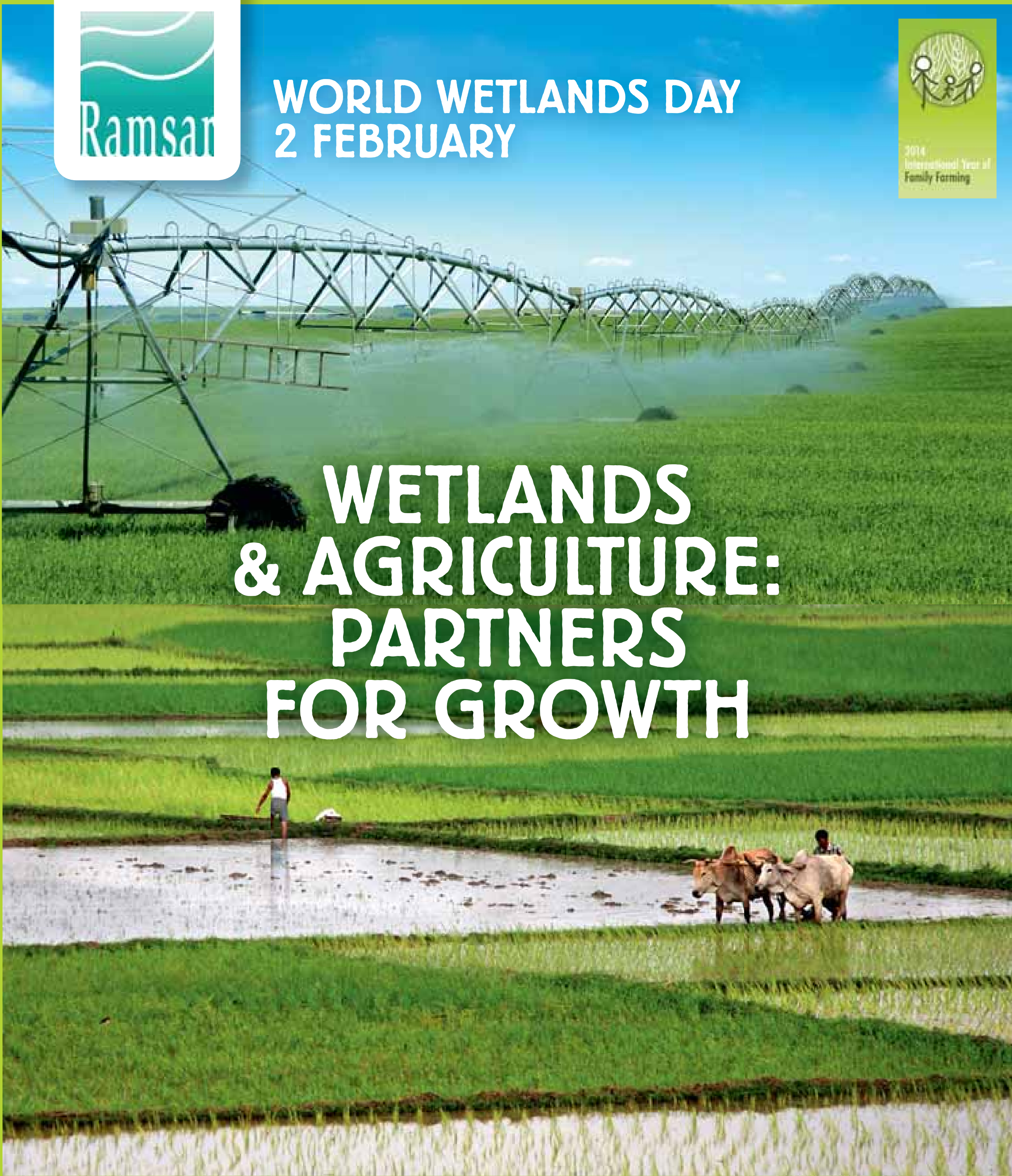
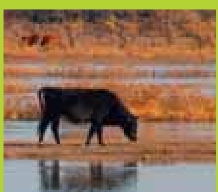
Ramsar

WORLD WETLANDS DAY
2 FEBRUARY

2014 International Year of Family Farming



WETLANDS & AGRICULTURE: PARTNERS FOR GROWTH



UNDERSTANDING AGRICULTURE AND WETLANDS

MANAGING THE IMPACTS OF AGRICULTURE

FINDING CREATIVE SOLUTIONS

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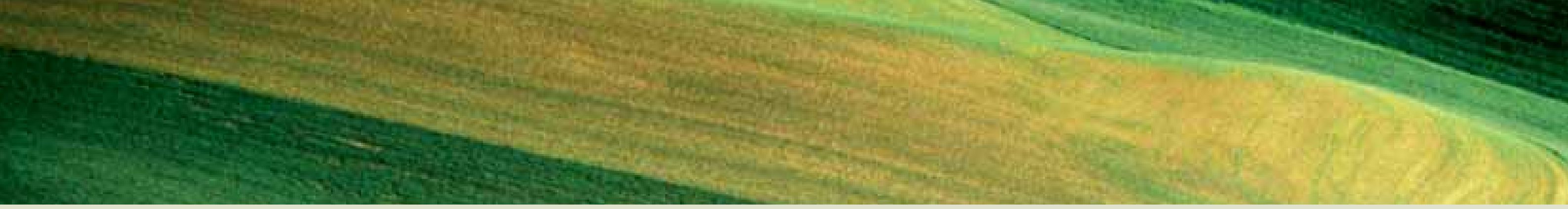


INTRODUCTION

Wetlands have been used for agriculture for millennia, especially riverine wetlands in floodplains where soils are fertile and water is plentiful. Indeed, wetlands have nurtured the development of many important cultures around the world – but the downside is that drainage and reclamation of wetlands for agriculture has become ever more widespread and effective. **In some regions of the world more than 50% of peatlands, marshes, riparian zones, lake littoral zones and floodplains have been lost,** with conversion for agricultural uses being one of the primary reasons for these ongoing wetland losses. Today, roughly **2.5 billion rural people depend directly on agriculture, forestry, fishing and hunting** or some combination of these for their livelihoods. Thus agriculture is often a primary driver of economic growth in developing countries and provides critical economic support for poor rural households.

Wetlands provide food and other agricultural products such as fuel and fibre directly through agricultural production activities that take place within wetlands, such as in rice paddies, coastal grazing marshes, recession agriculture and aquaculture in large floodplains, and cropping of small seasonal wetlands. Wetlands **also support agriculture indirectly,** for example by providing fertile soils and reliable supplies of good quality water.

In support of the UN International Year of Family Farming, Ramsar's theme for World Wetlands Day 2014 is **Wetlands and agriculture.** It provides an ideal opportunity to highlight the importance of wetlands in supporting agriculture, especially since many family farming operations rely on the soils, water, plants and animals found in wetlands to provide food security and improve their livelihoods. In this leaflet we'll explore some of the **more critical interdependencies between agriculture, water and wetlands,** with special attention to the role of wetlands in providing natural infrastructure to support agriculture for food production. We'll also show how people around the world are finding **practical ways to resolve some of the conflicts and tensions** that can arise. The Ramsar Convention and partner organizations such as FAO and IWMI offer many practical tools and integrated approaches to help in these efforts.

Before we look in more depth at wetland-agriculture interactions it is useful to first identify the **diversity of types and scales of agriculture**. Agriculture encompasses subsistence production, where families produce enough to meet their own needs; small-scale or artisanal production, where farmers may produce additional, often specialized, goods in relatively small quantities which they can trade or sell; and commercial production, where large quantities of agricultural goods are produced, often in monoculture settings, for widespread distribution and sale.

Intensive agricultural systems tend to use more inputs (fertilizers, chemicals, modern machinery or traditional manual labour) to generate higher levels of productivity from relatively smaller areas. **Extensive** (sometimes called non-intensive) **agricultural systems** tend to use smaller inputs relative to land area and rely more on natural processes and productivity.

Crop production can be rainfed or irrigated. Irrigation can be delivered through surface water application via spraying or flooding of fields or through mist, micro-jet and micro-drip irrigation systems. In many arid parts of the world, farmers use traditional practices as well as modern technology to carefully manage soil moisture content in their fields to ensure adequate water for their crops.

Combined agricultural production systems, bringing together crop farming, animal husbandry and sometimes aquaculture in one farming operation, can be found in all parts of the world, and can be either intensive or extensive systems.

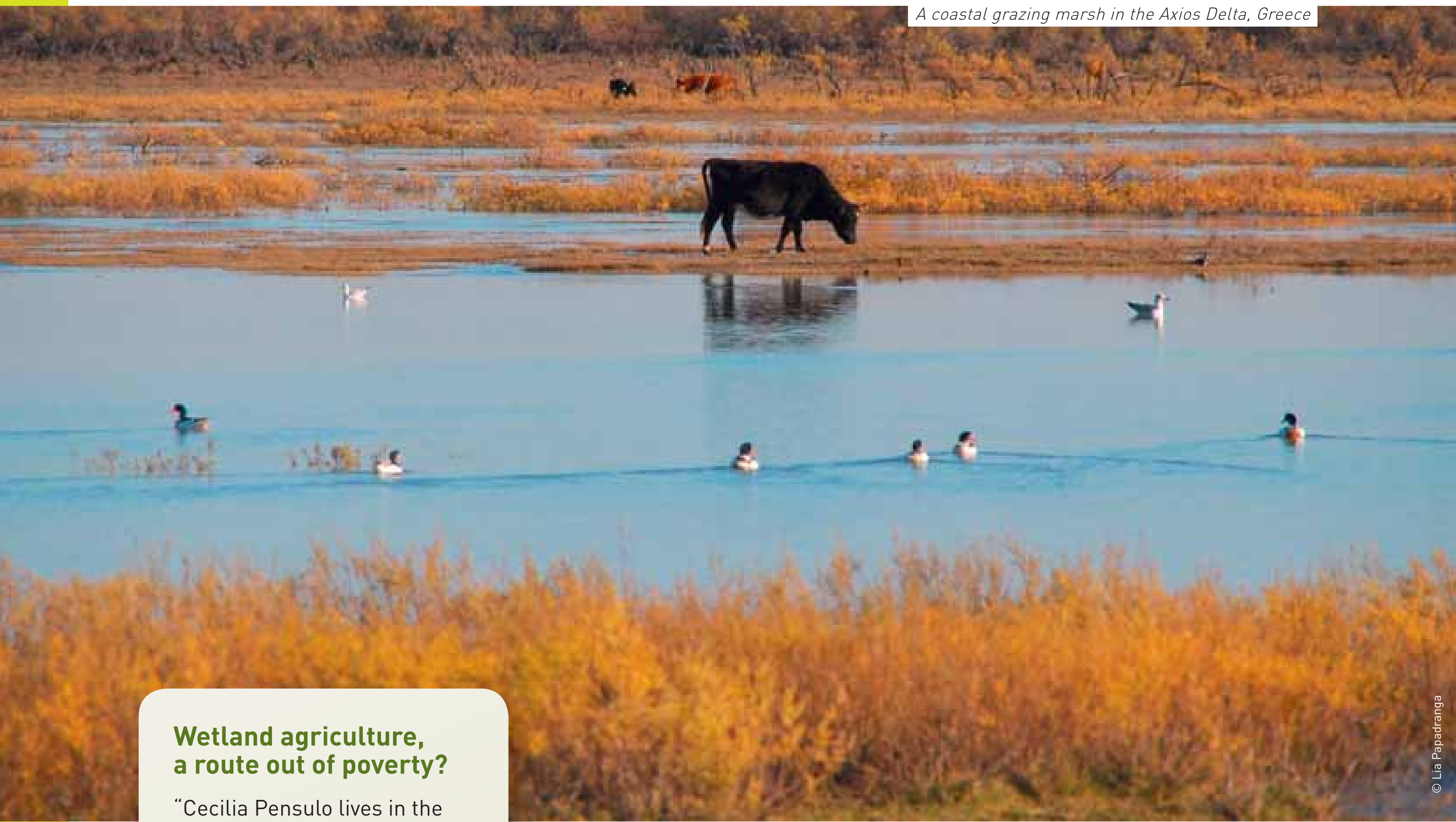
DEFINITIONS

- Ramsar uses a broad definition of **wetlands**, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans.

- **"Agriculture** is "the deliberate effort to modify a portion of Earth's surface through the cultivation of crops and the raising of livestock for sustenance or economic gain" (Rubenstein, J.M. 2003). Crops may provide food and other resources such as fuel and medicines.

For the purposes of this leaflet, this definition of agriculture will include not only land-based agriculture, but also inland and coastal aquaculture (but not capture fisheries). **Aquaculture** as defined by FAO includes the farming of both animals (including crustaceans, finfish and molluscs) and plants (including seaweeds and freshwater macrophytes).

AGRICULTURE AND WETLANDS: COMPLEX INTERACTIONS IN A COMPLEX SETTING



A coastal grazing marsh in the Axios Delta, Greece

© Lia Papadranga

Wetland agriculture, a route out of poverty?

"Cecilia Pensulo lives in the Mpika District of Northern Zambia, bringing up four children by herself. She was aware that there was plenty of land available in the dambo (seasonal wetland) near her village. With help from a local NGO she learned that with new cultivation methods this previously unusable land could become productive. In her first year of cultivation in the dambo she met her household costs and could also send her children to school again. In her second year, from the pumpkins, squash and tomatoes she sold to traders from the nearby district headquarters, she managed to make over $200, a small fortune by local standards."

Source: Sampa J. (2008)

Given their importance for water supply and food production, wetlands are a key element of achieving the goals of poverty alleviation worldwide. They can literally be lifesavers – for example, oases and springs, particularly in arid regions, that support dry season food production, water and grazing for livestock.

Wetlands used for agriculture can be:

- **Wetland ecosystems which have been converted to some degree but maintain a modified range of ecosystem services that support agricultural production.** Examples include "dambos", "bas fonds", "inland valleys" and other similar small seasonal wetlands in Africa; floodplains in which flood recession agriculture and seasonal aquaculture are practiced; rice paddies; and coastal grazing marshes.

- **Wetlands that are dependent on continued agricultural activities to maintain their ecological character, such as mowing and grazing in wet grasslands.** Many wet grasslands are also important for biodiversity and hydrological functions as well as for agriculture and freshwater fisheries.

- **Wetlands maintained in a natural state for production and harvesting of specific products,** such as the Kakagon and Bad River Sloughs Ramsar Site in the USA, where wild rice beds are managed and harvested using traditional techniques.

- **Wetland systems constructed or managed expressly for agricultural purposes** may also have wetland biodiversity values, for example cranberry

Wetlands and biofuels, friends or foes?

The cultivation of various crops for bioenergy has increased rapidly since 2000. If current trends continue, land requirements for biofuel production in 2030 are expected to be about 35 million hectares, an area the size of Spain and France combined.

In some parts of the world the land and water impacts on wetlands due to biofuel production have been significant. For example, many tropical peatlands in southeast Asia (about 880,000 ha by the early 2000s) have been drained and converted for production of palm oil, which is used for bioenergy amongst other things.

The Ramsar Convention's resolution on wetlands and biofuels in 2008 noted the growing tensions between wetlands and biofuel production. While sustainable biofuel production can provide additional revenue for farmers and satisfy essential energy needs, national and regional energy planning need to consider the impacts on wetland ecosystem services and find ways to balance the "pros" and "cons".

Palm oil fruits ready for transport, Sungai gelam, Jambi, Indonesia

KEY MESSAGE

Wetlands serve as valuable natural infrastructure for agriculture, providing reliable water and fertile soils, but they are at risk from agriculture's growing demands for land and water. They are increasingly threatened by population growth, large-scale development initiatives intended to alleviate poverty, and the possible impacts of climate change. The functions and economic values of wetlands must be considered in planning for the production of food and other agricultural products.

DEFINITION

Wetlands deliver a wide range of **ecosystem services** that contribute to human wellbeing. These include **provisioning services** such as food, fresh water, fibre and fuel; **regulating services** such as water purification and waste treatment, climate regulation, retention of soils and sediments, protection from storms and floods; **supporting services** such as soil formation and nutrient cycling (nitrogen, phosphorus and carbon); and **cultural services** such as aesthetic and spiritual values, education and recreation.

bogs, fish ponds, or reservoirs originally built for irrigation which also support migratory waterbirds and other wetland species.

Many wetland ecosystems around the world have already been severely affected by agricultural water use: for example, the Aral Sea has lost about two-thirds of its volume and its water has become much more saline due to upstream demands for irrigation water; abstraction of groundwater for irrigation in the Guadiana basin in Spain has led to rivers running dry and downstream wetlands becoming desiccated; human pressures and rising air temperatures have led to the frequent drying up of the Yellow River in China.

Wetlands are also increasingly being impacted by activities related to energy production, for example through demands for water and large-scale conversion of wetland areas for the cultivation of biofuels.

> **"Wetlands are being impacted by conversion for the cultivation of biofuels"**

The likely impacts of climate change will also add to stresses on wetlands and wetland fauna and flora that are already working hard to deliver food and fresh water for humans – they will make rainfall less predictable in many regions of the world, which in turn will particularly affect agriculture. This places wetlands in the middle of the 'energy-water-food-ecosystems nexus', where wetlands both affect and are affected by energy, water and food policies. The challenge? We need 'joined-up' thinking to manage these interconnections, and for many countries this is an ongoing challenge.

IMPACTS OF AGRICULTURE ON WETLANDS IN BRIEF

There are many ways in which poorly managed agriculture can negatively impact wetlands. This can lead to changes in the ecological character of a wetland and the possible permanent loss of its benefits to people.

Seaweed aquaculture in Zanzibar, Tanzania

DEFINITION

Ramsar defines **the ecological character of a wetland** as "the combination of the **ecosystem components** (physical, chemical and biological parts of a wetland), **processes** (physical, chemical or biological changes or reactions occurring naturally in a wetland) and **benefits/services** (benefits that people receive from wetlands) that characterize the wetland at a given point in time".

▶ **Water quantity impacts:** Decreases in flows due to the building of dams and abstraction of surface water and groundwater for irrigation or other purposes, increases in river flows or water levels due to irrigation return flows or dam releases, and changes in the timing and patterns of river flows can all significantly alter and sometimes damage the ecological character of wetlands. Many coastal wetlands depend on the nutrients and sediments carried down by rivers to maintain their ecological character.

▶ **Water quality impacts:** Intensive agriculture activities including intensive aquaculture often lead to increased loads of pollutants such as pesticides, fertilizers, antibiotics and disinfectants. Not only do these affect the ecological character of both inland and coastal wetlands, they also have impacts on human health and the quality of drinking water supplied from wetlands.

Wetland conversion and disturbance: Agricultural activities which can disturb wetland functions and ecosystem services include the drainage and conversion of wetlands to cultivated land or aquaculture; the introduction of invasive plant and animal species; the introduction of human and animal disease vectors; and the disturbance of breeding, migration and feeding patterns of wetland fauna. For example, the rapid expansion of intensive shrimp farming has contributed to the loss of large areas of coastal wetlands in several countries, with an associated loss of wetland ecosystem services such as coastal storm protection, fisheries, and mangrove forest products.

Conflicts over land and water in the Tana River Delta.

Approximately 97,000 people living in the Tana Delta in Kenya relied on water and grazing for livestock, cultivated rice and other crops on the flood recession and river banks, and made use of the Delta's diverse fish resources. Increasing demands from developers to convert large tracts of land in the Delta for biofuels and other commercial crops led to violence as the people living in the Delta found their livelihoods threatened.
The High Court recently ruled that a master plan for the shared use of the Delta's natural resources must be drawn up with the full participation of local people.

FACTS AND FIGURES

Water for agriculture: how much do we use; how does it affect wetlands? And what lies ahead in the coming decades – do we have enough water for our planet's growing population?

70%

The percentage of all withdrawals from surface water and groundwater that is used for agricultural purposes. Most of it is used for irrigation: some finds its way back to rivers and groundwater as return flows, and the rest returns to the atmosphere through evapotranspiration (Figure 1).

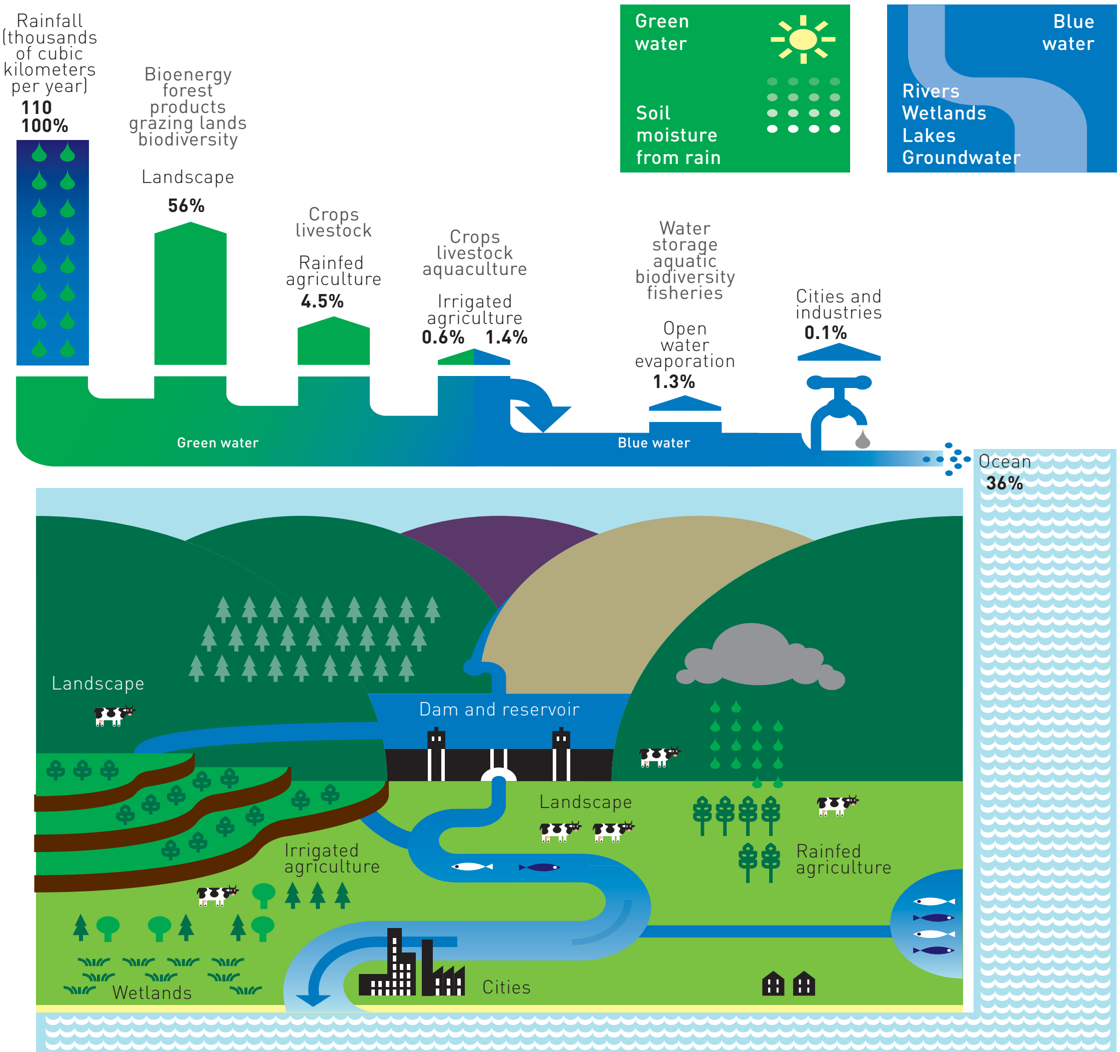
40%

The approximate percentage of irrigated areas that rely on groundwater either as a primary source or in conjunction with other sources of water.

20%

The estimated percentage of current agricultural water needs that are met by irrigation - the rest is provided by rainfall. The balance between rainfed and irrigated agriculture is highly variable around the world (Figure 2).

Figure 1: Water use in rainfed and irrigated agriculture



Source: Comprehensive Assessment of Water Management in Agriculture (2007)

19%

The best estimate of the increase by 2050 over current rates of global agricultural water consumption, including rainfed and irrigated agriculture, to produce food, fibre and bioenergy – and much of the increase will be in irrigation water demand in areas which are already water-scarce.

11%

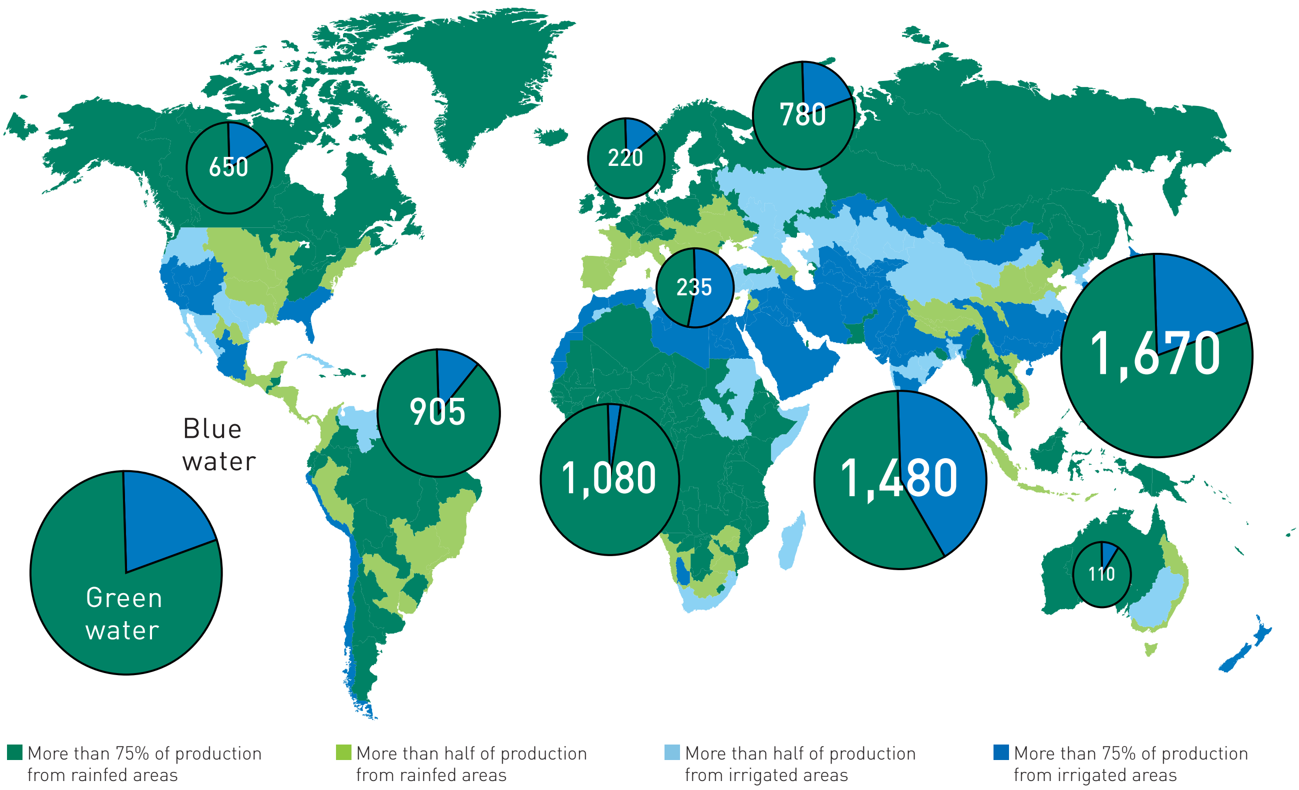
The percentage of the world's land surface currently used for crop production. Agricultural production has almost tripled over the past 50 years while the total cultivated area has only grown by 12%, clearly showing the effects of intensification. Irrigated areas have doubled in extent in that time, and they account for about 40% of the increase in production.

6.6%

The average growth per year in food fish production through aquaculture between 1970 and 2008. The demands for land, water and feed for fish are also increasing, leading to more pressures on both inland and coastal wetlands.

Figure 2: Balance between rainfed and irrigated agriculture around the world

Global total: 7,130 cubic kilometers (80% from green water, 20% from blue water)



Note: Production refers to gross value of production. The pie charts show total crop water evapotranspiration in cubic kilometers by region.

Source: Comprehensive Assessment of Water Management in Agriculture (2007)

KEY MESSAGES

- ***In many parts of the world water resources have already been utilized at or beyond their sustainable limits. Agriculture will need more water to support more people in future, yet wetlands must still have enough water to maintain their ecological character and essential ecosystem services.***
- ***Agriculture will need more land to support more people in the future, but conversion of wetlands for agriculture will lead to the loss of vital wetland ecosystem services.***

AGRICULTURE, WETLANDS AND WATER
FINDING THE RIGHT BALANCE

The wise use of wetlands and their ecosystem services is central to the purpose of the Ramsar Convention. So what is wise use in the agricultural context? It means managing agriculture-wetland interactions in ways that maintain essential wetland ecosystem services; it means seeking an appropriate balance between provisioning, supporting, regulating and cultural services. The need to find this balance as well as recognize the importance of wetlands to agriculture are highlighted in Ramsar's Resolution VIII.34 (2002) on agriculture, wetlands and water resources management.

DEFINITIONS

▶ At the centre of the Ramsar philosophy is the concept of **"wise use"** – in its simplest terms it means the conservation and sustainable use of wetlands and their resources, for the benefit of humankind. For scientists it is defined as "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development".

▶ An **agroecosystem** can be defined as "a biological and natural resource system managed by humans for the primary purpose of producing food as well as other socially valuable non-food goods and environmental services".

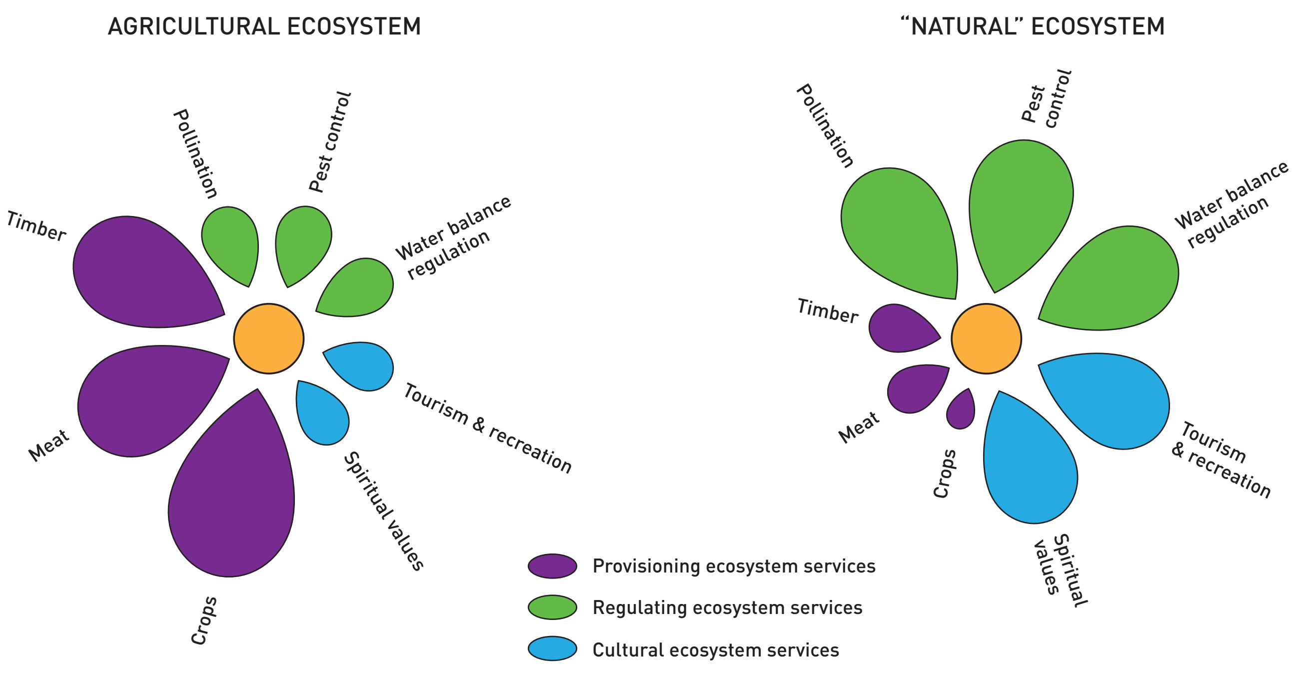
Agriculture focuses on managing and enhancing provisioning ecosystem services. While we can increase agricultural production – thus increasing the provisioning services – perhaps by using more fertilizers to obtain higher yields for crops grown in seasonal wetlands or by withdrawing larger amounts of water for irrigation, there is the risk that the ecological character of the wetlands will be altered to the point where we lose essential regulating and supporting services (Figure 3). And this can in turn result in the subsequent loss or degradation of those very provisioning services that were so important in the first place.

Global solutions are few, since climate, wetlands, agriculture and communities vary so greatly from region to region.

Yet experience and observations from many wetlands show that **it is indeed possible to find mutual benefits for agriculture and wetlands**, particularly when local solutions are implemented using local knowledge, within larger integrated planning efforts.

The most effective solutions to the question of balance tend to be those that **employ a combination of approaches,** including: agricultural practices that help to reduce impacts on wetlands; development of multifunctional agro-ecosystems which are managed to provide the broadest possible range of wetland ecosystem services; and restoration of wetlands to provide functions and services in agricultural landscapes.

Figure 3: Agriculture generally increases provisioning ecosystem services at the expense of regulating and cultural services.



Source: L.J. Gordon et. al. Agricultural Water management 97 (2010): 512-519

REDUCING IMPACTS OF AGRICULTURE ON WETLANDS

▶ **More "crop per drop":** There is still much scope for improvement in water productivity and management in both irrigated and rainfed agriculture. Highly efficient irrigation technologies are becoming more widely available; drought-tolerant crop varieties are reducing irrigation needs; and cultivation of more flood-tolerant crops could reduce the need to drain wetlands. Traditional agricultural water management practices can be made more effective with smartphone technologies that allow farmers to access weather and crop data in the field. Water re-use and wastewater use in agriculture can reduce withdrawals from wetlands. Return flows from urban areas could provide valuable water resources for agriculture, and wetlands can help to provide treatment before this water is used for agriculture.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Waza Logone Ramsar Site where traditional farming, livestock and fishing sustain local livelihoods

▶ **Integrated water resources planning:** While large dams will remain an option for reducing the vulnerability of farmers to drought and for increasing production, small local storage options such as tanks and farm dams provide local resilience: for example, the ancient irrigation systems of Sri Lanka utilize networks of large and small reservoirs called "tanks", which are frequently a rich source of wetland biodiversity. Larger dams can be designed and operated for multiple uses such as agriculture, hydropower, fisheries, and recreation, and should allow water releases for downstream ecosystems.

▶ **Reducing the impacts of agriculture on water quality:** Options such as conservation tillage and organic farming practices can reduce the pollution loads reaching wetlands. Integrated pest management and targeted life stage interventions can help to reduce the need for pesticide. Combined production systems can utilize livestock manure to fertilize crops and aquaculture. In small, intensive operations and family farms these strategies can reduce input costs significantly. ■

Combined production systems

Combined production systems are often intensive smallholder operations, and while they may require significant labour inputs they are often very efficient in their use of soil, water and nutrients. In traditional rice-fish systems in Asia, farmers use practices that are thousands of years old, where fish provide fertilizer for the rice and help to control insect pests and weeds in the fields, while the rice provides shade and habitat for the fish. Rice-fish-duck systems in China take this approach further, and in areas where silk production is important, mulberry trees are incorporated into combined production systems with fish and ducks. The ancient Ifugao Rice Terraces in the Philippines support intensive organic food production, significant agricultural biodiversity and a culture that is two thousand years old.

Management solutions in Cameroon

In the Waza-Logone floodplain in Cameroon, seasonal floods traditionally supported a large population of fishers, sedentary farmers and pastoralists, all relying on the reliable natural sequence of inundation and flood recession. The construction of a large dam upstream to provide irrigation water for a rice cultivation project led to a sharp reduction in flooding downstream, with associated loss of wetland ecosystems and the livelihoods of people living in the floodplain. Subsequently, alternative water management options were negotiated and implemented in order to restore some of the flooding patterns while still providing water for the rice schemes. The outcomes have been very positive, with the return of traditional farming productivity as well as increases in fish catches and carrying capacity for wildlife and livestock. This experience highlights the importance of recognizing the values of wetland-dependent agriculture in planning for agricultural water infrastructure.

MANAGING LAND AND WATER FOR MULTIFUNCTIONAL AGROECOSYSTEMS

Conventional commercial agriculture has tended to focus on a single provisioning ecosystem service or at most a narrow range of services such as one or other of grain, fibre, fish, meat or biofuel production. **In a multifunctional agroecosystem approach,** farmers manage land and water for a larger set of ecosystem services. Where wetland ecosystem services are involved, this requires a good hydrological and ecological understanding of the landscape so that **production systems deliver not only provisioning services but also essential regulating, supporting and cultural services.** An approach that recognizes the values of the full range of ecosystem services will also allow farmers to identify where and how net benefits could be achieved. ■

Urban agriculture

Increasing productivity on agricultural land outside wetlands will help to reduce the need to convert wetlands. Growing interest in urban agriculture as a viable option for providing food to cities helps to ensure that productivity of other available land is taken into account before converting wetlands.

Wetlands in or near urban areas also provide opportunities for city dwellers to grow crops and raise livestock, which in many cases can be a critical lifeline for poor urban people.

In East Calcutta Wetlands (a Ramsar Site in India), the city's waste water is treated and used for pond-fish cultivation and agriculture.

The wetland provides about 150 tons of fresh vegetables daily, as well as some 10,500 tons of table fish per year, the latter providing livelihoods for about 50,000 people directly, and as many again indirectly.

In Freetown, Sierra Leone, low-lying valleys and areas prone to flooding are being zoned for agriculture in order to discourage people from building there. The green open spaces can store excess flood water and allow infiltration of stormwater.

In Amman, Jordan, urban agriculture and forestry are integrated into the city's Clean Development Plan. In Cape Town, South Africa, 450 ha of wetland area have been protected within the city in order to support small-scale horticulture.

RESTORING WETLANDS IN AGRICULTURAL LANDSCAPES

Restoring wetland functions and securing water allocations to maintain the ecological character of wetlands can be viewed as investments in the natural infrastructure that wetlands provide for agriculture. Wetlands on agricultural land can help to manage flood waters in the wet seasons, improve soil moisture conditions, provide more local water storage for irrigation in the dry season, and provide water for ecosystems downstream. ■

Paying farmers to restore ecosystem services

Wetland ecosystem services other than agricultural production also have economic value, for example in reducing peak flood flows or protecting the quality of drinking water supplies. In a growing number of countries, farmers are paid by downstream beneficiaries to provide these services. In the Tualatin watershed (USA), a local water utility pays farmers to restore riparian vegetation in order to generate shade over the river – this cools the water and offsets the temperature impact of the water treatment plant's discharge as well as improving stream habitat for salmon. And this in turn helps farmers to keep their land in production while also diversifying their revenue.

The Srebarna Ramsar Site in Bulgaria includes arable lands, forests, islets with reedbeds and a freshwater lake

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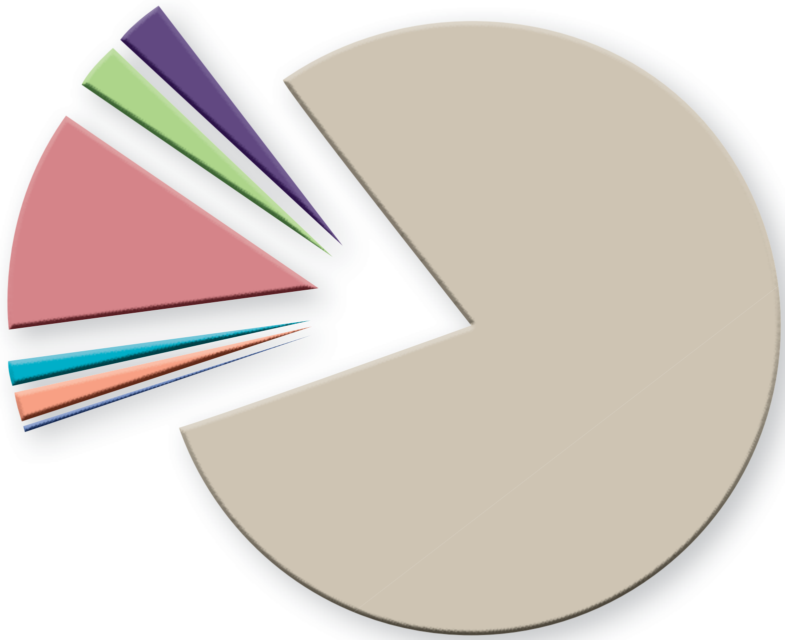
RAMSAR SITES
EXAMPLES OF MULTIFUNCTIONAL AGROECOSYSTEMS?

Figure 4: Ramsar Sites which include agricultural wetland types



- Africa
- Asia
- Europe
- North America
- Neotropics
- Oceania
- Other Ramsar Sites

As of August 2013, approximately 20% of all Ramsar Sites included one or more of the following Ramsar wetland types:

- Aquaculture;
- Ponds, i.e., farm or stock ponds, small tanks;
- Irrigated land including irrigation channels and rice fields;
- Seasonally flooded irrigation land.

DEFINITION

Ramsar Sites are wetlands designated by the Convention's Contracting Parties for inclusion in the **List of Wetlands of International Importance** because they meet one or more of the Ramsar Criteria. Learn more about the Criteria here: www.ramsar.org/criteria_en/

There are many Ramsar Sites around the world where agricultural production within the wetland area is an integral aspect of both the ecological character and the wise use of that wetland (Figure 4). Many human-made Ramsar Sites constructed expressly for agriculture or aquaculture also provide significant biodiversity and cultural values.

Of course Ramsar Sites are not immune to threats posed by agricultural activities within or outside their boundaries. A study undertaken in 2006 showed that more than 78% of all Ramsar Sites supported agricultural activities but these same activities were also listed as a threat to more than half of those sites.

Supporting wildlife: human-made Lakes of Tata Ramsar Site, Hungary

Organically farmed rice fields at Kabukuri-numa Ramsar Site, Japan

© Lew Young

RAMSAR SITES AND AGRICULTURE, A WORLD OF DIVERSITY

▶ **Rice paddies at the Kabukuri-numa wetland in Japan** are farmed organically and also managed so as to attract wintering waterbirds. In winter and post-harvest, the rice fields are left flooded for wild birds to winter in the site; later the nutrient-rich soil from droppings is used as natural fertilizer for the wild rice, in addition to controlling weeds and pests.

▶ **The marshes of the Cotentin and Bessin in France** are flooded in winter and provide a huge area for fish and waterbirds. When they dry in spring, local farmers release their cattle on the rich pasture land. The surrounding higher meadows are used for hay making. This sustainable way of dairy farming evolved in medieval times and still suits modern agricultural needs.

▶ **The Oasis de Ouled Saïd in Algeria** is a rare human-made wetland created on the vestiges of a "fossil" wadi where a traditional "fouggara" system has been constructed for the capture and distribution of groundwater. The water, distributed in little open-air channels within the tradition of an ancestral social organization, is shared out equitably to individual gardens for the cultivation of palms, cereals and fruits. The site is also important for migratory birds and includes important archaeological remains of "Ksars" (fortresses) from the 14th century.

▶ **Hawizeh Marsh in Iraq (Haur Al-Hawizeh):** the indigenous tribes of Marsh Arabs, or Madans, have practiced their traditional agriculture in the Mesopotamian Marshlands for over 5,000 years, gathering reeds, cultivating cereals and date palm, grazing large livestock, fishing and hunting.

▶ **The Cuatrociénegas Wildlife Protection Area in the Chihuahuan Desert in Mexico** is a complex of streams, marshes and lakes where a local conservation network has joined forces with the users of water from the wetland for agriculture. Through this cooperation new crops have been introduced such as the nopal, a vegetable that has replaced traditional crops with higher water requirements. This has generated higher income for farmers and reduced the water needs from the wetland.

▶ **In the Laguna de la Cocha in Colombia,** farming families have given up unsustainable practices such as charcoal production in favour of more sustainable activities. The use of agrochemicals has declined and new production techniques involving composting, crop rotation and earthworm breeding have reduced soil degradation. ■

Organically grown winter-flooded rice from Kabukuri-numa

© Masayuki Kurechi

© Jassim Al-Asadi

Traditional agriculture is praticed by Marsh Arabs in the Mesopotamian Marshlands

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Flooded marshes of Cotentin and Bessin Ramsar Site, France

© APFF Cuatrociénegas

Nopal, a vegetable made from the prickly pear, replaces high water-demanding crops in the Cuatrociénegas Ramsar Site

KEY MESSAGES

▶ ***Improving the agricultural productivity of land and water can help to limit the amount of water that is withdrawn from wetlands and discourage their conversion for agriculture.***

▶ ***Intensification of agricultural activities can provide some efficiency gains, and so too can adoption of new technologies by farmers or the reintroduction of traditional practices with new technological support.***

▶ ***Managing land and water to create multifunctional agroecosystems helps to provide diversity and resilience for livelihoods and maintain a balance between provisioning, regulating, supporting and cultural wetland ecosystem services.***

RAMSAR, FAO AND IWMI

The UN International Year of Family Farming 2014, coordinated by the UN Food and Agriculture Organization (FAO), offers an opportunity to highlight the critical role of wetlands as natural infrastructure to support agriculture. Many Ramsar Sites support agriculture for families and households. Ramsar has access to a rich and diverse body of knowledge about agriculture and wetland interdependencies, accumulated over the Convention's long history.

FAO, a longtime contributor to the work of Ramsar's Scientific and Technical Review Panel, is mandated to improve nutrition, increase agricultural productivity, raise the standard of living in rural populations and contribute to global economic growth. IWMI's aim is to improve the management of land and water resources for food, livelihoods and the environment.

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ADDITIONAL READING

We have made use of many resources in preparing this text. General reading on the relationship between wetlands and agriculture is given below. Specific sources of information used in each section are available in a separate document on our website here:
www.ramsar.org/WWD2014-resources/

- **Boelee, E. (ed) 2011.** Ecosystems for water and food security. Nairobi: United Nations Environment Programme. Colombo: International Water Management Institute.
- **FAO (2011).** The state of the world's land and water resources for food and agriculture: managing systems at risk. Rome.
  www.fao.org/nr/solaw/en/
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- **Gordon, Finlayson & Falkenmark (2010).** Managing water in agriculture for food production and other ecosystem services. Agricultural Water Management 97(4): 512-519.
- **Hirji, R. and Davis, R. (2009).** Environmental flows in water resources policies, plans and projects: findings and recommendations. World Bank, Washington DC.
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