

4. Value Chain Development for Agricultural Biodiversity: Experiences from Bioversity International

Hugo Lamers, Associate Scientist Socio-economics and Marketing Bioversity International, New Delhi, India

Workshop Value Chain Development for Agricultural Biodiversity Yerevan, Armenia, 26-27-28 September 2017

### **Outline**

- Multi-chain approach
- Holistic Value Chain Approach
- Experiences Tropical Fruit Trees (UNEP/GEF)
- Experiences IEMaC (USAID)
- Experiences Quinoa (IFAD)
- Experiences minor millets (IFAD)





Holistic value chain approach for neglected and underutilized species (NUS)



#### Rationale

- Farmers do not maintain diversity for a single purpose but for the beneficial combination of a range of purposes such as income, nutrition, resilience or adaptation
- Farmers are engaged in several crops connected to several value chains – this requires a livelihood perspective instead of a single value chain perspective
- Trade-offs between market orientation and food security
- Limited knowledge on gender or nutrition impacts besides income

### **Diversified livelihoods vs. specialized value chains**



### Holistic Value Chain Approach

A holistic approach to promoting NUS: From Neglected to High Value Crops



Source: Adapted from Padulosi, 2014

Different type of market strategies that built upon agricultural biodiversity



### Six type of market strategies for ABD



## Product differentiation

 Product differentiation based on favorable crop attributes





Celebrating diversity

- Bouquet gift packages
- Diversity box





#### Eco and agrotourism

- Trekking
- Diversity garden
- Homestay



### Six type of market strategies for ABD



#### Geographic indication and certification strategy

- GI-registration of satpuri hills mandarin
- Malihabadi dushera
- Appe midi mango
- Regulations taken up in existing labels
- New ABD label







- Self-declaration
- Voluntary standards
- CBM fund



#### Introduction

The server on contribution of grindback (Idadia Server) for Half India Artistic The Server Server (Idadia Server), and a server (Idadia Idadia Server) and a development, segmentation indiated to appendix all backeting has grindback controls (Idadia Idadia Idadia Idadia Idadia Idadia Perturbational Idadia Idadia Idadia Idadia Perturbational Idadia Idadia Idadia Idadia pertita Arrange Control Idadia Idadia Perturbational Idadia Idadia

Community-based Biodewsky Maragament (CINI) is a community-drive participatry approach that empowers formers and communities to expanish barnelses and to device participatry and plans that support on form surgement of agricultural biodiversity (Shapit et al. 2006). Empowerment is dering face to moderate and popel for conservation offsets and a sostating the community-based processes. Access to finandia sources as an one to empower rand access to finandia sources in a most to empower face most process of an one to prove the analytic processes. Access to finandia sources is an one to empower face and access to finandia sources is an one to empower face and the sourcesses. proceed the process has been done to measure of an empirical constant and efficience and the second sequentical constant and efficience and the second sequentical constant and efficience and the second sequentical constant and the second sequence and the second second second sequence and the second sequence periodipation in agriculture transmission and second secon





#### Trade and CSR budgets allocated for conservation efforts

- Long-term supply arrangement
- Conservation activities connect to CSR programs of larger buyer







Results of Tropical Fruit Tree diversity project and the value chain activities (UNEP/GEF)



# <sup>–</sup>ruit Diversity in South Kalimantan, Indonesia



#### **Community Biodiversity Management**

- Realizing conservation & sustainable use of TFT diversity in farmers' fields, home gardens, orchards, & in the wild
- Must happen as an integral part of farmers' production, livelihood & income-generating systems
- CBM concept aims to achieve the overarching onfarm conservation goal through:
  - Community empowerment
  - Livelihood development
  - Biodiversity conservation & ecosystem services







#### **Research questions, to assess whether:**

- i. Which or what TFT diversity is still there?
- ii. Why do people maintain diversity/what are the values and benefits of TFT diversity for rural communities?
- iii. What are the driving forces or threats?
- iv. How is TFT diversity conserved on-farm/in-situ?
- v. How to strengthen and support these practices?

#### With the aim to:

 Deepen our understanding of farmer management of diversity to determine when, where & how such strategies could be further developed to improve the resilience of such systems & farmer well-being



Mangifera foetida, South Kalimantan, Indonesia



#### Type of activities and interventions

- Creating awareness (Diversity fairs, Four Cell Analysis)
- Document knowledge & genetic resources (Four Cell Analysis, Fruit Catalogues, TK documentation)
- Collective action and inclusion (Establish or strengthen Self Help Groups and Farmer Cooperatives)
- Capacity building (Grafting, tree nursery management, agronomic practices, processing, marketing)
- Improving the seed system (Identifying superior types, establish tree nurseries, distribution of preferred saplings)
- Conservation activities (Diversity block, marking of source trees, adoption in ex-situ collections)
- Market development and home use (Product development, market linkages, promote nutritional value)



Conduct Four Cell Analysis to assess local fruit tree diversity in Sirsi, Karnataka, India



#### Where the work was done & how?

Study sites:

- 4 countries
- 22 sites
- 36 communities
- 14,345 fruit HHs

Timeframe:

- 6 years
- from 2009-2015

Sample size:

- 1,946 interviews
- 180 group discussions





#### TFT project target species and their wild relatives/landraces



Mango









Citrus



Mangifera foetida,, South Kalimantan



Garcinia indica, Karnataka, India



- N. mutabile (pulasan),



Citrus unknown, Chantaburi, Thailand



Mangifera casturi, South Kalimantan



Garcinia atroviridis, Malaysia



N. Xerospermoides (hairless rambutan)



Citrus hystrix, Kalimantan, Indonesia



Mangifera indica, landrace, India



Garcinia forbesii, Sabah, Malaysia



Yellow rambutan, landrace, Sarawak



Citrus maxima (pomelo), East Java, Indonesia



#### Inter-specific diversity in TFT project sites (wild and domesticated)

Genus	Number	Species
Mangifera	15	M. applanata, M. caesia, M. caloneura, M. casturi, M. cochinchinensis, M. foetida, M. griffithii, M. indica, M. laurina, M. odorata, M. pajang, M. pentandra, M. quadrifida, M. torquenda, M. rufocostata
Citrus	14	C. aurantifolia, C. aurantium, C. decumana, C. hystrix, C. jambhiri, C. japonica, C. limon, C. limonia, C. maxima/grandis, C. medica, C. pseudolimon, C. reshni, C. reticulata, C. sinensis
Garcinia	14	G. atroviridis, G. cowa, G. forbesii, G. fusca, G. gummigutta, G. hombroniana, G. indica, G. mangostana, G. morella, G. parvifolia, G. prainiana, G. schomburgkiana, G. speciosa, G. xanthochymus
Nephelium	4	N. cuspidatum var. robustum, N. lappaceum, N. ramboutan-ake/mutabile, N xerospermoides
	47 spp.	Found across 36 communities in four countries



#### Need for on-farm and in-situ conservation of fruit species



#### 96.9% of trees of two most popular fruit species



67.3% of trees of three most popular fruit species



#### Intra-specific diversity of Mangifera indica



211 named varieties found across 36 communities in 4 countries



#### And 164 named farmer varieties in 18 communities in India





#### Need for conservation of mango diversity in India

#### Intra-specific diversity of *Mangifera indica* in India



Neelam
Baneshan
Seedling
Lucknow Safeda
Alphonso

Malda

- 164 varieties found in project sites in India
- 93.9 % of tree population represents 10 most popular varieties only
- 51.2 % of the 164 varieties have less then 5 trees

#### Mangifera indica - number of trees per variety





### 155 named farmer varieties in India





### Market Pyramid Mango in India



#### **Results of the TFT project**

Outputs achieved per country	India	Indonesia	Malaysia	Thailand	Total
Number of communities	18	6	6	6	36
Number of beneficiaries (i.e. fruit households)	5,681	3,405	1,328	3,931	14,345
Number of implementation partners	7	4	4	4	19
Number of target species identified in project sites	13	16	13	17	47
SHG strengthened or established	168	5	3	4	180
Cooperatives strengthened or established	2	1	2	2	7
Diversity fairs organized	28	12	16	5	61
Fruit Catalogues developed	12	7	6	2	27
Nurseries established	33	10	5	5	53
Saplings distributed	56,650	9,150	1,211	10,250	77,261
Diversity conservation block established	10	4	2	2	18
Training workshops provided	60	20	31	29	140
Prototype products developed based on 14 species	12	8	5	10	35
Products marketed successfully based on 10 species	5	4	4	3	16



#### **Example 1: Custodians facilitate distribution of superior types**

TFT: 83 custodians identified -> 99 superior trees identified, documented, registered and multiplied in 53 nurseries -> 77,261 saplings distributed and sold in 4 countries

India: Saplings of *appe midi* varieties (*haladota*) identified by grafting experts (custodians) fetch high demand in local village nurseries and at College of Forestry in Sirsi, Karnataka









### Pork curry (moo chamuang)

#### 2. Local market



#### **Process of interventions**

- SHG started in 1997 (durian chips, mangosteen and durian candies, jackfruit chips etc)
- Started to sell moo chamuang on roadside for direct consumption
- Support from OTOP program
- Used initially canning facility of other group
- Obtained Thai certification for food processing in 2003 (local HACCP)

### Moo Chamuang



#### Women Self Help Group in Troknong in Chantaburi, Thailand Pork Curry with Chamuang leaves (Garcinia cowa)

	2003	2013	2014
Volume (packs)	200	500	1,000
Volume (cans)	-	1,500	2,000
Revenue (USD)	-	3,060	4,896

### Agro-tourism Kakeng, Sarawak Malaysia



akeng village in Sarawak, Malaysia

**建**憲 ==

**Diversity Garden:** 

Nephelium spp.

Garcinia spp.

Mangifera spp.

Citrus spp.

#### **Process of interventions**

- Exposure visit to Government Agro-park
- Establish Diversity Garden at the edge of the village and trekking route with help from DoA.
- Rapid Market Appraisal to tourist agents
- Provide watermelon and papaya by DoA.
- Organised fam-visit for tourist agents/ministry of tourism
- Develop list of activities (welcome dance, making of parang, trekking with fruit lunch at the end, handy crafts, paddy harvesting or planting)
- Identified groups and fees per activity
- Training by famous tourist guide specialized in adventure tourism

### Preliminary outputs - Kakeng



### Fruit Diversity Garden & trekking route

- Linked up with two tourist agents from Kuching
- Promotion is done by tourist agents
- Need only to prepare activities, groups & fees





After

Aromatic mango Pickle, Kokum juice and Uppage rinds in Sirsi, Karnataka India



### **Site location**



- Vanalli Cluster
- Devanalli Cluster

25 villages - households





# Mosaic landscape of various forest types with agricultural













### **Context analysis**



- Loss in forest cover from 84.0% to 74.6% and 71.9% from 1979-1999-2013 in Uttara Kannada
- Collectors are mainly small farmers and wage laborers of lower caste (OBC/SC/ST)
- Low asset base but high level of Traditional Knowledge on NTFP and forests
- Market linkages very poor although strong growth of NTFP markets (depend on few collecting traders)



Bioversity International\Lamers, H



### **Context analysis**



- No access to 'bettalands'
- FD and Village Forest Committees regulates collection of uppage by tender – some NTFP banned – other NTFP not much regulated
- Despite reservations low involvement lower caste and women in VFC because wage labor jobs, household chores, travel norms
- Encroachment on forest among OBC/ST/SC groups



Bioversity International\Lamers, H



### **Target Value Chains and Products**



- Garcinia gummigatta (upage) dried rinds (weight loss)
- *Garcinia indica (murugulu)* dried rinds (ayurvedic), butter (skin treatment), kokum juice
- *Mangifera indica* (appe mango) pickle (side dish for daily meals)



Bioversity International H. Lamers

College of Forestry, Vasudeva R.



### Value Chain of NTFPs



Collection and Drying Grading, Sorting, Storage Aggregation, Processing, Retailing



- Popularly called Appemidi.
- Unique Shape and effervescent aroma
- Delicacy in the Central Western Ghats region of India
- Pickles made of immature fruits is an integral part of every single meal of the local communities
- For home use only,
   but now developed
   into a product



### **Domestication & commercialization**





Dr. Vasudeva, College of Forestry



### Preliminary outputs - Salkani





SHG Shree Lakshminarasimha Mahila Raitara Sangh Aromatic mango pickle from Malanji & Nandagar Appe

	2011	2012	2013	2014
Volume (kg)	11	30	200	450
Revenue (USD)	-	-	950	2100
Active members	12			13

### Preliminary outputs - Kalgadde



#### SHG Matrabhoomi Women Group

Syrup from fresh kokum fruits

	2012	2013	2014	2015
Volume (kg)	20	150	350	500
Revenue (USD)	-	285	680	1120
Active members	12	12	12	11

### Garcinia Gummigatta







### Linking collectors to Himalaya Drug company



### **Enterprise evaluation - Kadamba Cooperative**

- Established in 1997 and changed into farmer producer company in 2005
- Sales of 70 consumer products under own brand (<u>www.kadambamarketing.com</u>)
- One of the few cooperatives in Karnataka involved in sales of organic certified NTFPs
  - Jackfruit papads, chips (A. heterophyllus)
  - Kokum juice, jam, dried rinds (*G. indica*)
  - Mango pickle from appe middi (M. indica)
  - Wild collected honey
- In 2016 they have 2800 members of which 50%-Higher caste, 30%-OBC, 20%-STSC with estimated landholdings:
  - ✓ 40% 0-2 acre
  - ✓ 40% 2-4 acre
  - ✓ 20% more than 4 acre









#### **Financial assets**

- Achieved revenue of USD 765,000 in 2016 (15% ~ USD 115,000 from NTFPs)
- Managed to increase profit from USD 5,300 to USD 36,700 from 2005 to 2016
- No information obtained about outstanding loans or savings

#### **Physical assets**

- Owner of large warehouse for storage and processing activities, including office and cooperative shop in Sirsi town
- Additional small shop in Yellapur







#### Natural assets

- Organic certification of 400 farmers in place (NPOP India organic standard)
- Distributed organic fertilizer and pesticides to its members with support from UAS and Horticulture Department
- Organizes yearly jackfruit varietal diversity festival since 2008 with regular tree planting activities
- Limited insights or evidence obtained about forest monitoring and incentive mechanism to avoid destructive harvesting practices







#### Human assets

- Experienced and entrepreneurial general manager *Mr. Vishweshwar Bhat*
- Total 28 staffs of which 13 female and 15 male in 2016. No female in senior management, 1 female in office and rest among production staff.
- Increased member base from 800 to 2800 members from 2000 to 2016 of which 20% female (560 female members)
- Female members organized in SHG to process sambar powder, cut jackfruits for papads & chips, supply salted mangoes and rinds for kokum juice
- 800 members became shareholder for USD 15 per share – other members pay USD 0.25 annually for membership. Shareholders predominantly male.







#### **Social assets**

- Well established network of buyers
   within Karnataka State
- Good linkages with various government programmes to obtain grants, subsidies or training (NABARD, UAS, Horti Dep).
- Established strong local brand name and is recognised for being niche player focusing on organic forest products
- Services in place for its members like training, credit and guaranteed purchase of raw materials – opened a spice trading centre in 2015





### How to strengthen female and STSC&OBC groups?

 Dominance of farm produce and forward caste groups in Kadamba and other existing cooperatives

Two options:

- Improve representation and voice of women and STSC&OBC within Kadamba
- Registration and establishment of SHG and new organization Aasare Producer Company for STSC&OBC with high female participation and focus NTFPs









# Thank you





