Nature Based Solutions (NBS) to achieve food security and SDGs in drought prone subtropical area

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Introduction

Climate change is causing droughts to become more severe. Due to the drought's impact on agricultural productivity and the fact that most of the rural areas depend on farming and on an agriculture-based economy, thus rural populations appear to be more susceptible. A sustainable approach is needed to reduce the negative effects of droughts. This can be more effectively accomplished by incorporating Nature Based Solutions (NBS) into agricultural practices.

Aim

The aim of this research is two folds:

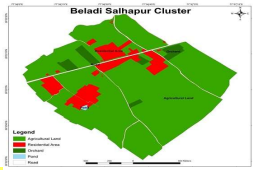
1. To understand the concept of NBS within the agriculture systems
2. To assess if NBS lead of greater food security and attainment of SDGs

Methodology

1. Literature Review
2. Questionnaire design
3. Field visit to two village Belladi and Bhagwanpur village, Roorkee, Uttarakhand
4. Comparative analysis summary of both the villages
5. Analyzing the extent of NBS parameters being followed up by the villages and key outcomes
6. Significance of the outcomes in achieving SDGs

Beladi village, Uttarakhand, India

- Modern/ chemical fertilizers-based farming.
- Mostly smallholders and medium holders' farmers



Challenges they are facing:

- Lack of training programmes
- Lack of reachability of government schemes
- Limited access to large markets
- Crop failure due to sudden rainfall
- Limited income

Adaptation Strategy:

- No strategy followed until the initiative taken under Unnat Bharat Abhiyan project, where vermicompost bed was installed in March 2022.

Bhagwanpur village, Uttarakhand, India

- Organic farming, Connected with FPO
- Mostly medium holders' farmers

Benefits:

- Income stability
- Training programmes
- Good market reachability
- Benefits of government policies

Challenges they are facing:

- Lack of resources (tools and techniques
- Crop failure due to sudden rainfall

Adaptation Strategy:

- Following IMD prediction to sow seeds
- Following Agroforestry
- Initiative towards carbon credit

NBS parameters for agriculture (Telwala, 2023)

S.No.	Parameters	Belladi	Bhagwanpur	IUCN Criteria
1	Biodiversity Conservation	☑	☑☑☑	3
2	Sustainable land management		☑☑☑☑	8
3	Water management	☑	☑	8
4	Knowledge and innovation	☑	☑☑☑	7,8
5	Manage risks, build resilience and reduce vulnerabilities	☑	☑☑☑	7
6	Climate Resilience	☑	☑☑☑	6,7
7	Pest and disease management		☑☑☑☑	3,8
8	Capacity building	☑	☑☑☑☑	6,7
9	Livelihood diversification		☑☑☑	1,2
10	Sustainable Livelihoods		☑☑☑	1,8
11	Access to markets and finance support	☑	☑☑☑☑	2
12	Policy and governance	☑	☑☑	5

IUCN NBS criteria 2020	
Criterion 1	NbS effectively address societal challenges
Criterion 2	Design of NbS is informed by scale
Criterion 3	NbS result in a net gain to biodiversity and ecosystem integrity
Criterion 4	NbS are economically viable

IUCN NBS criteria 2020	
Criterion 5	NbS are based on inclusive, transparent and empowering governance processes
Criterion 6	NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits
Criterion 7	NbS are managed adaptively, based on evidence
Criterion 8	NbS are sustainable and mainstreamed within an appropriate jurisdictional context

Food security and SDG outcomes

Food security:
Ensuring food security due to increase in crop productivity and better nutrient quality

Ecological benefits:
(SDG 13, SDG 15)

- Biodiversity conservation
- Soil nutrient enrichment
- Carbon dioxide sequestration
- Decrease in land degradation

Socioeconomic benefits:
(SDG 1,2,3,4,5,7,8,10,16)

- Upliftment in social and economic condition of people
- Increasing carbon markets
- Building resilience through capacity building

Source: https://socius.be/partnerships-tussen-bedrijven-en-non-profit/

References:
Telwala, Y. (2023) "Unlocking the potential of agroforestry as a nature-based solution for Localizing Sustainable Development Goals: A case study from a drought-prone region in rural India," *Nature-Based Solutions*, 3, p. 100045. Available at: https://doi.org/10.1016/j.nbsj.2022.100045.

In conclusion, the utilization of NBS such as agroforestry, regenerative land management is facilitated by collective action of Farmer Producer Organization (FPO) in Bhagwanpur village can contribute to achieving food security and attainment of SDGs, while also providing socioeconomic and ecological benefits. By prioritizing NBS interventions, farming communities are moving towards a more climate-resilient future with a better understanding trade-offs within the agriculture practices.

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