

GCP/GLO/289/MUL

ORGANIC RESEARCH CENTRES ALLIANCE

PROJECT PROPOSAL

**START-UP PHASE FOR THE
ORGANIC RESEARCH CENTRES ALLIANCE (ORCA)
AND
PROTOTYPE CENTRE ON HUMID AND SUB-HUMID AREAS (HUSHA)**

Rome, December 2009



EXECUTIVE SUMMARY

There are currently huge challenges facing the world's food system: more than 1 billion people in the world do not have enough to eat. Despite all development programmes and good intentions, that number is increasing. Three-quarters of the poor people in developing countries live in rural areas and most of them depend on agriculture for their livelihoods. These smallholder producers have great potential to contribute to increasing the world's food production and reducing poverty – even though they do not benefit from conventional, and often expensive, technologies such as purchased agricultural inputs such as seeds, fertilizers and pesticides. Climate change and the parallel increases in environmental variability, coupled with global economic instability, result in increased vulnerability for smallholders. Agricultural systems based on crop and livestock uniformity are unable to cope with unexpected problems arising on the farm or in volatile food markets. Reserves of fossil fuels are decreasing, causing intermittent spikes in oil prices, plus degradation of natural resources is on the increase. This means that agriculture no longer can depend on fossil fuel-based inputs to produce food.

It is time to re-think food production models, focusing on making them more diverse, more resilient and more socially just. Organic agriculture is particularly interesting seen in this light.

More than 1.2 million farmers around the world currently practice organic food production. Most of them live in developing countries. The market value of organically certified produce, now more than USD \$46 billion annually, has sustained steady annual growth for two decades, increasing by 10 percent in 2009 despite the global financial crisis. Market-marginalized farmers are increasingly adopting organic agricultural practices, as they seek food self-sufficiency through a better use of existing resources. At the same time, global consumer demand for organic food production is increasing, creating lucrative markets for smallholders and expanding the right to choose healthy foods.

The benefits that organic food systems provide to farmers, consumers and the environment are well documented. For example, organic agriculture:

- Gives smallholders a fair chance to access an economically attractive market while also improving household food security;
- Optimizes farm output while using fewer capital inputs and increasing labour productivity and employment in marginalized market areas and those with low-potential;
- Attracts women farmers who build on their traditional and indigenous knowledge and take advantage of engaging in commercial food production while also producing food for their families;
- Produces nutritious and diversified food and celebrates culinary traditions;
- Uses biodiversity to decrease agricultural inputs and increase outputs, thus supporting broader environmental conservation goals at gene, species and landscape levels and ensuring that organic producers receive premium market value in return for their environmental efforts;
- Stabilizes the farm ecological balance, which increase the adaptive and risk management capacity needed to cope with climate change;
- Reduces greenhouse gas emissions and increases soil carbon sequestration, thus contributing to climate change mitigation and reducing fossil-based energy requirements.

The goal now is to support further expansion in order to improve opportunities for more producers in more countries to benefit. There are, however, serious challenges for the farmers associated with organic production. While organic systems are low input systems in terms of energy and chemicals, they require rather intensive and careful management, knowledge and skills on how to prevent and/or address problems through the use of renewable and local resources. It is therefore crucial for the further development of organic agriculture that reliable information and scientific knowledge be available.

However in developing countries, the growth of organic production, processing and marketing currently happens in a scientific knowledge vacuum that makes the management system risky and also depending on the producer readiness to experiment and undertake innovations. There are research institutions and producer groups active in researching organic agriculture in developing countries, but they are few, scattered and under-resourced.

The established mainstreamed agricultural research system has research activities that respond to some of the challenges in organic systems (e.g. biological pest control) but rarely has a system-based research approach. Currently, no global efforts exist for real collection of knowledge or coordination of activities. Research in organic agriculture is at this moment of time, neither appropriately nor sufficiently served as part of the mainstream research platforms. Organic agriculture requires a specific research effort, with appropriate approaches and modalities.

This project proposal has been developed by FAO and partners for the establishment of an Organic Research Centre Alliance (ORCA) in order to enhance organic research worldwide and particularly in developing countries. The ultimate vision of ORCA is to improve through organic agriculture, household food security, rural livelihoods, smallholders' resilience, consumers' health and environmental integrity. For this end, ORCA seek to create a global network of research centres dedicated to interdisciplinary and participatory research in organic food systems of relevance to the needs of organic producers.

The ORCA concept has been developed through a consultative process that started in July 2008 and included an electronic public discussion that involved over 200 individuals in November-December 2008, as well as a number of face-to-face dialogues in 2009 with the African organic community and a group of European organic research institutions committed to assist developing countries' institutions in strengthening organic research capacities.

Once fully developed, ORCA will consist of some eleven research networks, or Centres, that pool their intellectual and financial resources to work on common research objectives. All eleven Centres are linked together, forming a global network of networks for organic knowledge generation and sharing. Each ORCA Centre will be coordinated by a consortium (i.e. a legal entity) of key organic institutions entrusted to ensure the active participation of farmers and the cooperation of relevant institutions. Coordination between Centres will be carried by an ORCA Secretariat hosted by FAO. The Secretariat will maintain a web portal where all expertise is pooled and made available. The Secretariat will also convene biennial global conferences on organic research for development that will provide an opportunity to engage stakeholders in demand-driven research and to consider epistemological questions arising within the ORCA system.

Five of the ORCA Centres will focus on specific agro-ecosystems: coastal and small islands; hilly and mountains; arid and semi-arid; humid and sub-humid; and temperate and irrigated. Other six ORCA Centres will focus on cross-sectoral topics that merit special attention: climate change; urban and peri-urban; nutrition, quality and health; economics, markets and trade; post-harvest handling and food safety; seeds and breeds. Each of the Centres will both undertake inter-disciplinary and participatory research and develop a virtual library where all information on two key topics will be maintained and regularly updated. ORCA Centres will grow from existing institutions, which synergies will create excellence centres on specific themes. The ultimate outcome of ORCA is that multifaceted benefits accruing from the organic sector are shared worldwide.

ORCA presents an alternative way of undertaking research. Research in organic food production requires a holistic approach of combining traditional and indigenous knowledge, social development, technical innovation and market development. It builds on the following principles:

- Participation of all actors in the food chain, including farmers, processors, traders, advisers, trainers and policy makers;
- Networking of institutions in order to mobilise all the expertise required from organic research institutions as well as other research institutions with interest in organic research;

- Cross and inter-disciplinary research building bridges between disciplines and between science and society;
- Holistic systems methodologies that can describe the production from a systems perspective;
- Global collaboration, which will include twinning arrangements between organic research institutions in developed countries and in developing countries.

Based on the concept above, this project document seeks to launch ORCA incrementally over 3 years. It covers a start-up phase where the basic facilities for ORCA are established, including a Secretariat and governance structure for the whole ORCA system, as well as the establishment of a prototype ORCA Centre to be based in Sub-Saharan Africa and meant to become the excellence centre for Humid and Sub-Humid Areas (HUSHA). During the start-up phase, the Secretariat will support HUSHA and launch at least four more ORCA Centres.

HUSHA will undertake high quality organic research in humid and sub-humid areas. Humid and sub-humid areas represent huge opportunities for increasing organic food production of smallholder farmers. There is already a significant development of organic production on-going in humid and sub-humid areas in Africa, Asia and Latin America. But so far, there have been only small and scattered research activities to support this development and increase knowledge in organic systems in humid and sub-humid areas. Considering the potential of smallholder organic agriculture in these areas, it is a valid assumption that joint and strengthened research efforts will make a consistent societal contribution in terms of supporting the implementation of promising livelihood alternatives for smallholders.

Studies of the prevailing farming systems in humid and sub-humid areas show that there are three major challenges for the development of organic agriculture in these areas:

- Building and maintaining soil fertility, nutrients as well as water-holding capacity;
- Managing the pressure of pests and diseases;
- Building the capacity, knowledge and skills of farmers to be able to manage the complexity of the organic systems.

Following the ORCA principles, the research consortium for HUSHA will first establish a participatory consultative process for determining a joint strategic agenda for addressing the above challenges. This process will involve all stakeholders, including producers and the organic movements. The joint research programme will be prepared based on this joint strategic agenda and priorities. User groups of farmers and practitioners will be involved in all steps of the research programme and its implementation.

A large part of the research activities will be action-research, undertaken on-farm by the farmers participating in HUSHA. A credible organic research site will also be established at the HUSHA core institution, with a view to provide a reference to solid on-farm research. The research projects will be undertaken by cross-disciplinary research teams and the methodologies that will be developed will be based on agro-ecosystems research combined with research for development. The HUSHA Centre will present a joint research programme to the ORCA Facilitation Board for approval along the ORCA requirements. The HUSHA Centre will furthermore collect and make available through its web facility worldwide knowledge and information on the two key topics: (i) organic fruits and vegetables; and (ii) organic rice systems.

In brief, HUSHA will be a Centre “without walls” consisting of a consortium of research institutions undertaking research in organic agriculture and food systems in humid and sub-humid areas and coordinating related research projects implemented by other network partners in Africa, Latin America and Asia.

There are several organic research and related institutions active in the humid and sub-humid areas of the three regions. A few of these are dedicated to organic research others are conventional (or non-

organic) research institutions, which have low-external input research activities in, or of relevance to, organic production. A number of organic research institutions in developed countries have experiences that can support research institutions in developing countries through twinning arrangements. Moreover, organic agriculture associations or like-minded civil organisations representing producers and other stakeholders in the organic sector are present in many countries. Thus, HUSHA will consist of the following categories of partner institutions:

HUSHA consortium:

- Organic research institutes with research activities and/or experience in humid and sub-humid areas hosting the centre (lead partners);
- Organic research institutes in developed countries with collaboration interests (twinning partners).

HUSHA collaborating partners:

- Organic producers organisations, organic movements and private companies (community of practise);
- Non-organic research institutions with interest in collaborating on organic research (other research partners).

The HUSHA consortium will engage through a formal contract with the ORCA Secretariat whereby agreement on processes and procedures for collaboration are agreed upon. The lead institution will be situated in Sub-Saharan Africa and among others there will be active cooperation with institutions in Asia and Latin America, with a view to creating regional HUSHA hubs. The lead HUSHA institution will be supported with salaries for two staff members and the regional hubs will be supported with a part-time staff each. The lead institution and the regional hubs will also receive support to establish and maintain the facilities required to run the virtual HUSHA platform and to enable researchers to participate in meetings and conferences for sharing of preliminary results.

The establishment of the HUSHA Centre will be facilitated and supported by the ORCA Facilitation Board and Secretariat. The Facilitation Board will consist of 15 experts from 15 countries and will be appointed by FAO. The Facilitation Board will develop the overall ORCA research policy and all rules governing ORCA support. The Facilitation Board will meet virtually several times a year and will ensure transparent and good governance throughout the ORCA system.

The Secretariat will be hosted in FAO, in Rome. It will consist of 2 professional staff members and 1 administrative staff. The Secretariat will facilitate collaboration within the HUSHA network, assist in developing research proposals and manage funds. It will also be responsible for raising funds beyond the scope of the present project document, with a view to establish other ORCA Centres.

The collection and dissemination of knowledge and research results will be facilitated by the ORCA portal that will connect partners both within HUSHA and to the ORCA system as a whole, i.e. other Centres, as they develop. The ORCA portal is already being developed by FAO, with a view to provide a common platform for all Centres, HUSHA and others. Currently, organic research activities worldwide are being compiled in order to populate the ORCA Portal and the future updates of the portal will be directly made by the participating institutions. While the global part of the portal will be managed by the ORCA Secretariat, the HUSHA part of it will be managed by the lead institution assisted by the hubs in the two other regions. The ORCA portal is ultimately meant to serve as a window to all those interested in freely accessing organic knowledge, including also policy makers and sustainable agriculture constituencies.

Funding will be organized in a way that promotes collaboration among institutions within and between ORCA Centres, starting with HUSHA, as well as to support the ORCA Secretariat and Facilitation Board.

HUSHA will receive funding to pilot ORCA activities including support to: purchase appropriate communication tools; gather and make available information material related to the key 2 topics; and

minimum staff support for the administrative and management work of the Centre. A research fund will be created to finance the HUSHA research programme, including the consortium's research site, regional hubs and collaborating farmers and institutions. HUSHA will moreover be encouraged to also compete for other sources of research funding for organic research.

FAO will contribute to the ORCA start-up phase with a part time senior professional, office space and the running costs of the ORCA portal. The HUSHA consortium and regional hubs will contribute with the necessary furnished offices, minimal staff for research activities, and research facilities such as buildings, land, water and laboratories.

A multi-donor trust fund will be created to provide adequate and predictable funding for the operation of ORCA but bilateral funding will also be accommodated for HUSHA in order to augment stakeholders' participation and research activities. With a view to ensure multilateral and bilateral donors collaboration within the ORCA scope, the Secretariat in FAO will convene periodic donors' round tables. As ORCA is supposed to continue gradually progressing from the start-up phase with one Centre implemented to up to eleven Centres, the Secretariat will be charged with the responsibility to continue the fundraising for increasingly more availability of funds. The donors' round tables will be an important forum for discussions on financing the progression of ORCA.

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List of Abbreviations

AAO	Associação de Agricultura Organica
AREU	Agricultural Research and Extension Unit
ATTRA	National Sustainable Agriculture Information Service
AVRDC	World Vegetable Centre
BOKU	University of Natural Resources and Applied Life Sciences, Vienna
BIRRI	Bangladesh Rice Research Institute
CAADP	Comprehensive African Agriculture Development
CATAS	Chinese Academy of Tropical Agricultural Sciences
CATIE	Tropical Agricultural research and Higher Education Center
CERTCOST	Economic analysis of certification systems for organic food and farming
CETDEM	Center for Environment, technology and Development in Malaysia
CFA	Comprehensive Framework for Action
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CLOA	Central Laboratory of Organic Agriculture
CLRRI	Cuu Long Delta Rice Research Institute
CORE Organic	Coordination of European trans-national research in organic food and farming
CPWF	Challenge Programme for Water and Food
CREI	Citrus research and Extension Institute
CIRRI	Central Rice Research Institute
DARCOF	Danish Agricultural Research Centre for Organic Food
DIIS	Danish Institute of International Studies
EU	European Union
FAO	Food and Agriculture Organisation
FARA	Forum for Agricultural Research in Africa
FB	Facilitation Board
FFS	Farmer Field School
FiBL	Research Institute of Organic Agriculture
GFAR	Global Forum for Agricultural Research
GHG	Green House Gases
GOAN	Ghana Organic Agriculture Network
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
HUSHA	Centre for Humid and Sub-Humid Areas
IAASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development
IBDF	Institute for Biodynamic Research
ICCOA	International Competence Centre for Organic Agriculture
Icipe	Institute of Insect Physiology and Ecology
ICRAF	World Agro-forestry Centre
ICROFS	International Centre for Organic Food Systems
IFAD	International Fund for Agricultural Development
IFOAM	International Federation of Organic Agriculture Movement
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IOL	Institute of Organic Agriculture, University of Bonn
IRRI	International Rice Research Centre
ISD	Institute for Sustainable Development
ISHS	International Society for Horticultural Sciences
ISOFAR	International Society of Organic Agriculture Research
ITC	International Trypanotolerance Centre
ITF	International Task Force
JKI	Julius Kuehn-Institute
KIOF	Kenya Institute for Organic Farming
KOAN	Kenya Organic Agriculture Network

MARDI	Malaysian Agricultural Research and Development Institute
MDG	Millennium Development Goals
MHAC	Manor House Agricultural Centre
MOGA	Malawi Organic Growers Association
NAHWOA	Network Animal Health and Welfare in Organic Agriculture
NEPAD	New Partnership for African Development
NGO	Non Governmental Organisation
NIAES	National Institute for Agro-Environmental Sciences
NIHORT	National Horticultural research Institute
NOGAMU	National Organic Agriculture Movement of Uganda
OAC	Organic Agriculture Consortium
OACC	Organic Agriculture Centre of Canada
OAPTIN	Organic Agriculture Projects in Tertiary Institutions in Nigeria
OECD	Organisation for Economic Co-operation and Development
OLRG	Organic Livestock Research Group
OOCORD	Obasanjo Organic Agriculture Development Centre in Nigeria
OPPAZ	Organic Producers and Processors Association of Zambia
ORCA	Organic Research Centre Alliance
PELUM	Participatory Ecological Land-use Management
RIRDC	Rural Industries Research and Development Corporation
SC	Steering Committee
SSA	Sub-Saharan Africa
TOAM	Tanzania Organic Agriculture Movement
UF-CTA	University of Florida Center for Tropical Agriculture
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
USD	US Dollars
USDA	United States Department of Agriculture
VEERU	Veterinary Epidemiology and Economic Research Unit
VTI	Johann Heinrich von Thunen Institute
WARDA	Africa Rice Centre
ZOPPA	Zimbabwe Organic Producers and Processors Association

1. BACKGROUND

According to the Codex Alimentarius Commission, "Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system."

In this document, the term organic agriculture refers to agricultural management systems that apply to the above general definition. The document however also mentions and aims to cover biodynamic agriculture, which follows organic principles and more¹.

Organic agriculture systems and products may be certified, a verification process required in many developed countries. However, systems and products that are organic but not certified also represent a significant portion of production and are referred to as "non-certified organic agriculture or products." But agriculture systems that have as their primary characteristic that they do not use synthetic inputs are not organic by default as such systems may lack the required soil building practices and thus may degrade land.

Organic agriculture has proved to be well suited for improving livelihoods of poor smallholder farmers in developing countries, who for several reasons cannot benefit from external agricultural inputs. Organic practices are therefore increasingly adopted by market-marginalized farmers who seek food self-sufficiency through a better use of existing resources. Organic food production is practiced today by more than 1 200 000 farmers around the world, most of which living in developing countries. Moreover, the market for agricultural produce is increasing worldwide, the value of certified produce was in 2007 more than USD \$46 billion and is increasing annually by 10% despite the financial crisis. This offers good opportunities for smallholders to be integrated in commercial agriculture.

Organic agriculture is particularly interesting seen in the light of current challenges facing the world's food production. The rapidly increasing and changing demand for food products, low agricultural productivity in otherwise potential food producing areas and the changing climate calls for innovative alternatives. The organic food production systems represent very relevant options, in terms of land and soil conservation, carbon sequestration, water protection and increasing productivity in low productivity areas of developing countries. A recent report on Low Carbon Development and Poverty Alleviation² from Danish Institute of International Studies (DIIS) recommends development of low carbon multifunctional agriculture as a way of combining the aims of pro-poor agricultural development and the requirements for climate change mitigation as well as adaptation. The report particular emphasizes support for stimulation of organic development as an important instrument to achieve the dual goals of pro-poor and low carbon agricultural development.

The potential of the organic production systems to contribute to both environmental and social protection has been well recognised in a few developed countries and substantial public investments into organic research have been made in these cases³. These investments have proved to be instrumental for developing organic production systems and also for documenting the impacts of this management system in these countries. This is however not the case for developing countries, where

¹ Biodynamic agriculture works with the influence of planetary rhythms on the growth of plants and animals and therefore uses an astrological calendar for guiding cultivation practises as well as compost and spray preparations from naturally fermented organic substances in minute doses to soils and crops. The aim is to harvest crops which not only have substances but also vitality.

² Funder, M.; Fjalland, J.; Munk Ravnsborg, H.; Egelyng, H.; 2009; Low Carbon Development and Poverty Alleviation, Options for Development Cooperation in Energy, Agriculture and Forestry: DIIS Report 2009:20

³ Examples of such countries are Denmark, Switzerland, Austria, Norway and Sweden.

there is a great gap of knowledge in this regard. Research efforts are scattered but recently, there has been evidence of a movement toward international collaboration in organic research. However, these few efforts are struggling with lack of resources and synergies are being sought.

In order to enhance organic research for, and within, developing countries a project proposal has been developed by FAO and partners⁴ for an Organic Research Centres Alliance (ORCA). ORCA aims to establish a global network of research centres collaborating to produce high quality research in organic agricultural systems relevant to the needs of farmers and processors in developing countries.

Once fully developed, ORCA will consist of a network of eleven research Centres and a global network consisting of a Secretariat hosted at FAO. A virtual web-based facility will allow all network members to share and access knowledge on organic research. Five of the Centres will focus on undertaking organic research in specific agro-ecosystems and six on undertaking research in special themes that merit special attention. Each of the Centres will both undertake research and collect, organize and make available information on two related key topics. The Centres and the suggested key topics are shown in Table 1 below.

Table 1. ORCA Centres

11 Centres	22 Key Topics	
Coastal and Small Island	Capture Fisheries	Aquaculture
Hilly and Mountainous	Forests	Agro-forestry
Arid and Semi-Arid	Pastures	Livestock
Humid and Sub-Humid	Rice Systems	Fruit and Vegetables
Temperate and Irrigated	Comparative Studies	Cropland Yield
Seeds and Breeds	Protected Areas	Agro-tourism
Post Harvest and Safety	Pest/Disease Management	Fibres
Economics, Markets, Trade	Commodity Intelligence	Consumers
Nutrition, Quality, Health	Under-Utilized Varieties	Aromatic and Medicinal Plants
Urban and Peri-Urban	Landscaping and Gardening	Compost and Waste
Climate Change	Agro-energy	Energy Flows

Each centre will be a centre of excellence on organic production systems in the particular agro-ecological zone or theme and at the same time the system-wide knowledge repository on the key topics. The ultimate outcome of ORCA is that environmental, economic, and social benefits accruing from the organic sector are shared worldwide.

Annex 7 provides an overview and description of the envisioned ORCA Centres as well as the suggested Key Topics and the background ideas to these. A detailed description of the ORCA concept, is available in a separate document (see www.fao.org/organicag).

To launch this system, the partners so far associated with this initiative have agreed to pilot a first ORCA centre for Humid and Sub-Humid Areas (HUSHA). The present document describes this prototype centre, building on real life contexts, including existing institutions and resources at work in humid and sub-humid areas. This start-up phase covers a plan for implementation through an initial

⁴ Initially, FAO has developed the ORCA concept together with Tufts University, USA. Partners who have gradually joined in further conceptualizing and developing ORCA, with the intent to bring together their knowledge and eventually, support developing countries through twinning arrangements are: the Swiss Research Institute of Organic Agriculture (FiBL), the Danish International Centre for Research in Organic Food Systems (ICROFS), International Society of Organic Farming Research (ISOFA), International Federation of Organic Agriculture Movements (IFOAM), Agro Eco Louis Bolk Institute, Vienna University of Natural Resources and Applied Life Sciences (BOKU), German Federal Research Institute von Thunen (vTI) and the Institute of Organic Agriculture of the University of Bonn (IOL).

three years period. It is proposed that this first ORCA Centre be located in Africa, with ramifications in humid and sub-humid areas of Asia and Latin America.

1.1 General Context

The core work of HUSHA is to conduct organic research relevant to farming systems proper to humid and sub-humid areas. This section will therefore describe the particular context of these areas as related to development of organic production systems and the research institutions currently active in these areas.

Situation of organic production in developing countries

Developing countries are important suppliers of the global organic market and smallholder organic production is growing rapidly also in Africa (see Table 2).

Table 2. Organic production in the developing world in 2007⁵

	Asia	Latin America	Africa
Hectares certified organic	2.9 million	6.4 million	900 000
Number of farmers	230 000	220 000	530 000
Crops	Rice, fruits, cotton, tea, coffee, herbs and spices	Fruits, grains, cereals, coffee, cocoa, sugar and meat	Fruits, vegetables, coffee, spices, cotton

Statistics on organic lands, farmers and production quantity is not specified for humid and sub-humid areas, but the importance of the crops like rice, fruit, vegetables, coffee and spices indicates that a major part of the organic development currently takes place in these areas.

Characteristics of Humid and Sub-Humid areas

Tropical humid areas are characterised by receiving 2 to 3 seasons of rain every year, annually above 1000 mm or so. The natural vegetation is rain forest and agricultural lands experience frequent flooding. Sub-humid areas are characterised by having normally one rain-season per year and up to 6 month dry season. The annual rainfall varies between 600 and ~1000 mm and the natural vegetation of sub-humid areas is normally grass or forest savannah.

Humid and sub-humid areas are widespread in most tropical regions of the world and contain a great variation of farming systems depending on many other agro-ecological factors such as temperatures, altitude, soil type, population density etc. Both types of areas have very high potential for agricultural production, including food-crop, fibre crop (cotton), fruit, vegetables and farm integrated livestock systems.

Annex 5 provides an overview of the areas and farming systems that are relevant for HUSHA; it describes the general contexts and central issues for the potential for organic development of the most important farming systems of humid and sub-humid areas in: Sub-Saharan Africa; South Asia; East Asia and the Pacific; Latin America and the Caribbean⁶.

Except for areas with alluvial soils, humid and sub-humid areas are often characterized by poor and acidic soils due to abundant rainfall and fast decomposition/high mineralization rates of biomass and organic matter. Pest and disease pressure is usually high because of year-round favourable temperatures and high relative humidity.

⁵ Willer and Kilcher; 2009; The World of Organic Agriculture, Statistics and Emerging Trends 2009; IFOAM

⁶ The typology and the information about the farming systems in the four regions are adapted from Dixon et al., 2001.

Farming Systems and Poverty, Improving Farmers' Livelihoods in a Changing World - supplemented by statistics on organic agriculture from Willer and Kilcher, 2009. The World of Organic Agriculture, Statistics and Emerging Trends 2009; IFOAM

Agricultural inputs are generally available, but prices depend heavily on the distance to urban centres and the infrastructure. The costs of transportation can make the costs of inputs at the farm gate level increase to double or six times in distant areas compared to urban centres. Inputs are therefore – if available – often not affordable and in many cases also not profitable to use for small farmers living in these areas.

Potential and conversion issues of organic production systems

There are three major challenges in implementing organic agriculture in most of these farming systems: building and maintaining soil fertility, nutrients as well as water-holding capacity; managing the pressure of pests and diseases; building knowledge and skills of farmers for managing the complexity of organic systems.

Organic research in humid and sub-humid areas needs to address these major challenges. Apart from that, each farming system has its own potentials and difficulties to be addressed by research. Conversion to organic production under humid conditions, particularly in Asia, often implies less intensive and more integrated production, using resistant and local cultivars that often have lower yields. This will however rarely be the case in the sub-humid areas of Africa, where conventional production by smallholders is often quite extensive with low level of external inputs. Increased crop rotations and diversification, agroforestry and the integration of livestock, aquaculture and bee-keeping typical of organic production provide opportunities to diversify and intensify the system and increase household food security, income stability and the total farm output.

It is suggested that key topics for collection of information by HUSHA be rice and fruit and vegetables, as these crops have good potential for organic production in such ecosystem.

Research and related institutions

Annex 6 provides an overview of organic research and related institutions active in the humid and sub-humid areas. A few of these are dedicated to organic research and are listed as organic research institutes. Others are conventional research institutions, which have research activities in, or of relevance to, organic production. Moreover, a good number of institutions have experience in development and research in organic cropping and livestock in mixed farming systems in developed countries, which could be helpful in twinning arrangements in tropical countries.

Over the last decade, organic producer organisations or like-minded civil organisations representing producers and other stakeholders in the organic sector have developed in many countries. An example is the Asian Farmers' Association for Sustainable Rural development (AFA), which has member organisations from 8 different Asian countries representing 10 million smallholder farmers. AFA works on promotion and lobbying for organic farming systems for smallholder farmers.

In Southern and East Africa, a major facilitator for the promotion and strengthening of organic production has been the network organisation Participatory Ecological Land Use Management (PELUM). PELUM represents 210 civil society organisations working in 10 countries in Southern and East Africa and it facilitates learning, networking, advocacy and lobbying for organic production and enabling policies in this region. Moreover, a number of organisations of organic producers have been established in the countries, which are active in supporting the development of organic production and markets for their members⁷.

⁷ Examples in Africa are NOGAMU (Uganda), TOAM (Tanzania), OPPAZ (Zambia), ZOPPA (Zimbabwe), MOGA (Malawi) and KORA (Kenya).

1.2 Sectoral Context

1.2.1 RESEARCH PRIORITIES AND MILLENNIUM DEVELOPMENT GOALS

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) (<http://WWW.AGASSESSMENT.ORG>) was organized around answering a pressing and fundamental question: “How can agricultural knowledge, science and technology be used to reduce hunger and poverty, to improve rural livelihoods and to facilitate equitable, environmentally, socially and economically sustainable development?”. While the agricultural research enterprise has fulfilled its promise to improve productivity, significantly improving the livelihoods of millions of people, it has been less attentive to the unintended social and environmental consequences of research achievements.

It is therefore critical that the proposed organic research centre alliance be evaluated for its potential to contribute to achieving the Millennium Development Goals (MDGs) (<http://WWW.UN.ORG/MILLENNIUMGOALS>).

The first MDG is the eradication of extreme poverty and hunger. While it is a fact that agricultural production and yields have increased during the last decades, with the use of improved varieties, fertilisers and pesticides. This development has mainly benefited already industrialised countries and some developing countries, who have had the conditions for take up of the technologies. The development has however also led to growing disparity between countries and populations within countries. Most countries in Sub-Saharan Africa (SSA) have not seen the improvements in food security and production – on the contrary, the food production per capita have decreased on the African continent. Despite the considerable advances in agricultural technology, it is a fact that the majority of the world’s farmers use inefficient manual tools and their plants and domestic animals have benefited very little from the advances.

The increase in fertiliser use and use of improved varieties has been among the most important factors for increased food production. But for many, especially the smallholder farmers in developing countries, the purchase of manufactured fertiliser, improved variety seed and pesticides is and will continue to be constrained by: their high costs relative to output prices; lack of capital for purchase; risks associated with purchase; unavailability.

The challenge therefore, is to provide the research and development necessary to aid poor farmers adopting organic management systems and hence, optimizing the productive use of local natural resources and human and social capital. In particular, capitalizing on available labour, knowledge and institutions is a promising strategy for poverty alleviation in rural areas.

According to The Science Council of the Consultative Group on International Agricultural Research (CGIAR), diversification of smallholder production systems through incorporation of high value crops and livestock is an important strategy for improving rural livelihoods, particularly in the absence of a major redistribution of land and capital. But achieving this will require a reorientation of traditional research systems such that scientists develop technology and knowledge systems that would enable small-scale producers to access dynamic markets. As detailed in Section 4, the proposed organic research centres are designed, from inception, as networks that include farmers-researchers and other practitioners’ participation at the heart of the research agenda and modalities, including on-farm research and other forms of cooperation that bring together scientists and producers. This design significantly lowers the costs of research, ensures that it responds appropriately to issues of reality and aids the rapid absorption of new findings into agricultural practice.

The second and third MDGs relate to women and organic agriculture indirectly contributes to the realization of these goals. The second MDG is to achieve universal primary education. In cases where farmers have experienced higher yields and higher incomes (from lower production costs and

organic premiums), the extra household income is often invested in the schooling of girls. The education of girls, in turn, improves the agricultural system performance; according to the International Fund for Agricultural Development (IFAD), farm yields rise around 22% when women receive the same education as men⁸. The third MDG is to promote gender equality and empower women. When farms are managed organically, women can participate better as less capital investments are needed for purchasing agricultural inputs. Women often take on a variety of tasks that empowers them within the household and also lifts their skill level and contribution to family income and nutrition.

The fourth, fifth and sixth MDGs (to reduce child mortality, to improve maternal health, and to combat HIV/AIDS, malaria and other diseases) all relate to human health. Organic agriculture contributes in several ways to these objectives. First, it reduces the risk of contaminating water with agrochemicals, allowing for more access to safe drinking water. More importantly, organic production does not make use of synthetic pesticides, which are responsible for 20 000 deaths from pesticide poisoning annually. The diversification of organic systems can contribute to a more diversified diet, thus consumption of a diversity of nutrients that improve disease immunity and health.

The seventh MDG is to ensure environmental sustainability. Many of the regions facing the greatest challenges in achieving the MDGs are the regions that face the greatest problems of ecosystem degradation. Although socioeconomic factors will play a primary role, achievement of the MDGs is unlikely without improvements in ecosystem management. Organic agriculture is a promising approach. Soil health and fertility is improved^{9,10} biodiversity enhanced^{11,12,13} external energy consumption decreased¹⁴ and climate mitigation and adaptation is optimal through organic management¹⁵.

The challenge is to design ecologically sound organic production systems so that they provide increased yields commensurate with conventional agriculture over the long term. At the FAO International Conference on Organic Agriculture and Food Security in 2007, scientists raised the question: can organic agriculture feed the world? Among the papers presented was an econometric model that found organic agriculture could produce enough food on a global per capita basis for the current world population¹⁶. This study generated controversy, as expected, since it was one of the very first attempts at evaluating the potential of widespread adoption of organic agriculture. Multiple assessments and additional research is needed to ultimately determine the suitability of organic production for all regions of the world. Long-term comparison trials are necessary to evaluate and improve organic agriculture for yield enhancements, a function central to the design of the organic research centre system.

The eighth MDG – developing global partnerships with the aim of reducing poverty and hunger, improving education and health and protecting the world's natural resources – is extremely relevant to

⁸ IFAD, 2001. Rural Poverty Report: The Challenge of Ending Rural Poverty

⁹Reganold, J.P., Elliott, L.F., Unger, Y.L., 1987. Long-term effects of organic and conventional farming on soil erosion. *Nature*. 330: 370-372

¹⁰ Mäder, P., Flieback, A., Dubois, D., Gunst, L., Fried, P., Niggli, U., 2002. Soil fertility and biodiversity: organic farming. *Science*. 296: 1694-1697

¹¹ Hole, D.G., Perkins, A.J., Wilson, J.D., Alexander, I.H., Grice, P.V., Evans, A.D., 2005. Does organic farming benefit biodiversity? *Biol. Conserv.* 122: 113-130

¹² Bengtsson, J., Ahnström, J., Weibull, A.C., 2005. The effects of organic agriculture on biodiversity and abundance: a meta-analysis. *J. Appl. Ecol.* 42: 261-269

¹³ Kotschi, J., 2006. Coping with climate change and the role of agrobiodiversity. Conference of International Agriculture Research for Development. October 11-13, 2006

¹⁴ Pimentel, D., 2006. Impacts of organic farming on the efficiency of energy use in agriculture. Organic Centre State of Science Review

¹⁵ Niggli U, A. Flissbach, P. Hepperly and N. Scialabba, 2009. Low Greenhouse Gas Agriculture. Mitigation and Adaptation Potential of Sustainable Farming System. FAO, April 2009.

¹⁶ Badgley, C., Moghtader, J., Quintero, E., Zakem, E., Chappell, M.J., Avilés-Vázquez, K., Samulon, A., Perfecto, I., 2007. Organic agriculture and the global food supply. *Renew. Agric. Food Syst.* 22: 86-108

the proposed organic research centre alliance. Building an agricultural research for development system in Africa requires, according to one analysis, carefully linking the research agenda with national development priorities, increasing coordination, interaction, inter-linkages, partnerships, and networks and securing innovative financing and resource mobilising mechanisms¹⁷. By identifying research and development priorities and collaborating with Northern research institutes, ORCA provides a framework within which these kinds of relationships can be built. Rather than a series of small and scattered research communities, fragmented both geographically and institutionally, the proposed alliance of centres will facilitate the gathering of dispersed expertise and thereby increase the competitive quality and relevance of the research.

1.2 Sectoral Policy and Legislation

From a development perspective, the promotion of organic agriculture is a very attractive option to policy makers, who wish to improve environment and at the same time create jobs and income for the producers.

In a context of persistent and even increasing poverty and hunger, it has become obvious that only focusing on high input technologies and credit provision cannot meet the needs of the poor. The combination of rising input costs (costs of nitrogen fertilizers increased 160% in 2008), decreased availability of natural resources (especially water) and climate variability are already squeezing most farmers, but especially smallholders with little to invest. Evidence exists on opportunities for improving agricultural productivity at lower costs with organic agricultural practices. In the humid and sub-humid areas, there are favourable agro-ecological potential and often markets available for organic production. In these areas, certified organic products offer valuable opportunities for commercialization of small farmers and export earning.

Organic agriculture combines and integrates solutions to natural resources conservation, profitability of farming and health of land, ecosystems and people. Appropriate public policies promoting organic agriculture are therefore likely to render multiple benefits to communities. This has to some extent been recognised in Europe, where a study¹⁸ using OECD indicators of environmental indicators concluded that “promoting organic farming is an effective and economically efficient way of achieving environmental goals; Organic farming results in improvements in most environmental indicators and supplies environmental services at lower costs”.

The European Union and recently also USA have therefore applied public policies that promote organic agriculture and also provide the enabling institutional environment for its development. These policies are comprehensive and involve economic incentives, trade instruments such as organic standards and regulation for certification and labelling, consumer awareness and promotion, plus extension and research to support the continuous development and improvements of the organic production systems all along the value chain, and at the same time provide policy makers with information that enables monitoring and evaluation of the applied policies and tools.

Many other countries have adopted policies for organic agriculture. In 2009, 71 countries have implemented regulations on organic farming and 21 countries are in the process of drafting regulations. The FAO-IFOAM-UNCTAD International Task Force on Harmonisation and Equivalence in Organic Agriculture (ITF) has introduced tools to harmonise the regulations in order to reduce barriers to international trade in organic produce. The task force is now promoting the uptake of these tools and assists developing countries in their development of regulations.

¹⁷ Mbabu, A. and Ochieng, C., 2006. Toward building an agricultural research for development system in Africa. IFPRI-SNAR discussion paper, No 10.

¹⁸ Stoltze, M, Piorr, A., Haring, A. and Dabbert, S., 2000. The environmental impact of organic farming in Europe. Organic Farming in Europe: Economics and Policy, vol. 6. University of Hohenheim, Germany.

The objectives of the organic agriculture policies vary in the countries from income generation through exports (e.g. Chile) to import substitution on domestic markets (e.g. Malaysia), environmental protection (e.g. Denmark), rural development (e.g. South Africa), strengthening the competitiveness of small holders (e.g. India), promoting quality over quantity as a market strategy (e.g. small island states) or a combination of these.

In many developing countries, organic legislation, including production and certification standards, is seen mostly as the entry point to lucrative markets in Northern countries. The policies therefore mostly focus on these legislations and the organic legislations do not provide for measures that can enhance farmers' adoption or agro-ecosystem productivity, such as research and extension.

The experience shows that Government support to research and development on adapting production to different ecosystems and cultural traditions is needed as part of the policy-package. The relatively few countries (e.g. Switzerland, Denmark, and Sweden) that have implemented comprehensive organic policies as part of the overall agricultural policies, including support to research, training and advice have experienced strong and dynamic development of the organic sectors, which are well on the way to become efficient mainstream production systems. Moreover, the supporting research has documented the public good outcome of this in terms of environmental improvements.

2. RATIONALE

2.1 Opportunities and Issues to be addressed

There is a strong and urgent need to support the emerging organic development in developing countries and fill the existing knowledge gap. The ORCA Centre for Humid and Sub-humid Areas is developed as a response to this need and intend to promote research collaboration in organic agricultural systems of developing countries.

The world agricultural sector is currently experiencing major challenges of food production, such as rapidly increasing and changing demand, high levels of poverty and low productivity in otherwise potentially good food producing areas. This is compounded by changing climate, which increases uncertainty, seasonality scarcity, water availability and temperature fluctuations - all factors which exacerbate problems of low agriculture performance of many areas.

Along with these challenges, many countries experience a continuous increase in demand for organic products, food and non-food. In particular, the number of producers (i.e. farmers and processors) in developing countries who strive to develop organic production systems, often to supply Northern markets, is growing. The demand for export commodities such as fruits, vegetables, rice, coffee, tea, cotton, spices and oils for cosmetics is steadily growing. At the same time, a demand for a safer environment and better health is emerging in developing countries by conscious consumers.

There are several aspects of organic production systems which respond positively to the current global challenges of food production:

- While poor small scale producers in developing countries are largely unable to benefit from the technical advances of conventional agriculture because they have little access to the improved technologies, the increased global market for certified organic produce offers important opportunities for these farmers to improve their livelihoods through increased incomes, reduced costs and more sustainable use of their natural resources.
- Considering the concern of elevated atmospheric greenhouse gases (GHG), organic agriculture systems offer multiple opportunities to reduce GHGs and counteract global warming, by reducing energy requirements for input production, sequestering carbon by building up organic matter in the soils and reducing N₂O emissions.

- Organic systems also offer opportunities for improving adaptation to climate change: as the build up of organic matter for soil fertility is a priority, with improved effects on biodiversity and water holding/drainage capacity, organic systems often prove to be more resilient to drought/flood conditions and other environmental stress than conventional production systems, thus reducing risks.
- In terms of reducing general pollution and water pollution in particular, the lower livestock concentration, lower levels of nitrogen and lack of chemical plant protection of organic production has much to offer. This has particular promising prospects for humid areas where the extremely intensive agriculture and livestock development (e.g. South East Asia) has caused severe environmental and human health hazards.
- While the level of productivity is a critical issue of organic production in developed countries, there is evidence that development of organic production systems in agricultural areas of developing countries, where production practices are extensive and poorly performing has the ability to increase yields considerably while reducing dependence on input supply.

In developed countries where organic research has had priority, innovations resulted in organic systems with clear improvements as compared to conventional systems on the above aspects.

There are, however also serious challenges for farmers associated with organic production. While organic systems are low input systems in terms of energy and chemicals, they require intensive knowledge and careful management with regards the prevention and treatment of problems without using synthetic inputs. It is therefore crucial for the success of organic agriculture that knowledge and scientifically based recommendations are made available. This has been well recognised in the developed countries that are successful in developing the organic sector and where substantial investments in research have been instrumental in accessing the required knowledge and innovations.

In most developed countries, the development of organic agriculture is being supported by research in terms of both knowledge creation and innovation in many areas, including: primary production, processing technologies, consumer behaviour and marketing. Also, comparative research is undertaken in order to increase the understanding on the impact of organic management on: farm and community economy; natural resources and the environment; energy efficiency; animal welfare and human health and nutrition.

In developing countries, this has not been the case. The current development of organic production and domestic organic markets happens in a knowledge vacuum, making organic management risky and poor in terms of innovations for more adequate technologies. There are research institutions and organisations active in organic agriculture in developing countries, but they are few, scattered and under-resourced. The very few mainstreamed organic research systems have activities that respond to some of the challenges in organic management but they rarely have a holistic research approach and there is currently no real collection of knowledge or coordination of such activities.

2.2 Stakeholders and Target Beneficiaries

Annex 6 lists some potential members of the ORCA Centre for Humid and Sub-Humid areas (HUSHA), including various institutions and networks of organic agriculture scientists and producers¹⁹. HUSHA will also link-up with partners not directly involved in organic research such universities, government ministries, civil society groups, private industry, international development organizations and global think tanks.

¹⁹ It should be noted that the list may not be all encompassing and may also contain some information that is outdated.

Target beneficiaries are farmers and processors, particularly those in developing countries who face serious knowledge and resource constraints. That said the knowledge to be generated by ORCA is expected to benefit most food producers, regardless of their chosen mode of production. For example, new knowledge on soil fertility may benefit farmers choosing to produce under conventional systems as well as those who maintain organic practices. This has been the case in many practices pioneered by organic farmers – once viewed as an organic alternative – now widely practiced by a variety of farm types.

For HUSHA to benefit farmers and processors, it will directly involve organic producer organisations in the research continuum, from planning to development, testing and evaluation of innovations.

Extension and training agents are important stakeholders. They are first of all important sources of information and dialogue regarding the practical problems and risks related to the adoption of organic management. Secondly, extension agents are important beneficiaries of improved access to research results that can expand their capabilities.

Other beneficiaries include researchers who will strengthen their work and critical mass by networking with other scientists, as well as their interactions with real life situations, i.e. farmers' fields.

Moreover, HUSHA will benefit organic inspectors, certifiers, accreditors and legislators on adequate standards for organic verification systems. Consumers will also benefit, as organic research is conducted on market development and supply chain dynamics in order to provide access to organic foods and products.

Furthermore, HUSHA results will inform policy makers regarding appropriate policy measures and tools for promoting organic agriculture in humid and sub-humid areas, based on research outcomes evaluating economic, social and environmental benefits and constraints.

2.3 Project Justification

In humid and sub-humid areas, there are three major challenges for farmers in developing organic agriculture (see Annex 5):

- Building and maintaining soil fertility, including nutrient recycling and improvement of water holding/drainage capacity;
- Managing the high incidence of pests and diseases;
- Building the knowledge capacity and skills of farmers for their management of complex organic systems.

As described in detail below, the current knowledge and capacity to deal with these challenges is totally insufficient. Considering the urgency to address global concerns such as climate change, food insecurity and search of livelihoods - combined with the growing demand for organic produce - the probability is high for HUSHA to trigger an immediate response in terms of improving organic agriculture performance and consequently, environmental and social benefits.

The core work of HUSHA is to conduct research relevant to farming systems based in humid and sub-humid areas dominated by flooded cropping systems or tropical forest systems. These areas are often characterized by poor and acidic soils due to abundant rainfall and fast decomposition and high mineralization rates of biomass and organic matter – the latter being the most important reservoir for nutrients. Pest and disease pressure is usually high because of year-round favourable temperatures and high relative humidity. Agricultural inputs are generally available, but not always affordable for small farmers living in these areas. Conversion to organic agriculture in humid and sub-humid areas implies less intensive and more integrated production, using resistant and often local cultivars that are often lower yielding. Increased crop rotations and diversification, agro-forestry and the integration of livestock, aquaculture and bee-keeping typical of organic production provide opportunities to diversify

the system and increase the security and stability of income and total farm output. The major challenges in converting to organic agriculture in this agro-ecosystem are pest and disease pressure.

Although the research agenda is expected to be prioritized by the HUSHA stakeholders, HUSHA will be mandated to undertake soil research, an essential topic in organic production and which is largely believed to most differentiate organic from conventional production. Soil research in humid and sub-humid areas will provide a common ground for collaboration and systematic analysis. It is expected that the multidisciplinary and multi-regional perspectives gained from universal involvement in the study of soils will benefit the science of organic agriculture and sustainable agriculture as a whole. ORCA places high priority on funding for soil science and this is a major area for Secretariat-driven fund solicitation. Each year, the available budget for soils will be divided and one-half of the funding will be allocated to support ongoing work in soil science. An annual internal competition will be held for the remaining half of the soil funding (i.e., Soil Challenge Fund), with the awards determined by the Facilitation Board.

HUSHA is also expected to maintain a global virtual library on two key topics: organic fruits and vegetables and organic rice - because rice farming systems are predominately found in this agro-ecosystem and because there is possibility of growing fruit and vegetables year-round in most locations.

In 2007, 178 000 ha of vegetables were grown organically around the world²⁰. In sub-Saharan Africa, certified organic vegetables are grown in Kenya, Uganda, Madagascar, Malawi, South Africa and Zambia, the majority in humid and sub-humid areas, where sufficient water is available. While much research on organic production of fruit and vegetables is taking place globally, it encompasses only a handful of crops and is mostly being undertaken in developed countries in temperate and subtropical climates. Therefore, it does not respond adequately to the constraints of cultivation and processing in tropical areas. There are inadequate science-based recommendations available for organic production of tropical fruits and vegetables. So, while the production and market demand for organic tropical fruits and vegetables are steadily increasing, there is a considerable gap in knowledge and information concerning the optimal management of these crops, which is hindering optimal development of the sector.

There has been no systematic collection of research needs and priorities in these areas. However, the institutions and organisations serving the organic sector indicate that the overriding issues in these areas are connected to pest and diseases and soil fertility (see Annex 5). Organic farmers in humid and sub-humid areas are seeking information on how to manage pests and pathogens organically. They ask for expanded information on the potential of botanical pesticides for crop protection, production techniques for low soil fertility conditions, and identification of indigenous varieties that perform well under organic management. There is also a need to understand how to reduce the risks of post-harvest losses of fruit and vegetable due to pest damage and spoilage.

Research on organic vegetable production is conducted at numerous universities and research institutions around the world, but the information has yet to be collated. The World Vegetable Centre (AVRDC) has undertaken organic vegetable research related to plant compounds and yields, which could be of use to organic researchers. In addition, civil society organisations, such as Garden Organic, which seeks to improve techniques in organic horticulture in developing countries, have valuable expertise on the production of organic fruit and vegetables.

Rice production systems are one of the major types of farming systems in the world and rice is the most rapidly growing food item in Sub-Saharan Africa. A major concern with conventional rice production is the intensive use of pesticides and organic production is in many ways an important alternative. Evidence from Asia shows that organic rice systems are much less pesticide demanding

²⁰ Willer and Kilcher; 2009; The World of Organic Agriculture, Statistics and Emerging Trends 2009; IFOAM

than conventional rice systems, because they have lower levels of nitrogen fertilisation. However, weed control and soil fertility remain major challenges in growing rice organically. Better information on fertilisation strategies from crop rotations, particularly from legumes, and ways to optimize their use of locally-available nutrients such as rice straw, manure, guano and rock-phosphate is needed. Further research topics could include the potential for organic rice systems to emit less methane than conventional rice systems. In particular, organic rice systems offer opportunities of double cropping with integrated fish production. Although these rice-fish systems are fairly popular in Asia, they are still in the early stages of establishment in Africa.

Much of the current rice research is being done in Asian countries. The research carried out on organic rice is very scarce as most research on alternative systems is on integrated pest management. As the environmental concerns related to the intensive rice production systems are increasing and the global market for organic rice is growing, the gap in knowledge regarding organic rice production becomes evident. For African rice production, the lack of research creates a vacuum of knowledge, which is hindering further development. The International Rice Research Institute (IRRI) however recently published a primer on organic rice farming and has strong rice research connections in Africa, which represents a starting point for information for organic researchers.

While commercialisation for smallholder farmers often disadvantages women's position and pushes gender balance in the wrong direction due to access issues, organic management often takes a departure from traditional indigenous systems by making use of plant diversity and local varieties. Particularly in Africa, low capital and no external input agriculture is carried by women; women are therefore likely to be able to maintain a better position when commercialising organic produce than otherwise. Connections between gender and organic production is however not well researched, but interdisciplinary development oriented research would provide important information about the gender dynamics of commercialisation.

Annex 6 provides a list of research and related institutions and their activities in the Humid and Sub-humid areas. It should be noted that the list may not be all encompassing and may also contain some information that is outdated.

2.4 Past and Related Work

The functions and networking structure of ORCA is much related to and also inspired from the CGIAR Challenge Program on Water and Food (CPWF). The CPWF is an international, multi-institutional research initiative with a strong emphasis on north-south and south-south partnerships. The initiative brings together research scientists, development specialists, and river basin communities in Africa, Asia and Latin America aiming to improve the productivity of water in river basins in ways that are pro-poor, gender equitable and environmentally sustainable. The CPWF represents the largest, most comprehensive investment in the world on water, food and environment research. Through the paradigm of water productivity - developing ways to produce more food within limited water availability - it offers a new approach to natural resources management research within the CGIAR. The CPWF works together with institutions, NGOs and community groups in partnerships which seek meaningful impact for the people who use the new innovations developed by scientific research. The programme is led by 19 institutions, with over 150 partners participating – each with clearly defined roles. Participation is open to national research organizations and universities, NGOs, international research groups, and CGIAR centres. Project funding is disbursed through a competitive grant scheme that began in 2003.

In Africa, the CPWF is implemented through Forum for Agricultural Research in Africa (FARA), which at the same time holds the responsibility for implementation of the Comprehensive African Agricultural Development Programme (CAADP)'s Pillar four, which is Technology Development and Capacity Building.

At this moment of time, organic research is however, neither appropriately nor sufficiently served as part of the mainstream research platforms and thus requires a specific effort with specific approaches and modalities.

On the other hand, it is clear, as seen from the institutional analysis in Annex 6, that the CGIAR centres provide important contributions to organic research. It is therefore inevitable that HUSHA must and will establish close relationships and collaboration with relevant CGIAR centres.

The realisation that boosting research in organic food systems requires a specific and separate effort is not entirely new. Examples of countries that have formulated specific organic research agendas and developed frameworks to carry out high priority organic research in their own countries are:

- USA: The Organic Agriculture Consortium (OAC)
- Canada: The Organic Agriculture Centre of Canada (OACC)
- Australia: Rural Industries Research and Development Corporation (RIRDC) – Australian Organic Hub
- Denmark: International Centre for Research in Organic Food Systems (ICROFS)
- Switzerland: Research Institute of Organic Agriculture (FiBL)

Of these only FiBL has its own physical structure and facilities. The others are, as the HUSHA, centres without walls but with their own funding, which means they are using the facilities of other mainstream research institutions. The experiences from some of these countries are quite promising in terms of supporting development of the organic sectors in their respective countries, but also for providing ideas and knowledge of practises that are taken over by conventional systems in order to improve their sustainability. At the same time, they make it possible for authorities to monitor the desired impacts of the development of the organic production.

A recent example of research collaboration of substantive scale on organic farming in a tropical country is seen in Brazil, where 27 centres of research under the Brazilian Agricultural Research Cooperation (EMBRAPA) has joined to work together on the project “Scientific and Technological Basis for the Development of Brazilian Organic Agriculture”. More than 300 researchers are involved in this and the project is designed with a strong element of interchange and collaboration with European organic researchers.

So far, the efforts to organise and promote organic research on a large scale has not been seen in any developing countries, but there are a number of initiatives in this line such as for example, Thailand and India, where funds are allocated to public research into organic agriculture. In Africa, such initiatives in most cases involve support from bilateral development partners. This is for example the case in Uganda and Kenya but at a much smaller scale.

One institution that is important to mention is the International Society for Organic Research (ISO FAR), established in 2003. The goals of ISO FAR are to promote research in organic agriculture by facilitating global cooperation in research and education and knowledge exchange. The 400 individual scientist members of ISO FAR are from all parts of the globe, although the majority resides in Europe. Together with IFOAM (<http://www.ifoam.org>), ISO FAR facilitated a discussion among scientists from European countries to envision an organic research agenda for the next 20 years, which was published in 2008²¹. At this time, ISO FAR may be the most significant international organic research network in existence. It is noted that while ISO FAR is a network of organic scientists, it is not undertaking research as such. It will however be crucial that ORCA establish close linkages with ISO FAR.

²¹ Niggli, U., A. Slabe, O. Schmid, N. Halberg and M. Schluter, 2008. Technology Platform “Organics”, Vision for an Organic Food and Farming Research Agenda to 2025, Organic Knowledge for the Future. IFOAM/EU, ISO FAR.

2.5 FAO's Comparative Advantage

The long-term objective of the FAO Organic Agriculture Programme is to enhance food security, rural development, sustainable livelihoods and environmental integrity by building capacity in member countries in organic production, processing, certification and marketing. The FAO website ([HTTP://WWW.FAO.ORG/ORGANICAG](http://www.fao.org/organicag)) documents the evolution of FAO work in this area and provides access to essential documents. Typically, FAO work consists of development projects that focus on a country or region. FAO is well poised to work in concert with the proposed organic research centre alliance (as it now does with the CGIAR system) along with other UN development agencies (e.g., UNEP, IFAD, and UNCTAD) and international and national partners. This kind of partnership allows the proposed centres to focus on research and shift the main burden of development work onto FAO and other development agency partners.

In April 2009, the FAO Committee on Agriculture “stressed that an ecosystem approach be adopted in agricultural management in order to achieve sustainable agriculture, including integrated pest management, organic agriculture and other traditional and indigenous coping strategies that promote agro-ecosystem diversification and soil carbon sequestration... Several Committee members noted the need for capacity building in new approaches and incentives to producers. The Committee endorsed the proposal that public and private investments be made in agro-ecological research, at both national and international levels.”

FAO hosts the Secretariat of the Science Council of the Consultative Group for International Agricultural Research (CGIAR) and the Secretariat of the Global Forum for Agricultural Research (GFAR) and has the mandate to assist advancing agricultural research under all aspects.

Through its 10 years of consecutive work with the global organic community, including NGOs and farmers' organizations, and its mandate to work with governments on agricultural policies and capacity building, FAO is in an ideal position to host ORCA and link organic and non-organic research institutions, as well as northern and southern partners, in order to advance organic agriculture in developing countries.

2.6 Contributions to FAO's Strategic Objectives and Organisational Results

At the time of writing the present proposal, a guideline for integrating FAO's Strategic Objectives and Organisational Results into the project framework is not yet ready. However the following describes how the project will contribute to the FAO Strategic Objectives and Organisational Results and also how it supports the Impact Focus Areas. It also mentions the future perspectives of the potential contributions of a fully fledged ORCA.

In the context of the global goals of FAO's mandate, the project relates to the all the three Global Goals, first of all strongly to: *Sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources, for the benefit of present and future generations*. But also the two other goals of reduction of hunger and the contribution of agriculture to economic and social progress are being addressed through the project as the development of organic food systems are well suited for improving livelihoods of poor smallholder farmers in developing countries and organic agriculture practices are increasingly adopted by market-marginalized farmers who seek food self-sufficiency through a better use of existing resources. Moreover, an increasing market for organic produce offers good opportunities for smallholders to be integrated in commercial agriculture.

The project thus addresses several of the Strategic Objectives of FAO²². It particularly by order of priority addresses the following:

²² Strategic Framework 2010 - 2019

F: Sustainable management of land, water and genetic resources and improved responses to global environmental challenges affecting food and agriculture by focussing on natural resources management and agro-ecology. The project will increase and improve access to the knowledge about management of organic agricultural systems but also document the impacts of the organic agricultural systems as they respond to the global environmental challenges affecting food and agriculture. The project will thereby contribute directly to the organizational result F6 on “improved access to, and sharing of knowledge for natural resource management”, which through the dialogue and information sharing with policy makers will make possible important contribution to other organizational results related to land, biodiversity and climate change (F1, F3 and F5).

A: Sustainable intensification of crop production by contributing to enhancing the use of local resources through polycultures and integrated systems of crop production, diversification of crops and crop varieties as well as biological crop protection. The project will thereby directly contribute to the organizational results A2 and A3, reducing risks of outbreaks of plant pests and diseases and of risks associated with use of pesticides. Moreover, through the increased availability of knowledge and dialogue with policy makers it will contribute to the organizational results A1 and A4 for policies for sustainability, diversification and better management of plant genetic resources.

G: Enabling environment for markets to improve livelihoods and rural development through the development of organic agriculture, which is driven by improved access to lucrative markets, with evidence on improved competitiveness of small producers. The increased global market for certified organic produce offers attractive opportunities for small scale farmers to improve their livelihoods through increased incomes, reduced costs and more sustainable use of their natural resources. The project will provide access to knowledge and scientific recommendations on management of the systems that are crucial to the ability of the small scale farmers to take advantage of the market opportunities. The project will thereby contribute also to the organizational results G1 on enabling small producers to improve competitiveness, diversify their enterprises and increase value addition and G2 on rural employment and income diversification.

H: Improved food security and better nutrition, especially at the household level and through diversified foods. The project has focus on research in organic food systems which are intensive, diversified, environmental friendly and less depending on capital demanding inputs, thus reducing risks and improving food security. The project will therefore increase and make knowledge and information available to stakeholders and policy makers that contribute to the organisational results H1 for addressing root causes of hunger, food insecurity and malnutrition and H5 for better access to information on food security, agriculture and nutrition.

B: Increased sustainable livestock production, through the better use of local breeds and animal welfare. The development of organic agricultural systems is almost always linked with, and depending on, a strong integration of crop and livestock production. The research collaboration will therefore inevitably strengthen the synergies between crop and livestock production. The available documentation indicates that further development of these systems are likely to make important contributions to the organizational results B1 on “livestock contributing to food security and poverty alleviation”, B2 on “reduced animal diseases and human health risks” and B3 on “better natural resource management in livestock production”. Moreover, the project will contribute to providing access to reliable information for guiding policy and practice (B4).

K: Gender equity in access to resources, goods, services and decision making in the rural areas, as organic farming has a specific track record in enabling female farmers to benefit in terms of both improved household food security and access to an attractive market for organic and fair trade produce and small scale processing. The project particularly emphasizes involvement of both men and women at all levels of decision making, priority setting and conducting research with male and female researchers, farmers and processors. The project has incorporated this directly in the programme and will therefore contribute to the objective of gender equity.

The project is thus framed within the Impact Focus Areas of FAO's Medium Term Plan and Programme of Work and Budget. First of all: *Capacity building to strengthen information and statistics for decision making in the sustainable management of agriculture, natural resources, food security and poverty alleviation*. But it also contributes to: *Support to implementation of the Comprehensive Framework for Action (CFA) – smallholder farmer food production and global information and monitoring systems*. It particularly supports the CFA outcome of “Smallholder farmer food production growth sustained”.

Longer term perspective:

The full fledged ORCA system with all the research centres in place will moreover also address and contribute to the strategic objectives:

C: Sustainable management and use of fisheries and aquaculture resources, as one of the eleven research centres to be implemented will be on Coastal and Small Islands and deal particularly with sustainable capture fisheries and aquaculture and also with integration of fisheries and farming.

E: Sustainable management of forests and trees, as another of the up-coming ORCA research centres is on hilly and mountainous areas. The key topics of this centre will be forests and agroforestry, thereby contributing to the strategic objective.

3. PROJECT FRAMEWORK

This section establishes the strategic framework for the HUSHA during a three year start-up phase, which relates closely to the strategic framework for the proposal for ORCA as a whole. The establishment and implementation of the HUSHA also require the establishment of the basic facilitative ORCA structures, particularly the Facilitation Board, Secretariat and Virtual Network/communication tool. The project proposal therefore includes these elements as required for HUSHA, as well as the ORCA Secretariat commitment to prepare and establish four more ORCA Centres, according to stakeholders' preparedness and upcoming demand. The complete logical framework is presented in Annex 2.

3.1 Impact

The overall development goal of ORCA is:

Organic research is mainstream, robust, and valued by farmers and policy-makers worldwide by 2025.

The overall development goal of the ORCA HUSHA in the start-up phase is parallel to ORCA's overall goal, however considering the specified and shorter time frame:

Organic research in humid and sub-humid areas is promoted and valued by farmers and policy-makers in the countries of operation

The ultimate vision is to create household food security, sustainable livelihoods for smallholder farmers and environmental sustainability through an organic food producing sector.

3.2 Outcome and Outputs

3.2.1 OUTCOME

There will be two major outcomes of the start-up phase:

- A centre of excellence established in organic food systems in humid and sub-humid areas producing and communicating high quality research in organic food systems that are relevant

to the needs of farmers and processors – both female and male – and also credible and recognised.

- Four centres of excellence in organic food systems at different stages of preparation and start up.

3.2.2 OUTPUTS AND ACTIVITIES

Outputs and activities will be the following:

Output 1

The ORCA Secretariat established, managed and administrated efficiently, with the capacity to facilitate and service HUSHA, communicate research results and facilitate the launching of other 4 ORCA centres.

Activities:

- 1.1 Establish the ORCA Facilitation Board
- 1.2 Establish the overall ORCA Research Policy
- 1.3 Recruit relevant Secretariat staff
- 1.4 Conduct donor roundtable meetings
- 1.5 Facilitate the establishment of HUSHA, including the preparation of competitive research calls
- 1.6 Communicate research results to policy makers at high level
- 1.7 Prepare proposals for four other ORCA centres and raise funds for these
- 1.8 Establish and maintain collaboration with related institutions at the global level
- 1.9 Convene the first biannual ORCA conference
- 1.10 Prepare Inception Report
- 1.11 Prepare Progress Reports
- 1.12 Prepare the Final Report
- 1.13 Undertake independent evaluation

Output 2

Operational procedures are developed and tested for the ORCA system and for the first ORCA Centre in Humid and Sub-Humid Areas (HUSHA).

Activities:

- 2.1 Develop the operational procedures for the application of research consortia for ORCA's support (the first test is the HUSHA)
- 2.2. Conduct a process for selection of a research consortium of host and partner institutions for HUSHA, based on detailed proposals
- 2.3 Establish a contract between the ORCA secretariat and the selected HUSHA consortium
- 2.4 Develop a monitoring scheme for ORCA centres
- 2.5 Develop the ORCA funding policy

Output 3

The HUSHA centre established and in-operation, conducting organic research activities in humid and sub-humid areas, coordinating research activities by other research partners responding to organic farmers' and processors' needs (as articulated by both female and male farmers and processors) and facilitating a network of informal research collaboration.

Activities:

- 3.1 Establish a general agreement of collaboration between organic research institutions active in the humid and sub-humid areas, including a lead institution based in Africa and twinning partner institution(s) with extensive experience in organic research activities
- 3.2 Establish operational procedures for the network including procedures for identifying and prioritising research needs and projects and for communicating the results, which involves all

- stakeholders both the HUSHA research consortium and the organic community of practise, and with an equal gender representation
- 3.3 Conduct an inventory of existing information and organic research activities in humid and sub-humid areas of all three regions to inform the stakeholder consultation on research priorities
 - 3.4 Conduct a gender balanced stakeholder consultation in Africa, Asia and Latin-America for developing the research agenda and priorities for HUSHA
 - 3.5 Develop the research programme based on the results of a stakeholders' consultation and following the approaches and methodologies outlined in the present document and involving an equal number of female and male researchers
 - 3.6 Prepare tender material for competitive calls for project proposals as part of a HUSHA programme to be implemented by other non-consortium partners

Output 4

Facilities established and research activities started for organic research in humid and sub-humid areas of Sub-Saharan Africa, Asia and Latin America, involving an equal number of female and male researchers and farmers.

Activities:

- 4.1 Planning and establishment of an organic research site for on-station research and demonstration
- 4.2 Screening and selection of smallholder organic farms for on-farm activities and action research
- 4.3 Implementation and monitoring of at least 3 HUSHA research projects on-station and on-farm
- 4.4 Implementation and monitoring of at least 3 HUSHA activities to be undertaken by non-consortium network partners
- 4.5 Training and mentoring of young scientists – at least one for each of the research projects

Output 5

A virtual interactive web portal for knowledge sharing of ORCA research resources, as well as a fully-fledged platform for HUSHA that connects institutions involved and makes available both research outcomes and the global knowledge hub on organic fruits and vegetables and organic rice.

Activities:

- 5.1. Maintain and develop the ORCA portal with all information relevant to organic research worldwide, as well as chat rooms/online discussions forum, file sharing facilities, directory of institutions, news and other resources.
- 5.2 Establish facilities for and develop the ORCA portal HUSHA platform, including all relevant HUSHA resources and research agenda and outcomes and the virtual libraries on organic fruits and vegetables and organic rice
- 5.3. Establish a call centre for guidance on organic research, training and development resources.

Output 6

Facilities established for publishing organic food research and preliminary research results made freely available to practitioners, other researchers and policy makers, with a gender lens in published results

Activities:

- 6.1 Establish a scientific board for review and selection of materials
- 6.2 Publicise relevant research in the area of organic food sciences and distribute the Journal beginning from the third year
- 6.3 Upload for each research project, at least annually, preliminary and available final research results to the ORCA web site
- 6.4 Participate in relevant meetings, workshops, seminars and conferences to present progress and available research results to practitioners (i.e. farmers and agricultural advisers), researchers and policy makers

3.3 Sustainability

The ORCA Centre for HUSHA is designed to be a lasting network of institutions committed to the development of its field of work. At the heart of this project' concept is institutional responsibility and individual commitment of the partners. ORCA principles are based on criteria seeking a high degree of system' sustainability, as participating institutions become centres of excellence that can generate their own resources within the global network. Furthermore, the concept is based on catalyzing existing cooperation and partnerships. Also, the administrative capacity of the project is partly provided through FAO regular programme. At all levels, co-financing of ORCA services is provided in-kind by capitalizing on existing work force, facilities and infrastructure.

3.4 Risks and Assumptions

3.4.1 OUTPUT LEVEL

Funds for supporting the development in the agriculture sector in developing countries is inexistent and public allocations to agricultural research in general have declined for a while. Therefore, despite the recent increased attention to agricultural research for Africa's development, it is expected that competition for research funds will be hard. As a matter of fact, organic research is not high on the agenda of the established platform for funding agricultural research in Africa (e.g. FARA).

The establishment of ORCA will provide a joint effort of advocacy, as competition for research funding will be undertaken by the collaborating research institutions with the back-up of the ORCA Secretariat. It is assumed that this set-up and the gathered knowledge on the benefits that organic agriculture research provide will make Governments and development partners acknowledge the potential of organic production and thus, allocate sufficient resources.

Other risks pertain to the fact that stakeholders might resist committing to a joint research agenda, such as already seen within several organic movements that have different ideologies and perspectives at play. With a view to ensure that developed countries' institutions have an incentive to collaborate with institutions in developing countries, ORCA has deliberately been formulated in partnership with the relevant stakeholders and the ORCA documents are based on their views and interests; a number of the partners who have taken part in the formulation of ORCA have already expressed their interest in engaging in twinning arrangements.

Generally, the ORCA concept is designed in a flexible manner in order to accommodate all pertinent perspectives and ideologies predominant in organic and biodynamic agriculture. The assumption is therefore that there is strong interest from the stakeholders in developing a joint research agenda for organic agriculture in humid and sub-humid areas.

3.4.2 OUTCOME LEVEL

Organic production has a low status among scientists as well as policy makers in many countries. The general perception is that organic agriculture it a high risk area for a scientist to engage in, with the fear of being marginalized. At this level, the risk s the difficulty to attract and engage high capacity scientific staff and also to get the work acknowledged locally and regionally. ORCA is designed in order to address this risk and provide the high profile support and funding that should attract the interest of policy makers as well as scientists in developing countries. Moreover, it is assumed that the strong attention to climate change adaptation and mitigation will cause global, regional and local interest in researching solutions through organic management.

3.4.3 IMPACT LEVEL

There are huge commercial economic interests connected to the conventional approach to agricultural development, which is leaning on commercial supply of genetically engineered seeds, uniform breeds, synthetic pesticides and chemical fertilisers, whose importance in the global economy is enormous. It therefore needs to be mentioned that there are huge constraints to obtaining the necessary support to organic agriculture development, well beyond scientific arguments. It is however assumed that the urgency of addressing increasing food and nutrition security along with environmental problems and adverse impacts of industrial agriculture on climate change creates a political environment where development goals such as economic resilience and environmental integrity are given higher priority for the search for alternative and more sustainable options for food and agricultural production.

4. IMPLEMENTATION AND MANAGEMENT ARRANGEMENTS

4.1 Principles of implementation

ORCA presents an alternative way of undertaking research. Research in organic food production requires a holistic approach of combining traditional and indigenous knowledge, social development, technical innovation and market development. It builds on the following principles:

- Participation of all actors in the food chain, including farmers, processors, traders, advisers, trainers and policy makers.
- Gender equity at all levels from the participation in decision making and actual research activities.
- Networking of institutions in order to mobilise all the expertise required from organic research institutions, as well as other research institutions undertaking research of interest to low external input agriculture.
- Cross and inter-disciplinary research, building bridges between disciplines and between science and society.
- Holistic systems methodologies that can describe the production from a systems' perspective.
- Global collaboration, which will include twinning arrangements between organic research institutions in developed countries and in developing countries.

The aim of the implementation and management arrangements is to create a mechanism that can enable high quality research while providing for the above-mentioned principles.

The plan for implementation described here is for a 3 year start-up phase, with research activities based in humid and sub-humid areas in:

- Sub-Saharan Africa
- Asia
- Latin America and the Caribbean

The lead institution will be based in Sub-Saharan Africa.

4.2 Institutional Framework and Coordination

The first phase of the implementation of HUSHA is to fit in the design of the fully-fledged ORCA as described in the ORCA project proposal (see vision of ORCA in 2025). The institutional framework presented here therefore consists of the HUSHA together with the ORCA Facilitation Board and Secretariat.

4.2.1 THE ORCA CENTRE FOR HUMID AND SUB-HUMID AREAS (HUSHA)

The HUSHA will be a “Centre without walls” consisting of a consortium of research institutions undertaking research in organic agriculture and food systems and coordinating related research projects implemented by other networking partners in humid and sub-humid areas of Africa, Latin America and Asia. Moreover, it will be the knowledge repository on two key topics: organic rice; and organic vegetables and fruit. The following categories of actors will be involved:

Consortium partners:

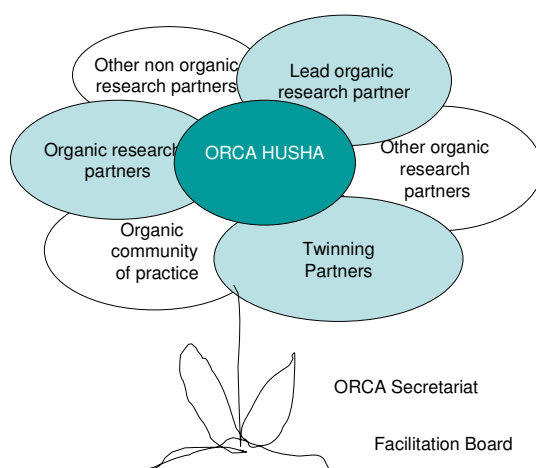
- Organic research institutions with research activities and/or experiences in humid and sub-humid areas hosting the Centre (lead-partners).
- Organic research institutes in developed countries with interest in collaborating in these areas (twinning partners).

Collaborating partners not part of the consortium:

- Organic research and non-organic research institutions with interest in collaborating with the consortium (other research partners).
- Organic movements, producer organisations and private companies (community of practice).

Figure 1 shows HUSHA and its partners. HUSHA is a network undertaking a number of joint research activities by independent autonomous institutions. The consortium partners who coordinate the network are at the centre and the collaborating partners are brought together around the common objective of advancing a joint research agenda with their respective different comparative advantage and priorities. The ORCA Secretariat and Facilitation Board will provide the required support and governance to network activities. HUSHA is therefore a network of networks.

Figure 1 ORCA Centre for Humid and Sub-humid Areas



It should be noted that despite the fact that the HUSHA consists of autonomous partners with different types of mandate, the mandate for the Centre is clearly organic research. What binds the partners together in the HUSHA activities is a research agenda characterized by common research questions, a common methodology and common funding.

With regards institutions belonging to the organic community of practice, which also have other issues than research at hand, their particular role in the network is to make available local knowledge, needs and requirements into the research activities of scientists and farmers involved in HUSHA research.

HUSHA consists of partner institutions in three regions: Africa, Asia and Latin America and one of the institutions will be selected as the lead institution. The lead institution should preferably be based in Sub-Saharan Africa and will be responsible for coordinating the network and the activities, as well as securing the link to ORCA Facilitation Board and Secretariat. The lead institution will convey information on collaboration with other research institutions and the community of practice. Moreover, two institutions will be the focal points (regional hubs) in Asia and Latin America. These two institutions together with the lead institution will be responsible for the regional hubs of the virtual network.

The HUSHA will include twinning collaboration with one or more organic research institutions in developed countries having capacities and expertise to offer into the HUSHA network activities.

In order to compete for research funding, the network will have a formal structure of a research consortium with a legally binding agreement between its members and a contract with the ORCA Secretariat for the period of the start-up phase (i.e. three years). The agreement will specify clearly the roles of the different partners and will include the establishment of a Steering Committee (SC) with representatives from all the partners mentioned above. The SC will guide and oversee the activities of HUSHA. The research programme will be planned and implemented according to a research agenda which will be defined through a stakeholders' consultation, to be held at the start up of HUSHA.

4.2.2 THE ORCA SECRETARIAT

The ORCA Secretariat will have a lean administration office based in FAO's headquarters in Rome, Italy. The Secretariat is responsible for facilitating all ORCA Centres' collaboration; budgets and annual disbursement of funds; public communications; Facilitation Board services; and donor solicitations. The number of staff is relatively limited, consisting of one senior professional staff member responsible for overall administration and programming, one professional staff member responsible for fund raising, proposals' development and financial planning; and one general service staff responsible for administrative support and ORCA portal development.

4.2.3 THE FACILITATION BOARD

The Facilitation Board serves to ensure good and transparent governance and forge partnerships with non-governmental and civil society organizations, as recommended by the FAO Policy and Strategy for Cooperation and stressed by member governments in the World Food Summit Plan of Action.

At the start up of the programme, the Facilitation Board will meet for a strategic planning workshop with the particular aim of formulating the overall ORCA research policy, including rules and procedures. The Facilitation Board will thereafter be convened virtually several times a year. The Board is required to:

- Determine the overall research policy for ORCA and assist the Secretariat in soliciting contributions to support that policy;
- Approve the research programmes to be developed by the ORCA Centres;
- Review and advise the Secretariat on ORCA publications, websites, and other communications to ensure that such materials are consistent in design, integrated across Centres, widely disseminated, and useful for various constituencies;
- Biannually review progress reports and annually review Centre's budgets and work plans, with a view to provide advice with regard enhanced collaborations across centres and with other contributing organizations;
- Publish a formal public evaluation of ORCA, including detailed reviews of the individual ORCA Centres;
- Select ORCA Centre projects for receipt of the Soil Science Challenge Fund annual awards;
- Assist the Secretariat in other duties, as necessary.

Members of the Facilitation Board will be appointed by FAO's Lead Technical Unit, which is the Natural Resources Management and Environment Department, in consultation with the Interdepartmental Working Group for Organic Agriculture for serving a five-year staggered non-renewable term.

The Board will consist of 15 members from 15 different countries, at least 7 of whom from developing countries and an equal representation of men and women. Board appointments will be made in a way that ensures geographic diversity, as well as a range of expertise and perspectives. Categories of appointment are specified. Members of the Board are prohibited from having a financial relationship with any of the individual centres that form ORCA (e.g., staff member, consultant).

The HUSHA will designate a liaison person from its consortium to the Facilitation Board and who will participate, on invitation, as a non-voting advisor.

The Facilitation Board membership will be as follows:

- 5 scientists (at least one of whom is a soil scientist);
- 3 farmers (involved in crop, livestock and fish farming);
- 2 processors;
- 1 organic certifier;
- 2 agribusiness representatives;
- 2 representatives of organic civil society organizations.

4.3 Strategy/Methodology

Organic research differs from conventional agricultural research in several aspects. First of all, organic research requires researching in systems in a holistic manner, meaning that it requires a mechanism for inter-disciplinary work between scientists of different disciplines and approaches and methodologies that are able to describe and analyse situations from a systems' perspective. Secondly, the development of organic systems is based on traditional, indigenous and location-specific resources and knowledge. It is therefore crucial that the organic farming community be closely involved and participating in the research. Also, as women are often carriers of traditional indigenous knowledge in agriculture, it is particularly important that they are strongly involved. A third aspect is the value chain approach, as organic practices have to be followed along the whole food chain, from primary production, through processing and marketing, to consumption.

The development of research approaches and methodologies in HUSHA will be documented and the lessons learned will be shared in the larger ORCA system.

4.3.1 PARTICIPATORY PROCESS FOR A JOINT RESEARCH AGENDA

In order to ensure that HUSHA responds appropriately to local demand and priorities for new knowledge, the strategy will include developing a participatory process for setting-up a joint research agenda. HUSHA will develop this process and methodologies in order to ensure that all the stakeholders – both female and male - are involved and consulted on setting the overall agenda. To ensure that a value chain approach is applied, the consultation will include actors from the whole value chain. The research agenda will include the definition of main issues to be addressed. HUSHA will prepare the research programme based on the resulting joint agenda.

4.3.2 USER GROUPS AS ADVISORY TO RESEARCH PROJECTS

The strategy will include engaging relevant stakeholders, especially producers and processors, as advisory user-groups to be consulted in the process of designing and conducting research projects. The user groups will be gender balanced and will assist the researchers in defining the most relevant

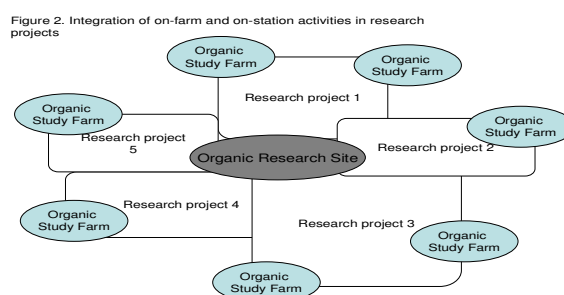
research questions, including suggestions to where and how to conduct the research. The user-groups will moreover be involved in testing and evaluating innovations and new technologies.

Many organic farmers are engaged in Farmer Field Schools (FFS) in all three regions. Practical learning and experimentations are continuously taking place and farmers have experiences in evaluating methods and technologies. These would provide excellent user-groups for HUSHA research projects, including both forward and backward responses to research projects.

4.3.3 STRONG FOCUS ON ON-FARM RESEARCH

Apart from involving organic producers and processors in user groups for the research projects, HUSHA will focus a substantial part of the research activities on action research within farms, thus involving the hosting farmers in the research. This will be combined with the establishment of an organic research site for necessary on-station research.

The research site will be located at the lead HUSHA institution, for experimental and demonstration purposes, and ideally in the proximity of a network of study farms, which are actually the farmers' fields of those farmers who have opted to join the HUSHA research agenda (see Figure 2). These study farms will be selected among interested organic farmers or groups of farmers having the agro-ecological conditions and farming systems appropriate to the agreed research agenda. Efforts will be made to have at least half of the study farms headed by female farmers. Baseline agro ecological and other data will be documented in order to provide the necessary background information for carrying out a substantial part of the research activities.

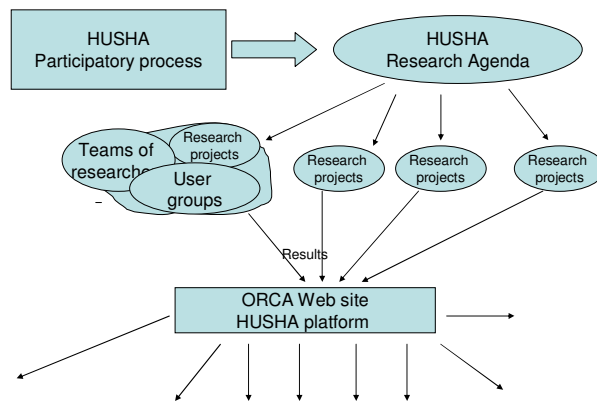


4.3.4 TEAMS OF SCIENTISTS ACROSS DISCIPLINES

HUSHA will not only be a networking mechanism for institutions, but also an excellence centre that pools scientists from a wide range of different disciplines. Organic research is likely to require expertise from environment, penology, agronomy, veterinary, nutrition, agro processing, social and economic sciences and so forth. For every research project, the requirement for disciplines will be scrutinised and a gender balanced team of researcher will be established to plan, carry-out and evaluate projects, while consulting the relevant user groups. Where a required expertise is not represented in the HUSHA network, it will be sought from outside the Centre.

The virtual network facility will enable the team to keep close contact and share ideas and experiences among its members as well as with other scientists working on related issues. The virtual network will moreover be a tool for disseminating the results to a wider audience beyond the teams and the Centre itself. It will be ensured that results will be openly and freely available.

Figure 2 Implementation of HUSHA research



4.3.5 DEVELOPING RESEARCH METHODOLOGIES TOWARDS THE AGRO ECOSYSTEM' PERSPECTIVE

The above strategy of bridging the scientific disciplines by working in teams of scientists across the disciplines will also include developing research methodologies that support particular agro ecosystems' requirements. A number of research institutions in developed countries have gained important experience in customizing research approaches. The foreseen twinning arrangements between institutions in developed and developing countries will be used to support this approach.

4.3.6 THE ORCA VIRTUAL NETWORK AS A TOOL FOR DISSEMINATION OF KNOWLEDGE

The collection and dissemination of knowledge and research results will be facilitated by the ORCA portal that will connects partners both within HUSHA and the ORCA system as a whole, i.e. other Centres, as they develop. The ORCA portal is already being developed by FAO, with a view to provide a common platform for all Centres, HUSHA and others. Currently, organic research activities worldwide are being compiled in order to populate the ORCA Portal and the future updates of the portal will be directly made by the participating institutions. While the global part of the portal will be managed by the ORCA Secretariat, the HUSHA part of it will be managed by the lead African institution, assisted by the hubs in the two other regions (e.g. Asia and Latin America). The ORCA portal is ultimately meant to serve as a window to all those interested in freely accessing organic knowledge, including also policy makers and sustainable agriculture constituencies.

The virtual network will include virtual libraries for the key topics, which will be maintained by the ORCA Centres entrusted to develop them and linked to already existing open access archives for organic research results, such as for example OrganicEprint²³.

It is foreseen, that as a fully-fledged ORCA, the portal will operate in 5 languages: English, Spanish, French, Chinese and Arabic. However, for the start-up phase, it will operate only in English, Spanish and French.

²³ OrganicEprint is an open access archive for organic research results, reports, workshop proceedings etc. It is hosted and maintained by ICROFS and currently being developed to have all information available in English, French, Spanish and Portuguese).

4.4 Funding structure

Funding schemes are organized to promote the collaboration among the institutions engaging in HUSHA, to promote the ORCA Facilitation Board and Secretariat and in the future to promote the collaboration among the centres within ORCA, to value private sector engagement in the research programme and to stimulate the production of credible and innovative science.

4.4.1 START-UP FUNDING

HUSHA will receive funding to initiate ORCA-related activities. This one time infusion of funds is to support the purchase and coordination of appropriate communication tools in order to facilitate network interactions and make develop the virtual library on the selected key topics.

4.4.2 BASE ANNUAL FUNDING

HUSHA will receive, upon approval of the Facilitation Board, an annual disbursement of funding in order to maintain the virtual libraries on the key topics and to support minimum staff for the administrative and management work of the Centre. Additional funding for research of the Centre must be solicited from the Secretariat and is based on an internal competition for funds.

4.4.3 COMPETITIVE RESEARCH FUNDING

An important responsibility of the ORCA Secretariat is to advocate for, and raise funding for a research fund from different existing and new sources. The funds obtained by ORCA to the research fund will be issued to HUSHA after approval of the proposed research programme by the Facilitation Board, with assistance from the Secretariat and *ad hoc* peer review panels. As other ORCA Centres are being established, the funding will be distributed via an internal competitive process.

4.4.4 EXTERNAL COMPETITIVE FUNDING

It is expected that HUSHA will seek funding from non-ORCA sources. The Secretariat will have a staff person to help with the development of competitive proposals and to facilitate collaboration among the various centres within ORCA.

4.4.5 VALUING COLLABORATION

When funding is limited, people tend to invest most of their energy in maintaining their own research and teams, rather than engaging in collaborative work. It is the aim of the ORCA collaboration that the Centres have an open approach to research activities. For this reason, research partnerships, both within and outside of ORCA, will be encouraged and 50% of the research funds allocated to HUSHA will be for the part of the HUSHA research programme, which is to be implemented through projects awarded to external research partners through a competitive bidding process, which will be coordinated by HUSHA. It should be noted that while collaboration with related research activities in CGIAR centres are encouraged, CGIAR research activities will not receive ORCA funds, as they are expected to be funded through their own sources.

4.4.6 FUNDING PROHIBITION

ORCA does not fund construction of buildings and large infrastructure. The ORCA Centres are “centres without walls”, albeit hosted by an existing research institution. The goal is to strengthen and network institutions that already exist. It is expected that the infrastructure at these existing research entities and field stations will suffice for ORCA work.

4.4.7 IN-KIND CONTRIBUTIONS

FAO will contribute to the ORCA start-up phase with half time assistance of a senior professional and also by supplying the running costs of the ORCA portal. Partner institutions in the consortium will contribute with the necessary furnished offices, a minimal staff available for research activities and facilities for research such as buildings, land, water and laboratories.

4.5 Process and Criteria for selection of consortium for HUSHA

The process for the selection of the HUSHA consortium will be applying FAO regulations on international procurement. A tender call will be issued by FAO upon receipt of sufficient funding to run the Centre. The tender call will contain this Project Document, the Terms of References and the outlines for technical and financial proposals. Before the tender procedure starts, the ORCA Facilitation Board will have been established and a Selection Committee appointed.

The selection will be carried out according to the following criteria:

- Participation of all categories of stakeholders in the Centre
- Clear, strong and viable agreement between the proposed partners
- Institutional commitment from interested institutions
- Dedication of resources from the participating institutions to support the Centre
- Ability to produce high quality research
- Demonstrated expertise in organic agriculture
- Likelihood of assisting developing countries
- Articulation of Centre' purpose and research agenda
- Participatory process of setting research priorities and for testing and evaluating results
- Strategy for ensuring gender equity at all levels of decision making and research activities
- Publications record
- Track record in external funding
- Ability to develop and maintain viable networks
- Language and technological capabilities

4.6 Donor Inputs

The ORCA secretariat will be hosted by FAO and will provide the staff that will work to solicit funds for the start-up phase of establishing the Secretariat and HUSHA. As more is learned about donor demands, needs, and expectations, specific project documents will be developed, tailored to donor's contributions and target beneficiaries.

The ORCA Secretariat will raise and channel funds to establish and support the HUSHA. As ORCA does not aim to centralize funding but add value to existing efforts, donors' contributions to ORCA also foresee the continuation of bilateral assistance from a donor to a specific beneficiary in a developing country, but through a coordinated process where central ORCA resources and bilateral resources pursue a common objective. For this purpose, the ORCA Secretariat will organize donor's round table meetings every year to share information and build synergies among respective programmes.

While multilateral collaboration is at the centre of ORCA, the system provides also for a multitude of bilateral donor cooperation. For example, some donors may retain their direct support with their beneficiaries but prefer to operate within a wider coordinated system such as ORCA. The same applies for philanthropic organizations seeking to assist civil society organizations and smallholder groups working within a broader network such as ORCA. Similarly, universities may wish to allocate grants to their students seeking overseas experience to a target-oriented system such as ORCA. Contributions

to ORCA can take different forms, as long as the different efforts seek the common objective of sharing and advancing organic agriculture knowledge.

ORCA's main vocation is research but linkages with training and development institutions will be deployed, from local NGOs, through national education/extension, to international UN organizations. For this purpose, coordinated efforts will also be maintained with donors seeking to support NGOs for disseminating ORCA's knowledge outputs, as well as development organizations with a capacity building mandate.

At a minimum, our expectation is that the ORCA vision will inspire donors to increase their commitment to organic research, with particular regard to developing countries' needs. If, for whatever reason, donors choose not to place funds within the ORCA framework but rather allocate additional funding to organic research in different ways, spurred on by the argumentation in this paper, we will welcome and applaud those inputs.

4.7 Technical Support / Linkages

In developing the ORCA concept and basic information services, FAO is drawing on the technical expertise of its Inter-Departmental Working Group on Organic Agriculture and its worldwide network of partners. FAO will continue providing the services of a Senior Officer to ORCA, on a part-time base, as well as its general staff expertise, when requested. During implementation, FAO will provide liaison services with the Science Council of the CGIAR system and the Global Forum for Agricultural Research (GFAR), both of which having a Secretariat in FAO, as well as with national research institutions with whom it normally collaborates.

In 2008, FAO has developed an ORCA Webpage, E-Forum and Directory. In early 2009, an extensive ORCA-List was created, as well as a preliminary ORCA Portal that maps organic research institutions and other relevant research worldwide. This platform will evolve to become the hub of the platform and virtual libraries of all ORCA Centres.

FiBL and ICROFS partners have a key role in implementing research cooperation and twinning arrangements with developing countries' research institutions. ORCA is in line with their mandates and shared desire to create such an alliance. More recently, the International Society for Organic Agriculture Research (ISOFAR) and the International Federation of Organic Agriculture Movements (IFOAM) have joined the Alliance, as well as a number of national research institutions (i.e. Agro Eco Louis Bolk Institute, BOKU University, Bonn University and vTI) with an international mandate. They brought their insights in finalizing the ORCA concept and will respectively prompt their countries to support ORCA.

The shared concerns of these partners create a critical mass of institutions willing to pool resources and expertise for international assistance in organic research.

In developing the virtual network, existing resources will be brought closer to the ORCA virtual facilities. For example, connections are being made to capitalize on resources such as Organic Edunet ([HTTP://WWW.ORGANIC-EDUNET.EU/ORGANIC/INDEX.HTML](http://www.organic-edunet.eu/organic/index.html)), an online resource that provides content (e.g., news, events, recent projects) on organic agriculture and agro ecology. Edunet is driven by a consortium of European institutions, all of which can provide useful input into the start-up of ORCA's virtual communication. Another example is Organic Eprints, which is an existing open access archive for research results, reports, workshop proceedings, etc. that can be used at no cost by ORCA. Organic Eprints is currently being further developed and information will be available in several languages (i.e. English, French, Spanish and Portuguese). The number of Organic Eprints contributors is expected to be enlarged by the ORCA Centres.

4.8 Management and Operational Support Arrangements

Management arrangements and operational costs will follow the standard FAO procedures. This will apply to the procedures for selection of a consortium for implementation of the HUSHA, the recruitment of Secretariat staff and implementation of information services.

The Lead Technical Unit in FAO for supporting the programme is the Natural Resources Management and Environment Department, in collaboration with the Inter-Departmental Working Group on Organic Agriculture and external institutions who have become ORCA partners. Management and operational support (budget holder) is provided to ORCA by the Senior Officer for Environment and Sustainable Development. This same management and operational support set-up will continue to assist the ORCA Secretariat, to be hosted in FAO's Natural Resources Management and Environment Department.

The management and operational support to the HUSHA network will be specified in the contract to be signed between the ORCA Facilitation Board and the HUSHA consortium. The management and operational support within the HUSHA Centre will be specified in the legally binding agreement between the consortium partners.

5. OVERSIGHT, MONITORING, MANAGEMENT INFORMATION AND REPORTING

This section describes how monitoring and reporting will be carried out for the start-up phase for the ORCA Secretariat and HUSHA implementation as well as for the launch of other 4 ORCA Centres. Regarding planning and focussing the reporting, it is considered that the start-up phase will be the first step of a continuous and further development of a collaborating network. The logical framework presented in Annex 2 will form the basis around which monitoring, evaluation, and reporting will take place.

5.1 Oversight and Reviews

Half way of the three year start-up phase, the Facilitation Board, in collaboration with donors, will undertake an independent evaluation of the ORCA Secretariat and of HUSHA and make it available to the public. Considering the short time frame of the start-up phase with regards research outcomes, this particular evaluation will focus on progress according to the set timetable and the assessment of lessons learned from this first experience of implementing the ORCA centre. The focus will be on the ORCA performance in terms of Secretariat's efficiency in facilitating and servicing the network and promoting new centres. For HUSHA, the focus will be on the Centre's ability to contribute to the ORCA network and its purposes, in relation to its institutional structure and methodologies for networking and facilitating organic research. The evaluation and the lessons learned will be used as important insights in the further development of ORCA and design of other ORCA centres.

Impact indicators will include the level of participation of stakeholders and collaborative research activities taking shape. Outcome and output indicators will include level of networking and number of research activities planned and started, the number of farmers actively participating in the research, approved proposals, studies funded and field trials established.

5.2 Monitoring and Knowledge Sharing

5.2.1 SECRETARIAT AND FACILITATION BOARD

Routine monitoring of the HUSHA implementation will be conducted by the Secretariat, in terms of funds disbursed and public communications. Periodic monitoring will be conducted by the Secretariat

through the Facilitation Board's intra-annual virtual meetings, biannual reviews of progress reports and annual reviews of Centre budgets and work plans.

5.2.2 THE HUSHA CONSORTIUM

At the beginning of the start-up phase, the Secretariat will contract an international consultant to assist in developing a monitoring and evaluation system for monitoring the progress of the network and the ORCA-funded research and dissemination of results. This system should aim to monitor the progress of HUSHA in accordance with the contractual agreement between FAO and the HUSHA consortium. At the same time, it should as far as possible be applicable to all the ORCA centres to be established.

5.3 *Communication and Visibility*

An ORCA website was created in 2008. The ORCA draft concept paper was made available electronically for public comments, from 17 November 2008 to 15 December 2008. To enter the E-Forum, responders were required to login and provide some basic information including the name and location of their institution and the major agro ecological area(s) and research topics where their institution is engaged. The electronic consultation resulted in comments from 211 people in 57 countries. The comments provided on the draft ORCA concept are summarized into a document Reflections on the Discussion Forum available online at: [HTTP://WWW.FAO.ORG/ORGANICAG/OA-FORUM/EN/](http://www.fao.org/organicag/oa-forum/en/).

This electronic forum respondent information was compiled by FAO into a "Directory", available on that same webpage. FAO used this Directory to create an ORCA-List, also by adding other hundreds institutions known to be involved in organic research; this list of over 1000 addresses will be a primary route for distribution of announcements relative to ORCA, including calls for Centres' proposals. The mailing list will also be used as a tool to connect potential Centre applicants with one another and to facilitate twinning and other collaborative arrangements for the advancement of organic research.

FiBL has taken leadership in compiling worldwide data on many topics related to organic agriculture. Currently, FiBL is in the process of constructing profiles for each country and these profiles will include information on scientists and institutions engaged in organic research within each country. The FiBL effort is extensive and the ORCA portal will feature these country profiles.

The ORCA website will be a vehicle for communicating progress and lessons learnt from the alliance. As HUSHA is established and developed, the ORCA Portal will become the Meta database of the 2 Virtual Libraries. Evaluations, publications, and announcements will be made available and updated regularly by the Secretariat. In addition, the portal will maintain a database of training and development institutions that might be prepared to pass-on ORCA research findings to the field.

5.4 *Reporting Schedule*

The reporting schedule will follow the requirements and standards of FAO.

At the start of the project, the ORCA Coordinator will prepare a short inception report and submit it to the ORCA budget holder in FAO. The inception Report will include a summary of the prevailing situation of the programme at the start. This report will feed into the preparation of the project management plan and the first work plan.

Progress reports will be produced every six months and budgets and work plans will be updated annually by the Secretariat. The HUSHA Centre will submit progress reports to the Secretariat and the Secretariat will submit progress reports to the Facilitation Board and ORCA donors, summarizing HUSHA reports and other ORCA-related activities.

The format of the progress report is flexible but will contain the following:

- Progress and outputs;
- Inputs received;
- Activities;
- Problems encountered and solution measures taken;
- Lessons learned;
- Work plan and expected outputs for the next reporting period.

The contract with the HUSHA consortium will specify the dates for submission of progress reports.

The ORCA budget holder in FAO will prepare Quarterly Project Implementation Reports (QPIR) and submit these to the Facilitation Board, who will act as the project task force.

At the end of the start-up phase, a final report will be presented to the FAO competent office and to the donors. The format will follow FAO standards but basically, the final report will contain the following information:

- Information on how funds were utilised;
- Main results;
- Conclusions and lessons learned;
- Recommendations for continuation.

The contract with the HUSHA consortium will specify the date for submission of the final report, which would in any case be planned to feed into the final report to be prepared by the ORCA Secretariat consolidating the reports of all ORCA activities.

LIST OF ANNEXES

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Annex 1: Budget

Annex 2: Logical Framework

Impact	Indicators/targets	Data sources	Assumptions
Organic research in humid and sub-humid areas is promoted and valued by farmers and policy-makers in the countries of operation	Increased number of research activities in organic production systems in humid and sub-humid areas	ORCA progress reports and Non-ORCA sources of scientific and non-scientific publications	Political support to organic production will not be corrupted by external factors and/or non-scientific based national or regional agendas
Outcome			
A centre of excellence established in humid and sub-humid areas producing and communicating high quality research in organic food systems that are relevant to the needs of farmers and processors – both female and male - and also scientifically credible and recognised	<p>New knowledge and techniques for organic production systems for Humid and Sub-humid areas are being developed</p> <p>Information about organic farming are published and made available through open information sources</p> <p>Organic farmers and advisers in the countries of operation have increased access to information and are valuing the information and preliminary results</p> <p>Policy makers in the countries of operation have increased access to information about organic agriculture and are valuing the information and preliminary results</p> <p>En equal number of men and women are involved at all levels – Facilitation Board, researchers and farmers participating</p>	<p>ORCA established information sources</p> <p>Progress reports</p> <p>Stakeholder responses</p> <p>Stakeholder responses Internet data on citations</p> <p>ORCA and HUSHA progress reports</p>	<p>The research of the Centre is acknowledged and supported locally and in the regions and can attract high capacity scientific staff also from organic and non-organic disciplines</p> <p>The stakeholders are interested and will collaborate on the prioritisation</p> <p>Training and advisory institutions are interested and will use the knowledge</p> <p>Policy makers are interested in using information about organic agriculture to develop their policies and strategies for sustainable natural resource management and food production</p>
For centres of excellence in organic food systems at different stages of preparation and start up	Four proposals for new ORCA centres developed	ORCA progress reports	Partner Research institutions are interested in collaboration in new areas Donors will commit funds to finance the centres
Outputs			
1. The ORCA secretariat established, managed and administrated efficiently, with the capacity to facilitate and service HUSHA, communicate research results and facilitate	<p>3 staff with appropriate qualifications and job-descriptions in place</p> <p>15 members of Facilitation Board appointed</p>	<p>Inception report</p> <p>Inception report</p>	<p>FAO hosting the ORCA secretariat</p> <p>Allocation of sufficient resources for the secretariat</p>

the launching of other 4 ORCA centres	<p>Number of face to face and virtual meetings of the Facilitation Board Overall ORCA Research Policy established</p> <p>Administrative and management procedures established</p> <p>HUSHA consortium selected and HUSHA centre functioning</p> <p>HUSHA submits proposals and gets – at least 6 research projects approved and funded</p> <p>At least four new ORCA centres prepared</p> <p>Number of high level meetings with participation of ORCA for communication of preliminary results</p> <p>Increasing number of collaboration partners</p>	<p>Minutes of Facilitation Board meetings</p> <p>Procedures manual of secretariat and facilitation Board</p> <p>Contract with the HUSHA consortium ORCA progress reports</p> <p>Progress reports and meeting reports</p> <p>Project proposals</p> <p>Meeting reports</p> <p>progress reports</p>	<p>Donors acknowledge the potential for organic production and allocate sufficient resources for the first ORCA Centre</p> <p>Interest from institutions in other centre areas to collaborate on ORCA and interest from donors to finance Interest at high level of the ORCA results</p> <p>Other collaborating partners interested in the organic research outcomes</p>
2. Operational procedures are developed and tested for the ORCA system and for the first ORCA Centre in Humid and Sub-Humid Areas (HUSHA)	Described and tested operational procedures	ORCA progress reports Operational manual for the collaboration of ORCA with research centres	Allocation of sufficient resources for the secretariat
3. The HUSHA Centre established and in-operation, conducting organic research activities in humid and sub-humid areas, coordinating research activities by other research partners responding to organic farmers' and processors' needs (as articulated by both female and male farmers and processors) and facilitating a network of informal research collaboration	<p>Research agenda and a set of research priorities agreed through a process with participation of all stakeholders</p> <p>Number of stakeholders participating in developing the research agenda, of which at least half are women</p> <p>Number of joint research proposals prepared and submitted to ORCA facilitation Board – at least 6 joint proposals approved and funded</p>	<p>Research agenda document available on the ORCA website</p> <p>Process described at the web-site including list of participants Stakeholder responses</p> <p>Research data bases</p> <p>Monitoring and progress reports Financial reports</p>	<p>Sufficient interest from the stakeholders in developing a joined research agenda for organic agriculture in humid and sub-humid areas</p> <p>Sufficient interest from twinning partners to engage with partners in developing countries and vice versa</p>
4. Facilities established and research activities started for organic research in humid and sub-humid areas of Sub-Saharan Africa, Asia and Latin America involving an equal number of	<p>Organic Research Site established in SSA</p> <p>A number of Organic Study Farms selected and active in joined on-farm research</p>	<p>Monitoring and progress reports from HUSHA and ORCA</p> <p>Research data (In HUSHA reports)</p>	Sufficient funding available for the establishment of facilities and research activities

female and male researchers and farmers	<p>activities in SSA, Asia and Latin America (at least 3x 20)</p> <p>At least half of the Study Farms are headed by female farmers</p> <p>At least 6 joint organic research projects approved and being implemented in humid and sub-humid areas</p> <p>Half of the implemented research projects are by other research partners</p> <p>At least half of the involved researchers being women</p> <p>Number of standard research methodologies under development</p>	<p>Gender aggregated research data (in HUSHA reports)</p> <p>HUSHA progress reports</p> <p>Research data</p> <p>Gender aggregated research data (in HUSHA reports)</p> <p>HUSHA progress reports</p>	<p>Interest from farmers in participating in the research activities</p> <p>Other research institutions are able to and interested in undertaking organic research</p>
5. A virtual interactive web portal for knowledge sharing of ORCA research resources, as well as a fully fledged platform for HUSHA that connects institutions involved and makes available both research outcomes and the global knowledge hub on organic fruits and vegetables and organic rice	<p>Number of virtual interactions between research partners</p> <p>Number of virtual interactions between or to other partners</p> <p>Number of posted information on the platform</p> <p>Number of information searches recorded</p>	<p>Web-facilities available and being used by a “virtual community” of researchers and other stakeholders</p> <p>Communication data and statistics from the web facilities</p>	<p>Web platform hosted by FAO and technical solutions and access to the necessary equipment to support a virtual system is widely available in the areas of work</p>
6. Facilities established for publishing organic food research and preliminary research results made freely available to practitioners, other researchers and policy makers with a gender lens in results published	<p>Biannual publishing of the journal from the third year</p> <p>At least half of publishing by female researchers</p> <p>Increased number of articles being published in the organic journal and practitioners journals</p>	<p>The journal itself</p> <p>Progress reports, internet search and monitoring of press</p>	<p>Interest form scientists in publishing the work in organic journal</p>
Activities			Preconditions/Inputs
1.1 Establish the ORCA Facilitation Board	A gender balanced ORCA Facilitation board functioning	Progress reports and meeting minuts from virtual Facilitation Board meetings	Interest among experienced researchers, net workers, project managers with interest and/or experience from the organic sector to become members of the Facilitation Board.
1.2 Establish the overall ORCA Research Policy	Face to face meeting of the Facilitation Board conducted and ORCA Research Policy established and running	Minutes from face to face meeting of Facilitation Board	
1.3 Recruit Secretariat staff	Secretariat staff in place and functioning	Progress reports	FAO support to host secretariat
	Three donor roundtable meetings conducted	Minutes from donor roundtable meetings	Funds available for employing staff

<p>1.4 Conduct annual donor roundtable meeting</p> <p>1.5 Facilitate the establishment of HUSHA including the preparation of competitive research calls</p> <p>1.6 Communicate research results to policy makers at high level</p> <p>1.7 Prepare proposals for four other ORCA centres and raise funds for these</p> <p>1.8 Establish and maintain collaboration with related institutions at the global level</p> <p>1.9 Convene the first bi-annual ORCA conferences</p> <p>1.10 Prepare Inception Report</p> <p>1.11 Prepare Progress Reports</p> <p>1.12 Prepare Final Report</p> <p>1.13 Undertake independent evaluation</p>	<p>with participation of at least 8 donor organisations</p> <p>Number of technical support visits to HUSHA partners</p> <p>ORCA participation in relevant meetings at high level</p> <p>Number of proposals under preparation</p> <p>Four proposals ready and financed</p> <p>Number of meetings and interactions with related institutions at global level</p> <p>Number of participants in the conference Number of research presentations at the conference</p> <p>Number of reports</p>	<p>HUSHA contract</p> <p>Progress reports and minutes from Facilitation Board virtual meetings</p> <p>Project proposals</p> <p>Progress reports and minutes from meetings</p> <p>Conference conducted successfully with participants from all the regions</p> <p>Inception report</p>	<p>Interests by donors and foundations for sponsoring organic research in HUSHA</p> <p>Willingness among related institutions to collaborate and maintain linkages</p> <p>Interest by policy makers in organic research</p> <p>Funds available for conference</p> <p>Interest among researchers and other stakeholders from the organic as well as non organic sector to impact on and develop a common organic research agenda</p> <p>Sufficient funding for conducting the conference Sufficient interest in participation</p>
<p>2.1 Develop the operational procedures for the application of research consortia for ORCA's support (the first test is the HUSHA)</p> <p>2.2 Conduct the process for selection of a research consortium of host and partner institutions for HUSHA based on detailed proposals</p> <p>2.3 Establish a contract between ORCA secretariat and the selected HUSHA consortium</p>	<p>Number of successful research applications for ORCA funding</p> <p>Number of consortias applying for the HUSHA implementation</p> <p>Contract established between ORCA and HUSHA consortium</p>	<p>Operational procedure in place and disseminated to partners Progress reports and Facilitation Board meeting minutes</p> <p>Selection process in place and disseminated to partners</p> <p>The ORCA HUSHA contract</p> <p>Monitoring and evaluation system in place</p>	<p>Experienced and skilled staff recruited for the Secretariat</p> <p>Sufficient funds for support and monitoring activities of the Secretariat and expert resources when required.</p>

2.4 Develop a monitoring scheme for ORCA centres	Consultancy undertaken	and disseminated to partners	
2.4 Develop the ORCA funding policy		Funding policy in place and disseminated to partners	
3.1 Establish a general agreement of collaboration between organic research institutions active in humid and sub-humid areas, including a lead institution based in Africa and twinning partner institution(s) with extensive experience in organic research activities	Number of institutions taking active part in the collaboration Number of organic research experiences of the collected consortium	Agreement signed by participating institutions	The organic community of practise interested in participating in defining and prioritising research needs Funds for collaboration and networking available (for meetings, travels etc.) Relevant competitive funds available
3.2 Establish operational procedures for the network including procedures for identifying and prioritising research needs and projects and for communicating the results, which involves all stakeholders both the HUSHA research consortium and the organic community of practise and with an equal gender representation	Number of stakeholders included in and aware of the process	Operational procedures established, known and used Report from stakeholder consultation	Competent scientists who are interested in participating and have capacity to plan, carry out and monitor joined research programmes of some complexity
3.3 Conduct an inventory of existing information and organic research activities in humid and sub-humid areas of all three regions to inform the stakeholder consultation on research priorities	Consultancy conducted Inventory study report used in the stakeholder consultation	Inventory finalised and uploaded to the joined web database Report from stakeholder consultation	
3.4 Conduct a gender balanced stakeholder consultation in Africa, Asia and Latin America for developing the research agenda and priorities for HUSHA	Number of consultation meetings conducted Number of stakeholders actively involved in the stakeholder consultations in the regions Number of women and men actively involved in the stakeholder consultations Proposed research programme submitted to the ORCA Facilitation Board for approval, involving at least half female researchers	Consultation report, joined research agenda and priorities agreed	
3.5 Develop the research programme based on the results of the stakeholders' consultation and following the approaches and methodologies outlined in the present document and involving	Number of research projects included in the research programme Number of male and female researchers involved in the research programme	Research Programme	

<p>an equal number of female and male researchers</p> <p>3.6 Prepare tender material for competitive calls for project proposals as part of a HUSHA programme to be implemented by other non-consortium partners</p>	<p>Number of calls prepared for non-consortium partners</p>	<p>Tender material distributed</p>	
<p>4.1 Planning and establishment of organic research site for on-station research and demonstration</p> <p>4.2 Screening and selection of smallholder organic farms for on-farm activities and action research</p> <p>4.3 Implementation and monitoring of at least 3 HUSHA research projects on-station and on-farm</p> <p>4.4 Implementation and monitoring of at least 3 HUSHA research projects to be undertaken by non-consortium network partners</p> <p>4.5 Training and mentoring of young scientists – at least one for each of the research projects</p>	<p>One Organic Research Site operational Number of on-station trials and demonstrations undertaken</p> <p>At least 60 Organic Study Farms participating of which at least 50% are headed by female farmers</p> <p>At least 3 joint research projects in progress At least half of the involved researchers are female</p> <p>At least 3 research projects implemented by non-consortium partners in progress. At least half of researchers are female</p> <p>At least 6 young scientists undergoing training in the joined research projects of which at least half are female</p>	<p>HUSHA monitoring (gender aggregated) data and progress reports</p>	<p>Sufficient funding available to undertake the research</p>
<p>5.1 Maintain and develop the ORCA portal with all information relevant to organic research worldwide, as well as chat rooms/online discussions for a, file sharing facility; directory of institutions and, news and other resources</p> <p>5.2 Establish facilities for and develop the ORCA portal HUSHA platform, including all relevant HUSHA resources, research agenda and outcomes and the virtual libraries on organic fruit and vegetables and organic rice</p> <p>5.3 Establish a call centre for guidance on organic research, training and</p>	<p>Number of entries of information on organic research Number of visits and downloads by collaboration partners and other users from the public At least 6 discussion platforms functioning</p> <p>Number of entries of information Number of virtual interactions between the collaboration partners Number of entries into the virtual libraries</p> <p>Number of interactions where guidance has been sought and provided</p>	<p>Communication data and statistics</p> <p>Facility functioning and used among stakeholders for sharing information and results</p> <p>Two key topic libraries established and used</p> <p>Registered number of interactions</p>	<p>Sufficient technology available</p> <p>Competent staff available to develop, build and maintain the facility</p> <p>Competent specialised staff available to run the call centre</p> <p>Sufficient funds</p>

development resources			
6.1 Establish a scientific board for review and selection of materials	8 scientific board members selected Number of reviews and selections	Progress reports	Interest and need for an organic research journal
6.2 Publicise relevant research in the area of organic food sciences in the scientifically recognised Organic journal and distribute it beginning from the third year	Journal published and distributed 2 times per year starting from the third year (2 times) Number of articles reviewed and published Impact Factor increasing (Increasing number of articles cited in other recognised journals)	The organic journal Internet based data and statistics	Scientists with experiences in organic research in developing countries interested in joining the scientific board
6.3 Upload for each research project, at least annually, preliminary and available final research results to the ORCA web site	At least six uploads of research information annually	Web statistics	Funding and facilities available
6.4 Participate in relevant meetings, workshops, seminars and conferences to present preliminary and available research results to practitioners (i.e. farmers and agricultural advisers), researchers and policy makers	Participation by collaborating partners in at least 10 relevant meetings per year	HUSHA progress reports	

Activities	Responsibility	Cost implications (USD)
Output 1: The ORCA secretariat established, managed and administrated efficiently, with the capacity to facilitate and service HUSHA, communicate research results and facilitate the launching of other 4 ORCA centres		
1.1 Establish the ORCA Facilitation Board	FAO staff facilitates	
1.2 Establish the overall ORCA Research Policy	Facilitation Board through virtual communication	
1.3 Recruit relevant Secretariat staff	FAO staff	
1.4 Conduct donor roundtable meeting	Secretariat	
1.5 Facilitate the establishment of HUSHA including the preparation of competitive research proposals	Secretariat	
1.6 Communicate research results to policy makers at high level	Secretariat/FAO staff	
1.7 Prepare proposals for four other ORCA centres and raise funds for these	Secretariat	
1.8 Establish and maintain collaboration with related institutions at the global level	Secretariat	
1.9 Convene the first bi-annual ORCA conference	Secretariat	
1.10 Prepare Inception Report	ORCA Coordinator	
1.11 Prepare Progress Reports	Secretariat with inputs from HUSHA reports	
1.12 Prepare Final Report	Secretariat with inputs from HUSHA report	
1.13 Undertake Independent Evaluation	FAO	
Output 2: Operational procedures are developed and tested for the ORCA system and for the first ORCA Centre in Humid and Sub-Humid Areas (HUSHA)		
2.1 Develop the operational procedures for the application of research consortia for ORCA's support	Secretariat	
2.2 Conduct a process for selection of a research consortium of host and partner institutions for HUSHA based on detailed proposals	Secretariat	
2.3 Establish a contract between ORCA secretariat and the selected HUSHA consortium		
2.3 Develop a monitoring scheme for ORCA centres	Secretariat	
2.4 Develop the ORCA funding policy	Facilitation Board through virtual communication	
Output 3: The HUSHA Centre established and in-operation, conducting organic research activities in humid and sub-humid areas, coordinating research activities by other research partners responding to organic farmers' and processors' needs (as articulated by both female and male farmers and processors) and facilitating a network of informal research collaboration		
3.1 Establish a general agreement of collaboration (MOU) between organic research institutions active in humid and sub-humid areas, including a lead institution based in Africa and twinning partner institution(s) with extensive experience in organic research	HUSHA partners	
3.2 Establish operational procedures for the network including procedures for identifying and prioritising research needs and projects and for communicating the results, which involves all stakeholders both the HUSHA research consortium and the organic community of practise, and	HUSHA consortium	

	with and equal gender representation		
3.3	Conduct an inventory of existing information and organic research activities in humid and sub-humid areas of all three regions to inform the stakeholder consultation on research priorities	HUSHA Consortium	
3.4	Conduct a gender balanced stakeholder consultation in Africa, Asia and Latin America for developing the research agenda and priorities for ORCA HUSHA	HUSHA 3 country stakeholder meetings in each region 1 meeting in each region and a virtual conference to consolidate the outcomes	
3.5	Develop the research programme based on the results of the stakeholders consultation and following the approaches and methodologies outlined in the present document' and involving an equal number of female and male researchers	HUSHA consortium	
3.6	Prepare tender material for competitive calls for project proposals as part of a HUSHA programme to be implemented by non-consortium partners	HUSHA consortium	
Output 4: Facilities established and research activities started for organic research in humid and sub-humid areas of Sub-Saharan Africa, Asia and Latin America involving an equal number of female and male researchers and farmers			
4.1	Planning and establishment of and organic research site for on-station research and demonstration	HUSHA consortium	
4.2	Screening and selection of smallholder organic farms for on-farm activities and action research	HUSHA consortium	
4.3	Implementation and monitoring of at least 3 HUSHA research projects on-station and on-farm	HUSHA consortium	
4.4	Implementation and monitoring of at least 3 HUSHA research activities to be undertaken by non-consortium partners	HUSHA consortium	
4.5	Train and mentor young scientists – at least one for each of the research projects	HUSHA consortium	
Output 5: A virtual interactive web portal for knowledge sharing of ORCA research resources, as well as a fully fledged platform for HUSHA that connects institutions involved and makes available both research outcomes and the global knowledge hubs on organic fruits and vegetables and organic rice			
5.1	Maintain and develop the ORCA portal with all information relevant to organic research worldwide, as well as chat rooms/online discussions for a, file sharing facility; directory of institutions and, news and other resources	ORCA secretariat for the central part	
5.2	Establish facilities for and develop the ORCA portal HUSHA platform, including all relevant HUSHA resources, research agenda and outcomes and the virtual libraries on organic fruit and vegetables and organic rice	HUSHA consortium	
5.3	Establish a call centre for guidance on organic research, training and development	ORCA Secretariat	
Output 6: Facilities established for publishing organic food research and preliminary research results made freely available to practitioners, other researchers and policy makers, with a gender lens in published results			
6.1	Establish a scientific board for review	ORCA Secretariat	

and selection of materials		
6.2 Publicise relevant research in the area of organic food sciences in the scientifically recognised Organic journal and distribute it beginning from the third year	ORCA Secretariat through contract with publishing company	
6.3 Upload for each research project, at least annually, preliminary and available research results to the ORCA web site	ORCA Secretariat and HUSHA consortium	
6.4 Participate in relevant meetings, workshops, seminars and conferences to present preliminary and available research results to practitioners (i.e. farmers and agricultural advisers), researchers and policy makers	HUSHA consortium	

Annex 4: Terms of References

4.1 Terms of Reference – ORCA Coordinator (P5)

Position Title:	ORCA Coordinator
Duty Station:	Rome, Italy
Grade Level:	P-5
Duration:	Fixed term: 3 years
Organisational Unit:	NRD

Duties and responsibilities

Under the direct guidance and supervision of the Senior Officer for Environment and Sustainable Development and in collaboration with the Interdepartmental Working Group on Organic Agriculture and external institutions as ORCA partners, the Project Coordinator will be responsible for leading the overall administration and programming of the ORCA Secretariat and the coordination of the ORCA network, including HUSHA and other Centres. The Project Coordinator will collaborate closely with the Facilitation Board and provide the link between ORCA operations, Secretariat and Facilitation Board.

The tasks will be the following:

- Be the team leader of the ORCA Secretariat;
- Establish and maintain collaboration with all relevant institutions globally;
- Collaborate with the Facilitation Board in determining the overall research policy, including the ORCA funding policy, process for selection of ORCA consortia and other duties, as required;
- Provide advice and backstopping services to HUSHA, including on the process of stakeholder consultation;
- Review HUSHA research proposals and make recommendations to the Facilitation Board;
- Oversee the development of the ORCA portal, its operation and maintenance;
- Develop and further extend the ORCA network, including more ORCA centres;
- Participate in meetings with policy makers at high level in order to lobby for ORCA's development and to communicate preliminary results;
- Convene the first biannual ORCA conference;
- Ensure the preparation of biannual narrative progress reports of ORCA activities and annual financial reports to the Facilitation Board;
- Coordinate the preparation of the final report to the Facilitation Board.

Qualifications

Minimum qualifications required:

- Advanced university degree in agroecology or related science
- Ten years of relevant experience in the field of organic agriculture, including international experience and work in developing countries
- Working level knowledge of English and French and/or Spanish

Selection criteria:

- Demonstrated expertise in organic agriculture
- Overview of organic agriculture research globally
- Extent of experience in transnational collaboration
- Demonstrated administration skills
- Extent of leadership and supervisory skills of people from different cultures
- Maturity, initiative and drive and demonstrated ability to plan and organise work
- Quality of oral and written communication

4.2 Terms of Reference – ORCA Fund Manager (P4)

Position Title:	ORCA Fund Manager
Duty Station:	Rome, Italy
Grade Level:	P-4
Duration:	Fixed term: 3 years
Organisational Unit:	NRD

Duties and responsibilities

Under the direct guidance and supervision of the ORCA Coordinator, the ORCA Fund Manager will be responsible for programming and budgeting all ORCA activities, including also fund raising for new ORCA Centres, their establishment and functioning, starting with HUSHA.

The tasks will be the following:

- Prepare annual detailed work plans and budgets for the ORCA start-up phase;
- Develop the operational procedures for the use of research funds;
- Develop appropriate funding mechanisms for bilateral contributions;
- Mobilize additional funds for the extension of ORCA activities, including new Centres;
- Organize and convene donors roundtables;
- Assist HUSHA in preparing costed research proposals.

Qualifications

Minimum qualifications required:

- Advanced university degree in economic and financial science
- Seven years of relevant experiences in fund mobilization, including international experience in developing countries
- Working level knowledge of English and limited knowledge of French or Spanish

Selection criteria:

- Demonstrated expertise in fund mobilization and accounting
- Overview of international development aid
- Facilitation and collaboration skills
- Experience in organizing complex budgets

4.3 Terms of Reference – ORCA Administrative Assistant (G7)

Position Title:	ORCA Administrative Assistant
Duty Station:	Rome, Italy
Grade Level:	G-7
Duration:	Fixed term: 3 years
Organisational Unit:	NRD

Duties and responsibilities

Under direct supervision of the ORCA Coordinator, the Administrative Assistant will be responsible for all administrative and logistic support to the ORCA Secretariat and for the management of the ORCA portal.

The tasks will be the following:

- Provide administrative support to the ORCA Secretariat, such as recruitment of consultants, writing of contracts, purchase orders and requisitions, payment of vouchers, travel arrangements and claims, meetings and all the work involved for ensuring accuracy with operational procedures, rules and regulations;
- Maintain budgetary records and assist in the monitoring and review of the project financial situation, including the provision of up-to-date budgetary and financial information and status reports;
- Review documents and out-going material for accuracy and conformity to standards and attend to the preparation and distribution of copies, including follow-up on timely receipt of comments, translations, printing etc.;
- Set-up and maintain office and electronic files and directories of technical and administrative nature;
- Receive, screen, manage and route correspondence, reports and other materials distributed to appropriate staff members;
- Function as the web master of the ORCA global portal and advice HUSHA on the management of the HUSHA platform.

Qualifications

Minimum qualifications required:

- Graduate degree in administration or a related major
- Ten years of progressive experience in administrative, budgetary and accounting work
- Experience with information and communication technologies
- Working knowledge (level C) in English and French or Spanish
- Knowledge of FAO rules and regulations

4.4 Terms of Reference – HUSHA Coordinator

Position Title:	HUSHA Coordinator
Duty Station:	Country to be determined in Sub-Saharan Africa
Duration:	34 months

The HUSHA Coordinator will be outsourced to the contracted research consortium and the duty station will be at the HUSHA lead institution in Sub-Saharan Africa.

Duty and responsibilities

The responsibility will be to coordinate the HUSHA network of research institutions and organic farmer organisations and other stakeholders collaborating on the ORCA organic research activities.

The tasks will be the following:

- Be the contact point for all the collaborating institutions of HUSHA and the main liaison with the ORCA Secretariat;
- Coordinate the preparation of operational procedures for the HUSHA network, including procedures for identifying and prioritising research needs and projects and for communicating progress and results;
- Coordinate the preparation of an inventory of existing information and organic research activities in humid and sub-humid areas of all three regions, including contracting and supervising consultants;
- Coordinate the stakeholder consultations in Africa, Asia and Latin America for developing the research agenda and priorities for HUSHA, making the necessary contracts for facilitators;
- Coordinate the preparation of proposals for ORCA for joined research projects between the participating institutions, for submission to the ORCA Facilitation Board;
- Coordinate, monitor and provide backstopping to joint research projects, including training and mentoring young scientists;
- Coordinate and supervise the operation of the virtual platform for HUSHA;
- Prepare biannual progress reports to the ORCA Secretariat;
- Participate in the preparation of the final report.

Qualifications

Minimum qualifications required:

- Advanced university degree in agroecology or a related science
- Ten years of relevant experiences in the field of organic agriculture research, including international and working experience in developing countries
- Working level knowledge of English and limited knowledge of French or Spanish

Selection criteria:

- Demonstrated expertise in organic agriculture
- Extent of experience in organic agriculture research
- Extent of experience in transnational collaboration
- Demonstrated administration skills
- Extent of leadership and supervisory skills
- Maturity, initiative and drive and demonstrated ability to plan and organise work
- Quality of oral and written communication
- Extent of language skills

4.5 Terms of Reference – HUSHA Administrative Assistant

Position Title:	HUSHA Administrative Assistant
Duty Station:	To be determined in SSA
Duration:	34 months

The position as the HUSHA Administrative Assistant will be outsourced to the contracted research consortium and the station of duty will be at the HUSHA lead institution in Sub-Saharan Africa.

Duties and responsibilities

The HUSHA Administrative Assistant will be responsible for all administrative and logistic support to the HUSHA consortium and for the daily management of the HUSHA platform to the ORCA portal.

The tasks will be the following:

- Provide administrative support to HUSHA such as writing of contracts, purchase order/requisitions, payment vouchers, travel arrangements and claims, meetings, workshops;
- Maintain records related to budgetary control and assist in the monitoring and review of the HUSHA financial situation, including the provision of up-to-date budgetary and financial information and status reports;
- Review documents and outgoing material for accuracy and conformity to standards and attend to the preparation and distribution of copies, including follow-up on timely receipt of comments, translations, printing etc.;
- Set-up and maintain office and electronic files and directories of a technical and administrative nature;
- Receive, screen, manage and route correspondence, reports and other materials;
- Ensure general administrative assistance and logistical support for the smooth running of the project activities, including meetings and perform other related duties, as required;
- Function as the web master for the virtual HUSHA platform, including the Virtual Libraries.

Qualifications

Minimum qualifications required:

- High school degree
- Five years of progressive experience in administrative, budgetary and accounting work
- Experience with internet communication
- Working knowledge of English and/or French

4.6 Terms of Reference – HUSHA-Asia Coordinator

Position Title:	HUSHA-Asia Coordinator
Duty Station:	To be determined
Duration:	34 months

The position as the HUSHA-Asia Coordinator will be outsourced to the contracted research consortium and the station of duty will be at the institution selected as the Asia hub.

Duties and responsibilities

Under the general supervision of the HUSHA Coordinator, the Asia hub coordinator will be responsible for coordinating the HUSHA-Asia networks.

The main tasks will be:

- Establish and maintain the HUSHA-Asia network;
- Prepare and organize the Asia stakeholder consultations, in collaboration with the HUSHA Coordinator;
- Coordinate and facilitate all HUSHA activities in Asia;
- Service the Asia section of the HUSHA platform of the ORCA portal, in collaboration with the HUSHA Administrative Assistant;
- Prepare progress reports to the HUSHA Coordinator.

Qualifications

Minimum qualifications required:

- Degree in agroecology or related sciences
- Experience with networking and transnational collaboration
- Experience with internet communication as a web master
- Working knowledge of English

4.7 Terms of Reference – HUSHA-Latin America Coordinator

Position Title:	HUSHA-Latin America Coordinator
Duty Station:	To be determined
Duration:	34 months

The HUSHA-Latin America Coordinator will be outsourced to the contracted research consortium and the station of duty will be at the institution selected as the Latin America hub.

Duties and responsibilities

Under the supervision of the HUSHA Coordinator, the Latin America hub coordinator will be responsible for coordinating the HUSHA-Latin America network.

The main tasks will be:

- Establish and maintain the HUSHA-Latin America network;
- Prepare and organise the Latin America stakeholder consultations, in collaboration with the HUSHA Coordinator;
- Coordinate and facilitate all network activities in Asia;
- Service the Latin America section of the HUSHA platform of the ORCA portal;
- Prepare progress reports to the HUSHA Coordinator.

Qualifications

Minimum qualifications required:

- Degree in agroecology or related science
- Experience with networking and transnational collaboration
- Experience with internet communication as a web master
- Working knowledge of English

4.8 Terms of Reference – Monitoring and Evaluation Specialist

Position Title:	Monitoring and Evaluation Specialist
Duty Station:	Rome
Duration:	2 months

Duties and responsibilities

The consultant will work under the supervision of the ORCA Coordinator and collaborate with the staff in the Secretariat and with the HUSHA coordinator. The consultant will have the responsibility to develop a system for monitoring and evaluation for effective management of the ORCA system, using the logical framework of ORCA. The system should enable collection of data on:

- Flow and utilisation of funds;
- Functioning and effectiveness of the Secretariat;
- Functioning of the ORCA portal and its effectiveness in terms of making knowledge available, facilitating research networks and outreach to practitioners (usage);
- Functioning and effectiveness of HUSHA in terms of participation, knowledge sharing and preparation and execution of joint research projects;
- Performance of the joint research projects.

Qualifications

The consultancy will be carried out by a senior international consultant with expertise in monitoring and evaluation.

Minimum qualifications required:

- Advanced University Degree
- Ten years of relevant experiences in the field of monitoring and evaluation of international projects which included international experiences and working experiences in developing countries or countries in transition
- Working level knowledge of English and French and/or Spanish

4.9 Short Terms of Reference – Consultancy on the Status of Organic Agriculture in Humid and Sub-humid Areas

Duty station: Sub-Saharan Africa, Asia and Latin America, to be specified

Duration: 7.5 months

This consultancy will be outsourced to the HUSHA consortium as a part of the contract between ORCA and the HUSHA consortium.

Objectives

The process of determining the HUSHA research agenda well informed regarding the current situation of organic agriculture in the areas of operation and regarding past and on-going research and information activities and the prevailing knowledge gaps.

Scope of work

- Analyse the current situation of organic agriculture development in humid and sub-humid areas of the three regions: Sub-Saharan Africa, Asia and Latin America;
- Make an inventory of existing information and organic research activities including an analysis of the existing information in relation to the required knowledge;
- Identify key knowledge gaps;
- Make recommendations for the HUSHA consortium and the stakeholder consultation for determining the research agenda.

Methodology

The methodology applied will be a combination of desk study of available information and interviews with institutions involved in research and information dissemination on organic agriculture in the humid and sub-humid areas.

Consultants

The team of consultants will consist of:

- An international expert on organic information and knowledge systems, who will act as team leader for 1.5 months;
- One expert in organic information and knowledge systems in Africa for 2 months;
- One expert in organic information and knowledge systems in Asia for 2 months;
- One expert in organic information and knowledge systems in Latin America for 2 months.

4.10 Terms of Reference – Consultancy – ORCA Conference Organizers

Duty station: Rome, Italy

Duration: 4 months

The first biannual ORCA scientific conference will be organised under a consultancy supervised by the ORCA Secretariat and in close collaboration with the HUSHA consortium and worldwide partners.

Objectives

- ORCA HUSHA research and other organic research shared between researchers and other actors;
- Strengthened global institutional collaboration and networking on organic research.

Scope of work

The consultancy will have the following tasks:

- Collaborate with the Facilitation board, the Secretariat and the HUSHA consortium in planning the conference agenda and list of participants;
- Develop a conference programme;
- Send out invitations and register participants;
- Organise the venue and conference facilities;
- Collect abstracts and select papers for presentation, in collaboration with a scientific board;
- Organise travels and accommodation for participants;
- Facilitate the conduct of the conference, including selecting moderators;
- Organise events related to the conference;
- Communicate with the media.

Consultants

The team will consist of:

- An international consultant with experience in organic systems and with experience in organising international conferences for 2 months.
- Administrative and logistical support, preferably well experienced in servicing conferences for 2 months

4.11 Terms of Reference – ORCA Facilitation Board

The Facilitation Board serves to ensure good governance and forge partnerships with non-governmental and civil society organisations, as recommended by the FAO Policy and Strategy for Cooperation and stressed by member governments in the World Food Summit Plan of Action.

Members of the Board are appointed by the FAO and serve five-year staggered non-renewable terms. The Board has 15 members from 15 different countries, at least 7 of whom from developing countries. Board appointments are made to ensure geographic diversity, as well as a range of expertise and perspective. Members of the Facilitation Board cannot receive any financial relationship from individual centres that compose ORCA (e.g. staff member, consultant)

Duties and responsibilities

The Facilitation Board will be convened virtually several times a year in order to:

- Determine the overall research policy for ORCA including the funding policy and assist the Secretariat in soliciting contributions to support the priorities;
- Review, approve or reject research proposals from the ORCA Centre (HUSHA);
- Review and advise the Secretariat on ORCA publications, websites and other communications to ensure that such materials are consistent in design, integrated across centres, widely disseminated, and useful for various constituencies;
- Biannually review progress reports, annually review Centre budgets and work plans and provide advice, particularly with regard to potential collaborations with other contributing organisations;
- Publish a formal public evaluation of ORCA, including detailed reviews of the HUSHA centre;
- Select Centre projects for receipt of the Soil Science Challenge Fund annual awards;
- Assist the Secretariat in other functions, as requested.

MEMBERS OF THE FACILITATION BOARD Profiles and qualifications

1. The soil scientist in the ORCA Facilitation Board will be:

- Holding a Phd in soil science or related sciences and having a publication record with recognised scientific journals
- Having 10 years of experience in soil research of which at least 5 years related to organic agriculture, which includes experiences of international collaboration on research
- Having demonstrated an interest in organic research for developing countries

2. The livestock scientist in the ORCA Facilitation Board will be:

- Holding a Phd in livestock science or related sciences and having a publication record with recognised scientific journals
- Having 10 years of experience in livestock research of which at least 5 years related to organic agriculture, which includes experiences of international collaboration on research
- Having demonstrated an interest in organic research for developing countries

3. The crop scientist in the ORCA Facilitation Board will be:

- Holding a Phd in crop science or related sciences and having a publication record with recognised scientific journals
- Having 10 years of experience in crop research of which at least 5 years related to organic agriculture, which includes experiences of international collaboration on research
- Having demonstrated an interest in organic research for developing countries

4. The economist in the ORCA Facilitation Board will be:
 - Holding a Phd in economic science or related sciences and having a publication record with recognised scientific journals
 - Having 10 years of experience in horticultural research of which at least 5 years related to organic agriculture, which includes experiences of international collaboration on research
 - Having demonstrated an interest in organic research for developing countries
5. The ecology researcher in the ORCA Facilitation Board will be:
 - Holding a Phd in biology or environmental science and having a publication record with recognised scientific journals
 - Having 10 years of experience in organic research of, which includes experiences of international collaboration on research
 - Having demonstrated an interest in organic research for developing countries
6. The farmer representative in the ORCA Facilitation Board will be:
 - An organic farmer involved in crop farming
 - Having 10 years of experience in organic farming
 - Representing an organic farmer organisation
 - Having demonstrated an interest in organic research for developing countries
7. The farmer representative in the ORCA Facilitation Board will be:
 - An organic farmer involved in livestock husbandry
 - Having 10 years of experience in organic farming
 - Representing an organic farmer organisation
 - Having demonstrated an interest in organic research for developing countries
8. The farmer representative in the ORCA Facilitation Board will be:
 - An organic farmer involved in fish farming
 - Having 10 years of experience in organic farming
 - Representing an organic farmer organisation
 - Having demonstrated an interest in organic research for developing countries
9. The food processor representative in the ORCA Facilitation Board will be:
 - Running an organic food processing enterprise in a developed country
 - Having 5 years of experience in organic food processing
10. The food processor representative in the ORCA Facilitation Board will be:
 - Running an organic food processing enterprise in a developing country
 - Having 5 years of experience in organic food processing
11. The organic certifier representative in the ORCA Facilitation Board will be:
 - Working in organic and fair trade certification
 - Member of or employed by a recognised international organic certification body
 - Having 5 years of experience in organic and fair trade certification, including experience with certification of farmers in developing countries
12. The agribusiness representative in the ORCA Facilitation Board will be:
 - Running an, or employed by an organic agribusiness in a developed country
 - Having 5 years of experience in organic agribusiness, including experience in developing countries

13. The agribusiness representative in the ORCA Facilitation Board will be:
 - Running an, or employed by an organic agribusiness in a developing country
 - Having 5 years of experience in organic agribusiness, including experience in developing countries

14. The Civil Society representative in the ORCA Facilitation Board will be:
 - Member of an international organic civil society organisation
 - Having at least 5 years of experience in international collaboration between organic civil society organisations and other partners

15. The Civil Society representative in the ORCA Facilitation Board will be:
 - Having at least 5 years of experience as a poverty and rural development agent
 - Having experience in international collaboration between organic civil society organisations

4.12 Terms of Reference – Scientific Board for the Organic Journal

A scientific board will be established for reviewing and approving articles for the new Journal on Organic Agriculture and Food Systems. The board members will be appointed among distinguished and well credited scientists who are well experienced in organic research. There will be 8 board members covering the fields of:

- Organic crop sciences/horticultural sciences;
- Organic soil sciences;
- Organic livestock husbandry and animal health sciences;
- Plant pathology in organic systems;
- Organic market and trade development;
- Organic food and processing technologies;
- Organic agriculture in rural development;
- Biodiversity and environmental protection.

Annex 5: Farming Systems in Humid and Sub-humid Areas

Sub-Saharan Africa

SSA has a population of 626 million people of which 61% are farmers. About 51% of the areas are humid or sub-humid and these are the areas with the highest population and also the largest potential for agricultural production.

The farming systems

The farming systems are extremely varied, but the main ones are the following:

Farming System	Where	Crops	Livestock	Ecological issues
Tree Crop farming Systems	From Côte d'Ivoire to Ghana and from Cameroon to Gabon, with small pockets in Congo and Angola.	Industrial tree crops: Cocoa, coffee, oil palm and rubber. Food crops inter-planted between tree crops	Few cattle	Good potential
Forest Based Farming System	Humid forest zone of the Congo Democratic Republic and the Congo republic, Southeast Cameroon, Equatorial Guinea, Gabon, Southern Tanzania, Northern Zambia, Mozambique and Angola	Shifting cultivation 2 – 5 year crop, fallow 7 to 20 years. Subsistence – cassava complemented by maize, sorghum, beans and coco-yams	Only little	Large uncultivated areas and high rainfall, but the soils are fragile, so more intensive development would require careful management.
Rice-Tree Crop farming System	Madagascar	Banana and coffee cultivation is complemented by rice, maize, cassava and legumes	Few cattle	Some potential for growth but very small farm sizes.
Highland Perennial Farming System	Ethiopia, Uganda, Rwanda and Burundi	Banana, plantain, enset and coffee complemented by cassava, sweet potato, beans and cereal	Some cattle	Diminishing land-sizes and declining soil fertility
Root Crop Farming Systems	Sierra Leone, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon	Tree crops (oil palm) and root crops	Some cattle	Moderate, lack of technologies
Cereal-Root Crop Mixed Farming System	Guinea, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon, zones of Central and Southern Africa	Maize, sorghum, millet. Yams and cassava. Wide variety of crops intercropping	Much cattle	Dry Sub-humid, abundant cultivated land, high number of livestock
Maize Mixed Farming System	Kenya, Tanzania, Zambia, Malawi, Zimbabwe, South Africa, Swaziland, Lesotho	Maize, pulses, tobacco, coffee and cotton	Much cattle	Shortage of inputs, soil fertility declining, occasional drought

General trends in agricultural development

The majority of the population in SSA depend on agriculture for their livelihood. The population of SSA is increasing rapidly – despite the depression that HIV/AIDS have had on this particularly in East and Southern Africa. Food production is not increasing along with the growth of population. During the last 40 years the total food production per capital has actually decreased by 7%. Poverty is widespread – the proportion of people living in poverty is higher in SSA than in any other region – 43% of the total population lives in extreme poverty and 90% of these live in rural areas. Despite the last decade's increases in agricultural production in some countries, hunger is still a persisting issue of SSA. One of the major issues for agricultural production is the impacts of HIV/AIDS, which makes the continent lose important labour force for agricultural production as well as the indigenous knowledge that is normally passed on from generation to generation. The impacts of HIV/AIDS along

with the lacking development in terms of farm technologies makes lack of labour and knowledge important obstacles for agricultural development.

SSA has large reserves of un-cultivated land – only 173 million hectares out of almost 700 million arable are currently being cultivated. This is, however, unevenly distributed and the areas affected by land degradation are increasing with very complex causes. As global warming accelerates, Africa is tremendously affected by increased frequencies of drought, flooding, depleted water reserves as well as changing and uncertain growing seasons. Even despite these issues, the natural resources is still so extraordinarily abundant in SSA that, provided the appropriate policies, investments in research and extension and reforms of institutions were made, there would be immense opportunities for pro-poor agricultural development, particularly in the humid and sub-humid areas of SSA.

Science and technology

The advances of the “Green Revolution” in terms of increased productivity never really became reality in most of SSA. The majority of Africa’s farmers use inefficient manual tools and their plants and domestic animals have benefited very little from the advances. The overall productivity remains extremely low. The overall use of fertiliser and improved varieties is and will continue to be constrained by:

- Their high costs relative to output prices;
- Lack of capital for purchase;
- Risks associated with purchase (the more expensive seed or breed, the more risk);
- Unavailability.

Despite this, renewed introduction and promotion of improved varieties and fertilizer appears to continue being the main strategy from policy makers and researchers in relation to agricultural development.

Policies, institutions and public goods

Most of the SSA countries have undergone structural adjustment programmes and liberalisation of agricultural market, which has had an immense impact on many small scale farmers, who first almost completely lost access to markets. However gradually private sector development is taking over the processing and marketing of agricultural produce, but not without constraint, due to poor infrastructure and probably also distorting impacts from frequent interference from both government- and development agencies programmes.

Under the New Partnership for Africa’s Development (NEPAD), African Governments and development partners have agreed to a goal of agricultural growth of 6% per year through increased investments and improved more enabling policies for the agricultural sector. Under the Comprehensive African Agriculture Development Programme (CAADP) plans are being created to invest in capacity building, research, institutional reforms and improved public services to the agricultural sector. The fourth pillar of CAADP is concerning technology development and capacity building and the implementation of this is mandated to Forum for Agricultural research in Africa (FARA). The Africa Challenge Programme (part of the CPWF) is part of this and the intention is to boost pro-poor agricultural development through research and capacity building in the agricultural sector.

Information and human capital

The educational level of farmers in SSA is low. A large part the population in rural areas is illiterate. Moreover, the access for farmers to technology and market information is extremely low. There are great challenges connected to increasing farmers’ access to information and education in Africa.

Opportunities for development of organic agriculture

The humid and sub-humid areas of Africa have potential for organic production of many crops and fruit and vegetables in particular, but also food crop. In some countries (e.g. Kenya and Uganda),

organic production for export is developing rapidly and a good number of smallholder farmers take this opportunity to improve their livelihoods.

The main driver at this moment is a favourable economy in organic production of fruit, vegetables and others such as coffee, tea and cotton as a profitable niche for smallholders. But apart from this, organic production systems when well developed and applied, have much to offer in terms of increased and more sustainable production with smallholders, improved livelihoods as well as providing increased diversity and improved soil fertility management, which will reduce economical, environmental and food security risks.

South Asia

South Asia comprises a population of 1 344 million people, of which 970 million live in rural areas. 48% of the land is humid or sub-humid. These are very densely populated areas.

The humid and moist sub-humid areas of South Asia are characterised by more than 180 growing days per year. They are in Bangladesh and around the north-eastern, eastern and southern fringes of India and most of Sri Lanka. They have large areas of alluvial soils and support extremely high density of population. The dry sub-humid areas have 120 to 179 growing days each year. These areas are in most of Central India.

Farming systems

Depending on the availability of water and the soil types, there are three major farming systems:

Farming System	Where	Crops	Livestock	Ecological issues
Rice Farming System	Bangladesh, West Bengal, some in Tamil Nadu and Kerala in India and southern Sri Lanka	Intensive wetland rice	Cattle for draft power, milk and manure. Many small ruminants	Flood and cyclones Monoculture
Rice-Wheat Farming System	Summer paddy, winter wheat and sometimes spring vegetables	Northern Pakistan and India, northeast Bangladesh	Significant integration of crop and livestock	Decline in soil productivity due to unbalanced application of fertiliser Soil salinity and sodicity Mining of P and K
Rain-fed Mixed Farming System	India	Rice, wheat, millet, sorghum, pulses oilseed, sugarcane, vegetables and fruit	Many cattle and small ruminants	Climatic variations

Both the rice farming and the rice-wheat farming systems are often combined with intensive fish or scrimp production systems.

Population hunger and poverty

South Asia is characterised by strong urbanisation, where poverty levels are relatively low. However, poverty is persisting in rural areas, where small land sizes make it difficult to sustain proper livelihoods. This is often strengthened by land ownership systems with large absent landowners and numerous landless people striving to survive as agricultural labourers or by renting or leasing small plots of land. Overall, the poverty levels are high. In India, 44% of people are poor and it is approximately the same for Nepal, Pakistan and Bangladesh. For Sri Lanka the level of poverty is lower as Sri Lanka is now a middle income country.

Natural resources and climate

Due to the high population density, the pressure and competition on natural resources both land and water are high. Agricultural production is in strong competition with urban and industrial

development, and it is therefore most likely that any increase in production will come from modernising farming systems and improving water and nutrient management systems rather than increase of cultivated areas. The changing climate is hitting big parts of the area hard with frequent storms and flooding of agricultural areas of Bangladesh and Eastern India.

Science and technology

The advances in technology through agricultural research has been quite high and provide what is called the green revolution development of the area, with new high yielding varieties and use of fertilisers, which is quite wide spread and the area has also seen significant increases in food production. The research and technology development has however been and still is characterised by rather top-down development, with little emphasis to pro-poor technology development and it is clear that the more structural societal problems have so far hindered the advances in rendering benefit to the rural smallholders or landless labourers.

Policies, institutions and public goods

The policies of most countries in the area favour urban development compared to rural. Infrastructure and public services therefore remain problematic outside the urban areas and policy makers give priority to level of production and often intervene in the food market to keep prices artificially low.

Information and human capital

Educational levels are on the increase in the region and it is expected that soon almost all young people in the rural areas will have at least a basic education. Moreover the information technology is coming strongly through in the areas, particularly through the use of mobile phones for market information. Moreover research and extension systems also increase their use of computer based systems dissemination and for accessing information.

Opportunities for development of organic agriculture

Production and consumption of organic produce is increasing in South Asia. Although like in Africa, it is mostly driven by export market. The main crops are cereals (rice) and cotton. India is at the moment the world's leading in cotton production. However, in India there is also a movement towards consumer preference for organic produce. This is particularly driven by the environmental problems connected with the intensive conventional production systems with respect to land degradation, water pollution and especially human health problems with the high use of pesticides. Moreover, the alleged failure of Monsanto's BT cotton in India is adding to the movement towards organic cotton production.

There is a good potential for development of organic production in this region. The organic systems are well suited to the poor family farms with very small landholdings and little capital for inputs, as the production of higher value crops with little costs of inputs has the potential to increase the profitability of small pieces of land and improve rural livelihoods.

East Asia and the Pacific

This region is extremely heavily populated with 1 836 million people in all, of which 62% are involved in agriculture. For many characteristics, this region varies tremendously. 15% of the population live in extreme poverty, but the incidence of rural poverty ranges from approximately 5% in China to 57% in Vietnam and the importance of agricultural sector ranges from 5% in Korea to over 50% in Laos, Myanmar and Cambodia.

Farming systems

The region contains many different farming systems. The most important for Humid and Sub-humid areas are mentioned here:

Farming System	Where	Crops	Livestock	Ecological issues
Lowland Rice farming System	Thailand, Vietnam, Myanmar, South and central-East China, Philippines and Indonesia. Smaller areas in Cambodia, Korea DPR, republic of Korea, Laos DPR and Malaysia	Major crop is rice. Subsidiary are: Oilseed, maize, root crops, soybeans, sugarcane, cotton, vegetables and fruits the rice systems are often in coastal areas combined with fisheries such as crab, shrimps and pearls	In some of the areas, livestock (pigs and poultry) are becoming very intensive with large concentrations of specialised livestock productions	High levels of synthetic fertiliser and pesticides plus in some areas extremely high levels of nutrients from livestock production causes severe problems of water quality – groundwater as well as surface water. Pests and diseases
Tree Crop Mixed Farming System	Malaysia, Indonesia, Thailand, Cambodia, Philippines, Vietnam, Southern China, Papua New Guinea	Rubber, oil palm, coconut, coffee, tea, cocoa. For smallholders also condiments, cloves, peppers etc.	Substantial amount of livestock	Low yields by smallholders and dependence on few crops with insecure market. Pests and diseases
Root-Tuber Farming System	Papua New Guinea, Pacific Islands	Root food crops: yams, taro, sweet potato, vegetables and fruits, coconut	Livestock integrated. Supplemented by hunting and gathering	Few issues, with good potential to increase performance
Upland Intensive Mixed farming System	Most widespread and heterogeneous system in the region. In all East and Southeast Asia	A wide range of permanent crops	Integrated livestock important	Soils with low fertility, shallow and susceptible to erosion

Natural Resources and Climate

As the region is densely populated, available agricultural land is almost fully utilised and under pressure from the growing urban areas. Agriculture is mostly smallholder based and the average farm sizes are declining. The intensive production of both crop and livestock place heavy pressures on the environments, particularly on the water quality. As many of the areas are low-lying coastal or islands, the region is very vulnerable to the changing climate in terms of storms and floods. Moreover, the rising sea-level presents a severe threat to many of the islands.

Science and technology

The area has been relatively well served with research, information and the scopes provided by the “Green revolution” have been utilised. Most notable these years, is probably the rapidly expanding livestock sector.

Policies, institutions and public good

Many of the countries have in the recent years undergone policy reforms and good results on the farming and business environment have been seen. Most countries have strengthened their extension and research systems and thus access to knowledge, skills and services are improving. There is however need for much stronger responses from the governments towards the protection of natural resources.

Information and human capital

The farmers in this region are relatively well educated, almost all with at least basic education. Computerised information systems are emerging as research and extension topics but have still not reached the farming population to any substantial degree.

Potential for development of organic production

Many of the countries in this region have a small but rapidly growing organic sub-sector. They are exporting a number of organic commodities such as rice, fruits, beans, herbs and spices and the market for these are increasing. The natural conditions for organic production are good and further development would provide valuable contributions towards more balanced production systems with integration of livestock and crop production and with stronger emphasis on protection of land, biodiversity and water resources.

Latin America and Caribbean

This region covers an enormous amount of land (205 million ha) and 42 countries and contains a population of 505 million people. As it is rather thinly populated (0.25 persons per ha) and furthermore quite urbanised, the rural areas compose a wide range of favourable areas for agricultural production with a high level of biodiversity. It has moreover very favourable climate – with 40% of the humid areas of the developing world and almost half of its total renewable water resources (90% of the land is in humid and sub-humid areas). The region is very important globally on a number of crops and the farmers achieve very good yields on average. The region has generally an enormous potential for agricultural growth.

Farming Systems

As the diversity is so huge, the region contains very varied farming systems, but the most important for the humid and sub-humid areas are mentioned here:

Farming System	Where	Crops	Livestock	Ecological issues
Coastal Plantation and Mixed farming System	The Caribbean islands and the coastline of most of the Northern part of South America	Banana, coffee, citrus, coconut and tubers		Very rich agricultural lands
Intensive mixed Farming System	Eastern and Central Brazil;	Coffee, horticulture and fruit		Few issues, mostly rich lands under intensive use
Cereal-livestock Farming System	Southern Brazil and Northern Uruguay	Rice	Integrated livestock	This farming system is on the boarder line from semi dry to sub-humid and the soils' qualities are quite varied
Extensive Mixed Farming System	Central Western Brazil, Eastern Colombia, Venezuela and Guyana	Oilseeds, grain, some coffee	Integrated livestock	Enormous potential for growth

Population, hunger and poverty

The average per capita income is high in this region. It is actually the wealthiest of the developing regions. However there are strong problems of equity. There is a great difference between rural and urban areas, with poverty more widespread in rural than urban areas. In rural areas, poverty is strongly linked to unequal distribution of resources – mainly land. There are also great differences between countries. For example, less than 2% of the population in Uruguay are classified as poor, whereas this is as high as 40% in Guatemala and Honduras (data from 2000).

Natural resources and climate

As mentioned above, the available resources are abundant in this region and make up a great potential for agricultural production. The resources are however unequally distributed, so the poverty reducing

impacts of such will depend much on appropriate pro-poor policies and land distribution systems. The climate is generally very favourable but parts of the region are experiencing the consequences of climate changes and variations. This has been particular for the Caribbean, where hurricanes have destroyed many crops.

Science and technology

The region is undergoing strong growth in terms of agricultural development and for many crops the region is leading in the world market. Livestock production is moreover on the increase. Modern technologies such as improved varieties and breeds, fertiliser, pesticides and mechanical mechanisation are widely spread, however as in other regions mostly on large commercial farms. Poor smallholder farmers face a lot of the same problem of benefiting from the technologies as in other regions.

Policies, institutions and public goods

Structural adjustment and liberalisation of markets and services have generally been carried forward very strong and fast in this region. This means that most services such as research and extension are provided by the private sector, with the consequence that services to the agricultural sector mostly concentrate around commercial commodities. There is however a growing number of producer organisations providing services for their members and at the same time many smallholders tend to organise more around market oriented crops than they used to.

Decentralisation of responsibilities and decision making to regional and local governments is a major trend in the region, which appear as a strong basis for more pro-poor decision making in the rural areas.

Information and human capital

Historically there has been much emphasis on educating the elites, however, during the recent decades, there have been improvements of education in the rural areas and literacy has increased a lot. Moreover telecommunication and information technologies are developing very fast and also penetrating to the rural areas.

Potential for development of organic production

The organic production is under rapid development in Latin America and the Caribbean. In 2007 there were 6.4 million hectares under organic production in Latin America. . The countries with the highest percentage of organic land are Dominican Republic, Uruguay, Argentina and Mexico. Mexico has the largest number of organic farms. In the other countries the average size of organic farms are much larger. In many of the countries, foreign companies are buying or renting land for large scale organic production for export.

Many farmers are interested in growing organic. Some see organic production as a profitable opportunity for exporting at a premium price. But in this region many see organic farming as a way to live and maintain Latin American traditions in agriculture at the same time as increasing the income.

Most of the organic produce is sold for export especially to the European market, but there is also a local market for the produce and it is sold both in supermarkets, specialised stores and at local markets.

Annex 6: Institutions Relevant to HUSHA Research

Organic Research Centres

SUB-SAHARAN AFRICA

African Organic Center of Excellence, Uganda Martyrs University – Uganda

[HTTP://WWW.FIUC.ORG/UMU/INDEX.PHP/GENERAL-FACULTIES/FACULTY-OF-AGRICULTURE](http://www.fiuc.org/umu/index.php/general-faculties/faculty-of-agriculture)

The Centre is currently working to build its research and teaching capacity in organic agriculture. Research is being undertaken on organic pest management and soil amendments. Information about these research endeavours is not currently available on the University webpage.

Egerton University – Kenya

[WWW.EGERTON.AC.KE](http://www.egerton.ac.ke)

Egerton University is an officially recognised university in Kenya. It started as an agricultural school and has gradually been upgraded to offer studies at university level in several subjects. The Faculty of Agriculture is in progress of establishing an organic approach at all University levels. The organic activities include a curriculum for an organic master- and preparation of a bachelor degree, the planning of an interdisciplinary organic agriculture institute, preparation of the demonstration farm for organic farming, a research concept on organic research integrating master students and the different departments. The university has a group of academic staff trained in organic farming with international degrees, able to publish internationally.

Agricultural Research and Extension Unit (AREU) - Mauritius

[HTTP://WWW.PORTAL.AREU.MU](http://www.portal.areu.mu)

AREU is a body of the Government of the Republic of Mauritius. It regularly conducts collaborative research in organic agriculture. On-going projects include studies on the effects of leguminous crop cover and organic soil amendments on soil fertility, the effects of bio-fertilizers on yield and the efficacy of bio-pesticides and microbial pesticides.

National Horticultural Research Institute (NIHORT) – Nigeria

[HTTP://WWW.NIHORT.ORG](http://www.nihort.org)

NIHORT is focused on enhancing appreciation, production and utilisation of tropical fruits, vegetables, ornamental plants and spices in Nigeria. The Institute is conducting organic agriculture research in several areas, including comparative studies between conventional and organic fruit and vegetable production.

Obasanjo Organic Agriculture Development Centre in Nigeria (OOCORD)

OOCORD was launched in 2007. The mission is to develop research and knowledge exchange on sustainable, organic agricultural systems to address the dual needs of food security and incomes in Africa.

Organic Agriculture Projects in Tertiary Institutions in Nigeria (OAPTIN)

In Nigeria, a number of scientists (80) from different institutions have joined in OAPTIN, which acts as a cross institutional working group current working with capacity building of organic scientists through degree programs and training courses, strategic research activities in organic production systems, advocacy for organic practises, building partnerships with local and international scientists and practitioners.

University of Agriculture, Abeokuta – Nigeria

[HTTP://WWW.UNAAB.EDU.NG/](http://www.unaab.edu.ng/)

The University of Agriculture, Abeokuta aims to promote agricultural education and services for agricultural development and attainment of self-sufficiency in food and fibre. The University has established a Working Group on organic agriculture and that does research and capacity building in organic agriculture. Current research projects study the effects of compost and soil fertility-building

schemes, as well as the effect of crop rotation schemes on the severity of pests and diseases. Information about these research endeavours is not currently available on the University webpage.

Department of Agronomy at Ladoké Akintola University of Technology – Nigeria

[HTTP://WWW.LAUTECH.EDU.NG/](http://www.lautech.edu.ng/)

The Department's objective is to provide sustainable manpower to meet the growing needs in agronomy to Nigeria. Their mandate is to reduce hunger through applied research into various indigenous agronomical problems. Researchers in the Department are engaged in organic agriculture research. Current studies include research on cover crops, organic soil amendments and the use of plant extracts for pest and disease control. Information about these research endeavours is not currently available on the University webpage.

University of Ghana (UG) – Legon - Ghana

[HTTP://WWW.UG.EDU.GH](http://www.ug.edu.gh/)

University of Ghana was established as a university in 1961. It has a school of agriculture and three agricultural research centres. Despite the fact that UG does not have a specific organic research centre, it has participated in several research projects on organic and low input agriculture. The soil science department has been working on carbon sequestration and biodiversity of microbial populations in tropical soils. UG runs a project on co-compost in rain-fed peri-urban agriculture and are preparing a continuation of organically fortified co-compost. Moreover much work has been done on N-cycling through leguminous crops.

Agricultural Research and Extension Unit (AREU) - Mauritius

[HTTP://WWW.PORTAL.AREU.MU](http://www.portal.areu.mu/)

AREU, a body of the Government of the Republic of Mauritius regularly conducts collaborative research in organic agriculture. On-going projects include studies on the effects of leguminous crop cover and organic soil amendments on soil fertility, the effects of biofertilizers on yield and the efficacy of biopesticides and microbial pesticides.

ASIA

Earth Net Foundation – Thailand

[HTTP://WWW.GREENNET.OR.TH/E0000.HTM](http://www.greennet.or.th/e0000.htm)

Earth Net Foundation was established by the Green Net Cooperative, the first organic produce wholesaler in Thailand, for the purpose of promoting and supporting organic agriculture and products through the whole food system. The Foundation conducts several organic agriculture initiatives around the country including research and development, promotion of community enterprises, and management of a farmer field school for organic agriculture. Specifics on their research initiatives are not available on the Green Net Cooperative website.

Department of Agriculture, Thailand

[HTTP://WWW.DOA.GO.TH/DEFAULT.ASPX](http://www.doa.go.th/default.aspx)

The Organic Crops Project of the Department of Agriculture conducts research on organic rice. This webpage is only available in Thai.

Agricultural Experimental Farm, National Chung-Hsing University – Taiwan

[HTTP://WWW.BIOAGRI.NTU.EDU.TW/FARM/A/FARM/C.HTM](http://www.bioagri.ntu.edu.tw/farm/a/farm/c.htm)

The Agricultural Experimental Farm in Taiwan consists of 18 hectares of organic production, including a horticultural plot for teaching, extension and research. Information about specific research projects is not available on the University webpage.

College of Agriculture, University of the Philippines Los Baños

[HTTP://CA.UPLB.EDU.PH/](http://CA.UPLB.EDU.PH/)

The College of Agriculture conducts more than half of the country's total agricultural research and manages several extension programs. The Institute of Plant Breeding, located within the College of Agriculture, is currently researching breeding and selection for organic vegetables in the Pacific.

International Competence Centre for Organic Agriculture (ICCOA) - India

[HTTP://WWW.ICCOA.ORG](http://WWW.ICCOA.ORG)

ICCOA is knowledge and learning centre for all aspects of organic agriculture and agribusiness. The Centre, which is located in India, works in partnership with FiBL. Its mission is to help build the competence of individuals and organizations of the South Asian region contributing to the creation of ecologically, economically, and socially sustainable agriculture and organic business. The Centre is divided into five programs concerning different aspects of organic agriculture: Policy and Advocacy; Research and Technology; Capacity Building; Standards and Quality Management; and Market Development

World Vegetable Centre (AVRDC) - Taiwan

[HTTP://WWW.AVRDC.ORG/](http://WWW.AVRDC.ORG/)

AVRDC is a non-governmental, non-profit agricultural research institute based in Taiwan, with regional offices throughout Africa and Asia. The Centre has 6 hectares under organic production for research. Research is largely focused on comparative studies of different varieties of pak-choi, sweet corn and rice (for features such as mortality and fresh biomass production) and an effectiveness evaluation of green manure species. In addition, the Centre has established field boundaries to protect against pesticide drift and a small agro-forestry plot for research on intercropping of tropical fruit trees and vegetables.

Faculty of Agriculture, University of Peradeniya, Sri Lanka

[HTTP://WWW.PDN.AC.LK/AGRI/](http://WWW.PDN.AC.LK/AGRI/)

The Faculty of Agriculture of the University of Peradeniya, Sri Lanka, is the foundation faculty of this subject – in the nation. It has a very good record of 60 years of excellent education in tropical agriculture. The Department of Crop Science of the faculty has an active program on organic farming. It teaches tropical organic cropping both at the undergraduate and graduate levels, has an active research program and is therefore a key player in organic cropping in the country. It also manages an experimental station, which is developing an organic husbandry unit.

LATIN AMERICA

Brazilian Agricultural Research Cooperation (EMBRAPA) – Brazil

[HTTP://WWW.EMBRAPA.BR/ENGLISH](http://WWW.EMBRAPA.BR/ENGLISH)

27 centres of research under the EMBRAPA have joined to work together on the project “Scientific and Technological Basis for the Development of Brazilian Organic Agriculture”. More than 300 researchers are involved in the organic research activities.

Tropical Agricultural Research and Higher Education Center (CATIE) – Costa Rica

[HTTP://WWW.CATIE.AC.CR/MAGAZIN_ENG.ASP?CODIDIOMA=ENG](http://WWW.CATIE.AC.CR/MAGAZIN_ENG.ASP?CODIDIOMA=ENG)

CATIE is a joint endeavour between the Inter-American Institute for Agricultural Sciences and the Costa Rican Government. Its mission is to contribute to rural poverty reduction by promoting competitive and sustainable agriculture and natural resource management through higher education, research and technical cooperation. CATIE has more than 70 research and development project that fit into the following thematic groups: Cacao; Livestock and Environmental Management; Musa; Plant Genetic Resources; Centre for Competitiveness of Eco-enterprises; Agro-ecology; Coffee; Forests, Protected Areas and Biodiversity; Global Change; Watershed; and Socio-economics of Environmental Goods and Services. CATIE has an agroecological thematic group that works on research in organic agricultural systems. Research areas are: Comparative trials of systems, biological pest control, soil

quality, organic fertilizers and biodiversity. The work in organic production is not limited to research, but also to promotion and training, as well as an active participation in national and international organic movements to promote projects and enterprises that promote this type of activity with the other actors within the sector.

DEVELOPED COUNTRIES

Organic Agriculture Working Group, Kentucky State University – USA

[HTTP://ORGANIC.KYSU.EDU/INDEX.SHTML](http://ORGANIC.KYSU.EDU/INDEX.SHTML)

Kentucky State University's organic vegetable research program compares different organic production systems in terms of productivity, profitability and sustainability. Current projects include work on weed management, high tunnels for year-round production and alternatives to plastic mulch.

Freeville Organic Research Farm, Cornell University – USA

[HTTP://WWW.CUAES.CORNELL.EDU/CALS/CUAES/AG-OPERATIONS/FREEVILLE-FARM/INDEX.CFM](http://WWW.CUAES.CORNELL.EDU/CALS/CUAES/AG-OPERATIONS/FREEVILLE-FARM/INDEX.CFM)

The 30-acre farm serves several university departments, including Horticulture, Entomology, Plant Breeding and Plant Pathology. Research includes trials on vegetable cover cropping, rotations, minimum tillage, pests and crop diseases, breeding lines with particular potential of production in the North-eastern US, and the effects of organic nutrient sources on soil quality to identify new strategies for vegetable production.

Organic Agriculture Program, Iowa State University – USA

[HTTP://EXTENSION.AGRON.IASTATE.EDU/ORGANICAG/RR.HTML](http://EXTENSION.AGRON.IASTATE.EDU/ORGANICAG/RR.HTML)

The Program's mission is to educate producers, consumers and policy makers in the research activities in organic agriculture. The Program engages in both research and extension at its Neely-Kinyon Research and Demonstration Farm. Comparison studies are ongoing, with specific areas of focus on yield studies, pest and disease control, soil management, cover crops, and horticulture.

Organic Vegetable Research Program, Auburn University – USA

[HTTP://WWW.AG.AUBURN.EDU/AAES/ORGANICVEG/](http://WWW.AG.AUBURN.EDU/AAES/ORGANICVEG/)

Research at Auburn University focuses on developing integrated organic production systems to allow mid-summer production of tomato and pepper in Alabama. The components of the project include organic, no-till crop production, comparison of cover crops, tomato and pepper variety trials, farms-cropping plants for insect control, and comparison of organic pesticides for disease control.

Organic Training College, Lincoln University – New Zealand

[HTTP://WWW.BHU.CO.NZ/COLLEGE.HTML](http://WWW.BHU.CO.NZ/COLLEGE.HTML)

The Organic Training College is located at the Biological Husbandry Unit, a 10 hectare research farm in New Zealand. The College provides information and training on several aspects of organic agriculture, including vegetable production. Research on organic production and soil management is conducted at the University.

International Centre for Research in Organic Food Systems (ICROFS) - Denmark

[HTTP://WWW.ICROFS.ORG/](http://WWW.ICROFS.ORG/)

ICROFS is collaboration between research groups in different institutions and universities and coordinated through a head office in Denmark. The secretariat of ICROFS initiates, coordinates, and participates in international research activities. The aim of their work is to strengthen the positions of organic farming and food systems and to increase the conversion possibilities from conventional farming production. ICROFS plays a central role in a large number of research endeavours, including the DARCOF III, CORE Organic, CERTCOST and GlobalOrg projects. ICROFS also manages Organic Eprints, an open, online archive for research in organic agriculture with more than 8,000 publications.

Central Laboratory of Organic Agriculture (CLOA) - Egypt

<http://www.arc.sci.eg/InstsLabs/Default.aspx?OrgID=25&lang=en>

CLOA researches and promotes organic production of various crops, especially vegetables, fruit and MAPs. In addition, the Laboratory organizes organic agriculture training courses for the private and public sector, conducts organic certification, provides alternatives to agrochemicals and registers all accredited organic farms in Egypt.

Co-ordination for Organic Farming and Consumer Protection, University of Hohenheim – Germany

<HTTPS://OEKO.UNI-HOHENHEIM.DE/START.HTML?&L=1>

The Co-ordination for Organic Farming and Consumer Protection conducts organic research through many of the Institutes at the University of Hohenheim. Research on fruit and vegetables has recently included work on the impact of conventional, integrated and organic vegetable production on soil fertility and vegetable quality in Vietnam; the development of fertilisers of plant origin for organic vegetable production; the use of biological pest control for fruit-growing; strategies for weed control in root crop production; and impact of different cultivation measures (such as cultivar and biodynamic application used) on vegetable quality. The University also manages a 60 hectare organic experimental research station near the main campus and has degree offerings in organic agriculture.

RODALE INSTITUTE – USA

<HTTP://WWW.RODALEINSTITUTE.ORG>

The Rodale Institute is a US-based non-profit organization that aims to improve the health and well-being of people and the planet through organic agriculture research and training. Most famous for the Farming Systems Trial®, a long running comparison trial on organic and conventional farming techniques, Rodale now engages in a variety of studies that focus on yield, soil fertility, pest and disease management and opportunities to mitigate greenhouse gas emissions.

Research Institute of Organic Agriculture (FiBL) – Switzerland

<HTTP://WWW.FIBL.ORG>

FiBL is committed to the international development of organic agriculture through research and knowledge transfer. Based in Switzerland, FiBL has international offices in Germany and Austria and partners with organizations around the world. The Institute has eight research divisions: Horticultural Sciences, Entomology, Animal Health, Animal Husbandry, Food Quality and Safety, Plant Protection and Biodiversity, Socio-economics and Soil Sciences.

Faculty of Organic Agricultural Sciences, University of Kassel – Germany

<HTTP://WWW.UNI-KASSEL.DE/AGRAR/?LANGUAGE=EN>

The aim of the Faculty is to impart knowledge of sustainable agriculture with regard to different agro-ecological and economical conditions. The Faculty's main focal areas are in crop sciences, animal sciences, socio-economic and food sciences. Within each focal area, there are multiple departments that focus on areas such as, but not limited to, agricultural engineering, crop production, animal nutrition, ecological plant protection, farm management, grassland science and renewable plant resources, marketing, and food quality and culture.

Inst. of Organic Farming, Dep. Sust. Agriculture, BOKU University, Vienna, Austria

<HTTP://WWW.NAS.BOKU.AC.AT/OEKOLAND.HTML>

BOKU University is engaged in organic agriculture research and teaching following a system approach (socio-cultural, production, economic approach), integrating basic and applied sciences. Several institutes are collaborating with universities in developing countries as well as CGIAR centres in students and staff exchange, master thesis, PhD, and international funded projects with focus on organic agriculture. Research topics are e.g.: linking farmers to the market, legume based cropping systems, socio-cultural analysis, animal husbandry, bio-fuels, organic agriculture with trees, biodiversity, farm economy, local knowledge.

Institute of Organic Agriculture, University of Bonn - Germany

[HTTP://WWW.IOL.UNI-BONN.DE/](http://www.iol.uni-bonn.de/)

This Institute aims to develop methods for optimising ecological agriculture and support sustainable development. It seeks to integrate basic and applied research linked to the needs of farmers. Its research focuses on plant production, environmental impact assessment, product quality, and animal husbandry. The Institute has very close international research partnerships with ISOFAR and other research bodies.

Agro Eco Louis Bolk Institute – The Netherlands

[HTTP://WWW.LOUISBOLK.ORG/?RES=1280](http://www.louisbolk.org/?res=1280)

Agro Eco Louis Bolk Institute conducts research on organic agriculture, nutrition and health care and engages in knowledge transfer in Africa. The Institute, which is based in the Netherlands, has two regional offices in Africa to engage in research and information dissemination around tropical organic agriculture: Eastern Africa (Uganda) and West Africa (Ghana). Research at the Institute is divided into four thematic areas: Human, Animal, Plant and Soil. Current studies include organic productivity trials using different pest and disease management strategies; organic cotton staple length trials; studies on organic livestock rearing techniques; research on the nutritional and health attributes of organic food; and work in support of organic social impact research.

Group of Plant Nutrition, Institute of Plant Sciences, Eidhenossische Technissche Hochschule (ETH) - Switzerland

[HTTP://WWW.PE.IPW.AGRL.ETHZ.CH/](http://www.pe.ipw.agrl.ethz.ch/)

The Group of Plant Nutrition of the ETH Zurich has a long record on research projects using cropping systems such as organic farming; legume based low input and/or minimum tillage systems as model to improve our understanding on phosphorus (P) and nitrogen (N) cycling in the soil plant system. Our aim is to improve the understanding of a-biotic and biotic processes involved in soil nutrient dynamics in temperate and tropical zones so as to contribute to sustainable nutrient use. Particularly, the group has the expertise to study biological functions in soil systems involved in phosphorus (P) and nitrogen (N) cycling such as: microbial functions in P and N dynamics, including symbiotic nitrogen fixation, the functional diversity of arbuscular mycorrhiza and overall P and N (re-)cycling in agro-ecosystems using isotope techniques. We also characterize available and total nutrient stocks in the soil to prevent their depletion, and follow the fate of added nutrients in the soil-plant systems to minimize adverse effects on the environment.

Organic Research Centre – Elm Farm – UK

[HTTP://WWW.EFRC.COM/](http://www.efrc.com/)

The Organic Research Centre is a registered charity in the UK and a leading research, development and advisory institution for organic agriculture. The Centre's research is aimed at addressing the needs and questions of the UK organic sector. Research includes work on policy, whole farming systems, cropping, livestock and soil, water and nutrients. Studies have included work on agro-forestry, seed production and quality, extended season cropping, companion cropping and disease control, nutrient flows, livestock feeds and animal welfare.

Veterinary Epidemiology and Economics Research Unit (VEERU), University of Reading – UK

[HTTP://WWW.VEERU.READING.AC.UK/DEFAULT.HTM](http://www.veeru.reading.ac.uk/default.htm)

VEERU is a research and training centre in veterinary epidemiology and livestock economics. The Organic Livestock Research Group (OLRG) within VEERU carries out research to identify animal health and welfare constraints and research needs within organic livestock production. Current studies focus on milk production characteristics and fertility in organic dairy cows. Also, OLRG coordinated an EU-funded action project, Network for Animal Health and Welfare in Organic Agriculture (NAHWOA).

Institut für Biologisch-Dynamische Forschung (IBDF) (Institute for Biodynamic Research) - Germany

[HTTP://WWW.FORSCHUNGSRING.DE/IDX_EN.HTML](http://www.forschungsring.de/idx_en.html)

IBDF was founded to research solutions for biodynamic farmers and consultants. Currently, it focuses on conducting research in organic agriculture. The Institute's main research groups focus on long-term trials and fertilization; organic plant breeding, crop diversity, seed health and organic plant protection; and the optimization of biodynamic preparations. The long-term trials group is focused on soil organic matter and crop yields and yield components with and without biodynamic preparations.

Non-Research Organic Institutions

SUB-SAHARAN AFRICA

Participatory Ecological Land Use Management (PELUM) Association

[HTTP://WWW.PELUM.NET/](http://www.pelum.net/)

PELUM is a network of NGOs working with small-scale farmers in east, central, and southern Africa. It has 210 member organisations in 10 different countries (Kenya, Uganda, Tanzania, Rwanda, Zambia, Zimbabwe, Malawi, South Africa, Lesotho and Botswana). The Association is working towards sustainable local community empowerment, food security and prosperity. It strives to accomplish this by promoting ecological land use practices, seed security, and the consumption of indigenous foods.

Organic Producer and processors Association of Zambia (OPPAZ) - Zambia

[HTTP://WWW.OPPAZ.ORG.ZM](http://www.op paz.org.zm)

OPPAZ was set up in 1999 as a body affiliated to the Zambian National Farmers Union. It promotes the organic movement in Zambia. It also developed a technical advisory service for its members. In general, it provides marketing, certification and technical support to producers from the smallholder sector as well as to large-scale commercial enterprises

Ghana Organic Agriculture Network (GOAN) - Ghana

[HTTP://WWW.GARDENORGANIC.ORG.UK/INTERNATIONAL_PROGRAMME/IP_GOAN.PHP](http://www.gardenorganic.org.uk/international_programme/ip_goan.php)

GOAN is the main grouping of organic NGOs and trade associations, which is working actively with concerned organisations in developing the organic sector in Ghana. It has about 150 member groups and organisations, representing a thousand individual members.

GOAN in 1995 established an agriculture centre to provide information, training and advice on organic agriculture practices. It also has links with research institutes to examine alternative methods of pest control, particularly for cocoa, oil palm cotton, cereals and fruit vegetables.

Manor House Agricultural Centre (MHAC) – Kenya

[HTTP://WWW.MHACBIOINTENSIVE.ORG/](http://www.mhacbiointensive.org/)

MHAC is a non-profit program aimed at increasing food security in Kenya by educating farmers in sustainable and organic farming techniques. The Centre provides a two-year course in “Grow Bio-intensive”, a low-cost agricultural technology suited to small-scale farmers. It emphasizes composting to improve soil fertility, mulching, biological controls to manage pests, and increasing productivity by improved spacing. In addition to the training program, MHAC has developed mini-training centres in villages to provide information to women's groups and farmers.

Institute for Sustainable Development (ISD) – Ethiopia

[HTTP://ISD-TEST.100WEBSPACE.NET/](http://isd-test.100webspaces.net/)

ISD's main purpose is to engage in sustainable development by empowering local communities in Ethiopia and helping them build on current sustainable development practices. The Institute's focus with agriculture involves working with local farming communities and agricultural experts to improve local productivity and environmental health using ecologically sound practices; working with various groups to raise indigenous trees, make compost, and develop organic vegetable gardens; and

supporting the training of experts in the production of organic fertilizer and purification of water to use for growing crops.

Kenya Institute of Organic Farming (KIOF) - Kenya

[HTTP://WWW.KIOF.ORG/](http://www.kiof.org/)

KIOF is an NGO operating through Kenya and the Eastern Africa region. The Institute's vision is to achieve communities that are empowered with the skills and knowledge of organic farming to support sustainable rural livelihoods. KIOF promotes organic agriculture with a focus on youth, women, and self-help farming groups by training smallholder farmers in organic farming methods using locally available resources. Its techniques involve choice of crop, composting, planting systems, crop storage, animal husbandry, crop protection and soil conservation.

Tanzania Organic Agriculture Movement (TOAM) - Tanzania

[HTTP://WWW.KILIMOHAI.ORG/](http://www.kilimohai.org/)

TOAM is the registered association of organic producers in Tanzania. Its mission is to coordinate and facilitate stakeholders' initiatives in tapping the potential of organic agriculture to improve livelihoods. It provides organic producers with information, facilitates market linkages, and creates awareness on organic standards and technical back-stopping.

National Organic Agricultural Movement of Uganda (NOGAMU) - Uganda

[HTTP://WWW.NOGAMU.ORG.UG/](http://www.nogamu.org.ug/)

NOGAMU's mission is to coordinate and promote organic agricultural development, networking and marketing in order to reduce poverty of the rural poor in Uganda. It is an umbrella organisation which unites producers, processors, exporters, NGOs, and other organisations involved with the organic sector in Uganda. NOGAMU provides services such as marketing, training, lobbying and advocacy, and promotion of certification and standards.

Training Centres for Organic Farming in Madagascar

[WWW.SRIMADAGASCAR.ORG](http://www.srimadagascar.org)

A group of agricultural training centres in Madagascar have as part of the System of Rice Intensification (SRI) Madagascar initiative joined to provide different kinds of training related to organic agriculture. The training centres are: CHAMP-ECOLE, TAOEZAKA, ZOMA and TAF – agro-eco-tourist centre. SRI promotes the spread of the System of Rice Intensification in Madagascar. It is structured around several simple techniques: early replanting of rice seedlings, replanting on a grid and partial drying of rice paddies. SRI is entirely organic.

The African Organic Farming Foundation's (AOFF) – South Africa

[HTTP://AFRICANORGANICS.ORG](http://africanorganics.org)

AOFF was founded in 2001 and has 501 member organisations. AOFF's mission is to reduce poverty among Southern Africa's rural communities through the introduction of organic farming, better nutrition, agro-enterprise development and management of natural resources. AOFF's Marketing and Agro-Business Development (MAED) Program is a market-led, trade capacity building partnership that facilitates the inclusion of the resource-poor in organic production and trade by linking small farmers with markets to improve nutrition, food security, incomes and community decision making.

The Association for the Promotion of Organic Agriculture in Cameroon (ASPABIC)

ASPABIC is the sole structure/body gathering only operators of the organic sector. There are approximately 100 members who are also producers, exporters, researchers or advocates of organic agriculture. It provides its members with services of promotion of organic agriculture, information, public awareness, technical monitoring and advice.

ASIA

Asian farmers' Association for Sustainable Development (AFA)

[HTTP://WWW.ASIANFARMERS.ORG](http://www.asianfarmers.org)

AFA is a regional alliance of 9 farmer federations in 8 Asian countries, representing 10 million farmers. The organisation was established in May 2002. AFA is an advocacy group for farmers' rights and development, genuine agrarian reform and mainstreaming of sustainable agriculture in regional and national policies and programs. It promotes sustainable agricultural policies and practises

Centre for Environment, Technology and Development, Malaysia (CETDEM)

[HTTP://WWW.CETDEM.ORG.MY/](http://www.cetdem.org.my/)

CETDEM is a training, research, consultancy, referral, and development organization committed to improving environmental quality through sustainable development. Formerly, CETDEM ran an organic farm growing local vegetables for a decade. Currently, the farm is no longer in existence and CETDEM focuses on demonstrating the viability of organic farming and promoting the need for conservation of resources. It aims to do this by sharing its experience with farmers, trainers, and individuals.

Global Horticultural Institute (GHI), The World Vegetable Center - Taiwan

[HTTP://WWW.GLOBALHORT.ORG/](http://www.globalhort.org/)

The World Vegetable Center, with its headquarters in Taiwan, hosts the GHI. This Initiative aims to increase economic opportunities and food security for the poor. The Initiative has a focus area dedicated to underutilised crops.

LATIN AMERICA

Associação de Agricultura Orgânica (AAO) – Brazil

[HTTP://WWW.AAO.ORG.BR/](http://www.ao.org.br/)

AAO is an association of engineers, agronomists, producers, journalists, and researchers engaged in organic farming. The Association publishes standards of organic production, conducts training and events, develops projects in cooperation with other institutions, and contributes to the growth of organic agriculture in Brazil. AAO's webpage is only available in Portuguese.

DEVELOPED COUNTRIES

KAITE Company

[HTTP://WWW.KAITE.BIZ/EN/KAITE_COMPANY](http://www.kaite.biz/en/kaite_company)

KAITE is a private company engaged in social entrepreneurship in Zimbabwe and Germany. It works in the cultivation, production, authentication, processing, exportation and marketing of organic products, with an emphasis on herbs, spices, MAPs and staple foods. KAITE is actively engaged in training partner farmers in organic agriculture and coordinating social development projects for rural communities involved. Currently, it is conducting research on pollutants and land degradation through organic production, wild collection, organic oils and herbs.

Garden Organic – UK

[HTTP://WWW.GARDENORGANIC.ORG.UK/INDEX.PHP](http://www.gardenorganic.org.uk/index.php)

Garden Organic is an organic agriculture charity dedicated to researching and promoting organic gardening, farming, and food. The charity's International Development Programme promotes and facilitates organic agriculture in Africa, Asia and Latin America. Its research activities focus on sustainable agriculture and agro-forestry systems in rural, urban, and peri-urban farming systems in humid and sub-humid areas.

National Sustainable Agricultural Information Service (ATTRA) – USA

[HTTP://ATTRA.NCAT.ORG/ORGANIC.HTML](http://attra.ncat.org/organic.html)

ATTRA is a joint collaboration between the National Center for Appropriate Technology and the USDA. It seeks to provide information and technical assistance to farmers, ranchers, extension agents,

educators, and others involved in sustainable agriculture in the United States. Although ATTRA is focused specifically on the USDA Organic Standards, it provides information that would be useful to international members of the organic community. Organic agriculture publications are organized into the following areas: regulations, certification, transition and history; fruit; vegetables, flowers and herbs; field crops; livestock; control of pests; soil and fertilizer issues; and marketing.

Non-Organic Research Institutions

SUB-SAHARAN AFRICA

Citrus Research and Extension Institute (CREI), Belize Citrus Growers Association

[HTTP://WWW.BELIZECITRUS.ORG/INDEX.HTML](http://www.belizecitrus.org/index.html)

CREI's mission is to work with citrus industry stakeholders to develop, implement, and share technology that leads to the establishment of a sustainable citrus farming system. It researches methods of improving citrus production and comparing grove management techniques.

International Center for Tropical Agriculture (CIAT)

[HTTP://WWW.CIAT.CGIAR.ORG](http://www.ciat.cgiar.org)

CIAT is a CGIAR Centre dedicated to reducing poverty and hunger in tropics while improving agricultural productivity and protecting natural resources in developing countries. CIAT is organized into three main categories: enhancing and improving biodiversity; improving the lives of farmers and the agro-ecosystem; and soil biology and fertility. Also of interest, CIAT houses the Information Centre on Tropical Fruits, which contains information on thousands of varieties.

International Livestock Research Institute (ILRI)

[HTTP://WWW.ILRI.ORG](http://www.ilri.org)

ILRI is a CGIAR research center based in Kenya and Ethiopia. The Institute's aim is to improve the well-being of people in developing countries by enhancing the contribution livestock makes to smallholder farming. The Institute's primary research focuses on smallholder crop-livestock systems in arid, humid, and highland areas and the transition from subsistence to a market economy. ILRI studies methods of increasing production by precision application of manure, patchy grazing, forage-legume rotations and grazing animals on particular crop residues.

Institute of Insect Physiology and Ecology (ICIPE) - Kenya

[WWW.ICIPE.ORG](http://www.icipe.org)

Icipe's mission is to use insect science to help alleviate poverty, ensure food security, and improve the overall health status of people in the tropics. The Institute develops strategies for the use of harmful and useful arthropods, while preserving the natural resource base through research. *Icipe* has four divisions focusing on environmental health, human health, plant health, and animal health. The Institute conducts research on methods for pest control that are selective, non-polluting, non-susceptible to resistance and conserve Africa's biodiversity

International Trypano-tolerance Centre (ITC) – The Gambia

[HTTP://WWW.ITC.GM/INDEX.HTML](http://www.itc.gm/index.html)

ITC is a research institute serving the West African region, particularly the sub-humid and humid areas. The Centre's aim is to increase livestock productivity and utilization through the sustainable exploitation of the genetic resistance of indigenous breeds of livestock. ITC's research approach is systems low-input oriented, targeting the urban and peri-urban settings.

World Agro-forestry Centre

[WWW.WORLDAGROFORESTRY.ORG](http://www.worldagroforestry.org)

The World Agro-forestry Centre, a CGIAR centre, aims to generate science-based knowledge about the diverse roles that trees play in agricultural landscapes and to use its research to advance policies and practices that benefit the poor and the environment. The Centre partners with a range of scientific and development institutions to help move forward their efforts to generate tree-based solutions to

global problems. One especially useful resource that the Centre offers online is the Agro-forestry Database, a database of tree species for field workers and researchers. The Centre does not have a specific focus on organic agro-forestry, but has supported work in the area in the past.

International Institute of Tropic Agriculture (IITA) – Nigeria

[HTTP://WWW.IITA.ORG/](http://www.iita.org/)

IITA is a CGIAR centre that focuses on the tropical areas of Africa. The Institute's mission is to enhance food security and improve livelihoods in Africa. It has the following research programmes: Agriculture and Health; Agro-biodiversity; Banana and Plantain Systems; Cereals and Legume Systems; Horticulture and Tree Systems; Root and Tubers Systems; Threats to Food Security; Integrated Pest Management. In addition, IITA is the coordinating centre for the Eco-regional Programme for the Humid and Sub-humid Tropics of Sub-Saharan Africa. Currently, the Institute has a project in which the market potential of organic vegetables in West Africa is being assessed and organic pest management techniques are being disseminated through the Farmer Field School Approach.

Africa Rice Center (WARDA)

[HTTP://WWW.WARDA.ORG](http://www.warda.org)

WARDA is a CGIAR Centre with African member states. Its mission is to contribute to poverty alleviation and food security in Africa through the rice sector. WARDA's research focuses on overcoming the major shortfalls of rice production in Africa including low productivity and sustainability of rice, poor quality of the product, and an unfavourable market and policy environment.

ASIA

Chinese Academy of Tropical Agricultural Sciences (CATAS)

[HTTP://WWW.AT0086.COM/CATAS/](http://www.at0086.com/catas/)

CATAS conducts various research projects on sustainable rural and agricultural development in tropical and subtropical China. Some of the Academy's research topics include the collection and conservation of plant resources; environmental protection; the breeding of improved crop varieties; development of sustainable farming systems; control of crop pests, diseases and weeds; and animal and aquaculture development.

Hainan University – China

[HTTP://WWW.HAINU.EDU.CN/EN/](http://www.hainu.edu.cn/en/)

Hainan University was recently formed by the merger of the former South China University of Tropical Agriculture and the former Hainan University. Hainan University focuses on studies of tropical areas, ocean, and ecology.

Kerala Agricultural University – India

[HTTP://WWW.KAU.EDU/](http://www.kau.edu/)

Kerala Agricultural University seeks to provide the resources required for the sustainable development of agriculture. Research at the University is focused on increasing the productivity of crops, livestock, and fish grown in the state of Kerala. Given the high rainfall level of the state, much of it is considered humid areas. In each of the University's six research stations, a system approach incorporating crop, livestock, forestry, and fishery activities guides its research.

Institute Penyelidikan dan Kemajuan Pertanian Malaysia (Malaysian Agricultural Research and Development Institute) (MARDI)

[HTTP://WWW.MARDI.GOV.MY/HOME](http://www.mardi.gov.my/home)

MARDI aims to create, innovate, transfer, and apply knowledge, competencies and services to support the national food and agriculture industries of Malaysia. After releasing related papers on the topic, MARDI produced a book on organic vegetable production in Malaysia in 2005. However, their website does not indicate current organic vegetable research. MARDI's website is only partially available in English.

Agriculture Department, Government of Punjab (Agri Punjab) – India

[HTTP://WWW.AGRIPUNJAB.GOV.PK/DEFAULT.ASP](http://www.agripunjab.gov.pk/default.asp)

Agri Punjab is the State Department concerned with agricultural research and extension. The Department's Ayub Agricultural Research Institute is the primary research centre. Research directorates at the Institute cover the following areas: agronomy, plant protection, horticulture, post harvest, cotton, oil seeds, pulses, sugarcane, vegetables, wheat, arid areas, maize and millets, rice, fodder, and soil science. A special campaign was started to research methods of increasing crop production within a period of two years.

Bangladesh Rice Research Institute (BRRI)

[HTTP://WWW.BRRI.GOV.BD/](http://www.brri.gov.bd/)

BRRI is part of the National Agricultural Research System of Bangladesh focusing on research and development of rice production. The Institute's mandate is to conduct research on all aspects of rice improvement and production; conduct research on different problems of rice; develop new varieties of rice; and train farmers on modern techniques of rice production. BRRI researches many different program areas including varieties development, crop-soil-water management, pest management, rice farming systems, farm mechanization, and socioeconomic policy.

Philippine Rice Research Institute (PhilRice)

[HTTP://WWW.PHILRICE.GOV.PH](http://www.philrice.gov.ph)

PhilRice is a national research institute attached to the Philippine Department of Agriculture. The Institute functions to plan, undertake, and coordinate a national research and development program for rice-based farming systems and to coordinate the national network of rice research and development stations. Research at PhilRice is divided into four major programs and twenty-four sub-projects. The major programs include: irrigated lowland, rain fed lowland, knowledge management and promotion, and impact and policy research. Some of the sub-projects themes are variety, tillage and crop establishment, water management, integrated nutrient management, integrated pest management and harvesting.

Cuu Long Delta Rice Research Institute (CLRRI) – Vietnam

[HTTP://CLRRI.ORG/ENGLISH/](http://clrri.org/english/)

CLRRI is a research entity of the Vietnamese Ministry of Agricultural and Rural Development. The Institute's main function is to carry out research on rice and implement research programs in collaboration with local and international organizations. Its main research themes focus on genetics and plant breeding, plant protection, entomology, soil science, microbiology, water management, post-harvest technology, and agricultural economics.

Central Rice Research Institute (CRRI) – India

[HTTP://CRRI.NIC.IN/](http://crri.nic.in/)

CRRI is the research body of the Indian Council of Agricultural Research focused on rice research. The Institute has two research centres; one centre is focused on rain fed uplands and the other centre is focused on flood prone rain fed lowlands. CRRI's goal is to improve the income and quality of life of rice farmers in India. CRRI has divisions in crop improvement; crop production; crop protection; biochemistry, plant physiology and environmental sciences; and social sciences.

Interregional Research Programme on Methane Emissions from Rice Fields, Macaulay Land Use Research Institute – UK

[HTTP://WWW.MACAULAY.AC.UK/](http://www.macaulay.ac.uk/)

The Macaulay Land Use Research Institute is an international centre for research on the environmental and social consequences of rural land use. The Institute has recently partnered with IRRI to study methane emissions estimates from rice fields and evaluate ways of reducing those emissions.

National Institute for Agro-Environmental Sciences (NIAES) – Japan

[HTTP://WWW.NIAES.AFFRC.GO.JP/INDEX_E.HTML](http://www.niaes.affrc.go.jp/index_e.html)

NIAES is an independent research institution based in Japan. The Institute's aim is to carry out research pertaining agricultural production for the conservation and improvement of the environment. NIAES has several research projects of interest to rice researchers. The project on Biodiversity in Paddy Fields is directed toward proposing agricultural activities that contribute to the conservation and management of biodiversity. The project on Mitigation of Greenhouse Gas Emissions aims to measure actual emissions of methane from rice paddies and verify the effectiveness of various greenhouse gas reduction technologies.

International Rice Research Institute (IRRI)

[HTTP://WWW.IRRI.ORG](http://www.irri.org)

IRRI is a CGIAR centre focused on rice research and education. The Institute strives to reduce poverty through improved and diversified rice systems; to ensure that rice production is sustainable and can handle climate change; and to improve the nutrition and health of poor rice consumers and farmers. Research conducted by and coordinated by IRRI covers a breath of rice research areas from breeding and genetics through post-harvest.

LATIN-AMERICA

DEVELOPED COUNTRIES

Danish Institute for International Studies (DIIS)

[HTTP://WWW.DIIS.DK/SW152.ASP](http://www.diis.dk/sw152.asp)

DIIS is an independent research institution engaged in research and dissemination in international affairs. The Institute is involved in a number of studies on agriculture. Among these, DIIS is working on the ICROFS partnership study, GLOBAL-ORG, which analyses the institutional conditions under which certified organic agriculture develops in the South.

University of Florida Center for Tropical Agriculture (UF-CTA) – USA

[HTTP://CTA.UFL.EDU/](http://cta.ufl.edu/)

UF-CTA's mission is to conduct research to improve the sustainability of agricultural productivity and natural resource management; to protect and restore natural ecosystems threatened by agricultural activities to prevent loss of biodiversity; and to improve the quality of life for people living in humid tropical and subtropical regions. Research at UF-CTA includes work on invasive species, the conservation of genetic resources and biodiversity, the effects of climate change, sustainability of tropical agriculture, food security and nutrition, and food technology and safety.

Faculty of Agricultural Sciences, University of Hohenheim - Germany

[HTTPS://AGRAR.UNI-HOHENHEIM.DE/1781.HTML?&L=1](https://agrar.uni-hohenheim.de/1781.html?&L=1)

The University of Hohenheim has a long tradition of research and teaching in agriculture and natural sciences. The Faculty of Agricultural Sciences has five research stations each with its own area of specialization. The Crop Production and Crop Protection Station focuses on systems and process engineering, efficiency and productivity, as well as plant and grassland production. The Plant Breeding Station focuses on certain grains, forage and energy crops. The Horticulture Station focuses on vegetable cropping, orchards, and ornamental plants. The Husbandry Station focuses on high-performance dairy production. The Animal Husbandry, Animal Breeding and Poultry Production Station focuses on production methods, animal welfare, and environmental impact.

University of California Small Farm Program – USA

[HTTP://WWW.SFC.UCAVIS.EDU](http://www.sfc.ucdavis.edu)

The Small Farm Program develops field and marketing research relevant to small- and moderate-scale farmers and then works to disseminate the information. It is not focused exclusively on organics, but conducts much work in the area. The Program has written several publications of interest to organic researchers, farmers and policy makers that are available on the website. These include research briefs

on developing agricultural tourism; a guide called *Post-harvest Handling of Organic Crops*; and a comprehensive seven-publication set on organic vegetable production.

International Society for Horticultural Science (ISHS)

[HTTP://WWW.ISHS.ORG/](http://www.ishs.org/)

The ISHS aims to promote horticultural research of all sorts. It has over 7000 Individual Members worldwide, a large number of Institutional Members and 50 Member States/Countries. ISHS functions as a major source of information on global horticultural research and encourages the development of international collaborations by bringing together scientific and technical professionals. The Society has a large number of Commissions, Sections and Working Groups, dedicated to all types of horticultural systems, products, and issues, including MAPs, underutilized plant genetic resources, landscaping and urban horticulture, post harvest handling, economics and management and irrigation. Most notably for ORCA, ISHS has a Commission on Sustainability through Integrated and Organic Horticulture.

Federal Research Centre for Cultivated Plants, Julius Kuehn-Institute (JKI) – Germany

[HTTP://WWW.JKI.BUND.DE/CLN_045/NN_1194990/EN/INSTITUTE/INSTITUTE_NODE.HTML_NNN=TRUE](http://www.jki.bund.de/CLN_045/NN_1194990/EN/INSTITUTE/INSTITUTE_NODE.HTML_NNN=TRUE)

JKI is both a federal authority and research body for the German Government. The Centre carries out a variety of research on cultivated plant systems and products at 15 different specialized institutes: Application Techniques for Plant Protection; Biological Control; Breeding Research on Agricultural Crops; Breeding Research on Horticultural and Fruit Crops; Crop and Soil Science; Ecological Chemistry, Analysis and Stored Products Protection; Epidemiology and Pathogen Diagnostics; Bio-safety of Genetically Modified Plants; Grapevine Breeding; National and International Plant Health; Plant Protection in Field Crops and Grassland; Plant Protection in Fruit Crops and Viticulture; Plant Protection in Horticulture and Forests; Resistance Research and Stress Tolerance; and Strategies and Technology Assessment in Plant Protection. Of particular interest, the Institute for Biological Control performs research on the use of natural antagonists to control arthropod pests and diseases and has produced a number of publications on the use of biological control in organic agriculture.

Cooperative Research Centre for Sustainable Rice Production (Rice CRC) – Australia

[HTTP://WWW.RICECRC.ORG](http://www.ricecrc.org)

Rice CRC was a research centre supported by the Australian Government and partnered with several universities and growers groups. It was formed to address specific issues regarding the long-term future of the rice industry in Australia. The Centre was divided into five programs: sustainability of natural resources, sustainable production systems, genetic improvement for sustainable production, product control, and education and technology transfer. Although Rice CRC completed in 2005, the website still contains research literature including published reports, presentations, and posters.

Group of Plant Nutrition, Institute of Plant Sciences, Eidgenössische Technische Hochschule (ETH) - Switzerland

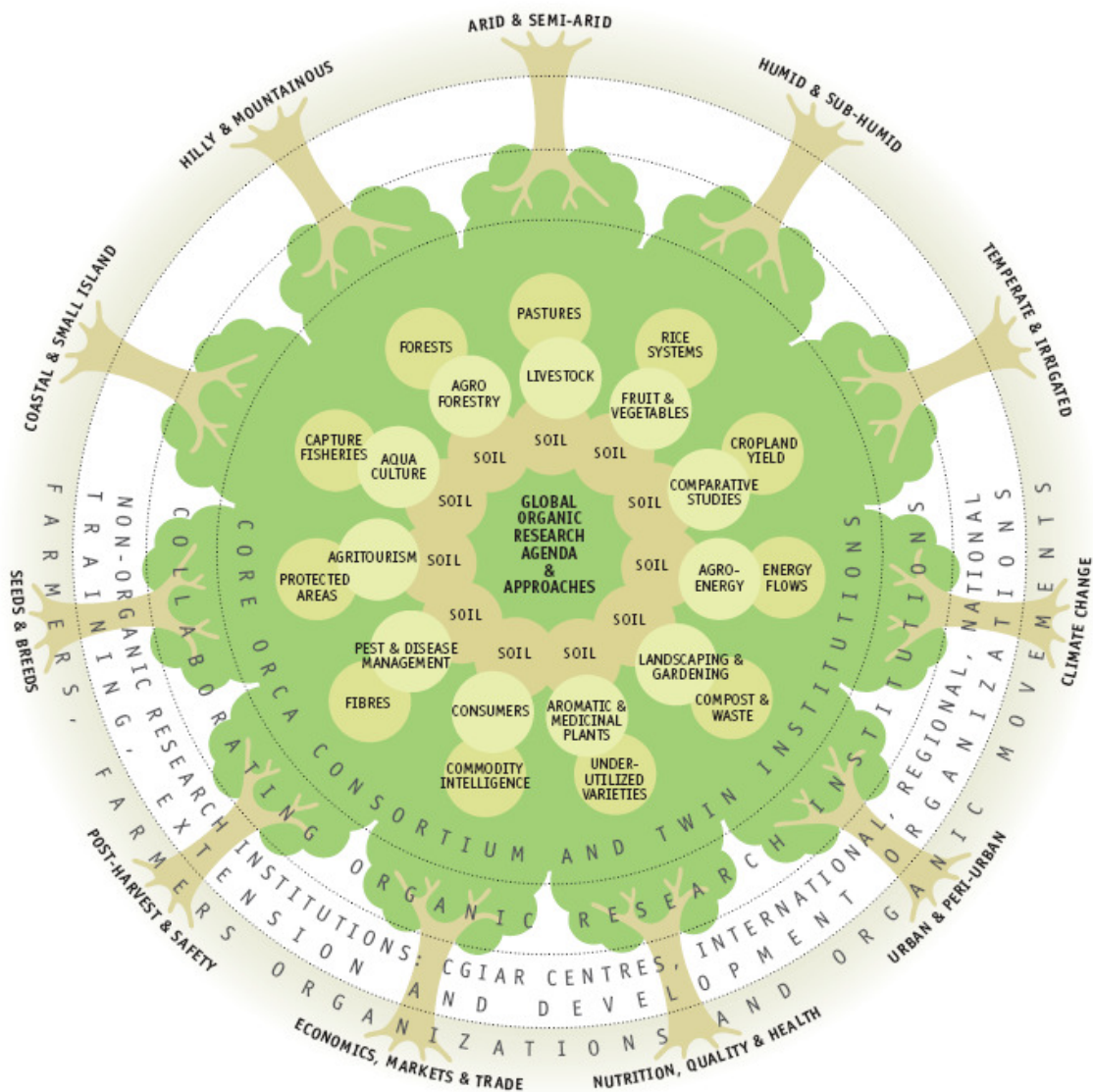
[HTTP://WWW.PE.IPW.AGRL.ETHZ.CH/](http://www.pe.ipw.agrl.ethz.ch/)

The Group of Plant Nutrition of the ETH Zurich has a long record on research projects using cropping systems such as organic farming; legume based low input and/or minimum tillage systems as model to improve our understanding on phosphorus (P) and nitrogen (N) cycling in the soil plant system. Our aim is to improve the understanding of a-biotic and biotic processes involved in soil nutrient dynamics in temperate and tropical zones so as to contribute to sustainable nutrient use. Particularly, the group has the expertise to study biological functions in soil systems involved in phosphorus (P) and nitrogen (N) cycling such as: microbial functions in P and N dynamics, including symbiotic nitrogen fixation, the functional diversity of arbuscular mycorrhiza and overall P and N (re-)cycling in agro-ecosystems using isotope techniques. We also characterize available and total nutrient stocks in the soil to prevent their depletion, and follow the fate of added nutrients in the soil-plant systems to minimize adverse effects on the environment.

Annex 7: The ORCA System

The ORCA system will ultimately comprise eleven centres that undertake holistic research according to their Focus areas (i.e. agro-ecosystem type or specialty subject), as well as being the excellence centres of the ORCA system on two key topics. As described below, soil research is fundamental to all centres. The development of the ORCA global agenda and research approaches will emerge from the collective efforts of all centres. The system-wide work, including tackling of new issues, will be coordinated and orchestrated by the ORCA Secretariat. The graphic below depicts a vision of what ORCA could ideally be in 2025.

VISION OF ORCA IN 2025



DESCRIPTION OF THE 11 ORCA CENTRES

Centre for Humid and Sub-Humid Agro-ecosystems (HUSHA)

The core work of this Centre is to conduct research relevant to farming systems based in humid and sub-humid areas dominated by flooded cropping systems or tropical forest systems. These areas are often characterized by poor and acidic soils due to abundant rainfall and fast decomposition/high mineralization rates of biomass and organic matter – the latter being the most important reservoir for nutrients. Pest and disease pressure is usually high because of year-round favourable temperatures and high relative humidity. Agricultural inputs are generally available, but not always affordable for small farmers living in these areas. Conversion to organic agriculture in humid and sub-humid areas implies less intensive and more integrated production, using resistant and often local cultivars that are often lower yielding. Increased crop rotations and diversification, agro-forestry and the integration of livestock, aquaculture and bee-keeping typical of organic production provide opportunities to diversify the system and increase the security and stability of income and total farm output. The major challenges in converting to organic agriculture in this agro-ecosystem are pest and disease pressure. The proposed Key Topics are: Rice Systems & Fruits and Vegetables.

Centre on Coastal and Small Island Agro-ecosystems

The core work of this Centre is to conduct research relevant to food production in coastal and small island agro-ecosystems. Such systems are found at the interface between land and sea, including marine, estuary and coastal wetland areas and large inland lakes. Highly productive agricultural areas are located in river deltas and coastal plains. Coastal areas frequently contain critical terrestrial and aquatic habitats and support rich biological diversity. Examples of such habitats are estuarine areas, coral reefs, coastal mangrove forests and other wetlands, tidal flats and sea grass beds, which also provide essential nursery and feeding areas for many coastal and oceanic aquatic species. Countries known collectively as Small Island Developing States (SIDS) have in common their smallness and insularity which often also indicates their vulnerability. These small island and low-lying coastal countries are subject to structural vulnerability that affects their productivity, development and cooperation policies. Organic agriculture is a strategy to improve the resilience of food production in highly pressured ecosystems. The major challenges of converting to organic production in these regions include vulnerability to contamination from shared watershed, sea-level rise and salinization of soils and improving performance of lesser-known but traditionally produced crops. The proposed Key Topics are: Capture Fisheries & Aquaculture.

Centre on Hilly and Mountainous Agro-ecosystems

The core work of this Centre is to conduct research relevant to hilly and mountainous areas often characterized by extreme weather conditions, inaccessibility, poor quality and steep soils subject to erosion, low population density, poor infrastructure and lack of training facilities. Technology transfer is particularly problematic due to lack of roads and transportation infrastructure between villages. Access to agricultural inputs is difficult because of challenging topography and poor roads. Such areas also have favourable conditions such as pristine environments with low incidence of pests and diseases. Organic management is often by default, non-certified, and based mainly on inputs available on the farm. The major challenges of converting farms to organic agriculture in this agro-ecosystem are the costs of extension services, the need for improved household food security, and the distance from farms to the market. Research relevant to farming systems based in hilly and mountainous agro-ecosystems is occurring all over the world. Few research institutions are currently dedicated solely to the study of organic agriculture in these ecosystems, but scientists in many countries are conducting research with applicability to organic hill and mountain farmers. The proposed Key Topics are: Forests & Agroforestry.

Centre on Arid and Semi-Arid Agro-ecosystems

The core work of this Centre is to conduct research relevant to farming systems based in arid and semi-arid areas. Eighty percent of the world's poor live in areas characterized as rainfed, livestock-oriented, and largely subsistence based. Intensification of agriculture and livestock production often pushes beyond the capacity of the ecosystem, resulting in overgrazing and severe environmental degradation such as soil compaction, erosion, and desertification. As climate change progresses, more areas could become arid and semi-arid and current areas could become further degraded. Since livestock is a vital and integral part of the production system, well managed pastures and adequate stocking rates are necessary to optimize the feed production potential of the ecosystem. Agricultural inputs in these ecosystems are often too expensive for small holder farmers and also difficult to purchase. Moreover, lack of knowledge often results in incorrect application methodologies by small farmers. Organic farming methods, which are more resilient to drought conditions, could be the solution against poverty and hunger, reducing overgrazing and improving soil fertility. The main challenge of converting to organic agriculture in this agro-ecosystem is dealing with the scarcity and the disrupted dynamics of biomass decomposition during the long dry season(s) which result in a very slow build-up of soil organic matter. Research on best practices for animal husbandry to raise livestock with high productivity within an arid and semi-arid organic system is another need. The proposed Key Topics are: Pastures & Livestock.

Centre on Temperate and Irrigated Agro-ecosystems

The core work of this Centre is to conduct research relevant to farming systems in temperate and irrigated areas that are generally characterized by favourable soils, high levels of mechanization and functioning markets for farm supplies. In these areas, high external inputs make it possible to obtain high production levels but productivity may be pushed beyond the actual ecosystem capacity. Soils receive high levels of synthetically produced fertilizers and crop genetic resources are often hybrids designed to perform well under ideal conditions (such as receiving regular and abundant water and nutrients) and with high levels of pesticides and herbicides. Organic agriculture meets consumers demand for food free of pesticide residues and meets stringent environmental regulations that exist in certain areas. The major challenges in converting farms to organic agriculture in this agro-ecosystem are maintaining the financial health of farms during organic transition and full rotations, labour demand, and raising yields to be comparable to conventional systems. The proposed Key Topics are: Comparative Studies & Cropland Yield.

Centre on Climate Change

The core work of this Centre is to research the impacts of climate change on organic systems and the potential for organic agriculture to mitigate and adapt to climate change. This will include conducting global assessments and developing appropriate methodological tools to assess carbon sequestration levels in organic production. The impacts of increasing global surface temperature, and both the amount and distribution of precipitation are expected to disproportionately impact people in developing countries. There is ample evidence that organic systems are more resilient to abiotic stresses associated with these changes and have lesser contributions to overall greenhouse gas emissions than systems that rely heavily on purchased, synthetic inputs. As the climate changes, diversified organic farms will be more likely than conventional farms to go through natural stages of succession and adaptation and avoid agro-ecosystem collapse. In addition, organic soil management is particularly attractive as a climate change mitigation strategy as it focuses on increasing soil organic matter, which in turn, increases the carbon sequestered in the soil. This Centre can conduct important research on this sequestration potential as well as on other key topics that impact climate change such as the timing and management of manure and use of nitrogen fixing crops.

The proposed Key Topics are: Agro-Energy & Energy Flows.

Centre on Seeds and Breeds

The core work of this Centre will be production and improvement of plant and animal genetic resources appropriate for organic systems. Currently, many organic farms rely on crop and livestock varieties that have been developed for agrochemical intensive systems. Organic growers and livestock producers require breeding programmes that produce crops and livestock that meet the conditions and

challenges of organic farming systems. Breeding crops and livestock under conventional management for use in organic systems fail to meet these needs. Organic crop breeding programmes should focus on optimizing yields while considering such factors as insect and disease resistance, weed competition, and environmental conditions while under low-input conditions. Organic livestock breeding should focus on selecting healthy, adaptable animals that perform well on pasture and that have disease and parasite resistance. Research in the future should be focused on developing crop varieties and livestock breeds that are compatible and complementary in mixed crop-livestock systems.

The proposed Key Topics are: Protected Areas & Agritourism.

Centre on Post Harvest and Safety

The core work of this Centre concerns organic processing, transportation, storage, spoilage and waste, and safety of organic products after harvest. Microbial ecology related to organic practices will be undertaken as will the identification and development of appropriate processing materials and inputs. Post-harvest storage and preservation of products and pest and disease control within those systems will be investigated. Major routes for adventitious presence of contaminants in organic foods will be explored and tools to detect the presence, identify the source, and prevent contamination will be developed. Quantitative and qualitative risk assessments for the safety of organically produced foods will be undertaken and models and decision tools for precautionary decision-making will be developed.

The proposed Key Topics are: Pest and Disease Management & Fibres.

Centre on Economics, Markets and Trade

The core work of this Centre will be economic and policy analysis. The Centre will measure, forecast, and explain indicators of economic performance, determine costs of production, and assess the financial health of organic farmers and processors. Research on the socio-economic impact of organic production will be undertaken, including its effect on livelihoods of smallholder farmers. Structural characteristics of farms and markets will be evaluated to determine factors underlying the sector's efficiency, returns, and competitiveness. Analysis of the linkages between agricultural and environmental policies and environmental quality will be explored. Trade of organic products will be tracked and international trade agreements will be analyzed for impact on the organic sector. In addition, the distribution of benefits of organic agriculture will be evaluated, with particular concern for price premiums that can make organic inaccessible to many consumers.

The proposed Key Topics are: Commodity Intelligence & Consumers.

Centre on Nutrition, Quality and Health

The core work of this Centre is to conduct research that will generate knowledge on the health and other benefits of organic production and organic foods. Recently several significant studies have been published that seek to identify food quality differences between organically and non-organically produced food, focused primarily on nutrient density, antioxidant capacity, and pesticide residues. The application of this rapidly emerging research to nutritional diversity and its role in the context of food security around the globe will be an important consideration of the Centre. This Centre will also address the cumulative health and quality factors of organic systems production, including calculating the secondary health impact from water and air. The Centre will conduct animal food studies and epidemiological research; gauge the impact of consumption of organic foods and develop parameters and methods to differentiate between organic and non-organic foods.

The proposed Key Topics are: Aromatics and Medicinal Plants & Underutilized Varieties.

Centre on Urban and Peri-Urban Systems

The core work of this Centre is to conduct research relevant to farming systems located in urban and peri-urban settings. Urban and peri-urban agriculture is growing, with more than half of the world's population living in urban areas in 2007 and two-thirds of the world's population projected to be living in urban areas in 2005. Agricultural production in these settings is necessary because as pressure for natural resources increases, more efficient uses of land, such as food production, will be essential. Organic production is desirable because it is relatively environmentally-friendly while fitting the needs

of agriculture practiced in close proximity to human settlement. Urban agriculture is characterized by high competition for land, limited space, closeness to markets, and a high degree of product specialization. Such farming systems include, among other things, commercial farms, community gardens, backyard gardens, balconies, decks and rooftops, school gardens, publicly owned land, roadside land, riverbanks, vacant plots, roadway land, and ponds. Use of yard and food waste, grey water for irrigation, and livestock, particularly poultry and egg production is common. There are also many opportunities in urban agriculture to reduce food wastage along the supply chain, from processing to consumption, due to the more contained setting in which production occurs (e.g. community gardens).

The proposed Key Topics are: Landscaping and Gardening & Compost and Waste.

DESCRIPTION OF THE 22 KEY TOPICS OF THE ORCA CENTRES

Agro-tourism

Agro-tourism refers to people visiting working farms or other agricultural operations for the purpose of enjoyment, education, or other active involvement. Agro-tourism encompasses a wide variety of activities and provides a means for farmers to diversify and supplement their income. Such activities may include wildlife study, horseback riding, cannery tours, cooking classes, wine tasting, harvest festivals, barn dances, farm stays, guided tours, and petting zoos. While many visitors will engage in agro-tourism for short periods of time, such as an afternoon of berry picking, others remain for days and, in some cases, work on the farm. Diversifying income is an important risk management strategy and organic farmers want to learn more about successful agro-tourism ventures. They also need better understanding of risks and potential liabilities of having visitors on the farm.

Currently, research in agro-tourism is virtually non-existent. Most agro-tourism organizations focus on promoting and encouraging tourism rather than research. Bioecological Agro-tourism, a programme of the Italian Association for Organic Agriculture (AIAB) is the most well developed entity focusing on organic agro-tourism.

Agro-energy

The development of agro-energy in recent years has been one of rapid growth in Europe, Asia, and the Americas. However, it may be at the price of unsustainable plantations for bioethanol and biodiesel. Rather than using non-food agricultural products, first generation biofuels are made from crops that otherwise could be used as animal feed or human food. With the growing global population, new methods of obtaining agro-energy that do not cause food shortages and resource degradation must be developed. The second generation of agrofuels will feed on agricultural residues and forest biomass and may have fewer trade-offs. While organic agriculture reduces the need for energy compared with conventional agriculture, energy is still needed for many purposes such as operating machinery and irrigation. Farmers would like to balance their energy production and consumption, and organic agro-energy may allow for a more positive balance since there are few alternatives for fuel besides biofuel. Beyond capturing the environmental savings from use of waste materials and natural resources to generate energy on farms, agro-energy can provide critical access to energy, heat, and cooking fuel for smallholder farmers while providing an income through organic agrofuel production and classic bioenergy (e.g. biogas, gas produced by the anaerobic breakdown of organic matter). The potential of agro-energy within the context of organic systems remains a topic ripe for research and development should opportunities be maximized without risking conflicting use of agricultural biomass (e.g. food, feed, energy, soil amendment). Producers interested in agro-energy are interested in the most energy positive sources of biomass, efficient methods of biogas conversion, and environmental change and stress.

Currently, there has been a lot of interest in researching agro-energy sources; however, much of it is conventional. Organic research in the topic focuses on methods of obtaining large yields of biomass from crops. The main organic research institute involved is the University of Kassel.

Agroforestry

Agroforestry defines land-use systems and practices that integrate woody perennials with other crops and/or animals. The integration of agroforestry in organic production is uncommon, creating a significant opportunity for research to assist farmers in this underdeveloped strategy. Although use of alley cropping and mixed perennial cropping is increasing in the organic sector, farmers are anxious to understand more about the use of trees, hedges and shrubs as a way to improve soil physical properties, maintain soil organic matter, protect crops and livestock from flying insects and other predators and promote nutrient-cycling. In areas where land-use practices have led to serious degradation, farmers are seeking to make better use of trees in their efforts to reclaim land. Of particular interest is the need to develop the use of and best practices for agroforestry alongside organic agriculture as a strategy to sequester carbon and to complement the existing suite of mitigation approaches for global climate change. This is highly relevant to sustainable development as agroforestry can also be used to improve livelihoods through intercropping and crop diversification as well as potentially enable access to other income generating avenues such as carbon markets.

Few research institutions are currently engaged in organic agroforestry research. However, non-organic institutions and organizations are engaged in work that will be vital to developing research capacity in organic agroforestry. For example, although not organic institutions, the World Agroforestry Centre maintains extensive libraries of books and journal articles on agroforestry and the International Union of Forestry Research Organisations (IUFRO) is a strong resource for identifying materials and scientific work in the field.

Aquaculture

Aquaculture is the fastest growing method of food production. Although aquatic products are among the most widely traded foods, organic aquaculture has lagged behind the agricultural sector in terms of the quantities and diversity of certified organic products. This is due, in part, because standards for organic fish, crustaceans, and aquaculture production have only recently been established in a limited number of countries. Organic aquaculture producers are seeking knowledge related to nutritional aspects of fish production, including the replacement of fish meal and oil with potential substitutes of plant origin, use of synthetic amino acids and natural antioxidants; construction materials for holding facilities, stocking densities, processing (particularly avoiding microbiological hazards in smoked vacuum packed fish) oxygenation, and management for water quality. Other more broad research topics include allowable feed sources in organic aquaculture, supply chain issues with organic fish sales, and infrastructure for processing fish as organic.

Much of the work in organic aquaculture has been in certification rather than research. Therefore, a research void exists in this area. The main organic research work is being done by ICROFS in their ORAQUA project that focuses on feed.

Aromatics and Medicinals

Medicinal, aromatic and dye plants (MADPs) can be either cultivated or harvested in the wild under the Organic Standards. These plants have uses ranging from edible herbs and spices to medical and cosmetic applications, as well as uses such as botanical grain protectants. The emergence of the organic cosmetic sector, coupled with the revival of traditional and alternative medicines (US\$30 billion annually in the USA alone), has created an enormous demand for plants free of chemical residues, whether cultivated or harvested in the wild. Many of the 700 species commercially used by the herbal industries are harvested under pressure for other uses and are frequently exploited without any particular management strategy. As a result, many species are overexploited and are diminishing if not disappearing. Management methods for these areas and increased cultivation and domestication of some of the species are needed to assure future required supplies of those species. The sustained availability of aromatic and medicinal plants is of high significance to the millions of households and health practitioners, especially in developing nations. However, very few plant species have been sufficiently tested in the laboratory to indicate their usefulness for wider use.

Nonetheless, the research and development sector for MADPs is rapidly expanding around the world. Organizations which focus on phytotherapy, pharmacology, and the aroma and spice trades are particularly active. Located in Bhutan, the Institute of Traditional Medicine Services is a leading institution for research on organic MADPs and a potential resource to organic researchers.

Capture Fisheries

Fish are a significant source of animal protein among the worlds' poor. Beyond its nutritional importance, at least 200 million people derive direct and indirect income from fish. As such, capture fisheries (i.e. fish caught in the wild) are becoming an increasingly important component of the organic food market. Standards for organic capture fisheries still do not exist and there are no signs that they will be developed in the near future. However, the Marine Stewardship Council has established an ecolabel for fish caught in the wild. Research topics range from supply chain issues with organic fish sales and infrastructure for processing fish as organic to a better understanding of consumer demand in buying an organic product that has been source from a wild fishery.

Very little research has been conducted on organic capture fisheries, perhaps resulting from the lack of an international standard for the product. As a result, a sizeable gap still exists in organic fisheries research.

Commodity Intelligence

Farmers seek price and sales information to assist in the orderly marketing and distribution of farm commodities. Information is needed on prices, volume, quality, condition, and other market data on farm products in specific domestic and international markets. To constantly improve the efficiency and fairness of the organic market, it is imperative that this information is available to all stakeholders in the supply system.

While many institutions are engaged in research on the marketing and trade of organic products, very few are doing work on commodity intelligence, especially in the developing world. Thus far, the most robust research in this area has been carried out by researchers at Aberystwyth University in Wales, where studies have been conducted on organic marketing initiatives with the aim of improving the strategic marketing position of organic products.

Comparative Studies

Long-term comparison trials are necessary to evaluate the benefits of organic agricultural systems. Conversion to organic agriculture can be time-intensive and costly in terms of certification. Before beginning the process, farmers want to be sure of the long-term advantages. They want to understand how organic systems compare with regard to nutrients, energy and in terms of capital and labour requirements. It is expected that the longer land is under organic management, the better crops will perform, due to enhanced nutrient cycling, improved soil quality, and systematic resistance to pests. Long-term studies are needed to document changes that occur over time in maturing organic systems and identify those factors that are most significant over time in maximizing organic productivity.

The current research in comparison trials focus on cropped based systems. Comparison trials on organic versus conventional livestock systems have not been started. Several civil society organizations have undertaken long-term trials on crops. The USA-based Rodale Institute's long-term trials are in their third decade of comparing organic and conventional production. Recently, FiBL and its partners began developing sites for long-term comparison trials in Kenya, India, and Bolivia. FiBL, along with Agroscope, also maintains another long-term comparison project called BOK.

Compost and Waste

Compost, vermin-composting, and compost teas are widely used by organic farmers. Composting helps restore soil fertility and raise crop yields particularly for farmers in degraded areas, contributes to soil conservation, and can be used for control and rehabilitation of gullies created by erosion. Some urban centres have begun compost programmes as an environmentally sound way to reduce consumer waste. Organic farmers seek better information on potential pathogens in compost, the impact of

turning compost piles, the carbon and nitrogen dynamics within compost piles, and safe methods for making compost teas. Alternative uses (e.g. energy generation) for organic waste materials are an area in need of further research on appropriate technologies, costs and environmental impacts.

There currently are no research institutes or programs specifically dedicated to researching compost and waste and very little research on organic compost and waste. The Organic Farming Systems and Nutrient Management Program at Washington State University are conducting most of the research on organic compost and waste.

Consumers

Knowledge of consumer behaviour including purchasing practices and perceptions of organic goods ranging from commodities to branded food and fibre products is needed within the context of developing countries and the global market. Curiously enough, the financial crisis has not led to a decrease in global retail of organic products. The full potential for organic in the marketplace will not be realized without understanding the interest in demand (e.g. willingness to pay and market studies) and barriers (e.g. challenges in sourcing organic foods locally) to supplying consumers with organic food. In addition it is important to understand how consumers perceive quality attributes of organic foods such as nutritional value, food safety and its adherence to standards that align with their expectations.

At this time, many different institutions are conducting research on organic consumers. In April 2009, the EU-coordinated QualityLowInputFood (QLIF) integrated project held their final congress. For the past several years, QLIF has provided a platform upon which to expand research in this area, particularly in the developing country context where studies are limited.

Cropland Yield

Research is needed to determine the suitability of organic production for various regions of the world particularly with regard to the impact of organic systems on yield and yield security during years of extreme climatic conditions. All agricultural production systems, organic included, must devise strategies to enhance yields to meet increased demand for food. Organic farmers want to understand how to optimize yields in highly diverse, mixed crop and livestock systems. They need information on high-yielding varieties suitable for organic systems. Assessments that better calculate yields in systems with multi-year long-term rotations and that are calibrated to food security needs rather than marketing orders and other artificial dictates of food aesthetics must be undertaken. Farmers are seeking information about rotation strategies that best boost yields.

Unlike conventional agriculture, research on organic agriculture does not mainly focus on yields. Most of the current research is studying the impacts of high-yield systems on the environment and community. The Institute of Organic Farming within the German Federal Research Institute for Rural Areas, Forestry and Fisheries (vTI) is the main research body focusing on improving organic crop production in respect to high yields.

Energy Flows

Conversion to organic production reduces farmers' dependence on energy and off-farm inputs and can increase efficiency of energy use. Proper use of manure, green manures, crop rotation and weeding strategies are critical in organic systems and can provide an energy savings by removing the manufacturing, packaging, and shipping costs associated with synthetic pesticides and nitrogen fertilizers. Organic farming also improves soil organic matter by enhancing fertility through increased nitrogen in the soil and reducing water (and energy) demand by increasing storage of rainfall. Forage production also requires less energy than grain production; for example, production of beef protein on good organic pasture has been found to require half as much energy as grain-fed beef. Research to document these energy savings and flows throughout organic systems will help farmers and policy-makers understand the cost savings associated with organic agriculture, both economically and environmentally. Improving efficiency of moving food from farm to fork can also have trickle down effects such as facilitating local access to foods.

Organic research into energy flows is just beginning. There is a gap in research determining the energy savings of organic agriculture. ICROFS is conducting the Global Org project in collaboration with Aarhus University. This is currently the main project studying organic energy flows.

Fibres

The organic fibre market is growing rapidly; between 2005 and 2008, organic cotton showed an average annual growth rate of 185%. Organic cotton now represents 0.48% of the world's harvested area. Combined, India, Syria and Turkey account for more than 86% of the total production of organic cotton. Other countries with significant organic cotton production include the US, Peru, Uganda, Tanzania, Egypt, Senegal, Israel, Greece, Benin and Brazil. Producing and processing cotton without the use of toxic materials is difficult. Organic farmers are seeking information on pre-plant flaming strategies, beneficial habitat planting, strip and trap planting, field borders, cultivars that mature early, insecticidal soaps, and all aspects of fibre processing and acceptable materials.

At this time, there are no research institutions dedicated in their entirety to studying organic fibres and textiles. However, several organic non-research partners have done considerable work in the area and could offer valuable expertise to organic researchers. These potential sources of expertise include the Cotton Development Organization in Uganda and Organic Exchange.

Forestry

Forestry can be a stand-alone occupation for timber production or be done in conjunction with other income generating activities (e.g. alongside agriculture). Organic forestry, a system that functions without the inputs of synthetic pesticides and fertilizers, has tremendous potential to redefine best-practice in forestry. In the Australian state Tasmania, approximately 1% of the state forest is harvested and regenerated annually without use of chemicals through an organic forestry program. The timber from such programs is often marketed as 'eco-friendly' to consumers and sold at a premium (though consumer demand remains limited). Carbon benefits can also be captured, providing additional income and environmental benefits. It is clear that there is great potential for research on alternatives to chemicals used in traditional silviculture, use of indigenous trees and use of forestry as a tool for climate change mitigation. Non-timber forest products (NTFPs) collected in forests also serve as a major source of nutrition and income in many parts of the world. However, organic forestry is relatively undeveloped and there is no IFOAM Organic Forestry Standard. Only two certifiers have developed their own Organic Forestry Standards: Debio (Norway) and Naturland (Germany). In the absence of an IFOAM standard, sustainable certification schemes are often pursued by environmentally conscious stakeholders. The Forest Stewardship Council is the international leader for sustainable forestry.

At this time there are no forestry research institutions dedicated in their entirety to this field of organics. This research void has likely persisted due to the absence of an IFOAM Organic Forestry Standard. There are in fact, however, several networks, institutions and organizations that dedicate some portion of their resources to the study of forestry that does not rely on chemical inputs. These relevant non-organic institutions include CIFOR and Forestry Tasmania.

Fruit and Vegetables

In 2007, 178 000 ha of vegetables were grown organically around the world. In sub-Saharan Africa, organic vegetables are grown in Kenya, Uganda, Madagascar, Malawi, South Africa and Zambia, although this production is almost entirely for export. While much research on organic production of fruit and vegetables is taking place, it encompasses only a handful of crops and is mostly being undertaken in developed countries in temperate and subtropical climates. Organic farmers are seeking information on how to organically manage pests and pathogens. They are asking for expanded information on the potential of botanical pesticides for crop protection, production techniques for low soil fertility conditions, and identification of indigenous varieties that perform well under organic management. There is also a need to understand how to reduce the risks of fruit and vegetable post-harvest losses (which can be as high as 40-60% of yields) due to pest damage and spoilage.

Research on organic vegetable production is conducted at numerous universities and research institutions around the world, but this information has yet to be collated. The World Vegetable Centre (AVRDC) has undertaken organic vegetable research related to plant compounds and yields, which could be of use to organic researchers. In addition, civil society organisations, such as Garden Organic, which seeks to improve techniques in organic horticulture in developing countries, have valuable expertise on the production of organic fruit and vegetables.

Landscaping and Gardening

Ornamental and turf agribusinesses, nurseries, cut flower operations, and other landscaping enterprises create systems that are highly dependent on synthetic inputs and often use unsustainable quantities of water. Ecological management of landscapes through organic agriculture is a nascent, but critical pursuit. Organic farmers and residents seeking to beautify their properties need better information on how to create landscapes that are diverse, durable, drought-tolerant, and aesthetically pleasing. Additionally, technical support is needed to allow for the expansion and revision of organic standards in this area. In Canada, efforts are underway to encourage residents to undertake edible landscaping – the incorporation of edible species throughout the landscape. Edible species include a wide diversity of perennial and annual plants. Urban yards use vertical spaces and multi-layered approaches which, on a per-square-foot basis, may provide more food, wildlife habitat and aesthetic interest than typical annual vegetable gardens. People want to learn more about the use of edible landscaping to assist those who are food insecure and to apply them in various settings such as school yards, businesses, apartment complexes, and public spaces.

Research into agricultural landscaping is highly limited and very diverse. The few institutions that are currently undertaking research projects on organic landscaping generally have other dominant research foci. Much room remains for the expansion of research in this concentration area.

Livestock

More than 50% of the world's poor own livestock and depend on them for food, income, traction, and fertilizer. Across the world, organic livestock (our use of this term includes poultry) systems are far less developed than those for crops. In many aspects, standards are, unfortunately, open to many interpretations and not easily enforceable. For example, the EU Regulation requires that animals be given 'regular exercise' and that 'appropriate breeds' be used, yet there is no clear definition of either of these dictates. However, high priorities for organic livestock are clear. Due to organic prohibitions on certain veterinary drugs, health care protocols must be developed for each species, including research on alternative and complementary methods of disease prevention, effective non-chemical parasiticides, and preventive health care practices. Development of rations and feeding strategies to reduce the incidence of harmful pathogens and breeding programmes for organic animals are needed. Improvements in animal housing, husbandry and better understanding of mixed crop and livestock systems are also important. Especially key in arid and semi-arid areas is the development of feeding strategies that provide adequate nutrition and high livestock productivity given the environmental constraints.

Most of the research on organic livestock is occurring in temperate areas. Though arid areas are largely dependent on livestock, little research is being done on organically raised livestock. The University of Reading's Veterinary Epidemiology and Economics Research Unit (VEERU) is the main institution involved in this work.

Pastures

Approximately two-thirds of organically managed land, roughly 20 million ha, was pasture in 2007. Requirements for animals to be pasture-raised are increasing in organic regulations in developed countries. Furthermore, demands on pasture quality are increasing. For example, the EU Regulation requires that pastures be suitable to natural nutritional and behavioural needs of particular species. These market drivers, along with a burgeoning market for grass-fed meat, has created great interest in the organic sector in pasture improvement strategies. Pastures may also have a large role in mitigating

climate change through carbon sequestration. While organic pastures are not typically mono-cultural and include varied species including legumes, organic farmers seek better information on the best plant species and varieties and animal combinations for various regions, and for reaching different soil layers to better absorb soil nutrients. Farmers want to know more about the potential role of early cultivation of pasture crops as an organic weed control strategy; complete protocols for organic pastured beef, hog, and poultry production systems; and biological controls for invasive and harmful weeds.

Most of the research in this area is occurring in temperate areas. For example, the Institute of Organic Farming and Farm Animal Biodiversity at the Agricultural Research and Education Centre (AREC), based in Austria, is one institution that studies grassland management. To date, little research is being done on organic pastures in arid areas, although these areas are largely dependent on livestock and pasture.

Pest and Disease Management

Organic agriculture requires farmers and processors to rely on preventive, cultural, and physical methods of pest and disease management rather than chemical inputs. Botanical pesticides are used but only when biological and cultural practices, such as crop rotations, crop diversification, and beneficial organism releases, fail. Additionally, questions remain on the phytotoxicity and compatibility when mixing these botanical pesticides. Organic farmers and processors continue to ask for development of organic pest management protocols, bioregion organic crop and pest management strategies, and models of weed population dynamics under different cover crop, tillage, and crop rotation management strategies. They seek better knowledge on pest life cycles and natural hosts, natural enemies, prey and predators, habitats that accommodate beneficial organisms, the potential of breeding for resistance, and the identification of critical periods for weed control.

Several universities and institutions in the north also have robust research in the area. Currently, far fewer institutions are conducting this research in developing countries, but efforts are beginning. For example, scientists in the African Organic Center of Excellence at Uganda Martyrs University and some of the CGIAR network institutions are now conducting research on organic pest and disease management.

Protected Areas

Protected areas cover about 10% of the earth. Since few toxic inputs are used in organic agriculture, introducing organic farms in protected areas is believed to be a viable strategy for sustainable conservation and food production as demand for resources increases. However, there is an acute need to find biodiversity-sensitive management strategies for protected areas. There are numerous ways of approaching the conservation of biodiversity and no simple relationship between biodiversity and benefits for the farm. Organic farmers are seeking replicable models of effective conservation and organic production. In particular, they seek strategies for habitat preservation for crop pollinators and for crop pest predators, promotion of *in situ* conservation of wild crop relatives and wild plants for food production, and approaches for farm layouts that can be used in concert with management practices to increase biodiversity. In addition, research also needs to be done on maintaining and increasing biodiversity in other forms of agriculture such as wetland use strategies, forestry preservation, protocols to monitor potential transmission of wildlife diseases to livestock, and recommendations on equitable and ecologically sustainable limits.

Currently, most organic research focuses on biodiversity in a specific area of agriculture such as livestock or comparative studies. Research gaps remain in better understanding the large-scale benefits and disadvantages of organic farms in protected areas, as well as maintaining biodiversity on a system-wide scale. The University of Guelph's Organic Agriculture Program is the main organic institution studying biodiversity conservation.

Rice Systems

Rice systems are one of the major types of farming systems in the world and rice is the most rapidly growing food source in sub-Saharan Africa. Organic rice systems are much less pesticide intensive than conventional rice systems. However, weed control and soil fertility remain major challenges in growing rice organically. Primary weed control practices include crop rotations (including lengthening typical rotations to include a fallow year), land levelling, seedbed preparation, water management, and rotary hoeing. Because of weed pressure and fallowing, yields tend to be smaller in organic production. Better information on fertilisation strategies from crop rotations, particularly from legumes such as purple vetch, and ways to optimize their use of locally-available nutrients such as rice straw, manure, guano and rock-phosphate is needed. Further research topics could include the potential for organic rice systems to emit less methane than conventional rice systems and rice-crop systems. Rice-fish systems have the potential for providing an extra source of food and income. Although these systems are fairly popular in Asia, they are still in the early stages of establishment in Africa.

Much of the current rice research is being done in Asian countries and a gap exists both in organic rice research and African rice research. Of the conventional research institutes, the International Rice Research Institute (IRRI), which recently published a primer on organic rice farming and has strong rice research connections in Africa, could be a major source of information for organic researchers.

Underutilized Varieties

Only 150 plant species are used and commercialized on a significant global scale despite the fact that an estimated 7000 species are important to people's livelihoods and have significant potential for commercialization. Many underutilized plant species provide important environmental services, as they are adapted to marginal soil and climate conditions. Organic underutilized varieties are both cultivated and collected in the wild.

A research gap in organic production and collection of underutilized varieties persists and presents substantial opportunity for future research. Bioversity International, which is engaged in research and promotion of underutilized crops and has done some research on organics, does not have a focus on organic production and collection but is nonetheless a valuable resource for information on underutilized varieties.