Watamu, Kilifi County, Kenya Coast

12–16 October 2015

Event report

Smallholder Innovation for Resilience (SIFOR)

Partners' workshop and policy dialogue

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KENYA FORESTRY RESEARCH INSTITUTE KEFRI

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About the event

'Smallholder Innovation for Resilience: strengthening innovation systems in the face of climate change. Partners' progress review and international policy workshop'

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For more information about this report or the SIFOR project, please visit http://biocultural.iied.org/smallholder-innovation-resilience-sifor or contact Krystyna Swiderska krystyna.swiderska@iied.org.

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Cover photo: Kenyan farmers show off their flourishing crop of a newly developed, drought-resistant cassava strain.

Photo credit: Tamara Leigh/IFRC-Climate Centre via Flickr

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Contents

Acronyms

ABS	access and benefit sharing
ANDES	Association for Nature and Sustainable Development
ARIPO	African Regional Intellectual Property Organization
BCH	biocultural heritage
BCHT	Biocultural Heritage Territory
BI	Biodiversity International
BIFFS	biocultural innovation field schools
CCAP	Center for Chinese Agricultural Policy
CFS	Committee on World Food Security
CIP	International Potato Center
CSA	community supported agriculture
CSB	community seed bank
FAO	Food and Agriculture Organization
FFS	farmer field school
FSN	Farmers' Seed Network
GHG	greenhouse gas
KALRO	Kenya Agriculture and Livestock Research Organization
KEFRI	Kenya Forestry Research Institute
KFS	Kenya Forest Service
IIED	International Institute for Environment and Development
ILO	International Labour Organization
INDC	Intended Nationally Determined Contribution (Action Plan for Climate Change)
INIA	Instituto Nacional de Innovacion Agraria
IPR	intellectual property right
M&E	monitoring and evaluation
NARS	National Agriculture Research System
NGO	non-governmental organisation
NMK	National Museums of Kenya
NRM	natural resource management
OAPI	Organisation Africaine de la Propriété Intellectuelle
OPV	open pollinated variety
OSSI	Open Source Seed Initiative
PAR	participatory action research
PDS	Public Distribution System (India)

PGRFA	Plant Genetic Resources for Food and Agriculture
PGS	participatory guarantee system
PPB	participatory plant breeding
PPVFRA	Protection of Plant Varieties and Farmers' Rights Act
PTD	Participatory Technology Development
PVE	Participatory Variety Evaluation
PVP	Plant variety protection
PVS	Participatory variety selection
SADC	Southern African Development Community
SDG	Sustainable Development Goals
SHF	Smallholder Farmer
SIFOR	Smallholder Innovation for Resilience
TRIPs	Trade Related Intellectual Property Rights Agreement
TK	traditional knowledge
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPOV	Convention for Protection of New Plant Varieties
WIPO	World Intellectual Property Organisation
WTO	World Trade Organization
WWF	World Wide Fund for Nature

Executive summary

The Smallholder Innovation for Resilience (SIFOR) project aims to strengthen biocultural innovation for food security in the face of climate change in China, India, Kenya and Peru. This five-year project supports innovation by small-scale farmers by strengthening biocultural heritage (interlinked traditional knowledge, biodiversity, landscapes, cultural and spiritual values and customary laws) and by linking farmers with scientists, markets and policymakers. Biocultural innovations arise from interaction between the components of biocultural heritage, and between traditional knowledge and science.

This workshop brought together SIFOR research teams from the four countries, and government representatives, researchers and Mijikenda farmers from Kenya, to share the findings of a baseline study in the SIFOR communities, develop strategies to strengthen TK-based innovation, explore how policies affect TK-based innovation, and provide a space for dialogue between farmers and policy makers.

SIFOR communities – baseline studies

The baseline study surveyed 64 indigenous communities on trends in livelihoods, food security, crop diversity and climate change over the past 30 years, and the technological, market and institutional biocultural innovations they have developed in response to these challenges. It also explored the factors or conditions that affect biocultural innovation.

All of the communities have seen changing livelihood patterns with off-farm income becoming more significant and farming becoming increasingly feminised and ageing due to migration to urban areas. With the exception of the Potato Park in Peru, most are becoming less self-sufficient in their staple crop, and more dependent on markets for food security. All reported climatic changes, in particular changes in rainfall patterns, prolonged droughts, rising temperatures, increased pests and diseases, and more flooding in some cases (Kenya and Central Himalayas), resulting in reduced crop productivity.

In all the communities, farmers are turning to crop diversity and resilient local landraces to avoid crop failure – eg. in coastal Kenya, 43% of farmers have started planting different varieties together - and because of the resilience of local landraces. However, traditional varieties and landraces are being lost rapidly due to expanding hybrid cultivation, linked to campaigns to promote improved varieties (eg. cassava in Kenya); and to China's WTO entry in 2000, leading to subsidies for modern agriculture. Rising temperatures and soil pests are contributing to the loss of native potato varieties in the Potato Park, Peru. Another factor is low productivity of landraces due to limited scientific effort to improve them. In the Indian Himalayas, drivers of crop diversity loss include the availability of cheap food from the Public Distribution System and a lack of markets for local varieties.

In Kenya crop diversity loss has slowed in the last five years due to conservation for food security. Food security is the main reason for conserving crop diversity in all the communities, along with cultural value/traditional use. In Southwest China, Participatory Plant Breeding has produced several new maize varieties that are higher yielding and drought and pest tolerant. This, along with links to urban markets for healthy/ecological food has doubled market prices for vegetables and livestock, and rapidly increased the area planted with landraces. In Peru, several hundred native varieties of potato have been repatriated to the Potato Park communities from the International Potato Center. In India, farmers are still largely growing local landraces because the saved seeds of hybrid varieties supplied by extension services don't produce the same results and farmers rely on saved seed for nearly 90% of their seed.

All of the communities have developed a number of innovations using traditional knowledge to address climatic and livelihood challenges, largely technological innovations. Examples include the development of new crop varieties, some of which are being registered as farmers' varieties (eg. a higher yielding black rice bean cultivar in India); domestication of wild crop relatives (eg. medicinal and fruit trees in Kenya); new cropping or cultivation methods, including returning to traditional agroecological practices; and switching to more drought tolerant crops (eg. cassava instead of maize in Kenya). Market innovations include collective micro-enterprises (eg. in the Potato Park), the revival of traditional markets, community supported agriculture (selling directly to consumers), eco-tourism and online marketing. Institutional innovations

include seed exchanges between communities and collective governance of biocultural heritage, such as the Potato Park in Peru which is managed by 5 Quechua communities.

Strengthening innovation systems

Generally, capacity for innovation amongst smallholders is declining. For example in the central Himalayas in India, only a few individuals in each community are innovators and innovation is no longer a community effort; people invest very little time in innovation because their culture is changing; and there is little interaction between scientists and farmers because extension services are supply driven rather than demand driven.

However, several factors that promote biocultural innovation were identified. These include 1) traditional institutions that promote the conservation of biodiversity and culture; 2) customs which value an inquisitive nature; 3) community organisations and networks promoting information exchange; 4) traditional beliefs and cultural values that promote sharing, conservation and collective action (eg. reciprocity, equilibrium and solidarity); 5) ceremonies and festivals that promote networking; 6) respectful collaboration between traditional knowledge holders and scientists; 7) markets for biocultural products, value addition and community funds to encourage innovation; and 8) protection of indigenous peoples' rights to biocultural heritage and farmers' rights. Women play an important role in seed conservation and selection, sustaining related traditional knowledge and developing innovations.

Capacity for innovation and experimentation can be strengthened through farmer field schools, or 'Biocultural Innovation Field Schools', participatory plant breeding and participatory technology development, that link traditional knowledge holders and scientists. Other ways to strengthen innovation identified by the workshop include platforms/fairs to bring together farmers from different communities, community seed banks, seed sharing networks, repatriation agreements to enhance genetic diversity, establishing biocultural heritage territories, engaging communities in government discussions and planning, and establishing national and international networks for scaling up innovations. The importance of protecting the intellectual property rights of traditional innovators was stressed, through instruments that recognise collective rights rather than exclusive rights (eg. collective trademarks rather than patents).

Policy support is needed for Participatory Plant Breeding and linking ex-situ and in-situ conservation efforts. Traditional and scientific knowledge are complementary – farmers often have knowledge that scientists don't have, for example about local climatic changes and the uses and conservation of local crop diversity.

Policy frameworks

National and international policies that support biocultural innovation include those that protect farmers' rights, promote sustainable agriculture and participatory development, support commercialisation of biocultural products, and support community-led climate adaptation and biodiversity conservation. However other policies, particularly those promoting intellectual property rights over new varieties, protect plant breeders' rights at the expense of farmers' by restricting the saving, exchange and sale of conventional seeds and not requiring benefit-sharing with farmers. These policies tend to be more legally binding and actively enforced than those relating to biodiversity or indigenous peoples' rights.

SIFOR communities are contributing to the implementation of international policies such as the FAO Treaty on Genetic Resources and the Sustainable Development Goals, through PPB, community seed banks, repatriation agreements and biocultural heritage territories. These initiatives, along with low-carbon lifestyles and farming practices and forest conservation, also contribute to climate change adaptation and mitigation. Policy support is therefore needed to promote such initiatives on a larger scale.

Kenya has a national policy on Traditional Knowledge, Genetic Resources and Traditional Cultural Expressions which aims to protect TK. However, climate adaptation policies don't recognise the creativity of local people or support and enhance local knowledge systems, and there is inadequate channelling of adaptation funds to support grassroots adaptation initiatives. Furthermore, Kenya is in the process of adopting UPOV '91 to protect plant breeders' rights but has no national legislation to protect Farmers' Rights

under the FAO Treaty, which is likely to undermine local seed systems and crop diversity. There is a need to learn from other countries which have protected farmers' rights, such as India and China.

Kenya is reviewing a number of laws to align them with the new Constitution, which provides a window for integrating community concerns. Counties can customise national agriculture legislation which provides room to support TK-based innovation. Kwale County is currently formulating a food security policy, and recognises the need to improve the yields of resilient landraces. It has established incubation centres for innovation which could support TK-based innovation through grants to selected innovators.

Kaya forests are an important source of resilient crop wild relatives for adaptation. Kaya elders at the workshop raised concerns about the lack of support for their efforts to conserve Kaya forests from the National Museums of Kenya and Kenya Forest Service. Many Kayas are being encroached and title deeds have been granted to private developers in 3 Kayas. The NMK, KFS and county governments need to work together to provide better support for Kaya conservation. Kwale County is finalising a County Forest Bill, providing an opportunity to promote stronger legal protection for Kayas, equivalent to forest reserves.

Introduction

The Smallholder Innovation for Resilience: Strengthening innovation systems for food security in the face of climate change (SIFOR) project, is a five-year EU-funded project involving IIED and partners in China, India, Kenya and Peru. The project aims to strengthen the innovation systems and adaptive capacity of indigenous communities by using existing indigenous knowledge and biocultural heritage. It has identified traditional knowledge (TK)-based innovations which enhance productivity in the face of climate change for global sharing with farmers, scientists and policy makers.

The SIFOR Partners' Workshop and Policy Dialogue in Kenya was held from 12–16 October 2015 at Temple Point Resort, Watamu, Kenya. It was organised by the Kenya Forestry Research Institute (KEFRI), SIFOR's partner institution in Kenya. It was the third SIFOR partners' workshop since the inception of the project — the first and second were held in China and Peru in 2012 and 2013 respectively. The workshop brought together representatives from Kenya's Ministry of Agriculture and Ministry of Environment and Natural Resources, the Kilifi and Kwale county governments, researchers from KEFRI, the Center for Chinese Agricultural Policy (CCAP; China), Association for Nature and Sustainable Development (ANDES; Peru) and Lok Chetna Manch (LCM, India), and smallholder farmers and Kaya elders from the SIFOR communities in Kilifi and Kwale.

The aims of the workshop were:

1. To share the findings of a baseline study on trends in climate, livelihoods and agrobiodiversity, TK-based innovations and factors that support them.
2. To develop strategies for strengthening TK-based innovation systems and learn from successful experiences in different countries.
3. To explore how national and international policies affect TK-based innovation, and how communities are implementing policy targets.
4. To provide a space for dialogue between local farmers and innovators and county and national policy makers in Kenya.
5. To develop strategies for policy engagement and identify next steps for the project.

The workshop enabled farmers from Mijikenda communities to have a dialogue with the government for the first time. The workshop involved a field trip to interact with Mijikenda communities involved in the SIFOR communities. In the Giriama community, Kilifi County, the women's herbal group explained its work on value addition for herbal medicines, and participants visited their herbal grove which has over 100 tree species of medicinal value, and the herbal processing unit. Participants also visited the Rabai Community in Kilifi County (near Mombasa), where they learnt about the Kaya council of elders and Kaya court, and visited the Kaya Rabai sacred forest and the Rabai cultural village.

Workshop proceedings

Session I: Official opening

Chair: Dr. Bernard Kigomo, senior deputy director research and development, KEFRI

Dr. Ben Chikamai, director of KEFRI, outlined the organisation's mandate to conduct research in forestry and allied natural resources, disseminate research findings, and establish partnerships with other research organisations. He emphasised synergies between the SIFOR project, KEFRI's strategic objectives and the Environment Ministry's objectives and activities on policies, laws and guidelines for sustainable use of the environment, climate change adaptation and mitigation, and the promotion of appropriate technologies for environmental management.

Krystyna Swiderska, principal researcher at IIED, introduced the project, noting that scientific innovation has contributed to the loss of TK, crop diversity and resilience, creating a need to strengthen approaches and policies that support smallholder innovations, to create a better balance between traditional and scientific knowledge and innovations, which are equally important, and complement each other for enhancing food security in the face of climate change.

Mr. Hewason Kabugi, representing the principal secretary, Ministry of Environment, Natural Resources and Regional Development Authorities, noted that climate change is one of the global environmental concerns affecting the social, economic and at times political stability of many nations. The vagaries of climate change have posed significant threats to the Sustainable Development Goals (SDGs) especially eliminating poverty, hunger and promoting environmental sustainability. He stressed that tackling climate change challenges is complex and requires co-ordinated efforts at global, regional and national levels. Climate change mitigation strategies should recognise the creativity of local people in adapting, strengthen their local adaptive capacity and channel adaptation funds to local organisations to support grassroots adaptation initiatives. Kenya has developed sector-based strategies and policies to mitigate against climate change and participants should share innovations for adaptation and deliberate on how TK-based innovations can be strengthened. He acknowledged the collaboration the government of Kenya continues to have with IIED which fosters development in the country.

Mr. Ephraim Muchiri, conservation secretary, Ministry of Environment, Natural Resources and Regional Development Authorities, highlighted the key drivers of loss of traditional knowledge, skills and practices related to food security in the face of climate change, including commercialisation of agriculture, population dynamics, land-use changes and climate change impacts. Kenya has developed a national policy on Traditional Knowledge, Genetic Resources and Traditional Cultural Expressions (2009) to curb the erosion of traditional knowledge and innovations and address the accelerating technological development, among other drivers of loss. The policy aims to preserve, protect and promote traditional knowledge, genetic resources and traditional cultural expressions in Kenya by providing a legal and institutional framework for access, informed consent, sustainable utilisation and equitable benefit sharing. The policy protects biocultural innovations by safeguarding the intellectual property rights of indigenous communities. Kenya is in the process of developing a national climate change policy to facilitate co-ordinated, coherent and effective responses to local, national and global climate change challenges and opportunities.

Dr Ben Chikamai, director of KEFRI giving opening remarks. Photo by Arafa Amur

Questions and discussion

Agrobiodiversity is being lost due to genetic erosion and unfair competition from western subsidies. This is making the food system extremely vulnerable. TK is used by millions of farmers to ensure food security. About 900 million poor people live in rural areas, of which up to 400 million are indigenous people. TK is very important for climate change adaptation and predicting extreme events. Normally it is usually engineers who are considered innovators — we also need to recognise local people as innovators to ensure they benefit.

Session II: SIFOR baseline study findings: key trends and biocultural innovations

Chair: Paul Ongugo, science leader, KEFRI

Introducing SIFOR and the baseline study (Krystyna Swiderska, IIED)

The goal of the SIFOR project is "improved food security and resilience from thriving smallholder innovation and traditional knowledge in developing countries". The specific objectives are:

- To identify and disseminate TK-based innovations that enhance productivity and conditions which foster vibrant and resilient innovation systems
- To develop and spread tools that increase the resilience of smallholder innovation systems for enhanced productivity, and improve rights security
- To enhance capacity and preparedness of smallholder farmers, women and indigenous people to sustain innovation systems, TK and agrobiodiversity, and
- To inform scientists and policy makers about changes needed in policies, laws and institutions to support TK-based innovation, and promote a number of such changes.

The project focuses on innovations based on biocultural heritage as a whole, not just traditional knowledge. Biocultural heritage is composed of TK, biodiversity, landscapes, cultural and spiritual values, and customary laws — which are all interlinked and interdependent and together support environmental conservation and local economies. This concept reflects the holistic worldview of indigenous peoples; previous research by IIED and partners shows that these linkages exist in practice. Innovation can be simply defined as a new way of doing things; biocultural innovations emerge from the interaction between the elements of biocultural heritage or between traditional knowledge and science.

The baseline study was the conducted to address the first objective and provide a baseline for monitoring and evaluation (M&E). It involved qualitative research and quantitative surveys in 64 communities in China, India, Kenya and Peru, on trends in livelihoods, agrobiodiversity and climate change over the last 30 years and the biocultural innovations developed in response to these challenges. It focused on technological, market and institutional innovations. It also explored the factors which support TK-based innovation through these surveys and an additional qualitative survey focusing on the linkages between cultural values and biocultural innovation.

Krystyna Swiderska (IIED) outlining projects' objectives. Photo by Sylvia Mwalewa

Kenya baseline study findings (Chemuku Wekesa, SIFOR co-ordinator, KEFRI)

Community context and livelihood trends

The coastal region of Kenya is characterised by high poverty levels; 70–80 per cent of the population lives below the poverty line, and people are heavily dependent on natural resources for survival. The impacts of climate change are already being felt, and most if not all the TK-based innovations identified are coping strategies to deal with extreme weather events, mostly related to climate change. The study was conducted in five Mijikenda communities along the coast: Giriama, Chonyi, Rabai, Digo and Duruma (more inland), spanning semi-arid, arid and wet fertile areas.

Livelihood activities have changed over the years with a notable decline in crop production and sales and an increase in charcoal burning. Herbal medicines have remained an important livelihood activity. Running small businesses is an important livelihood activity although to varying degrees across the Mijikenda communities (they are not doing very well in Giriama). The involvement of youth in agriculture has been declining over the years, a trend attributed to modern education and migration to urban areas to seek employment. Yields for self-consumption is higher than for markets because the surplus is low and production has been declining. Since 2008, livestock production for consumption has increased significantly particularly in arid areas, but production for the market has declined.

Crop diversity and seeds

Crop/landrace diversity has declined and the area planted with hybrids has grown, but the loss of diversity has declined in the last five years. Crop diversity is sustained through saved or stored seeds (e.g. maize, cowpeas). The main reason why farmers conserve different crop varieties is for food security — they have to grow many different varieties to avoid crop failure. Landraces are saved due to their resilience — they have many positive characteristics. But the number of households planting landraces as the main crops is decreasing, because of campaigns to promote improved varieties, for example of cassava, promoted by the Kenya Agriculture and Livestock Research Organization (KALRO).

The main sources of seeds are buying and borrowing, with exchanges of seeds between farmers and seed saving ranked very low. Seed exchange is minimal within villages but high between villages because farmers in the same village grow similar crop varieties and villagers are keen to increase diversity and can only do this by exchanging with other villages. Low levels of seed saving for landraces was attributed to low organisational capacity and hence it was recommended that a community seed bank be established to enhance the saving of seeds.

Climatic changes and adaptation strategies

Among the farmers involved, 77 per cent said that rainfall was decreasing, and 90 per cent said temperatures were increasing. There have been a lot of changes in the time rain arrives — it can no longer be predicted — and there are decreasing amounts of rain, which was associated with the disappearance of native species and reduction in forested area. Floods and drought were identified as the main extreme weather events in the last ten years which have affected staple food crop quality and yields. The frequency of floods and drought have increased in the last ten years. A number of different adaptation strategies were identified. The Rabai Community mostly practised the offering of prayers and sacrifices, the Chonyi have shifted to cultivating large portions of drought-tolerant crops such as cassava, and the Duruma have adopted early planting. Coping strategies include buying food from shops, using local bio-pesticides and networking to learn from each other.

Biocultural innovation and supporting factors

Three types of TK-based innovations were identified:

1) Livelihood/market innovations:
    - Village banking for economic empowerment — this was identified in all five communities (but is not TK-based)
    - The use of marketing strategies (low level of adoption) and
    - The revival of traditional markets (adopted by about 14 per cent of households).
2) Technological innovations:
    - Re-introduction of traditional farming methods
    - Use of herbal plants to treat livestock disease (adoption rate of 10 per cent)
    - Preservation of landraces in community seed banks (CSBs) (adoption rate of 10 per cent) and

- Planting of diversified varieties of the same crop on the same piece of land in a single season was found in all communities (high adoption – 43 per cent).

3) Institutional innovations:
   - Free seed exchange between communities – all communities (17 per cent adoption) and
   - Use of customary laws and practices in conserving natural resources and agro-biodiversity.

The level of adoption of innovations generally low, ranging from 1 to 20 per cent. The majority of the innovations identified are based on both TK and science, followed by just TK-based and then just science-based. The area of innovation most important to households is confronting climate change.

There are social and cultural factors which support biocultural innovation:

- Traditional institutions like the Kaya elders' council
- Community organisations, such as herbal groups, farmers' groups and women's groups, which provide avenues for information exchange
- Cultural values: principles of solidarity, reciprocity, equilibrium – these are common in all the communities and are very important for promoting innovation
- Rituals and ceremonies are very important for innovation, because nearly all are associated with natural resources (such as seeds), and to sustain ceremonies these resources need to be conserved; the same goes for Kaya sacred forests, whereby Kaya elders have to conserve forests, and
- Culture also supports adaptation through beliefs — for example, people make sacrifices and hold prayers, there is a sacred tree where Kaya elders go to pray to request a bumper harvest and they have a special traditional hut for prayers.

In conclusion, it was evident that communities use indigenous knowledge to develop local innovations to adapt to climate change. Strong and appropriate policies are therefore needed to safeguard TK and local innovation. There is also a need to build the capacity of communities to add value to innovations for example through traditional products and tourism, and to create incentives for innovation and sustaining biodiversity and TK. Culture enhances the capacities of communities for adaptation, and TK builds bridges to help address challenges related to climate change.

Chemuku Wekesa, KEFRI, presenting baseline study findings. Photo by Stella Mutta

China baseline study findings (Yiching Song, SIFOR Co-ordinator, CCAP)

Community context and livelihood trends

Under the project's common framework of biocultural heritage, a working framework was developed for the China baseline study, where innovation for resilience takes place in three key areas: livelihoods, agro-biodiversity and social capital (Figure 1). Each of these three main aspects have sub-indicators. The

baseline study involved 344 households in total, spanning 17 villages in Guangxi province and 12 in Yunnan province, in southwest China. The data collection for the baseline study was completed in 2013.

Figure 1. Research framework for biocultural innovation systems for resilience, China

The survey showed that non-farming activities have increased considerably and have become the main source of income. Subsistence farming is transforming: the biggest source of household income is migration to cities, the second is livestock, the third crops, and the fourth non-farm income in rural villages. Incomes have increased a lot, from US$ 2,000 in 2002 to US$ 9,000 in 2012, but spending has increased a lot too, which means that farmers are relying much more on markets and cash. Women make up the majority of farming labour, followed by elders (over 60 years old) — the feminisation and ageing of agriculture is becoming more and more apparent.

Crop diversity and seeds

Biodiversity is decreasing very rapidly in China, along with TK and culture, due to the modernisation of agriculture. In one village, native crop varieties have been lost, mainly because of the big push to grow hybrids, and also because of the low productivity of landraces since scientists have not put much effort into improving landraces. But some households are keeping landraces, because of their cultural value and resilience to drought (similar reasons as in Kenya). Since 2000, landraces have been lost rapidly every year, and since China's joined the World Trade Organization (WTO) in 2000, hybrids have spread more rapidly because of subsidies for modern agriculture. In Guangxi, the most landraces were lost in 2000 and 2006; while in Yunnan the most were lost in 2008 and 2010, due to provincial and national agricultural policies.

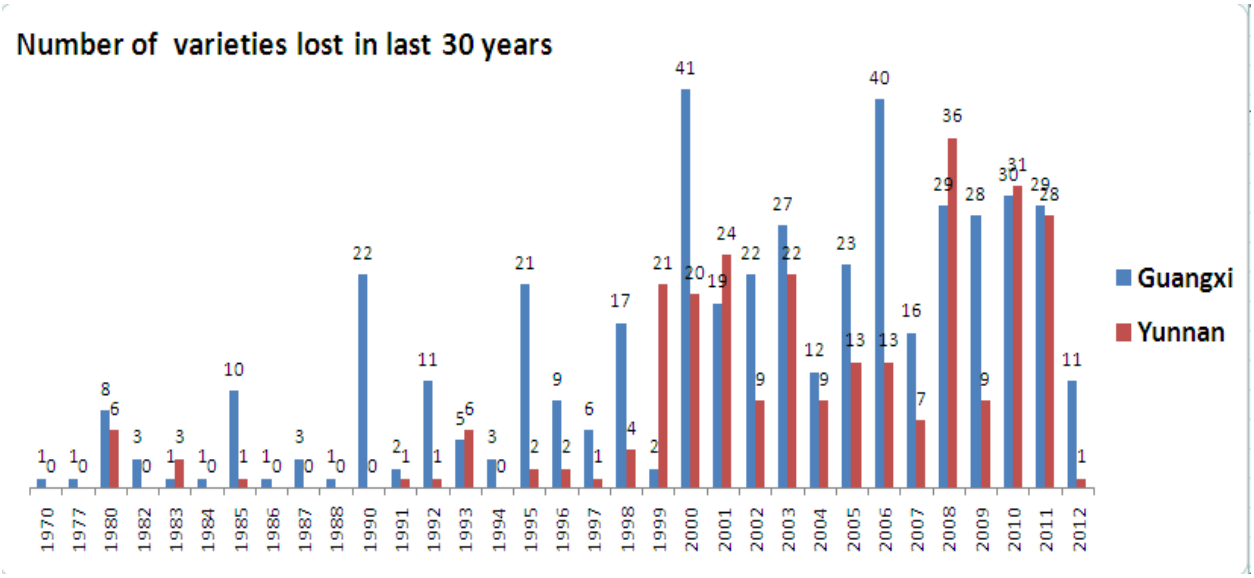


Figure 2: Number of crop varieties lost in last 30 years

Food self-sufficiency is decreasing in Guangxi because of increased dependence on markets. Both provinces have seen reduced consumption of maize, potato and wild vegetables, which formed a key part of the diet 30 years ago, and increased rice and meat consumption.

Climatic changes and adaptation strategies

Climate change is affecting all the study communities — increased temperatures, severe drought, and more pests and diseases. In Yunnan, the spring rain comes later every year. In the last three years it has been delayed by six weeks, which means that the planting time is also delayed. Adaptation strategies include: 1) improving land and water management based on customary laws (in Yunnan they already have a traditional irrigation system); 2) planting earlier to avoid drought; 3) planting drought-resistant crops and switching varieties; and 4) the use of more pesticides in some communities because there are more insects. All the communities have collective adaptation strategies and methods; because of climate change they have more and more interest in working collectively.

Biocultural innovations and supporting factors

The study identified more than 500 smallholder innovations developed in last 30 years. Most are practical/technological innovations, and there are fewer market and institutional innovations. There is more need for institutional innovations related to participatory plant breeding (PPB) and community supported agriculture (CSA) than technological innovations. The main drivers of innovation are economic and market needs, food security and climate change, social and cultural needs, and labour shortages. Similarly to Kenya, cultural values are also important for innovation. Traditional basic values and beliefs are the basis and core for the continuity of the local innovation and adaptation process. Technological innovations such as improved crop varieties were usually initiated by innovative farmers/individuals. Institutional and market innovations were developed more through collective action, which has been increasing in recent years.

Farmers consider PPB and CSA to be very good innovations; these are developed collaboratively with scientists and non-governmental organisations (NGOs). In Mashan village, the area planted with landraces rose from 30 per cent in 2007 to more than 50 per cent in 2012, due to the impact of PPB and CSA. In Yunnan where PPB started in 2012, the area of maize landraces planted has already increased from 2.2 per cent to 30–40 per cent, while maize yields have increased by more than 15–20 per cent on average.

How to enhance adaptive capacity? For internal innovation, more support is needed to enhance community-led market and institutional innovations. For collaborative innovations, there is a need to enhance support for PPB, CSA and seed networking, but through farmer-centred approaches, rather than unfair support (which favours other actors).

The CCAP's PPB programme bred one maize hybrid, and farmers can now produce the hybrid seed and parent lines themselves — this shows that farmers can do hybrid breeding themselves without needing to rely on breeders. It is important to have a community seed bank to enhance conservation and seed exchange; these can be enhanced through links to public gene banks, which can create a section for community seeds. But farmers feel they also need a CSB themselves for seed exchange amongst farmers within and between communities.

To provide more incentives to farmers, we need to add value to farmers' varieties. CSA and agro-ecological farming is a good way to add value because it can bring a market premium. Consumers increasingly recognise the importance of landraces for their quality, taste and role in protecting biodiversity and the environment. CSA activities involve linking communities directly to healthy farming restaurants in provincial capitals. Restaurants sell the ecologically produced food based on trust rather than organic certification, but because of that they have recently had some problems. Communities need to develop a participatory guarantee system (PGS) to build trust amongst stakeholders, and have started to explore this in Guangxi. The internet is another important market channel because the online market has developed a lot recently, and this year they have an internet shop in Chentang village in Guangxi. Communities need multiple market channels for adding value.

More recognition and support is needed to link farmers and scientists, who need each other. Public research and extension services need more formal support and incentives for doing PPB. Smallholders need more support for market linkages. The National Farmer Seed Network in China has been helping to scale up these PPB and CSA innovations more widely in China in the last two years.

India Eastern Himalayas baseline study findings (Nawraj Gurung, LCM)

Community context

The survey was conducted in five Lepcha and Limbu communities near Kalimpong, West Bengal State, northeast India. The total population is about 2,500 people with about 400 households.

Climatic changes and impacts

Climatic changes have been observed, notably reduced rainfall and shortened rainy seasons — rainfall has decreased by 10.2 per cent between 2007 and 2011 — which had led to changes in cropping systems. In the last ten years, the communities have experienced prolonged drought, frequent landslides, and high prevalence of pests and diseases.

Biocultural heritage and crop diversity

The Green Revolution in India in 1960s was successful in lowland plain areas where it increased inputs and production, but it did not have much inroads or success in mountain areas. The Public Distribution System (PDS) provided food grains, mainly wheat and rice, to all parts of the country as highly subsidised rations. As a result of the access to cheap foods and a big increase in roads and packaged foods, people have become more dependent on the market even in remote areas. This trend has adversely affected TK, social cohesion and collective natural resource management (NRM). Traditional crops and varieties are threatened, including several millet and buckwheat landraces. There is hope as indigenous communities have high regard for traditional wisdom from ancestors and traditional leaders play a significant role in conserving endangered species and still value traditional foods and crops for family customs.

Revenues from agriculture have consistently decreased. Those households that don't have land for cash crops have much lower incomes. In one village livestock is the most important source of income, but in the others it is crop production and sale. Cash crops are becoming increasingly popular every year. The communities have lost local varieties of maize, paddy, beans and pulses. Although government extension agencies have supplied hybrid maize and paddy seeds, farmers are still largely growing local maize and paddy landraces because the new seeds are not supplied every year and farmers don't get the same results from the farm-saved seed of these varieties; 80–90 per cent of seeds are self-saved. Seed exchange between households used to be common but is now only occasional. It is mainly women who are engaged in the seed system — the sourcing, selection and storage of seeds.

The communities still perform many rituals. Traditional community organisations encourage the preservation of cultural heritage. They mostly speak their own language and have traditional farming

systems. The communities have abandoned slash and burn systems and are practising the use of sticks and broadcasting to plant. The traditional mixed farming systems persists, with a shift towards cash crops, off-farm activities and an increase in private forest area. For food security, dependence is shifting towards external sources like markets and the PDS.

Biocultural innovation and supporting factors

Technological innovations identified include the development of a new cardamom cropping system outside the forest and of a locally adapted variety in response to pests and diseases. Other innovations include early uprooting of maize in response to erratic rainfall without reducing yield, the development of new local cultivar of black rice bean to enhance yields, replacing an old variety of squash with a higher-yielding one from Nepal, the adoption of new technology for potato production after loss of paddy land due to a landslide, the domestication of broomstick grass to reclaim land destroyed by a landslide, the reintroduction of traditional mustard cultivation, and sustaining traditional crop species and landraces by changing planting times.

The village communities are trying to register the new black rice bean variety as a farmers' variety to protect their rights under the national law, the Protection of Plant Varieties and Farmers Rights Act (PPVFRA) that protects both farmers' and breeders' rights. The black bean variety was developed by the indigenous farmers themselves from the red and white varieties. The new variety is adaptable to other parts of the country and they are also in the process of establishing a Bean Park, hence the need to register it as their intellectual property.

Mountain farmers continue to sustain many traditional crops, varieties and landraces through innovations based on biocultural heritage like food sharing and exchange of planting materials, cultural traditions, and rituals and ceremonies to seek blessings from the Creator and ancestors. Cultural values of reciprocity, solidarity, equilibrium and collectivity support biocultural innovation:

- Reciprocity promotes seed sharing and conservation of natural resources; and the inquisitive nature of exploring new crops and varieties is embedded in customs.
- Solidarity: the traditional community organisation — the Sezom — encompasses solidarity and so improves community bonding and collective action. They believe in sacred places such as lakes and mountains, and use different flowers for rituals at different times.
- Equilibrium means respect for nature — they don't hunt when animals and fish are breeding and they want to have more varieties and biocultural heritage, which promotes innovation.
- Collectivity: rituals and beliefs bind them and enable collective actions for NRM. To maintain agrobiodiversity, they exchange seeds within and between communities.

Since indigenous people have a respect for nature, they have a tendency to conserve by coming up with ideas for conservation and not necessarily for consumption purposes, and to plant crop wild relatives in their backyard thus enhancing biodiversity conservation and innovation.

In conclusion, there is a need to strengthen smallholders' capacity to experiment through participatory technology development, PPB and farmer field schools. Some of this is already going on informally but needs to be institutionalised in the communities. For example, farmers' experimentation is needed to introduce dryland paddy in other villages. There is also a need to establish a Biocultural Heritage Territory — a Bean Park, along with biocultural heritage tourism and a community seed bank, and facilitate the engagement of indigenous communities in the discussions and planning processes of the government and other relevant organisations.

India Central Himalayas baseline study findings (Ajay Rastogi, SIFOR co-ordinator, LCM)

Community context and livelihood trends

The baseline study was conducted in five communities in Almora District, Uttarankhand State. Cultural values, practices, rituals, custom and TK still play a critical role in peoples' lives and survival. The survey findings revealed that overall income has been increasing since 2002. There has been an increase in off-farm income, but a decrease in income from crop production in all the villages, and an increase in

dependence on markets. Self-sufficiency in staple foods had declined since 2002 in all the villages. The number of cows has gone down by almost 50 per cent from 2007 to 2012, but goats have increased as they need less water and fodder.

Crop diversity and seeds

An average of 26 crops and 33 varieties are grown. About 5 new crops have been introduced and about 12 varieties of paddy have been lost in the last 30 years. The reasons for the losses include: a lack of markets and local use (e.g. for flax); wildlife was destroying groundnut crops so they were discontinued; and some crops were lost because processing is very labour intensive, so appropriate processing technologies are needed.

For seed security, farmers rely on self-saved seeds for landraces and on local markets for the improved varieties. Nearly 90 per cent of people rely on saved seeds; sometimes the government provides seeds but seeds from extension services don't have a permanent impact on local crop diversity because farmers go back to local varieties when they need seeds. As in the Eastern Himalayas, women also play a key role in seed systems here. Women are responsible for selecting seed for the household for the next cropping season and for storage, whereas men determine seed selection for the market. If crops fail, seeds are mostly acquired from neighbours and relatives.

Climatic changes and impacts

In terms of climate change impacts, most farmers reported reduced rainfall, many reported an increase in pests and extreme weather events, and all observed increased flooding and cloudbursts. Farmers also reported higher temperatures, drought, drying of rivers and lakes, reduction in forest areas, and changes in the length of the seasons. Yield and productivity have decreased and 45 per cent of farmers feel that dependence on markets has increased, while 95 per cent feel there was more brotherhood in past and more respect and mutual support between people. They also had more informal get-togethers; 50 per cent of people feel that migration to cities has affected these social bonds.

Biocultural innovation and supporting factors

There is no term for 'innovation' in the community's local language — they have a term for invention, but innovation is more about adaptation and coping mechanisms, in response to climate and other factors. Biodiversity and culture depend on one another: in their culture they worship and conserve trees. If they get hail in spring, it destroys crops, but people say prayers. One farmer developed a new radish variety over six years: they are doing quite a lot of innovation even if they don't call it that and they are also experimenting on dryland paddy. But they invest very little time in innovation because their culture is changing. It is not a community effort as it used to be and only a few individuals are innovators. Although all the farmers recognise the importance of innovation, few are willing to do it, and fewer elders and young people are engaged in farming.

The values underlying innovation include solidarity, equilibrium, collectiveness. For example, the radish farmer has not earned anything for breeding it, he has done it for the common good. Factors that sustain innovation are: kinship and ancestors; institutions, a landscape focus and community-based organisation; networks, cultural events and festivals. New festivals can be introduced, such as food festivals.

Ajay Rastogi, LCM India. Photo by Arafa Amur

Questions and discussion

Representative from the Ministry of Agriculture: are there no links between farmers and scientists in India?

Response: there is an elaborate extension system and a high number of scientists; but there are problems with government programmes because the government works through schemes that are supply driven rather than demand driven, so the people implementing them lower down think that their role is to distribute inputs. Very often farmers just use the seeds distributed for free as food for cooking. There is no spirit of engagement and no monitoring or feedback system that allows farmers to say how well the seeds did. There is no interaction between scientists, policymakers and farmers. India is a very important destination for seed companies (after China) but 88 per cent of seed in the country is self-saved and only 12 per cent is from external sources — 8 per cent from the government and 4 per cent from the private sector.

Crop protection committees were set up because farmers had three big problems: monkeys, stray cattle which cannot be hunted and are not owned by anyone, and wild boar attacks at night. So each household contributes money and one family member is paid to ward and watch. Animals can't just be chased from one field or one village to another, so effective protection needs to done at landscape level. Farmers are creating ideas and commercialising those ideas — but it is hard to translate terms like innovation and biocultural heritage.

Mrs Salome, a farmer from Giriama community, Kilifi County: farmers from other countries are doing so much in terms of research and innovation — they seem to be doing a lot more than in our case. Did you ever meet resistance when pushing them in that direction or was it very easy?

Response: we found that farmers have an inherent love for their ancestors and natural heritage, and if we emphasise those aspects then they understand. Their challenge is economic, most of the farmers say higher yield is the most important thing. PPB and market links can promote innovation as in China.

Yiching Song, CCAP China: farmers may worry that they lose good maize varieties for cultural uses, and then scientist find that farmers know a lot about maize, and that encourages innovation. But it is not enough — after 1-2 years of PPB, yields improve, but farmers need more income, so we need to think what else we can do with them. And then we realised that if we link vegetables and livestock to the market and promote ecological farming, farmers can get double their market prices. A lot of innovation is on production, less on markets — we need innovations that are able to complete the chain.

Response: The involvement of women was high in both the Eastern and Central Himalayas but for slightly different reasons. In the indigenous culture of the Eastern Himalayas there is inherently high equality between men and women. In the more traditional caste-based hierarchical society of the Central

Himalayas, although women have less say, they are most influential in decision making with regard to agriculture, animal husbandry and natural resource management, mainly because they are the ones handling most agricultural operations.

The Potato Park, Peru (Ana Dorrego, ANDES Peru)

Community context and livelihood trends

The Potato Park in the high Andes near Cusco is managed by five Quechua communities by means of collective governance based on customary laws. Its objectives are: *in-situ* conservation of potato diversity and other Andean species, including landraces and wild relatives, for food security and food sovereignty, income and the conservation of indigenous peoples' biocultural heritage.

ANDES uses the 'decolonising methodology' as the philosophy of its research. This is a multiple evidence-based approach in which knowledge comes from multiple sources to create epistemological bridges between indigenous/traditional knowledge and science, and research is designed and facilitated by researchers from each community.

The survey found that the number of households with both mother and father in farming is still high but has decreased slightly. There are slightly more women in agriculture, and the percentage of people migrating to work outside the park has increased due to the search for other job opportunities and the development of economic activities other than agriculture (such as taxi driving for men), as well as the increase in state programmes of social support. Feminisation in farming, therefore, remains high and has been increasing over the years.

In 2012, income was higher than spending for the first time. The main part of household expenditures are constant over the years and they are, in order of importance: food, education and clothing. Staple food self-sufficiency is over 50 per cent and potato yields have increased slightly between 2003 and 2012. The size of landholdings has gone down, private land ownership has gone up continuously and communal land ownership has gone down. Self-sufficiency in the staple food (potato) has slightly increased. Barley is mainly used for livestock food and pulses are the main crops for market. Potato is the crop which is sold least and has the lowest price.

Crop diversity and seeds

Regarding agrobiodiversity, the main crop for all communities is the potato with the exception of one community which prioritises maize. There are 5 native varieties of maize while potato diversity varies between 370 types in Amaru and 1,180 in Pampallaqta and Chawatyre. This is due to the introduction of native varieties repatriated through an agreement signed between the CIP (International Potato Center) and the Potato Park in 2004 by which about 410 varieties of native potato have been returned to the communities, bringing the total to about 650 potato varieties (or 1,350 different types according to the communities' classification). Some varieties have been lost, for example due to climate change which has pushed the lower planting line for potatoes up by 200 metres in the last 30 years. Food security is the main reason for conserving crop diversity. The main source of seed is self-saved, seed exchange and barter markets; it is not usual to buy seeds.

In traditional peasant communities, when the harvest is carried out on communal land, called *laime* in Quechua, all members of the family participate in the harvest, but the selection and management of the harvested products is done by women, including the differentiation of products for the food needs of the family, surplus for sale or barter, and especially the selection of seeds for the next season. The men participate in the classification of seed tubers and show a greater interest in the introduction of new varieties, however, in the inventory of potato varieties in the Altiplano, women provide more information than men.

Climatic changes and impacts

The climate change impacts observed include changes in rainfall patterns and increased temperatures, disease prevalence and wind strengths, and increases in extreme events such as heavy rain and drought. Farmers are moving their fields further up the mountains where temperatures are cooler and there are fewer soil pests.

Biocultural innovation and supporting factors

Biocultural heritage is very much intact. Biocultural innovations were defined as: "the practical use of new knowledge derived from the interaction of the components of biocultural heritage, as expressed in the

Ayllu system"[1]. A total of 30 biocultural innovations were recorded, comprising 18 technological innovations, 4 market ones and 8 institutional and policy innovations:

- There were four types of technological innovations: technologies that spread risk over space (mobility) and across time (storage) such as the community seed bank and net-houses for disease control adapted by the communities; technologies that spread risk over asset classes (diversification) and across households or communities (sharing and pooling).
- Market innovations were defined as innovative farm and non-farm based and biocultural heritage-derived livelihood options and business opportunities for products and services that support socioeconomically viable and climate resilient options. Examples were collective micro-enterprises, a collective Potato Park trademark and the revival of barter based on reciprocity.
- Institutional and policy innovations, were defined as: "new institutions and policies that promote the use of IK and effective functioning of local institutions to reduce vulnerability to climate change". These innovations were classified into two groups: 1) community governance of biocultural heritage and 2) influencing policy change from the bottom up. Some examples are the establishment of a local group of crop experts from different communities, the repatriation agreement with the CIP, collective governance of the Potato Park's biocultural heritage and declaring a National Day of the Potato.

The main innovation factors identified are:

- **Individual factors** related to technological innovations, such as the presence of elders and women, access to technical support and resources, *papa arariwas* (potato guardian groups) and other specialised groups.
- **Institutional factors** related to policies and legal instruments such as recognition of indigenous people´s values, lands and customary seed systems; training in support of innovation capacity; microenterprises oriented toward TK and the integration of local norms; and rules and protocols for managing innovations.
- **Networking factors** such as the existence of capacity-building programmes for indigenous communities, participation and involvement of indigenous peoples in the formulation of policies, attention to customers' choices and establishing relations with more costumers.
- **Community factors** such as the definition of the legal status of the Potato Park, a trust fund for BCH innovations, a long-term vision for BCH innovation in the Potato Park, local authorities with knowledge of innovation, transmission of TK to younger generations, and involvement of the communities in resource management and conservation strategies.

These biocultural innovations have enhanced food security, biocultural heritage and community organisation which are important for economic growth and climate mitigation and adaptation. There is a need to develop innovations for Biocultural Heritage Territories such as the diversification of crop production and broadening genetic diversity; supporting seed production and distribution, the development and commercialisation of farmers' varieties and underutilised species, and policies for ex-situ and in-situ complementarity (ie. linking communities' conservation efforts with gene banks). There is also a need to further explore key innovation factors, use the findings to identify priority actions to strengthen innovation systems, and develop gender-based innovation strategies. It is also important to stimulate greater levels of awareness and interest in the Potato Park, and continue strengthening collaborative relationships with CIP and links with related initiatives at international, national and local level.

Questions and discussion

Question: why do the farmers keep growing potatoes if they bring a low price?

[1] Asociacion ANDES and the Potato Park (2015). Biocultural Heritage Innovations in the Potato Park. SIFOR Qualitative Baseline Study, Peru.

Response: there are incentives through value addition — potatoes are used to make products such as potato shampoo and sold in the restaurant. There is no other crop that can grow well at high altitude hence potatoes will remain a key crop and potatoes are closely inter-linked with cultural identity and spiritual values.

Question: why do we need to work with TK if science is more advanced and more economic?

Response: TK focuses on the macro level, while science focuses on the micro level so the two are complementary. TK is also specific to the particular local environment and has been built up over centuries, hence farmers need to work with scientists to get optimum knowledge (e.g. for climate adaptation). In Peru, CIP scientists have conducted collaborative research with Quechua farmers since 2004 to test and adapt varieties for climate change. Local knowledge systems sustain a huge diversity of crop species and varieties and farmers have knowledge about their use and conservation which scientists do not have.

Session III: How to strengthen biocultural innovation systems?

Chair: Dr Joyce Jefwa, Pwani University

Innovation factors, capacity and biocultural innovation field schools (Krystyna Swiderska, IIED)

The baseline study has identified a number of factors that promote biocultural innovation, including:

- Traditional institutions and cultural values that promote biodiversity conservation
- Traditional customs in which inquisitive nature is embedded
- Community organisations that promote information sharing
- Values of reciprocity, solidarity and kinship that promote sharing and collaboration
- Ceremonies and festivals that promote networking
- Respectful collaboration between holders of TK and scientists (e.g. PPB, farmer field schools), and
- Markets for biocultural products.

Other research has identified the *core capacities* needed for innovation in relation to natural resources (Prolinnova and the CGIAR)[2]. These are the capacity to:

- Identify and prioritise problems and opportunities
- Experiment with social and technical options and assess trade-offs
- Mobilise resources and form support coalitions around promising options
- Link with others to access and share relevant information in support of the above
- Collaborate and co-ordinate with others during the above.

How to enhance innovation capacity in the SIFOR communities and move from individual, small scale, to collective innovation? One way could be to strengthen the cultural values and community factors that promote innovation — but that alone may not be enough to strengthen innovation systems. Another approach could be to establish farmer field schools or biocultural innovation field schools (BIFFSs). We need to identify the broad innovation pathway, that is the key steps involved in biocultural innovation; and use this as the basis for developing the curriculum for BIFFSs (as suggested by Alejandro Argumedo, SIFOR co-ordinator, Peru).

A 'biocultural innovation pathway' might include the following key steps:

- Identify a problem or situation to improve (e.g. through a community meeting)
- Better understand BCH and TK, who holds important TK and skills for innovation, what are the key 'sites' of community innovation, and what innovations are being developed that could be supported (develop a checklist).
- Explore what further innovations could be developed based on the new understanding of BCH and existing innovations (and market research)
- Experiment — get the resources and capacity to do this; test and assess different options.

[2] Leeuwis C. et al (2014). Capacity to innovate from a system-CRP perspective. Draft for comment.

Innovation is generally associated with business and industry. Drawing on this perspective, an innovation cycle might involve the following key steps[3]:

- Idea formation
- Research and development (funding, links with universities, internet)
- Innovators need to keep pushing (e.g. to advance quickly, get past any negative attitudes, get more funding)
- Growth and consolidation (need proper resources)
- Re-vision: how to move to the next innovation — can the innovation be replicated? Applied in a different setting?

Farmer field schools (FFSs) involving communities and scientists could be used to increase capacity to innovate or spread innovations. FFSs can strengthen capacity through experiential learning and participatory approaches; they promote action, observation, analysis and decision making. Their curriculum needs to be developed and tested, followed by training the trainers. FFSs need good facilitators with skills in managing participatory and experiential learning and relevant technical knowledge. ANDES has used FFSs to enhance productivity through crop diversification in the Potato Park (Oxfam-Novib project) — this curriculum could be adapted for BIFFSs.

Farmer field schools in the Potato Park, Peru (Ana Dorrego, ANDES)

ANDES is establishing farmer field schools for potato Participatory Variety Selection (PVS) and maize participatory plant breeding (PPB), which will serve as models for other crops. They will focus on plant breeding (PVS, hybridisation, Participatory Variety Evaluation and seed production) but closely related to overall agronomy, farming systems and ecosystem management. They will recognise traditional knowledge and the farmers´ (men and women) worldview and needs, and combine formal (modern) science and local knowledge systems and traditions, and provide space for dialogue between different types of knowledge (scientific and traditional/indigenous) and to address farmers´ needs.

The participatory approaches use non-formal education methods, farmers' fields, diversity wheels, timeline analysis and simple scoring techniques, and integrate the Andean indigenous concept of *Sumaq Causay*. The tools need to be adapted to local cultures and use local symbols, while considering different agro-ecological zones. The challenges ahead include: 1) further development of audio-visual tools especially for non-literate participants (mainly women); 2) involvement of women, young people and elders; training farmers next season to implement self-replicating FFSs; 3) farmer-led PPB; 4) and maintaining partnership with research institutions like CIP and the Instituto Nacional de Innovacion Agraria (INIA), which provide sources of breeding lines, supportive research and technical support, and developing policies and protocols for this.

Questions and discussion

Apart from a solution to a problem, innovation should also provide the basis for laying claim to rights — there is a need to document indigenous technological systems as this knowledge is being lost. Documentation will help to ensure that processes are repeatable but it is important not to publish the details as this can lead to misappropriation by others or 'biopiracy'. The innovation process can also be recorded through video — video evidence can be more convincing for policymakers than a publication. The biggest challenge is ownership. Farmers need to be given an assurance that they will benefit from the knowledge they have generated. Farmers need mechanisms to protect their intellectual property rights, while allowing the sharing of knowledge and innovations amongst communities.

Farmer field schools are already a concept in Kenya under the Ministry of Agriculture, but these have been promoting hybrids — if we now focus on landraces, we will be bringing a different approach which could be confusing. This is also an issue for India as FFSs promoted by the Food and Agriculture Organization (FAO) were seen as promoting mainstream agricultural technologies. But in the last few years, they have had broader use, for example land use committees, water user committees and organic

[3] Argumedo A. (2012), Indigenous Peoples, Biocultural Heritage and Biocultural Innovations. Draft.

agriculture. FFSs provide a unit of 15-20 farmers who can do something together — the discipline of meeting regularly and sharing knowledge systems helps to see them in a different light. FFSs are a very good methodology and approach; although they have had challenges they have also had tremendous success. In Kenya they tried to rebrand them as forest field schools, for example for managing an invasive plant species (*Prosopis juliflora*) and now the farmers are benefiting from this. Even if governments recognise the importance of Participatory Technology Development, they focus on ready technologies as governments are very impatient.

Break-out groups: how to strengthen biocultural innovation?

Participants broke into country groups to discuss strategies to establish and strengthen biocultural innovation systems in the SIFOR communities. The groups discussed the following three questions:

1) What is the broad innovation pathway for biocultural innovation that is the key steps that could form the curriculum for FFS?
2) How are existing action-research activities strengthening innovation capacity/systems? Can they be improved to better support biocultural innovation?
3) What additional activities are needed to ensure the project strengthens biocultural innovation systems (within existing resources and time)?

Report back from Kenya, Kilifi County break-out group (Leila Ndalilo, KEFRI)

1) There are several innovation pathways; scientific institutions used to develop innovations but over time the farmers were pushed out. Another approach is to train farmers in innovation centres. Tourism hotels provide a platform for farmers to showcase their crops, so more farmers want to promote traditional crops. There is a concern that culture is being lost so promoting culture and associated cultural practices can be part of an innovation culture — more people, especially youth, should embrace these innovation pathways. There is a need to document local innovations as a basis for protecting the rights of the farmers; and involving youth is essential.
2) Culture is playing an important role in enhancing innovation. We have project initiatives like community register development which is documenting TK and innovations to protect rights and preserve knowledge. Various platforms are being used, for example farmer innovation fairs are bringing together farmers from different communities. If enhanced, these can play an important role in enhancing capacity for innovation.
3) Communities are domesticating wild plants and crops. We need to establish community seed banks for crops with important traits that can be used to strengthen these innovations. We also need to support traditional medicine groups so they can improve these services and enhance value addition. Perhaps the project could provide equipment like grading machines to add value. Developing websites can enhance visibility — we have done this for the Rabai community who can now market their biocultural innovations. The introduction of FFSs would also be a viable means of bringing together farmers and scientists and strengthening innovation. FFSs are a good tool for spreading innovations through farmers' own demonstrations, for example a cassava innovation in the Rabai community was promoted through farmer demonstrations and field trials.

Questions and discussion

Are there people who can ensure the traditional knowledge system that has proved useful for the community is being transmitted and sustained? For example, the Kaya elders are championing the cause of forest conservation — but do they also recruit champions outside the community to ensure the forest is conserved? Formal education is undermining informal/traditional knowledge systems.

Participants in group discussions. Photos by Rita Mulatya

Report back from Kenya, Kwale County break-out group (Mohamed Pakia, Kwale County Government)

1) Broad innovation pathway: innovations come after the identification of a problem, then experimentation and trials such as domestication, then processing and marketing, expansion locally and beyond, documentation of the process, and repetition and replication.
2) Existing activities that encourage innovation: existence of a local market for new products, capacity building and exposure.
3) Activities to strengthen innovation: adding value to innovations, policy support, introduction of FFSs, broadening markets and reviewing existing innovations to improve them. FFSs focus on learning by experimentation but so far this has only been done by the farmers or groups that innovated. We need to bring in external institutions that are experimenting on these issues.

Questions and discussion

Question: FFSs always assume that farmers are so knowledgeable and can learn from other farmers. How far are we in developing capacity so that they can pass on their knowledge and become trainers to other farmers?

Response: So we have not done so much, but farmer innovation fairs help other farmers identify knowledgeable farmers. After that, formal sittings can be organised that lead to these farmers training others. This is a recommended action in the next steps.

Question: Resource-poor farmers do not have time to participate actively in FFSs as these have several stages before graduation.

Response: The idea of being 'poor' is very contentious – a farmer may not think he is poor. The most important thing is that FFSs start with a problem. Farmers themselves need to identify the problem as defined by them.

Report back from India break-out group (Ajay Rastogi, LCM India)

For farmers' field schools, we need to build on what we already have. We have two multi-stakeholder platforms — they are not very robust with respect to biocultural heritage but now that we have the baseline study results we can share them with these platforms. We have traditional institutions and MFAIR, a Mountain Farmers' Innovation network. How to build the FFSs on these existing institutions? As soon as we get farmers and scientists together there is a lot of debate and FFSs are an appropriate platform for that. Our strategy is to develop a concept/framework for BIFFSs at landscape level. The key steps include:

- Identification of stakeholders
- Mobilising participation and raising awareness about biocultural innovation
- Capacity building on participatory approaches
- Participatory problem identification, and
- Experimentation at individual fields and in demonstration plot and regular sharing of findings.

We think we can do this in the project budget.

Questions and discussion
Instead of focusing on FFSs, which are more a farm approach, we need to focus more at the landscape level because when we talk about climate change we may be talking about issues that are a bit away from the farm. Landscapes are also important to provide resources for innovation (wild crop relatives and forests), and FFSs can bring together different communities in the landscape. In India, there are Biodiversity Management Committees, but communities are not empowered. There is a need to undertake capacity building of these committees. It is important to involve youth — the Sezom holds traditional language sessions in the evening and the youth organise ceremonies, guided by elders.

Report back from China break-out group (Yiching Song, CCAP)
The strategy for strengthening internal innovation and joint innovation involves the following:

- A farmer seed network, which is a kind of FFS at local level and national level.
- Farmer-to-farmer exchanges of TK, PPB and seed production. We are doing this in different communities, but we need to link different communities including at national level, and to network at international level and exchange seed through SIFOR and the Mountain Network.
- Need to link farmers and scientists through farmer-farmer-scientist exchanges of knowledge and seeds, for example with CIP in the Potato Park.
- Need to establish CSBs to conserve crop diversity and provide seeds in case there is a disaster.
- Need to link CSBs to public gene banks to provide a back-up for communities and develop community protocols for CSBs, otherwise it's difficult to exchange with formal gene bank. Community protocols are needed to ensure community rights are respected by gene banks; and to guide the sharing of seeds obtained from gene banks amongst communities.
- Establishing 'seed parks' or biocultural heritage territories in each SIFOR country — it is important to link them together and to formal gene banks.
- Value adding is important to encourage innovation.
- Need more policy recognition and support for linking farmers and public agricultural research and extension, and for protecting farmers' rights.

Report back from Peru break-out group (Ana Dorrego, ANDES)
Key strategies to strengthen biocultural innovation:

- **Diversification of crop production**: Repatriation of crops from CIP and INIA, *in-situ* and *ex-situ* complementarities, farmer experimentation with growing commercial crop varieties and species for markets, promotion of underutilised Andean crop species, and community-to-community seed exchanges.
- **Genetic enhancement**: strengthen the Ayllu System as a biocultural territory model with three interdependent realms (wild, domesticated and sacred) with a focus on providing a biocultural environment for crop co-evolution; participatory varietal selection for potatoes; participatory plant breeding for maize and other crops; and seed exchanges with other communities in the Andean Region.
- **Enhancing seed production and distribution**: establish community seed banks, hydroponic/sandponic seed multiplication units, community seed enterprises, and seed sharing as per the Open Source Seed Initiative (OSSI).
- **Commercialisation of farmers' varieties and underutilised species**: develop potato-based natural products, culinary sanctuaries and indigenous gastronomy; short and long value chains; and gender-focused innovations.
- **Enhancing *ex-situ* and *in-situ* complementarity**: developing biocultural community protocols to guide the exchange of seeds, in line with the FAO multilateral system; repatriation of plant genetic resources for food and agriculture (PGRFA) from gene banks other than CIP including the Svalbard

Seed Vault where the Potato Park has sent its CSB to; and an information system for traditional knowledge and climate farmer schools.

- **Training courses** on Biocultural Heritage Territories (BCHTs) and integrated landscape management for researchers, farmers and students; exchange visits with other communities, workshops and a training programme for policy makers to promote the establishment of policies and institutions that support the local innovation systems; establishing a community extension network to disseminate innovations and the integrated landscape model; and fostering collaborative research with national and international universities and research centres.
- **Scaling up the Potato Park innovations** across regions and replicating it in other areas such as the Lares Barter Market Park and the Vilcanota Spiritual Park, as steps towards establishing a Food Sovereignty Corridor and Network of Agrobiodiversity Protected Landscapes in Peru; and establishing an international network of *in-situ* conservation sites and an International Federation of Community Seed Banks and seed-exchange network.

Ana Dorrego (ANDES, Peru). Photo by Arafa Amur

Questions and discussion

Participants stressed the importance of open-source seeds to promote sharing of seeds amongst communities. Intellectual property rights (IPRs) such as plant breeders' rights and seed patents that protect exclusive rights of individuals or companies often restrict seed access and exchange by farmers. Free and reciprocal exchange of seeds enhances access to and conservation of crop diversity for innovation and climate adaptation. National gene banks and formal seed systems operate under privatised IPR regimes, whereas communities traditionally share seeds, hence the importance of community protocols for exchanging seeds with formal gene banks.

Traditional foodways of the Mijikenda (Dr Joyce Jefwa, Pwani University, and Dr Y Morimoto and Dr P Maundu, Bioversity International)

The Mijikenda consist of nine tribes with a similar language, in Kilifi, Kwale and Mombasa in the coastal forest of Kenya, one of the most biodiverse regions of Africa. They have a total of 60 Kaya sacred forests, of which 42 have been gazetted. Both Kenya Forest Service (KFS) and National Museums of Kenya (NMK) manage these forests. Work to identify useful botanical plants was instrumental in gazetting these forests. Kayas are important for sustaining biodiversity in a changing landscape and an important source of NTFPs; tree cutting is prohibited and they are refugia for endemic, endangered and rare species, according to International Union for Conservation of Nature (IUCN) classifications. Kaya forests are also listed as United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites thanks to the botanical work. However, they face many challenges because traditional institutions are being weakened, for example elders are accused of being witches. Lack of understanding between modern and traditional culture is a major threat to TK. Due to erosion of culture, indigenous crop varieties have been lost. There is a need to strengthen innovation and policies to enhance use of traditional food crops and wild relatives with high nutritional value, and for enhanced income.

A survey by Fondo et al. (2006)[4] identified wild fruits and vegetables with potential for cultivation and marketing so a Bioversity International (BI) project is seeing if they can be grown in kitchen gardens for nutrition security and income. Only one of these species *Tamarindus indica* is consistently grown on farms, tamarind. Kayas have other key food biodiversity that can benefit farmers, such as mushrooms with 40 different local names, 20 of which are edible (Jefwa et al., 2007)[5]. They also have truffles sold in Zimbabwe. People also eat *Mopawe* worms in the Kenya coast. There is no coast-wide inventory of edible biodiversity. Rich local knowledge of biodiversity is being lost. The project aims to support farmers to sustainably grow these foods for income and food, and identify related cultural values and TK. It works with Kaya forest management schools. The project will produce a joint publication by BI and UNESCO, 'Traditional food ways of Mijikenda communities' , to publish local knowledge about food sources. The UNESCO-funded project on Traditional Foodways in Kenya aims to safeguard intangible cultural heritage.

Questions and discussion

Kaya forest elder, Rabai community: Why is the NMK no longer supporting Kaya forests? When we go to Kenya Forest Service or NMK there is no help… but then they come with their issues.

Dr Jefwa: The World Wide Fund for Nature (WWF) was providing support for Kaya Forest Conservation Units and after ten years it said the government should step in. We need to find other donors if the Kenya government can't support kaya forests.

Dr Chikamai: Some kayas are under the NMK, others are under the KFS, and there is dual gazettement of some Kaya forests — part of the forest is gazetted by the NMK and part by the KFS. Where the NMK is responsible, they will provide support, but where it is the KFS, they will look for funds. The NMK and KFS need to come together and develop a joint strategy with the county governments so they can work together — that should help the situation in future.

Field visit to SIFOR communities

Giriama community, Kilifi County

Participants visited the Ufanisi Conservation Group in the Giriama community. The SIFOR project has supported the group through training for value addition, setting up a processing unit and packaging for two improved herbal products *Mtenda mengi* and *Mix safi* which improve reproductive health. It has also provided inputs and training to establish and manage a tree nursery. The herbal grove has over 149 tree species of medicinal value covering an area of 2 acres. To enhance conservation, group members also plant some of the seedlings in their homestead. The group was thankful to the project for the support. Before the grove was established, the land was used to produce cassava and maize, but the loss of crop production has been replaced by fruit and income from the herbal grove. Furthermore, the grove provides a place for communal learning. The head of the group, Madam Salome, does not practice sorcery, she is a Christian and believes in God for healing power, and problems with women's reproductive health are diagnosed through massage. To reach the wider community, the group has been creating awareness through local functions and exhibitions, creating songs and reciting poems. Plans have been initiated to link the group with the county government to help in marketing.

[4] Fondo J, Morimoto Y, Maundu PM (2006). Documenting the Diversity of Traditional Leafy Vegetables and Fruit Trees Used by the Giriama Community of Coastal Kenya: A community-led ethnobiological research and development initiative. In: Proceedings of the 10th International Congress of Ethnobiology (ICE2006), 6th Nov. 2006, Chiang Rai, Thailand, pp. 10-11.

[5] Jefwa JM, Khayota B, Ngugi G, Otieno V, Musila W and Okoth S (2007). Biodiversity and utilization of edible mushrooms by forest margin communities of lowland coastal forests of Kenya. In World Fungi 2007. First World Conference on the Conservation and Sustainable Use of Wild Fungi. 10 – 16 December, Cordoba, España. P. 33-35

Participants at Ufanisi Conservation Group, Giriama community. Photos by Nereoh Leley

Rabai community, Kilifi County

The Rabai community is known for its preservation of culture among the Mijikenda communities. Participants were received by the Kaya Council of Elders. The Kaya elder, Daniel Mwawara Begarero explained that the Kaya Council is well organised, consisting of seven groups with different responsibilities. The most senior group (*Wavyere*) is in charge of leadership and management of the forest. Other groups include *Wanyere*, responsible for logistics and offerings; women have been brought on board in respect to the constitution of Kenya promulgated in 2010. Another group is involved in giving oaths and honouring ancestors. There are also messengers who deliver messages and meeting invitations to the community or fellow elders and an elderly women's group who are role models to young girls and counsel them on culture and marriage issues.

The Kaya Council meets twice a week, every Wednesday and Monday, and handles at least four court cases in each sitting — to do with land disputes, adultery, livestock theft and witchcraft — based on customary laws inherited from their forefathers. Cases the court is not able to handle are passed to the police and local chief along with cases such as rape, robbery with violence and child defilement. The senior most Kaya elder is required to stand on the highest stone, symbolic of their power, when passing a verdict or addressing the court. Another stone, the second highest, is used by the next Kaya elder in command and a third stone which is lower is used by the woman Kaya elder. Reporting a case costs Ksh 80 (Kenyan shillings) and each party is required to pay KSh 150 (USD 1.5) to the Council of Elders. Land cases are expensive, reporting them is KSh 3,000 as the Kaya elders have to visit and see the farm. The court only handles reported cases. It has a secretary who takes note of court proceedings and verdicts and the records are kept for reference.

Participants at Rabai Council Court. Photo by Stella Mutta

The Rabai community considers the Baobab (*Adansonia digitata*) and Mware (*Bombax rhodognaphalon*) as sacred trees; if cut, there is a fine of KShs 1,600, a black chicken and a goat. Failure to comply will lead to curses. The Kaya elders work with youth as a way to pass on knowledge and traditions. Christianity in Kenya started in the Rabai community with the development of a school but the community has reverted to their culture and traditions. The Kaya Council and Court have helped to maintain the culture and the collective spirit despite the fact that the Rabai community is relatively developed.

Participants visited an information centre about Mijikenda culture and Kaya forests and their biodiversity. They also visited the Rabai Cultural Village, an innovation supported by the SIFOR project, which aims to conserve traditional crops, Kaya forests and culture and generate income for the community. KEFRI has provided support for a water tank and water connection, training for tree nursery establishment and management, product branding and developing a website to promote the Mijikenda culture. The cultural village showcases traditional dances, traditional houses for different uses (such as marriages) and traditional healing.

Visit to the Rabai Community. Photo by Sylvia Mwalewa

Visit to the Rabai Community. Photos by Sylvia Mwalewa

KEFRI suggested that the Cultural Village should become self-sufficient and be able to cover small costs such as the repair of traditional houses based on the income it generates. The head of the Cultural Village explained that to construct traditional Rabai houses for preserving culture involves cutting trees which is against the conservation norms of the Kaya forest. The group has opted to buy construction poles which are costly, making it struggle to become self-sustaining. It was suggested that a meeting should be held to identify ways to make the group sustainable without compromising their objectives, for example the Kaya elder could provide a portion of their revenues to the village account. It was noted that China and Peru were also establishing Biocultural Heritage Territories to protect biodiversity and culture and generate income. The Rabai Cultural Village could also be used for biodiversity conservation at landscape level, in conjunction with the adjacent Kaya forest, and could also consider setting up a community seed bank to conserve landraces and a small restaurant serving traditional food.

Session IV: Policy dialogue: linking community innovations and policy frameworks

Chair: Dr Joseph Githiomi, deputy director forest products development, KEFRI

How policy frameworks affect biocultural innovation (Krystyna Swiderska, IIED)

Policies can support and encourage biocultural innovation by:

- Protecting intellectual rights over biocultural innovations, resources required for innovation (eg. TK, seeds, biodiversity) and cultural values that promote it
- Promoting sustainable agriculture and participatory technology development
- Supporting commercialisation of biocultural innovations such as markets for traditional crops, herbal medicines and eco-tourism, and
- Supporting TK-based climate adaptation and community participation in adaptation policies.

International policies relating to biodiversity conservation and genetic resources generally support biocultural innovation by promoting the recognition of farmers' rights and protection of traditional knowledge, for example the FAO Treaty on Plant Genetic Resources for Food and Agriculture (PGRFA; Article 9 on farmers' rights), the Biodiversity Convention and the Nagoya Protocol on access to genetic resources and benefit sharing. Others support innovation by protecting indigenous peoples' rights, such as the International Labour Organization's (ILO) Convention 169 on Indigenous and Tribal Peoples (1991) and the UN Declaration on the Rights of Indigenous Peoples (UNDRIP). However, IPR and seed policies such as the 1991 UPOV (Convention for Protection of New Plant Varieties) tend to undermine biocultural innovation by protecting only breeders' rights and not farmers' rights, and restricting farmers' rights to save and exchange seeds (Table 1). They are also more legally binding and actively implemented by governments than policies relating to biodiversity or indigenous peoples' rights.

Table 1. International policies affecting biocultural innovation

International or national policy	How it supports or affects biocultural innovation
FAO Treaty on PGRFA: Article 9 on farmers' rights	Recognises farmers' rights to save, use, exchange and sell farm-saved seed/propagating material. Requires countries to protect TK, ensure equitable benefit sharing with farmers from the use of genetic resources and ensure farmers' participation in national decision making on PGRFA.
Biodiversity Convention (1992)	Art 8(j): Respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles. Art 10(c): Protect and encourage customary use of biological resources in accordance with traditional cultural practices. Art 17.2: Promote exchange of information, including indigenous & TK; repatriation/ return of information
Nagoya Protocol (2010)	Requires equitable benefit sharing from use of genetic resources and traditional knowledge. Encourages Prior Informed Consent of indigenous peoples and local communities and the development of community protocols for access and benefit sharing (ABS).

UPOV 91: Convention for Protection of New Plant Varieties (1991)	Farmers cannot sell, produce or stock protected seed/material for propagating i.e. cannot save seed for use/innovation.
National seed policies	Usually protect breeders' rights but not farmers', so farmers have no incentive to conserve landraces. For example, one hybrid wiped out half the maize landraces in ten years in Guangxi province in China. UPOV '91 seed certification laws mean all seeds must be certified under DUS criteria — Distinctiveness, Uniformity, Stability — but these criteria do not support crop diversity or landraces.
World Intellectual Property Organisation (WIPO)	Intergovernmental Committee's Policy on Traditional Knowledge, Genetic Resources and Folklore is non-binding and does not include a focus on smallholder innovation. Technical assistance champions UPOV 91. Patent treaties don't require disclosure of origin of TK or genetic resources used to produce 'inventions'.
World Trade Organization (WTO) Trade Related Intellectual Property Rights Agreement (TRIPs)	Requires countries to make available Plant Variety Protection – which can be patents or *sui generis* systems (ie. 'of their own kind', tailored to the context) or a combination (Article 27.3b).
Free trade agreements and international investment treaties	Often require developing countries to introduce plant breeders' rights or patents on seeds without providing the option of alternative *sui generis* systems that can protect TK (hence known as TRIPS-PLUS).
Food security policies	Largely focus on increasing production through intensification and monocultures, driving the loss of crop diversity and TK.
Committee on World Food Security (CFS)	Principles for Responsible Investment in Agriculture (RAI): 7. "Respect cultural heritage and TK and support diversity and innovation".
Science and technology policies	Support scientific and high-tech innovation but not TK-based innovation.
Convention for Safeguarding Intangible Cultural Heritage (UNESCO)	Aims to safeguard and ensure respect for intangible cultural heritage, including knowledge, practices, skills, cultural spaces, rituals and languages.
UN Declaration on the Rights of Indigenous Peoples (UNDRIP)	Requires states to protect indigenous peoples' rights over TK, genetic resources, landscapes and customary laws. It is widely endorsed including by China, India and Peru but is not legally binding (Kenya abstained).

Participants commented that Kenya is a signatory to most of the treaties presented. There is a need for clarification on food security policies in Kenya — there are food security and food sufficiency policies but there have always been conflicts between the two. There are harmonies and contradictions between policies on IPRs and breeders' rights, and policies on TK. There is a need to ensure both inter-link through the development of biocultural policies.

Participatory plant breeding and community-supported agriculture in China (Irene Song, CCAP)

The CCAP of the Chinese Academy of Sciences has initiated a participatory action research (PAR) programme, which has focused on participatory plant breeding, community-based natural resource management and biodiversity enhancement since 2000 in Guangxi Autonomous Region, southwest China. The PPB programme aims to bridge the two separate systems — the farmers' seed system and the formal seed system in the southwest mountain areas. The working principle is that farmer breeders and formal breeders collaborate through germplasm provision, field varietal selection, seed testing and

seed production, to utilise local landraces and breed suitable varieties for marginal mountain regions. Through direct research collaboration between farmers and scientists, we have developed four new PPB varieties: three open pollinated varieties and one maize hybrid. Farmers and scientists participate equally in decision making at each step of the joint innovation process. Since 2013, the SIFOR project has supported this PPB programme in Guangxi and it is scaling up to Yunnan province. The recent community-based seed production base is located in the Stone Village, Yunnan, a biodiversity hotspot with over 20 local staple food crops and 180 native crop varieties. After conducting a thorough Community Biodiversity Register in the Stone Village, a local community seed bank will be established here to further explore appropriate access and benefit sharing (ABS) institutions and enhance the farmers' seed system.

The PPB programme aims to increase yields through field varietal selection and the adoption of crops with desirable characteristics based on maturity, plant height and resistance to disease, pest, drought and soil infertility. The PPB programme has reversed the loss of crop diversity and ensures on-site conservation by farmers and public breeding institutes, while responding to the specific needs of farmers' livelihoods in harsh environments. It has resulted in better crop yields for maize and rice and higher resilience to the increasingly frequent drought. Another advantage of PPB is that it actively engages women as key players in local seed systems since women pay more attention to taste and nutritional aspects in selecting PPB varieties. Through PPB, CCAP has improved participatory governance in the communities and empowered women in the decision-making process. Finally, PPB responds to the need to improve local landraces. Although landraces may be lower yielding than hybrids, they are still popular in local communities since they are often more nutritious.

The PPB programme has also involved the following activities:

- Farmers' seed fairs to promote seed exchange amongst communities and with scientists, and enhance the visibility of the project.
- Organic vegetable production and marketing, which has led to a five-fold increase in household income in the last few years. This is largely due to the increase in direct supply to organic/ecological restaurants in provincial capitals, under the community supported agriculture model, where consumers in the urban community support the farmer by paying a premium for organic products. But in the last two years, the demand for their organic products has declined, with the rapid decline of the dining economy business in China. However, the collaborative scientists have been showing support by purchasing and promoting the organic produce of the project communities.
- The introduction of chemical-free duck-in-rice farming, after which they formed a farmer co-operative because the price of rice went up and labour costs went down.

Currently, there is a huge national market for organic produce — last year, China became a net importer of organic produce for the first time. At the same time, farmers want to link directly to consumers rather than using intermediaries, as they introduce risks. Therefore, CCAP would like to introduce a participatory guarantee system (PGS) to present a win-win situation to both farmers and urban consumers. With a PGS, consumers have a guarantee that healthy ecological production methods are used, for which they are willing to continuously pay a premium; whereas farmers have their livelihood guaranteed and hard work appreciated and are willing to farm ecologically. With the effort of the Farmers' Seed Network (FSN), a national farmers' participatory breeding and seed-sharing network, a collectively owned trademark was developed for all the PPB communities, which forms part of the PGS. The PGS does not require a third-party certification; rather it requires mutually agreed production and processing standards between farmers and consumers. The key of PGS is the mutual trust so that farmers can avoid those big fees to certify their products' quality.

PPB and CSA are biocultural innovations developed jointly by farmers, CCAP, scientists and partner NGOs. In order to scale up these innovations and promote policy support, the National Farmers' Seed Network (FSN) was founded jointly by CCAP, the Liang Shu-Ming Rural Reconstruction Centre and the Third World Network in December 2013. To date, the FSN has involved 26 communities in 7 provinces in north, east and southwest China. The network shares the vision of seed and knowledge sharing, multiple participation and collaboration in seed conservation and improvement with local communities, plant breeders and other stakeholders. It also aims to protect farmers' rights by organising policy dialogues to develop policy proposals, enabling better information flows and collaboration. For example, China is now being pushed to adopt UPOV 91, but farmers did not know a Seed Law even existed. The FSN identified farmers' needs and drafted policy proposals for China's revised new seed law to protect

farmers' rights to save, exchange and sell conventional seeds. One of the proposals was accepted thanks to the collective effort and involvement of China's leading maize breeder (a Cabinet member) in the PPB programme. Generally, seed laws support breeders' rights but not the rights of farmers or indigenous peoples.

Linking community innovations and policy frameworks in the Potato Park, Peru (Krystyna Swiderska, IIED)

The Potato Park implements the objectives of the FAO PGRFA Treaty and Articles 5 and 6 on *in-situ* conservation and sustainable use. It was established in 2000 by six Quechua communities who registered an Association of Potato Park Communities and have collective land title, with support of the NGO ANDES. It has a population of about 6,000 people and spans an area of over 9,000 hectares in a beautiful mountain valley in the Andes near Cusco; and is managed collectively through Quechua customary laws. The communities conserve over 1,300 types of potato or about 650 different native potato varieties. The Potato Park implements the FAO Treaty through:

- A Biocultural Heritage Territory model for conservation at landscape level based on the Andean *ayllu* system, where wellbeing is achieved through balance between three realms — the wild, the human and domesticated, and the sacred.
- A community seed bank (cold storage of tubers using water and air flow, not electricity), a greenhouse for seedlings, botanical seeds and planting on-farm, managed by a Potato Guardians group.

In 2004, the Potato Park and the CIP signed an agreement for the repatriation, restoration and monitoring of potato diversity and associated community knowledge, which supports the Treaty's objectives on enhancing in situ-ex situ linkages. As a result, the CIP returned 410 native potato varieties to the Potato Park communities which had been collected from the area in the 1960s but had since been lost through genetic erosion. The Potato Park also implements the PGRFA Treaty provision on Farmers' Rights (Article 9) which requires national governments to protect TK and ensure equitable benefit sharing from the use of genetic resources, and recognises farmers' rights to save, exchange, use, and sell farm-saved seed. It is a *sui generis* system which helps to protect TK from loss and misappropriation, including through a community TK register database and community protocols. The Park has entered its potato collection into the FAO Treaty Multilateral System and the Svalbard Seed Vault, as a safeguard for the park communities and a contribution to global food security.

The Potato Park also reduces poverty and contributes to meeting the Sustainable Development Goals (SDGs), in particular:

- SDG 2.5 on conservation of plant genetic resources for food security
- SGD 15 on sustainable use of ecosystems and halting biodiversity loss
- SGD 1 on ending poverty
- SGD 1.4 on rights to ownership and control of land and natural resources, and
- SGD 1.5 on building the resilience of the poor and vulnerable, and reducing exposure to climate-related extreme events and other shocks.

The Potato Park also reduces poverty by empowering farmers through a highly participatory research approach, capacity building, local institution building, use of cultural concepts (which also builds ownership for conservation), microenterprises (gastronomy, crafts, potato products and herbal products such as tea, shampoo and creams), and ecotourism (treks, homestays). Ten per cent of the revenues derived from the sale of Potato Park products and services are invested in a communal fund, and redistributed to the communities in accordance with an inter-community agreement for benefit sharing and used to provide a safety net for the poorest groups (such as widows and orphans).

The Potato Park communities are also at the forefront of climate change adaptation by:

- Conserving genetic resources in-situ so these can continue to evolve and co-evolve to adapt to climate change (unlike those in gene banks)
- Continually selecting for resilient traits (e.g. frost and pest resistance).
- Testing potatoes in different parts of the landscape (the lower planting line has gone up by 200m in 30 years)
- Monitoring climatic changes (through a weather station)
- Sustaining resilient farming practices based on TK (e.g. planting different varieties together) and
- Sustaining ecosystem services (such as water).

Questions and discussion

- Can the concept of Potato Park be initiated in Kenya? Plans are underway to start a cassava park in the Rabai community, and farmers from the community visited the Potato Park in Peru to learn and become the champions in establishing of the cassava park. The Potato Park varieties may not grow well in the low altitude Kenya coast, e.g. they may be lost to soil pests due to the high temperature.
- The policy formulation process should be interactive and recognize the rich knowledge and culture of communities. Kenya is reviewing a lot of legislation to align it with the new constitution and this provides a window for integrating community concerns.
- The question is are the existing policy frameworks sufficient to recognise community rights over genetic resources and TK and ensure equitable benefit sharing? The Mijikenda should identify a TK-based innovation and run with it as in the case of *Maasai Shuka*. So much TK has been published and is in the public domain, which means it is not protected and open to commercial use, but the knowledge was not shared for commercialisation, so there is a need for TK in the public domain to be included in the legal framework.

SIFOR communities, India: Contribution to policies and programmes (Ajay Rastogi, LCM India)

The activities of SIFOR communities are contributing to national goals to implement the Biodiversity Convention's Aichi targets by 2020, as follows:

- Target 1 (national): by 2020, create awareness for conservation and sustainable use. SIFOR contributed by engaging youth in traditional recipe documentation in schools and a competition to engage youth; youth engagement in the development of community biodiversity registers. We have contributed information on trends in agrobiodiversity.
- Target 2 (national): integrate values of biodiversity into national planning.
- Target 3: reducing the rate of degradation and fragmentation; improve soil fertility. SIFOR got agrobiodiversity included in national Aichi targets (otherwise they would only focus on wild biodiversity); increased organic agricultural production; and enhanced awareness of agricultural extension staff.
- Target 6: increase agricultural biodiversity in ecologically representative areas. SIFOR is establishing a Bean Park and conserving local landraces.
- Target 8 (14): health and wellbeing including women, local community and poor.
- Target 9 (16): access to genetic resources, fair and equitable sharing of benefits.

Under India's Protection of Plant Variety and Farmers' Rights Act (PPVFRA), very few farmers' varieties were registered for many years, but since 2010, 455 varieties have been registered on behalf of farmers because the government brought in a financial incentive scheme and the National Agriculture Research System (NARS) provided passport data. By registering their varieties, farmers will get more commercial revenue, because if a farmers' variety is used commercially they will get royalties, and the associated TK of farmers also gets recognised.

Under India's National Action Plan for Climate Change (INDC), the first goal is: "to put forward and further propagate a healthy and sustainable way of living based on traditions and values of" The INDC acknowledges that India has very low per capita emissions but does not seem to lend adequate support to traditional ways of life that have a very low carbon footprint. It also recognises that women are most impacted by climate change, but there is no gender differentiation in its programmes and plans. Some national agricultural schemes and programmes support the objectives of SIFOR. For example, the Integrated Livelihood Support Programme allocated funds to women members of the Self-Help Groups in the village. There is a national programme (*Paramparagat Krishi Vikas Yojna* or Traditional Agricultural Development Programme) that promotes organic farming for markets but does not focus on traditional diverse farming.

There are several other national missions, programmes and schemes that claim to recognise indigenous knowledge in some form. The national mission on Sustaining the Himalayan Eco-Systems encompasses areas such as biodiversity conservation and protection, and traditional knowledge societies and their livelihoods. Others include the National Mission for Sustainable Agriculture (NMSA), the National Food Security Mission (NFSM), *Rashtriya Krishi Vikas Yojna* (RKVY), the Mission for Integrated Development of Horticulture (MIDH), and the *Rashtriya Gokul* Mission which also promotes the protection of indigenous breeds of cattle.

Under the proposed Seed Bill, all varieties of seed need to be registered and certified, otherwise they cannot be marketed as branded seed. So far only one genetically modified crop has been allowed in the country, Bt cotton. Very heavy royalties were paid both by Indian farmers and the government to promote these seeds. In a few years, the pink bollworm had developed resistance against Bt seeds causing huge losses to farmers. Farmer suicides are a big problem in India, but the incidences of suicides is almost negligible where farmers are practising traditional farming.

SIFOR Kenya: Contribution to national and international policy targets (Chemuku Wekesa, KEFRI)

What are the problems facing communities? Loss of agrobiodiversity, climate adaptation strategies which don't recognise the creativity of local people, weak local adaptive capacity and inadequate channelling of adaptation funds to local organisations and grassroots adaptation initiatives. Policy responses to climate change in most cases do not support and enhance local knowledge systems. How do policies protect biocultural heritage, indigenous peoples' rights and so on? There are several policies and laws which allow local communities to make claims on agrobiodiversity and cultural resources. Kenya's relevant policies and laws include:

- **Science, Technology & Innovation Act** (2013): protects innovations, but the process of patenting traditional innovations is complex and difficult.
- **Wildlife Conservation and Management Act** (2013): The SIFOR contribution to wildlife conservation is not that strong, but Biocultural Heritage Territories (BCHTs) do contribute.
- **Biosafety Bill** (2009): the Bill is mainly applied to technological research so there is a need to bring in the traditional knowledge aspect.
- **Seed policy** (2010): puts a lot of emphasis on conventional breeding and not on natural seed varieties; focuses more on breeders than on farmers. SIFOR is focusing on establishing a BCHT or Cassava Park, the conservation of landraces and plans to establish a CSB.
- The **Constitution of Kenya** (2010).
- **National Museums and Heritage Act** (2012): SIFOR aims to protect biocultural heritage and TK and contributes to agrobiodiversity conservation through heritage sites such as Kaya forests, and the revival and preservation of customary laws and practices.
- **Poverty Reduction Strategy Paper** (2010): SIFOR contributes through value addition, for example through the the Rabai cultural village and herbal medicine products.

- **Agricultural Act** (2012): aims to increase agricultural productivity and incomes and food security for smallholders. SIFOR contributes although the act focuses more on modern agriculture.
- **National Food and Nutrition Security policy** (2011).
- **Food Security Bill** (2014).
- **National Climate Change Response Strategy**, being used to develop a national climate change policy. SIFOR is very relevant as it is focusing on enhancing adaptive capacity. Policy responses to climate change in most cases do not support and enhance local knowledge systems.
- **Community Lands Bill** (2014): can help protect landscapes and related TK and biodiversity.
- **Forest Act** (2005).

In conclusion, most Kenyan policies are focused on science at the expense of TK — hence the need to sensitise policymakers to change their attitude towards protection of TK. At the international level SIFOR contributes to and is supported by the Convention on Biological Diversity (1992), UN Declaration on the Rights of Indigenous Peoples (2007), UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003), WIPO policy to protect traditional cultural expressions (2009–10), and the Nagoya Protocol on Access to Genetic Resources (2010).

Questions and discussion: Use of fertilisers and markets for tree seedlings

Mzee Mzomba (Mijikenda farmer): we have been talking to scientists about improving productivity. We were given inorganic fertilizers and we were not informed about how to use them. There was not enough rainfall and the maize dried; and we then planted cassava and it did not do very well.

Kilifi government: that's unfortunate — training on the use of fertilisers should come ahead of distribution of fertilisers. Use of inorganic fertiliser in dry areas is not good so KEFRI is advocating organic fertiliser in those areas.

Farmer: I tried inorganic fertiliser and it failed; and now I have tried organic and the yield is amazing — **Response**: They use inorganic fertiliser in dry areas in Israel — we should use both organic and inorganic fertilizer but we first need to understand the soil conditions.

Kenya Agriculture and Livestock Research Organization (KALRO): in some cases things are brought to farmers before consultations and proper preparation with farmers to receive the inputs — proper co-ordination and preparation of farmers is needed before new technologies are introduced.

Mama Salome (Giriama community): The Ufanisi group have already planted all their land. They are willing to plant in the forest but they don't have transport; and they have no one to buy the medicinal plant seedlings that they have planted with support from KEFRI and sometimes they have to buy water for the seedlings.

KEFRI: this is a big challenge; we need to equip the group with marketing skills. We discussed this with the minister and he promised that whenever there is a nursery he will support it. We will try to connect them to markets together with county government; and KEFRI could buy the seedlings. Indigenous trees are specialised products — people want trees that produce money quickly — we should also support the production of trees with ready markets.

County and national policies in Kenya: Opportunities for supporting smallholder innovation

Kwale County policy on climate change (Hon. Ali Mafimbo, Kwale County executive committee member, environment and natural resources)

Climate change impacts in Kwale County include extreme weather events such as droughts, floods and windstorms accompanied by soil loss and landslides. To enable adaptation, it is crucial to plan for these extreme events. The county's adaptation strategies are founded on:

- **County Integrated Development Plan** (2013-17): this is the main policy, which mirrors the national development plan. It includes the following key policy strategies: high impact programmes; building

local capacity; promoting good governance; sustainable participatory and inclusive development; invest in information and technology.

- **County Forestry Bill**: grants research awards to further knowledge on forest resource management – could be TK; award prizes for good forest management;
- **Kaya Restoration Programme**: kayas are in danger and we must protect them; Kwale County recognises their importance; the tourism department will support tourism in Kaya forests.
- **Incubation Centres** which promote innovation in all areas, and could support TK-based innovation — we identify, nurture and promote innovations. The idea that we are partnering with UNDP on is to send out scouts to villages and schools to try identify anyone with any idea that can be described as innovative; and then ask them to come to the centre to explain the idea, and if accepted they are given a grant to start developing the innovation. We want to establish 3 more incubation centres so every sub-county can have one.

Kwale County policy on agriculture (Joanne Nyamasyo, Kwale County executive committee member, agriculture)

Agriculture policy is a national government function but production is a local function – the county has the option of adopting or customising national policies. So if we need to formulate a policy there is room to support TK-based innovation. We will always ensure community participation but it is not always clear how to do this. We are currently formulating food security policy, focusing on: availability (enough food), accessibility (ability to purchase) and meeting nutritional requirements. The approach to food security includes long-term action to enhance production potential and responding to immediate needs of the poor and food insecure; community participation in research. Problems and responses include:

- Low quality breeds and planting material — we provide high quality seeds and livestock breeds
- Low diversification — we are promoting cassava, sorghum and Irish potatoes and we can bring in native vegetables and fruits under this area
- Training farmers on conservation agriculture, and
- Fast tracking land titling.

Questions and discussion: Conservation of Kaya forests

Kwale farmer: I know the benefits that can come from good conservation of Kaya forest, there is one Kaya in Kwale whose registration has been delayed. Can the county minister explain what they are doing about registration of that Kaya so they can manage it better?
Response: The county has prioritised conservation of Kayas, this year 10 Kayas have been earmarked for conservation; next financial year, that Kaya will be prioritised for conservation.
Question: The promotion of ecotourism in the Kayas is a good initiative, but Kayas have more to offer – in the incubation centre, can you consider including community knowledge as a contribution to food security?
Response: TK and Kaya forests provide sources of wild relatives for food security and indigenous foods, which are important for climate adaptation.
Kwale farmer: The wind direction was controlled by Kaya Mtwakasara forest and they used to perform rituals, and harvested throughout the year, but now the forest is being destroyed and they are worried the wind will blow and they will have no rain in the whole county.
Response: That Kaya forest shall be considered for rehabilitation in 2016/17 as it has not been included in the list of Kayas prioritized for conservation in the current financial year.
Question: There is conflict and duplication of laws: the Forests Bill of 2015 allows sustainable utilisation, whereas the Monuments Act inhibits utilisation — can the county come up with harmonised policy? How are the new bills capturing management of Kaya forests? How is the county government ensuring that TK is being protected?
Response: The county forest bill has largely borrowed from the national bill — it can add to the national bill as long as there is no conflict.
Mining and forests – There is some conflict between mining and forest policy: in one area mining may take place, so they want to document the biodiversity of that area.

Land use and women's rights to use the land: some women are not getting rights — some of the issues are cultural, and best dealt with at local level.
Question: What is the county is doing for marketing of farm products, and provision of veterinary services given the high prevalence of pests and diseases?
Response: There are plans for the development of Collection Centres where producers will be connected to buyers and products sold collectively (through formation of producer cooperatives); and a processing plant will be put up in Dzombo. To curb pest and disease prevalence, routine vaccination is being undertaken every six months in addition to putting up community cattle dips. Veterinary officers will be employed at least one per ward to enhance provision of veterinary services.
Vice secretary for Kayas in the coast region: Many Kayas are being encroached and even some private people have titles. One reason we came up with a policy of conserving Kayas at national level was because title deeds were granted to private developers over Kayas Ukunda, Diani and Kaya Waa.
Response: The national land commissions have been requested to nullify the title deeds. For Kaya Waa the title deeds have been revoked. Through the county development plan, three departments are concerned with Kayas: the Department of Land and for Mapping, the Department of Forests to benefit from tourism products, and the Department of Tourism is providing training for hoteliers.
Question: Because of the increasingly dry conditions, livestock diseases are increasing and some drugs are not effective but very expensive. There are also concerns about forest conservation, as many people extracting charcoal – what is county doing to prevent this?
Response: People use charcoal for business and household use — we need to look at it carefully, direct the people to also plant trees and control/regulate charcoal activities. KEFRI has good project tackling this problem.
County Executive for Agriculture: It is important to promote local varieties and we are doing that with poultry. For crops we are not just bringing in hybrids, but also promoting traditional varieties such as cassava and cowpeas. We need more research to improve yields of resilient local varieties.

Kwale County presentation on County policies on climate change and food security. Photo by Stella Mutta

Kilifi County planning framework for climate change and food security (Baha Nguma, Chief Officer, Agriculture, Livestock Development and isheries, Kilifi County)

The mission of food security is to transform and promote agriculture, livestock and fisheries for improved livelihoods and sustainable development. The county has over 60 per cent poverty rates and food insecurity. The challenges include a shortage of high-quality propagation/breeding material.

The strategic objectives are to modernise agriculture for increased productivity to increase income and promote the use of appropriate technologies. We are prepared to identify innovators in communities. The strategic vision for developing plans is taken from Vision 2030. At this time of year the national

government is redrawing most of the legislation and policy, including agricultural policy. The main county policies are:

- County Agricultural Development Policy: an initial draft is ready
- Disaster Preparedness and Management Bill
- Kilifi County Agricultural Development Bill 2014 has gone through participation.

In addition, the county has developed four bills: Kilifi County Livestock Sale Yards Bill 2014; Kilifi County Abattoirs Bill 2014; Kilifi County Agricultural Development Bill 2014 and Kilifi County Animal Welfare Bill 2014. These are yet to be approved.

The climate change adaptation strategy includes a focus on converting coconut waste into useful products. There is a need for scientists and researchers to identify useful information amongst communities and see how best to promote it. We are thinking of creating a research fund which will work through universities or KEFRI to check existing innovations that may solve serious coconut and livestock problems. The county government also works on water harvesting because of the droughts experienced in recent years, conservation agriculture and SHF irrigation schemes. We have a conservation agriculture project to increase productivity and we are using FFSs.

Questions and discussion

Question: There is strong emphasis on mechanisation in the county's strategy, which leads to soil compaction — tractors should not be used year in year out especially on clay soil.

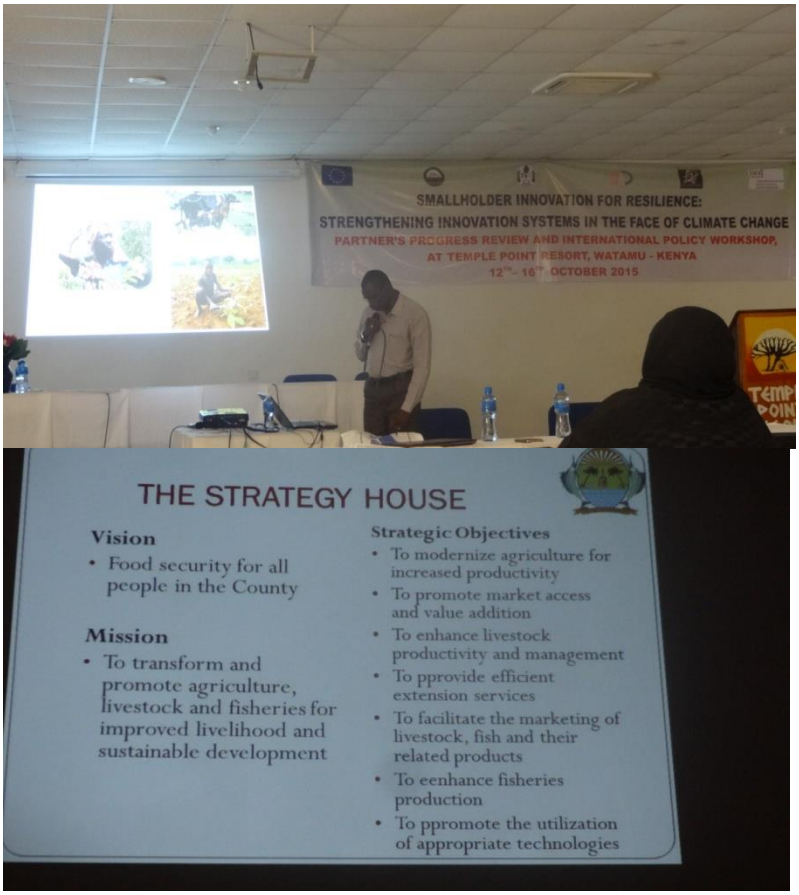
Question: Is irrigation economically viable for the county given limited water availability?

Response: Yes, they will use the Galana and Sabaki River as water sources. Irrigation is the only way to ensure we have enough food. One million hectares of maize plantation provides evidence that irrigation is the way to go. But we need to do more on soil and water conservation.

Response: If trees are planted, there is no need for irrigation.

Question: Is the county working on coconut and cashew value addition and marketing?

Response: Yes through the Directorate for Coconut and Cashew Nut. Value addition is a serious issue. The Kilifi County Coconut Bill was put before the county executive to support value addition and markets.



Kilifi County Presentation. Photo by Rita Mulatya

Kenya's national policies on TK, seeds and food security (Geoffrey Kituyi, assistant director in charge of policy, Ministry of Agriculture, Livestock and Fisheries)

When we talk about food security we also include nutrition, according to FAO. At the macro level it means availability/adequate supplies of food; at the micro level we are referring to incomes, food production and markets. Challenges include droughts, pests and diseases, and high costs of production especially fertiliser. There are international obligations: Kenya is a member of the FAO and a signatory of the FAO Treaty, UPOV, OECD seed schemes, fruit and vegetable schemes, forestry seed schemes, and the International Seed Testing Association. The Ministry of Agriculture has developed a national law to implement farmers' rights.

Mr. Kabugi, director of forestry, Ministry of Environment, Forests and Natural Resources

The governance system in Kenya is a two-tier system — the national government prepares policies which relate to the national level and county governments develop county policies. The policy formulation process involves public participation. The history regarding patents, copyright and trademarks includes the 1957 Trademarks Act; but this is not easily accessible for inventors. There is a need to harmonise all these disjointed efforts. The National Policy on TK, Genetic Resources and Traditional Cultural Expressions (2009) attempts to harmonise these and implement international agreements, but requires enabling legislation. The new constitution of 2010 requires the protection and enhancement of intellectual property rights in indigenous knowledge of biodiversity and genetic resources. Kenya is reviewing a lot of legislation in line with the Constitution so it is the right time to promote the inclusion of the cultural/TK side into the review.

There are two types of IPR: 1) defensive protection stops people outside the community from acquiring IPR over TK; and 2) positive protection grants rights over TK. Challenges include the fact that TK is

constantly evolving, cultural values are difficult to quantify in monetary terms and we don't have appropriate IPRs for TK. Forest policy includes the principle that IK should be protected. The National Environment Policy aims to regulate and encourage bioprospecting; and develop mechanisms to ensure equitable benefit sharing with communities for TK and genetic resources. Many aspects of TK and traditional cultural expressions are already in the public domain and hence not a new invention, so how can they be protected? We are already experiencing unfair exploitation of our cultural heritage. IP systems protect only private and corporate property, not the collective heritage of the past.

Questions and discussion

- There is a need to protect the rights of indigenous people and local communities over their collective biocultural heritage as a whole – not just TK- and to protect them from loss as well as bio-piracy.
- If there is active participation of indigenous peoples in the process to develop the national law, that will answer many of these questions, and ensure that TK is protected on the basis of customary laws and values which are important for sustaining TK (e.g. reciprocity).
- There is a forthcoming public hearing on the draft Forest Bill and IPRs are included in that. It is establishing a fund which even communities can access for biodiversity conservation and so on. All forest extension will be managed by county governments.

Recent plant variety protection developments in Africa and their effect on farmers' rights (Aprinah Shikoli, advocate of the high court, Kenya)

Aprinah Shikoli is an advocate of the Kenyan high court, majored in plant variety protection (PVP) and did her thesis on the protection of maize varieties in Kenya. In 1961 a harmonised system for the protection of plant variety rights was developed, the UPOV Convention. Varieties have to be new, distinct, uniform and stable to be registered. UPOV 1978 included an exemption: anyone can use a protected variety to breed a new variety. But UPOV 1991 narrowed the exemption: farmers have to get authorisation from the variety holder before can they can use a protected variety for breeding. UPOV 1978 allowed farmers to use and exchange seed on a non-commercial scale but under UPOV 91, they have to seek permission from the rights holder. UPOV 91 gives member countries the option to allow a person to save and re-use seed on their own land holding — that is, farmers' rights have been narrowed.

The WTO TRIPS Article 27.3b makes it compulsory to provide PVP by patent or *sui generis* system or a combination of these. There has been a regional PVP system in Africa since 2006 in the Organisation Africaine de la Propriété Intellectuelle (OAPI) countries (French speaking). The Arusha Protocol based on UPOV 91 was adopted in July 2015 and will be available to 19 countries which are African Regional Intellectual Property Organization (ARIPO) members, but no country has signed yet. There is also a draft Southern African Development Community (SADC) agreement which is compliant with UPOV 91. There is no obligation to put PVP in place under TRIPS until 2020 especially for LDCs. All 3 regional PVP blocks follow UPOV 91. It is uncertain whether the Arusha Protocol will have a direct legal effect on farmers. It aims to apply rights uniformly across all member countries. Implementation of these regional PVP systems is overseen by ministries of trade.

There are challenges in implementing farmers' rights under UPOV 91 because this restricts farmers' rights as outlined in article 9 of the FAO Treaty. A vast population of African farmers obtain seeds from informal sources — over 80 per cent of African farmers save seeds or get them from neighbours or local markets. Over 30 African countries are party to the FAO Treaty, but how to implement it is a challenge. ARIPO and OAPI have also developed protocols for the protection of TK but not rights over genetic resources. Opportunities for the implementation of farmers' rights include:

- Give more voice to farmers in the development of implementing PVP regulations.
- Take advantage of UPOV 91 provisions that could protect farmers' rights, for example by interpreting "private and non-commercial use exception" and "farmers' privilege provisions" more liberally.
- Develop their own *sui generis* system, as in India.
- Take a differentiated approach, allowing full PVP for commercial crops and zero PVP for others crops such as food crops.

Questions and discussion

- Kenya now uses UPOV 78 — it is in the process of adopting UPOV 91, but has not done so yet. There is no national legislation to protect farmers' rights in Kenya yet. There will be a very big contradiction.
- How can farmers engage in a dialogue? Mostly the NGOs engage, but they are pursuing agricultural technologies, so it is hard to promote farmers' rights.
- Farmers in Tanzania have had problems after adopting UPOV 91; there is a need to learn from their experience and from countries which have protected farmers' rights such as India and China.

Session V: Strategies for policy engagement

How can we promote policies which support biocultural innovation? Indigenous peoples and local communities are generally not involved in the policy development process. Communities should be more involved in forums like this multi-stakeholder workshop where they can be sensitised on the existing policy gaps and contribute to policy discussions. The project partners in the different countries should collaborate with other related institutions in their countries to develop policies that can support thriving biocultural innovation systems.

International policy engagement

Participants discussed developing a joint statement for the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP21) in December 2015, highlighting key findings and recommendations from the workshop, which could be published online with a press release and the workshop proceedings ahead of the Paris meeting if the report could be prepared in time. Such a statement should highlight the role of traditional farmers in climate mitigation as well as adaptation to interest international policymakers. For example, the inter-connection between culture and Kaya forests, which are very important for climate mitigation and for sustaining watersheds and agrobiodiversity for adaptation. However mitigation has not been the focus of SIFOR research, so we would need to draw on other research. The Kenya Agriculture and Livestock Research Organization (KALRO) indicated that it has been undertaking studies on climate change mitigation strategies including traditional farming; it was also noted that 'climate-smart' agriculture has largely focused on modern agricultural practices using chemical inputs and monocultures. Livestock forms an integral part of traditional farming systems, which contributes to greenhouse gas (GHG) emissions, but traditional communities have low levels of meat consumption per capita. It was therefore suggested that a study on the GHG emissions of traditional farming systems should be undertaken in Kenya and other SIFOR countries. In Kenya, a herbal grove has been established through the project but since the trees are still at the sapling and seedling stage it is difficult to measure their contribution to carbon absorption. The project could develop a policy brief on the role of indigenous knowledge and innovations in climate change adaptation and mitigation.

National and sub-national policy engagement

It is often easier to engage and influence policy makers at local or sub-national level, than at national level. As the SIFOR Project Advisers noted, science and evidence does not change policy by itself — key figures need to be involved in the process of learning what needs to change, as they can then advocate to others, whereas outsiders would have no legitimacy. The workshop sought to map out policy influencing pathways and actors. The case of the development of the County Forest Bill in Kwale County was chosen as this presents an opportunity for policy influence, and as the country government representative was present during the workshop to provide advice. To address the increasing threats to the Kaya sacred forests, a strategy for engaging with the policy process was developed, with the aim of enhancing the legal conservation status of Kaya forests, in line with the national Forest Conservation Act. The Forest Act talks about community forests but provides no protection status, while the National Museums Act is too weak. Thus, there is a need to identify a county level protection status for Kaya forests equivalent to forest reserve. As the bill is going through the final stages of review, there is a need to move quickly. The SIFOR co-ordinator at KEFRI agreed to prepare a letter explaining the history of degradation and encroachment of Kaya forests in Kwale County, the reasons behind it and the consequences in terms of climate change mitigation and adaptation, watershed conservation, agrobiodiversity and economic losses; as well as the benefits of Kaya forest conservation, including economic gains (eg. from tourism). The letter should also identify gaps in existing county legislation and the proposed articles to change in the County Forest Bill. It should be sent to the relevant County Assembly Committee, and a meeting with members of the County Assembly should be requested to discuss the proposal. Other key actors to target for promoting the kaya forest conservation policy agenda are CSO networks, professional forest networks, international NGOs and the private sector.

The SIFOR team in India have managed to engage policymakers at state level by participating actively with the State Biodiversity Board that recognised the village-level institutional mechanism initiated to enhance agricultural productivity and diversity in the project site. They invited government officials to

participate in a multi-stakeholder workshop and to visit the field to see what the project communities have been doing. Collaborating very closely with the Mayel Lyang Lepcha Development Board set up by the state government, traditional food festivals have been organised to raise awareness of biocultural heritage. The SIFOR team also participated in contributing to the national biodiversity targets, thus bringing the importance of agricultural biodiversity to the fore in the national agenda. In Peru, they have also engaged the local government from the start of the project through local workshops and participation in a committee of the regional government of Cusco. Before SIFOR, ANDES participated in this committee and played an important role in promoting the introduction of two new regional laws – one against biopiracy, and the other banning genetically modified organisms in the Cusco region, given the importance of traditionally farmed landscapes for tourism.

Participants discussing how to influence policy. Photo by Stella Mutta

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The Smallholder Innovation for Resilience (SIFOR) project aims to strengthen biocultural innovation for food security in the face of climate change in China, India, Kenya and Peru. This five-year project initiated in 2012 supports innovation by small-scale farmers by supporting biocultural heritage (interlinked traditional knowledge, biodiversity, landscapes, cultural and spiritual values and customary laws) and by linking farmers with scientists and policymakers. Biocultural innovation arises from interaction between the components of biocultural heritage, or between traditional knowledge and science.

This workshop brought together SIFOR research teams from the four countries, and government representatives, researchers and Mijikenda farmers from Kenya, to share the findings of a baseline study in the SIFOR communities, develop strategies to strengthen TK-based innovation, explore how policies affect TK-based innovation, provide a space for dialogue between farmers and policy makers in Kenya, and develop strategies for policy engagement.

Event Materials

Food and Agriculture

Keywords:
Smallholder Innovation for Resilience (SIFOR), traditional knowledge, biocultural heritage, climate change adaptation

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