



"Sustainable food system and natural resources  
for the equitable social and economic well-being"

# Digital Innovation and Mechanization for Smart Farming:

*“An Approach to Improving Food Security and Women Farmers’ Working  
Conditions in Bhutan”*

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# Outline



Introduction



Key Challenges



Solutions :

- Recommendations & Current practices in Bhutan

# Introduction

- Food security and Gender Inclusivity are critical challenges in many regions, particularly for smallholder farmers, who are vital to agricultural production
- Women farmers play a crucial role in food production but face barriers in accessing resources, technology, and financial support
- Agriculture sector in Bhutan has a **higher female participation**, making up to **51.9 %** of the workforce (LFS., 2024)
- **Gender Specific Norms & Practices of Agriculture in Bhutan:**



# Key Challenges of Women Farmers

## 1. Challenges in Mechanization:

- Limited access to gender-friendly agricultural machinery
- High costs of mechanization
- Lack of gender-responsive machinery design

- Minimal reflection of gender-sensitive interventions in agri-food value chains

## 2. Limited Access to Agri-Smart Technology

- Digital literacy gap among women farmers
- Lack of internet connectivity in rural areas
- High costs of digital tools and training

## 3. Policy and Institutional Barriers:

- Limited Women Participation in policy making
- Lack of representation in decision-making

- Underrepresented at the leadership and management levels (**13.88%**) (FAO., 2023)

## CALL FOR ACTIONS:

- Digital innovation and mechanization can transform agriculture, making farming more efficient, productive, and sustainable
- Smart farming techniques, such as precision agriculture, AI-driven advisory services, and IoT-based monitoring, can empower women farmers by improving productivity and reducing labor
- Need for Gender-responsive approaches to ensure women have access to affordable digital tools, training programs, and financial mechanisms for modern farming.
- Addressing these challenges will not only improve food security but also promote gender equity in agriculture, fostering a sustainable and inclusive farming ecosystem.

# Solution 1: Agri-Smart Technology for Women Farmers

## 1. Improving Access to Digital Tools:

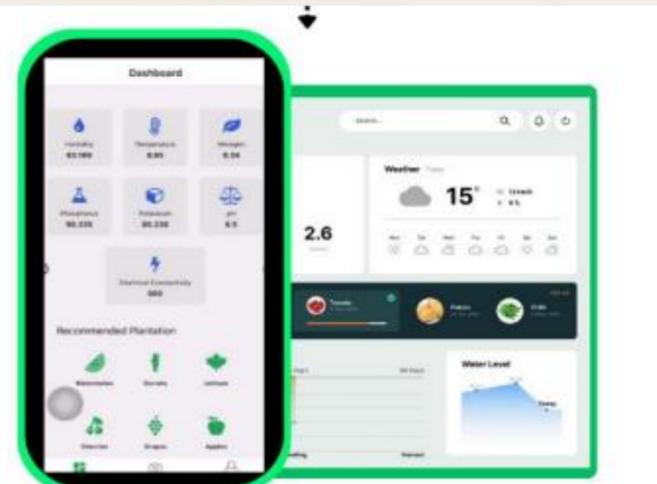
- Affordable and accessible mobile apps for farming
- Community-based digital literacy programs
- Expanding rural internet and mobile connectivity

## 2. Gender-Responsive Smart Farming Technologies:

- Smart advisory services tailored for women farmers
- IoT-based smart irrigation and climate monitoring systems
- Mobile financial solutions (e.g., microloans, digital wallets)

### On-going activities:

Mobile & Web Application Development



Smart Irrigation System



Automation of GreenHouse & Hydroponic Systems



# Solution 2: Mechanization for Women Farmers

## 1. Developing Gender-Responsive Machinery:

- Lightweight, ergonomic farm equipment designed for women
- Training women in machinery use and maintenance
- Technical support for women-focused cooperatives

### On-going activities:

Training Woman Farmer on machine operation



Automation of Grain Drying



Mulch Laying & Weeding



Timer & AI-Based Animal Repellent System



## Solution 3: Collaborative Approaches & Partnerships

### Government Initiatives

- Promoting women in agriculture through subsidized grants or low-interest loans
- **Capacity Building & Training:** Establishing women-focused mechanization training programs to increase access to machinery and technical knowledge

### Multi-Stakeholder Partnerships

- **Agri-Tech Startups Supporting Women:** Encouraging private companies to develop gender-responsive Agri-tech solutions such as mobile advisory platforms and AI-based farming tools
- **Public-Private Partnerships (PPPs):** Collaborations between governments and private firms to make precision agriculture and mechanization affordable and accessible
- **Financial Inclusion Programs:** Partnering with financial institutions to provide women farmers with microloans, digital payment solutions, and crop insurance.

## Solution 3: Collaborative Approaches & Partnerships

### International organizations and NGOs

- Support gender-responsive agricultural initiatives through funding, policy development, and capacity-building.
- **NGO-Led Smart Farming Projects:** Organizations working with rural communities to distribute affordable smart farming tools and promote mechanization.
- **Global Research & Development Initiatives:** International research collaborations focused on designing ergonomic, cost-effective agricultural machinery for women, with mandatory female engineers & researchers
- Farmer cooperatives and knowledge-sharing networks

# Bhutan's Entrepreneurial Tale

## “Empowerment through Entrepreneurship”

### • Bhutan Association of Women Entrepreneurs (BAOWE)



#### Vision

- To promote a conducive environment for sustainable and equitable opportunities for women

#### Mission

- To Promote Sustainable and Equitable opportunities for women entrepreneurs



Sales outlet Hejo, Thimphu



Sales outlet at RSTA Bus Terminal, Thimphu



Sales outlet at the entrance of IDWNRH



Sales Outlet & Yogurt Unit near RSTA Bus Terminal, Phuntsholing



Self Help Groups of Sunkiri & Watsa, Haa



Self Help Group of Ura, Bumthang

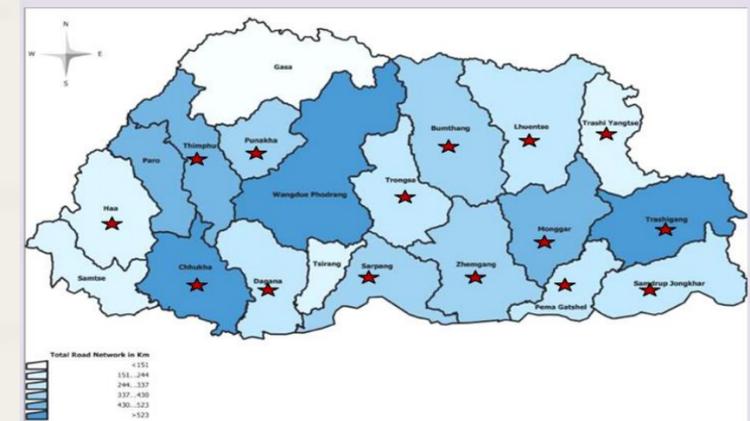
#### 1. Ura Bucketwheat Processing Unit



#### 2. Tang Processing Unit



#### BAOWE's OUTREACH



1. Thimphu – Market structure (Sales Outlet)
  2. Haa – Dairy
  3. Chukha – Agriculture and Dairy
  4. Trongsa – Aromatic Plants
  5. Bumthang – Buckwheat (Sweet & Bitter)
  6. Trashigang – Cattle and Poultry Feed production
  7. Trashiyangtse – Urkha Bangla chilli production
  8. Zhemgang – Cardamom, Rice, Dairy, Turmeric, Rice, Mustard Oil and Vegetable production
  9. Sarpang – Sales Outlet
  10. S/Jongkhar – Food Processing Unit
  11. Punkha- Pangtse Oil
  12. Pemgatshel – Tshatsi Buram (Jaggery)
  13. Mongar
  14. Lhuntse
  15. Dagana
- Sustainable Hospitality Industry Inclusive of Native Entrepreneurs (SHINE)

# Bhutan's Entrepreneurial Tale

## BHUTAN HYDROPONICS

- Country's First Private Hydroponic start up by a Woman



Founder:

- Ms. Kinley Wangmo, Mother of Two



Place of Study visit for students



Salad Business



Place for visitors

**THANK YOU!**