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

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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 Africa and South Asia. Credit: International Water Management Institute (IWMI), Report: *Water for wealth and food security: Supporting farmer-driven investments in agricultural water management*

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 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."