# LEG4DEV - Legume-based agroecological intensification of maize and cassava cropping systems in Sub-Saharan Africa for water-food-energy nexus sustainability, nutritional security & livelihood resilience

## Objectives of the project

- ✓ To identify, develop and adapt legume-based agroecological intensification technologies/ practices as well as innovations for rural energy and labour efficiency for smallholders, especially women.
- ✓ To identify, develop, adapt and scale innovations for transformative shifts in rural bioeconomies by generating new enterprises and rural employment (especially for youth and women) from legume-derived products and co-products.

*Women inspect pigeonpea at flowering time in East Africa (ICRISAT, 2008)*

## Background

Grain and agroforestry legume crops have major unrealised potential for climate-smart transformation of nutritional, income and sustainability outcomes from smallholder systems in sub-Saharan Africa (SSA). In addition to nutritional benefits, legumes play a key agroecological role in soil fertility. Yet, the food security and sustainability merits of legumes are currently unrealised at scale.

Both yields and adoption rates of legume crops remain low in SSA despite their potential. There are multiple barriers to the scaling out of multipurpose legume integration into maize and cassava cultivation, including current productivity, seed supply systems, labour/mechanisation and energy constraints, consumption/production and cultural preferences, food safety and marketability concerns. Ensuring access for poorer smallholders to legume-based innovations is essential, to ensure that the furthest behind can transition to more economically and sustainable farming systems. Indeed, legumes represent a strategic entry point for gender transformative agroecological intensification.

LEG4DEV project will test, adapt and improve a portfolio of innovations for diversifying maize or cassava dominated cropping systems by legume-based agroecological intensification, and enable results of legume-based participatory research can be more readily adopted by farmers and enterprises, and scaled out for impacts on livelihoods and resilience.

## The theory of change to achieve the objectives

LEG4DEV's Theory of Change is that its "research into use" and innovation activities focused on overcoming key barriers will enable scaling out of legume-based agroecological intensification to generate transformative impacts on smallholder livelihoods while strengthening the sustainability and climate resilience of agrifood systems of smallholder farmers and rural communities in east and southern Africa. Overall, the LEG4DEV project will work on behalf of smallholder farmers in Zambia, Malawi, Tanzania and Ethiopia.

The main outcomes of LEG4DEV are (1) Legume-based agroecological intensification scaling for climate-resilient productivity, (2) Legume-based agroecological intensification scaling for food & nutrition security, (3) Legume-based agroecological intensification scaling for water use efficiency, (4) Rural energy and labour-efficiency transformation pathways for legume-based agroecological intensification, (5) Legume-derived enterprises and employment for more resilient rural bioeconomies, and (6) Identification of policy & institutional options for transformative scaling of legume-based agroecological intensification for enhanced livelihoods and resilience.

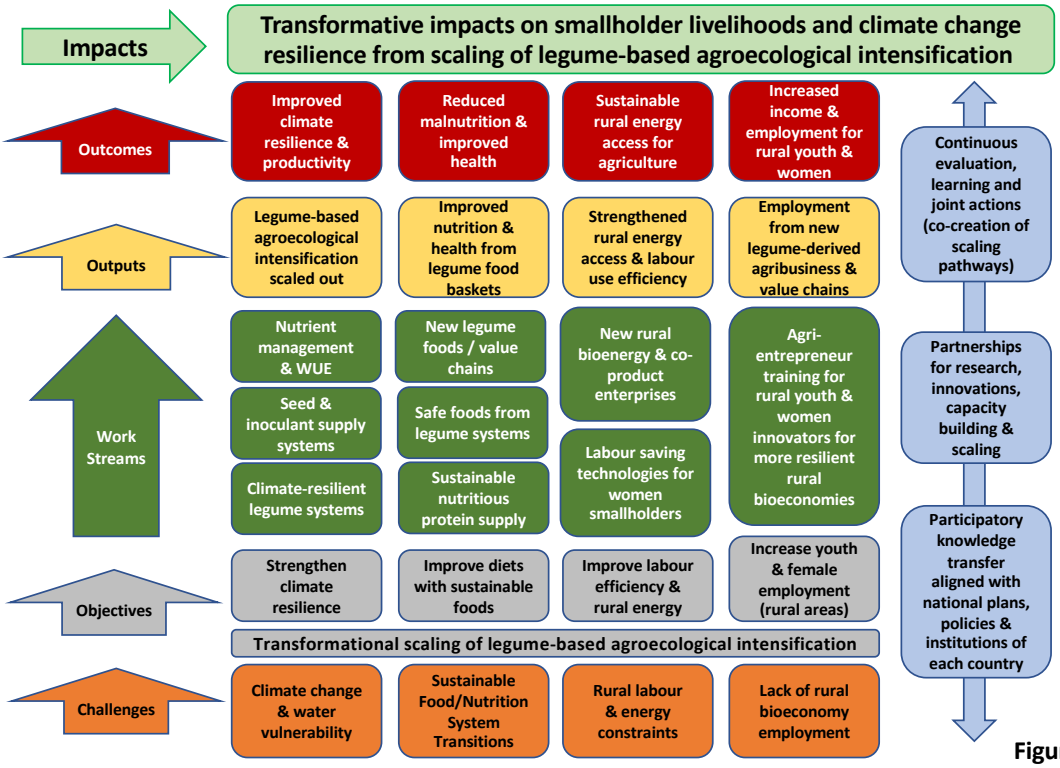


**Figure 1**

LEG4DEV will focus its research and innovation activities on overcoming the range of barriers to scaling of legume-based agroecological intensification. This will be done through working with partners who are "agents/engines of change" that can translate research and innovations into tangible outcomes and impacts on smallholder livelihoods and climate change resilience. From the outset, through a participatory process with stakeholders, LEG4DEV will identify and rank the key barriers to scaling, and lever existing and new research/innovations towards overcoming of each barrier, in partnership with scaling partners. LEG4DEV's scaling partners will span the entire value chain from producers to consumers, with particular focus on partners who have capabilities for enabling the scaling of innovations (e.g. farmers organisations, youth and women groups/entrepreneurs, private sector, investors, extension services, agrodealers, research organisations, ministries, policymakers and opinion leaders).

The LEG4DEV will adopt a participatory approach through its activities to ensure that all LEG4DEV and innovation activities are needs driven and focused on clear measurable impact pathways. Key strategies for scaling of legume-based innovations at the farm and landscape level by LEG4DEV will focus on peer-to-peer approaches (e.g. farmer field schools) and participatory technology development, where possible aiming to facilitate empowerment and user-driven innovation

approaches. LEG4DEV's entrepreneurship and rural bioeconomy activities will focus on generating profitable and sustainable enterprises that also deliver social and environmental dividends (using social and ethical business model frameworks, including design thinking, disciplined entrepreneuship and social entrpreneurship). The outputs from the work packages in this project would be disseminated for partnership-based scaling by LEG4DEV partners and adoption by smallholder farmers and associated value chains' actors.

### Main activities

Research and innovation activities on legume-based agroecological intensification within LEG4DEV will include, inter alia: participatory diagnosis, policy/institutional analysis, modelling (climate, crop, farming systems), life-cycle assessment of products, water footprinting of farming systems, farmer participatory field & technology trials, demo and extension approaches for farmers, food product development, support to enterprise and entrepreneurship including education, training and capacity development

### Organization

LEG4DEV is organised around 6 Work packages. A series of LEG4DEV workpackages will contribute to increasing farm productivity and resilience to climate change, while improving water food and nutrition security and water use efficiency. Additional workpackages are focused on increasing rural energy and labour-use efficiency, and on increasing agribusiness and employment opportunities for rural youth and women from legume-derived enterprises. A cross-cutting workpackage consists of 'transformation scaling of legume-based agroecological intensification of smallholder farming systems' through policy and institutional innovations. Each Work package has an impact pathway (overall and in each country) with research/innovations outputs, outcomes and impacts.

The LEG4DEV project will be governed by a General Assembly with representatives from each of the partner institutions. The implementation approach will be based on two LEG4DEV research and innovation teams operating in east Africa (Ethiopia/Tanzania) and southern Africa (Malawi/Zambia). At the national level, LEG4DEV National Stakeholder Advisory Committees will be established in each of the four countries to enable representation, engagement, coordination and alignment with NGO collaborators, regional bodies and multi-stakeholder partners in each of the beneficiary countries.

### Implementing organizations

Led by National University of Ireland Galway (Ryan Institute),

### Partners of the project

- ✓ Wageningen University, Swedish University of Agricultural Sciences (SLU), University of Hohenheim
- ✓ Three CGIAR partners: IITA, ILRI/CCAFS, CIMMYT

### Other main stakeholders

- ✓ Multi-stakeholder partners from each of the four beneficiary countries, NGOs and regional organisations
- ✓ Smallholder farmer groups/organisations in each of the four countries, rural women and youth.

## Region

East Africa (Ethiopia, Tanzania) and southern Africa (Malawi, Zambia).

## Funding and co-funding

European Union, € 6.5 million

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|---|---|
| EU | € 6,500,000 |
| Total budget | € 6,500,000 |

## Duration

5 years, (Nov 2020 – Oct 2025)