

# Agriculture science & innovation for national climate change action plans

Tested technologies and practices for countries to build robust, climate-smart food production systems.

**Large-scale climate change investment starts in 2020.** As your country refines its Nationally Determined Contributions and Adaptation Plans, a range of expertise and technology packages for agriculture is available. They strengthen national action plans to mitigate and adapt to climate change.

**Climate change is a fact of life in the world's dry lands.** Extreme and unpredictable climate events are more frequent. In these regions, the trend is toward hotter and drier climates, threatening food production and people's livelihoods. Agricultural research in drylands ecosystems is the laboratory for the world, demonstrating solutions to climate shocks that other regions will experience.

**Climate-smart technologies and practices from drylands research add value to national climate change plans.**



## Building climate resilience on dry and marginal lands

- **Climate-resilient crops.**  
A range of improved varieties adapted to harsh dryland environments - heat and drought tolerance. From the ICARDA genebank of 154,000 accessions of land races and crop wild relatives.
- **Crop diversification strategies.**  
Cereal-legume systems make soils fertile and bring people increased nutrition and food.
- **Crop-livestock systems.**  
Mixing sheep and goats with a diverse cropping system brings foods security and income for families living on marginal lands.
- **Managing severe water scarcity.**  
Stabilizing and increasing crop and rainwater productivity. Producing more food with less water.
- **Rehabilitating rangelands.**  
Soils are the biggest terrestrial carbon sink after oceans. Rehabilitating rangelands for small-scale fodder production improved livelihoods and carbon capture.

# How agricultural innovations benefit country climate change strategies

*Agriculture is often overlooked; it is a strategic solution to fight climate change.*

Climate-smart farming, as part of a national climate change action plan, supports drylands countries' long-term agricultural growth. It helps regenerate degraded lands and brings new nutrition and income benefits to rural populations. A range of technologies, practices and policy options are tested and ready for scaling-up.

## Assessing climate change at community level

Global averages hide pockets of climate change variation and vulnerability. **ICARDA's 'climate downscaling techniques'** work with several drylands countries to assess village-level impacts of climate shifts. This helps national plans target activities to specific parts of the population.



## New crops that fight drought, heat and disease

**All countries can use ICARDA's wealth of drylands plant genetic resources** to breed crop varieties that thrive in tough climatic conditions – such as excessive drought, heat and salinity. These include 1037 new varieties of bread and durum wheat, barley, chickpea, lentil, faba bean and grasspea.



**Raised bed farming brings a 25% increase in wheat yields using 30% less water** and a 50% reduction in seeds used. The Egyptian Government plans to cover 729,000 hectares by 2018.

## Conservation Agriculture protects fragile soils

**Conservation agriculture avoids plowing to protect fragile soils** and help drylands farmers produce consistent yields under harsh environments. This preserves soil fertility and reduces fuel costs. Seeders from high-income countries are not suited to local land and market conditions. **Drylands conservation approaches for low-income and marginal areas** – were designed with farmers in Syria, Jordan, Central Asia, Morocco and Iraq, who have local markets for seeder production and repair.



## Climate-smart land and water practices to combat growing water scarcity

**A unique 'salinity development package' is available to drylands countries** whose food production is threatened by salinity problems. This expertise helps plan investments to rejuvenate salt-damaged agricultural systems, including: salt-tolerant crop varieties; new food production value chains; options for efficient irrigation management and salt tolerant forage crops – to create new livestock sectors where traditional crops no longer grow.



## Crop-livestock technology packages to fight climate change

**A national crop-livestock strategy protects families from climate change** – opening a new agricultural sector in marginal areas. Sheep and goats are a food security bank for families, providing meat, value added products for home and market (milk, cheese products, wool and cashmere). **ICARDA's 'livestock livelihood packages'** can benefit millions of drylands smallholder communities.