CGIAR Challenge Program on WATER & FOOD

BASIN FOCAL PROJECTS (BFP) POLICY BRIEF

Water, agriculture and poverty: Insights from BFP analyses

Basin focal projects (BFPs) provide analysis to clarify the links between water, agriculture and poverty in the Andes, Indo-Ganges, Karkheh, Limpopo, Mekong, Niger, Nile, Sao Francisco, Volta and Yellow River basins. Together their results demonstrate diversity, but also general patterns of water distribution, water use and poverty. They also bridge insight of global and local scales of agricultural water use systems and the livelihoods on which they depend.

The linkages between global food and water systems:

BFP research aims to promote better agricultural water management, leading to poverty alleviation, increased food security and environmental protection. At a global scale, the linkage between food and water systems appears simple – agriculture is the greatest user of freshwater; therefore increased activity of food systems puts greater pressure on water. In detail, the linkages are complicated by the myriad ways in which people adapt to opportunities and threats locally.

Water and poverty:

The BFPs clarify the link between water and poverty, to move beyond localized case studies that give detailed, but partial views. The first finding was to confirm that while water availability and poverty can be linked in some places, the linkage is predominantly indirect: Not all the poor are water-poor, not all water-poor are poor. Analysis from basins indicates specific linkages. In the sub-humid or semi-arid regions of the Volta or Sao Francisco basins, while drought or other physical problems of water availability can induce poverty, other factors are often more influential in poverty alleviation. Irrigation has both direct and indirect effects on poverty, with multipliers depending on other factors such as market development and credit availability. In the Mekong and Volta, direct linkages are observed between fishers, who are often amongst the poorest, and water since the dependence for livelihood is more direct. Similarly, livestock herders in the Sahelian zone of the Volta, are strongly influenced by seasonal and local availability of water resources and fodder.

One of the most important findings from the BFPs is the realization that the influence of water and agricultural activity on poverty are strongly dependent on the overall development trajectory within the basin. Water availability and water use controls the activity of many sectors and agriculture remains the major user in all basins. Yet its influence is moderated by the relative importance of agriculture to GDP and the capacity of countries to modify rural poverty by other means. In the Karkheh basin, for example, government policy strongly supports rural life such that poverty there is less than in the cities, despite relatively low levels of water productivity. The Sao Francisco basin contains areas where subsistence farmers exist side-by–side to profitable commercial farms.

Hydrology of river basins:

River basins differ widely in basic hydrologic characteristics of total flow, seasonal flow, water availability and water use. These factors present opportunities and risks that influence

rural livelihoods. In the Mekong, widespread flooding threatens some, but at the same time supports most people living in the basin through fisheries. Average runoff in the Volta, for example is less than 10% of rainfall, in the Limpopo, less than 5% and in the Karkheh about 2%. Unreliable rainfall distribution in these basins constrains the opportunities for cropping and so grasslands predominate – in the Volta, the vast majority (80%) of water passes through grassland systems - yet less is known about the livestock systems they support than the cropping systems that occupy the minor part of the basin. In African basins, irrigation accounts for a very small proportion of total water use (1% or less). In Asia, this figure rises to a maximum of about 30% in the Indus.

Water productivity- a key concept

Agricultural water productivity describes the gain from each unit volume of water depleted by agriculture. Since agriculture is the prime consumer of water, this is a valuable diagnostic of basin performance: strong growth of water productivity signals response to the problem; weak growth of water productivity indicates a stagnant system. Basin-wide estimates show that most rainfed cropping systems operate far below capacity, producing as little as 10% of their potential. Water productivity is higher in irrigated systems, but remains well below potential.

Water productivity needs to consider all gains from agricultural systems, which can sometimes be complex. In the Karkheh basin for example, crop productivity remains low, but total system productivity is supplemented greatly by income from livestock products.

Livestock water productivity is difficult to measure and, contrary to the general impression of profligate water-user, can contribute to livelihoods effectively where animals use feed that would not otherwise be unused - such as under the grassland that covers most basins in Africa. Water productivity of fisheries is even more difficult to assess, since capture fisheries require water to live in rather than consume. Nevertheless, such data as exists suggests that the special contribution of fisheries to livelihoods of the poor in the Mekong, Ganges and other basins seems to be widely under-acknowledged, and productivity almost certainly grossly under-estimated.

Options for increasing water productivity evidently differs between the basins and depends on environment, market, policies and institutions. In the Karkheh, reallocation of water from lower to higher value users like livestock holds potential. In the Volta, water harvesting and related field level practices can improve water availability and productivity. In the Sao Francisco, market-oriented production of high valued crops holds the key to reduce rural poverty (via increased labor demand). In the Mekong, increased productivity is already happening, but strengthening of institutions and policies holds the key to benefit sharing.

BFPs found that water and agriculture institutions in most basins face major operational challenges to control water use and policies. But this overlap is generally small. Basin level institutions remain weak and often over-ridden by national priorities, even where the basin organizations are well-established, such as in the Mekong. Priorities of water use remain different in basin countries (e.g, in hydropower in Ghana and irrigation in Burkina Faso and Togo).

Recommendations:

Food and water systems as interacting systems. Agriculture should be viewed as livelihood support systems that enable people in river basins to meet objectives of food and income security, without damaging critical environmental functions on which others depend.

Understand rural activities within the context of underlying development trajectories, since these characterize the drivers for change, and the likely capacity and willingness of national governments to support rural livelihoods.

Policy makers should consider the total ability of river basins to support people through the broad range of activities, not just 'blue water' activities such as irrigation, but 'green water uses' - such as 'rainfed cropping or livestock - and those supported by the aquatic environment, such as fisheries. This would highlight threats to some, such as fishers or livestock herders who tend to be overlooked by more conventional analysis. It would also highlight the opportunities to meet the food supply problem from improvements in green water use.

Use Water productivity as diagnostics of under-performance. Given the scope for improvement of water productivity and the capacity of some systems to meet demand, there is reason to hope that most basins can meet future demands for food without increasing demand for water. Areas where water productivity is increasing indicate the food system is responding. Static water productivity indicates where food systems require attention to other limitations such as soil fertility, markets, or institutional support.

For more information

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