be on finding ways to motivate non-export companies to engage in sustainable production.

using efficient irrigation and improved agronomic practices.

Challenges for up-scaling

However, several policy and organisational gaps are still hampering multi-stakeholder action towards water stewardship in the country:

- There has been no inclusion of farmers/ water users through their Water User Association in water management with clear duty bearing roles, and much of the irrigation network continues to be governed by primarily British era legislation. While the PPIP projects referred to above are involving Water User Associations at the farm level in order to improve on-farm water efficiency, these associations do not have a role in the overall management of irrigation system.
- There is no policy to formally engage the private sector in water efficiency issues or invest in water use efficiency to positively reflect on water productivity or revenues.
- The huge irrigation system and water reservoir network provides highly subsidised irrigation water at the farm gate. In addition, the government subsidises electricity to pump groundwater and laser levelling equipment and provides low-interest loans and free extension services. Water is therefore seen as a

free good by users. The government finds it hard to collect targeted revenues from users. The irrigation system stands deteriorated, and maintenance of the system is becoming increasingly expensive due to physical damages putting more financial burden on the government.

- Water stress in canals is often compensated by pumping out groundwater through tube wells. The provision of subsidies for the installation of tube wells will result in deterioration of the groundwater table.
- Public private partners and farmers are not working together on a commonly determined objective of water productivity. There are trust deficits on all sides. All the actors are working in silos.
- The equipment for improved water efficiency used in the WAPRO project is not readily available in the local market.

A brief outlook

The project partners will continue to participate in a learning process and assure that water productive techniques are used on a sustainable basis by the farmers. The main future outlook is towards high-level up-scaling by ensuring rice uptake by the private sector and the government. At a global level, efforts are ongoing to increase the market share of SRP rice by bring-

ing more rice companies interested in SRP rice production and making these standards incrementally binding. This may only be achieved through a continuous dialogue with those who matter – and by disseminating a business model through different awareness raising mediums at local and national levels.

In the longer term, the partners will facilitate collaboration between actors in the rice supply chain to build a supportive infrastructure for

rice growers, and to integrate rice growers into a more effective rice value chain by providing them with better access to technology, knowledge and training and linking them better to markets. This would drive positive change in the rice sector and develop an inclusive value chain, where rice farmers may supply quality rice, become stewards of the environment and increase the economic viability of their households. Partnerships are the basis for making a change – as stipulated in SDG 17.

Jawad Ali is Water and Climate Specialist at Helvetas Swiss Intercooperation Pakistan and is based in Islamabad.

Contact: Jawad.Ali@helvetas.org

Arjumand Nizami is the Country Director of Helvetas Swiss Intercooperation Pakistan and is based in Islamabad.

Contact: Arjumand.Nizami@helvetas.org

"The world we want tomorrow starts with how we do business today"

Five questions to Ian Knight, Global Sustainability Manager at Mars, Incorporated.

Mr Knight, you work in Pakistan and India with the WAPRO project. Why these countries, and why rice?

India and Pakistan are the largest producers of Basmati rice, and for us as the owner of the world's biggest rice brand, Uncle Ben's, Basmati rice is an important and growing part of our portfolio. Rice is a staple for half the global population, so it needs to be protected. We are working to create a sustainable rice supply that can help support business growth and the nutritional needs of a growing population.

What is the benefit evolving from such a kind of partnership for a company like yours?

Through collaboration and building partnerships, we believe that we are able to create mutual benefits for all involved. WAPRO serves to promote long-term relationships with our suppliers and the farmers who supply them. This encourages investment in training and deployment of more sustainable agricultural techniques that can improve yield and smallholder farmer income whilst reducing environmental impacts like water use.

What exactly is your role in this multi-stakeholder partnership?

Mars targets to ensure that all its rice farmers are working to implement the best practice techniques contained in the Sustainable Rice Platform (SRP) standard, such as alternate wetting and drying and laser levelling. Mars invests in agronomy to support and train farmers with implementation of the SRP. We also support the use of the Alliance for Water Stewardship's International standard as a framework for wider stakeholder consultation and engagement within the WAPRO project. Helvetas and its partners within WAPRO work to address the shared water challenges faced by communities in the areas we source rice from.

What has been reached so far? What are the lessons learnt?

In the first phase of WAPRO in Pakistan, we saw farm income and water productivity improve by 30 per cent. This encouraged us to

extend our participation in WAPRO phase 2 to our Indian Basmati rice operations. A key learning has been the benefits of the Push Pull Policy approach and its suitability to be scaled, as WAPRO is now involved with projects in six countries.

What is next?

In terms of the partnership, we are keen to carefully assess the impact of WAPRO in Haryana state, India, and we are hopeful that the project will again be enabling significant water and economic productivity improvements.

As a business, we believe that the world we want tomorrow starts with how we do business today. We will be continuing to work to improve the sustainability of global rice supply and make sure that this crucial crop is around for generations to come.



The questions were asked by Silvia Richter.

Mars Sustainability Plan

In 2017, Mars announced they would invest a billion dollars in their 'Sustainable in a Generation Plan'. The plan addresses key areas of the Sustainable Development Goals. The company committed to ensure that their products are sustainably sourced and have a positive impact on the value chain – with a better yield and fairer pay. Regarding rice, the company's ambition is that by the end of 2020, 100 per cent of its rice is sourced from farmers working towards the Sustainable Rice Platform standard. By 2025, all farmers are to be on the path to sustainable income, and the gap to sustainable water use is to be reduced by 50 per cent. In addition, the company made a global commitment that 100 per cent of their packaging would be recycle-ready by 2025.