ANNOUNCEMENT

ELECTRONIC DISCUSSION FROM 17 NOVEMBER TO 15 DECEMBER 2008

ORGANIC RESEARCH CENTRES ALLIANCE (ORCA)

ORCA is a project proposal seeking to enhance organic agriculture knowledge. This will be done through international networking and strengthening a number of existing institutions to become collaborative centres of excellence in organic agriculture research. FAO puts forwards this proposal for public discussion before finalizing it and submitting it to donors for consideration. ORCA is a possibility: let's explore it together. The view of each of you will affect this project. Our common intent will be the driving force towards ORCA realization. Infiltrate the space with your ideas!

WHY?

Organic agriculture has been steadily growing for more than a decade and today like yesterday, the demand for organic products continues to be larger than supply. The new global context of increased climate variability, water scarcity, peak-oil and commodity-price volatility pose unprecedented challenges to agriculture which could be addressed by organic management and a re-localisation of food production and consumption. Organic agriculture offers many synergistic benefits for tackling the bio-physical ad socio-economic challenges for reducing hunger, rural poverty and inequality and conserving natural resources cultural diversity. However, a rapid expansion of organic management in the agriculture, forestry and fisheries sectors requires investments in the knowledge base all levels: from agro-ecology and landscape management to societal organization and market intelligence. Fundamental science and applied research are crucial requirements for the development of organic agriculture, especially in developing countries.

WHAT?

The proposed Organic Research Centres Alliance (ORCA) intends to internationally network and strengthen existing institutions with scientific credentials and empower them to become centres of excellence in transdisciplinary organic agriculture research. The objective is to ensure that environmental, economic, and social benefits accruing from organic research are shared worldwide. The ORCA concept is designed following a research paradigm that heavily draws on traditional knowledge, improves it with scientific investigation and shares it widely. Research centres may be physical laboratories or "institutions without walls", formed through alliances between producers and scientists, as well as twinning between developing and developed countries' institutions. The ORCA proposal is therefore put forward for public consultation and discussion through an electronic forum.

WHEN?

The electronic consultation will start on 17 November 2008 and terminates on 15 December 2008. Comments on the ORCA proposal can be at the level of the "big picture" all the way to those that detail proposed elements. Our intent is to refine the ORCA concept based on the comments received and distribute it, after the electronic consultation, to donors for consideration and hopefully, coordinated investment in organic research.

WHO?

The paper describing the ORCA concept has been developed jointly by the Food and Agriculture Organization of the United Nations (Italy), Tufts University (USA) and the Research Institute of Organic Agriculture (Switzerland). The electronic discussion on ORCA is targeted to scientists and individuals in civil society and private industry all over the world who are engaged in organic agriculture research and development. Developing countries' researchers interested in sustainable agriculture are especially encouraged to join the discussion.

HOW?

The electronic forum is expected to discuss a strategy for empowering the organic research enterprise with a concept in which most, if not all, people currently advocating organic research could envision themselves and their work within the scope of the ORCA organisation as a whole. Therefore, the ORCA concept is described as a fully functioning, multi-centre alliance covering multiple topics for which organic research needs exist in order to in order to spark discussion and elicit detailed feedback.

- For participating to the discussion, you are required to login and register your institution's details.
- The ORCA document is made available in English and Spanish.
- Although discussions can be held by discussants in English and Spanish, no translation will be made by the forum organizers of these exchanges.
- Weekly summaries will be provided by the forum moderators in English and Spanish.

OUTPUTS

- A Report of the electronic discussions will be made available in January 2009.
- The final ORCA project proposal, amended in light of the electronic discussions, will be made available thereafter.
- The registrations made for the discussion forum will be compiled in a directory of organic research institutes.
- The FAO website for organic agriculture will host a special entry on ORCA, including the above-mentioned documents, as well as information on ORCA implementation, which is expected to be incremental.

ELECTRONIC FORUM MODERATORS

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DRAFT PROJECT PROPOSAL

ORGANIC RESEARCH CENTRES ALLIANCE

(ORCA)

Rome, November 2008

REQUEST FOR COMMENTS

This draft working paper has been developed to facilitate discussion among scientists and individuals in civil society and private industry who are engaged in organic agriculture research, development, and production.

Please do not quote this document as it will be revised after the electronic consultation.

No pledges have yet been solicited or made to support the work described herein.

We welcome and appreciate your comments on this draft proposal.

Thank you for your time and energy,

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I. 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 emphasises 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." (FAO/WHO Codex Alimentarius Commission, 1999).

Therefore, organic agriculture is a system that relies on ecosystem management rather than external agricultural inputs. It is a system that begins to consider potential environmental and social impacts by eliminating the use of synthetic inputs, such as synthetic fertilizers and pesticides, veterinary drugs, genetically modified seeds and breeds, preservatives, additives and irradiation. These are replaced with site-specific management practices that maintain and increase long-term soil fertility and prevent pest and diseases (http://www.fao.org/organicag).

Organic agriculture systems and products may be certified, a verification process required in many developed countries. Those systems and products that are organically produced 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 do not use synthetic inputs are not organic by default as such systems lack the required soil building practices and degrade land.

In this paper, the concept and rationale for creating an alliance of organic research centres to advance organic agriculture globally is developed. Recognizing that resource-constrained countries must focus limited national resources on ensuring local adaptability of research findings and translating findings to farmers, the proposed alliance of research centres would enhance organic research for and in developing countries. A focus on poverty would cross cut and orient all research on global, eco-regional, and sectoral topics.

The ultimate goal of the proposed organic research system is ensuring that environmental, economic, and social benefits accruing from the organic sector are shared worldwide. To launch this system, an internationally devised, donor supported strategy is needed. The aim is to strengthen existing organic research centres that are poised to implement comprehensive research programmes and transform them into centres of excellence. Centres would exist in a larger network so that the breadth of research and analysis demanded by the organic sector would be achieved through a division of labour, with individual centres specializing in high priority research areas and sharing research results across the alliance.

1.1. Vibrancy of the organic sector

Production and sale of organically grown food and fibre continue to increase exponentially. The 2006 tally from138 countries reporting organic production data finds 30.4 million hectares under organic management, with an additional 33 mha under wild cultivation (FiBL, 2008). Global sales have increased $5 billion annually since 2000, with the 2006 market estimated at $38.6 billion (Organic Monitor, 2006).

Organic agriculture is practiced worldwide, with all continents reporting increases in production. Two-thirds of the agricultural land is in permanent grasslands and 1/3 is in cropland. Of this agricultural land, two-thirds is in the developed world. Organic wild cultivation, in contrast, if largely found in developing countries. For example, while Africa has only 400,000 ha of cropland under organic cropland, it has 8 million ha of organic wild cultivation.

Continent	Area under Organic management	Certified Organic Farms	Number of Countries With Organic Regulations
Africa	400,000 ha cropland; 8 million ha wild cultivation	175,266	3 countries, and 7 in process of drafting; East African Organic Products Standard
Asia	3.1 m ha cropland	130,000	11 countries, and 8 in process of drafting
Europe	7.4 m ha cropland	200,000	EU regulation
Latin America	4.9 million ha	223,277	15 countries, and 3 in process of drafting
North America	2.2 million ha	12,064	US has regulation and Canada in process of drafting
Oceania/Australia	12.4 million ha	7,594	Australia and New Zealand

Source: The World of Organic Agriculture 2008

While lagging behind, developing countries are nevertheless benefiting from organic agriculture. Most obviously, consumer demand in Europe, North America and certain parts of Asia has outpaced supply, creating lucrative export opportunities for developing countries. More significantly, organic production is well suited to the southern hemisphere. Resource-constrained countries, whose farmers traditionally use few external inputs, find organic agriculture suitable for maintaining and building soil fertility. As well, the labour-intensiveness of organic production leads to gainful employment in rural areas; but this also creates serious challenges in communities devastated by the HIVAIDS epidemic. Adoption of organic management is hindered by a serious lack of agroecological knowledge appropriate to variouis regions, a shortfall which is particularly acute in tropical countries.

All indicators suggest that organic agriculture is a thriving and increasingly important in all areas across the globe. IFOAM, an official liaison to FAO for organic production has 750 member organisations in 108 countries. At least 60 countries have an organic regulation and many more are proceeding to enact organic standards and laws.

1.2. Rationale for organic agriculture investment

Several important efforts are underway, as described in Chapter 2, to increase efforts in organic agriculture. However, those efforts fall short of the kind of investment needed for organic agriculture to meet its full potential.

1.2.1. Organic as a Millennium Development Goals Strategy

The International Assessment of Agricultural Knowledge, Science and Technology for Development (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?" (IAASTD, 2008). While the agricultural research enterprise has fulfilled its promise to improve productivity, significantly improving the livelihoods of millions of people, it has, according to IAASTD and others, 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) (www.un.org/millenniumgoals).

The first MDG is the eradication of extreme poverty and hunger. As a production method, organic agriculture is well suited for resource-poor and subsistence farmers as well as those who are commercially successful. Organic agriculture relies on fossil-fuel independent and locally-available production assets. Farmers work with natural processes and thus increase cost-effectiveness and resilience of agro-ecosystems to climatic stress. By managing biodiversity in time (rotation) and space (mixed cropping), organic farmers use their labour and environmental services to intensify production. Organic agriculture also breaks the vicious cycle of indebtedness for agricultural inputs and reduces the improper use of chemicals that sometimes contaminate the environment and compromise public health (Scialabba, 2007). The challenge therefore, is to provide the research and development necessary to aid poor farmers in adopting organic management systems.

Organic Contribution

Organic agriculture contributes to food security by a combination of many features, most notably by:

* Increasing yields in low-potential areas (e.g. dry lands) and market-marginalized areas
* Conserving bio-diversity and nature resources on the farm and in the surrounding environment
* Increasing income and/or reducing production costs
* Producing safe and diversified food
* Creating sustainable food supply chains
* Being environmentally, socially and economically sustainable in the long term

Source: IFOAM

Consumer demand in North America and Europe has created wealth-generating market opportunities for some, but certainly not all, farmers in the developing world. According to The Science Council of the 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 (Science Council, 2005). As detailed in Section III of this paper, the proposed organic research centre alliance is designed, from inception, to retain close contact with practitioners and includes, among other things, on-farm research, network analyses, and expert dialogues. This design significantly lowers the costs of research 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 realisation of these goals. The second MDG is to achieve universal primary education. In cases where farmers have experienced higher yields and higher incomes (from organic premiums), the extra household income is often invested in the schooling of girls (IFOAM). The education of girls, in turn, improves the agricultural system; according to IFAD, farm yields rise around 22% when women receive the same education as men (IFAD, 2001). The third MDG is to promote gender equality and empower women. When farms are managed organically, diversification is required, meaning that women are often required to take on a variety of tasks related to the various crops and plots. Also, the use of existing natural resources and workforce, rather than external inputs that require financial resources, is more conducive to women participation because they often have less entitlements and cash flow than men. This empowers women within the household and also lifts their skill level, as their participation requires specialized skills and knowledge (IFOAM).

MDGs 4, 5, and 6 relate to human health. Organic agriculture contributes in several ways. First, it does not degrade water, allowing for more access to safe drinking water, a critical need in the developing world. Organic production does not rely on dangerous pesticides which have been a serious cause of illness and death in some countries. The diversification of organic systems can contribute to a more diversified diet, significant for the attainment of essential nutrients that maintain health and combat disease. Finally, research is emerging to suggest that organically grown food may have favourable health qualities compared to conventionally grown food, for example, increased levels of polyphenols and carotenes.

The seventh MDG is to ensure environmental sustainability. Many of the regions facing the greatest challenges in achieving the MDGs are the very same regions facing 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 through organic management (Reganold, 1987; Mader, 2002), biodiversity enhanced (Hole, 2005, Bengtsson, 2005, Kotschi, 2006) and external energy consumption decreased (Pimentel, 2007).

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, 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 population (Badgley et al, 2007). 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.

This 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 the proposed organic research centre alliance. Building an agriculture research for development system in Africa requires, according to one analysis, carefully linking the research agenda with national development priorities, increasing coordination, interaction, interlinkages, partnerships, and networks and securing innovative financing and resourcing mechanisms (Mbabu and Ochieng, 2006). By identifying research and development priorities and collaborating with northern research institutes, the organic research centre alliance 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.

1.2.2. FAO's role

The long-term objective of the FAO Organic Agriculture Programme is to enhance food security, rural development, sustainable livelihoods and environmental integrity by building capacities of member countries in organic production, processing, certification and marketing. The FAO website (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 development agencies (eg, UNEP, IFAD, UNCTAD). 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.

II. SCIENTIFIC EFFORTS IN ORGANIC AGRICULTURE

If we are to realize the full potential of organic agriculture, additional research capacity is needed. This is especially true given that all future scenarios depict crippling food demand, climate shock, and water scarcity, all which challenge the very foundations of the agricultural sector and require new strategies and major adaptations. To account for this, several efforts are underway to identify high priority research for organic agriculture.

2.1. Transnational Organic Research Networks

Several efforts are now underway to share and coordinate scientific expertise and compare country experiences in organic agriculture. While many of these efforts are struggling for lack of resources, they indicate a strong desire for international collaboration in organic research. In most cases, these efforts have included exercises to identify and build consensus on research priorities for organic agriculture. These various research agenda provide strong evidence that investment in organic agriculture is necessary and were carefully considered in the drafting of this paper.

In 2003, the International Society of Organic Research (www.ISOFAR.org) was organized by Institute of Organic Agriculture (IOL) in Germany and the Research Institute of Organic Agriculture (FiBL) in Switzerland. The goals of ISOFAR are to promote and support research in organic agriculture by facilitating global cooperation in research, methodological development, and education and knowledge exchange. The 400 individual scientist members of ISOFAR are from all parts of the globe, although the majority reside in Europe where ISOFAR is based. Together with the International Federation of Organic Farming Movements (www.IFOAM.org) ISOFAR facilitated a discussion among scientists from European countries to envision an organic research agenda for the next 20 years which was published in 2008 (ISOFAR). At this time, ISOFAR may be the most significant international organic research network in existence in that, despite a predominately European membership, the design and purpose of the organisation is to be a global network.

Cultivating the Future
Modena, Italy June 2008

The 16th IFOAM Organic World Congress, the 2nd ISOFAR Conference, and the 4th QLIF workshop were held concurrently with 1,700 people from 108 countries in attendance.
Over 400 scientific papers were submitted to ISOFAR in preparation for the conference. A two volume set of these papers, all of which are 4 pages long, consistently formatted, and organized by topic is available for purchase (www.fibl.org).

The Organic Food Quality and Health (FQH) association was launched by four European Research Institutes in 2003 to encourage, coordinate, and disseminate research in the field of organic food and health (www.organicfqhresearch.org). The research institutions within FQH work on research concepts and on collective or bilateral research projects. In 2008, FQH published a research agenda for 2008-2011, available on the website, that describes high priority organic research needs in the area of organic food quality and health.

The European Council has, on several occasions, recognised that organic agriculture improves Common Agricultural Policy. In 2004, “Coordination of European Transnational Research in Organic Food and Farming" (CORE Organic) was launched by the European Commission as

part of the ERA-NET scheme to improve coordination between national research activities. The overall objective of CORE Organic has been to enhance the quality, relevance and utilisation of resources in European research in organic food and farming by gathering a critical mass and establishing a joint research programme. Over 36 months, 13 national partners in 11 countries participated in transnational research in eight high priority areas supported by a budget of 1.200.000 € (www.coreorganic.org). In October 2007, CORE organic partners met and developed an agenda for future joint activities, identifying high priority research to improve coherence and coordination across European research entities.

While these transnational efforts to determine global research priorities have been primarily organised in Europe, other parts of the world are beginning to undertake similar activities. In 2001, the Asian Research Network of Organic Agriculture (ARNOA) was established and for many years it has held an international conference to discuss regional concerns (e.g., 2004 International Conference on Organic Rice, Korea). In 2004, IFOAM established the Africa Organic Service Centre (AOSC) to help facilitate growth in organic agriculture on that continent. Among other things, AOSC facilitates the exchange of information on the different experiences with organic production across African nations and a database of these experiences is under development. The Association for Strengthening Agricultural Research in Eastern, Central, and Southern Africa (ASARECA), while not focused on organic agriculture, is nevertheless an important effort to unify and strengthen the research enterprise in Africa. A Research Network for Organic Agriculture in Africa has recently been established. In May 2009, a conference will be held in Uganda, on "Enhancing Organic Agriculture Research in Africa" which its sponsors expect will strengthen collaborative efforts in the region.

2.2. Developed Country Organic Research Coordination

Undoubtedly, many efforts at developing organic research agenda within developed countries are underway. In this section we present three such examples as evidence that countries are individually coming to the realisation that it is necessary to formulate organic research agenda and develop new frameworks to carry out high priority research.

In the United States, the Department of Agriculture provided a grant of 1.148.618 € to establish The Organic Agriculture Consortium (OAC) in 2000, the purpose of which was to network university scientists to better assist farmers through integrated multidisciplinary research, education, and outreach programs. At the same time, the Scientific Congress on Organic Agriculture Research (SCOAR) was launched to facilitate collaboration between scientists nationwide on organic research and information-exchange. In 2007, SCOAR published a National Organic Research Agenda (www.ofrf.org) which was largely adopted by the advisory board to the U.S. Secretary of Agriculture on research in 2008 (www.ree.usda.gov/nareeeab/reports030708/organicag0308.pdf). Later that same year, the US Congress approved, as part of the farm bill legislation, a historic 50.018.268 € for competitive research grants for organic agriculture research through the year 2012.

In Australia, the Rural Industries Research and Development Corporation (RIRDC) of the Australian government has been the major investor in organic research and development, although the dollar amount (up to $300,000 pa) is small by conventional agricultural and

international organic industry standards. The RIRDC has produced three five year plans for organic research and development. In producing these plans, the latest of which covers the years 2006-2011, input is solicited from conventional and organic agriculture, organic supply chain participants, researchers and food and agriculture investors. The current plan (www.rirdc.gov.au/pub/org5yr.htm), which is implemented in partnership with the Organic Federation of Australia (OFA) calls for investment in farming systems, supply chain issues, and the agro-ecological performance of organic farming systems, with high priority research needs cited in grains, dairy, horticulture, and meat production. A key feature of the 2006-2011 plan is that it seeks co-investment in its program from the commodity and food sectors. of activities.

Spotlight on Canada

The Organic Agriculture Centre of Canada (OACC) was established in 2001 and conducts research and education on numerous topics, oftentimes in concert with Canadian universities. The Atlantic Canadian Organic Regional Network (ACORN) is a membership organisation that provides a resource base for marketing organic food. In 2008, the Government of Canada provided organic farmers $258,100 to help them capitalise on interest in local food systems. Since 2004, the government agency Agriculture and Agri-Food Canada has provided more than $7.2 million to support 74 organic projects. The Canada Organic Growers (www.cog.org) is a membership organisation with 15 local chapters and links Canada's organic farmers to IFOAM activities globally.

2.3. Need for Developing Country Organic Research Coordination

No large scale efforts to devise an organic research agenda and implementation strategy, such as described in the previous section, has been undertaken by developing countries. Without such a systematic and funded effort, developing countries are unlikely to obtain the expertise necessary to fully develop regional and site-appropriate organic production methods. Experts from developed countries can help apply science and technology to assist developing countries, but if long-term goals are to be achieved, taking into account the indigenous knowledge and problem-solving to be tailored to developing countries need to undertake their own agenda and develop capabilities for science, technology, and innovation (Juma, 2006).

The disparity between organic research activities among developed and developing countries is consistent with significant geopolitical concentration of science spending. Ten countries now account for over 80 percent of worldwide science spending (IFPRI, 2006). This has

created a large and growing divide between the scientific capabilities of countries, with developing nations maintaining weak and sometimes almost non-existent infrastructure. Investments in agricultural research and development in sub-Saharan Africa, for example, failed to grow by more than one percent per year for the whole of the 1990s and, for the 27 African countries for which national estimates are available, about half spent less on agricultural research and development in 2000 than was spent in 1991 (IBID).

Organic Agriculture Research in Cuba

The late 80s crisis led Cuba towards structural changes in order to find an alternative to fossil-fuel based agricultural inputs and promote ecological agriculture as a necessary path towards food self reliance. Towards the end of the 90', Cuba could count on a well developed research capacity and scientific skills in organic (or semi-organic) agriculture, with 221 research and development centres and 46 centres of higher education that employ over 60 000 workers. While prior to 1990, agricultural research was highly disciplinary, with institutes specializing in particular crops and commodities, a process of institutional consolidation was started in 1995. The aims, objectives and strategies of the 19 research institutes of the Ministry of Agriculture were revised to establish a model network: the National System of Agricultural Science and Technological Innovation (SINCITA). In 1994, the Cuban Association of Organic Agriculture (ACAO) was founded, largely by a group of applied researchers. ACAO now has local offices in most provinces and each member is active in his or her own area of work. In 1999, ACAO achieved formal recognition by the Cuban Government and became the Grupo de Agricultura Orgánica (GAO). In 1998, the Government has launched a national programme for biological pest control. The Centres for the Reproduction of Entomophages and Entomopathogens (CREE) produces beneficial insects and biopesticides, as well as bio-preparation plants; in 1998, there were 222 CREEs situated on farms or in higher education establishments. The Soils Institute and its Basic Units of Worm Culture provides ecological soil fertility inputs.

Despite this paucity of funding, several G77 research institutes and dozens of scientists have persevered, organizing credible, scientifically significant programmes in the developing world. For example, the Kenya Institute of Organic Farming facilitates adoption of organic agriculture in sub-humid areas. In Cuba, nearly all of the agricultural research is oriented to organic agriculture, including 220 reproduction centres producing lines of bio-pesticides. As well, the country has contributed greatly to the understanding of organic citrus production. Organic agriculture is a growing sector in India. In 2003, India had only 73,000 ha of cultivated certified organic land; by 2007, this figure grew to 311,000 ha, with an additional 217,000 ha of land under conversion to organic management. Several developing countries have started organic programmes. While these efforts are now focused on standard setting and market facilitation, in the future it is hoped these countries will augment their programmes to encompass research.

The Kenya Institute of Organic Farming (KIOF; www.kiof.org) established in 1986, facilitates adoption of organic agriculture in sub-humid areas. KIOF maintains five regional demonstration centres and has published several books on smallholder organic farming practices. In 2007 KIOF initiated, along with several other research institutes, a long-term farming experiment in which conventional and organic production of maize and vegetables are compared.

Organic Agriculture Research in India

Since 2003, the Indian Council of Agricultural Research (ICAR) is implementing a network programme on "Development of Technology Package for Organic Farming" to develop production packages, conducting applied and strategic research and documenting know-how in organic agriculture. Many institutes established by ICAR and its 26 agricultural universities conduct research on various aspects of organic horticultural crops. The National Centre of Organic Farming was created in 2004 by the Ministry of Agriculture as a service provider for organic farmers. This Centre has six regional centres of about 100 staff each with the mandate of providing technical training and facilitating organic certification. The federal Horticulture Mission scheme provides funds to State Horticulture Departments which in turn reach-out to farmers with regards subsidies, credit, planting material and know-how, including subsidies for organic agriculture. Organic subsidies were provided on a pilot basis (200 rupies per acre) till 2007 and credit schemes for organic agriculture are now being explored through the National Agricultural Bank for Rural Development.

2.4. Context of science spending and institutional reform

2.4.1 Relationship to the CGIAR System

The Consultative Group on International Agricultural Research (CGIAR), established in 1971, is a strategic alliance of members, partners and international agricultural centres producing science and engaging in development activities to benefit the poor. Members include 21 developing and 26 industrialized countries, four co-sponsors and 13 other international organizations. CGIAR's 8,000 staff members include approximately 1,000 scientists and the organization is active in over 100 countries. The annual expenditure for the CGIAR system was $506 million in 2007.

It is reasonable to ask why an alliance of centres for organic agriculture research is necessary, given the research capacity of CGIAR. Can an inter-disciplinary system perspective (and location-specific information) such as organic agriculture be accommodated within the CGIAR mandate and mode of operation? Organic agriculture research falls within the broader CGIAR mandate of research on sustainable agriculture for poverty reduction. Inter-centre research programs and centre research projects do not tend to focus exclusively on organic agriculture but several of the centres are involved in research related to the principles of organic agriculture. For example, the IRRI has published a primer on organic-based rice farming; the INIBAP network has published a report on organic banana production; ICARDA has been investigating organic seed production; and the IITA is involved in a research project to assess the market potential of organic vegetables in West Africa. Organic can and does fit into the CGIAR system. Prior to commencing our effort to develop a proposal for an organic research centre alliance, we sought to catalogue the organic research carried out by CGIAR centres to better understand how the CGIAR can be harnessed for the advancement of organic agriculture knowledge.

Our analysis and communication with CGIAR leadership suggests that while the CGIAR system does not have the capacity to lead and undertake the substantial new agenda proposed in this paper, there are clearly important synergies between the CGIAR centres and the organic research centres alliance proposed herein. These synergies must be exploited to ensure wise use of resources and to bring together the best of scientific thinking. In some ways, the newly proposed structure is loosely modelled on CGIAR, but it is not envisioned as an organic replica. It is a virtual system of centres that will work in tandem with CGIAR, together creating communities of practice to advance organic agriculture. While this new alliance is a substantial undertaking, it will not require the levels of financial support or infrastructure necessary to sustain the CGIAR.

2.4.2. Needs Unique to Organic Agriculture

Is it necessary to design a research system specifically for organic agriculture or can existing conventional agriculture research entities take on the research agenda envisioned in this paper? We anticipate that some will ask what, if anything, is inherently so different about organic agricultural research that requires a dedicated enterprise?

A dedicated enterprise focused solely on organic systems is necessary. An obvious example would be organic post harvest handling, in which severe limits on pest control agents and ionizing radiation make it necessary for organic processors to develop novel systems to meet organic standards; thus organic post harvest handling is quite different from conventional post harvest handling. Livestock breeding provides another striking example. The attributes desired for animals maintained under an organic system differ significantly from the desired attributes for livestock under conventional management. Vegetable varieties grown under organic management often are distinct from those grown under conventional management. The organic harvesting of wild products has been overlooked entirely by most research entities, and yet is hugely significant in the organic market in the developing world. The list of examples could go on and on. Yet we do recognize that there may be other topics, within our proposed scheme, that seem to be less organic-specific. Agri-tourism may be an example of this, with various kinds of small farms seeking to diversify their enterprises to strengthen their financial position. That said, the vast majority of agri-tourism farms at this period in time are organic farms and this seems to match consumer demand. So even here, it would seem an organic approach is appropriate.

Just as with CGIAR, we expect synergies and cross-learning between organic research centres and other sorts of research entities. Increasingly conventional farmers and processors will face new production constraints as a result of environmental degradation stemming from environmental laws and regulations. While not all of these farmers and processors will adopt a fully organic orientation as a result, we do expect that the research pioneered by organic operations and led by the organic research centres proposed in this paper will significantly aid them in their transition to more environmentally sound techniques. A good example of this is drawn from the U.S. where organic farmers had, for years, worked on perfecting rotational grazing systems. With research documenting the value of rotational grazing, many conventional farmers then adapted their systems to embrace this strategy.

2.4.3. Responding to IAASTD

The International Assessment of Agricultural Knowledge, Science and Technology for Development (www.agassessment.org) was a three-year international collaborative effort (2005-2007) to evaluate the "relevance, quality and effectiveness of agricultural knowledge, science, and technology (AKST) and effectiveness of public and private sector policies as well as institutional arrangements in relation to AKST." It assessed current research institutions and structures for meeting the goals of reducing hunger and poverty; improving nutrition, health and rural livelihoods; and facilitating social and environmental sustainability

Before brainstorming our own ideas for promotion of organic research, we carefully studied the IAASTD report. Our goal was to learn from past experience and build upon the IAASTD analysis by incorporating IAASTD recommendations directly into the design of whatever institutional arrangement we developed.

Consistent with this proposal, IAASTD recommended increasing the investment in research to improve low impact practices such as organic agriculture, as well as providing incentives for the sustainable management of natural resources. As we developed our vision, we were mindful of these specific recommendations derived from the IAASTD report:

- Expand focus from ensuring food production to include environmental, social and economic functions such as mitigating climate change and preserving biodiversity;
- Harness local and traditional knowledge as well as formal science and technology information to increase equitable access to technologies;
- Develop incentives in research organizations to foster different kinds of partnerships;
- Create systems of incentives and rewards for multi-functionality and ecosystem services;
- Improve community-level scientific literacy by decentralizing technological opportunities;
- Integrate farmer concerns in research priority setting and the design of farmer services; and
- Encourage public-private partnerships for improved commercialization.

In addition, the IAASTD report notes that research would better advance sustainable agriculture if it was designed to address certain objectives from the inception of the work. While there are multiple objectives embedded in the IAASTD report, the list includes the following, all of which are addressed in the design of the proposed alliance in this paper:

- Deploy suitable cultivars adaptable to site-specific conditions;
- Improve soil, water and nutrient management and conservation;
- Increase small-scale farm diversification;
- Increase the full range of agricultural exports and imports, including organic and fair trade products;
- Reduce transaction costs for small-scale producers; and
- Strengthen local markets and food safety nets.

III. FRAMEWORK OF THE ORGANIC RESEARCH CENTRE ALLIANCE

3.1. The Vision

Organic research: mainstream, robust, and worldwide by 2025

Our vision is one of a future in which organic agricultural research is pervasive, rigorous, and meaningful. Strategic planners suggest that prospective organizations, from the start, develop a clear and compelling vision with a long-term year goal and a clear finish line. Well known examples of such visions from the corporate world include: Nokia: *Connecting 5 billion people by 2015* and Microsoft: *A personal computer in every home running Microsoft software*. In 2000, the CGIAR System adopted a new vision: *A food secure world for all*.

As documented in the previous section, organic agricultural research is barely funded and geographically concentrated in OECD countries. Most peer reviewed journals and universities are just beginning to include organic agriculture in their work. Therefore, it is fair to characterize organic agricultural research as a small, albeit emerging, alternative within the conventional scientific enterprise. This is the context within which the vision for the Organic Research Centre Alliance (ORCA) was developed.

We see a future in which organic management systems prevent many of the vexing problems we face today. Through organic agriculture, a sustainable foundation for long-term gains in productivity will be achieved. Leading scientific journals, of all sorts, will regularly publish articles on organic agricultural systems. Universities will support training in organic agriculture and promotion systems will be recalibrated to value transdisciplinary work. Research produced within developing countries will be of a high quality and on par with that produced by OECD countries. Vibrant research networks, supported by cutting edge communication technology, will stimulate novel collaborations. Farmers and food processors in all regions of the world will benefit from the research and improve their production systems.

How do we achieve this vision?

3.2. Mission

Ten networked research centres collaborating to produce high quality research in organic agricultural systems relevant to the needs of farmers and processors in developing countries

This mission statement succinctly describes the central purpose of ORCA. It is the means by which we achieve our vision. While this statement is somewhat general in nature, it conveys some important organisational principles:

- First, the organisation is a network. A single research centre producing high quality research does not accomplish the mission. The organisation is designed to promote high quality research through collaborative arrangements between research centres formally within ORCA as well as through partnerships with research institutes and networks outside of the system.
- Second, the focus is on developing countries. This does not exclude the participation of scientists and research centres in OECD countries. In several ways their involvement is integral to the construction of the organisation. But the focus is on building the scientific capacity in the developing world to undertake research on problems confronted by farmers and food processors in those regions, most of them challenged by significant resource constraints.
- Third, the research must be relevant to the needs of farmers and food processors. From inception, all research projects will be evaluated and chosen for their applicability to the problems faced by food producers. This requires scientists to co-create research agenda with practioners to ensure the relevance of the research enterprise and to articulate the justification for their work. This does not prevent scientists within the organisation from competing for external funding to support very basic research, but it is not the primary function of the centres and must not dominate the work of the organisation.
- Finally, the needs of food processors as well as farmers are considered. Organic processors confront issues of food safety, quality, materials, processing, and storage, among other things, that require scientific investigation and support.

3.3. Objectives

The research of the organisation is structured around major problems of international significance. ORCA, acting as one entity, albeit with many parts, will:

- Identify organic agriculture research priorities and provide a framework within which research collaborations can be built;
- Undertake high priority organic systems research, including on-farm participatory, whole systems, and multi-farm studies;
- Utilize transdisciplinary research methodologies, when possible, to facilitate collaboration among scientists and organic farmers, processors, civil society and private enterprise;
- Promote scientific exchange and cooperation between industrialized and developing countries and between centres within the system;
- Create a shared understanding of organic agriculture as an ecological approach for managing agricultural systems;

- Pursue knowledge to understand better the complex interactions and long-term effects of organic agricultural production on agro-ecosystems; and
- Engage in the analysis of research findings across centres and regions to develop a comprehensive understanding of the impact of broad-scale adoption of organic agriculture.

3.4. Organisational design

ORCA
Different priorities * Different tasks * Shared concern
Building a future on organic knowledge

ORCA consists of 10 international research 'centres' held together by shared concern for organic agriculture, administrative processes, cross-cutting research programmes in soil topics, and shared funding. As seen in the diagram below, each 'centre' is actually two research entities twinned strategically together to pursue a joint research programme.

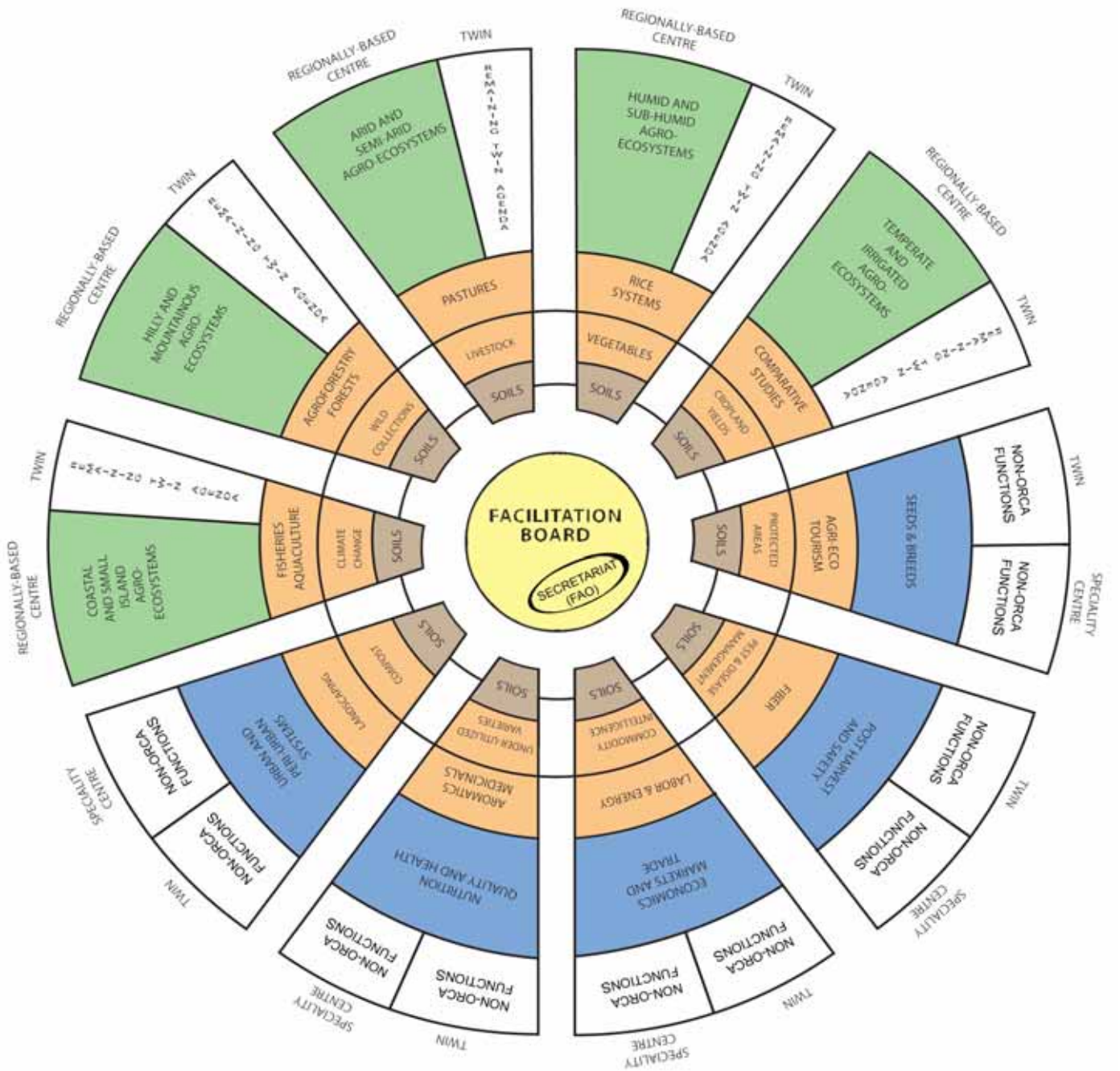
3.4.1. Sectors

Ten sectors have been chosen for ORCA inclusion. Five of the 10 sectors are determined by the major agro-ecosystems which require radically different farming systems from one to the next, and for which place-based research is appropriate and necessary. The remaining five sectors are parts of the organic system that merit attention. For example, the concurrent growth in urban and organic agriculture makes this sector attractive for investment.

The 10 Centres of ORCA

Agro-ecosystem Centres
1. Coastal and small islands agro-ecosytems
2. Hilly and mountainous agro-ecosystems
3. Arid and semi-arid agro-ecosystems
4. Humid and sub-humid agro-ecosystems
5. Temperate and irrigated agro-ecosystems

Speciality Centres
6. Seeds and breeds
7. Post-harvest and safety
8. Economics, markets and trade
9. Nutrition, quality, and health
10. Urban and peri-urban systems



3.4.2. Twinning

In the case of the five centres spanning the top half of the diagram, a regionally-based agro-ecosystems centre (e.g., arid and semi-arid region) in a developing country is designated and joined together with a second research entity – the 'twin' – most likely from the industrialized world and not necessarily from that same agro-ecosystem. The purpose of this twinning is to strengthen the regionally-based centre in the developing country through research collaboration.

In the case of the remaining five centres, located at the bottom half of the diagram, two speciality centres (e.g., nutritional quality and health) are twinned to facilitate collaboration and concentrate resources. At least one of the centres will be based in a developing country.

3.4.3. Soils

All 10 centres will undertake research programmes relevant to soil, an essential topic in organic production and which is largely believed to most differentiate organic from conventional production. Each of the five regionally-based agro-ecosystem centres will undertake soil research relevant to their region. Speciality centres will also undertake soil research. For example:

- the Centre on Economics, Markets and Trade could explore the economics of sequestering carbon through organic production;
- the Centre on Seeds and Breeds could undertake breeding for salinity and drought tolerance;
- the Centre on Urban and Peri-Urban Agriculture could explore mediation strategies to negate the contamination of soil by ambient air pollutants; and
- the Centre on Nutrition Quality and Health could explore the relationship between soil fertility and crop nutrition.

Although our wheel diagram suggests that the soils agenda within each centre will be of equal proportion, this is not our intent. In some centres, we foresee soil work consuming a significant portion of the research portfolio. In other centres, it may play a minor role. The extent to which soil research is undertaken by each centre within ORCA will depend on the applicability to an individual centre's role in the network. Despite varying levels of importance placed on soils research within each Centre, we nevertheless expect that the cross-network research on soils will unite ORCA, providing a common ground for collaboration and systematic analysis. Furthermore, we expect that the multidisciplinary and multi-regional perspectives gained from universal involvement in the study of soils will benefit the science of organic agriculture.

3.4.4. Resource Concentrations

Each of the centres is responsible for taking the lead in two subjects. For each subject, the designated centre will become the ORCA focal point by:

- collecting and sharing research materials, databases, and models in that subject area with other centres and the public at large (e.g., through a web portal); and
- facilitating communication and collaboration between centres in that subject.

10 Centres	20 Resource Concentrations	
Coastal and Small Island	Fisheries and Aquaculture	Climate Change
Hilly and Mountainous	Agroforestry/Forests	Wild Collections
Arid and Semi-Arid	Pastures	Livestock
Humid and Per-Humid	Rice Systems	Vegetables and Fruits
Temperate and Irrigated	Comparative Studies	Cropland Yields
Seeds and Breeds	Protected Areas	Agri-Tourism
Post Harvest and Safety	Pest/Disease Management	Fibres
Economics, Markets, Trade	Commodity Intelligence	Labour and Energy
Nutrition Quality, Health	Under-utilized varieties	Aromatics and Medicinals
Urban and Peri-Urban	Landscaping	Compost

The 20 subjects have been placed within centres most likely to have research interests that encompass, or at least overlap, these areas. For example, we expect that the centre on Coastal and Small Island Agro-Ecosystems is a natural home for a resource library on organic

fisheries and aquaculture. Climate change is also located within this centre as a second subject for resource concentration. While climate change could be placed within any centre, it is lodged here because of the dramatic impact expected on coastal and island communities, making issues of climate change central to their research pursuits.

3.4.5. Flexibility in Design

It was necessary to launch the idea of ORCA with enough specific information to engage constituent groups in meaningful consultation. We recognize that these centre and resource concentration divisions could be envisioned in various ways and assume this will be part of the discussion. Are topics treated consistently? Are they appropriately placed? One could argue, with the importance of climate change, that it should be given different emphasis in the "wheel." As well, a review of this paper may question where plantation crops fall in the current configuration (e.g. tea, cocoa). We expect our discussions will result in some deviation from the specifics we propose. After the consultation process, we may wish to view these divisions of labour as flexible. Centres may, as described in Chapter 6, articulate resource concentrations that may not "fit" the wheel perfectly as currently constructed but upon review, would be nevertheless highly valued in the network. As well, we expect research needs to evolve over time.

3.4.5. Non-ORCA Functions

Because ORCA is built upon existing research institutes, it is expected that these entities will modify their agendas to accommodate the needs of ORCA and facilitate collaboration with their twin, but this effort will not constitute the entire portfolio of the institute's work. In our wheel diagram we illustrate this reality with in the white outer parts of the circle labelled "remaining twin agenda." For example, the Twin working with the regionally-based centre in Arid and Semi-arid Agro-Ecosystem research will maintain some aspects of their current work. In the case of the five centres in the lower half of the diagram, it is expected that all 20 institutes will continue some aspects of their current work. In this way, participation in ORCA does not subsume all organic research now underway, nor prevent the development of comprehensive research agenda.

3.5. Secretariat and Facilitation Board

The ORCA Secretariat is based in FAO and headquartered in Rome, Italy. The Secretariat is responsible for overseeing centre collaboration; budgets and annual disbursement of funds; public communications; Facilitation Board services; and donor solicitations. The staff is small and consists of one professional staff member responsible for overall administration and programming, one professional staff member responsible for fund raising, proposal development and financial planning; and one person responsible for administrative support.

Facilitation Board Membership
5 scientists (at least one of whom is a soil scientist)
3 farmers (involved in crop, livestock and fish farming)
2 processors
1 person involved in organic certification
2 agribusiness representatives (retail, marketing, trade, input suppliers)
2 representatives of civil society organizations (at least one of whom is focused on issues of development and poverty alleviation)

The Facilitation Board, found in the centre of the diagram, is convened virtually several times a year. The Board is required to:

- Determine research priorities for ORCA and assist the Secretariat in soliciting contributions to support the priorities;
- 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;
- Annually review Centre budgets and work plans and provide advice, particularly with regard to potential collaborations across centres and with other contributing organisations. Every five years, publish a formal public evaluation of ORCA, including detailed reviews of the individual centres;
- Select centre projects for receipt of the Soil Science Challenge Fund annual awards;
- Assist the Secretariat in other functions as requested.

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 reside in developing countries. Board appointments are made to ensure geographic diversity, as well as a range of expertise and perspective. 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).

Each of the 10 Centres will designate a liaison from that Centre to the Facilitation Board, to participate, as invited, as a non-voting advisor.

The Facilitation Board serves to elevate 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.

3.6. Research Methods

3.6.1. Transdisciplinary, Participatory Research

The preferred method for ORCA programmes is transdisciplinary research. Transdisciplinary research is defined as participatory research that, from inception, is conceived of and undertaken by extremely diverse teams, including non-scientists, who tackle complex problems with the goal of finding practical solutions. Such research is structured to accommodate and integrate different kinds of knowledge produced from various sectors such as laboratory scientists, field researchers, farmers, and others.

Transdisciplinary research methods are favoured for several reasons:

- First, the best ideas are often produced by diverse teams. Farmer engagement in organic agricultural research is particularly desirable, since traditional and indigenous knowledge is scarcely documented yet crucial for ecological evaluations (e.g., genotype, phenotype, site, climate and management interactions of plants and animals).
- Second, keeping analyses at a realistic level, engaging in expert dialogues, and utilizing on-farm and field research, ensures that research results are feasible for adoption.

- Third, research is not, in itself, sufficient to catalyse wide-scale adoption. Engaging various stakeholders in the research programme will accelerate implementation of results by promoting joint learning and ownership.
- Finally, participatory research can contribute to capacity building for research collaborators, from small community-based organizations to national government research institutes and universities.

It would be a mistake to assume that transdisciplinary work is synonymous with that of development. The mission of ORCA is to produce high quality research. If this distinction is not maintained, it is possible that ORCA-based scientists would pursue development work because of attractive funding opportunities. Development work is necessary, of course, but it must not distract from the central mission of the organisation. The development community, including the staff of inter-governmental agencies such as FAO, UNEP, UNCTAD, IFAD, WHO and others should be kept informed of ORCA work so to enable them to undertake corresponding development work. We include this precautionary statement because recent critiques of the CGIAR system have found that insufficient funding created an incentive for scientists to take on the dual role of development practioners, leading to an erosion of the core research programme.

3.6.2. Farmer-Scientists

Farmers are capable of undertaking research on their farms and some ORCA projects may be entirely farmer-led. Many progressive farmers are experienced in research design, as success has come from their efforts to learn and adjust production methodologies over time in a series of informal experiments. This concept of farmer-scientist has been taken up across the world. In Bolivia, for example, potato farmers have been trained to design and manage experiments and carry out basic statistical interpretation of results; on the other side of the world, potato growers in the Netherlands formed an association to monitor nematode infestations and experiment with alternative control methods. In Germany, a network of biodynamic farmers has undertaken systematic on-farm plant breeding to develop high quality varieties that perform well in organic systems; success has been so great that many of these varieties are now registered with the European Union and available to farmers worldwide. These efforts, and many more like them, are well documented and validate the concept of farmers as scientists. This practice needs strengthening and expansion. Centres should find ways to compensate farmers for participating in ORCA research, a tacit acknowledgement of their role as research partners

3.6.3. Virtual Laboratories

Launching and maintaining an active alliance of Centres and an extended network of scientists and stakeholders will require support systems that allow sharing of information and ideas in real time. To facilitate this, ORCA will acquire appropriately tailored Internet and web-based systems to allow participants to communicate and organize. Interactive websites, chat rooms, on-line discussion facilities, file sharing, and voice-over-internet and teleconferencing options will support the ‘ORCA virtual laboratory.’

3.7. Funding Structure

Funding schemes are organised to promote collaboration among the centres within ORCA, to value private sector engagement in the research programme, and stimulate the production of competitive and innovative science.

3.7.1. Start-up Funding

All centres will receive funding to initiate ORCA activities. This one time infusion of funds is to support: purchase and coordination of appropriate, state-of-the art communication tools to facilitate centre interaction; and accumulation of materials for the Centre's two resource concentration areas.

3.7.2. Base Annual Funding

Each centre will receive, upon approval of the Facilitation Board, an annual disbursement of funding to maintain the resource libraries in the areas of concentration and minimum staff support for the core work of the centre. Additional funding for research and the work of the Centre must be solicited from the Secretariat and is based on an internal competition for funds. The CGIAR experience is that developing countries contribute only 4% of the total organisational budget. It is unreasonable to expect that twinned institutes based in developed countries require the same level of support as those in developing countries. For this reason, basic annual funding is provided based on specific needs.

3.7.3. Soil Funding

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. One-half of the funding will be shared equally by the 10 Centres to support their 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. Preference will be given to proposals that include more than one centre.

3.7.4. Internal Competitive Funding

Research funding obtained by ORCA, in addition to funding for soil programming and base Centre support, will be distributed via an internal competitive process. The Secretariat, with assistance from the Facilitation Board and *ad hoc* peer review panels, will determine grant awards.

3.7.5. External Competitive Funding

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

3.7.6. 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. For this reason, research

partnerships, both within and outside of ORCA, will be calculated in the assessment of internal grant proposals. Teams involving researchers from the countries of study as equal partners are likely to produce better research and more quickly lead to institutional change. Contributions from the private sector, in cash, time, or materials, to facilitate the research of the Centre are highly valued. Such contributions may be considered by the Secretariat and the Facilitation Board in the awarding of competitive funds.

3.7.7. Funding Prohibition

ORCA does not fund construction of buildings and large infrastructure. The centres are virtual – "centres without walls" -- and it is expected that the infrastructure at existing research entities and field stations will suffice for ORCA work.

3.8. Stakeholders and Target Beneficiaries

The various networks and organisations of scientists identified in Section I of this paper will be among the first participants in ORCA. Farmer networks will be engaged early on as described in previous sections. Partner organizations will also include universities, aid organizations, civil society groups, international organizations (e.g., UN bodies, global think tanks) private industry, and government ministries.

Target beneficiaries are farmers and processors, particularly those in developing countries who face serious resource constraints. That said, the knowledge 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, such as in the United States where rotational grazing for dairy cattle – once viewed as an organic alternative –is now widely practiced by a variety of farm types.

Selection of research institutes for ORCA inclusion will be based on a competitive process described in Section 4.

3.9. Outputs

ORCA is a scientific organisation, and as such, the output expectations are consistent with those of all high quality research institutes and universities. These outputs are quantifiable and enable measurement of the organisation's performance. ORCA is expected to advance knowledge in organic agriculture by:

- Publishing papers in peer-reviewed journals;
- Presenting research results at significant congresses;
- Educating constituencies through publication in 'grey'(practitioner-oriented) literature and websites and responding to media inquiries;
- Training and mentoring young scientists; and
- Competing successfully for external funding.

Below we describe additional outputs, by organisational objective, that ORCA is expected to achieve.

Objective 1: Identify organic agriculture research priorities and provide a framework within which research collaborations can be built. This objective will be achieved by:

- Establishing overarching ORCA research priorities through annual Facilitation Board discussion and debate;
- Engaging diverse stakeholders in annual discussion and debate of individual centre research priorities;
- Developing an extended network of scientists and other research collaborators and through virtual methods, maintain active information exchange; and
- Participating in and responding to non-ORCA led research priority setting such as the recent ISOFAR/EU endeavour.

Objective 2: Undertake high priority organic systems research, including on-farm participatory, whole systems, and multi-farm studies. This objective will be achieved by:

- Maintaining field-based research within the work conducted by all Centres of ORCA;
- Engaging farmers and processors in the research enterprise;
- Establishing on-farm research trials; and
- Organising systems research.

Objective 3: Utilize transdisciplinary research methodologies, when possible, to facilitate collaboration among scientists and organic farmers, processors, civil society and private enterprise. This objective will be achieved by:

- Including farmers, processors, and other stakeholders in the research from the inception of research ideas and composing proposals through to conducting the research and analysing the results; and
- Maintaining an active and engaged Facilitation Board to help steer the organisation.

Objective 4: Create a shared understanding of organic agriculture as an ecological approach for managing agricultural systems. This objective will be achieved by:

- Reporting all research results in *both* peer-reviewed and practitioner journals;

Objective 5: Promote scientific exchange and cooperation between industrialized and developing countries and between centres within the system. This objective will be achieved by:

- Sustaining twinned relationships between research institutes comprising the Centres;
- Co-authoring publications and research proposals; and
- Engaging in collaborative research partnerships that extend beyond individual Centres.

Objective 6: Pursue knowledge to better understand the complex interactions and long-term effects of organic agricultural production. This objective will be achieved by:

- Sustaining long-term field trials;
- Integrating agro-ecological research with post harvest, nutritional quality, safety, economic, marketing and trade analyses.

Objective 7: Engage in the analysis of research findings across centres and regions to develop a comprehensive understanding of the impact of broad-scale adoption of organic agriculture. This objective will be achieved by:

- Transmitting ORCA results through web-based technology and publication;
- Designing research methodologies that are adopted across the various Centres to allow for cross-regional comparison; and

- Integrating production and economic analysis to understand the impact of transition to organic agriculture under various scenarios.

3.10. Evaluation

Every five years, the Facilitation Board will undertake a comprehensive evaluation of ORCA and provide that evaluation to the public. Among other things, this evaluation will include:

- Solicitation of input from those outside of ORCA, including representatives from farming, handling, academia, civil society and private industry. These reviewers will be asked to evaluate ORCA contributions. This input will be summarized and available to the public along with Facilitation Board views and conclusions;
- Statistics on publications;
- Statistics on media imprints and web traffic;
- Examples of real world application of ORCA research results;
- Evidence of ORCA research contributing to livelihood improvement and poverty reduction.

IV. CENTRE DESIGNATION

4.1. Description of Centre Sectors

In this section we briefly and in a general manner describe the sectors selected for ORCA. The descriptions are intended to provide potential applicants an understanding of what is meant by the designation so to determine if their centre is suitable to undertake the sector work. Herein, we have listed the resource concentrations found on the diagram and linked to particular sectors as "proposed." As previously stated, we connected resource concentrations to sectors anticipating overlapping research pursuits and expertise. However, this may not always be the case; in Section 4.3 we describe a process by which applicants can propose realignments of the resource concentrations.

The first five centres represent major agro-ecosystems. We expect that these centres will undertake research of all sorts relevant to that agro-ecosystem within the region described. For example, the Centre on Arid and Semi-Arid Agro-Ecosystems will be based in and conduct research on a variety of organic cropping and livestock systems suitable and relevant to farmers living in arid and semi-arid lands. The remaining five centres represent major areas where research related to organic systems is needed. There is no constraint on the location of these centres, as the work could be undertaken in many parts of the world.

4.1.1. Centre on Coastal and Small Island Agro-ecosystems

Proposed resource concentrations: Fisheries and Aquaculture, Climate Change

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 eco-systems. The major challenges of converting to organic production in this region are lack of market intelligence, transportation costs, limited product quantities, vulnerability to contamination from shared watershed, salinization of soils, and improving performance of lesser-known but traditionally produced crops. The resource concentrations are suggested because 90% of the world's fish are, at some time in their life cycle, dependent on coastal areas and climate change is likely to most dramatically effect coastal and small island environments.

4.1.2. Centre on Hilly and Mountainous Agro-ecosystems

Proposed resource concentrations: Agroforestry/Forests, Wild collections

The core work of this Centre is to conduct research relevant to farming systems based in hilly and mountainous agro-ecosystems. Hilly and mountainous areas are 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 difficulty of travel 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. The resource concentrations are suggested because of the large amount of forested area in this agro-ecosystem and because many wild products are collected within forest ecosystems.

4.1.3. Centre on Arid and Semi-arid Agro-ecosystems

Proposed resource concentrations: Pastures, Livestock

The core work of this Centre is to conduct research relevant to farming systems based in semi-arid and arid areas. Such systems are typically rainfed, include livestock, and are largely subsistence operations. Intensification of agriculture and livestock production often pushes beyond the capacity of the ecosystem, resulting in overgrazing and severe environmental degradation. The UN Environment Programme estimates that close to 70% of drylands are degraded. Livestock is a vital and integral part of the organic production system. Well managed pastures and adequate stocking rates are necessary to adjust 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. 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. The suggested resource concentrations are due the preponderance of pastured livestock systems within this agro-ecosystem; we expect research synergies to result from this placement.

4.1.4. Centre on Humid and Sub-humid Agro-ecosystems

Proposed resource concentrations: Rice Systems, Vegetables

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 acid 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 provides opportunities to diversify the system and increases 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 resource concentrations are suggested because rice farming systems are predominately found in this agro-ecosystem and because there is possibility of growing vegetables year-round in most locations.

4.1.5. Centre on Temperate and Irrigated Agro-ecosystems
Proposed resource concentrations: Comparative Studies, Cropland Yields

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 resource concentrations are suggested because significant work in comparative research trials and yield enhancement efforts are already underway in this agro-ecosystem.

4.1.6. Centre on Seeds and Breeds
Proposed resource concentrations: Protected Areas, Agri-ecotourism

The core work of this Centre will be production of a large diversity of plant and animal genetic resources appropriate for organic systems and maintained and protected in the public domain. Organic growers and livestock producers require breeding programmes that produce crops and animals that meet the needs and conditions of organic farming systems. Breeding crops and livestock under conventional management for use in organic systems fails to meet these needs. Organic crop breeding programmes should focus on optimizing yields by considering such factors as insect and disease resistance, weed competition, good response to organic fertility sources, and good yield in biologically diverse systems. Organic livestock breeding should focus on selecting healthy, adaptable animals that perform well on pasture and that have disease and parasite resistance. Work to develop crop varieties and animal breeds that are compatible with each other in mixed crop-livestock systems will be a major focus of the work. The resource concentrations are suggested because rich biodiversity is often found in protected areas and such areas are attractive for agri-ecotourism.

4.1.7. Centre on Post Harvest Strategies and Safety
Proposed resource concentrations: Pest/Disease Management, Fibre

The core work of this Centre concerns organic processing, transportation, storage, 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 those contaminants 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 resource concentrations are suggested because many of the most vexing and little studied pest and disease problems occur

post-harvest and because the processing of organic fibres remains a significant challenge because typical toxic processing materials are disallowed.

4.1.8. Centre on Economics, Markets and Trade

Proposed resource concentrations: Commodity Intelligence, Labour and Energy

The core work of this Centre will be economic and policy analysis. Prices, income, and demographic characteristics related to organic systems will be collected and analyzed. Agricultural productivity will be quantified and measured. The distribution of benefits of organic agriculture will be evaluated with particular concern that price premiums can make organic inaccessible to many consumers. 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. Structural characteristics of farms and markets will be evaluated to determine factors underling the sector's efficiency, returns, and competitiveness. Analysis of the linkages between agricultural and environmental policies and environmental quality will be explored. Research on the socioeconomic impact of organic production will be undertaken. Trade of organic products will be tracked and international trade agreements will be analyzed for impact on the organic sector. The resource concentrations are suggested because analysis of commodity markets, labour inputs and availability, and energy calculations are all essential to the work of this Centre.

4.1.9 Centre on Nutrition, Quality and Health

Proposed resource concentrations: Underutilized Varieties, Aromatics and Medicinals

The core work of this Centre is to conduct research to generate knowledge on the health and other benefits of organic foods and production. Recently several significant studies have been published that seek to identify food quality differences between organic and non-organic produced food, focused primarily on nutrient density, antioxidant capacity, and pesticide residues. This Centre will continue such work but 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 differential between organic and non-organic foods. The resource concentrations are suggested because of explorations of the use of underutilized varieties and other plants and plant products for health promotion.

4.1.10. Centre on Urban and Peri-urban Systems

Proposed resource concentrations: Landscaping, Compost

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 200 million urban residents now producing close to 20% of the world food supply. Organic production in these settings is desirable because it is relatively environmentally-friendly, 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. The resource concentrations

are suggested because organic landscaping is taking root in urban areas and because of opportunities for urban residents, restaurants, and institutions to compost waste for community needs and beyond.

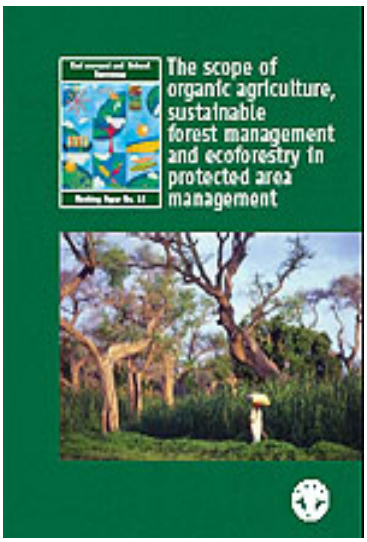
4.2. Description of Resource Concentrations

Brief descriptions of ORCA resource concentrations are provided. To give an understanding of why such research concentrations are necessary, we provide some ideas as to essential organic needs for resources in these areas. Our idea is that the Centres should be working in close collaboration with CGIAR centres and affiliated research institutes to avoid duplication of effort. Rather, the work of the Centres is to search out and obtain available expertise, tailor that information so that it is appropriate to the needs of the organic sector, and serve as the focal point for scientists, farmers and processors seeking information on organic agriculture. In some cases, this will take minor effort, in other cases it will require significant research specific to organic production systems.

In many cases, we have also listed an example or more of existing centres and networks that will be likely collaborators for this work. These listing are not meant to be exclusive or to suggest potential awardees of ORCA centre work. Rather these organisations are included to give an idea that work in this area is ongoing and that there are likely research partners with whom to interact.

4.2.1. Agroforestry/Forests Resource Concentration

The integration of agroforestry in organic production is uncommon, creating a significant opportunity 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, for example, use of trees, hedges and shrubs as a way to improve soil physical properties, maintain soil organic matter, 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. Organic farmers need better knowledge on how to use trees as physical barriers for flying insects and other predators. Improved strategies for use of forests for flood and run-off control, eco-timber production for 'organic' furniture, agri-ecotourism enhancement, and maintenance of biodiversity are also cited as needs within the organic sector.



2004 FAO report on organic, eco-forestry, and protected areas www.fao.org/organicag

The World Agroforestry Centre (formally ICRAF) and the Centre for International Forestry Research (CIFOR) will be significant sources of information and collaboration for the Centre. Among other things, these CGIAR Centres maintain extensive libraries of books and journal articles that will be vital to the work of the Centre. Civil society organizations and networks will also need to be involved. The International Union of Forestry Research Organisations, for example, a network of 700 member organizations in 110 countries, will be a likely partner in efforts to identify materials and devise scientific work tailored to organic production.

4.2.2. Wild Collection Resource Concentration

At last count in 2006, there were 376 organic wild products in the global market, covering 64 countries, and covering more than 60 million hectares of land. This is a growing sector within the organic marketplace. Organic farmers and processors are seeking help in clarifying terms and definitions (e.g., cultivation versus collection), as well as further developing standards and regulations. The primary scientific challenge is to understand how to implement sustainable harvesting schemes and respect biodiversity and sensitive ecological environments. As well, research is required to better understand the natural potential of several plants now in commerce.

2006, 1st IFOAM International Conference on Organic Wild Production, Proceedings at www.ifoam.org

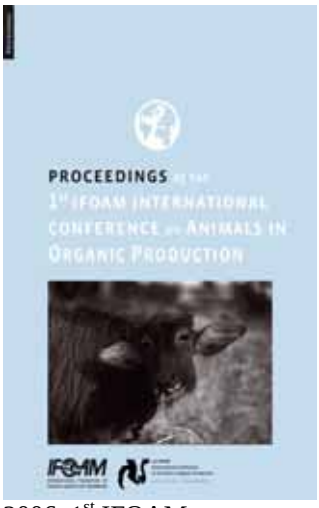
While no international science institutes currently exist to support farmers and processors engaged in wild collection, several related organisations and efforts are available to support the Centre's work. In the private sector, Swiss biodynamic company Weleda supports efforts to protect wild materials essential for medicine and body care products. Institutes specialising in native species (e.g., The Land Institute); civil society organisations concerned with wild collection (e.g., Wild Farms Alliance); and Bionet, a global taxonomy network providing assistance for biodiversity-rich, economically-poor countries are among examples of potential collaborators.

4.2.3. Pastures Resource Concentration

Approximately two thirds of organically managed land – 20 million ha – were pasture lands 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. 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. Farmers want complete protocols developed for organic pastured beef, hog, and poultry production systems; biological controls for invasive and harmful weeds; and information on the potential for native plants to provide medicinal benefits to livestock.

The International Crop Research Institute for the Semi-Arid Tropics will be an important collaborator to help in building pasture resources tailored to the organic sector. Not only does the Institute house a significant library, agro-pastural management issues, such as common property arrangements and the design of tools to directly measure pasture feed quantity, quality, and utilization are of equal interest to organic and conventional farmers. Potential civil society collaborators include the Society for Range Management (with 4000 members in 48 countries) to smaller, but organic pasture focused organisations such as MassGrass, a US-based group of farmers and scientists working to improve organic pasture management.

4.2.4. Livestock Resource Concentration



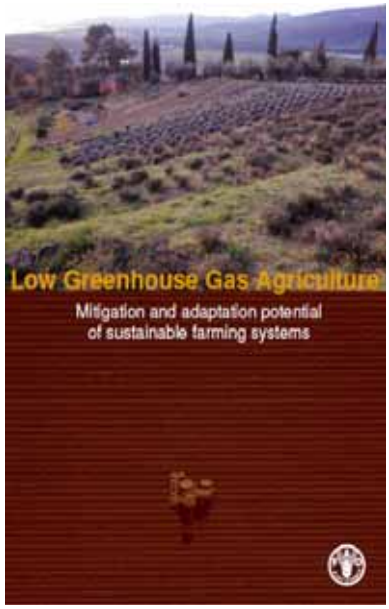
2006, 1st IFOAM International Conference on Animals in Organic Production www.ifoam.org

More than 50% of the world's poor own livestock and depend on them for food, income, traction, and fertilisation. 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 have, unfortunately, gone beyond the actual understanding of organic livestock systems. For example, the EU Regulation requires that animals be given 'regular exercise' and that 'appropriate breeds' be used, yet there is no common understanding or interpretation of these dictates. To generate organic livestock research, the EU funded two major efforts: The Network for Animal Health and Welfare in Organic Agriculture (NAHWOA), a collaborative research effort of 17 research institutes in 13 EU countries from 1999-2001; and Sustaining Animal Health and Food Safety in Organic Farming (SAFO), a 26 country collaboration that ran from 2003-2006. Both efforts identified significant research needs as did SCOAR in the US. Food safety analysis, for example, is necessary because organic production requires animals to have outdoor access, be housed in groups, and incorporates manure on the farm. Development of rations and feeding strategies to reduce the incidence of harmful pathogens such as *E. coli* 0157:H7 and breeding programmes for organic animals are cited as high priorities. Because of organic prohibitions on certain veterinary drugs, health care protocols must be developed for each species, including research on probiotics for disease prevention; sources of amino acids; effective non-chemical parasiticides; and preventive health care practices. Improvements in animal housing, and better understanding of mixed crop and livestock systems are needed.

The Livestock Research Institute (ILRI), with 700 staff in 40 countries, will be a significant collaborator. As well, the CGIAR Systemwide Livestock Programme, a consortium of 12 international agricultural research centres, will be a source of great expertise. Numerous livestock associations exist around the world, including several dedicated to organic production.

4.2.5. Climate Resource Concentration

While agriculture is a major contributor to climate change, this sector also has the potential to reduce its emissions and mitigate climate change through carbon sequestration. Organic soil management is particularly attractive for this reason because it focuses on increasing soil organic matter, which in turn, increases the carbon sequestered in the soil. Organic farmers are seeking knowledge to better improve soil fertility and stimulate the role of plants and microbes in natural soil processes. Increased knowledge of symbiotic and asymbiotic nitrogen fixation; intercropping and undersowing of legumes; and integrating deep and shallow rooting crops



2008 FAO document www.fao.org/organicag

is needed. No-till farming is advocated for farmers as a strategy to reduce climate change, but non-chemical systems need to be improved for organic production. The timing and management of manure and nitrogen fixing crops requires further exploration. The contributions of organic dairy to methane production requires analysis, with some studies finding that organic contributes less methane since dairy cows live longer with other studies citing lower milk yields (caused by a higher proportion of roughage in the diet) which increases methane emissions.

Chapter V. CRITERIA AND PROCESS FOR CENTRE SELECTION

5.1. Criteria for Centre Selection

Centres seeking inclusion in ORCA will be evaluated and selected using the 16 criteria listed herein.

5.1.1. Ability to produce high quality research

ORCA is designed to facilitate the production of high quality, relevant research. The likely ability to succeed in producing high quality research will be the most heavily weighted criterion in proposal evaluation.

5.1.2. Demonstrated expertise in organic agriculture systems

It is essential for proposed centres to have expertise in organic agriculture. This expertise may be in different forms but it must indicate potential for the proposed centre to take a leadership role in organic agriculture research. Expertise may be demonstrated across several fields of knowledge (e.g. a centre that has been involved in both organic livestock and crop production) or it may be focused within an area that matches the proposed area of resource concentration (e.g., expertise in organic seed propagation for the seeds and breeds resource centre). It is not necessary for centres to be solely focused on organic research. It is possible, for example, for a research institute specializing in vegetable production and exploring multiple production methodologies, including organic, to be suitable for ORCA inclusion. Many centres have credible, and in some cases exemplary programs in organic agriculture complemented by non-organic research. That said, we expect that upon application, institutes vying for centre designation will already have in place organic agriculture programming that is central to the work of their institute. Proposals in which organic agriculture is clearly a proposed new endeavour will not be ranked highly.

5.1.3. Institutional commitment

Proposed centres must demonstrate a commitment to organic agriculture through their research and development work, and centre leaders must be able to articulate a vision for and commitment to organic agriculture. ORCA investment is aimed at strengthening the overall capacity for organic research; its ability to financially support research may ebb and flow given donor interest. Thus is it essential that ORCA resources be dedicated to centres that will do everything possible to maintain organic research programmes even during times when ORCA resources may be constrained

5.1.4. Location

The five regionally-based Centres must have at least one of the twinned institutes located in that agro-ecosystem. All 10 Centres of ORCA will be comprised of twinned institutes, at least one of which must be located in a developing country.

5.1.5. Articulation of Centre research agenda

This paper lays out, in a brief manner, expectations of Centre work; the request for proposals will provide significant elaboration. The ability of applicants to describe convincingly how

they intend to carry out the described work and furthermore, to articulate a clear agenda for the Centre will be an important factor in the evaluation.

5.1.6. Likelihood of assisting developing countries

The relevance of proposed scope of work to the needs of developing countries will be assessed.

5.1.7. Dedication of resources to support the Centre

Proposed centres are expected to contribute resources to ORCA. Resource contributions may take many forms. Financial support for staff and research programmes is one important way a centre can support ORCA work. Support may also take the form of dedicated infrastructure, land, and equipment for ORCA-related research.

5.1.8. Correspondence with ORCA needs

As envisioned, ORCA will efficiently allocate leadership responsibility for various research topics across many centres, thereby concentrating expertise and reducing overlapping and duplicative efforts. A proposed centre, therefore, will be evaluated based on its likelihood to augment ORCA research and expand the Alliance's capacity to meet a broad array of research needs, needs which may shift over time in response to emerging scientific knowledge,.

5.1.9. Proposed resource concentration

Centres will be responsible for two resource concentrations, as described in this paper. While we have connected resource concentrations to specific Centres, we recognize that there are other, equally valid ways of organising these multiple resource needs. Applicants will be asked to propose two resource concentrations for inclusion in their Centre. These concentration proposals will be evaluated based on the ability of the applicant to carry out the work.

5.1.10. Proposed twinning of institutes

Integrated proposals submitted jointly by collaborating institutes suggesting themselves as twins will be highly favoured.

5.1.11. Publication record

Centres are responsible for producing scientific information and for disseminating information in their respective areas of resource expertise. Centres with proven records in placing research results in peer reviewed journals, as well as in literature designed to advance farmer and processor adoption of organic agricultural systems will be favourably considered.

5.1.12. Participation of farmer-scientists

The design of farmer and processor integration into research structures and programmes and the degree to which they will participate in carrying out the work will be evaluated.

5.1.13. Track record in external funding

As described in Chapter III, the centres of ORCA will be expected to seek external funding to complement the funds received through ORCA participation. Proposed centres with demonstrated ability to secure external funding will be favourably considered.

5.1.14. Ability to develop and maintain viable networks

Each Centre is expected to interact with existing research institutions, including the CGIAR Centres as well as networks of scientists, farmers, processors and other stakeholders in organic systems. The purpose of this networking is to assist in research priority setting, obtain expertise, facilitate research collaborations, avoid duplication of efforts, and disseminate information. The degree to which an applicant has existing networks and the potential to build networks will be considered. Proposed centres with proven records in outreach to and partnering with other organisations will be favourably considered, particularly if those efforts have extended between the northern and southern hemispheres.

5.1.15. Participation of stakeholders in centre design

Evidence of participation of stakeholders, such as private industry and civil society organisations, as well as farmer and processors will be considered. While letters of endorsement of such organisations and individuals will be considered, preference will be given to proposals that demonstrate active involvement of such stakeholders in the proposed Centre operations.

5.1.16. Language and technological capabilities

Communication between the centres within ORCA, and between each individual centre and the various constituencies seeking information related to its resource concentrations, will necessitate strong language and technology skills. Proposed centres with some staff capacity to converse and write in English and that have staff able to creatively use the kinds of technology that ORCA will rely upon, including various web-based tools, will be favourably considered.

5.2. Process for Selection

It is not known, at this writing, when and in what amounts, money will become available to proceed with ORCA implementation. While it is possible and would be ideal to receive support for full-scale implementation at the onset, we rather anticipate that donations will require staggered implementation. Donors may also have strong interests in sponsoring research endeavours in certain areas of the world and as a result will place additional restrictions on their investments. However, to the extent possible, the vision for ORCA centre selection is that it will be donor driven, FAO facilitated, and peer-reviewed.

5.2.1. Request for proposals

A call for Centre proposals will be issued by FAO upon receipt of sufficient funding to designate at least one Centre within ORCA. Depending on donor interest, the request for proposals may be specific to a particular centre(s) and/or resource concentration(s) (e.g.,

solicitation of proposals for the Centre on Urban and Peri-Urban systems) or it may be open-ended (e.g., solicitation of proposals for any Centre as described in this proposal).

The request for proposals will be posted on the FAO organic website, distributed to the directory of people and organisations contributing to development of this proposal (see Section 6.1), and sent to networks and organisations with likely interest (e.g., ISOFAR). The call for proposals (issued in English, French, Spanish, Arabic, and Chinese) will fully elaborate the paperwork requirements for proposal submission. There will be a time period of no less than four months between the call for proposals and the deadline for proposal submission.

Preference will be given to proposals that are jointly submitted as twinned institutes vying together for Centre designation. We anticipate, however, that some applicants may require assistance in establishing such twinning relationships. To the extent possible, before and after the deadline for Centre proposals, FAO staff will assist in partnering organisations who demonstrate strong interest and potential affinity.

5.2.2. Proposal Review

Once proposals are received, FAO will convene a small committee to evaluate and rank them. The committee will consist of FAO technical staff and four non-FAO members including a farmer, a processor, a representative of a civil society organisation and a representative from private industry. In this way, the initiating process reflects the shared decision-making of diverse constituencies that is expected to be endemic to Centre work.

Applicants for proposed centres will be asked for a one paragraph description of their centre for posting on the FAO website. This posting will allow parties interested in ORCA to understand the community of potential centres and facilitate connections that might facilitate future proposal development.

Awards of centre designation will be announced through the same procedures described in 5.2.1 for release of the request for proposals. All unsuccessful applicants will receive feedback on their proposal so that they may learn ways in which they could, if they so choose, strengthen their proposal for resubmission upon a subsequent request for proposals.

VI. IMPLEMENTATION

6.1. Establishing the organic institutions directory

This ORCA concept paper is available for electronic consultation beginning 17 November 2008 and terminating 15 December 2008. To comment on the paper, responders are required to login and provide some basic information including the name and location of their institution and the major agro-ecological area and research topics with which their institution is engaged. This information will be compiled by FAO and the resulting "directory" will be made public. FAO will use it in several ways. First, it will be a primary route for distribution of the final ORCA concept paper, as well as subsequent announcements relative to ORCA, including requests for centre proposals. It will be used as a tool to connect potential centre applicants with one another and facilitate twinning and other collaborative arrangements for the advancement of organic research. Finally, it will assist FAO in further understanding the depth and breadth of research around the world.

The Swiss Research Institute of Organic Agriculture (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 institutes engaged in organic research within each country. The FiBL effort is extensive; this FAO directory is not expected to be duplicative of that effort. FiBL is collaborating with FAO and Tufts University in producing this concept paper; we fully intend that the information collection efforts for the ORCA directory and FiBL country profiles will be mutually reinforcing.

6.2. Budget

Funds have not yet been raised for ORCA implementation. FAO has engaged in a few preliminary discussions with potential donors, alerting them to the electronic consultation and sharing with them our goal of finalising this proposal for funding consideration early in 2009. But at this early stage, we do not yet have a sense of the funding potential for ORCA. In a way, this has been liberating. We have drafted this concept paper with little regard to potential resource constraints, instead allowing our vision to drive design principles. For example, we conceived of 10 centres for ORCA based on agroecological logic and research needs; even if we had money beyond our imagined success, we do not anticipate, at this time, a need for more than 10 centres.

We estimate that a fully operational ORCA, as described in this paper with all 10 centres, would require an annual budget in the range of US$ 10 to 20 million. While that is a considerable sum, it does not begin to match the investment in the 15 centres of the CGIAR system, with its annual budget of US$ 507 million. Among the many reasons for the magnitude of difference between the financial needs of ORCA and CGIAR is that ORCA consists of virtual centres, no infrastructure is funded, and centres may carry out non-ORCA work that helps sustain them.

It is difficult to fully know what ORCA would cost to operate. We have provided an estimate in the form of a range of dollars. One reason for this is because comparable activities will require different amounts of money depending on location. For example, farm labourers to tend research plots cost more in Switzerland than in Bangladesh. Not knowing the pool of potential centre applicants, let alone, those who might succeed in the competition for funding,

makes it is impossible to fully cost-out centre activities. Furthermore, centre applicants will be required to detail the scope of work and investment needs upon application, providing donors and FAO a better sense of budgetary needs.

We do not anticipate, necessarily, that each centre within ORCA will receive an equal share of whatever funding becomes available. The principle guiding ORCA fund distribution will be achieving system-wide research priorities, which may shift over time.

The Secretariat based at FAO is, as described in 3.5, will consist of no more than three staff. Facilitation board meetings will be virtual and therefore require minimum funding. ORCA is not intended to be a "top-down" entity with large expenditures to a central organising body. Rather, the bare minimum of resources will be used to facilitate ORCA, with FAO providing general support in terms of office space, equipment and support staff. We anticipate that about US$ 500 000 annually will be needed for ORCA administration; this sum will be considerably less during the start-up phase when there may be few operational centres.

The reality is that we may not obtain the necessary funding for all 10 centres immediately upon launching ORCA. We understand that our vision may require retrofitting to available funds. But we believe it is important for donors to understand what it would take to fully carry out a comprehensive worldwide organic research programme.

Assuming that funds will be received incrementally, FAO will consult with organic constituencies and those in the FAO institutional directory (section 6.1) to help establish system priorities. Request for proposals for ORCA centre designation will be issued as sufficient funding for a centre becomes available. Thus, a request for centre proposals may include one or more centres, depending on the resources that become available at any one time. It is also possible that donors will establish priorities consistent with their funding programmes. We can envision a donor with strong interests in fisheries and aquaculture, for example, looking at the wheel diagram used to illustrate ORCA operations and then indicating to FAO their interest in funding that particular centre. In such a case, FAO would organise the competition for funding for that particular centre.

6.3. Donor inputs

FAO staff will work to solicit funds for ORCA. As we learn more about donor demands, needs, and expectations with regard to ORCA, this section of our paper discussion will expand.

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 country 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.

6.4. Workplan

An partial draft of this paper was prepared in July 2008. A small number of individuals volunteered to review it and based on the feedback received, the paper was revised in its present form for electronic discussion, to be held in November and December 2008. Once the

electronic consultation ends, the comments received will be analyzed and a final version of this paper will be available, early in 2009.

FAO staff will share the final paper with potential donor organisations. As funding becomes available, FAO staff will establish an ORCA office and develop request for proposals for ORCA centres. In this early, phase the FAO corporate website on organic agriculture will host a Special Feature on ORCA related resources and information.

6.5. System sustainability

Institutional responsibility and individual commitment of the ORCA partners lies at the heart of this project. The ORCA principles for centres' selection and support are based on criteria seeking a high degree of system' sustainability, as participating institutions become centres of excellence that can generate their own resources in the global network. Furthermore, the ORCA concept is based on catalyzing existing cooperation and partnerships, rather than "subsidizing" research activities. Also, the administrative capacity of the project is partly provided through the FAO regular programme for organic agriculture. At all levels, co-financing of ORCA services are provided in kind by capitalizing on existing work force and related infrastructure.