

## Memorandum of Agreement

Between

**The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)**  
Patancheru 502 324, Andhra Pradesh, India

and

**University of Agricultural Sciences, Bengaluru**  
GKVK, Bengaluru, State Karnataka

**The International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT)**, a member of CGIAR Consortium, is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics has over 2 billion people, with almost 650 million of these are the poorest of the poor. ICRISAT and its partners help empower these poor people to overcome poverty, hunger and a degraded environment through better agriculture. ICRISAT is headquartered in Patancheru, Andhra Pradesh, India, with two regional hubs and four country offices in sub-Saharan Africa. ICRISAT's mission is to reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics.

**University of Agricultural Sciences, Bangalore (UASB)** with a mandate of teaching, research and extension in the field of agriculture and allied subjects. UAS Bangalore is one of the leading agricultural universities in the country. The area under this university has varied crop and soil diversity providing opportunities to have varied experience of handling complex projects.

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and University of Agricultural Sciences, Bengaluru (UAS-B) (hereinafter referred to "the Institutions") desire and intend to collaborate in the area of Bio-treated wastewater reuse with enhanced water use efficiency. Both ICRISAT and UAS-B are working for the sustainable development and protecting the environment through their research in the following areas:

- Water use efficiency enhancement and wastewater reuse in agriculture
- Rehabilitation of degraded lands and bring them in reuse for food and fodder production
- Improving livelihoods of people
- Both the institutions agree to collaborate through a consortium for India-EU project on "*Integrating bio-treated wastewater reuse with enhanced water use efficiency to support the green economy in EU and India* (India side)" shortly referred to as "*Water4Crops*" project supported and funded by the Department of Biotechnology (DBT), Government of India. ICRISAT is the Lead Institution of the Consortium (India side).



Water, food and energy securities are emerging as increasingly important and vital issues for India and the world. Most of the river basins in India and elsewhere are experiencing moderate to severe water shortages, brought on by the simultaneous effects of agricultural growth, industrialization and urbanization. Current and future freshwater demand could be met by harnessing rainfed potential, by enhancing water use efficiency and demand management. Thus, wastewater / low quality water is emerging as a potential source for demand management after essential treatment.

Water4Crops project involves multidisciplinary issues of water management, provides an opportunity to efficiently utilize low quality industrial (food) and municipal wastewater and facilitate developing various technologies for wastewater treatment and its feasible use in agriculture. This project would also describe practical solutions of wastewater treatment and its management which open-up various avenues to scale-up such technologies. Treatment and management of wastewater would not only reduce freshwater demand in agriculture but also helps in protecting groundwater contamination and water quality at downstream water bodies. Multiple uses of scarce water resources through science-based interventions are proposed in this EU-India proposal to find solutions for the most important pillar of sustainable development.

The objectives of the Water4Crops project are as follows:

- Develop and demonstrate integrated treatment processes for agro-food industry effluents targeted at recovery of economically useful components and recycling of water suitable for irrigation
- Selection and optimization of fungal consortium to remove contaminants from municipal wastewater for re-use in agriculture
- Enhancing water use efficiency through improved irrigation systems, agronomic practices and using validated simulation models
- Assess impacts of treated wastewater on soil, crop produce and groundwater quality
- Increasing saline wastewater use efficiency through Integrated Mangrove-Fishery Farming System
- Mapping and characterization of quantitative trait loci (QTL) for drought tolerance related traits in maize, sorghum, pearl millet, chickpea and tomato
- Improving drought adaptation using marker-assisted breeding and trait-based selection approaches in maize, sorghum, pearl millet, chickpea and tomato
- Evaluate and optimize the proposed combinations of bio-treatment and wastewater reuse from a perspective of supporting green growth and to boost interaction between knowledge organizations and industries of the European and Indian parties.



To undertake the specific activities as detailed in the project document (Annex 1) following budget is approved by the Department of Biotechnology (DBT), Govt. of India to UAS-B.

(Rupees in lakhs)

Year1	Year2	Year3	Year4	Total
34.60	21.00	20.62	20.62	96.84

DBT shall release the funds allocated to UAS-B directly based on the performance and submission of the technical reports to the Lead Institution.

The Institutions acknowledge that all research and development work as envisaged in the project proposal with specific milestones will be accomplished in a timely manner and submitted to the consortium leader

#### **Rights of Ownership/Technology Transfer and Utilization**

The know-how generated from the project by UAS-B and ICRISAT will be joint property of UAS-B, ICRISAT and DBT. It shall be the responsibility of UAS-B and ICRISAT to take necessary action for protection of the intellectual property arising out of the Project through proper instruments, such as, patents, copyrights, etc.

The know-how developed may be transferred to other entrepreneurs on a non-exclusive basis on such terms and conditions as may be determined by the DBT.

All the assets including the equipment and produce acquired will be the property of DBT and shall not be utilized for the purposes other than those for which the grant has been sanctioned. The rights of UAS-B and ICRISAT under this MOA shall not be transferred to any other Party without the prior approval in writing of DBT.

It shall be the responsibility of UAS-B and ICRISAT to ensure that support of DBT is suitably acknowledged in the publications (papers, reports, etc.) arising out of the project.

#### **Dispute Resolution**

Should there be any dispute or difference arising out of or regarding this Agreement, then in that event, both the Institutions will make all efforts to amicably settle such disputes. If efforts at amicable settlement fail, all disputes or differences arising out of this Agreement will be finally decided in accordance with the provisions of the Indian Arbitration and Conciliation Act 1996, as amended from time to time.



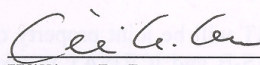
**Effective date, Modification and Termination**

Upon the last duly authorized signature of this Agreement as provided below, this Agreement shall be effective as of start date; i.e. 5 November 2012 and shall remain in force for the project duration of 4 years as approved by DBT-Government of India.

This agreement can be amended/ modified by mutual written consent of both the Institutions through issuance of a written instrument and signed by authorized representative of both the Institutions.

IN WITNESS THEREOF, the representatives of the Institutions duly authorized sign this Partnership Agreement in two originals.

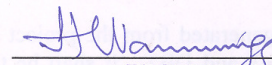
*On behalf of the*  
**International Crops Research Institute  
for the Semi-Arid Tropics (ICRISAT)**

  
**William D. Dar**  
**Director General**



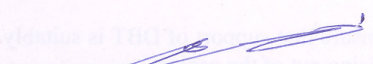
Date: - 1 MAY 2013


*On behalf of the*  
**University of Agricultural Sciences  
(UAS), Bengaluru**

  
**REGISTRAR**  
**UNIVERSITY OF AGRICULTURAL SCIENCES**  
**G.K.V.K. CAMPUS, BANGALORE - 560 065.**

Date: 25.05.2013

Witnesses:

  
**S.P. Wani**  
**Consortium Leader for Water4Crops**

  
**D.L. Savithramma**  
**PI for Water4Crops at UAS, Bengaluru**