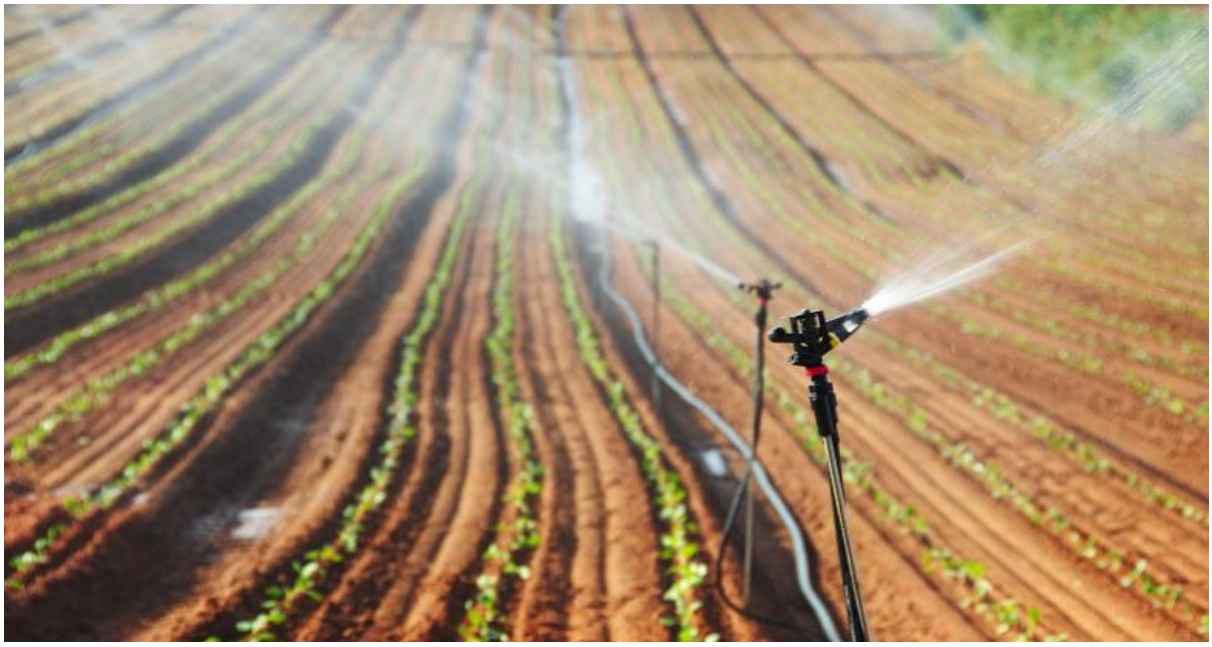
Five Minute Reads



Water in Agriculture – The World Bank Report.

with Don May, Guest Writer for Ferti-Ject.

Introduction

According to their website, the World Bank supports countries with sustainable intensification of agriculture through critical investments in irrigation infrastructure and key institutional reforms, which also help achieve it program of sustainable development goals for efficient use of water as well as on eliminating hunger.

In this edition of Five-Minute Reads, our Global Irrigation Technology guru, Don May takes a in depth look at what they have to say.

Context

Water is a critical input for agricultural production and plays an increasingly important role in food security.

Globally today, irrigated agriculture represents only about 20% of the world's total cultivated land, but it contributes around 40% of the total food produced worldwide.

'An interesting statistic is that irrigated agriculture is, on average, at least twice as productive per unit of land as traditional rainfed agriculture, which allows for more intense production and diversification of crops.'

Towards 2050

As a direct result of population growth and the increasing urbanization of the population, coupled with the effect of climate change, we expect that competition for freshwater resources will increase and that this will have a particular impact on agriculture.

The world's population is expected to increase to somewhere over 10 billion by 2050, and no matter if this population is urban or rural, it will need more food and more fibre to meet its basic needs.

"In addition to the increased consumption of calories and more complex foods as nations develop, it is estimated that global agricultural production will need to expand its capacity by approximately 70% by the year 2050."

"Future investments in agriculture will need to be in activities whereby much higher rates of production can be achieved."

"Agriculture will have to adapt to be much more productive per unit of land, and irrigated Agriculture has already proven its worth to this end."

Where will the water come from?

Future demand on water by all sectors will require as much as 25% to 40% of water to be re-allocated from those agricultural activities that have lower rates of productivity and employment activities, to those activities that have a much higher production capacity, particularly in water stressed regions.

In most cases, such reallocation of water resources is expected to come from agriculture due to its high share of water use. Currently, agriculture accounts (on average) for 70% of all freshwater withdrawals globally (and an even higher percentage of "consumptive water use" due to the evapotranspiration of crops).

The movement of water will need to be both physical and virtual.

Physical movement of water can occur through changes in initial allocations of surface and groundwater resources mainly from the agricultural to urban, environmental, and industrial users.

Water can also move virtually as the production of water intensive food, goods, and services is concentrated in water abundant localities and is traded to water scarce localities.

Inter sector water re-allocations and significant shifts of water away from agriculture will also need to be accompanied by improvements in water use efficiency and improvements in water delivery systems.

Irrigation efficiency

Improving the efficiency of water use in agriculture will also depend on matching of improvements main system (off-farm) with appropriate incentives for (on-farm) investments aiming to improve soil and water management.

"these options will require improved water delivery systems to provide adequate on-demand supply as well as use of advanced technologies to improve efficiency and productivity of water used in agriculture."

In resolving the challenges for the future requires a careful and thorough reconsideration of how water is managed in the agricultural sector, and how it can be repositioned in the broader context of overall water resources management and water security.

Irrigation and drainage schemes, whether large or small, represent prominent spatially dispersed public works in the rural spaces. Thereby, they represent a logical vehicle for mobilizing employment opportunities into communities.

Practical Challenges for Water in Agriculture

The ability to improve water management in agriculture is typically constrained by inadequate policies, major institutional under-performance, and financing limitations.

Critical public and private institutions (encompassing agricultural and water ministries, basin authorities, irrigation agencies, water users' and farmer organizations) generally lack the enabling environment and necessary capacities to effectively carry out their functions.

For example, basin authorities often hold limited ability to enforce water allocations and to convene their stakeholders.

The institutions who are responsible for developing irrigation infrastructure often limit themselves to very capital-intensive larger scale schemes rather than developing opportunities for small-scale private financing and irrigation management.

Farmers and their organizations are also often responding to highly distorted incentive frameworks in terms of water pricing and agricultural support policies, which further hinder positive developments in the sector.

"For the most part, governments and water utilities fail to invest adequately in the maintenance of irrigation and drainage (I&D) systems."

While inadequate management and operation may play a part in the poor performance of I&D systems, it is especially the failure to sufficiently maintain systems that results in their declining performance and the subsequent need for rehabilitation.

"This failure to provide adequate funds for maintenance of I&D systems has resulted in the "build-neglect-rehabilitate-neglect" cycle commonly observed in the sector."

Given the existing constraints above, the agricultural water management sector is currently in the process of repositioning itself towards modern and sustainable service provision.

It proposes a singular water approach on building resilient water services and sustaining water resources, while also managing risks related to broader social and economic water-related impacts.

This includes transforming governance and service provision as well as supporting watershed management and greening the sector and can be achieved by providing improved incentives for innovation, reforms, and accountability.

The Strategy

The World Bank is committed to assisting countries meet their economic growth and poverty reduction targets based on their sustainable development goals.

"Some of these goals establish food security and water management efficiency and water quality objectives for countries which are dependent on how water is managed in agriculture."

Accordingly, the World Bank has a major interest in helping countries advance their management of water in agriculture.

The World Bank's work in water in agriculture has increasingly supported key elements of agricultural water stewardship with several good examples of basin level modelling and support to basin governance, upgrading of irrigation systems, and support to farmers for shifting to higher value crops.

However, due to its own fracturing of the water agenda in the Bank, there has been limited attention to addressing the higher-level policy drivers of water use in agriculture, linking it to the overall integrated water resources management agenda, and facilitating broader water stakeholder cooperation.

"Project development objectives and indicators have focused almost exclusively on farmers income, and inconsistently highlight the benefits of water service improvements, though recent program have begun to explicitly consider improvements in overall water quantity and quality impacts."

The World Bank has also been constrained by the challenges of difficult implementation.

Most irrigation and drainage projects take longer than planned, and even then, are completed with less than fully satisfactory outcomes due to basic challenges in design and contracting.

As a result, even where institutional and other aspects are addressed by project design, there is little space during implementation for the Bank and client to focus on broader issues of incentives and behavioural change prior to project closing, but rather all efforts are committed to completion of physical works.

Moving forward

In order to support clients in moving towards agricultural water stewardship, the World Bank is strengthening its overall approach to water in agriculture.

This includes reassessment of the World Bank's approach to client dialogue and supporting analytical work to ensure that we bring a whole water system perspective.

Project design and implementation are providing the space to better balance infrastructure construction with institutional development consistent with agricultural water stewardship.

In order to support this ambitious agenda, the World Bank is investing in upgrading the knowledge and skills of its staff, and strengthening partnerships, in order to bring experience and global expertise to the benefit of our clients.

The Results

Support for water in agriculture projects accounts for the largest share of the World Bank's support for agricultural productivity-related activities.

Technological innovations combined with changes in the policy environment are playing an increasingly important role in agricultural water management.

Advances in the use of remote sensing technologies are now making it possible to cost-effectively estimate crop evapotranspiration from farmers' fields and to improve water accounting and management at the regional and basin-wide levels.

Case Study Peru

The Peru Irrigation Subsector Project raised agricultural production and productivity by enhancing the sustainability and efficiency of existing public irrigation systems.

As a result of the project, water conveyance efficiency increased by up to 68% in improved irrigation systems, and the program formalized about 190,000 new water rights.

The project benefitted 135,000 farm families over a total irrigated area of 435,000 hectares, created 6,400 new jobs, and generally increased agricultural productivity. Yields per hectare were raised by up to 50% in on-farm improvement areas.

Case Study Bangladesh

The Second Rural Electrification and Renewable Energy Development Project (RERED II) pilots the installation of solar-powered irrigation pumps and aims to increase access to clean energy in rural Bangladesh where grids are not economically viable.

Farmers in the pilot area have been switching from diesel-run to solar irrigation pumps.

By reducing irrigation costs, solar pumps are becoming popular, especially in areas without electricity grid coverage.

More than 300 pumps were installed, benefiting more than 6,000 farmers, with a target of 1,250 additional pumps by 2018. Each solar pump can supply electricity for 3 crop irrigations for 20 acres of land.

Case Study Nepal

The Irrigation and Water Resources Management Project has been working to improving agriculture productivity and the management of irrigation schemes in Nepal, as well as enhancing capacity for integrated water resources management.

The primary beneficiaries are over 415,200 water users of farmer-managed irrigation systems (FMIS), covering over 26,859 ha, mainly in the hill regions.

Case Study Cameroon

Two projects in Cameroon aim to provide sustainable irrigation and drainage services as well as improve agricultural production in irrigated areas.

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Both projects combine improvements in infrastructure with related institutional and governance reforms in the irrigation subsector, along with rehabilitation or extension of irrigated areas.

Case Study the Gambia

Since 2014, female farmers in the Gambia receive assistance with systems combining solar pumping with drip irrigation through the Gambia Commercial Agriculture and Value Chain Management Project.

Vegetable gardens were fully equipped with boreholes and galvanized overhead tanks, using solar-powered water pumps to withdraw water from aquifers, and also with labour- and water-saving drip irrigation systems, modernizing the way vegetable gardening is done by women and improving their livelihood.

In Summary

Improving the efficiency of off-farm water distribution and on-farm irrigation will be key to reaching the production targets in the future.

Significant investment in large scale water infrastructure project will be required by nearly all governments to sustain population growth and increased need for food and fibre.

The material used in this article can be found on the World Bank's web site.