



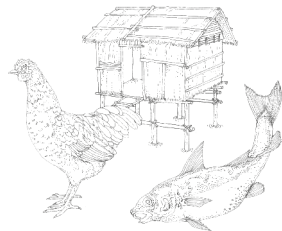
Food and Agriculture
Organization of the
United Nations



REPORT

OF THE INTERNATIONAL SYMPOSIUM ON AGROECOLOGY *in China*

Kunming, Yunnan, China, 29-31 August 2016



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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2017

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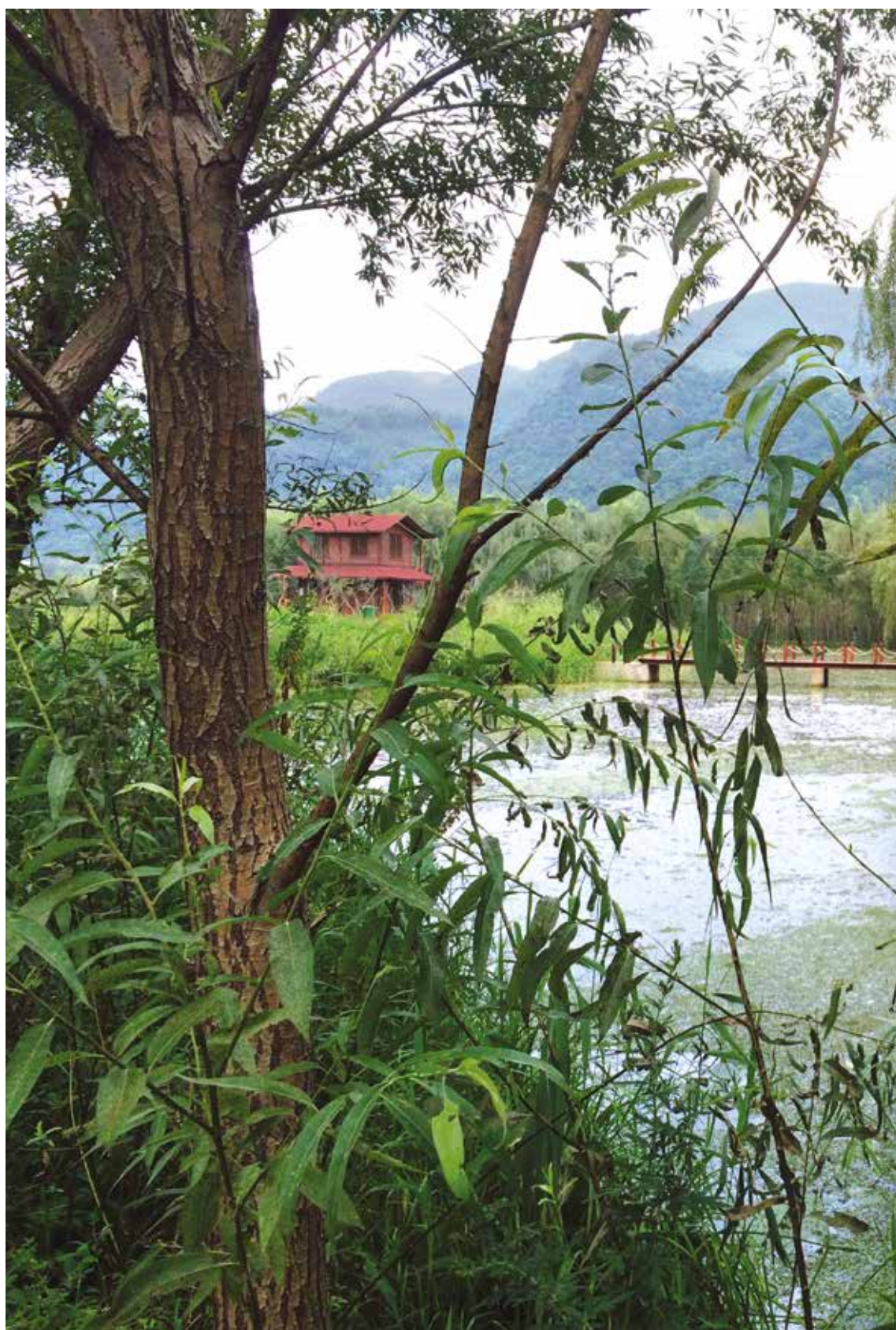
Illustrations: Guida Joseph



CONTENTS



| | |
|--|-----------|
| INTRODUCTION | 1 |
| AGROECOLOGY IN THE CONTEXT OF CHINA | 1 |
| CONTENTS OF THE SYMPOSIUM | 2 |
| OPENING SESSION..... | 3 |
| SUMMARY OF SPEECHES | 3 |
| KEYNOTE SPEECHES | 7 |
| 1) AGROECOLOGY AND FOOD SYSTEMS | 7 |
| 2) AGROECOLOGY USING BIODIVERSITY FOR SUSTAINABLE FOOD AND AGRICULTURE IN CHINA | 8 |
| 3) CHINA ENCOUNTERING MODERN AGRICULTURE: FARMING WITHOUT TRADITIONAL FARMERS? | 10 |
| 4) INNOVATIONS AND MARKET CHALLENGES | 11 |
| PARALLEL SESSIONS..... | 13 |
| 1) BEYOND PRODUCTIVITY: MULTIPLE CRITERIA FOR ASSESSING PERFORMANCE OF AGRICULTURAL SYSTEMS | 13 |
| 2) BIODIVERSITY AS AN INTEGRAL PART OF AGROECOLOGY | 16 |
| 3) PROMISING POLICIES IN SUPPORT OF AGROECOLOGICAL TRANSITIONS | 19 |
| 4) SOCIO-ECONOMIC DIMENSIONS OF AGROECOLOGY: THE ROLE OF CIVIL SOCIETY, NGOS, FARMER ORGANIZATIONS, IN AGROECOLOGICAL TRANSFORMATIONS | 22 |
| 5) CLOSING (NUTRIENT, WATER) CYCLES IN AGROECOLOGY: OPPORTUNITIES AND CHALLENGES | 26 |
| 6) LANDSCAPE ARRANGEMENTS | 29 |
| 7) INNOVATIVE MARKETS FOR AGROECOLOGY: WHERE NEXT FOR CHINA? | 32 |
| 8) LOCAL INNOVATION SYSTEMS: SIGNIFICANCE AND NEEDS | 34 |
| CLOSING SESSION | 38 |
| CASE STUDIES | 40 |
| BOX 1. EXAMPLES OF BIODIVERSITY AND AGROECOLOGY USED IN THE RICE PRODUCTION REGION IN SOUTH CHINA..... | 40 |
| BOX 2. FAO'S REGIONAL RICE INITIATIVE: LANDSCAPE MANAGEMENT FOR SUSTAINABLE INTENSIFICATION OF RICE PRODUCTION IN ASIA | 41 |
| BOX 3. FARMING WITH LIVESTOCK MODEL FOR SMALL-SCALE FARMERS IN CENTRAL VIET NAM | 43 |
| BOX 4. MANAGEMENT OF DRINKING-WATER CATCHMENTS IN AGRICULTURAL LANDSCAPES IN FRANCE..... | 44 |
| FIELD TRIPS | 46 |
| 1. POLICY FIELD TRIP | 46 |
| 2. BIODIVERSITY FIELD TRIP..... | 48 |
| 3. RECYCLING FIELD TRIP | 50 |
| ANNEXES..... | 53 |
| Annex 1. RECOMMENDATIONS | 53 |
| Annex 2. AGENDA | 57 |
| Annex 3. PARTICIPANTS | 62 |
| Annex 4. ADVISORY PANEL | 71 |
| Annex 5. PHOTOS OF THE EVENT | 72 |
| Annex 6. OVERVIEW OF PRESS COVERAGE | 74 |



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INTRODUCTION

In September 2014 the Food and Agriculture Organization of the United Nations (FAO) convened the International Symposium on Agroecology for Food Security and Nutrition. This was followed in 2015 by three regional meetings in Brazil, Senegal and Thailand. These meetings brought together stakeholders from academia, policy and civil society to facilitate better understanding of the role of agroecology in contributing to food security and nutrition. The meetings confirmed that FAO's approach to agroecology should be based on regional and local realities as well as economic, social and environmental conditions.

In order to continue to develop this regional approach a further symposium on agroecology the **International Symposium on Agroecology for Sustainable Agriculture and Food Systems in China** was organized by the Chinese Academy of Agricultural Sciences (CAAS), FAO, and Yunnan Academy of Agricultural Sciences (YAAS), with the support of the Government of France.

Agroecology in the context of China

China is a large agricultural country with a sizeable rural population¹. The country has rich agricultural resources and a long history of farming traditions; therefore agroecology is not a new concept in China. Traditionally, farms in China have developed ecologically-based farming systems, for instance intercropping and rotation, organic fertilization and integrated rice–fish farming.

Land degradation, soil erosion, grassland degradation, deforestation, water shortages and significant deterioration in water quality standards are imposing severe threats to natural resources and biodiversity, for which technical capacities in combating these changes need to be further improved¹. Agroecology is seen as a key component of China's concept of 'ecological civilization', a set of wide-ranging reforms, detailed in the 2015 plan, have been proposed to reconcile environmental sustainability with economic development.

In May 2015, The State Council of China released the National Strategic Plan for Sustainable Agriculture Development (2015–2030). This was followed by the State Council's Guidelines for accelerating transformation of China's agriculture development mechanisms, which were issued in August 2015. These policies were developed to protect China's ecosystems and to promote ecological approaches to agriculture.

Several key national projects have been initiated that use agroecological approaches, for example to protect grasslands, conserve soil and water and reforestation. Six hundred designated agroecology demonstration counties and more than 1 000 villages have been identified for development as model agroecological villages. In addition, effective science and technology models have been developed to conserve and control water consumption, reduce or even remove the use of synthetic fertilizers and pesticides and efficiently use animal waste.

1 <http://www.fao.org/china/en/>



Contents of the Symposium

There were 221 participants from 25 countries (See Annex 3) representing research, government, civil society, including farmer and consumer organizations and non-governmental organizations (NGOs), indigenous peoples, and the private sector, who gathered in Kunming, Yunnan, China **from 29 to 31 August 2016**. The symposium was guided by an Advisory Panel (See Annex 4).

The discussions were organized into eight sessions on the following subjects:

1. Beyond productivity: Multiple criteria for assessing performance of agricultural systems
2. Biodiversity as an integral part of agroecology: achievements and challenges in policy and practice
3. Promising policies in support of agroecological transitions
4. Socio-economic dimensions of agroecology: the role of civil society, NGOs, farmer organizations, in agroecological transformations
5. Closing (nutrient, water, etc.) cycles in agroecology: opportunities and challenges
6. Landscape arrangements
7. Innovative markets for agroecology: where next for China?
8. Local innovation systems: significance and needs

Based on these discussions, participants adopted recommendations for the development of agroecology in China (see Annex 1). In addition around 20 posters were prepared and displayed in and outside the Conference Hall during the Symposium.

General information for participants was available on the Website:

<http://111.203.21.22:5000/ISASAF/>



OPENING SESSION

Speakers

Opening remarks by **Tang Kaixue**, *Vice President, Yunnan Academy of Agricultural Sciences (YAAS)*

Message from **José Graziano da Silva**, *Director-General Food and Agriculture Organization of the United Nations (FAO)* presented by **Ren Wang**, *Assistant Director-General, FAO*

Opening remarks by **Wu Kongming**, *Vice President, Chinese Academy of Agricultural Sciences (CAAS)*

Opening remarks by **Carole Ly**, *Agricultural Councillor, French Embassy, Beijing*

Summary of the FAO regional meetings on agroecology (**Caterina Batello** and **Nicole Yanes**)

Co-chaired by **Vincent Martin**, *Food and Agriculture Organization of the United Nations (FAO), Representative in China* and **Zhang Huijie**, *Vice Director, Department of International Cooperation of the Chinese Academy of Agricultural Sciences (CAAS)*

Summary of speeches

Tang Kaixue

Vice President, Yunnan Academy of Agricultural Sciences (YAAS)

Agroecology is part of China's drive towards an 'ecological civilization'. China is in a critical phase of transition from traditional to modern agriculture and needs to resolve the conflict between the environment and rural development. Several plans have been adopted, such as curbing ecological depletion, clean energy and development of a circular economy. Many challenges remain, however, such as lingering poverty. Scientific progress plays a very important role and this Symposium is an important opportunity for exchanging knowledge with other countries on the development of agroecology. The President of China, Xi Jinping, has stated that the Province should be a vanguard of ecological civilization. The Provincial Government has given high priority to agriculture in development, paying attention to ecological sustainability, particularly safe and good quality produce. Yunnan is very rich in cultural and biological diversity and the province is an ecological security screen for southwest China.

José Graziano da Silva

Director-General, FAO (delivered by Ren Wang, Assistant Director-General, FAO)

By 2030 the world must shift to sustainable food systems, producing more at lower cost. This requires scientific, technical and social innovations that draw from various knowledge systems. Agroecology offers an innovative solution. Through a number of international and regional symposia on agroecology organized by FAO in 2014 and 2015, scientific and practical evidence was gathered on how agroecology can simultaneously address social, economic and environmental challenges in the context of sustainable agriculture. In recent years China has made much



progress in this regard. Nationwide, several laws and regulations have been adopted to protect land, water, grasslands and forestry, such as those on the circular economy, clean production and the prevention and control of livestock pollution. The 'National Strategic Plan for sustainable agriculture development' (2015-2030) and the 'Guidelines for accelerating transformation of China's agriculture development mechanisms' are the latest developments in this direction. FAO will engage in sustaining effective work on agroecological innovations at local and regional levels, building upon existing programmes and activities including knowledge platforms and partnerships to ensure sustainable adoption. In the next biennium, FAO will focus on integrating agroecological approaches on the ground and contribute to the agreed regional and national priorities, based on FAO's ongoing work on sustainable food and agriculture.

Wu Kongming

Vice President, Chinese Academy of Agricultural Sciences (CAAS)

Agriculture is important for economic development and social stability. Traditional agriculture and ecological civilization faces many challenges, such as the excessive use of chemical pesticides and fertilizers. The Chinese Government recognizes these problems and in response has formulated policies such as the State Council 'Ecological civilization strategy', the 'National Sustainable Agricultural Development Plan' (2015–2030), and the guideline document, 'Opinions on strengthening reform and innovation to accelerate agricultural modernization'. Structural adjustment is needed in all agricultural sectors, including crops, to ensure green production for domestic markets. Specific priority objectives include the reduced use of water and pesticides and recycling of residues. The Chinese Academy of Agricultural Sciences is directly charged with meeting these goals.

Carole Ly

Agricultural Councillor, Embassy of France in China

A key global challenge is how to produce more food without degrading natural resources, while taking into account climate change, and offering livelihoods to 1 billion farmers. Taking into account trade-offs, which public policies are needed for the agroecological transition? The challenges are global and agroecology must be supported worldwide. For example, soil fertility is a global problem. This is why France has strongly supported the role of FAO in agroecology.

The European Common Agriculture Policy (CAP) must face the challenges of the environmental and social impacts of agriculture. There has been some progress: CAP has put in place tools to support the transition, such as linking subsidies to the adoption of sustainable practices. Since 2012 France has engaged actively at the national level by taking a multiscale and multidisciplinary approach, combining research, extension and food chain development. Finance and public policy are not enough, and agricultural development and extension bodies are being mobilized. Extension agents and the most experienced farmers should engage in exchanges to share knowledge based on a peer-to-peer approach. The advisory system is being transformed in France. Agroecology must be supported by research and innovation since new questions are being raised. For example, research topics are under review in France with new priorities being given, for example, to the development of adapted breeds and varieties.



Caterina Batello

Team Leader Agroecology, Food and Agriculture Organization of the United Nations (FAO)

Recognizing the role that agroecology can play in food security and nutrition, FAO organized the International Symposium on Agroecology for Food Security and Nutrition in Rome in September 2014. This was followed up in 2015 by regional symposia in Latin America, sub-Saharan Africa, and Asia and the Pacific. These led to the adoption of recommendations, some of which are common across the three regions, while others are regionally specific. The main outcomes per region can be found in Table 1.

Farmers and other food producers manage resources and are ultimately responsible for practicing agroecology therefore their efforts should be supported by public policies. While the cocreation of knowledge might be a well-known term, implementation at the local level is still a challenge. Finally there is a great need for information, data, statistics and monitoring of agroecology.

FAO is supporting fieldwork in sub-Saharan Africa, and developing a website and knowledge hub. A symposium on agroecology in Europe and Central Asia will be held in November 2016, as well as a second symposium in Bolivia (Plurinational State of) in September 2016 and a second symposium in Senegal in November 2016.

Table 1. **Main outcomes of regional meetings by region**

| Sub-Saharan Africa | Asia and the Pacific | Latin America and the Caribbean |
|---|---|---|
| Mainstream agroecology into regional economic communities such as those implemented by the Comprehensive Africa Agriculture Development Programme (CAADP), including the creation of innovation platforms on agroecology . | Mainstream agroecology into subnational agricultural policies, prioritizing resource-poor environments such as uplands, rainfed, arid and degraded areas . | Mainstream agroecology policies in regional and sub-regional organizations such as: - the Working Group on Family Farming and Rural Development of the Community of Latin American and Caribbean States (CELAC) - the Specialized Meeting of Family Farming of Mercosur (REAF) |
| Securing smallholders' tenure of land – Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (VGGT). | Ensure coherence among policies favouring the transition to agroecology and those hindering it. | Assure the social role of land and water through agrarian reforms, guaranteeing land rights for traditional communities. |
| Review and transform current agricultural subsidy systems, trade, investment and finance policies . | Monitor environmental costs and risks derived from existing practices and policies. | Recognize and safeguard traditional knowledge and cultural identities , through the promotion of knowledge dialogue and participatory research systems. |
| Promote agroecological innovations in value chains and markets to empower youth in agriculture. | Support and revive traditional management practices, local rice varieties and drought-resistant crops . | Promote the productive organization of family farmers, women and youth supporting their agroecological activities. |



| Sub-Saharan Africa | Asia and the Pacific | Latin America and the Caribbean |
|--|----------------------|--|
| Integrate agroecology curricula in formal and informal primary and higher education, based on cocreated knowledge among farmers and researchers (including farmer field schools). | | Support rural agroecological schools , strengthening education and professional training for rural youth. |
| Create agroecological zones and territories at community level, integrating social, economic and environmental aspects. | | Enable reciprocity of participatory guarantee systems among countries. |

Nicole Yanes

International Indian Treaty Council and International Planning Committee for Food Sovereignty (IPC)

The International Planning Committee for Food Sovereignty is composed of social movements that include farmers, pastoralists, fisherfolk, and indigenous peoples. These small-scale food producers play a central role as drivers of agroecology and it is therefore important to note that the IPC has participated in the Advisory Panels of each of the FAO agroecology symposia. In order to prepare for the regional symposia IPC organized a global meeting to develop a common understanding of agroecology among its members. The International Forum for Agroecology was held at the Nyeleni Centre, Mali, in February 2015 and led to the Nyeleni Declaration. The declaration emphasized that agroecology contributes to multiple benefits, and while income is important, it must not be allowed to eclipse social and ecological benefits. The multiple benefits of agroecology can best be harnessed when production is linked with local markets. The declaration also stresses the importance of preserving the access and control of small-scale food producers over biodiversity.



KEYNOTE SPEECHES

1) Agroecology and food systems

By Professor Emeritus Stephen Gliessman

University of California Santa Cruz

Agroecology in the context of a region of the world – China – has always been present. Professor Luo Shiming started the current agroecology movement in China in the 1980s, after experiencing agroecology in the United States, building on the rich past. Traditional farms in China have many elements of agroecology, with – for example, pigs recycling material for crop fertility.

Agroecology applies the principles of ecology, which is the ‘science of how nature works’ to the design and management of sustainable food systems. Agroecology is transdisciplinary, participatory, and action-oriented. Three questions are raised to introduce the concept of agroecology. The first question is: ‘Why is agroecology needed?’ Among the factors promoting a transformation process in the way we produce food are the rising energy costs of our current systems, leading to a need to ‘grow’ alternative food systems, as well as global climate change and variability, growing environmental awareness and new and strong markets for products grown and produced alternatively and locally.

The second question raised was agroecology – what for? Missing from conventional, monoculture agriculture is an important relationship that is making food production unsustainable: people are missing from monoculture. Farmers lose the ability to choose. Agroecology diversifies farming systems by including social, economic and ecological aspects. The imperative to move agriculture from simplified monocultures to diversified food systems is well captured in the recent report from the International Panel of Experts on Sustainable Food Systems (IPES), ‘From Uniformity to Diversity’ (http://www.ipes-food.org/images/Reports/UniformityToDiversity_FullReport.pdf). There remains so much to learn about the dangers of over simplification. How does agroecology affect climate change, fossil fuels or the value of agricultural livelihoods? And how do we bring about changes in these areas through agroecology? In addition, over time the farmers’ share of consumer dollars has reduced consistently. For many farmers today, theirs is not a fair livelihood.

The third question raised was agroecology – how? Agroecology is based on an understanding of the full system, the differences and capacities of agroecosystems. Over time, with conventional practices, trends have been toward more open, and leaky energy flows and nutrient cycles, with reduced capacity for self-regulation. A fundamental principle of agroecology is that if farming systems can be designed to be more like natural systems, they will perform better.

Agroecology is based also on the value of local knowledge. Some decades ago, the earliest researchers into agroecology were inspired and learned about many of the benefits of local knowledge, for example from the Mayan farmers in southern Mexico. There, as elsewhere, home gardens flourish near where people live, with remarkably high diversity. Working with these farmers in southern Mexico, it became apparent that contrary to current trends, it is far better if smallholder coffee growers do not depend too much on their coffee cash crop, and maintain the diversity of their production.



Traditional or local agroecosystems do not depend on commercial inputs, but use renewable and locally available resources emphasizing the recycling of nutrients. These agroecosystems are adapted to local conditions and benefit the environment both off and on the farm, making maximum use of microclimates. Yields are maximized while productive capacity is also maintained, as well as spatial and temporal diversity and continuity. Production is prioritized to satisfy local needs, and the agroecosystem depends on and conserves local genetic diversity, as well as depends on and conserves local knowledge and culture.

Research on the transition process from industrial to sustainable food systems has contributed to a five level process.

- » **Level 1:** Increase input use efficiency, reducing the use of costly, scarce, or environmentally damaging inputs.
- » **Level 2:** Substitution of conventional inputs and practices with alternatives.
- » **Level 3:** Redesign of the agroecosystem so that it functions on the basis of a new set of ecological processes.

For example, in strawberry production in Salinas Valley, California, it was found that putting 3 percent of the crop fields under strips of alfalfa, provided a refuge for beneficial insects and a trap crop for pests, eliminating the need for toxic chemicals.

- » **Level 4:** Reconnecting the two most important parts of the food system – consumers and producers, through the development of alternative food networks.
- » **Level 5:** A full paradigm shift, based on locale, fairness, resilience, food security and participation in the global food system.

Agroecology thus returns ‘culture’ to ‘agriculture’. Research, education, action and change are needed that bring sustainability to all parts of the food system. A Chinese proverb quotes that, “all you need to start a prairie fire is a spark”, agroecology can be known as that spark.

2) Agroecology using biodiversity for sustainable food and agriculture in China

By Professor Zhu Youyong

Yunnan Agricultural University

There has been a sharp reduction in crop varieties over the past 100 years. In China, over this period rice varieties have reduced from 46 000 to 1 000. Monocultures and loss of farmland biodiversity leads to pest and disease epidemics, which causes overuse of pesticides and increases food safety risks. Breeding programmes have been developed to select for disease control, for example multiline variety, horizontal resistance and pyramid breeding.

The solutions for disease control discussed relate to the increase in crop or variety diversity and biodiversity in and around the field. Professor Zhu raised three questions:

1. What are the possibilities for disease control?
2. What are the mechanisms for disease control?
3. What are the possibilities for scaling up?



Several field experiments showed reduced pests and diseases after increasing crop diversity. The example was given of Yunnan in the 1980s where rice producers faced problems with rice blast. Three examples were given in which growing several rice varieties within the field has shown a reduction of rice blast.

Other field experiments in rice cultivation have confirmed that diversity of rice varieties grown within the field reduces the severity of diseases by 12 to 77 percent. The same is found for other crops. For example, intercropping faba-bean/wheat and maize/potato has shown disease severity has been reduced from 16 to 88 percent.

Between 1997 and 1999 research was conducted on large-scale rice production, which also confirmed disease was controlled when variety diversity was increased. Growing diverse varieties of rice, over 1 000 ha spread over two counties and ten towns, resulted in 85 percent disease control and a 19 percent increase in yield.

The mechanisms behind disease control were also explained as relating to the heterogeneity within the field, the greater the genetic distance between the varieties, the better the resistance. These experiments provided the answer to the three questions raised: diseases can be controlled by crop diversity. However, it was also stressed that we are facing problems in application. The following approaches were discussed:

1. **Heterogeneity:** Field results show that over 10 years variety monoculture causes increasingly severe disease (rice blast) in the same field: more than 334 percent increase in severity. However, genetic diversity of pathogens also decreased in monoculture fields over the same period.
2. **Dilution and barriers:** Pathogen spores are diluted in a rice field with mixed varieties compared to a monocrop field. Moreover disease control methods also include firewalls provided by crop strips. Similarly strip rotation (year-by-year) has shown a 63 to 90 percent reduction in pathogens.
3. **Meteorology:** Crops that grow closer to the ground are more vulnerable to pests and diseases, because of reduced airflow. Also timing of seed planting should be adapted to avoid diseases associated with rainfall.
4. **Application innovation:**
 1. technique for rapid varietal combination based on gene chips;
 2. spatial scale arrangements: height of plants, row distance, firewalls, intercropping;
 3. temporal scale adjustments: staggering planting to avoid rainfall-associated diseases.

These techniques are being used in China on increasing areas of rice production, which in 2010 totalled 2.6 million ha. Maize and potato intercropping has also been found in 112 counties. Each year the diverse variety cropping system is implemented on another 3 million ha. Results have shown that farmers reduce fungicide and fertilizer use. Impacts have been shared between provinces and through South–South cooperation.



3) China encountering modern agriculture: farming without traditional farmers?

By Professor Ye Jingzhong

China Agricultural University

Agroecology is closely linked to the mode of agriculture, in other words, to the way that agriculture is practised. With its ancient and important history of agriculture, should China move towards farmer-centred agroecology or intensive, industrial agriculture?

Traditional farming in China involved multiple activities and sources of livelihoods, such as farming, fishing, making of bean curd, noodle threading, etc. Children collected wild vegetables and were able to drink water from ponds and rivers – something that is unthinkable today throughout China because of pollution. Farmers would once visit their fields regularly “just to have look”.

Over the past several decades, modernization has been one of the Government’s important objectives. The main focus areas were presented as the ‘four modernizations’: agriculture, industry, defence and science and technology. Consequently, agricultural policies have focused strongly on modernization. For example, the National Modern Agricultural Development Plan (2011–2015) states, “.....China needs to equip agriculture with modern material conditions, renovate agriculture with modern science and technologies, increase agricultural production with modern industrial systems, enhance agricultural production with modern business methods and guide its development with modern development concepts and newly-born farmers...”.

However, intensive agriculture needs modern farmers and modern entrepreneurs – not the hundreds of millions of traditional farmers that exist today. This is a paradox in China’s current situation: on the one hand, farmer-centred agriculture dominates the landscape and on the other, intensive, industrialized agriculture is the policy objective.

We believe that farmer-centred agriculture today is playing an important role in feeding China’s massive population. According to the 2006 Agriculture Census, 200 million rural households were engaged in agriculture and 58.4 percent derived most of their income from agriculture. Furthermore, agricultural production has increased over 12 consecutive years. Intensive, industrialized agriculture is based on, for example, the idea that there is not enough food. But in reality, in China, over the past 12 years, farmers have had difficulty selling their grains.

The competitiveness of peasant agriculture, as compared to intensive, industrialized agriculture, is the result of the differences in economic efficiency, but government support is focused mainly on increasing production without sufficient attention being placed on the associated social and environmental costs. Neglecting policies concerning agroecological agriculture, which are centred on the capacities of farmers, places farmers and natural resources under severe threats.

The main question remains whether China can produce food without peasants? What will happen to the 260 million migrants from the countryside when economic growth declines?



4) Innovations and market challenges

By Dr Allison Loconto

Institut National de la Recherche Agronomique and the Food and Agriculture Organization of the United Nations

There is an assumed linear path for innovation that begins with invention, follows through technology and product development and design, and ends with commercialization. However, there is significant evidence of innovation as multi-actor networked paths, rather than linear paths. Based on studies in new and emerging technologies as well as information technology and appropriate technologies, a number of scholars have differently named these phenomena where innovation has become a collective endeavour, with inventors and users collaborating and sharing ideas and information. Thus, if innovation is not linear, can we not also consider it to be innovative uses of old technologies?

More significantly, however, innovation is not based on the invention of only one individual, it is a collective process. The innovation literature tells us innovation is a journey. Therefore, “innovation is not simply a technology (or a technical object), it must be the reorganization of institutions, organizations, value chains, businesses to enable actors to innovate on their own terms” (Felt *et al.*, 2007). This means that innovation is not a new technology, but a new way of doing things.

The linkages between innovations and markets must also be reconsidered. Markets do not serve only to commercialize new products, rather, they are: “the collective devices that allow compromises to be reached, not only on the nature of goods to produce and distribute but also on the value to be given to them” (Callon and Muniesa, 2005). In the FAO study of 15 case studies of innovations linking sustainable producers with markets, it was found that the reorganization of rules and the re-allocation of responsibilities between actors provided space for innovation through markets (<http://www.fao.org/publications/card/en/c/53d39282-ddd7-460c-a27f-3d5015eea7ca/>). These are called institutional innovations, which are defined as the new situations, not necessarily new knowledge (or technologies).

The recent IPES report (2016) clearly outlined the current challenge we are facing as we try to transition towards an agroecological future. These transitions are multiple, and diverse strategies are needed to overcome the challenges of both reducing reliance on high-input models of agriculture and on moving out of purely subsistence models. While these are major challenges, they can also provide opportunities for innovation. These challenges are:

1. Gaining access to sustainable inputs
2. Satisfying consumer demand in terms of quantity and availability throughout the year
3. Providing quality guarantees to consumers
4. Finding the right balance between costs and prices
5. Strengthening the capacity of farmers both in terms of sustainable farming practices and in terms of market knowledge because improving the ability to negotiate value is fundamental
6. How can these systems be made sustainable and attractive to the next generation?



Examples from Benin, USA and France illustrated how some groups across the world are overcoming these challenges by introducing new ideas, new technologies and different ways of working together.

The innovations in connecting smallholders to markets and re-localizing markets for agroecological products are strategies aimed at diversifying the types of exchanges, the quantity of market channels and ensuring fair prices for both producers and consumers. This is a trend that is emerging around the world with specific local variations.

Through these examples, it is clear that innovating through markets in networks is a way to close agroecological systems. A circular economy is not only the idea of a local, closed or protected system – it is the facilitation of interactions that enable knowledge, goods and services to circulate within networks of actors and markets so that all resources are used to the most sustainable extent possible.

So how then can we innovate in food systems transitions? FAO and INRA are currently working with a group of innovators across about 20 countries to try to develop advice, regarding these organizational aspects that have proved challenging in navigating system change. The following six Re(s) of policy support that can (re)Value agroecology are proposed across many different contexts:

- » **Recognize** existing agroecological markets by facilitating the registration of agroecological farmers with trade and food safety authorities according to appropriate standards.
- » **Revise** input subsidy schemes to include agroecological and biological inputs (or remove subsidies altogether) and provide financial incentives for creating small-scale agroenterprises.
- » **Reform** research and extension programmes in order to include agroecology and enable more flexible collaboration and experimentation with producers, private and civic actors.
- » **Reinvest** in agriculture through public procurement from agroecological producers by adapting procurement protocols to the local realities of agroecological production (e.g. informal trading relations).
- » **Recreate** public spaces for agroecology by providing public facilities that can be used to host farmers' markets, fairs and festivals for agroecology.
- » **Research**, using participatory methods, the innovative markets for agroecology and sustainable agriculture in order to better understand how they contribute to sustainable agriculture and food systems.

The Dutch philosopher of science, Anne Marie Mol, said that: "In travelling to 'unpredictable' places, an object that isn't too rigorously bounded, that doesn't impose itself but tries to serve, that is adaptable, flexible and responsive – in short, a fluid object – may well prove to be stronger than one which is firm". She underlined that we should be actively thinking about the types of technologies and innovations that are best suited to agroecological food systems and that we should work towards ensuring that these are the ones that we promote because they will be the ones that enable us to transition to an agroecological future.



PARALLEL SESSIONS

1) Beyond productivity: Multiple criteria for assessing performance of agricultural systems

Speakers

1. Pollution externalities and soil health (**Zhang Fusuo**, *China Agricultural University*)
2. Enhancing ecosystem services and indicators (**Etienne Hainzelin**, *CIRAD*)
3. Climate change and enhancing ecosystem services (**Lin Erda**, *Chinese Academy of Agricultural Sciences*)
4. Social performance of agriculture and agroecology (**Afsar Jafri**, *Focus on the Global South*)
5. True costing/TEEB (**Harpinder Sandhu**, *Flinders University Australia*)
6. Lessons of Rural Reconstruction for assessing performance of agricultural systems (**Chen Jie**, *Research Center for Rural Economy, Ministry of Agriculture*)

Concluding synthesis by **Etienne Hainzelin** (*CIRAD*) and **Zhang Fusuo** (*China Agriculture University*)

Summaries of the presentations

1. **Zhang Fusuo:** Production costs of agriculture in China are high, resulting in high market prices compared to import prices. The ammonia contribution from agriculture results in high environmental costs related to air pollution. The challenge in China is the so-called 'double high agriculture': to produce more food, with lower labour and environmental costs. The Chinese Government wants to work towards a zero increase in fertilizer application by 2020. An example used to achieve this is integrated nutrient management (INM), which has the potential of improving nutrient use efficiency (NUE) by 10 to 20 percent while increasing yield. In addition, to increasing plant density and yield, manual transplanting of rice has become mechanical transplanting and nutrients are supplied to match crop demand. Another example is integrated soil-crop system management (ISSM), which increases nutrient use efficiency by 30 to 50 percent. In addition to integrated nutrient management soil quality is also improved. A new approach for household farmers in developing 'double high sustainable agriculture' is through the Science and Technology Backyard Programme (STB), which closes yield gaps by involving smallholder farmers in training, demonstrations and field schools.
2. **Etienne Hainzelin:** Agroecological pathways build on natural resources and ecosystem services to improve production. Secondly, they also reduce negative externalities. Some ecosystem services are difficult to measure. Several hundreds of indicators have been explored, but no consensus has yet emerged on a consolidated list of well-documented services, with attached measurable indicators. Furthermore, because trade-offs are implied mostly between different ecosystem services, a common metrics is needed to build a comprehensive measure



of performance. Inevitably, this common metric is an economic value that is not always compatible with the very nature of some services. Often the time factor is not taken into account. Examples from Brazil and Africa illustrate these questions; the examples show the complexity and locality of agroecology. Second, ecosystems cannot be fragmented: boundaries disappear under pressure. Ecosystem space must be seen in 4D; time is fundamental. Finally, managing trade-offs is key and criteria are not the same at different scales.

3. **Lin Erda:** Change in global temperature has had a significant impact on crops, as for example a warmer climate increases the incidence of crop pests. The case studies presented show the different negative impacts of global warming on wheat and maize yields in different regions in China, where agriculture accounts for 15 to 18 percent of total greenhouse gas emissions. Various solutions were mentioned to enhance resilience to climate change and productivity, such as conservation tillage, hole irrigation, furrow irrigation and anti-leakage ditches.
4. **Afsar Jafri:** It is important to take into account the social aspects of agriculture, as productivity is not the only criteria used to measure success. For example in India, smallholder farmers experience high levels of debt as a result of high levels of input use, such as seeds and pesticides, under industrial models of agriculture. Rural livelihoods should be prioritized and farmers should be able to select the farming practices they wish to adopt. Agroecology offers an alternative to the challenges posed by industrial models of agriculture as it: 1) focuses on the food security of the local population; 2) reduces dependence on farm inputs; 3) safeguards rural employment; 4) builds social status and dignity of small-scale farmers in society; 5) promotes collective farming; 6) promotes biodiversity conservation; 7) is in synergy with life forms (animals and plants); 8) enhances soil health and fertility; 9) improves water conservation; 10) ensures human health and 11) supports resilience to climate change.
5. **Harpinder Sandhu:** Agriculture is at a crossroads: there is a need to increase productivity while decreasing the impacts on the environment and human health. A lens is required that will capture all the costs and benefits of an agroecosystem, one that is beyond inputs and outputs, which detects all relevant indicators that are difficult to evaluate economically such as pollination, pollution of water, CO₂ and social benefits. Economics of Ecosystems and Biodiversity (TEEB) AgFood quantifies ecosystem services by identifying and valuing different assets for example natural, human, physical and social. The farm sustainability assessment tool was developed to calculate externalities: production value, environmental benefits, environmental costs and social costs, four types of farming systems were compared. This measurable information could be used for inclusion in national accounts and then in the GDP. Currently outcomes are used to improve farming practices, to inform consumers about their choices and to provide evidence to policy-makers.
6. **Chen Jie:** The new countryside construction in China focuses on enhancing productivity while ensuring higher living standards. The system guarantees that there is more giving, less taking and more flexibility. Today farmers' income and living standards maintain a higher growth rate. In addition, there is much development of rural infrastructure for example water conservation projects, rural highways, national township patency. Rural education has entered a new stage as well as health care (rural cooperative medical care) and social security. Rural



poverty has been alleviated over the past years and the rural living environment has been improved. In the future, farmers' income and employment should be promoted to further intensify efforts to alleviate poverty.

Discussion and Synthesis

During the discussion there was broad agreement on the importance of recognizing the multifunctional nature of agriculture. The performance of agriculture activity clearly has to go beyond yield and productivity; it should encompass the social and environmental aspects of performance, including ecosystem services, and the presentations in this session clearly demonstrated that natural variety is one element that should be considered.

The land tenure system was one of the key problems discussed during the session. For example there is no private land in China, so farmers first consider the short-term economic benefits and not the long-term best management of soil fertility.

Indicators concerning the environmental, social, cultural, and economic dimensions of agroecology should be identified and developed at different spatial scales (farm, society, national level) as well as data gathered on agroecology. Several examples of negative impacts (disservices) of agriculture policies were given when the focus is only on increasing production and productivity (in China for example, soil erosion and water eutrophication). Largely the debate was dedicated to the question of measuring social or human performance and the impact of production systems on social capital such as empowerment, freedom of decision, dependence on technology, dignity and equity. Furthermore, as a whole, agriculture and rural development are closely linked, and more comprehensive indicators should be considered such as access to education and health care, employment and infrastructure. The methodological challenge is to define these indicators. It may be useful to consider the different scales at which ecosystems are delivered (local, regional, national or global) to define different sets of pertinent indicators. The time factor, including the very long duration implied by some ecosystem services, should also be taken into account.

Efforts have been made to describe and inventory ecosystem services, including the introduction of their true costs into national accountability, but indicators at the level of society do not really exist yet and are not measured. So far only farm level social indicators have been developed. Accountability at the national level has been developed in different countries for certain indicators with possible links to Sustainable Development Goals (SDGs).

Markets have a role to play in promoting agroecology and prices are a strong lever. During the session a request was made for governments to intervene in specific situations if prices for produce fall too low. Erratic volatility of prices including inputs, seeds and products could strongly affect dependency and increase the risk of debt for small farmers. Imports of inexpensive products from overseas could have a negative impact on local production, such as the deterioration of soy production in China after allowing large volumes of imports at relatively low costs.

How could different farming systems be better oriented towards more environmentally friendly systems? Payment for ecosystem services should be explored, but is not always possible. The following should be considered for public policies: Action-oriented (paying for a certain action) *versus* result-oriented approach (farmers only receive payment if they achieve a result). The farmer, however, is free to select the practices he/she wants to apply.



2) Biodiversity as an integral part of agroecology

Speakers

1. Nutrition and biodiversity (**Maryam Rahmanian**, *Food and Agriculture Organization of the United Nations*)
2. Integrated pest management in China (**Zheng Jianqiu**, *Beijing Plant Protection Station*)
3. Biodiversity and agroecology used in field crop production (**Luo Shiming**, *South China Agricultural University*)
4. Pollination: A key agroecological function (**Barbara Herren**, *Food and Agriculture Organization of the United Nations*)
5. Agroforestry (**Xu Jianchu**, *World Agroforestry Center*)
6. Farmers' Seed Networks for climate change resilience in China (**Song Yiching**, *Chinese Academy of Agricultural Sciences*)

Concluding synthesis by **Maryam Rahmanian** (*Food and Agriculture Organization of the United Nations*) and **Peter Kenmore** (*Food and Agriculture Organization of the United Nations*)

Summaries of the presentations

1. **Maryam Rahmanian:** Historically, food security and nutrition has focused on total calorie intake, which has driven agricultural research agendas and policies. Inadequate food security and nutrition is linked to current problems of rising malnutrition: two billion people worldwide suffer from micronutrient deficiencies; two billion are overweight or obese. Traditionally, the focus has been on single micronutrients, but micronutrient deficiency does not occur in isolation; diversified diets would help address all deficiencies. Biodiversity is not limited to the diversity of crops or animals used as food, but also includes biodiversity in soils, pollinators and microbial diversity in the human gut. Possible solutions and policies were outlined that could support diversified production for diversified diets.
2. **Zheng Jianqiu:** There are many pests and diseases in vegetable production, as documented in a handbook of vegetable pests and diseases in China, which was based on 20 years of research. Integrated pest management (IPM) has successfully reduced the use of pesticides in crop production. Techniques include: adapted pesticide application, machinery and auxiliary techniques, accurate pesticide application and measuring implements, biological control and associated techniques, integration of trappers and sexual inducement, various soil treatments and high-heat composting of vegetable waste. Integrated prevention systems need to be set up that include all of the above techniques. Farmer field schools (FFS) and demonstration yards were established to foster farmer participation. Finally, a professional vegetable pest prevention service has been established in China, where these activities have attracted media coverage.



- 3. Luo Shiming:** Examining biodiversity in traditional subtropical rice production systems in China highlights the importance of biodiversity at three scales: landscape, ecosystem and field. Principles of biodiversity in agroecology are widely practised in the monsoon rice production regions of China, covering all three scales. Examples of biodiversity include integration of fish and ducks in paddy fields, intercropping of rice, for example with water spinach or yam, and maintaining field ridges with diversified plant species. Examples of ecosystem cycling include, integration of mulch from crop rotations, use of straw for earthworm and mushroom production, as well as for animal feed. At the landscape level, mountain forests are preserved to safeguard water resources, permanent tea garden and orchards are on lower hilly areas; paddy fields on the plains; high-bed low-ditch systems, fish pond and dyke systems are employed where there is a high water level; shelter belt systems are in use along the coastal area. These diversified landscapes also attract tourists. Nevertheless, today, these practices, based on local innovation and knowledge, are facing challenges. Understanding the functions and mechanisms of these techniques will support the preservation and spread of these sustainable practices.
- 4. Barbara Gemmill-Herren:** Pollination is essential to food security and nutrition: 75 percent of all crops depend to some degree on visits from animal pollinators, and one-third of every bite of food we eat depends on pollinators. Pollinators increase the yields of crops – primarily fruit, vegetables and nuts – that are critically important for nutritional security. They are also responsible not only for yields, but also for the quality of the fruits or vegetables. There are reports that pollinators are declining on every continent (except Antarctica), although the most drastic is the decline in North America and Europe. Studies have shown that bees prefer agricultural fields to the natural environment. There is often greater pollinator diversity on farms, than in protected forests. Therefore agriculture is not necessarily detrimental to pollinators. Diversified, small farms where there is minimal use of pesticides are the most supportive of pollinators. Farming system design is key to supporting pollinators.
- 5. Xu Jianchu:** During human history, tree cover has declined globally: from 42 to 51 percent. Yet, in almost all regions, there has been a significant increase in tree cover on agricultural land. Levels of tree cover and population density vary by region. In China the area of planted trees has exceeded 46 million ha, the highest in the world. The presentation stressed the importance of trees for productivity, carbon sinks and nutrient cycles. Trees are hotspots of biodiversity and ecosystem services, including: alley cropping, mixed planting, windbreaks, riparian buffers and silvopasture. Trees should be integrated at all levels: farms, ecosystems and landscapes. China has significant opportunities to upscale agroforestry. Although China has increased tree cover overall, including on agricultural land, more than 30 percent of all agricultural land was found to have lost tree cover.
- 6. Song Yiching:** Modern agriculture and the Green Revolution have had a great impact on hunger, but also brought challenges. In China, since 2000 there have been achievements in participatory plant breeding and the strengthening of farmer seed systems including seed registration, seed bank exchanges, participatory varietal selection and participatory plant breeding, seed production, value addition and facilitation of exchanges. In 2013, a



National Farmer Seed Network was established in China that involves 22 rural communities in seven provinces, four public agricultural research organizations, two universities and NGOs. Recently the Network has engaged in the process of revising China's seed law and has managed to maintain farmers' rights to save and exchange their seed, as well as to sell seed on a small scale.

Discussion and Synthesis

During the session participants discussed how to manage the transition towards agroecology. While the importance of sustainable agricultural practices is recognized and well documented, ensuring the progressive transition towards increasingly more integrated production systems, within the broader context of sustainable food systems, is a significant challenge for policy-makers. Some were critical of the fact that research funds are still focused on conventional approaches and top commodities, making it difficult to strengthen the scientific case for agroecology. Others said that institutional structures were not conducive to supporting agroecology, which requires greater inter-ministerial and inter-departmental collaboration and coordination. For example, ministries of forestry and of agriculture are not working together. Consumer awareness can play an important role in the transition, based on a deeper understanding of agriculture, biodiversity, nutrition, health and environment links. One example given was how the Olympics in China boosted integrated pest management.

Knowledge related to biodiversity was also a topic of discussion. There was some discussion about farmer seed systems in China, as being a relatively new topic in policy circles. The importance of on-farm conservation, and farmers' limited adoption of improved varieties, brought the topic to the agenda. Another issue was enhancing farmer knowledge. The example was given of farmers who are engaged in community supported agriculture (CSA) who are not traditional farmers; so how can they benefit from traditional knowledge in their practices? One possible link would be that farmer seed networks could supply seeds to farmers engaged in community supported agriculture.

Four inter-connected themes emerged as the key issues:

1. The strategic vision of agroecology with five levels of transition was reconfirmed as being relevant for China.
2. The importance of trees was stressed; their role in agriculture needs to be strengthened.
3. Recognition of the inter-connectedness of microbiomes. Human health and immune systems are dependent on microbial diversity and agroecology cannot ignore that level of biodiversity.
4. All seed systems depend on farmer seed systems. Plant breeders who ignore the importance of local contexts produce varieties that are not locally adapted. Farmers' knowledge is the starting point for trans-disciplinary approaches. Building on this knowledge leads to better varieties for agroecology and for multifunctionality.



3) Promising policies in support of agroecological transitions

Speakers

1. Multifunctional approaches in European Union policies and the experience of French law (**Laurent Bochereau**, *Delegation of the European Union to China* and **Carole Ly**, *French Embassy in China*)
2. Environmentally friendly agriculture; including subsidies for farmers for environ-friendly labelling in the Republic of Korea (**Ji-Hyun Kim**, *Ministry of Agriculture, Food and Rural Affairs, South Korea*)
3. Comparative analysis of the policy frameworks in place in each country of the Mekong Region (Cambodia, Laos, Myanmar and Viet Nam) in regards to support to agroecology (**Htet Kyu**, *GRET*)
4. Local policy support in Yunnan (**Sijun Zheng**, *Bioversity International/Yunnan Academy of Agricultural Sciences*)
5. New policies and vision related to agroecology in China (**Mei Xurong**, *Chinese Academy of Agricultural Sciences*)
6. Promising policies in support of agroecological transitions from Indonesia (**Zainal Arifin Fuan**, *Indonesian Peasant Union*)

Concluding synthesis by **Luo Shiming** (*South China Agricultural University*) and **Peter Kenmore** (*Food and Agriculture Organization of the United Nations*)

Summaries of the presentations

1. **Laurent Bochereau:** The Common Agriculture Policy (CAP) is one of the oldest policies in the European Union and claims more than one-third of its total budget. The CAP has been reformed several times and, while past emphasis was on food security and adequate incomes for farmers, in recent times concerns have shifted to sustainability. This has led to new rules regarding payments to farmers who adopt sustainable practices. These expenditures are designed to encourage farmers to protect and enhance ecosystem services through specific payments. Farmers commit themselves to adopting environmentally friendly farming practices that go beyond legal obligations for a minimum period of at least five years. In return, they receive compensation for additional costs and income foregone resulting from applying environmentally friendly farming practices in line with the stipulations of agri-environmental contracts. These approaches are also reflected in new European research and innovation priorities.
2. **Ji-Hyun Kim:** South Korea has a law concerning environmentally friendly agriculture that recognizes two categories: organic and non-pesticide (cultivation with no use of synthetic agricultural pesticides and use of less than one-third of the recommended quantity of chemical fertilizers). Today the total area of ecofriendly agriculture land is 75 000 ha, corresponding to 4.5 percent of total agricultural products. The promotion of environmentally friendly agriculture is based on three pillars: improvement of the certification system; securing and expanding the distribution system; and expansion of ecofriendly farms and



cultivation practices. Strategies have been developed for the implementation of each of these pillars. Several stakeholder groups are involved, showing that a cooperative approach is needed between the Ministry of Agriculture, Food and Rural Affairs; farmers and groups; local government and research centres.

3. **Htet Kyu:** In order to map agroecology stakeholders and review the national agriculture policy frameworks that support agroecology in the region, four national studies were carried out between October 2015 and February 2016 in Cambodia, Laos, Myanmar and Vietnam. Three important phases in the development of agriculture policies were found: 1) subsistence and agroecology based farming; 2) green revolution led agriculture; 3) a shift towards sustainable agriculture and agroecology. The main reasons for shifting towards sustainable agriculture and agroecology are: policy-makers' growing awareness of the negative impacts of the green revolution model and its limitations; influence of international organizations, research centres, donors, civil society organizations and the private sector; impact of climate change and need for adaptation; and market opportunities for safer and organic products combined with growing concern of consumers over food safety. In the four countries public policies, there are different levels of inclusion in agroecology, while there are still several common constraints to promoting agroecology across the region.
4. **Sijun Zheng:** Yunnan province in China is a highly diverse region that includes diversity of landscape, climate, ecological and ethnic cultural diversity. Yunnan province has created a plan to develop a 'manor economy'. The modern 'manor economy' is seen as an important mode of development to promote the development of Yunnan, with the objective of building 100 provincial agricultural estates in 2017. In development of the plateau, research efforts are focusing on the characteristics of agriculture in Yunnan, and on exploring various forms of agriculture modernization, and linking capital and farmers to achieve win-win cooperation. One example of research is on fusarium, which causes a wilt problem in Yunnan banana cultivation. Some plantations have even had to be uprooted. In 2013 the direct economic losses in China were 750 million Yuan, and in Yuan they were 250 million Yuan. One solution is to combine banana plantations with pig farming, which receives subsidies, because the manure improves the soil and increases resistance to the disease. Left over biomass can be used for fertilizers and feed. Only those operating the larger farms, however, have the necessary knowledge and technology to make this work.
5. **Mei Xurong:** China is in an age of transition with priority increasingly being given to increasing food quality and safety, efficiency and competitiveness. Cereal production peaked in 2015, but too much fertilizer was applied. Arable land is cultivated very intensively and water resources are over exploited (half of arable land is irrigated). The central government has recently adopted a number of policies and plans for improving ecological sustainability, such as the 'General planning for prominent problem control and governance of agricultural environment (2014–2018)'; 'Agricultural planning for sustainable development (2015–2030)'; the 'Action plan for water pollution control'; 'Action plan for soil pollution plan' and an ecological compensation mechanism. Innovation for the ecological transition will be geared towards:



- » Breeding for high potential productivity while maintaining good quality
- » Integrating technology for efficient use of resources and pollution/reduction of greenhouse gasses, theories and technologies of clean agricultural valley
- » Green inputs, smart fertilizer, bio- and nanopesticides, degradable plastic, etc.
- » Intelligent machinery for multicropping system
- » Innovation and creation of policies, including ecological service evaluation, technical and ecological subsidies, etc.

6. Zainal Arifin Fuad: Smallholder farmers in Indonesia do not want to be dependent on the purchase of external inputs. Agriculture is not just an economic activity for smallholder farmers, it is a way of life. Landless agricultural labourers face many pressures including insecure livelihoods, therefore the priority for small-scale farmers is to keep their land. Farmers in Indonesia participate in public policy-making through dialogue with the government, collaboration with researchers and mass action. A number of policies and laws reflect farmers' demands, such as 'The programme of land distribution', which will allocate 9 million ha to peasants and the landless; another programme supports local markets. Farmers are legally allowed to save seed. The government will also support the establishment of 1 000 agroecological villages.

Discussion and Synthesis

As a result of more than ten years experience with national policies in support of agroecology there are rich examples for all, including policy-makers in China. Policies are very location and history specific, sometimes farmers have prompted policies, sometimes they have been led by government through agriculture and other ministries; often market forces and public policies are combined; monitoring the impacts of these policies and sharing among countries will result in much needed learning opportunities.

This session showed that in **China**, the Government has supported programmes for eco-agriculture practices in various regions. It is necessary to identify suitable agroecology approaches for each. Government subsidies to ecofriendly actions include the return of farmland on steep slopes to forest and grasslands, the balance between grass growth and animal production on pasturelands, and reform of rural renewable energy. Appropriate, locally adapted subsidies were discussed that are also necessary for internalizing the public goods related to the eco-environment. Implementing these ideas and supporting policies is still a challenge. Facilitating greater awareness of farmers' experiences in agroecology should lead to experiments and actions, which would be welcomed by rural smallholder farmers and larger farming industries.

A number of presentations showed that in other countries and regions, such as in a number of economically **developed countries** and regions such as Japan, the Republic of Korea, and the European Union, in particular France, there has been effective restructuring of agricultural policies and legislative frameworks since the 1990s. This has been to catalyse the transition of industrial agriculture to more ecofriendly agriculture. Some **developing countries** in Asia and the Pacific including China, Indonesia and countries of the Mekong Region have become aware that efforts should be made to redirect policies to bypass industrial agriculture and encourage agroecology:



- » **Fundamental legislative framework** for agroecology: In the European Union there is the common agriculture policy; in Japan the basic law for food, agriculture and rural development; in the Republic of Korea the law for environmental friendly agriculture;
- » **Financial and monetary policies** should reward ecofriendly actions and curb ecodestructive conduct. These policies should be monitored and implemented with a large number of smallholder farmers; conservation should become a basic standard or precondition for financial support to farmers, as for the 'cross compliance' requirement in the European Union.
- » **Assessment standard for agriculture development:** Rather than narrowing goals to only yield and economic return. An agriculture assessment standard should be established such as multifunctional goals and standards including social economic and ecological effects.²
- » **Locally adapted agroecology practices:** A list to encourage agroecological practices including government-supported policy should be set up at the local level.
- » **Market system:** Innovative markets for local agroecology products³ should be complemented by consumer education.
- » **Increased reliance on farmers' creativity:** Farmers are the main players in agroecology development. Their roles, as shown by the Farmer Union in Indonesia, include the development of locally adapted practices, sharing good practices, monitoring rural environment and policy advocacy.
- » **Ownership of natural resources for farming:** Ownership of natural resources such as farmland, forestry, pasture, and irrigation water used for agriculture is very important for the conservation of these resources. Policy should be clarified and stabilized.
- » **Government supported agroecology programme:** Short-term pilot programmes should be adopted as stable policies such as agroecology practices, assessment standards and financial policies as soon as possible.

4) Socio-economic dimensions of agroecology: the role of civil society, NGOs, farmer organizations, in agroecological transformations

Speakers

1. Rural reconstruction in China (**Zhang Lanying**, *Liang Shuming Rural Reconstruction Centre*)
2. Farmers associations and their role in agroecology (**Yuan Peng**, *Chinese Academy of Agricultural Sciences*)
3. Inter-regional and inter-sectoral exchanges among small-scale food producers and civil society organizations to promote sharing of agroecological knowledge (**Shi Yan**, *Share Harvest Agriculture Development Ltd.*)
4. The economic impacts of different models of agricultural development on small-scale farmers (**Afsar Jafri**, *Focus on the Global South*)

2 See the Sustainability Assessment of Food and Agricultural Systems provided by FAO, 2013.

3 Please see the full presentation on innovative markets by A. Loconto.



5. Policy advocacy to promote agroecology and farmers' rights (**Yoke Ling Chee**, *Third World Network*)
6. Rural institutions for agroecological transformations (**Yang Puyun**, *Agricultural Technology Promotion Center, Ministry of Agriculture*)

Concluding synthesis by **Zhang Lanying** (*Liang Shuming Rural Reconstruction Centre*) and **Jim Harkness** (*Institute for Agriculture and Trade Policy*)

Summaries of the presentations

1. **Zhang Lanying:** The rural construction movement in China has a history of more than 100 years. Rural areas play an important role in China's society and culture, but modernization and foreign influences are endangering rural life. In relation to innovations in agricultural development the rural reconstruction movement seeks to: 1) support rural development through students' learning and knowledge sharing; 2) improve local governance through peasants' participation and cooperation; 3) promote interaction between peasants and consumers through agriculture innovation; 4) realize the dignity of labourers; 5) improve citizen participation through farmer cooperatives and integrated community services. Other innovations in rural reconstruction are participatory guarantee systems (PGS), community supported agriculture (CSA) and multifunctional eco-agriculture. These innovations have led to developing ideas about policy recommendations, which include: 1) supporting young peoples return to their home towns by encouraging students to work with farmer cooperatives and rural areas; and 2) strengthening farmer organizations to promote agroecological practices and promote farmer field schools to support this objective.
2. **Yuan Peng:** Farmer associations are composed of farmer specialized cooperatives, with the main objective of marketing products from small-scale farmers, and farmers' specialized technology associations. The main function of farmers' specialized technology associations is to provide technological services to their members (e.g. collective purchase of inputs and setting technological guidelines). Both have played important roles in agroecology as they lead to a change in the concept of farming through agricultural extension. Farmer associations also introduce new concepts through training programmes, field schools and production models. They help small-scale farmers change their traditional focus on yield per *mu* to include quality and environmental objectives. Farmers' associations in China are still in the preliminary development stage, being relatively small. They face several challenges, such as a lack of leadership and entrepreneurship, and market competition with large-scale companies. Therefore, there is a strong need to increase support for training programmes targeting the leaders of farmer associations.
3. **Shi Yan:** Globally, farmers only get 10 to 20 percent of the retail price from food, while ten companies control most of our food. In addition, the greater the distance between producers and consumers, the greater the food waste, which stands at 30 percent globally. URGENCI is the International Network for community supported agriculture, a system of local solidarity partnerships between producers and consumers, caring for the environment as well as for trade from local to global level. The community supported agriculture model is a way



for farmers to obtain the best price. In addition, community supported agriculture farmers use agroecology and low impact methods. In China, an estimated 300 000 consumers are members of community supported agriculture. An annual community supported agricultural conference has been held in China since 2010, which was attended by Vice Premier Wang Yang in 2015.

4. **Afsar Jafri:** The share of agriculture in India's GDP has fallen 50 percent to below 15 percent over the last four decades. Indian agriculture is largely subsistence agriculture, dominated by small-scale farmers. The agrarian crisis in India manifests itself through a wide-range of impacts. On the environmental side, yields are declining as a result of stagnating soil fertility and limited available water because of the shift to water-intensive crops. Regarding social and economic aspects, rural household incomes are declining in relation to increasing expenditures and costs of cultivation and there is high indebtedness among small-scale and marginal farmers, in some cases leading to farmers' suicides. The result has been increasing hunger and malnutrition and the exodus of farmers from agriculture and urban migration. Farmers are adopting agroecology to increase the sustainability of their farming systems. Agroecology redefines the relationship between farmers, agriculture and nature: the sole purpose of agriculture is not only production and yields, but also social and cultural well-being.
5. **Yoke Ling Chee:** Policy advocacy to promote agroecology and farmers' rights are important elements of agroecology and should be included in international policy level discussions: mainstreaming agroecology into policies and action plans on development, climate change, biodiversity, at the national, regional and international levels. Over the last 20 years, the rights-based approach has been strengthened, which should link social, economic and environmental dimensions. There are various policies at the international level, for example: Policy (in)coherence in international treaties, the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture (FAO Seed Treaty) and the International Convention for Protection of New Plant Varieties (UPOV).
6. **Yang Puyun:** Use of organic and biological fertilizers can improve the quality of the fruit as well as the quality of the soil. Several measures are applied to protect soil health, as well as the conservation and enhancement of beneficial fauna to maintain crop health. The quality of agroproducts increased significantly after transformation to ecological practices. But what is the role of rural institutions in agroecological transformations? The main objective of rural institutions that have been established for agroecological transformations are to help pay farmers for ecoservices. As ecological products receive higher prices, compared to conventional products, rural institutions should ensure quality control through monitoring, certification and assisting farmers access markets.

Discussion and Synthesis

The session focused on the role that civil society organizations play in supporting agroecology. The role of civil society organizations has been important since agroecology emerged from farmers as an alternative to the problems related to modern, large-scale, agriculture with high levels of



synthetic inputs. The speakers in this session applied concepts to the human elements of the agriculture and food system, focusing on how different social organizations build connections among the human actors including farmer-to-farmer, farmer-to-consumer, farmers and scientists, farmers and policy-makers.

Despite differences in ethnicity, culture, social and political systems, Asian countries share one commonality: the majority of the populations are ethnic minorities, who are engaged in small-scale farming. Agriculture is their most important means of livelihood. With a long history of farming, they have also developed their own social norms and self-governing system dealing with nature through their ecological beliefs and sustainable use.

The importance of rural society, which is the foundation of the country's security, is increasingly evident and many pilot social experiments, led by intellectuals and scholars, have been developed. Among them, Zhang Jian, Dr Y.C. James Yen, Scholar Liang Shuming and Lu Zuofu.

At the beginning of the twenty-first century, the New Rural Reconstruction movement emerged to address three agrarian issues: to protect farmer's rights, to promote social ecological agriculture and self-governance system based on community's traditions and norms. College students, youth, farmers and farmer organizations, citizens in the society have all participated in ecological agriculture or agroecology development, institutional development in rural areas as well as culture regeneration for ecocivilization.

There was discussion about the role of social organizations that enable cooperation among farmers and building trust between farmers and consumers. One of the challenges of formal certification systems in China is that consumers do not trust them. By contrast, community supported agriculture and participatory guarantee systems build trust through direct relationships, so that farmers can be rewarded for agroecological practices and consumers can feel confident about their food. Cooperatives also help small-scale, isolated farmers who are engaged in agroecology to combine resources and gain access to new markets.

Social organizations play an important role in the learning process in support of agroecology. Farmer knowledge is a key component of agroecology, and social organizations help build learning networks among farmers through farmer field schools (FFS), the farmer seed network, farmer cooperative network, so that knowledge can be built and shared effectively. Related to this, civil society organizations are also instrumental in identifying and promoting innovations in agroecology. For example, the Indian Government has adopted locally generated agroecology innovations on a large scale.

Civil society organizations also have an active role in advocacy at the global level. As Yoke Ling from Third World Network explained, industrial agriculture and the economic development models linked to it are causing threats that are global in nature: to biodiversity, seeds, farmers, food security and public health through water, air and soil pollution. Mainstreaming agroecology cannot happen in a vacuum: it requires attention to all related global institutions and issues.

In an example from China, the work of social organizations, such as farmers' associations, connect to other important institutions that combine to support agricultural development. Rural institutions, whether government or non-governmental, need to ensure farmers are rewarded for agroecological practices.



5) Closing (nutrient, water) cycles in agroecology: opportunities and challenges

Speakers

1. Creating virtuous cycles in soil management to reduce fertilizer use in Africa (**Paul Mapfumo**, *Soil Fertility Consortium for Southern Africa*)
2. Animal wastes into biogas (**Zhang Keqiang**, *AgroEnvironmental Protection Institute*)
3. Charcoal-applied environmentally-friendly farming with livestock (CEFL) model for small-scale farmers in central Viet Nam and the derived model in Mekong Delta (**Yosei Oikawa**, *Tokyo University of Agriculture and Technology*)
4. Towards improving manure management in China (**Ma Lin**, *Chinese Academy of Agricultural Sciences*)
5. Closing energy cycles in agriculture (**Zejiang Zhou**, *IFOAM Organics International*)
6. Recycling city waste (**Debra Turner**, *Food and Agriculture Organization of the United Nations*)

Concluding synthesis by **Ma Lin** (*Chinese Academy of Agricultural Sciences*) and **Keisuke Katsura** (*Tokyo University of Agriculture and Technology*)

Summaries of the presentations

1. **Paul Mapfumo:** In Africa the focus is on transforming African agriculture and food systems through management of soil ecological processes, where 80 percent of food production in Africa comes from smallholder farmers. Huge yield gaps exist as a result of poor soil fertility. Large-scale commercial agri-businesses do not necessarily benefit smallholders and the benefits from small-scale agriculture are ignored in favour of monocultures with large amounts of inputs. There are several links between soil biogeochemical processes and poverty traps that result from the loss of agroecology. Vulnerable households are more dependent on local ecological diversity. Therefore the focus is on 1) harnessing local ecological diversity; 2) managing different quality organic resources for improved soil health; 3) using agroecological principles to reclaim degraded soils; 4) intercropping, rotational and mixed cropping systems sustaining yields and food provision for most African farming families; 5) soil geochemistry applications for agriculture and health.
2. **Zhang Keqiang:** The output of Chinese animal husbandry rapidly increased by more than 80 times between 1980 and 2014. At the same time, animal waste production also increased, currently estimated at 21 to 30 billion tonnes/year. Most animal waste in China is used for traditional composting and biogas, but use of a large part is unknown. Straw was the source of substrate for biogas in the 1970s, livestock manure in the 1980s and today it is diverse, such as manure, straw, vegetable waste, diversified sources and more. Biogas is a potentially useful sustainable method for dealing with China's animal wastes, providing energy and social benefits such as for example reduced pollution and economic benefits.



3. **Yowei Oikawa:** The agricultural extension project in Bach Ma National Park, Viet Nam, improves rural living and nature conservation through the multipurpose use of charcoal and wood vinegar, which is easy and inexpensive for small-scale projects. Charcoal is produced from agrowastes such as rice husks. The charcoal is fed to pigs to prevent diarrhoea and to reduce odour, charcoal is also added to pig manure to produce charcoal organic fertilizer and is used directly as organic fertilizer. Organic vegetables are produced and sold at local markets and festivals. Thirty-six farmers have been certified, and are expected to transfer the model to other farmers.
4. **Ma Lin:** China is now the world's largest livestock producer, however it has only the fourth highest level of productivity. Since the 1980s there has been a transition from mixed systems to landless, roughly half of all livestock units today. Agriculture is the main non-point source of pollution, with high N losses from animal husbandry; for example into waterways. The Chinese Government announced a 15-year National Plan on sustainable agricultural development (2015–2030), with five main aims: productivity, pollution mitigation, water efficiency, increasing ecological function and protection of land resources. China also plans for zero increase in fertilizer use by 2020 by improving the structure of fertilizer application, the methods used and their efficiency. The functional model Nutrient Flows in Food Chains, Environment and Resources use or NUFER model facilitates understanding of nutrient flows through the whole manure management chain. Most N losses occur during the housing and storage stage, manure management should focus on these stages. Strategies to increase the fertilizer replacement rate are: 1) consideration of manure as a resource, 2) adoption of a strict environmental policy and/or incentives for recycling manure, and 3) development of recycling techniques throughout the manure management chain.
5. **Zejiang Zhou:** Organic agriculture is a production system that sustains the health of soils, ecosystems and people. The system is based on principles such as health, ecology, fairness and care. Purchasing external inputs is costly and difficult for most farmers. The ability to generate effective alternatives to external inputs on farm at no or low cost, while obtaining good yields, increases the viability of farms: organic matter increases as well as water use efficiency and soil stability. Organic systems have been shown to obtain higher yields during years of extreme climate. Nitrogen-fixing bacteria in the soil and in rice plants provide nitrogen to the agroecosystem. Natural systems are used to regulate pest outbreaks, e.g. beneficial insects eat pests: flowering plants in the fields and along the borders serve as a refuge for insects. Another method is the 'push-pull' method, which improves N-fixing, repels pests, suppresses weeds, hosts beneficial insects and traps pests. An example has shown how using organic compost outperformed the use of chemical fertilizers.
6. **Debra Turner:** Nutrient management and recycling in urban areas is far more complex than at a small-farm level because of the large import of nutrients into cities. The processes involved in making fertilizers consume massive amounts of resources such as electricity for nitrogen fixation and phosphorous mining. Nutrient losses are a waste of resources and money (landfill, sewage, etc.) and can cause problems including algal blooms, groundwater contamination and fish kills. How can we close waste gaps and reduce our reliance on external inputs?



The use of (treated) sewage products in agriculture and organic waste can be composted. However, these treatments and collections are costly. Debate continues about standards for treatment of water and sludge, raising questions about how to apply the resulting materials. The public perception of the use of biosolids for food production is a challenge. Less simple solutions would be the extraction of phosphorous from waste, urine separation in sewage systems and use of ash from the incineration of organic waste to fertilize crops. More analysis and research is needed and increased public awareness.

Discussion and Synthesis

The presentations focused on nutrient cycles, from large- to small-scale. At the large-scale, a systems approach toward the management of manure in China was discussed, recognizing that livestock production and manure quantities are rapidly increasing, while management is currently not sustainable. There are many opportunities for improving management and of addressing all aspects of the Chinese Plan for Sustainable Agriculture Development.

Still, on the large-scale, the current status of recycling water waste from cities was outlined, where there is great potential but poor understanding of the environmental costs and benefits, and poor public understanding. Moreover, at the large-scale, there is the potential for using animal waste for biogas production in China, which is receiving interest from the government for investment and may be a key method of recycling animal waste from agriculture.

Another route to recycling was presented about making charcoal from rice husks and combining with feed for piglets in Viet Nam, thereby producing good manure to combine with compost. Smallholder farmers need this type of organic and low-cost fertilizer, although the quantity of materials required makes this method less realistic for smallholders.

On a landscape and farm scale, two presentations demonstrated many solutions to cycling nutrients on a farm. In Zimbabwe, the point was made that conventional agriculture has consistently ignored the value of harnessing the local diversity occurring in fallows, using different local resources to build soil health, using agroecology to rehabilitate landscapes, and using the design of mixed systems, all with great potential for sustaining agriculture. From the viewpoint of organic agriculture, the focus on health not only for people, but also for soils, plants and animals, leads to greater diversity of farmer-based means for use as alternatives to external inputs and to close cycles.

The discussion focused on the fact that many of the issues and problems presented in solving waste and nutrient pollution come from a broken system. The question was asked: couldn't we focus on 'upstream' solutions that will reduce waste at its source? For example, large-scale livestock operations lead to over application of waste on the land around the operation, as the actual costs of the energy used to carry waste to where it is needed is unaccounted for. It was noted that with respect to waste, agroecology cannot limit its outlook to agriculture alone. Thinking in terms of systems is needed in policy development for multidisciplinary discussion and planning. What may be needed is better design so as to integrate farms with cities, with improved data to support such innovations.



6) Landscape arrangements

Speakers

1. FAO's Regional Rice Initiative: Landscape management approaches for sustainable Intensification of rice production in Asia (**Johannes Ketelaar**, *Food and Agriculture Organization of the United Nations*)
2. Landscape approach for agricultural clean production (**Zhang Qingzhong**, *Chinese Academy of Agricultural Sciences*)
3. Balance with forest and crop field (**Zhang Zongwen** and **Devra Jarvis**, *Bioversity International*)
4. Tea Systems in Yunnan (**Sailesh Ranjitkar**, *Kunming Institute of Botany*)
5. Management of drinking-water catchments in agricultural landscapes (**Alexander Wezel**, *Institut Supérieur de l'Agriculture Rhône-Alpes*)
6. Improved technology of upland rice effect on environment protection – experience from mountainous area of southern Yunnan (**Feng Lu**, *Yunnan Academy of Agricultural Sciences*)

Concluding synthesis by **Mei Xurong** (*Chinese Academy of Agricultural Sciences*) and **Len Wade** (*Graham Center for Agricultural Innovation*)

Summaries of the presentations

1. **Chang Tianle:** To meet the rice demand in 2035, there is need for an additional 114 million tonnes of rice. The challenges faced by Asian rice production are lack of availability of land, labour and water. In addition, productivity needs to be increased and efficiency improved. FAO developed the Regional Rice Initiative in Indonesia, The Philippines and the Lao People's Democratic Republic. Under the Initiative, rice farmers and producers are supported in applying sustainable rice production practices to rice ecosystems and landscapes. Farmers are also assisted in increasing rice production and improving resource use efficiency, and ultimately improving food and nutrition security. Capacity-building for the sustainable intensification of rice production is conducted through farmer field schools (FFS) and has resulted in increased productivity of rice. The Regional Rice Initiative also informs policy processes, especially related to national rice strategies or policies with due consideration being placed on the multiple goods and services provided by rice production systems and landscapes.
2. **Zhang Qingzhong:** Nitrogen and phosphorous discharge from agriculture contributes to 57.2 percent and 67.3 percent of total pollutants in China, respectively. Agricultural clean production is the win-win resolution for food security and non-point source pollution control. In this approach it is important to consider anthropogenic forces and to emphasize the power of nature and humans. Agroecosystems are extensive and closely coupled natural-human systems can provide ecosystem services beyond yield. Rural landscape protection and research are important in promoting clean agriculture production. Examples of landscape approaches that enable clean agriculture production are: 1) cropland-ditch landscapes for



the purification and sedimentation of suspended particles; 2) cropland-pond landscapes, including irrigation and interception of runoff; 3) village-cropland landscapes where sewage enters the paddy field for purification.

3. **Zhang Zongwen and Devra Jarvis:** Agroecosystems are supporting life on the planet. Biodiversity is a core component of agroecology and plays an important role in sustaining the stability or resilience of agroecological systems. However, biodiversity is decreasing in agroecosystems as a result of monocultures of crops and trees on farms, ecosystems and landscapes. In addition, instability of agroecological systems threatens sustainable nutrition, food systems and the livelihoods of smallholder farmers. Evidence from Uzbekistan has shown that varietal diversity in farmer's fields improves the production and resilience of farming systems. Numerous crops are cultivated in the dryland ecosystems on the loess plateau in China. Crop diversity not only sustains fragmented farmland in dryland ecosystems, but also provides the necessary nutrition and food for local people. However, loss of biodiversity, climate change and land degradation on the loess plateau are threatening the sustainability of local farming systems. Mainstreaming variety and species diversity into farming systems is key to sustainable productivity.
4. **Sailesh Ranjitkar:** Tea is an important good in Yunnan province, where the descendants of the earliest tea farmers live. Three main types of tea systems can be found in Yunnan: Forest tea/traditional garden, monoculture with and without shade. In western Yunnan agroforestry can also be found within tea systems. Climate change, however, is impacting tea in Yunnan, mostly from drought and frost damage, as tea plants are not adapted to these conditions. There is a need to define new areas and agroecosystems for tea; to shift the plucking period to increase the growing season; change crop management to diversification and mixed cropping such as agroforestry using native, economically important and nitrogen fixing trees.
5. **Alexander Wezel:** Agriculture has intensified over the past five decades, resulting in an increase in yields, but has also caused significant environmental problems, such as loss of biodiversity, pesticide contamination of soils, water and food and the eutrophication of water bodies. In Europe and in other regions of the world, today a particularly high nitrate contamination of groundwater resources has been determined. An improvement in drinking-water catchments in agricultural landscapes can only be achieved by implementing a landscape approach. This means establishing a combination of different farming practices in large parts of the catchment at different scales, restoring or conserving different semi-natural landscape elements, and in crucial areas, strongly intensifying or even, if necessary, abandoning agriculture. The way of implementing these different practices needs to be adjusted in relation to local, regional, and national regulations and policy-frame conditions. Also local pedo-climatic and cultural situations in the catchment, as well as farmers' constraints and possibilities for adapting or redesigning their systems, should be taken into account.
6. **Feng Lu:** Forty percent of the surface of Yunnan province is mountainous, there is a high poverty rate and many different ethnicities. Upland rice cultivation has a long history in the area. Improved upland rice technology is a comprehensive technology having the specific



objective of increasing rice production in upland regions, and includes the introduction of improved upland rice varieties, terrace construction, fertilizer use and training of farmers. The core technology comprises improved upland rice varieties with supporting measures taken by local government in accordance with local conditions and needs in the implementation process. Three rural household surveys were conducted based on the introduction of improved upland rice technology: 1) 'Food security and slash-and-burn', which showed a boost in yield per unit and a distribution of improved upland rice technology over more than 60 percent of the main traditional upland rice producing areas in Yunnan; 2) 'Income generation and land saving' showed an increase in farmers' income resulting from land saving in food crops; 3) 'Market development and intensive management of land', the diversification of cash crops showed the development of a market economy.

Discussion and Synthesis

To introduce the session, many factors were mentioned as likely to be critical in landscape arrangements, and hence, needing to be recognized and understood:

- » Off-site: air, water, soil – river, reservoir, groundwater, ocean (silt, nutrients, chemicals)
- » On-site: need to keep soil, nutrients, organic matter in place (erosion, leaching, percolation)
- » On-surface: need to retain ground cover, balance, biodiversity (rotation, livestock, canopy)
- » Dynamic balance in natural and intervened systems: management (above and below ground)
- » These parameters could shift under climate change, requiring modified solutions

Six contrasting papers were presented that covered all aspects of landscape arrangements. Several main principles were drawn from the papers presented and ensuing discussion. The first principle covered was maintenance of ground cover to prevent runoff, erosion, leaching, percolation and nutrient and soil loss. Second, the presentations expressed the importance of maintaining biological complexity, including practices or farming systems such as crop rotation, intercropping, mixtures, livestock and rice–fish integration. Third, *in situ* resources should be maintained, including nutrient balance, organic matter content, and integration of crop residues in the soil. In addition, it is essential that a dynamic equilibrium is maintained among system components for sustainability. The final major principle discussed was the importance of maintaining adapted systems for prevailing climates, for example by adjusting crop species and farm management.

The effect of landscape arrangements may take 10 to 15 years to improve drinking-water. Therefore, a long-term perspective for landscape arrangements is essential. One of the discussion points was about incentives, for example private incentives related to the improvement of water quality through landscape arrangements, so that water companies have less need to treat the water. In addition, in order to scale up landscape approaches, all relevant stakeholders within the landscape need to be engaged.

As a result, the following recommendations arose from the session discussion and synthesis:

- » Recognize and make good use of functional differences and diversities in the catchment/watershed, so as to balance food production and agroecological protection.



- » Design mechanisms to ensure a balance of interests among communities in the catchment/watershed, through identification of practical solutions, which may require consideration of financial support and subsidies, to ensure the performance of landscape arrangements.
- » Under climate change, such scenarios may need to shift, e.g. tea systems may require a change in cultivar or management, or move to cooler locations under global warming.

The overriding recommendation to take forward from Landscape Arrangements was that the landscape must retain adapted cover, biodiversity and *in situ* resources.

7) Innovative markets for agroecology: where next for China?

Speakers

1. Relationship marketing: Farmers' markets and community supported agriculture (**Chang Tianle**, *Beijing Farmers' Market*)
2. Agroecology and poverty reduction in rural areas in China (**Liu Yuan**, *Oxfam*)
3. Alternative food networks in China (**Shi Yan**, *Shared Harvest Agriculture Development Ltd.*)
4. The mis-interconnection: when peasant farming encounters modernized consumption (**He Congzhi**, *China Agricultural University*)
5. Example of project linking small-scale agroecological producers to the market (**Sokharith Touch**, *GRET*)
6. Linking public procurement and sustainable production systems: opportunities and open questions (**Israel Klug** and **Caterina Batello**, *Food and Agriculture Organization of the United Nations*)

Concluding synthesis by **Jim Harkness** (*Institute for Agriculture and Trade Policy*) and **Allison Loconto** (*Institut National de la Recherche Agronomique and Food and Agriculture Organization of the United Nations*)

Summaries of the presentations

1. **Chang Tianle:** The Beijing farmers' market was launched as a platform for producers and consumers to meet and trade. This market is a platform in the true sense, as it has provided the base for experimenting with different market forms and different ways of bringing producers and consumers together to build a community that uses the market place as an important site for learning and experimenting. As an economically viable form, this innovative market empowers both farmers and consumers, giving them both a fair price. Farmers feel respected and remain committed to sustainable farming, while consumers are empowered to organize themselves in order to become coproducers in the food system. The farmers' market provides true traceability, transparency, local, direct sale and fair trade, no artificial additives and simple packaging.
2. **Liu Yuan:** The extreme poverty rate in China has decreased from 47 percent in 1990 to 14 percent in 2015. Yet, there are still 14 contiguous areas that have been left behind. When discussing agroecology and poverty reduction in China, a number of ideas were presented



about how agroecology can contribute to poverty reduction. Agroecology could support science and technology in dealing with environmental pollution and problems in mountain areas. The practice of diversity in agroecology and the promotion of local knowledge and traditional cultures can help reduce poverty. Specifically through farmers' markets, participatory guarantee systems and support for seed networks. Knowledge sharing and co-produced knowledge by researchers and farmers is an important matter to be included in policy.

3. **Shi Yan:** Alternative food networks in China are redefining the questions of luxury and poverty through the rediscovery of harmony between the three factors of Chinese life: people, climate and soil. An example is the Shared Harvest Farm, a form of community supported agriculture (CSA). Where 80 percent of the vegetables produced go to members of the Shared Harvest Farm, 20 percent goes to consumer organizations, where there are designated pick-ups, and 5 to 10 percent of the produce is sold to farmers' markets such as the Beijing farmers' market. At the start, the farm used crowd funding to obtain a small amount of investment money from consumers, to ensure they would be committed to the farm. The community supported agriculture model, where to start consumers purchase shares, there is the motivation to vary farm production and opportunities are created to diversify market channels.
4. **He Congzhi:** Alternative food practices and food movements help articulate the central contradiction of the late twentieth-century global food system. For example the impasse experienced by smallholder farmers and the health risks of urban consumers resulting from the consumption of unsafe food. 'Nested-market' practices have been developed, which aim to promote the direct connection between rural peasant producers and urban consumers in Mainland China. However, various problems and obstacles have also emerged. There are disconnects between logistics employed by urban consumers and rural producers regarding food quality standards, the types of market exchanges they seek such as e-commerce versus direct sales, and the preference for 'good and cheap' food. These discrepancies are found at the interface between the different types of modernization between rural and urban – the gap between producers and consumers is widening and deepening.
5. **Sokharith Touch:** Local collectors are important in facilitating the market relationships between producers and consumers in Siem Reap province in Cambodia. Smallholder farmers face difficulties in adapting their local production to the rapidly increasing population, adapting their production as dictated by difficult natural conditions and competition with other producers who have greater market power. Local collectors can help diversify product availability throughout the year for consumers and help producer groups gain access to larger markets. These collectors are also engaged in assisting producers meet ecological standards. Local collectors are farmers with complementary business activities, such as providing advice about vegetable production practices, collecting and transporting produce to markets, sharing market information and maintaining social contact by living in the same community.
6. **Caterina Batello:** Public procurement offers an innovative market for agroecology, as these buyers are not acting from a profit motive, but demand specific quality standards. By creating targeted purchases of agroecological products, public actors can bring together the principles



of sustainability, food security, legality and equity. Targeted, predictable and regular public procurement of food can provide a reliable market for agroecology, but is not sufficient on its own. The objectives of public procurement of food are food system regulations, prices and strategic food reserves, catering services for public employees; food access and promotion of nutritious food habits, e.g. school feeding, food access for vulnerable people and nutritional programmes or interventions.

Discussion and Synthesis

Markets for agroecology exist; they are nested within territories, they are diverse, innovative, and focus on closing the gap between rural and urban, producers and consumers that has been created through modernization processes. These innovative markets are based on trust and the direct relationships between producers and consumers. Markets are places where different ideas can be experimented and there is a snowball effect with these experiences where new outlets and new stakeholders are brought together into networks. While consumers are increasingly becoming aware of the benefits of agroecology, there is a need for more information for both producers and consumers about agroecology, the reasons why indigenous seeds are important and the benefits of agroecology for both producers and consumers. Therefore, all of these innovative markets include knowledge sharing and education for producers, consumers and intermediaries. There are, nonetheless, challenges, particularly related to food safety regulations, which are very difficult to meet because they are unsuited to the reality of agroecological farmers, social innovation or innovative markets.

A number of experiences were discussed, which are at Gliessman's fourth level of transition, meaning closer relationships between producers and consumers. Also spill over effects are seen in the development of sustainable lifestyles for urban people, but the fifth level, a full paradigm shift in the global food system, has not been reached yet. The experiences in China have demonstrated that market innovations can play a primary role in this transition to the transformation into a global food system and these initiatives need to be integrated into the networks that are also advocating for policy change and conservation of native seeds. What is exciting about these innovative markets is getting consumers to support this work. It is important, however, that agroecology does not become co-opted by large companies and capitalist markets. Care should be taken in engagement with different stakeholders and there is a need to question which business models are best adapted to the principles of agroecology.

8) Local innovation systems: significance and needs

Speakers

1. Globally Important Agricultural Heritage Systems in China and Southeast Asia (**Min Qingwen**, *Chinese Academy of Sciences*)
2. Farmer field schools for agroecology in China (**Hu Xinmei**, *Yunnan Agricultural Department*)



3. Eco-agriculture for lakes protection: Policies and practice in Chengjiang and Eryuan counties (**Lei Baokun**, *Yunnan Academy of Agricultural Sciences*)
4. Science and technology Farmer Backyard (**Zhang Hongyan**, *China Agricultural University*)
5. Indigenous peoples food systems and intergenerational traditional knowledge sharing in strengthening agroecology (**Nicole Yanes**, *International Indian Treaty Council*)
6. Perennial rice, from theory to practices, for sustainable development in rice production (**Fengyi Hu**, *Yunnan University*)

Concluding synthesis by **Piao Yongfan** (*Food and Agriculture Organization of the United Nations*) and **Steve Gliessman** (*University of California, Santa Cruz*)

Summaries of the presentations

1. **Min Quinwen:** The Globally Important Agricultural Heritage Systems (GIAHS) in China and Southeast Asia are the results of the important coadaptation of a rural community with its environment and its needs and aspirations for sustainable development. The knowledge they contain represents the results of many generations of local innovation, and offer examples of how 'culture' can be brought back to agriculture as living systems. Despite their international designation as GIAHS, all sites face threats and need mechanisms for protection. They are living sites that demonstrate the continuous process of innovation in smallholder agriculture and food systems.
2. **Hu Xinmei:** Farmer field schools (FFS) in China are places for spreading agroecology. In Kunming the focus has been on integrated pest management (IPM) and green development, and the focus is being expanded to include recycling, composting, value chain development, and other practices that can strengthen the agroecological foundation of smallholder farming systems. Leaders are trained in the field in a 'school without walls' with the objective of adding new practices and leadership skills to the local knowledge base. Farmer field schools (FFS) were introduced to Kunming in 2003. Results in Kunming have shown a reduction in pesticide use from 20 to 35 percent and an increase in farm income from 45 to 230 RMB/mu).
3. **Lei Baokun:** In China fertilizer overuse and misuse has caused runoff into waterways, resulting in eutrophication of lakes. Eco-agriculture is practised to reduce pollution from fertilizer and pesticide runoff into two important freshwater lakes in Kunming: Lakes Fuxian and Erhai. This project is part of the countrywide National Ecologisation programme. Although pollution has been reduced, a large number of small-scale farmers have been resettled in the process of installing a large pilot project for the construction of ecological farmland. The project supports several measures, such as return of farmlands to wetlands, adjustment of planting structure, paddy rice and symbiosis of aquatic products in fields and control of environmental pollution from nitrogen and carbon dioxide and more.
4. **Zhang Hongyan:** A new platform for training smallholder farmers, called the Science and Technology Backyard Programme, is being implemented in the peri-urban areas of Kunming city so as to increase local food security. This Programme promotes optimization of the twin



high technologies: increase in yield and efficiency. There is a focus on technology transfer through use of a demonstration zone, farmer visits and guidance is provided to farmers in the growing season, the Programme works to reduce yield gaps with changes in practices and inputs. Local governments are involved in expanding the extension of new technologies.

5. **Nicole Yanes:** Indigenous peoples' knowledge is the result of the intimate relationship between people and their local ecologies. The relationship is constantly changing and is passed from generation-to-generation. Many factors are impacting indigenous knowledge, from climate change to modernization. However, the strong holistic philosophy, coupled with the deep relationship with food, can make use of agroecology to develop a shared ownership of research that respects the rights of indigenous peoples and their spiritual relationship to land and food.
6. **Fengyi Hu:** Perennial rice is being tested in farmers' fields in Yunnan province and shows potential for being a new technology for improving the sustainability of rice production. Perennial rice is a cross between *O. Logistaminata* (wild rice) and *O. Sativa* (annual rice). The benefit of perennial rice over annual rice is the reduction of production steps after the first season, saving input costs. With full farmer participation, traditional knowledge and experience with annual rice can now be tested for possible advantages as compared to perennial rice. If farmers see advantages, they may be encouraged to begin perennialization of their rice paddies.

Discussion and Synthesis

The primary issue that surfaced during the session was the need to strongly link agroecology with local, traditional, and indigenous peoples' knowledge to foster increased development of innovative changes in smallholder food and farming systems. But this cannot happen in the usual top-down system of conventional agricultural education and extension systems. Knowledge generation in agroecology is through the cocreation of knowledge, where science and practice join together in designing and testing new problem-based knowledge. Agroecology is transdisciplinary because different forms of knowledge and experience participate equally in sharing ideas and perspectives on how agroecology can help solve challenges. Agroecology is participatory since all stakeholders share equally in developing and testing innovations and alternatives. Agroecology is action-oriented because it is focused on creating change that improves the sustainability of all three pillars of sustainability – ecological, economic, and social.

Both farmer field schools (FFS) and the Science and Technology Backyard Programme are platforms for transferring knowledge, but there are a few differences. Farmer field schools (FFS) take place throughout the entire season and emphasize learning by doing while focusing on a participatory approach and empowerment of local leaders who eventually assume leadership roles. The Science and Technology Backyard Programme begins with the participatory evaluation of a problem in the field to identify what needs to be worked on, and the focus is on the approach to the whole farm system, where success is evaluated based on improved yield. Both programmes can benefit by deepening the integration of agroecology into all aspects of training, focus of research and community development.



Heritage sites hold 'genes' that are of importance, from plant genes to cultural genes, and this information can be used to protect and promote traditional and indigenous systems around the world. Heritage sites can also function as living laboratories, where farmers and researchers can participate in the shared cocreation of innovative practices and designs for improving the sustainability of smallholder agriculture and food systems.

Smallholder farmers and their farms produce much of the food consumed in the world today. This is especially the case in China where the number of peasant farmers is estimated to be more than 250 million. These farmers have been using agroecological principles for hundreds of years without using the term agroecology. They are continually adapting and changing their farming practices to meet local conditions and needs. Their knowledge and experience are the foundation upon which agroecology is based. Linking researchers and farmers in a participatory, shared, and respectful relationship can build on this foundation in order to co-create innovations and responses to the many pressures facing smallholder farmers around the world. Climate change, consolidation of farms and markets, lack of policy support, and globalization, among others, have forced many of these farmers off their farms and into the cities. Farmer-based training programmes, which are grounded in agroecology, where farmers themselves eventually become the trainers, are proving to be an effective course of action. As stated during the Symposium, farmers should not have to choose between "Farming for a living or farming for the market."



CLOSING SESSION

Speakers

1. Closing remarks by *Ren Wang*, Assistant Director-General, Agriculture and Consumers Protection department, Food and Agriculture Organization of the United Nations
2. Closing remarks by *Wu Kongming*, Vice President Chinese Academy of Agricultural Sciences, presented by *Mei Xurong*, Director, Chinese Academy of Agricultural Sciences

Co-chaired by **Vincent Martin**, *FAO Representative in China* and **Zhang Huijie**, *Vice Director, Department of International Cooperation, Chinese Academy of Agricultural Sciences*

Ren Wang

Assistant Director-General FAO

The Assistant Director-General of FAO thanked all participants for their active participation in the *International Symposium on Agroecology for Sustainable Agriculture and Food Systems*, giving special thanks to the Chinese Academy of Agricultural Sciences (CAAS) for co-organizing the meeting, the Government of France for joint sponsorship, and the Yunnan Academy of Agricultural Sciences (YAAS) for hosting the event. Mr Ren Wang underlined that agroecology is aligned to FAO's Common Vision for Sustainable Food and Agriculture and can contribute to achieving the Sustainable Development Goals (SDGs) – which emphasize the need to produce more with less by creating innovative solutions. Ren Wang expressed his hope that the meeting's recommendations and proceedings would enable a continued dialogue at local and global levels on the sustainability of agricultural and food systems.

The meeting raised debate on the need to promote public policies in support of agroecology; the value of agroecology as a platform for cocreating knowledge through the continuum of farmers to consumers; the need to promote innovations that benefit family farmers; to increasingly engage civil society, farmers' organizations and cooperatives in designing new food systems and informing policy to achieve the Sustainable Development Goals (SDGs); and that agroecology is not a one-size-fits-all solution, but rather a diversity of innovative solutions.

FAO's specific priorities are to: integrate agroecological approaches into its activities; strengthen South–South cooperation to promote agroecological approaches; create multistakeholder platforms for knowledge exchange and capacity-building; and, foster collaboration to further strengthen the scientific base of agroecology and to compile data on agroecology and its multiple benefits. Working with its partners, FAO seeks to bring transformative change to agriculture and food systems not only in China, but throughout the world.

**Wu Kongming**

Vice President, Chinese Academy of Agricultural Sciences (presented by Mei Xurong, Director, Chinese Academy of Agricultural Sciences)

The high expectations of the three-day agroecology symposium were met through the high quality of presentations, discussions and debate, and through the final recommendations. Wu Kongming thanked FAO for the efforts made in holding the meeting in China, and the Yunnan Academy of Agricultural Sciences for its support in organizing a smoothly run and enjoyable symposium. Delegates from government, institutions of higher education, NGOs and private enterprise were thanked for their contribution. The symposium was more than a 'talk show', it was a forum for getting together to brainstorm, air views and apply wisdom towards creating sustainable food systems. Despite differences, people and nature need to harmonize so as to achieve our goals and any one country alone cannot face the transition to agroecology. China's experience in transition from industrial agriculture, which led to an increase in productivity but caused problems such as land degradation, pollution and food safety issues, may provide lessons to others in the region with large populations and scarce resources. We need to enhance understanding, share and exchange knowledge and strengthen cooperation and communication to promote the transition to agroecology.



CASE STUDIES

Box 1. Examples of biodiversity and agroecology used in the rice production region in South China

By Luo Shiming

Institute of Tropical and Subtropical Ecology, South China Agricultural University

Rice is the staple food in China. Principles of biodiversity in agroecology are widely practised in the monsoon rice production regions of Southern China at the scale of the field, agroecosystem and watershed. At the **field level** mutual benefits mechanisms among different species and different varieties within species are used in rice production. Examples of practices in South China are the rice–fish systems in which the fish feed on insect pests, weeds, alga and snails, the rice–duck systems in which ducks release manure, feed on insects, weeds and snails and reduce diseases and plant height. Other examples are the intercropping of rice–hydrophytes, such as rice – water and spinach, rice – yam and rice – water chestnut, and field ridges with diversified plant species, for example vetiver grass or coreopsis around the paddy field and rotation in rice fields.

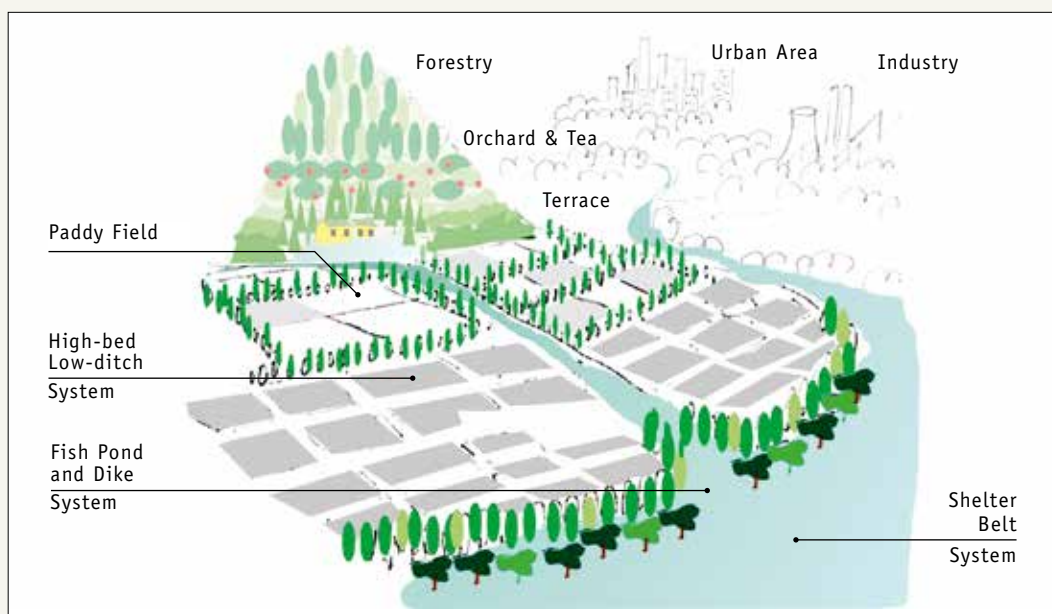
At the **agroecosystem level** the principles of reuse, recycle and reduce are implemented through the use of biodiversity. Examples are the use of rice straw mulch in no-tillage potato cultivation, after the second crop of rice has been harvested, and rice straw is used as a growth medium for earthworm and mushroom production. In addition, rice straw is used as cattle feed as well as an energy source for biogas production.

In South China a typical **watershed** is arranged as follows: forests for water conservation are located at the top of the hill where forest production for economic purposes is prevented. Permanent tea plantations or orchards are grown in the middle of the hill and terraces for upland crops on the lower slopes. Terraces in the valley can also be used for rice production. On the alluvial plain, moving away from the hill, paddy fields are the most popular form of land use. In lowland areas, where the water table is higher, high-bed low-ditch systems are in use, as well as fishponds and dyke systems. Diverse crops are grown in submerged areas and in ponds such as water bamboo, lettuce, water chestnut and mat grass. In the coastal areas windbreaks are planted around the fields to protect against typhoons.





AGRICULTURAL WATERSHED ARRANGEMENT IN SUBTROPICAL CHINA



Box 2. FAO's Regional Rice Initiative: Landscape management for sustainable intensification of rice production in Asia

By Jan Willem Ketelaar

*Food and Agriculture Organization of the United Nations
Regional Office for Asia and the Pacific*

To meet the rice demand in 2035, there is need for an additional 114 million tonnes of rice. The challenges in Asian rice production are the lack of availability of land, labour and water. In addition, there is a need to increase productivity and efficiency and farmers would benefit from learning about agroecological processes so as to increase rice production.

FAO has developed the Regional Rice Initiative. The Initiative is designed to contribute to the Strategic Objective 2 *Make agriculture, forestry and fisheries more productive and sustainable*. Since 2013 support has been provided to three focus countries: Indonesia, The Philippines and the Lao People's Democratic Republic. Under the Initiative rice farmers and producers are supported in applying sustainable rice production practices, such as promoting 'safe and grow' practices, supporting rice ecosystems and landscapes and increasing rice production, improving the efficiency of resource use, and ultimately improving food and nutrition security. Rural households, throughout much of Asia,





particularly in rainfed systems, depend on aquatic biodiversity for year-round food and nutrition security. For example, in rice fields in Asia, we can find more than 100 aquatic organisms that play a significant role in the food and nutrition security of local people. A wide array of fauna can be found that include not only fish, but also eels, snails, shrimps, frogs, crabs and edible insects.

Capacity-building on sustainable intensification of rice production is conducted through farmer field schools (FFS), promoting safe and grow practices (see Table 2). Farmer field schools (FFS) in The Philippines resulted in an increase in rice productivity by at least 10 percent (on average from 5.05 tonnes/ha under conventional system to 6.61 tonnes/ha), cost efficiencies were improved by reducing production costs by at least 15 percent (on average from 6.72 peso/kg under conventional system to 4.38 peso/kg) and increased farm incomes by at least 15 percent (on average from 53 308 peso/ha under the conventional system to 84 701 peso/ha).

The Regional Rice Initiative also informs policy processes, especially the (re)formulation and implementation of national rice strategies or policies with due consideration being given to the multiple goods and services provided by rice production systems and landscapes.

Table 2. **Safe and grow practices**

| Save and Grow innovative Practices | Conventional practices |
|---|---|
| Thorough land preparation (ploughing, first and second harrowing and final levelling) | Not well levelled |
| Best inbred seeds in the location either purified or certified/hybrid | Own saved or certified seeds |
| Planting distance of 20 x 20 cm, 25 x 25 cm and 30 x 30 cm | Planting distance of 20 x 20 cm |
| Transplanting 1–2 seedlings/hill | Transplanting 4–7 seedlings/hill |
| Soil analysis and site specific nutrient management, use of smartphone applications | No soil analysis; no basal fertilizer application |
| Application of organic fertilizer (vermin cast) | No organic fertilizer |
| Alternate wet and dry water management (1–2 cm) | Constantly flooded (3–5 cm) |
| Timely use of rotary weeder | Hand weeding |
| Integrated pest management with additional biological control augmentation | Integrated pest management |
| Planting of vegetables (eggplants, legumes) on the bunds | Not applied |
| Introduction of ducks, rice–fish | Not applied |



Box 3. Farming with livestock model for small-scale farmers in central Viet Nam

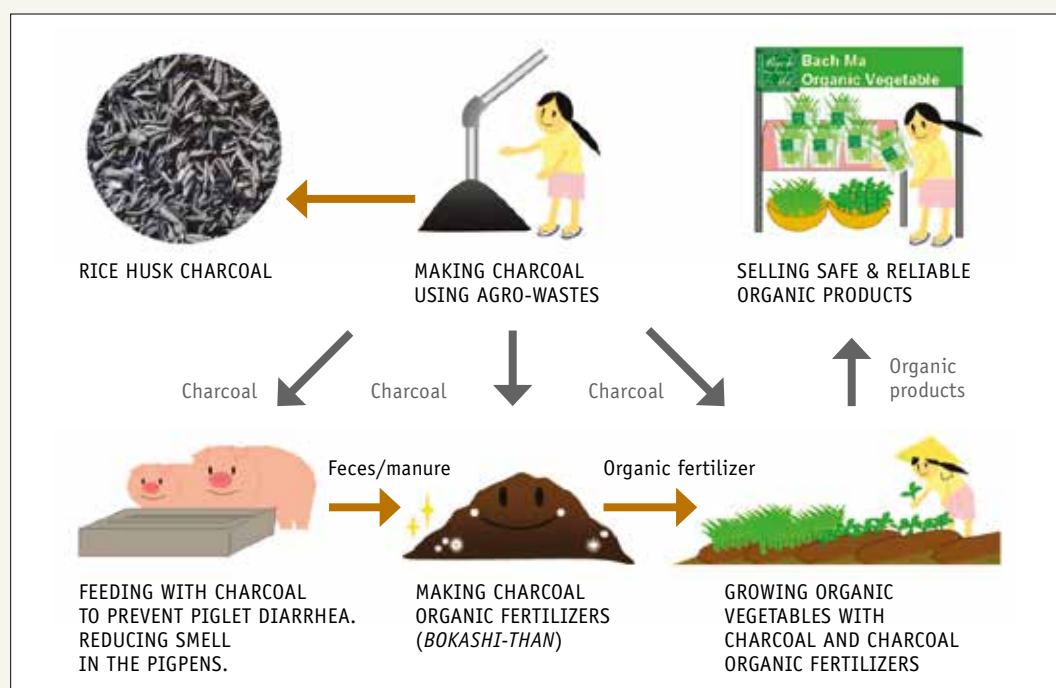
By Yosei Oikawa

Institute of Agriculture, Tokyo University of Agriculture and Technology

The Bach Ma Charcoal Project was conducted by the Tokyo University of Agriculture and Technology and Bach Ma National Park from 2008 to 2013. The Bach Ma National Park is located in central Viet Nam. The aim of the project is to improve rural livelihoods by transferring simple technologies of (agrowaste) charcoal application to small-scale farmers in the buffer zone villages of the national park.

Agricultural production is limited in this region and the inhabitants depend on natural forestry resources, such as firewood, for income. The Tokyo University of Agriculture and Technology reviewed the potentials and limitations of charcoal application farming with livestock activities in Viet Nam.

CHARCOAL APPLICATION FARMING WITH LIVESTOCK



Illustrated by A. Saito

Tokyo University of Agriculture and Technology promotes the charcoal-applied environmentally-friendly farming with livestock (CEFL) model where several dissemination activities are conducted and promoted among small-scale farmers.





The first activity is to practice how to make charcoal from agrowastes such as rice husks and *Acacia mangium* branches. The second activity focuses on animal husbandry and how to improve animal hygiene. When it is fed to pigs and cattle the charcoal improves animal hygiene by: 1) preventing diarrhoea, and 2) reducing unpleasant odours from manure and flies. The third activity contains the preparation of the charcoal-mixed organic fertilizer by mixing rice husks, rice bran, yeast, rice-husk charcoal and animal manure. The soil is very poor in the buffer zone area of the national park and application of the charcoal organic fertilizer improves the poor soil. The fourth activity is the growth of vegetables that receive, besides the charcoal organic fertilizer, natural pesticides such as garlic, chilli and neem. Home gardens are being promoted for people who depend on forest resources for their income, to improve their livelihoods. Finally, sales are promoted in, for instance, local markets and festivals. This is done to raise awareness among consumers and to help farmers market and sell their products.

Training workshops were organized, where experienced farmers provide training, to inform the activities of interested participants. These experienced farmers are certified by the project, so they can transfer their knowledge and experiences to other farmers.

Box 4. Management of drinking-water catchments in agricultural landscapes in France

By Alexander Wezel

ISARA

With the intensification of agriculture over the past four decades, yields have significantly increased. Meanwhile, significant environmental problems have also emerged, such as the loss of biodiversity, pesticide contamination of soils and food, and eutrophication of water bodies. Since the 1970s, one major issue has been the increasing degradation of water quality in drinking-water catchments because of increasing concentrations of nitrate and pesticides. In Europe, and other regions of the world, a particularly high nitrate contamination of groundwater resources has been discerned.

In general, over the past two decades different initiatives, action programmes, and policies have been implemented by either national, regional, or local authorities in many countries throughout the world to improve water quality in drinking-water catchments.





The proposed solutions that have been applied to catchments, where agricultural land use dominates, include: 1) limiting agricultural pesticide and nutrient inputs by implementing adapted or new practices, including conversion of cropland to grassland, 2) improving manure management and stocking facilities, 3) purchasing agricultural land by the institution managing the catchment, and in certain cases lending land to farmers with fixed rules for agricultural practices, 4) conducting reforestation, 5) excluding agriculture, or 6) partially or completely converting to organic agriculture.

A real improvement in drinking-water catchments in agricultural landscapes can only be achieved if a landscape approach is implemented. This means establishing a combination of different farming practices in large parts of the catchment, restoring or conserving different elements of the semi-natural landscape, and in crucial areas strongly intensifying or even, if necessary, abandoning agriculture. Among the most promising farming practices are different agroecological practices that reduce leaching or transfer of nutrients to groundwater or surface water and decrease pesticide use. At the scale of cropping systems there are for example diversified crop rotations, intercropping, cover crops, cultivar mixtures, no or reduced tillage, direct seeding, split fertilization, agroforestry and biological pest control. The integration of semi-natural landscape elements, such as hedges, grass strips and shrubbery, around fields and at farm and landscape scale contributes to reduced nutrient leaching or transference to surface waters, but also provides different ecosystem services to an agricultural landscape such as reduced erosion, improved pollination, and biodiversity conservation.

The method of implementing these different practices needs to be adjusted in relation to local, regional, and national regulations and policy frame conditions. Also local pedo-climatic and cultural situations in the catchment as well as farmers' constraints and possibilities of adapting or redesigning their systems should be taken into account. Thus no universal solutions can be proposed. A voluntary adoption of practices by farmers should be favoured, but experiences so far show that a combination of voluntary adoption, incentives, and regulations may be feasible. Successful examples include the result-oriented approach used in the management of a drinking-water catchment in Germany. Within a voluntary contract framework developed together with the water supplier and farmers, farmers were given the freedom to choose their best practice to manage their farmland. Upon successfully reaching a particular result, in this case a certain nitrate concentration in soils in the autumn, farmers were provided with different payments, depending on the nitrate concentration levels, to compensate them for any yield reductions. With this approach, a very good drinking-water quality has been achieved over a number of years, and this without any water treatment.



FIELD TRIPS

Three field trips were organized on the first day of the Symposium, Monday 29 August. Symposium participants could choose between the following field trips: 1) Policy, 2) Biodiversity or 3) Recycling.

1. Policy field trip

Presented by Lei Baokun

| No | Location / Route | Issues / topics | Remark |
|----|---|--|--|
| 1 | Lotus Ecological Farm | Water-saving, water-reusing, sightseeing agriculture | Utilizing pollution water, reducing fertilizer inputs, controlling agricultural non-point sources pollution. |
| 2 | Dakekou Wetland Park | A wetland converted from agricultural fields has become a wonderful place for a weekend destination. | Tourism development promotes agriculture transformation and water protection. |
| 3 | Mafangcun Wetland Park | Ecorestoration project around Fuxian lake | Sewage from ecological farm is purified by planting various kinds of aquatic plants, and finally drains into the Fuxian lake through the filter. |
| 4 | Chengjiang Lotus Root Starch Factory | Regional industry brand | Lotus root starch is the major industry of Chengjiang, has a long history and a high degree of brand popularity, and is the important part of agricultural industry chain. |
| 5 | Blueberry Ecological Farm | Modern efficient ecological agriculture | Modes of water saving drip irrigation, precision fertilization, intelligent management, ecotourism agriculture. |

The policy field trip comprised a visit to Fuxian lake, which is reported as being the largest deep fresh-water lake in China, with the largest water-storage capacity (206.2 billion m³) in Yunnan province. The lake spans an area of 212 km², with an average depth of 89.6 m and a maximum depth of 155 m. The lake basin is 674.69 km² and the population supported amount to 178 000 people and affects the downstream water quality of six Chinese provinces and Viet Nam. The water cycle takes 200 years to complete, meaning that any pollution of this lake is irreversible in our lifetime.

For this reason – and because of evidence of water pollution resulting from runoff from human sewage, high fertilizer-dependent agriculture and significant livestock effluents, which are the cause of about 80 percent of the pollution – the Chinese Government decided to implement public-private partnerships that would conserve the natural environment and promote agroecological practices. This policy response was multifaceted and comprised an agriculture structural adjustment



programme, and projects covering livestock relocation, the construction of wetlands ecosystems, an agricultural high efficient water-conservation and waste-reduction and tourism. Together these projects represent an ecological agriculture, standardization and landscape approach.

This set of policy responses promoted precision agriculture that reduced pesticide and fertilizer use through the use of soil testing, formulated fertilization, biocontrol technology and farm plastic film recovery technology. This was achieved by introducing low-input, high-value crops such as blueberry (Photo 1), lotus (Photo 2) and walnuts and by working with a specialized cooperatives and leading enterprises. These two organizations rent the land from 15 000 farmers who remained in the watershed. Through the ecomigration portion of the project, 28 000 small-scale farmers moved to urban centres and the 866 ha they left behind are being converted to wetlands and forests. Livestock (99 000 animals) were also relocated by replacing small-scale farms in the runoff area with planned large-scale industrial farms outside the runoff areas. To deal with the new concentration of effluents is being handled by recently constructed biological fermentation plants and biogas digesters. These efforts, combined with the implementation of a natural sewage processing plant (using lotus plants), and the enforcement of water rights and responsibilities, the conservation water rate was 54.1 percent and the total nitrogen and phosphorous draining into the lake was reduced by an average of 75 percent. The results of these efforts are visible in the lake itself (Photo 3) and in the increased green tourism sector that is being created around the lake.

Figure 1. **1) Prof. Luo Shiming explaining the Agriculture Structural Adjustment Programme at the lotus farm; 2) Blueberry farm, Fuxian watershed; 3) Crystal clear water at Fuxian lake; 4) Participants taste lotus root starch, lotus tea at a local lotus farm**



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2. Biodiversity field trip

Presented by Sijun Zheng

| No | Location / Route | Issues / topics | Remark |
|----|---|--|---|
| 1 | Yunnan Wanxin Fruit Co., Ltd.: kiwi plantation in Chijiu town | Agrobiodiversity, integration of ecological agriculture with leisure | The largest chrysanthemum cut flowers production, processing, export enterprise in China as flower seedling development and incubation centres, with 268 mu (17.87 ha) production area in greenhouses with more than 100 ornamental varieties of chrysanthemum from the Netherlands and adapted Dutch horticultural facilities and production technology system |
| 2 | Yunnan Fomdas Flower Co., Ltd. in Yongding town: cut flowers production base | Agrobiodiversity, horticulture, ornamental chrysanthemum production base | Tourism development promotes agriculture transformation and water protection |
| 3 | Chonglou (Rhizomaphysalis) cultivation base in Luomian town: unique traditional Chinese medicine | Agroecology, agroforestry, agrobiodiversity, traditional Chinese medicine Chonglou production chain with 'Forest + Medicine' interplanting ecological system | Fumin Rong Heng Agricultural Science and Technology Development Co., Ltd., the production area has plateau characteristics with Chinese herbal medicines Chonglou (Rhizomaphysalis) being grown on more than 1 000 mu (66.67 ha) on sloping land at more than 2 020 m. Three main varieties are grown using a mountain spring water irrigation system |
| 4 | Baihuashan sweet apple production base with plateau characteristics in Luomian town | Agroecology, Agrobiodiversity, plateau ecological agriculture system combined with fertilizer integration | Development of high-quality brand apples on the plateau at more than 1 000 mu (66.67 ha) and on sloping land at more than 2 400 m, combined with farmers + company management system, ecological production system with high quality sweet apple |

Participants in the biodiversity field trip visited four field sites in Fumin county of Yunnan provinces for the production of: kiwis (three varieties), greenhouse production of cut flowers (up to 200 varieties), chonglou (rhizomaphysalis, a traditional Chinese medicine) and apples (up to 43 varieties) respectively. Fumin is rich in the production of rice, corn, wheat, tobacco, melons wild rice, chestnuts, herbs, bayberry, grape, winter peach, cherry, and grain crops. It is an important region for vegetable production. The climate is typical for low-latitude plateau subtropical monsoon.

All four field sites applied some ecological principles but were not fully organic. The kiwi farm has for example chickens wandering in the field, adding manure to the trees. The chonglou farm



comprises an agroforestry system where the chonglou plants grow in the shade of the trees. One chonglou plant takes 10 years before it is ready for harvest. The apple trees were grown in an intercropping system with legumes. To protect the apples from pests, they are covered for some time with a paper bag.

All farms were based on a new model for organizing agriculture in China, whereby small-scale farmers lease their land to larger-scale farmers or investors who are able to invest in infrastructure and access markets for high-value products, including export markets. In some cases these investors collaborate with research institutes. The small-scale farmers receive the rent for the land, and some are employed as workers on the larger farmers. Village administrators help negotiate the land deals.

Figure 2. **1) Chonglou cultivation base in Luomian town; 2) Greenhouse cut flower production; 3) Production of traditional medicine in the agroforestry system; 4) Baihuashan sweet apple production base with plateau characteristics in Luomian town**



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3. Recycling field trip

Presented by Aidong Cheng

| No | Location / Route | Issues / topics | Remark |
|----|--|--|---|
| 1 | Xiaohe village | Water source protected region: Conversion of cropland to forest and fruit orchard development | Along the way to see the water source protected region in Xiaohe village and understand the policy of Kunming city government for water source protection |
| 2 | Baiyi township | Upstream of Songhua dam reservoir and wetland areas | To visit Lengshui river, organic agricultural farm and wetland of Housuo village |
| 3 | Xiangkeng village of Aziying township | Upland agriculture development | Upland agricultural development situation and diversity |

The recycling field excursion included a visit to the Songhua dam reservoir, which supplies 30 to 40 percent of the drinking-water to Kunming City, along with a tour of the broader catchment area which feeds the reservoir, highlighting the actions and measures the government has taken to protect the water quality in the area. The Kunming City Government's vision involves an integrated approach to land management where land use is regulated according to its proximity to water sources, and since 2006 has been implemented through its *Kunming Songhua Dam Reservoir Protection Regulation*.

Land very close to water sources, such as rivers, has been classified as 'first level' areas. Actions to address water quality in these areas include creating buffer zones around waterways with the resettlement of farmers and reforestation of farmland, combined with compensatory payments to farmers for providing ecosystem services. It is prohibited to use agrochemicals and fertilizers or to raise livestock in these areas so as to prevent the runoff of chemicals and excess nutrients into the waterways. Other employment opportunities have been created for local people to ensure they are responsible for maintaining rivers and streams and keeping them clear of rubbish and weeds. In areas further from water sources farming methods are encouraged and promoted that limit inputs, such as pesticides and fertilizers, and help manage soil erosion. An organic farm was established in 2001 in the area as a demonstration site for local farmers, where they could learn how to manage land and resources to produce high-quality organic vegetables with minimal impact on the environment. Other major water quality initiatives in the basin include the construction of wetlands to filter and purify the wastewater from villages. The wetlands not only act as a giant water purifier, but also provide other ecosystem services such as creating a haven for biodiversity, including many plants, birds and other animals, as well as recreational areas for locals and tourists. Tourism in these wetlands also provides extra income opportunities for local people.



Figure 3. 1) Part of the catchment area of the Songhua Dam Reservoir with Kunming City in the background; 2) Land reclamation area of Xiaohe village. Prior to reclamation the area was used to cultivate rice, now it is a natural area of vegetation with no agrochemical inputs; 3) Compost application and planting of organic vegetables at 'Organic Vegetable Planting Demonstration Base'; 4) Organic vegetable production base



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ANNEXES

Annex 1

Recommendations

International Symposium on Agroecology for Sustainable Agriculture and Food Systems in China

Kunming, Yunnan, China

29 - 31 August, 2016

Final Recommendations

Background

FAO organized the International Symposium on Agroecology for Food Security and Nutrition in 2014 and three regional symposia throughout 2015. Building on the recommendations of these symposia, a multistakeholder International Symposium on Agroecology for Sustainable Agriculture and Food Systems was organized by the Chinese Academy of Agricultural Sciences (CAAS) and FAO in Kunming, China, 29 to 31 August 2016.

The Symposium, hosted by the Yunnan Academy of Agricultural Science with support from the government of Yunnan province, was attended by over 230 participants representing research, government, civil society (including farmer and consumer organizations and NGOs), indigenous peoples, and the private sector from China and over twenty countries from the region and beyond.

The Symposium was held within the context of global challenges and new developments, especially the United Nations 2030 Agenda and Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change. Elimination of hunger, malnutrition and poverty is at the heart of achieving the Sustainable Development Goals (SDGs) at the local, national and global levels. Agroecology advocates innovative solutions to twenty-first century challenges, and a holistic and systematic approach towards achieving the Sustainable Development Goals (SDGs) in the face of climate change, to build sustainable food systems that produce more with fewer environmental, economic and social costs, with a particular focus on benefiting family farmers.

China, as the largest agricultural country in the world, has a history of more than 5 000 years of farming traditions and ecologically-based farming practised by smallholder farmers. The country is now at a critical point of “transition of agricultural development mode”, to reform its agriculture sector through structural adjustment with the dual goal of ensuring domestic food supply and promoting ecological sustainability. Since 2010, the government has launched a series of policy guidelines and strategic programmes, underpinned by broad scope and in-depth research as well as by increasing engagement of civil society, for the sustainable agricultural development and creation of an ‘ecological civilization’.



The Symposium has largely achieved its original objectives of facilitating the exchange of knowledge and experiences, identifying and defining potential entry points for the contribution of agroecology to sustainable agriculture and food systems in China and the region. The Symposium has also catalysed international collaboration to develop ways forward to strengthen agroecological practices and programmes.

Symposium participants agreed to the following recommendations:

Beyond productivity: multiple criteria for assessing the performance of agricultural systems

1. Take human development factors and social dimensions into account in farming/food system analysis and policy development, with a special focus on gender fairness and local empowerment.
2. Identify and develop indicators on the environmental, social, cultural, and economic dimensions of agroecology at different spatial scales (farm, society, national level) and gather data on agroecology, including the very long term. FAO should establish a working group to contribute to this task.
3. Apply frameworks that allow better understanding of the transition to agroecological systems, such as the five levels⁴, from improving efficiency through to agroecosystem diversification, innovative markets and policies.

Promising policies in support of agroecological transitions

4. Promote public policies in support of agroecology, especially those based on long-term processes, assuring the necessary financial mechanisms for their implementation, such as support for climate change mitigation and adaptation and taxation of pollution.
5. Prioritize the monitoring of the impacts of existing public policies for agroecology in various countries towards sustainable agriculture and food systems. Experiences on the impact of policies on agroecology should be shared among countries. FAO should collect information on existing policies on agroecology in Asia, to be included in the FAO Agroecology Knowledge Hub.
6. Promote the participation of farmers and other small-scale producers⁵ in policy formulation and decision-making at all levels. Public policies and legal frameworks should be adapted to local situations.
7. Ensure policy coherence, such that policies that hinder the transition toward agroecology are revised. Different ministries should cooperate to support policies concerning agroecology, for example environment, agriculture, forestry, rural development, health, trade and finance.
8. FAO should sustain its support for agroecology, including through integrating agroecological approaches in regional and national priorities.

4 Gliessman, Stephen R. 2015. *Agroecology: The ecology of sustainable food systems*, Third Edition. CRC Press.

5 The term 'small-scale producers' refers to artisanal fisherfolk, pastoralists, indigenous peoples and forest-dwellers.



Biodiversity as an integral part of agroecology

9. Value and strengthen the roles and contributions of pollinators, trees, beneficial organisms and micro-organisms to agroecosystems, human nutrition, health and well-being.
10. Recognize the essential role of farmer seed systems and strengthen their contributions to agroecology.

Closing cycles and nutrient flows

11. Increase efforts to develop innovative technologies and multistakeholder strategies that reduce waste and pollution at source and close relevant ecological cycles, with a special focus on water, nutrients, manure, energy and long-term effects.
12. Develop research and monitoring from farm to landscape scales to understand the factors causing the difficulties in disseminating the developed technologies.
13. Conduct research for comprehensive understanding of complex problems caused by nutrient flows in food systems.

Managing agroecological landscapes

14. Support the communities managing landscape arrangements to apply their local and traditional knowledge for successful agroecological innovations to retain ground cover, biodiversity and resources.
15. Minimize off-site effects on air, water and land quality caused by runoff, erosion, leaching, percolation, and eutrophication at landscape (farm, watershed, continent, globe) scale.
16. Recognize and make good use of the functional differences along a watershed across landscape levels.
17. Support adaptation to climate change, such as altered landscape temperature and water profiles, which could include adaptation of technologies to new locations.

Local innovation systems

18. Value the importance of the continual process of experimentation and innovation that continues, and has continued for generations, in local, traditional, smallholder agriculture around the world.
19. Value the important role of the farmer field school approach in knowledge generation and learning about agroecological concepts and good practices for improving productivity and rural livelihoods.
20. Support the linkage of academics, smallholder farmers, and indigenous peoples in the research that focuses on the transdisciplinary development of new knowledge and innovation.
21. Globally Important Agricultural Heritage Systems, with their special designation, should not just be conserved, but used as centres of learning about how agroecology and culture work together and innovation can occur.
22. Develop a broad network or platform of agroecology case studies from around the world on smallholder, local, traditional, and indigenous agriculture and food systems for the sharing and exchange of knowledge.



The role of farmer organizations and civil society in agroecological transitions

- 23.** Agroecology should support the culture, way of life and dignity of family farmers. Governments should recognize the key role of farmer organizations and other small-scale producers and civil society in the development of agroecology, dissemination of agroecological innovations and advocacy for supporting policies.
- 24.** Governments should implement farmers' and indigenous people's rights under the International Treaty on Plant Genetic Resources for Food and Agriculture, the United Nations Declaration on the Rights of Indigenous Peoples and other international agreements and instruments.
- 25.** Support internship programmes for students to work with farmer groups and cooperatives, with opportunities for longer-term employment in extension or other agricultural services.

Innovative markets for agroecology

- 26.** Policy-makers should recognize and support existing and emerging equitable markets and networks that connect producers and consumers.
- 27.** Promote institutional innovations that build mutual trust and benefits. FAO could facilitate international platforms on these innovations so as to foster learning and expand the reach of agroecology.
- 28.** Promote public procurement from agroecological producers by adapting procurement protocols to the local realities of agroecological production (e.g. informal trading relations).
- 29.** Create spaces for agroecology by providing public facilities that can be used to host farmers' markets, fairs and festivals, etc.
- 30.** Analyse policies and build capacity to facilitate small-scale producers' ability to exchange their products on their own terms.
- 31.** Collect data, through participatory methods, on the full range of markets for agroecology and produce analyses that can be used by producers, consumers, researchers and policy-makers.



Annex 2

Agenda

Final Agenda

International Symposium on Agroecology for Sustainable Agriculture and Food Systems

Kunming, Yunnan, China

29th – 31st August 2016

| | |
|--------------------------|--|
| SUNDAY, AUGUST 28 | |
| 10:00 – 22:00 | REGISTRATION (participants who have not arrived yet can register Tuesday 30 August) |
| MONDAY, AUGUST 29 | |
| 7:30 – 8:00 | INTRODUCTION ON-SITE VISITS Introduction pamphlet of three thematic on-site visits will be distributed to the participants before they get on board of the vehicles |
| 8:00 – 18:30 | THEMATIC ON-SITE PARALLEL VISITS 1. On-site visit for policy 2. On-site visit for biodiversity 3. On-site visit for recycling |
| 18:30 | DINNER: RESTAURANT ON THE SECOND FLOOR OF YUANTONG BUILDING LAUNCH OF AGROECOLOGY CASE STUDIES (Chaired by <i>Caterina Batello</i>) <ul style="list-style-type: none"> • Launch of Institutional Innovations in Agroecology by FAO (<i>Allison Loconto</i>) • Book presentation of 'Crop Genetic Diversity in the Field and on the Farm: Principles and Applications in Research Practices' by Devra I Jarvis et al. (<i>Song Yiching</i>) • Book presentation of 'Agroecology in China: Science, Practice and Sustainable Management' by <i>Luo Shiming</i> and <i>Stephen Gliessman</i> |



| TUESDAY, AUGUST 30 | | |
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| 8:30 – 9:00 | REGISTRATION MAIN MEETING ROOM AT THE FIRST FLOOR OF THE YUANTONG BUILDING | |
| 9:00 – 10:30 | OPENING SESSION (Co-chaired by Vincent Martin and Zhang Huijie) | |
| | <ol style="list-style-type: none"> 1. Opening remarks by Tang Kaixue, <i>Vice President of YAAS</i> 2. Message from José Graziano da Silva, <i>Director-General FAO</i>, presented by Ren Wang, <i>Assistant Director-General FAO</i> 3. Opening remarks by Wu Kongming, <i>Vice President CAAS</i> 4. Opening remarks by Carole Ly, <i>French Embassy, Beijing</i> 5. Summary of the Regional Meetings held in 2015 in Brazil, Senegal and Thailand (<i>Caterina Batello and Nicole Yanes</i>) | |
| 10:30 – 11:00 | COFFEE BREAK (GROUP PHOTO) | |
| 11:00 – 12:00 | KEYNOTE SPEECHES (Co-chaired by Vincent Martin and Zhang Huijie) | |
| | <ol style="list-style-type: none"> 1. Agroecology and food systems (<i>Steve Gliessman</i>) 2. Agroecology using biodiversity for sustainable food and agriculture in China (<i>Zhu Youyong</i>) | |
| 12:00 – 13:00 | LUNCH: RESTAURANT ON THE SECOND FLOOR OF YUANTONG BUILDING POSTER PRESENTATIONS OUTSIDE THE MAIN MEETING ROOM | |
| 13:00 – 15:30 | TECHNOLOGICAL AND INNOVATION ASPECTS: PARALLEL SESSION 1 (8 MIN FOR EACH SPEAKER) | |
| LOCATION | THE WEST FIRST LECTURE HALL ON THE FIRST FLOOR IN THE AUDITORIUM | THE WEST THIRD LECTURE HALL ON THE SECOND FLOOR IN THE AUDITORIUM |
| | Topic 1: Beyond productivity: Multiple criteria for assessing performance of agricultural systems <ol style="list-style-type: none"> 1. Pollution externalities and soil health (<i>Zhang Fusuo</i>) 2. Enhancing ecosystem services and indicators (<i>Etienne Hainzelin</i>) 3. Climate change (<i>Lin Erda</i>) 4. Social performance of agriculture and agroecology (<i>Afsar Jafri</i>) 5. True costing/TEEB (<i>Harpinder Sandhu</i>) 6. Lessons of rural reconstruction for assessing performance of agricultural systems (<i>Chen Jie</i>) | Topic 2: Biodiversity as an integral part of agroecology: achievements and challenges in policy and practice <ol style="list-style-type: none"> 7. Nutrition and biodiversity (<i>Maryam Rahmanian</i>) 8. Integrated pest management in China (<i>Zheng Jianqiu</i>) 9. Biodiversity and agroecology used in field crop production (<i>Luo Shiming</i>) 10. Pollination: A key agroecological function (<i>Barbara Herren</i>) 11. Agroforestry (<i>Xu Jianchu</i>) 12. Farmers' seed networks for climate change resilience in China (<i>Song Yiching</i>) |
| | Concluding synthesis – Etienne Hainzelin and Zhang Fusuo | Concluding synthesis – Maryam Rahmanian and Peter Kenmore |



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| 15:30 – 16:00 | COFFEE BREAK | |
| 16:00 – 18:30 | SOCIO-ECONOMIC AND POLICY ASPECTS: PARALLEL SESSION 2 (8 MIN FOR EACH SPEAKER) | |
| LOCATION | THE WEST FIRST LECTURE HALL ON THE FIRST FLOOR IN THE AUDITORIUM | THE WEST THIRD LECTURE HALL ON THE SECOND FLOOR IN THE AUDITORIUM |
| | <p>Topic 3: Promising policies in support of agroecological transitions</p> <ol style="list-style-type: none"> 1. Multifunctional approaches in European Union policies and on French law experience (<i>Laurent Bochereau and Carole Ly</i>) 2. Environmentally friendly agriculture; including subsidies for farmers for environ-friendly labelling in the Republic of Korea (<i>Ji-Hyun Kim</i>) 3. Comparative analysis of the policy frameworks in place in each country of the Mekong region (Cambodia, Laos, Myanmar and Vietnam) in regards to support to agroecology (<i>Htet Kyu</i>) 4. Local policy support in Yunnan (<i>Sijun Zheng</i>) 5. New policies and vision related to agroecology in China (<i>Mei Xurong</i>) 6. Promising policies in support of agroecological transitions from Indonesia (<i>Zainal Arifin Fuan</i>) <p>Concluding synthesis – Luo Shiming and Peter Kenmore</p> | <p>Topic 4: Socio-economic dimensions of agroecology: the role of civil society, NGO, farmer organizations, in agroecological transformations</p> <ol style="list-style-type: none"> 1. Rural reconstruction in China (<i>Zhang Lanying</i>) 2. Farmers associations and their role in Agroecology (<i>Yuan Peng</i>) 3. Inter-regional and inter-sectoral exchanges among small-scale food producers and civil society organizations to promote sharing of agroecological knowledge (<i>Shi Yan</i>) 4. The economic impacts of different models of agricultural development on small farmers (<i>Afsar Jafri</i>) 5. Third World Network (<i>Yoke Ling Chee</i>) 6. Rural institutions for agroecological transformations (<i>Yang Puyun</i>) <p>Concluding synthesis – Zhang Lanying and Jim Harkness</p> |
| 19:30 | <p>DINNER WITH VIDEOS SHOWN. (RESTAURANT AT THE SECOND FLOOR OF YUANTONG BUILDING)</p> <ul style="list-style-type: none"> • Video on agroecological reduction of pesticides on coffee in Latin America by Rotterdam Convention (<i>Caterina Batello for Christine Fuell, FAO</i>) • Videos about World Natural Heritage-Hani paddy terrace and colourful Yunnan | |



| WEDNESDAY, AUGUST 31 | | |
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| 8:30 – 9:30 | KEYNOTE SPEECHES (Chaired by Zhang Huijie) THE WEST FIRST LECTURE HALL ON THE FIRST FLOOR IN AUDITORIUM | |
| | 1. Social dimensions of sustainable agriculture in China by Professor Ye Jingzhong 2. Innovations and market challenges by Allison Loconto | |
| 9:30 – 10:00 | COFFEE BREAK | |
| 9:00 – 12:30 | TECHNOLOGICAL AND INNOVATION ASPECTS: PARALLEL SESSION 3 (8 MIN FOR EACH SPEAKER) | |
| LOCATION | THE WEST FIRST LECTURE HALL ON THE FIRST FLOOR IN THE AUDITORIUM | THE WEST THIRD LECTURE HALL ON THE SECOND FLOOR IN THE AUDITORIUM |
| | Topic 5: Closing (nutrient, water, etc.) cycles in agroecology: opportunities and challenges 1. Creating virtuous cycles in soil management to reduce fertilizer use in Africa (<i>Paul Mapfumo</i>) 2. Animal wastes into Biogas (<i>Zhang Keqiang</i>) 3. Charcoal-applied Environmentally-friendly Farming with Livestock (CEFL) model for the small-scale farmers in central Viet Nam and the derived model in the Mekong Delta (<i>Yosei Oikawa</i>) 4. Towards improving manure management in China (<i>Ma Lin</i>) 5. Closing energy cycles in agriculture (<i>Zejiang Zhou</i>) 6. Recycling city waste (<i>Debra Turner</i>) Concluding synthesis – Ma Lin and Keisuke Katsura | Topic 6: Landscape arrangements 1. FAO's Regional Rice Initiative: Landscape management approaches for sustainable Intensification of Rice Production in Asia (<i>Johannes Ketelaar</i>) 2. Landscape approach for agricultural clean production (<i>Zhang Qingzhong</i>) 3. Balance with forest and crop field (<i>Zhang Zongwen and Devra Jarvis</i>) 4. Tea systems in Yunnan (<i>Sailesh Ranjitkar</i>) 5. Management of drinking-water catchments in agricultural landscapes (<i>Alexander Wezel</i>) 6. Improved technology of upland rice effect on environment protection – experience from mountainous area of southern Yunnan (<i>Feng Lu</i>) Concluding synthesis – Mei Xurong and Len Wade |
| 12:30 – 13:30 | LUNCH WITH POSTER PRESENTATIONS. RESTAURANT ON THE SECOND FLOOR OF YUANTONG BUILDING, PLACE FOR POSTER PRESENTATION REMAIN UNCHANGED | |



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| 13:30 – 16:00 | SOCIO-ECONOMIC AND POLICY ASPECTS: PARALLEL SESSION 4 (8 MIN FOR EACH SPEAKER) | |
| LOCATION | THE WEST FIRST LECTURE HALL ON THE FIRST FLOOR IN THE AUDITORIUM | THE WEST THIRD LECTURE HALL ON THE SECOND FLOOR IN THE AUDITORIUM |
| | Topic 7: Innovative Markets for Agroecology: where next for China? <ol style="list-style-type: none"> 1. Relationship marketing: Farmers' markets and community supported agriculture (<i>Chang Tianle</i>) 2. Agroecology and poverty reduction in rural areas in Chinese (<i>Liu Yuan</i>) 3. Alternative food networks in China (<i>Shi Yan</i>) 4. Constructing nested market: An alternative way of rural development and poverty alleviation (<i>He Congzhi</i>) 5. Example of project linking small-scale agroecological producers to market (<i>Sokharith Touch</i>) 6. Linking public procurement and sustainable production systems: opportunities and open questions (<i>Israel Klug and Caterina Batello</i>) | Topic 8: Local innovation systems: significance and needs <ol style="list-style-type: none"> 1. Globally Important Agricultural Heritage Systems in China and Southeast Asia (<i>Min Qingwen</i>) 2. Farmer field schools for agroecology in China (<i>Hu Xinmei</i>) 3. County government Lishui City/Eryuan County (<i>Lei Baokun</i>) 4. Science and technology farmer backyard (<i>Zhang Hongyan</i>) 5. Indigenous peoples food systems and intergenerational traditional knowledge sharing in strengthening agroecology (<i>Nicole Yanes</i>) 6. Perennial rice, from theory to practices, for sustainable development rice production (<i>Fengyi Hu</i>) |
| | Concluding synthesis – Jim Harkness and Allison Loconto | Concluding synthesis – Piao Yongfan and Steve Gliessman |
| 16:00 – 16:30 | COFFEE BREAK | |
| 16:30 – 18:00 | PLENARY – GENERAL DISCUSSION AND RECOMMENDATIONS (Co-chaired by Martin Vincent and Zhang Huijie) THE WEST FIRST LECTURE HALL ON THE FIRST FLOOR IN AUDITORIUM | |
| | Conclusive reports created by Synthesis Providers for Topic 1–8 | |
| | Discussion and Amendment to the draft Recommendation | |
| | Adoption and announcement of the Recommendation | |
| 18.00 – 18.30 | CLOSING SESSION (Co-chaired by Martin Vincent and Zhang Huijie) <ol style="list-style-type: none"> 1. Remarks by Ren Wang, Assistant Director-General, AG Department, FAO 2. Remarks by Wu Kongming, Vice President CAAS presented by Mei Xurong, Director, CAAS | |
| 19:00 | DINNER: RESTAURANT ON THE SECOND FLOOR OF YUANTONG BUILDING | |



Annex 3 Participants

Speakers

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Annex 4

Advisory Panel

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| 4 | Zhang Fusuo | China Agricultural University |
| 5 | Zhu Youyong | Yunnan Agricultural University |
| 6 | Mei Xurong | Director, Department of Science, Chinese Academy of Agricultural Sciences |
| 7 | Peter E. Kenmore | FAO Representation in India |
| 8 | Caterina Batello | Agricultural Plant Production and Protection Division, FAO |
| 9 | Piao Yongfan | FAO Regional Office for Asia and the Pacific |
| 10 | Zhang Lanying | Director of the Liang Shuming Rural Reconstruction Centre |
| 11 | Jingzhong Ye | Dean of College of Humanities and Development Studies, China Agricultural University |
| 12 | Huijie Zhang | Deputy Director, Department of International Cooperation, Chinese Academy of Agricultural Sciences |

Member of the Advisory Panel (AP) of the International Symposium for Sustainable Agriculture and Food Systems in China



Annex 5

Photos of the event





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Annex 6

Overview of Press coverage

| No | Title | Media | Comments | Date |
|----|--|--|---|-----------|
| 1 | International Symposium on Agroecology for Sustainable Agriculture and Food Systems was held in Kunming | Xinhua news agency. | The symposium will encourage China and the Asia Pacific Region to better participate in the global agricultural market and trade. | 05-Sep-16 |
| 2 | Experts from worldwide focus on Agroecology and Sustainable Food Systems | The Chinanews online service (Chinanews.com) | This symposium provided a platform for information sharing and exchange for South-South Cooperation. | 31-Aug-16 |
| 3 | China held the International Symposium on Agroecology for Sustainable Agriculture and Food Systems, help achieve the goal of sustainable development of the United Nations | CST Net | The Seminar attracted participants from Asia, Europe and North America, has promoted exchanges and development for China and the Asia Pacific Region in agricultural ecology. | 02-Sep-16 |
| 4 | Strengthening innovation and promoting the sustainable development of agriculture | Yunnan Daily, www.yunnan.cn | The meeting was held in Kunming, will promote the development of Yunnan plateau characteristics of modern agriculture. | 31-Aug-16 |



REPORT *of the*
INTERNATIONAL SYMPOSIUM
ON AGROECOLOGY *in China*

The International Symposium on Agroecology for Sustainable Agriculture and Food Systems in China brought together concerned actors to consider how agroecology has contributed towards creating a new model of sustainable agriculture in China, and how this approach could further strengthen future transition. The symposium was organized by the Chinese Academy of Agricultural Sciences (CAAS), FAO and Yunnan Academy of Agricultural Sciences (YAAS) and held in Kunming, Yunnan, China on 29-31 August 2016.

The symposium provided a forum for representatives of governments, academia, the private sector and civil society organizations, including peasants, fisherfolk, pastoralists, urban communities, indigenous peoples, women's organizations, youth and others, to share experiences and showcase successful examples of agroecological approaches to agriculture. It also provided a space for discussion, debate and collaboration among a diverse range of actors to advance science, knowledge, public policies and programmes on agroecology, thus supporting and strengthening the already-extensive evidence-based knowledge on agroecological approaches in agriculture.

Participants –representatives of governments, civil society organizations, including peasants, fisherfolks, pastoralists, urban communities, indigenous peoples, women's organizations, youth and others, academia, and the private sector, discussed agroecological approaches in China and the region. The discussion and debate focused on the challenges linked to food system transformation, climate change, natural resources, social innovation and the necessary responses from public policies and resulted in a set of recommendations.

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