Organic Farming Innovation Awards 2017

9-11 November 2017, New Delhi, India
Foreword

The latest developments in organic farming and consumption show dynamic market growth, however the uptake of organic agriculture by farmers is fairly slow. In recent years, global market growth has been between 5 and 10%, without major changes in the land area. Bottlenecks in the uptake of organic farming are often due to production problems or the fact that farmers are not always convinced that organic methods can solve farming problems, such as fertilization, plant protection, animal health, efficient use of workforce, marketing diversity etc.

Although these problems can sometimes be solved through learning existing and regionally practiced methods, innovations are necessary to make organic farming a competitive and viable alternative system. Innovations play a crucial role in the local adaptation of sustainable and regenerative ways of farming and in bringing the benefits of organic farming and organic produce to a wider audience.

Since the 17th Organic World Congress held in 2011 in South Korea, IFOAM - Organics International and RDA honor innovations in the organic agriculture sector every three years with a Grand Prize and a Science Prize each. This time, in 2017 in India, it is the third OFIA Prize. The OFIA Summit in 2016 in Delhi showcased that India’s organic development is very dynamic, and that many issues discussed in OFIA, in the Innovations Committee and in TIPI (Technology and Innovation Platform of IFOAM - Organics International) are highly relevant in this context.

Highlighting the need for innovations, highlighting the impact of outstanding innovations, to get inspired and to learn from them is the purpose of this small, but strategically important and far-reaching event. It should help to increase awareness and appreciation of small but impactful innovations. An increased awareness inside and outside the organic community and a higher societal status of innovators inspire researchers and hence shape the research agenda towards more innovations for the benefit of present and future organic farmers.

Markus Arbenz
Executive Director
IFOAM - Organics International

What is OFIA?

The Organic Farming Innovation Award (OFIA) is the prize of the Organic Movement to highlight organic innovations of scientists, extension agents and practitioners. OFIA is an initiative of the government of South Korea in remembrance of the Organic World Congress (OWC) 2011 held in its Gyeonggi Province. The OFIA committee gives a signal for the research and extension community worldwide and emphasizes the need for innovation for the development of organic agriculture worldwide.

Once every three years, at the OWC, the International Federation of Organic Agriculture Movements (IFOAM) and the Rural Development Association (RDA) award great organic innovations and their discoverers to boost their uptake and to motivate other stakeholders to push innovation forward for the benefit of organic farming.

**OFIA Grand Prize:** The OFIA Grand Prize (10,000 US$) is the practitioners’ prize for innovators of applications for organic farming. Prize holders can be scientists, extension agents, farmers or other innovators.

**OFIA Science Prize:** The OFIA Science Prize (5000 US$) is the prize for scientists, who discover promising applications for organic farming, processing and marketing.
**Who is behind OFIA?**

The Rural Development Administration (RDA) is the central government organization responsible for extensive agricultural research and services in South Korea.

RDA’s efforts are directed towards highly competitive agriculture and efficient rural development. It endeavors to support farmers to produce agricultural commodities with better quality, advancing low-input, labor-saving and environment-friendly cropping technologies, promoting modern and automated production facilities, and nurturing future farmers.

Web: [www.rda.go.kr](http://www.rda.go.kr)

IFOAM - Organics International is the worldwide umbrella organization of the organic agriculture movement, uniting close to 800 member organizations in over 100 countries.

Its mission is leading, uniting and assisting the organic movement in its full diversity. The goal of the organization is the worldwide adoption of ecologically, socially and economically sounds systems that are based on the principles of Organic Agriculture.

Web: [www.ifoam.bio](http://www.ifoam.bio)

**OFIA Selection Criteria**

- Innovativeness: How innovative is the idea presented?
- Applicability: Can the idea be well applied in organic farming (or processing, trade and sector development depending on the concept)?
- Relevance: Can the innovation solve real problems or explore potentials?
- Impact potential: Has the innovation the potential to have a great impact?

**Next OFIA Application**

In 2019, IFOAM will publish a call for applications for the OFIA 2020. The call will be announced at [www.ifoam.bio/ofia](http://www.ifoam.bio/ofia).
Mike established the Inga Foundation to help spread the revolutionary agricultural system of Inga alley cropping which he developed after years of scientific research into slash and burn farming. Through the Inga Foundation he is now working closely with the local communities to implement this new and sustainable alternative to slash and burn.

For Honduran campesinos (subsistence farmers), changing the way they farm is a huge decision. Given that their lives depend on the food they produce, these farmers have had good reason to be conservative in their decision making. Mike, as a Cornish farmer as well as ecologist, has always emphasized the importance of establishing trust and understanding and working together with the local people. Inga’s success is built on a “bottom up” adoption process for farmers.

Slash and burn is a subsistence farming method used by millions of families in the tropics in which families cut down and burn an patch of forest in order to create an area of fertile soil on which they can grow their food. However, the soil fertility doesn’t last. Once cleared of trees and exposed to the strong tropical climate, the bare soil is rapidly stripped of nutrients. The first year slash and burn generally gives a good crop, the next year less so and, by the 3rd year, crops often fail completely. This forces families who depend on slash and burn to keep clearing fresh areas of rainforest every few years, just to survive.

**What is Inga Alley Cropping?**

Inga Alley Cropping is the revolutionary alternative to slash and burn developed by Inga Foundation’s...
Director, Mike Hands, based on the insights gained through over a decade of research into slash and burn in partnership with Cambridge University. Of the different potential alternatives investigated by Mike Hands, the only truly sustainable system to emerge from years of scientific research was alley cropping using nitrogen-fixing tree species from the genus Inga. Inga Alley Cropping is capable of maintaining soil fertility and good harvests year after year, thereby breaking the cycle of slash and burn and allowing families to gain long term food security on one piece of land.

**A year in Inga Alley cropping**

Once the Inga alleys have developed, the Inga trees are pruned at chest height. They have, at this stage, dominated the site and shaded out the weeds. The branches are stripped of leaves and used as mulch, thus protecting the soil and preventing further weed growth. Larger branches are used as firewood, allowing families to obtain all the wood they need for cooking from the Inga plots and thereby tackling another important cause of deforestation. The crop is then planted through the mulch within the pruned alleys. No herbicides or pesticides are needed. As it grows the Inga also recovers and regrows, providing the crop with some shade and protection from the sun. Once fully matured the crop is harvested. The Inga is then left to grow until the next planting season arrives, by which time they have fully recovered and the whole cycle is ready to be repeated, starting with pruning the Inga alleys once more.

This system delivers huge benefits through ensuring a reliable harvest year after year from the same plot of land with minimal labor required. By recreating the conditions naturally found on the forest floor, Inga out-competes the aggressive invasive grasses which normally dominate the farmers’ plots. This biological weed control is hugely important as without it securing a harvest can require a huge amount of labor in terms of weeding per year. In fact, it is often the combination of this takeover by weeds, as well as the loss of fertility, that forces farmers to abandon their plots and clear new areas of forest.

**Further information and links:**


- Phosphorus Dynamics In Slash-and-Burn; Phosphorus in the Global Environment (Chapter 10) by Mike Hands et al. [http://www.ingafoundation.org/wp-content/uploads/2012/02/Phosphorus-Dynamics-In-Slash-and-burn.pdf](http://www.ingafoundation.org/wp-content/uploads/2012/02/Phosphorus-Dynamics-In-Slash-and-burn.pdf)
• The Cambridge Research Projects (1986-2002). Inga Foundation projects are based upon the findings of long-term studies run by Inga’s founder Mike Hands for Cambridge University into subsistence slash-and-burn farming. Research was conducted in secondary rainforest, on two acid-soil sites, in the humid tropical lowlands of Costa Rica in the late 80s and early 90s and focused on the ecology of both intact rainforest and slash-and-burn systems on acid soils. This research was particularly important because of the confusions and contradictions which dominated the scientific literature at the time, especially regarding the fluxes and fates of plant nutrients during and after burning. The overall objectives were, firstly, to determine the key ecological constraints causing slash-and-burn to fail, and secondly, to establish the minimal ecological requirements of an alternative sustainable system.

INTERVIEW WITH MIKE HANDS

OFIA: What are the origins of your innovation?


Funding was secured from the EEC (EU) for a long-term investigation, based on the findings of my Cambridge thesis, in Costa Rica and, later, Honduras. The Cambridge Alley-cropping projects ran from 1988-2002. During this time, we trialled many agricultural systems, including conventional alley-cropping. The only system to emerge as sustainable from 7 years’ trial on that acid rain forest soil was Inga Alley-cropping supplemented with small additions of rock-phosphate. Later years of the projects were spent in pilot studies of the system with farming families in Honduras. Inga Foundation was established in 2007 as a UK-registered Charity to implement the findings of those years of R & D.

OFIA: Were there hurdles in realizing the project, and how were they overcome?
Mike: There were countless hurdles; both natural and human-induced. They were overcome with persistence and patience. The certainty that we had a solution to a massive, global problem of food-insecurity and environmental destruction kept me going.

OFIA: How have the stakeholders responded to the project? / How good has been the uptake?

Mike: NGO partners in Central America have been hugely supportive. The families have to see the Inga system demonstrated before they are ready to invest time, effort and faith in it. The growing success of our Land for Life Program is bringing more and more of them to our demonstration farm. We are now overwhelmed by demand in the two river valleys where we are concentrating our resources. The system is now being replicated in 8 tropical countries as a result of NGO and farmer-group visits to our demo-farm at Las Flores.

OFIA: How is the project financed?

Mike: Small grants and private donations. We are under-funded.

OFIA: What are the future plans for the project?

Mike: To continue our present 10-year Land for Life program. To use it and our demo-farm as a model of sustainable, environmentally-sound and organic production for the whole humid tropical region of South and Central America. We are being written into the Honduras Government’s strategic plan for Food Security and Climate Change as the Model for the wet zone of that country. In the future we will probably be concentrating more on training/teaching than on agricultural extension; but that is not yet ascertained.
Weeds are one of the most serious threats to cause a significant crop yield loss in organic farming. Use of cover crops is one of the methods to prevent weed damage, but it sometimes suppresses not only weed growth but also main crop growth. To achieve stable weed suppression in organic farming, Dr. Uchino conducted field studies for 10 years with soybean, maize and potato in Hokkaido and Tohoku, the northern regions in Japan.

He firstly developed a new simple method to measure the vegetation cover ratio (VCR: a percentage of area covered by vegetation to unit soil surface area) of each crop species. This enabled to analyze easily and non-destructively the competition between main crops, cover crops and weeds. With this method, he evaluated the relationship between growth traits of cover crop and weed suppression, and revealed that weed growth could be suppressed effectively by cover crops with high VCR. He also showed that cover crop species with heavier seed weight performed more effective weed suppression compared to light seed.
weight species. Based on the results, two cover crop species, winter rye and hairy vetch, were selected as the most suitable candidates for interseeding as a cover crop in Hokkaido.

Secondly, these two cover crops were sown on three sowing dates: before main crop (soybean and maize) planting, on the same date of main crop planting and after main crop planting. Weed growth was suppressed by sowing cover crops and this weed suppression was highly associated with the increase of VCR of main crops plus cover crops at the early growth stage. The sowing dates of cover crops also had great effects on main crop growth: dry weight of main crops was lower when cover crops were sown earlier.

Thirdly, under three-year rotational (potato-maize-soybean) organic farming systems in Hokkaido, he evaluated the stability of weed suppression by cover crops, which were sown three weeks after planting main crops. The vertical community structure revealed that light competition of main crops with cover crops and weeds was not severe, and thus, main crop yields were not suppressed significantly by either cover crops or weeds. A negative correlation was found between the VCR of main crops plus cover crops at the early growth stage and weed dry weight at the harvest stage. It indicated that weed growth was suppressed by interseeding cover crops, because cover crops increased the VCR of main crops plus cover crops from the early growth stage when main crop growth was depressed by unfavorable environmental conditions. This weed suppression by interseeding cover crops was stable in rotational cropping systems in organic farming.

Conducting the above experiment, he found that there was a significant difference in the spatial distribution of weeds between soybean and maize. This difference in weed distribution was affected mainly by the difference in canopy structure. In maize, weed density was higher within the crop row than between the crop rows, because the VCR of maize was higher between the crop rows. In soybean, on the other hand, weed density was higher between the crop rows because of the lower VCR of soybean between the crop rows. Interseeded cover crops increased largely the VCR between the crop rows, but slightly within the crop row. He concluded that the cover crop was more compatible with soybean than with maize, because the high weed density within the row of maize could not be decreased sufficiently by interseeding a cover crop.

Finally, he constructed the non-agrochemical forage soybean production system using Italian ryegrass as a living mulch in Tohoku region. Soybean contains a crude protein in high concentration and is suitable for the environmental conditions in Japan, where acid soils spread widely. In this system, Italian ryegrass was sown in April and soybean was sown without tillage after the ryegrass was mowed in June. Weed growth was suppressed almost completely by vigorous regrowth of ryegrass. Although the yield of forage soybean was also decreased by the competition with ryegrass, the yield reduction was less in late-maturing than in early-maturing varieties, and highly correlated with the VCR of soybean at flowering that is known as one of the most sensitive growth stages to environmental stresses. He concluded that forage soybean could be produced stably with significant weed suppression by using a late-maturing
soybean variety with high lodging tolerance and Italian ryegrass as living mulch. This production system is now under way in dissemination to forage production farmers in Tohoku region.

As described above, Dr. Uchino revealed an important physiological mechanism of weed suppression by cover crops in organic firming system in the northern part of Japan. His findings will help for organic farmers to use cover crops for weed suppression based on scientific knowledges not only in Japan but also in the other countries.

Further information and links:

**Interview with Dr. Hiroshi Uchino**

**OFIA:** What are the origins of your innovation?

**Hiroshi:** When I started pursuing my Master’s degree in Agriculture in 2002, I was very passionate about organic farming and always pondered how as a crop production scientist I could contribute to the development of organic farming. Through discussions with organic farmers and organic farming promoters, I learned that a lot of labor and time were required for weed management and wanted to work on establishing a labor-saving weed control system. It is known that the use of cover crops is a relatively effective technique for controlling weeds. I have worked on the application of the concept of cover crop in organic farming systems and evaluated its usefulness as a weed management tool by analyzing the competitive relationship between the main crop, cover crop and weeds.

**OFIA:** Were there hurdles in realizing the project, and how were they overcome?

**Hiroshi:** To be an effective weed management tool, cover crops need to suppress weed growth without suppressing the growth of the main crop. For the inclusion of cover crops into an agriculture system, it is important to understand the growth responses of the main crop, cover crop and weeds to environmental conditions (summer temperature etc.) and artificial agricultural practices (mowing etc.). For example, the cover crop, Italian ryegrass is superior to weeds in its ability for re-growth after mowing, but inferior to the main crop, soybean, in tolerating high temperatures. By efficiently utilizing these relationships of strengths and weakness, soybean could be produced without chemical and mechanical weeding.

**OFIA:** How have the stakeholders responded to the project? / How good has been the uptake?

**Hiroshi:** Our research team has developed a non-agrochemical forage soybean production system using the cover crop technique and is being promoted among the farmers of Tohoku region (the northeastern region of Japan). The livestock farmers have high expectations for this production system as a new self-supplied protein feed stock. On the other hand, forage production farmers have requested for more stable productivity in this system.

**OFIA:** What are the future plans for the project?

**Hiroshi:** To promote widely the cover crop technique among the farmers of Japan as well as around the world, there is always a room for improvement of such agricultural practices, for instance to control the cover crop growth without involving complicated practices for achieving the stable main crop yield.

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**The 2017 OFIA Committee**

Dr. Kun-Yang Huh, Deputy Administrator, Rural Development Administration (RDA)

Dr. Deog Cheon Choi, Korean Association of Organic Agriculture

Jörg Schumacher, Bio Suisse, OFIA Grand Prize winner, 2014

Prof. Dr. Uygun Aksoy, Professor at the Faculty of Agriculture, Department of Horticulture, Ege University, Turkey, and Internal Auditor, IFOAM - Organics International, 2014-2017

Dr. Shaikh Tanveer Hossain, Program Officer, Asian Productivity Organization (APO), Japan, and member of Council, TIPI of IFOAM - Organics International

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Markus Arbenz, Executive Director, IFOAM - Organics International