



Briefing Note

Adapting water use for crop production to regional and local conditions

The background

Agricultural water use in developing countries is faced with a whole array of new challenges, all within the global context of climate change, population growth and mounting water scarcity. A wealth of findings and practical experience from land and water development was gathered up to the late 1990s, but this experience is no longer so easy to access nowadays as the subject matter has become a niche topic over the past 15 years. Besides, the experience and findings from earlier periods cannot simply be mapped one-to-one to today's situation or future requirements. Agricultural water use needs to be adapted to many changes and current developments, and must prepare for special future dynamics.

Over the coming years and decades, disparities in economic and social development in the partner countries of international cooperation will widen further. Conurbations will grow, and urbanisation will advance rapidly to mid-century. This will be accompanied by structural change in rural regions. More and more, subsistence agriculture will be replaced by market-oriented farming which will be increasingly feminised. This is because a high percentage of the male population of working age are migrating to the conurbations.

Competition for scarce water resources will intensify. Both urban and rural demand for drinking water is on the rise, as is the demand for water from industry. More water will also be needed for energy generation in future than has been the case in the past. The water requirements for the maintenance of ecosystem, almost entirely ignored in the past, need to be given greater significance in agriculture and water management.

The purchasing or leasing of large areas of land by foreign investors also has an impact on the use of water in agriculture, because only areas that are irrigable or are capable of storing sufficient rain are sought after. As a rule, the more intensively they are farmed, the higher the demand is for water.

Market developments and price changes – both regional and global – also have an impact on water consumption. Higher food, feed, fibre or fuel prices make agriculture profitable once more in many areas, provided that access to water for crop production is ensured.

These trends spell out a need for forms of agricultural water use that utilise past experience while adjusting to the challenges set out above. It is particularly important that agricultural water use is adapted to the specific regional and local circumstances, both in rain-fed farming and in irrigated agriculture.

Our position

In this context, GIZ takes the following positions:

1. Agricultural water use must meet new demands

Existing knowledge and experience, especially from the irrigation sector, needs to be reactivated, but also adapted to meet current and future challenges. Within this process it is particularly important to strengthen coordination with water use in other sectors and improve the linkage between agricultural water use, land use and soil management. Similarly, the impacts of climate change have to be incorporated in planning for agricultural water use.

The international private sector is playing an ever-increasing role in agriculture. This also has to be taken into account when considering water use. Policymakers must keep the use of water resources in mind when large areas of land are developed by private investors. It is essential to assess whether or not the level of water use will be sustainable. That will require more detailed analyses and evaluations of agricultural water use in many areas than have been performed to date. These assessments must be based on economic, environmental and social criteria.

2. Different regions need different strategies

Demand for water varies widely, and what is an effective form of agricultural water use in one region need not be so in another. Across the world there are huge differences between individual agro-ecological regions, and even within them as far as the needs for water management are concerned. This means that the different levels of development in various partner countries and the different focuses of their agricultural strategies call for distinct approaches to agricultural water use. Differences in institutional capacity also need to be taken into account. If water is used properly in agriculture, it can make a major contribution to alleviating poverty. Too little use is made of this substantial potential in fragile states and post-conflict regions.

3. Local adaptation is essential for sustainable water use

The chosen method of agricultural water use within irrigated or rain fed agriculture must be tailored to suit existing farming and livelihood systems, and build on those. This means that it is also vital to take account of the circumstances, in which local people live, as well as their adaptive capacities and adaptation strategies. The influence of local power structures and constellations of interest needs to be considered.

4. Greater attention must be paid to aspects of risk

More attention must be paid to potential risks in the use of water for agricultural purposes – risks at global level but also at regional and national level and down to local, farm and household level.

On the one hand, for example, the option to irrigate or drain fields can mitigate the risk of yields being reduced or crops failing as a consequence of unpredictable dry periods, droughts or floods. On the other hand, the introduction of irrigated agriculture can also be seen as a risk factor for small-scale farmers. This is the case when water suddenly becomes available thereby significantly boosting the value of the farmland. This may bring about risks for smallholders to suffer silent expropriations by financially and politically more powerful farmers. Corruption in supply and marketing chains may also constitute a risk.

Degradation of the quality of both water resources and soil resources and of entire ecosystems as a result of inappropriate agricultural water use can become a problem. At the same time, the over-exploitation and quality deterioration of groundwater and surface water resources by agriculture threatens sustainability of water use in many regions of the world. Additionally, the discharge of urban wastewater can become a risk factor for irrigated agriculture if this wastewater remains untreated. In contrast, treated wastewater, however can be a valuable complementary source of irrigation water in situations of water scarcity.

Our recommended actions

Agricultural water use must be set up to be sustainable in the long term. Optimal adaptation of agricultural irrigation systems to their specific settings is an important step in this direction. Closer regional cooperation helps to achieve this, as do better institutional arrangements. Careful risk analysis reduces the risks related to agricultural water use, especially for small-scale farmers.

GIZ considers the following the most important recommendations for action:

1. Place agricultural water use on a sustainable footing

Experience gained in the past should be reappraised in order to take account of new dynamics and trends. This means that knowledge and experiences gained in the past, during the many years of intensive support for agricultural water use and above all irrigation between 1970 and 1990, should be made easily accessible. New developments in agricultural water use in international research and development should be monitored and interaction between research and development cooperation should be intensified in order to facilitate the uptake of successful innovations.

One key objective is sustainability. Supplementing economic analyses and evaluations with environmental, socio-economic and politico-economic assessments helps in this regard. International cooperation can promote and support this by taking a multi-level approach in its projects and programmes.

Another important factor for sustainability is integration of interventions into higher-level territorial land and water use planning. This can be achieved through approaches of integrated land and water resource management (ILWRM) embedded in the management of water catchments and river basins. In this context, the strengthening of cooperation mechanisms on cross-border water management is essential.

Instruments enabling agricultural water use to adapt to climate change need to be developed and deployed.

2. Adapt water use to the setting

Agricultural water use should be harmonised as closely as possible with the local and regional setting in which it takes place. This includes the institutional context just as much as the natural and socio-economic conditions.

Paying closer attention to the local situation and reflecting it in planning is a key determinant of success. Examples include the state and dynamics of local farming schemes and livelihood systems, or the local organisational and institutional capacities and the dimensions of power structures and interests. These factors should at the very least be roughly analysed and recorded, and be taken into account in the shaping of agricultural water use systems. Recommended technologies and approaches will also vary depending on the most limiting production factors for agriculture. At the regional level, international cooperation can encourage adaptation to context-specific conditions, for example, by supporting regional bodies in their efforts to reply to regional demands with respect to their agricultural water use promotion strategies.

At the regional level, it is particularly important to reappraise experience from fragile and post-conflict states and utilise it when shaping strategies to promote agricultural water use. This will help to make a correct assessment of the potential for agricultural water use in those countries.

3. Make better use of available opportunities

There is often a huge range of locally developed technical options for agricultural water use in crop cultivation. International cooperation can help to ensure that these are put to even better use. Above all, however, agricultural water use must be adapted to existing farming and livelihood systems. This means, for example, that support for irrigation by small-scale farmers must be tailored to suit existing village-level self-government, or that support be given for multi-purpose systems of water use must consider simultaneously promoting irrigation, rain-fed farming and livestock rearing as the provision of drinking water. It is also important to take account of ecosystem services in the design of agricultural water use schemes.



4. Strengthen and improve institutional arrangements

When farmers have to join together to manage an irrigation facility as a group, agricultural water use will not work sustainably unless appropriate institutional arrangements are in place. It is essential that specific norms, rules and regulations are in place and that institutions are established that can enforce compliance with these directives. In small village irrigation settings such arrangements can often be brought about by means of self-organisation of the farmers in water user groups. Often however the overarching legal and administrative system is of crucial complementary importance here. This is why efforts to improve institutional arrangements at different levels simultaneously must be strengthened.

5. Help to identify risks better

Small-scale farmers are particularly susceptible to risks associated with water use through irrigation. Climate change further exacerbates these risks, but access to markets for operating inputs and for selling the products of irrigation also plays a part. The more the farmers are aware of this, and know how they can cope with such risks, the less their livelihood is under threat. International cooperation can help to make these threats more visible to farmers, and it can assist in establishing risk mitigation strategies such as risk analyses, early-warning systems or systems providing social protection.

It is not only weather events that pose risks, however. Corruption in the management of water resources is often at least as much of a danger to small-scale farmers. In this regard international cooperation can make a contribution to calling for greater transparency and accountability, thus closing doors to corrupt practices.

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