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## Farmer-led irrigation schemes could alter food security in sub-Saharan Africa, South Asia

**Study shows potential for smallholder water management innovations to boost crop yields and household revenue by tens of billions of US dollars**

**This press release is available in [French](#), [Spanish](#) and [Chinese](#) on [EurekaAlert! Chinese](#).**

**STOCKHOLM (24 AUGUST 2012)**—As food prices escalate globally due to the failed monsoon season in Asia and the "super drought" in the US, a new study finds that small-scale irrigation schemes can protect millions of farmers from food insecurity and climate risks in sub-Saharan Africa and South Asia. The [International Water Management Institute \(IWMI\)](#), a CGIAR consortium research center, released the paper ahead of [Stockholm World Water Week](#).

According to the report, *Water for wealth and food security: Supporting farmer-driven investments in agricultural water management*, expanding the use of smallholder water management techniques could increase yields up to 300 percent in some cases, and add tens of billions of US dollars to household revenues across sub-Saharan Africa and South Asia.

"We've witnessed again and again what happens to the world's poor—the majority of whom depend on agriculture for their livelihoods and already suffer from water scarcity—when they are at the mercy of our fragile global food system," said Dr. Colin Chartres, director general of [IWMI](#). "However, farmers across the developing world are increasingly relying on and benefitting from small-scale, locally-relevant water solutions."

The assessment quantified the potential reach and possible additional household revenue for a number of different on-farm and local community water solutions. This is detailed in the table above.

The three-year AgWater Solutions Research Initiative unearthed for the first time the scale at which enterprising smallholder farmers themselves are driving this revolution by using their own resources innovatively rather than waiting for water to be delivered.

"We were amazed at the scale of what is going on," said [IWMI's](#) Meredith Giordano, who coordinated the initiative. "Despite constraints, such as high upfront costs and poorly developed supply chains, small-scale farmers across Africa and Asia have moved ahead using their own resources to finance and install irrigation technologies. It's clear that farmers themselves are driving this trend."

In Ghana, for instance, small private irrigation schemes already employ 45 times more individuals and cover 25 times more land than public irrigation schemes. The majority of farmers, who said they presently use buckets or rely on rain-fed cultivation, expressed the strong desire to buy a motorized pump, but lacked resources, knowledge or access to suppliers to do so.

Partners in the AgWater collaboration believe the implications of the work could be profound, especially for donors and private investors committed to boosting incomes and livelihoods in the world's poorest countries by improving farmer access to water resources.

The research—a collaborative effort involving several international and national partners and funded

Solution	Sub-Saharan Africa		South Asia	
	Number of people reached	Potential annual additional household net revenue (US \$ billion)	Number of people reached	Potential annual additional household net revenue (US \$ billion)
On-farm water management	100 million	US\$ 8 billion	200 million	US\$ 4 billion
Local community water management	100 million	US\$ 20 billion	50 million	US\$ 1 billion
Small-scale irrigation	50 million	US\$ 10 billion	50 million	US\$ 2 billion
Large-scale irrigation	50 million	US\$ 10 billion	50 million	US\$ 2 billion

**IMAGE:** This table details the number of people reached and the potential annual additional household net revenue generated by a number of different on-farm and local community water solutions in sub-Saharan...

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by the Bill & Melinda Gates Foundation—provides the best evidence to-date on the scale and potential economic benefits of smallholder water management in sub-Saharan Africa and South Asia.

Water is a major constraint on food production for millions of smallholder farmers. While water resources are often sufficient, farmers lack the means to harvest it, which limits crop production to the rainy season and diminishes income opportunities.

Of sub-Saharan Africa's abundant renewable water resources, the UN Food and Agriculture Organization reported that only 3 percent are withdrawn for agriculture. Approximately 4 percent of arable land is equipped for irrigation, of which less than 6 percent is serviced by groundwater.

Experts believe that improving water management capabilities could unleash smallholder farming and it could become a major driver of economic growth, poverty reduction and food security.

One example of an innovative farmer is Purushottam Patel, in Gujarat, India. He uses the dung from his eight cows to generate biogas. This fuel is then fed to a pump that runs partly on diesel and partly on gas. The novel arrangement has saved him USD 400 per year in fuel costs. It also has improved the water supply for his farm, which has enabled him to double his crop production. Mr Patel now sells water to adjacent farms—further enhancing local food production.

"The technologies for smallholder water management are already with us," says Giordano. "Cheap pumps and new ways of powering them are transforming farming and boosting incomes all over Africa and Asia. Simple tools for drilling wells and capturing rainwater have enabled many farmers to produce more crops in the dry season, hugely boosting their incomes."

There are risks to unchecked expansion of smallholder water management, however. The poorest farmers, especially women, still struggle to find the resources needed to access new technologies, which may lead to greater inequities. And if farmers engage in a water free-for-all, supplies in some areas could dwindle past sustainable levels.

AgWater partners believe new institutional arrangements are needed to address these challenges. They also are focusing on innovative business models that could help improve water access, such as *pump-on-a-bike* hire schemes, where cycling entrepreneurs tour rural areas, renting out pumps strapped to their bicycles.

The research has already influenced government policy in at least two places. In West Bengal, India, the state government has removed small pump licenses and introduced a flat electrical connection fee for farmers in water-abundant areas to encourage smallholders to use the available water to boost agricultural productivity. In Tanzania, the project research has also been a factor in the government's decision to increase national investment in agriculture by USD 6 million.

"There are huge investment opportunities for unlocking the potential of this farmer-led approach," says Chartres. "AgWater Solutions has identified where investments can be targeted for maximum impact at the country, state and local level. We now know which 'levers' need to be pulled to capitalize on the up-swell of farmer-led innovations."

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**Editor's Note:** All supporting materials, including a summary document, background documents and photos can be found at [www.iwmi.org/SWW2012](http://www.iwmi.org/SWW2012). Journalists attending Stockholm World Water Week are invited to attend a seminar on the project results on Sunday 26 August at 14.00. Details here: <http://bit.ly/waterweekevent>. There will also be a chance to meet the researchers in a more informal setting at a drinks reception to mark the launch of the report at the **IWMI/CGIAR** booth in the exhibition hall at 15.30 on Monday 27 August.

The research partners were the Stockholm Environment Institute, the International Food Policy Research Institute, iDE, the Food and Agriculture Organisation of the United Nations and CH2MHill. In-country collaborative partners included the Direction des Amenagements et du Developpement de l'Irrigation (DADI), Ministry of Agriculture, Burkina Faso; Ghana Irrigation Development Authority; Ministry of Food and Agriculture; Ministry of Agricultural and Rural Development, Ethiopia; Centre for Advanced Research & Development, Bhopal, India; Rajarhat PRASARI, West Bengal, India; Ministry of Agriculture, Food Security and Cooperatives, Tanzania; and the Department of Agriculture, Zambia.

More information on the program can be found at [www.iwmi.org/campaigns/agwater](http://www.iwmi.org/campaigns/agwater)

Led by the International Water Management Institute as part of the CGIAR Research Program on Water, Land and Ecosystems

With Research Consortium Partners:

International Development Enterprises (iDE), the International Food Policy Research Institute (IFPRI), the Food and Agriculture Organisation of the United Nations (FAO), Stockholm Environment Institute (SEI) and CH2MHill.

The **International Water Management Institute (IWMI)** is a nonprofit, scientific research organization focusing on the sustainable use of land and water resources in agriculture to benefit poor people in developing countries. IWMI's mission is "to improve the management of land and water resources for food, livelihoods and the environment." IWMI has its headquarters in Colombo, Sri Lanka, and regional offices across Asia and Africa. The Institute works in partnership with developing countries, international and national research institutes, universities and other organizations to develop tools and technologies that contribute to poverty reduction as well as food and livelihood security. [www.iwmi.org](http://www.iwmi.org)

**CGIAR** is a global research partnership that unites organizations engaged in research for sustainable development. CGIAR research is dedicated to reducing rural poverty, increasing food security, improving human health and nutrition, and ensuring more sustainable management of natural resources. It is carried out by the 15 centers who are members of the CGIAR Consortium in close collaboration with hundreds of partner organizations, including national and regional research institutes, civil society organizations, academia, and the private sector. [www.cgiar.org](http://www.cgiar.org)

The **CGIAR Research Program on Water, Land and Ecosystems** examines how we can intensify agriculture, while still protecting the environment and lifting millions of farm families out of poverty. The program focuses on the three critical issues of water scarcity, land degradation and ecosystem services. It will also make substantial contributions in the areas of food security, poverty alleviation and health and nutrition. The initiative combines the resources of 14 CGIAR centers and numerous external partners to provide an integrated approach to natural resource management research. This program is led by the **International Water Management Institute (IWMI)**. [wle.cgiar.org](http://wle.cgiar.org)

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