

## AGRICULTURE 2.0: TOWARDS A GLOBAL REVOLUTION FOR SUSTAINABILITY



Farmers cultivating lettuce, while another farmer digs a small chanal (marrwal) with a donkey.  
Hamish John Appleby (IWMI)

“ Sustainable management of water and land is not a matter of conserving nature and sacrificing productivity and incomes for farmers. Rather, it is the very entry point to be able to raise productivity and improve livelihoods.

Johan Rockström, WLE Steering Committee Chair ”

IN PARTNERSHIP WITH:



# SOLUTIONS FOR SUSTAINABLE INTENSIFICATION OF AGRICULTURE

EXPLORE SELECT HIGHLIGHTS FROM 2015-2016 BELOW.  
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## FROM CONFLICTING DEMANDS TO CONSTRUCTIVE SOLUTIONS IN THE GREATER MEKONG REGION

### CAMBODIA

The currently under-construction Lower Sesan 2 dam has been predicted to cause a 150,000 ton reduction in fish migration per year. Scientists have proposed a fish passage option that would allow more fish to pass unharmed, would consume at most 1.2% of the reservoir water, and result in no more than a 1.1% loss of planned power production. Building on this recommendation, the Cambodian Fisheries Administration is commissioning a six-month feasibility study to assess the efficacy of a fish passage.



Farmer Raman Parmar operates a switch to supply energy generated by solar panels. Prashanth Vishwanathan/IWMI

## SUSTAINABLE USE OF THE WATER HIDDEN BENEATH OUR FEET

### INDIA

Scientists have promoted solar-powered pumps as a green alternative to diesel pumps used for irrigation. However, because the electricity used for pumping is perceived as free, there is a risk of over extraction. To provide incentives for farmers to pump only as much water as they need, scientists have suggested enabling farmers to sell back surplus solar power to the utility grid. To simplify the transaction and avoid potentially high costs, the world's first solar pump irrigator's cooperative enterprise was launched in Dhundi, Gujarat, last year.

## SOLUTIONS FIT FOR FARMERS AND ECOSYSTEMS

### EGYPT

The development of an affordable, small, new plough has made it much easier for resource-poor smallholders in the Nile Delta to adopt raised-bed farming, which conserves water and soil. Scientists working with farmers to test the plough are reporting remarkable results, including a 25 percent saving in applied water, a 25 percent decrease in farming cost and a 15 to 25 percent increase in crop yields. The plough is being put into use all over Egypt, as well as to other countries in the region such as Ethiopia, Eritrea, Iraq, Jordan, Morocco, Nigeria, Uzbekistan and Sudan.

Fortifier pellets made from human waste in Ghana, West Africa. Josiane Nikiema/IWMI



## TRANSFORMING WASTE TO WEALTH

### GHANA

Scientists have developed a framework for exploring the feasibility of business models for resource recovery and reuse, which transform waste to wealth. The framework is based on experiences in six megacities (Lima, Bangalore, Kampala, Hanoi, Accra and Colombo) and supports investors to identify most feasible business opportunities in a given context. In 2015, scientists also continued to support the set-up of three public-private partnerships in Ghana, including one that will produce fuel briquettes from municipal solid waste and one that will produce organic fertilizer pellets from municipal sludge.

## IMPROVED INFRASTRUCTURE AND GOVERNANCE FOR INCREASED PRODUCTIVITY

### BANGLADESH

About half of the coastal zone of Bangladesh is enclosed in polders, which are low-lying tracts of land that help control water to protect inland fields and people from saline water intrusion and tidal floods. But these polders are not as productive as they could be, and scientists have identified poor water management and coordination as major constraints. By introducing technical solutions alongside new ways of collectively managing and governing polders, scientists have helped increase agricultural and economic productivity. Importantly, these interventions coincided with collectively made crop and water management decisions that will allow all farmers to benefit.



Community members work together to slow land degradation in Yewol watershed. Joanna Kane-Potaka/ICRISAT

## COOPERATION FOR LONG-TERM LANDSCAPE HEALTH

### ETHIOPIA

In the 7,500 ha Yewol watershed in Ethiopia, severe soil erosion has been slowed down thanks to an integrated community-based watershed management program launched by scientists and regional partners in 2011. Youth mobilization, terrace landscaping with rock hedges and greater legume cultivation have proved their worth from upstream to the lowlands. The regional government has come onboard to support these activities and has recognized the Yewol watershed as a learning site for 14 other districts in the region.

## HEALTHY SOILS FOR HEALTHY AGRICULTURE

### AFRICA

Scientists have, through the African Soil Information Service project (AfSIS), set up soil-plant spectral diagnostics labs in ten African countries. The labs use infra-red spectroscopy, a fast, cost-efficient technology that can analyze a soil sample in just 30 seconds and reveal its mineral and organic matter

composition. During the past six years, AfSIS has built the most comprehensive soil sample database to date for Africa, with over 28,000 sampling locations, and it is helping Ethiopia, Ghana, Nigeria, and Tanzania conduct their first-ever soil health baselines.

## DIVERSIFICATION FOR FARMER RESILIENCE

### UGANDA

For farmers to choose resilient options like crop diversification, setting up the right market conditions and policies is essential. Scientists have supported over 20,000 farmers from Kabwohe, Uganda, to establish a community seed bank that includes over 50 common bean varieties and 40 banana varieties, giving farmers reliable access to crop biodiversity. This community gene-bank received a national award for seed management excellence from the government of Uganda.

## RURAL MIGRATION, THE FEMINIZATION OF AGRICULTURE AND EMPOWERMENT

### SOUTH ASIA

In Asia alone, nearly one billion people are on the move. In November 2015, WLE and partners organized a conference to explore how the current, massive out-migration affects the families and places male migrant workers leave behind when they seek employment in urban centers. For example, women left behind are challenged by poor access to irrigation water, extension services, and agricultural production inputs, while remittances received are not enough to lift families out of poverty. The conference attracted great interest from development organizations and policy makers.

A female farmer from Selingi village, Dadeldhura, Nepal, whose husband migrated to Malaysia several years ago. Stephanie Leder/IWMI



# 2015 IN REVIEW



RESEARCH PROGRAM ON  
Water, Land and  
Ecosystems



## IN 2015 THE PROGRAM

*established*



*influenced*



*trained*

	MEN	WOMEN
SHORT TERM PROGRAMS	<b>7,400</b>	<b>5,600</b>
LONG TERM PROGRAMS	<b>190</b>	<b>150</b>

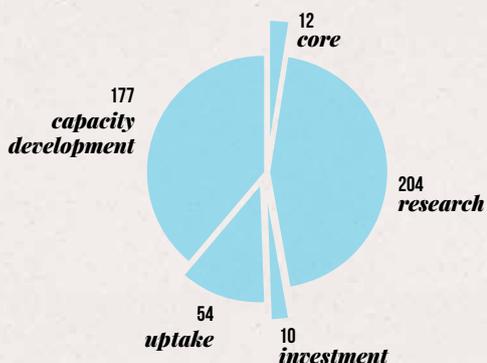
## IN 2015 WLE *field tested*

**62**  
TECHNOLOGIES  
+  
NATURAL RESOURCES  
MANAGEMENT PRACTICES

*applied by*  
**125,000**  
FARMERS

*on*  
**2,500,000**  
HECTARES

## WLE PARTNERS



**110,000**  
*website visits*

IN 2015

**141** *ISI publications*    **43,000** *views on CG-space*

**94**  
*open access publications*

## ABOUT WLE

The CGIAR Research Program on Water, Land and Ecosystems (WLE) combines the resources of 11 CGIAR centers, the Food and Agriculture Organization of the United Nations (FAO) and numerous national, regional and international partners to provide an integrated approach to natural resource management research. WLE promotes a new approach to sustainable intensification in which a healthy functioning ecosystem is seen as a prerequisite to agricultural development, resilience of food systems and human well-being. This program is led by the International Water Management Institute (IWMI) and is supported by the CGIAR System Organization, a global research partnership for a food-secure future.

CGIAR Research Program on Water, Land and Ecosystems (WLE)  
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