

Koen Roest,
Alterra, Integrated Water Resources Management team

Irrigation beyond technology

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THE NETHERLANDS
WATER PAVILION

New irrigation technology is developing at a rapid pace and due to better water availability farmers can significantly increase their food production. In this interview, Koen Roest of Wageningen University points out that this does not occur in a vacuum. Farmers want assurance that they will be able to have access to sufficient water when they need it. Without such assurance their investments could result in financial losses. This requires water management and participation in the matter. According to Roest, there is a growing demand for quality food and industrialised agriculture near cities.

“An investment in modern technology can easily double a harvest. A farmer needs to invest for such an expansion, so he seeks assurance for the water supply. Only then does it really happen,” so summarises Koen Roest of Wageningen University the water/food link succinctly. The increase in global food production, he believes, is largely interrelated with a sustainable water supply. No certainty about water, no investment, no expansion. It is as simple as that, according to Roest, who works as a senior researcher with the Integrated Water Resources Management (IWRM) team at the Wageningen University. With his team, he keeps a tab on water use in the agri-sector around the world. “You can see a strong rise in supplementary irrigation in areas where water is scarce. That type of irrigation is geared towards increasing the yield.”

Precision agriculture

Roest outlines a number of ways in which the amount of water available can be increased. Addressing non-revenue water is the simplest approach. “That’s the low hanging fruit,” says Roest. Another approach is precision agriculture where fertilisation and irrigation are applied more efficiently. “But that’s when the difficulties crop up for many farmers, as it involves ICT,” explains Roest. By including the weather forecasts in the computer models, irrigation needs can be anticipated from precipitation forecasts. Other systems use GPS technology and inform the farmer as to how much water (and fertilisers) he should use in which section of his land. In the Netherlands, precision agriculture is, according to Roest, already widely used and many types of specialised equipment are readily available. “Farmers can



therefore use their scarce water more efficiently and thus increase the harvest or grow higher quality products,” says Roest.

High-quality food products

“You can see a greater demand for quality food products, especially in cities,” indicates Roest. “The market demand there determines what farmers grow. The result is less production loss and greater efficiency in water availability. But for many farmers a demand-driven food market also means a transition to industrial production methods, such as cultivation in greenhouses.” Major cities, says Roest, have in place highly advanced plans for metropolitan food centres where agriculture, livestock, processing and distribution are housed under one roof. “This offers new opportunities for water reuse. Thanks to the short distance between the companies in the area, wastewater from one company can be used as a supply source by another company.” He finds that such

centres also offer new possibilities for anaerobic water treatment techniques. “Biogas production can be significantly increased if the wastewater is fermented with solid organic waste.”

The need for good governance

“Technical improvement of irrigation systems is also given the attention it deserves, but in dry areas, water management also plays a crucial role in the entire river. Improved, integrated water resource management for an entire river basin leads to greater water availability for all farmers. They can then increase their harvest and earn more as a result. This enables them to pay more for their water and allows collective measures to be taken in order to guarantee water availability in the future.” And that brings it full circle, according to Roest. “In the Netherlands we have provided security for our farmers through the Regional Water Authorities. Farmers and other stakeholders have a say in water management.”

Water, soil and nutrient efficiency

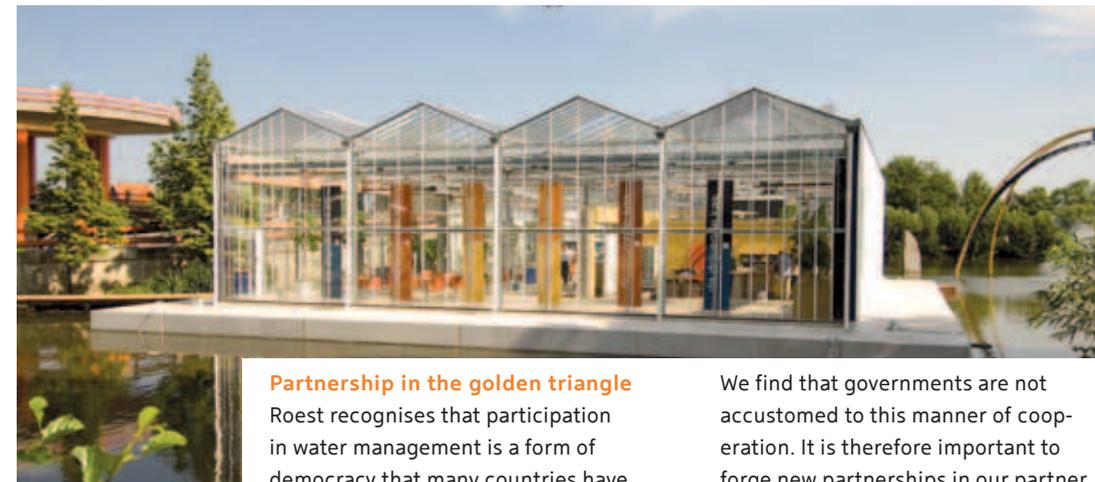
Water and nutrient stress are major constraints to agricultural production in East and West Africa. A better understanding of the impact of soil fertility management on the interactions between soil organic matter (SOM), soil structure, and nutrient and water use efficiency is pivotal to the optimal exploitation of scarcely available organic resources and the design of sustainable cropping systems. Although different functional groups of soil macrofauna greatly affect soil structure, SOM, soil water and nutrient dynamics, quantitative understanding and optimisation of their role is lacking. Our research programme comprises an interdisciplinary approach to investigate the effects of agricultural management on soil quality and nitrogen and water use efficiency, emphasising the role of soil macrofauna biodiversity across soil types and climates in East and West Africa.

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Partnership in the golden triangle

Roest recognises that participation in water management is a form of democracy that many countries have little experience with. However, he finds that it is important to underscore this kind of participation in integrated water resource management. “The Netherlands has extensive experience with participation in water management and we underscore that experience in our international irrigation projects.

We find that governments are not accustomed to this manner of cooperation. It is therefore important to forge new partnerships in our partner countries whereby the government, knowledge institutes and companies come together to create innovations that improve the value of water in agriculture.”

Read more about Alterra at www.alterra.nl

Solutions: Triple A

Without water, no agriculture. Food production is highly dependent on the availability of water. The amount of groundwater, rainwater and/or surface water available determines, to a large extent, the cultivation strategy. Water management of the local waters to the entire river basin has a huge impact - be it direct or indirect - on the potential of food production.

The Netherlands has therefore launched the Integrated agri-aqua approach - Triple A - concept. The concept divides the water issue into three parts, all of which require attention:

- 1 water management that ensures that the agreed amount of water with the agreed quality is supplied (irrigation) to the agri-sector and that the excess is discharged (to prevent waterlogging). This also includes the institutional assurance that the authorities will provide for proper management of the water resources, both in terms of quantity and quality.
- 2 utilisation of water at farms where the water is used as efficiently as possible, and where other production conditions (fertilisers, diseases and pests) are addressed to ensure that the harvest increases per m³ of water
- 3 The third component of the Triple A approach concerns the financial and economic aspects involved. Involvement of the food processing and market organisation in the process will make the financing of More Crop per Drop possible.

Thus, Triple A also stands for partnership among the government (water management), the primary agricultural sector and the industry.

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