

## CROPLIFE INTERNATIONAL PERSPECTIVE ON WATER SECURITY

**CropLife International believes that in global, regional and national plans to address food security, water availability must be considered a priority. As the world population grows and global food production increases to meet demand, water management in agriculture is becoming one of the key collective challenges to achieving sustainable development worldwide and preserving this crucial resource.**

Water is central and vital to life. However, around 1.2 billion people live in areas of water scarcity today.

Agriculture accounts for some 70% of global water use, primarily through irrigation. With estimates of a 40% increase in global water requirements by 2030<sup>1</sup>, agriculture must maximise the “crop per drop” that farmers produce and help close the gap in future water demands. Today, over one billion individuals suffer from chronic hunger. The growing inaccessibility of water resources due to climate change may significantly increase the number of those going hungry, the majority of whom live in the poorest and most vulnerable communities in the developing world. Beyond hunger, water insecurity is a catalyst for civil unrest, a variety of health problems and environmental degradation.

Numerous changes in water management are needed to improve water security. Sustainable use of water in agriculture is critical. At a minimum, this will require investment in irrigation and water management technology, alongside the dissemination of plant science technologies, adoption of advanced farming techniques, and investment in crop research.

### **Sustainable water management**

*Policies must enable and incentivize the most sustainable and efficient farming methods to optimize water use in agriculture.*

Depending on the circumstances, irrigation can produce two to three times as much per hectare as non-irrigated agriculture<sup>2</sup>, allowing farmers to increase production of their land without having to convert unfarmed land into cropland.

Around 1.2 billion people live in areas of water scarcity today. The OECD predicts that this will increase to an estimated 3.9 billion people by 2030, most of whom will be in developing countries.

However, inefficient irrigation can waste water resources, and current water resources are already under great pressure from the unprecedented population growth of the last fifty years. The number of irrigated hectares is expected to increase by a further 20% in the next 30 years<sup>3</sup>.

### **WHAT NEEDS TO BE ADDRESSED?**

#### **Sustainable water management**

Policies must enable and incentivize the most sustainable and efficient farming methods to optimize water use in agriculture.

#### **Disseminating technologies and knowledge**

Policies must facilitate farmer access to training in optimal farming methods, as well as ensure infrastructure and technology is available to implement them.

#### **Access to water resources**

Policies need to prioritise access to safe and reliable water resources if farmers are to produce sufficient yields to provide for food security.

#### **Fostering innovation**

Policies should be science-based and conducive to continued innovation in developing and improving water-efficient technologies and knowledge in agriculture.

<sup>1</sup> 2030 Water Resources Group, 2010.

<sup>2</sup> UN, 2006.

<sup>3</sup> FAO, 2008.

We need to reduce the water used to produce food. The most effective way to increase water efficiency is by following a step-by-step approach, considering measures from the source of water to the eventual plant biomass or animal produced. There are concrete measures that can be taken today to achieve greater water efficiency in crop production. These include **repairing leakages along canals and pipes**; **improving or upgrading irrigation systems**; and **promoting plant canopy growth** to reduce water evaporation from soil. Providing farmers with **improved pesticide applicators and packaging** also helps reduce water use.

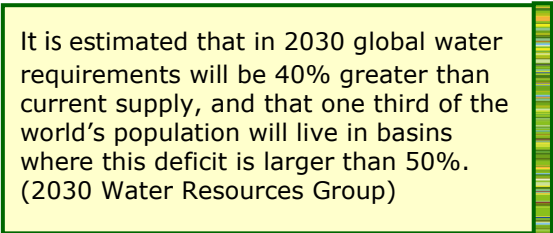
Beyond good practice in the management of water resources, improving agricultural productivity also reduces water consumption. By optimizing crop yields per hectare, farmers can grow more food without increasing their water footprint. In many parts of the world, crop production reaches only 20% of the yields achieved in the developed world. To raise productivity levels, more effective **dissemination of agronomic knowledge** is needed, as well as **farmer access to inputs** such as good quality seed and crop protection to reduce pre- and post-harvest losses to pests and disease.

Agricultural productivity increases in the US over the past two decades have significantly reduced the amount of water needed to grow crops. For example, water use for every irrigated acre of cotton has dropped by 32%, meaning 50,000 fewer gallons are now needed to grow an irrigated acre of cotton<sup>4</sup>.

### Disseminating knowledge and technologies

*Policies must facilitate farmer access to training in optimal farming methods, as well as ensure infrastructure and technology is available to implement them.*

Farmers should be able to access existing tools and practices that make efficient use of water; however, access in rural areas is often limited. Collaborations across sectors and across the agricultural commodity chain help ensure that helpful technologies and knowledge get to those who need them most. **Public-private partnerships (PPPs)** should be encouraged as a means to effectively share knowledge and



It is estimated that in 2030 global water requirements will be 40% greater than current supply, and that one third of the world's population will live in basins where this deficit is larger than 50%. (2030 Water Resources Group)

facilitate access to inputs. The Water Efficient Maize for Africa partnership, for example, brings together African public sector institutions and several private sector companies and foundations to develop drought-tolerant African maize. Such partnerships can be effective in facilitating the **distribution of agricultural inputs**, such as seeds and crop protection products, the **construction of agricultural infrastructure**, for instance irrigation systems, and the **building of transport links** to ensure accessibility to the most remote regions.

Training programmes provide farmers with locally relevant knowledge to practice the most efficient water-use techniques, optimize agricultural productivity levels, and apply the most sustainable farming methods. Continued **research into sustainable agricultural techniques** and **effective extension services** is crucial to ensuring that farmers are trained in the most advanced techniques for optimising water use in crop production. Practices such as conservation tillage, can make a big difference by preserving soil moisture and limiting run-off, reducing soil erosion by up to 50-98%. These low or no-till agricultural practices are often enabled through the use of crop protection products and improved seed. In Argentina and the U.S., the use of herbicide-tolerant soybean crops has reduced the number of tillage operations by up to 58%<sup>5</sup>.

Policies must encourage farmers to practice sustainable farming practices to maximise agriculture's capacity for preserving natural resources.

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<sup>4</sup> Field to Market 2009, Keystone

<sup>5</sup> Nature, 2010.

CropLife trains over 250,000 agricultural workers in Integrated Crop Management (ICM) techniques every year as a means of improving resource management, including water. Stewardship programmes also aim to protect water quality and availability by reducing soil erosion, avoiding run-off of pesticides and increasing wildlife habitat as part of a holistic land management approach.

## **Access to water resources**

*Policies need to prioritise access to safe and reliable water resources if farmers are to produce sufficient yields to provide for food security.*

It is predicted that by 2030, the impacts of climate change, along with the unsustainable and unevenly distributed use of water across the world, will leave around 3.9 billion people living in areas affected by water scarcity<sup>6</sup>.

Drought and desertification are key barriers to food security. Farmers in drought-prone areas are experiencing a higher frequency of dry spells due to the onset of climate change. In Africa, between 75 and 200 million people could be affected by additional water scarcity by 2020.

Equally, climate change has resulted in increasingly frequent floods. Whilst some agricultural areas of the world rely on annual flooding for production, such as Bangladesh, irregular floods of high magnitude can cause crop loss and widespread, long-term damage to agricultural land.

Crop production is impossible without adequate and timely water availability. For this to be possible, **effective international action to stem climate change and mitigate its effects** is a crucial prerequisite. Policies also need to address the impact of rising urbanisation on water availability through a consequent growth in demand for water for domestic and industrial use, resulting in less water for agricultural use. One measure with significant potential is the **use of treated wastewater for irrigation in agriculture**. Spain and Mexico are among the few countries where this is currently widely practiced and there is potential for much wider adoption of this practice. Globally agreed and coordinated policies are needed to address the irregular distribution of water resources and ensure that farmers, particularly in drought-prone areas, are able to access a reliable and clean supply of water. Investment needs to be increased in **agricultural research** that examines the water crisis and generates solutions in the form of protective infrastructure and agricultural tools that can help mitigate and adapt to increasingly water scarce conditions.

Beyond farmer access to water resources, the population at large must have access to clean, safe water resources. While much of this rests on the availability of adequate water treatment and delivery facilities, the agricultural community also has a role to play in preventing run-off of pesticides. Again, effective extension services can help ensure that agricultural workers are trained in best practices to prevent run-off and preserve water quality. A successful multi-stakeholder project has been led by the EU to define best practices in minimizing point-source pesticide losses into waterways. The TOPPS project<sup>7</sup> has used its findings to train and advise agricultural workers across Europe. Such collaborative projects are an effective way to minimize the potential impact of agricultural practices on water quality. CropLife's stewardship activities also include training on best practice in preserving the quality of waterways around agricultural land.

## **Fostering innovation**

*Policies should be science-based and conducive to continued innovation in developing and improving water-efficient technologies and knowledge in agriculture.*

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<sup>6</sup> OECD, 2010.

<sup>7</sup> See <http://www.topps-life.org/>

Research and development into enhanced crop varieties offers great potential for the future of agriculture. Due to climate change, increased instances of severe weather such as drought and flooding will impact soil quality and availability. Drought and salinity lead to soil degradation, while flooding impacts harvests and may make some areas impossible to cultivate for long periods afterwards.

Biotech traits that enable plants to cope with drought and other water-related stresses, such as flooding and high salinity levels, offer great potential to improving water use efficiency.

The first drought-resistant crops are expected to be commercialised by 2012, pending government approvals, and are scheduled to be released in sub-Saharan Africa by 2017. Scientists estimate that maize with drought tolerance could perform better than non-biotech maize in moderate drought conditions by about 25-30%, which would translate into some two million more tonnes of food in times of drought. Research is also being conducted on 'waterproof' rice, which withstands submersion for longer periods of time, as well as on salinity resistance and tolerance of high temperatures.

Biotechnology has potential beyond food production – its application in wastewater treatment and remediation of contaminated soils are also being studied.

Crop protection products play a major role in water conservation by efficiently controlling invading alien plants that threaten scarce water resources. By reducing the competition between crops and weeds for moisture, herbicides also help produce higher yields with the same amount of water.

The private sector accounts for one-third of all research and development in agriculture<sup>8</sup>, which it invests in the lengthy process of researching and developing new, improved solutions for growing more food sustainably. The top 15 plant science companies spent US\$5 billion in 2008 on R&D. These important investments in solutions for the future presuppose facilitative, **science-based policies** that foster and incentivize such innovation. Such policies should encompass clearly defined, **robust intellectual property protection systems**.

Plant science technologies can make a significant difference to the ability of the world's farmers to grow crops in a sustainable manner in the face of challenges including water scarcity. However, the availability of such solutions needs to be complemented by continued research and innovation into other areas, including sustainable farming practices, more efficient pesticide application mechanisms, infrastructure for water treatment and delivery, and water efficient practices across all sectors.

**CropLife International is committed to providing farmers with the technology they need to optimise yields and increase water efficiency, while recognising that effectively addressing water scarcity requires action on each of the above principles. CropLife International calls for policies that reflect and support these priorities.**

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<sup>8</sup> Consultative Group on International Agricultural Research (CGIAR), 2007