Conserving local varieties and landraces: Agrobiodiversity in climate change adaptation in Bhutan

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Trondheim
31.05.2016 to 03.06.2016
1. Bhutan-Background

2. The impacts of climate change that agriculture in Bhutan is facing

3. How is agrobiodiversity being used in climate change adaptation in Bhutan?

4. Role of local communities in conserving local varieties and/or landraces

5. How can governments, private sector, academia, civil society, local communities, support agrobiodiversity?

6. Conclusion
1. Bhutan-Background
1. Bhutan-Background (1/3)

- 7,554 masl
- rugged mountains and deep valley making Bhutan rich in biodiversity
- 100 masl

Area = 38,394 sqkm

1. Bhutan-Background (2/3)

- Good Governance
- Preservation and Promotion of Culture
- Sustainable Socio-economic Development
- Environmental Conservation

1. Bhutan-Background (3/3)

- Living Standards
- Education
- Health
- Cultural Diversity & Resiliency
- Time Use
- Community Vitality
- Ecological Diversity
- 9 GNH domains
- Good Governance

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Our constitution demands that a minimum of 60% of Bhutan’s total land shall remain under forest cover for all time.

Snow cover: 7.44%

Forest cover: 70%

Arable land: 2.93% (1125 sqkm)

69% dependent on agri. sector
60-90% dryland farming <18% of the land is under irrigation
31% agriculture on slopes >50%.

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<tr>
<th>Agro-ecological zone</th>
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<th>Rainfall (mm/annum)</th>
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<tbody>
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Global biodiversity hotspot
Committed: carbon neutral
Annual emission: 1.5 m tons
Sequestration: 6.3 m tons
Carbon sink for: >4 m tons Co2 each yr

Vision 2020
2. Impacts of climate change that agriculture in Bhutan is facing
2. The impacts of climate change that agriculture in Bhutan is facing (1/4)

Despite Vision 2020

Bhutan 2020: A vision for Peace, Prosperity & Happiness

Planning Commission
Royal Government of Bhutan
1999

Despite BAPS/NBSAPs

Forest cover of 70%,

Despite being organic & conservation of biodiversity

Despite CoB mandating us to maintain a mini of 60% forest cover

Despite BAPS/NBSAPs

Despite being a Carbon sink for: >4 m tons CO2 each yr

Despite massive green initiatives

Bhutan is not spared
Outbreaks of pest and diseases; drought, erratic rainfall,
2. The impacts of climate change that agriculture in Bhutan is facing (3/4)

Windstorm April 2015 affected 45% of districts

Orange

Cardamom

But citrus greening

But cardamom wilt
The impacts of climate change that agriculture in Bhutan is facing (4/4)

23rd May: Maize and potato crops of 56 households were damaged by the hailstorm

But same glaciers retreating rapidly posing threat of GLOF

Harnessing gradual glacier melt to generate electricity
3. Use of PGRFA diversity in climate change adaptation in Bhutan (1/5)

In pursuant to Vision 2020

Bhutan 2020: A vision for Peace, Prosperity & Happiness
Planning Commission 1999

In pursuant to CoB

In pursuant to International treaties & conventions

UNFCC
UN CBD UNCCD

National action Plan Biodiversity Persistence and Climate change

In pursuant to national action plans

National Biodiversity Strategies and Action Plan

Conservation & Sustainable Use of PGRFA under overall Biodiversity Conservation National action Plan

SDGs

GPA
ITPGRFA

NAPA
SAPA
3. Use of PGRFA diversity in climate change adaptation in Bhutan (1/5)

Conservation & Sustainable Use of crop diversity through

EX-SITU (2005)

IN-SITU/ON-FARM (2001)

About 40 on-farm sites

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Initiatives
- Distribution of local crop seeds
- Seed selection & purification
- PVS (w/w/o CAT
- Biodiversity Fairs
- CSBs
- Value addition
3. Use of PGRFA diversity in climate change adaptation in Bhutan (2/5)

Story from one site on On-farm conservation of buckwheat in Bumthang

- Improving the value of landraces through value addition and increasing the competitiveness of landraces.
- To enhance income generation and contribute to livelihood of farmers.
- To increase buckwheat production and contribute to food security.

- Maintenance and conservation of buckwheat heritage and enhance resilience of farming ecosystem system.

Bumthang valley

Potato commercialization

Buckwheat
3. Use of PGRFA diversity in climate change adaptation in Bhutan (3/5)

How we started?

Through awareness raising in all 4 Gewogs and farmers’ group Formation who served like a catalyst.
3. Use of PGRFA diversity in climate change adaptation in Bhutan (4/5)

Through product development, diversification, improving market access & marketing

Valued added local products

Urban consumers

NUS Rural farmers
3. Use of PGRFA diversity in climate change adaptation in Bhutan (4/5)

Valued added local products
3. Use of PGRFA diversity in climate change adaptation in Bhutan (5/5)

**Results/Impacts**

- Conservation and sustainable use of crop diversity on-farm and in CSB
- Contribution to enhancement of farming ecosystem resilience
- Health and nutrition
- Women and community empowerment
- Employment opportunities
- Private and public benefits
- Connect farmers and consumers and improved availability
- Organic agriculture
- Contribution to livelihood
- Ecosystem service
- Preservation of traditional food culture
- Community Seed Bank
- Increase in production and area and contribution to food security
- Exposure to changing environment
- Mainstreaming biodiversity conservation

*Impact*
4. Role of local communities in conserving local varieties and/or landraces (1/3)

- **Conserving through use**
- **By keeping alive their knowledge on characteristics, traits, agronomic practices, seed selection, post harvest handling, processing, culinary properties, organoleptic properties, medical properties, cultural/traditional/religious values etc.**
4. Role of local communities in conserving local varieties and/or landraces (2/3)

Traditional knowledge on specific use of specific species

- Sesame seeds used in purification ceremony
- Garden cress: *Lepidium sativum* used for medicine
- Yellow mustard for use as Dukzay
- Horse gram *Macrotyloma uniflorum*
- Rice bean mixed with rice
- Fox tail millet
- Pink sorghum used for colouring *ara*
- Sweet potato
- Dioscorea villosa
- Colocasia
- Chaemar

Special religious cakes
Out of wheat flour
4. Role of local communities in conserving local varieties and/or landraces (1/3)

Recognizing & awarding to inculcate in them the value for GR WTR genetic, economic, environmental value, culture/tradition/religious value

Role in passing on the seeds and the associated knowledge
5. Governments, private sector, academia, civil society, local communities, support agrobiodiversity (1/3)

Creating appropriate policy environment.

In Bhutan all major policy documents supports conservation of local varieties viz.

- COB,
- Vision 2020,
- BAB 2003,
- NBSAP(2014), FNS Policy (2014),
- Bio security Policy (2010),
- FNCA (1995),
- RNR Research Policy (2012),
- Bio safety Act,
- BA (draft),
- AM policy (draft).

- Mainstreaming & internalizing actions on C& SU into relevant sectors,
  - Agriculture,
  - Livestock,
  - Forest,
  - Livelihood/ Poverty Reduction,
  - Organic Agriculture,
  - Ecotourism,
  - Hydropower,
  - Mining,
  - Trade Etc.

- Mobilize funds
- Capacity building of the relevant stakeholders
5. Governments, private sector, academia, civil society, local communities, support agrobiodiversity (2/3)

Academia

College of Natural Resources

RITH

RTC

School agriculture program
Private Sector: marketing local products, exploring markets

Future possible roles by:
NGOs and CSOs:
• The Loden Foundation,
• Bhutan Association of Women Entrepreneurs (BAOWE),
• SABAH (SAARC Business Association for Home-Based Workers) could play role in future provided their capacity is built.
5. Governments, private sector, academia, civil society, local communities, support agrobiodiversity (1/3)

Four harmonious friends

1. Government

2. Research, Academia, NGOs, CSOs

3. Extension & Private sector

4. Local communities
6. Conclusion

Start has been made

Long way to go

Look forward to cooperation & collaboration

Thank you for your kind attention