

Fresh perspectives on drip irrigation in agriculture

Facts from research and training



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Discussions with development practitioners, private sector actors, and financiers

Main message

Drip irrigation is spreading among agro-entrepreneurs and smallholders in most countries, but it is not a miracle solution to water scarcity, food insecurity, and poverty.

Drip irrigation

Drip irrigation entails applying water to individual plants in small, frequent quantities through a network of perforated plastic pipes and emitters. It is widely promoted for water saving, improved agricultural productivity, and poverty alleviation.

Recent history

Technical innovation in drip irrigation arose in the 1960s in Europe, Israel, and the United States in response to a demand for intensification of agriculture. Since then, most research and development efforts have focused on engineering more efficient drip systems. Experiments in controlled conditions demonstrated that these systems could save water and labour, optimize the use of

inputs, increase crop productivity, and extend agriculture to previously uncultivated areas, such as sandy soils and hilly regions.

Initially, high investment costs and management requirements confined drip irrigation use mostly to large-scale farms in developed economies. Over the last two decades, many smallholder farmers in developing and transition economies have adopted drip irrigation systems tailored to their needs. In response, the industry has begun to offer more affordable products to smallholders, while small drip kits have been designed for the poorest farmers by development practitioners as well as the industry. Although this recent trend has attracted much attention, smallholders seldom use drip irrigation kits, especially in Sub-Saharan Africa.

Geography and crops

Drip irrigation is widespread in regions cultivating cash crops (fruit trees, vegetables, sugarcane, cotton) and where the pressure on water resources is high, such as the southwest of the United States, the Mediterranean region, the

Near East, the northeast of Brazil, the west of China, the south and northwest of India, and the east and southwest of South Africa.

Drip irrigated areas have increased from 3 million to over 10 million hectares globally over the last 15 years. Since most of the expansion is driven by farmers and the industry, the trend is difficult to monitor and obtaining accurate information on the actual extent of drip irrigation is challenging.

Adoption

Over the last 20 years, drip irrigation has experienced the highest growth in China, Latin America, North Africa, the Near East, and Southern Africa, but remains marginal in sub-Saharan Africa. Most drip irrigation adaptation by smallholders takes place through informal learning mechanisms and with support from local craftsmen and knowledge brokers, rather than public extension services.

Public action

Governments usually promote drip irrigation through a combination of subsidies and large-scale modernization programmes. However, public subsidy mechanisms are often cumbersome and mostly benefit well-off farmers and irrigation equipment manufacturers. Many modernization projects focus solely on infrastructural modifications, disregarding decision-making processes concerning water management and the broader agricultural sector.

Does drip irrigation save water?

Theoretically and in relative terms, yes, but the concept deserves careful scrutiny. Drip irrigation equipment often performs far below its theoretical potential and manufacturing specifications. Low water quality and pressure can further hinder its

functioning. At farm level, growers often use the water they “save” to switch to water-intensive high-value crops, or to extend their irrigated area. At system level, saving water requires better management and close monitoring, which not all farmers are able or willing to do. At landscape level, drip irrigation is often used for reclamation of new lands, such as the Pacific coast of Peru, or the Egyptian and Algerian deserts. In such instances, drip irrigation can lead to increased groundwater abstraction or re-allocation of water.

Does drip irrigation reduce poverty?

Drip irrigation requires significant capital and management investment. However, it reduces the time and effort spent on irrigation, permitting smallholders to focus on better crop management, thus resulting in higher yields and improved livelihoods.

On the flip side, drip irrigation is also part of agricultural intensification to some extent driven by large-scale agribusinesses. In the absence of safeguards, such investments can prompt reallocations of water that disadvantage smallholders.

Lastly, in some regions, farmers have shown little interest in adopting the technology. Until their motivations are

better understood, and the equipment and dissemination strategies adjusted accordingly, drip irrigation is unlikely to contribute significantly to poverty reduction.

Learn more about drip irrigation

Is drip irrigation delivering on its promises to address current water, food, poverty, and environmental challenges? Join us and our partners in an event that will provide fresh perspectives on the topic and reflect on questions such as:

- What is the validity domain of smallholder drip irrigation? Is it a global option for poverty reduction or a “niche technology”?
- Going beyond the alibi of water saving: what forms of public action and private intervention can support change in public irrigation systems?
- How to make drip irrigation systems manageable by a wide range of users: what are the advantages and limits of systems designed by engineers and of those that are assembled by smallholders?
- Who is benefitting from public subsidies and modernization projects: irrigation equipment manufacturers, retailers, consulting companies, or farmers? And how?



Selected references and websites

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