



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

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OUTLINE

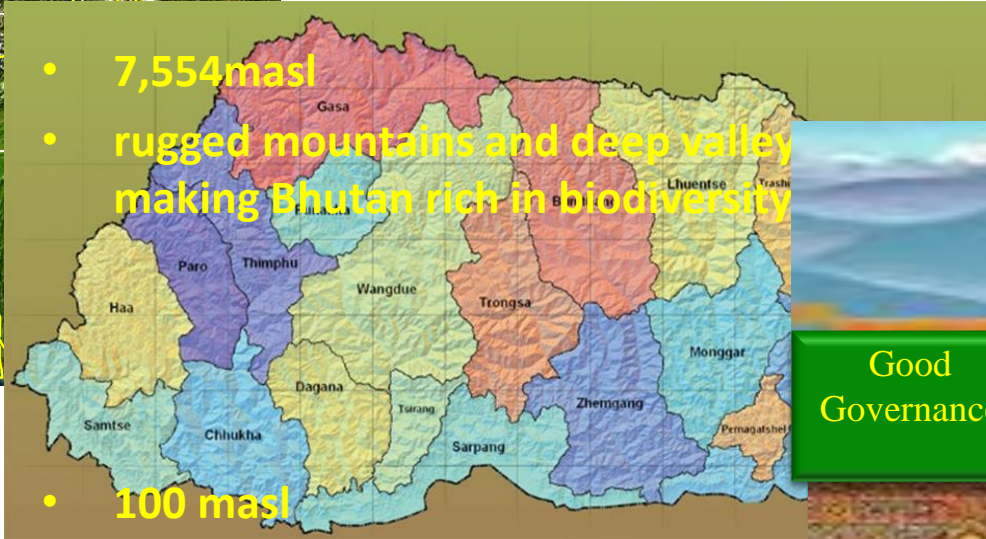
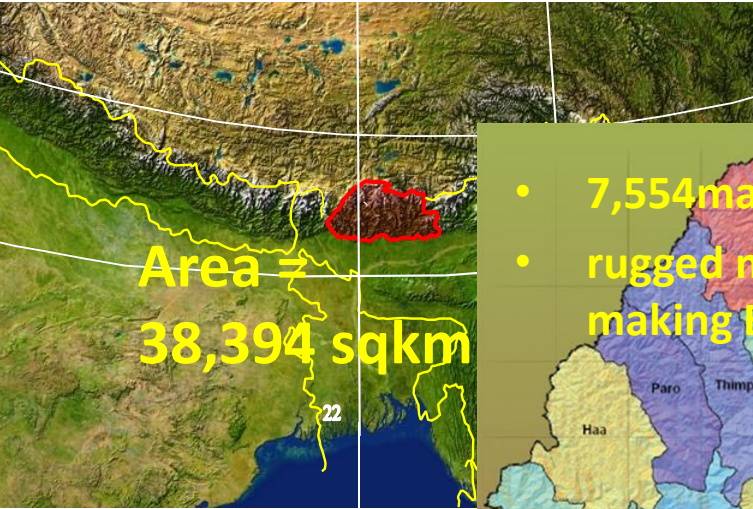


- ▶ 1. Bhutan-Background
- ▶ 2. The impacts of climate change that agriculture in Bhutan is facing
- ▶ 3. How is agrobiodiversity being used in climate change adaptation in Bhutan?
- ▶ 4. Role of local communities in conserving local varieties and/or landraces
- ▶ 5. How can governments, private sector, academia, civil society, local communities, support agrobiodiversity?
- ▶ 6. Conclusion



1. Bhutan-Background

1. Bhutan-Background (1/3)



1. Bhutan-Background (2/3)

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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.

The Constitution of the Kingdom of Bhutan



Snow cover
7.44%



Forest cover
70%,

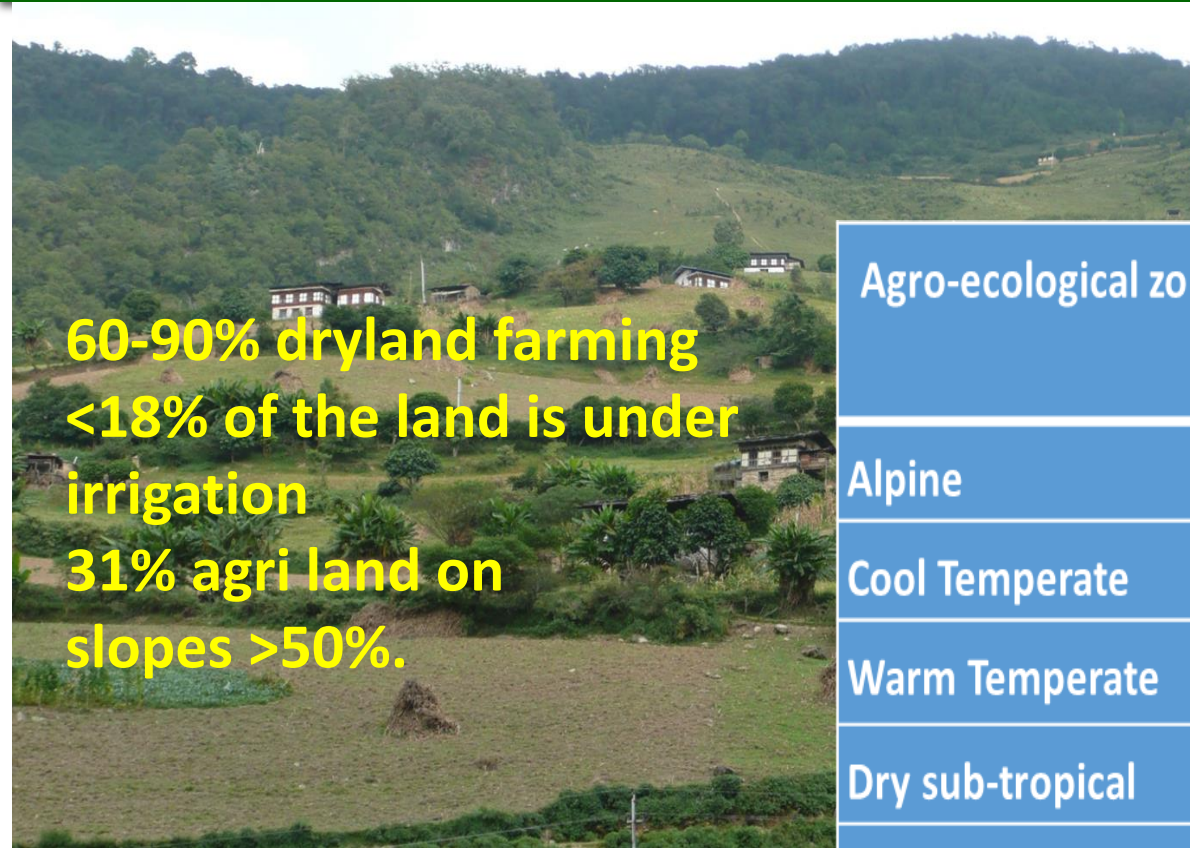


Arable land
2.93% (1125 sqkm).



69%
dependent on
agri. sector

1. Bhutan-Background (3/3)



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

| Agro-ecological zone | Altitude (m.a.s.l) | Rainfall (mm/annum) |
|----------------------|--------------------|---------------------|
| Alpine | 3600-4600 | < 650 |
| Cool Temperate | 2600-3600 | 650- |
| Warm Temperate | 1800-2600 | 650- |
| Dry sub-tropical | 1200-1800 | 850- |
| Humid sub-tropical | 600-1200 | 1200- |
| Wet sub-tropical | 150-600 | 2500- |



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)

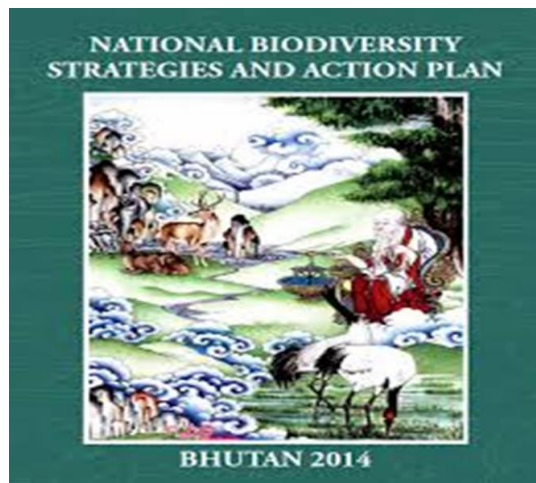
Despite Vision 2020

Bhutan 2020:
A vision for Peace, Prosperity
& Happiness



Planning Commission
Royal Government of Bhutan
1999

Despite BAPS/NBSAPs



Forest cover of 70%,



Despite massive green initiatives



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

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

The Constitution of
the Kingdom of Bhutan

Despite being a Carbon sink
for: >4 m tons Co2 each yr



Despite being organic & conservation of biodiversity



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

Outbreaks of pest and diseases; drought, erratic rainfall,



Rice



But no water



Maize



Outbreak of pests



Erratic rainfall



But outbreak of diseases



Drought

2. The impacts of climate change that agriculture in Bhutan is facing (3/4)

Orange



But citrus greening

Cardamom



But cardamom wilt

Windstorm April 2015
affected 45 % of districts



10

Photo: BBS

2. 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

Photo: Kuenselonline

Harnessing gradual glacier melt to generate electricity



But same glaciers retreating rapidly posing threat of GLOF



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

GNH dev. philosophy

In pursuant to Vision 2020

In pursuant to International treaties & conventions

In pursuant to national action plan

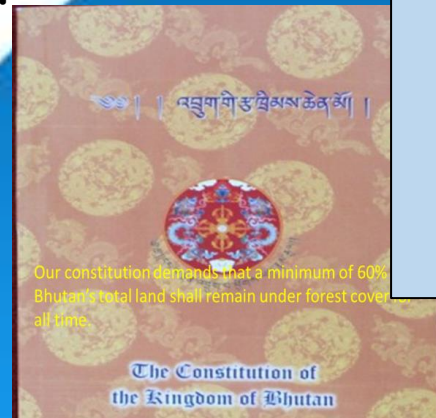
In pursuant to CoB

Bhutan 2020:
A vision for
Peace,
Prosperity &
Happiness

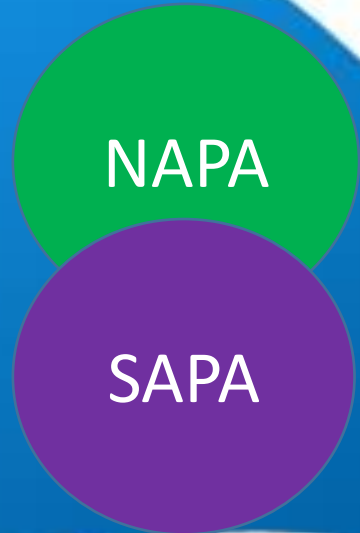
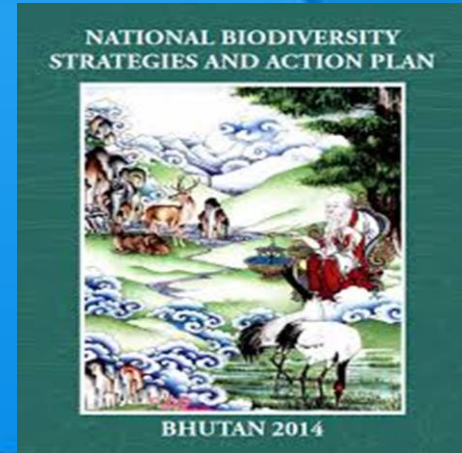
Planning
Commission
1999

UNFCC
UN CBD UNCCD

National action Plan
Biodiversity Persistence
and Climate change



GPA
ITPGRFA



SDGs

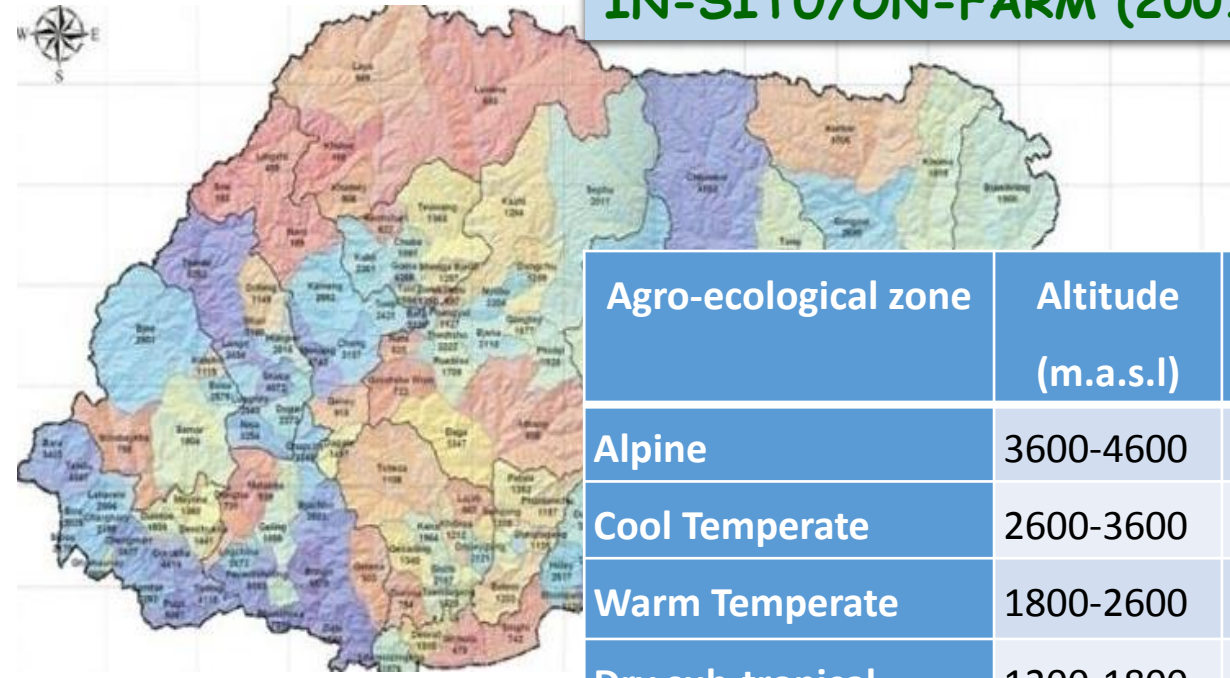
Conservation & Sustainable Use of PGRFA

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)

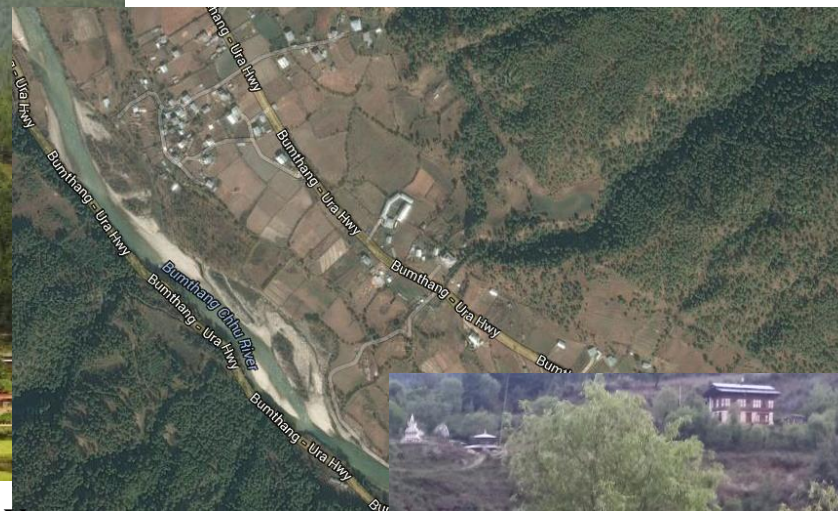


| Agro-ecological zone | Altitude (m.a.s.l) | Rainfall | Initiatives |
|----------------------|--------------------|----------|--|
| Alpine | 3600-4600 | | <ul style="list-style-type: none"> • Distribution of local crop seeds • Seed selection & purification • PVS (w/w/o CAT) • Biodiversity Fairs • CSBs • Value addition |
| Cool Temperate | 2600-3600 | | |
| Warm Temperate | 1800-2600 | | |
| Dry sub-tropical | 1200-1800 | | |
| Humid sub-tropical | 600-1200 | | |
| Wet sub-tropical | 150-600 | | |

About 40 on-farm sites

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



Bumthang valley



Outcome

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

Outputs

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



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.



Farmers' Group members

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

Through product development, diversification, improving market access & marketing



NUS
Rural farmers

Valued added local
products

Urban consumers

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

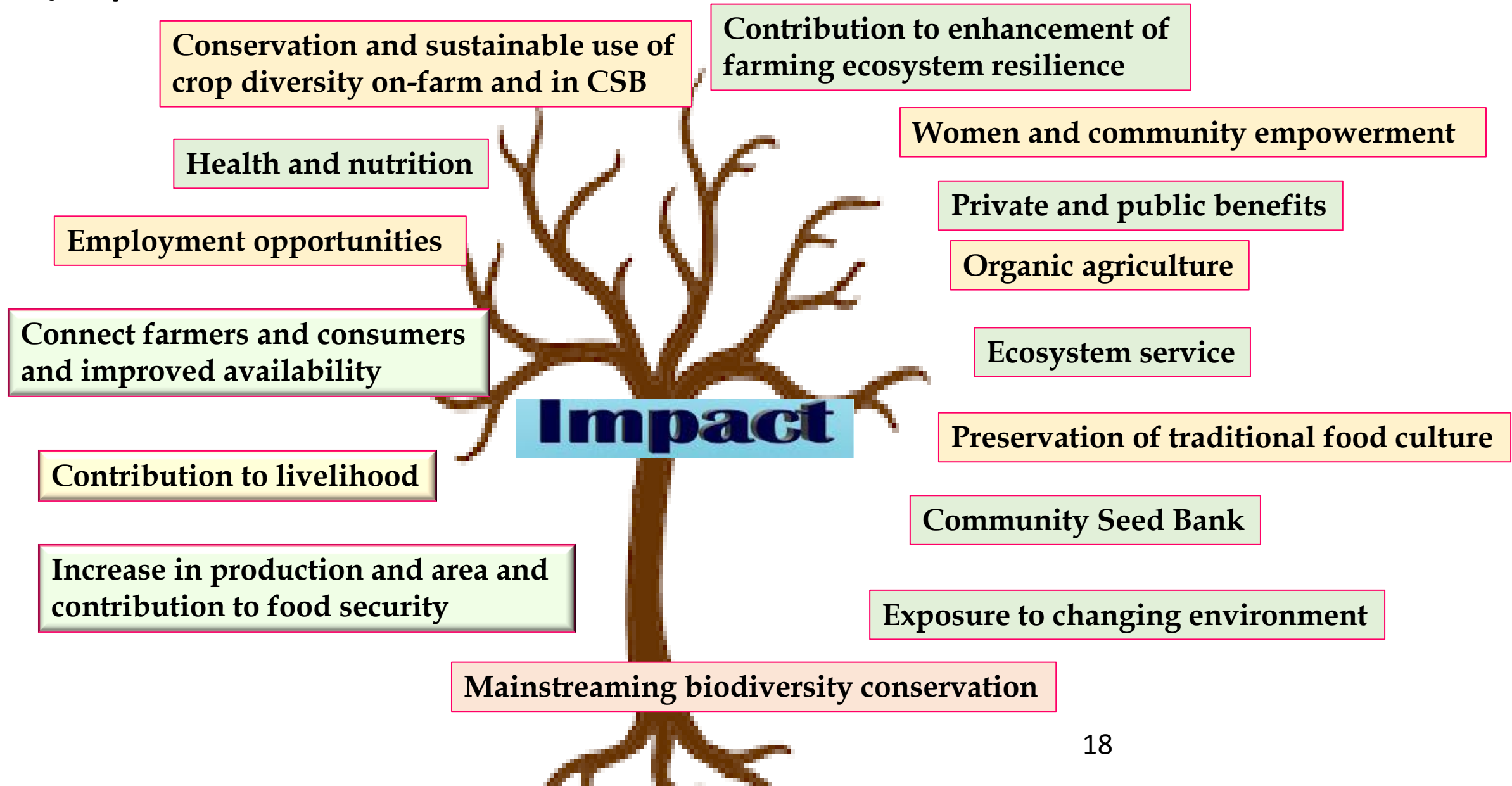


Valued added local products



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

Results/Impacts



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.*



Aru:
Terminalia
chebula



Baru:
Terminalia
belerica



Churu:
Phyllanthu
s emblica



Drizang:
Stigma of Crocus
sativus



Alainchi
Cardamom



Gapur:
Cinnamomum
camphora

4. Role of local communities in conserving local varieties and/or landraces (2/3)

Traditional knowledge on specific use of specific species



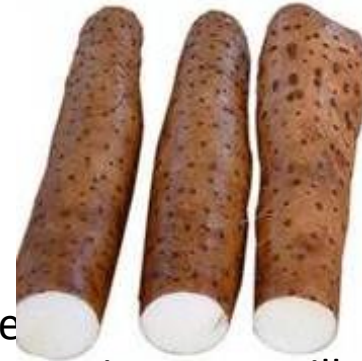
Sesame seeds used in purification ceremony



Garden cress:
Lepidium sativum
used for medicine



Rice bean mixed with rice



Dioscorea villosa



Yellow mustard for use as Dukzay



Fox tail millet



Sweet potato



Horse gram
Macrotyloma uniflorum



Pink sorghum used for colouring ara



Colocasia



Special religious cakes
Out of wheat flour



Chaemar

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)

Government



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



5. Governments, private sector, academia, civil society, local communities, support agrobiodiversity (3/3)



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

4. Local communities

3. Extension & Private sector

2. Research, Academia, NGOs, CSOs

1. Government

6. Conclusion

Start has been made

Long way to go

Look forward to cooperation
& collaboration

Thank you for your kind attention

