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Investing in ecosystem services vital to improving food security

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Recognising healthy ecosystems as the basis for sustainable water resources and stable food security can help produce more food per unit of agricultural land, improve resilience to climate change and provide economic benefits for poor communities, according to a new report from the United Nations Environment Programme (UNEP) and the International Water Management Institute (IWMI), in partnership with 19 other organizations, including the Stockholm Environment Institute and the Stockholm Resilience Centre.

The report shows how managing and investing in the connections between ecosystems, water and food, through diversifying crops, planting trees on farmland and improving rainwater collection and other practical steps, could help avoid water scarcity and meet the growing food demands of a global population set to reach 9 billion by 2050.

The report **An Ecosystems Approach to Water and Food Security**, launched during World Water Week in Stockholm, Sweden, says that policymakers should consider farmland, fisheries and other agricultural areas as "agroecosystems", which provide sources of food as well as performing diverse ecosystem services such as water purification and flood regulation.

Declines in these 'regulatory' ecosystem services – leading to problems such as a loss of soil nutrients or increased vulnerability of crops to disease – have already begun to adversely affect agricultural productivity. Exacerbated by climate change, these declines could result in crop yields that are up to 25% short of demand by 2050, greatly impacting poor communities worldwide.

One of the main challenges in boosting current levels of food production is the availability of water, which is needed for livestock, crop irrigation and fisheries and other agricultural uses. Groundwater levels, for example, are declining rapidly in several major breadbaskets and rice bowl regions such as the North China plains, the Indian Punjab and in the Western USA. Maintaining healthy, resilient ecosystems to ensure water availability for agriculture and other ecosystem services is thus essential for long-term food security.

In many parts of the world, increases in food production through intensive farming methods have come at the expense of other ecosystem services, such as biodiversity, pollination or soil erosion protection, caused by pollution from agricultural run-off or the diversion of water from rivers to farmland.

The UNEP-IWMI report shows how an ecosystems-based approach to agriculture can restore this balance and result in a more efficient use of water, a reduction in the 5-10 million hectares of farmland that are lost each year to degradation, fewer yield losses as a result of pests and increased benefits to poor communities dependent on farmlands, rivers,

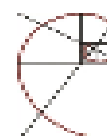
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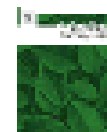
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forests and other ecosystems for their food and livelihoods. But for this shift in thinking to take place, several changes are required to the way ecosystems, water resource management and food security are approached by planners and policymakers.

A new approach

Written by over 50 contributors from 21 organizations, and using case studies from China, Guatemala, Jordan and other communities, the report recommends changes to three specific areas - environmental protection, water resources management and food production (eg. farms, fisheries and livestock) – which are needed to improve food security and reduce stresses on water supply. The report also sets out recommendations for drylands, wetlands, crop systems, fisheries and livestock systems.

Drylands support one third of the world's population, up to 44% of the world's cultivated systems and about 50% of the world's livestock. Water scarcity and land degradation are the most prominent constraints for food production in these areas. Desertification also poses a major environmental problem. The report states opportunities exist to increase the productivity of agroecosystems in drylands, such as:

- Creating corridors to promote the movement of livestock, which can reduce overgrazing and land degradation caused when animals are confined to small areas
- Diversification of land to integrate crop, tree and livestock production and promote soil fertility through manure, crop residues and provide tree fodder for feed
- Cultivation of local plants better adapted to dry conditions, which can capture benefits from infrequent rainfall and control erosion in areas too dry to support traditional field crops

Wetlands such as lakes, rivers and mangroves, support multiple, high-value ecosystem services, many of which are vital for agriculture, such as water storage and water quality control (eg. purification and retention of nutrients). However, agriculture is a major cause of wetland loss worldwide through water use and land conversion. In Asia, for example, over a third of mangrove habitats have been lost since the 1980s due mainly to shrimp and fish farming and deforestation.

UNEP, IWMI and partners recommend several steps to help realign agriculture improved and wetland policies:

- Reducing pollution of wetlands through improved practices for the use of fertilisers and pesticides
- The use of buffer strips between land and water to protect rivers and lakes from potentially harmful run-offs
- Providing alternative drinking sites for livestock away from sensitive wetlands
- Improving monitoring and assessment of environmental changes to wetlands

Opportunities exist in specific food production systems, such as crops, fisheries (aquacultures) and livestock, to take into account the interconnections between agriculture and ecosystems services. The resulting "agroecosystem" approach can improve food security and nutrition by diversifying food sources, while also improving sustainability. Key recommendations from the report include:

- Incorporating trees, hedgerows and other natural vegetation in agricultural landscapes to connect forest habitats, provide more insects for crop pollination and reduce soil erosion
- In livestock systems, using crop residues and tree fodder for animal feeds to reduce water use
- Invest in animal health measures to help reduce the need for bigger herds and, subsequently, reduce water use for maintaining livestock

As well as improving food security, an ecosystem services approach to agriculture can also help raise living standards and income. The Peruvian Amazon, for example, is home to indigenous communities that rely on forest ecosystem services for their food supply, livelihoods and cultural practices. Recently, conservation groups have been working with local people to develop agricultural and economic resources. Through better ecosystem management, some 600 families saw their incomes increase, mainly through revenues from more productive fish

farms and agroforestry. Increased food production came hand-in-hand with conservation plans, which were developed for 16 forest communities.

In its recommendations to government ministries and other policymakers, the report by UNEP, IWMI and collaborators states that closer collaboration between authorities in agriculture, environment, forestry, fisheries and other sectors is essential if ecosystems are to be placed at the centre of food security efforts. This may also include incentives – such as paying farmers to plant and maintain trees on their land – to bolster ecosystem services and their long-term contribution to water and food security.

Notes to editors

To download the UNEP-IWMI report, An Ecosystems Approach to Water and Food Security, as well as the background document Ecosystems for Water and Food Security, please visit: www.iwmi.org/ecosystems and www.unep.org

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