



## Landscape resilience of Khweng, Ri Bhoi & Umsawwar, East Khasi Hills Meghalaya

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# Introduction

Indigenous people in Meghalaya, North East India and across the world are experiencing changing climate which has affected their agriculture, food and nutritional security. Indigenous people have coped with these changes using their own traditional knowledge. Besides, the landscape has also been affected by external forces of materialism and consumerism which has also led to the exploitation of natural resources in indigenous lands.

It is therefore imperative to understand the condition of their landscapes so that they can take relevant action towards conserving their resources which will become a source of food and livelihood to improve their well being.



# What is a resilience?

**Resilience** can be described as a capacity to **absorb/withstand** shock (e.g. survive and recover after drought, flood, storm, wind, fire). And also to continually **change, adapt and transform** in response to external drivers, internal processes; and to have the opportunity for novelty and innovation

**Example 1:** During a long drought, some crop species/varieties were able to withstand the drought and ensure harvest for the farmers. And farmers were able to learn and in the next season plant more of drought-resilient crops. (*resilience through agrobiodiversity*)

**Example 2:** A farmer manages two land-use systems (wet paddy field in the lowland, and fruit agroforestry in the hills). The farmer lost paddy rice due to river floods caused by heavy rains, but the fruit agroforestry supported him as back-up land use. (*resilience through land-use diversity*)

# What are the resilience indicators?

- The social-ecological resilience indicators “measure” the interrelated features of a landscape that confer resilience.
- The indicators are based on 20 questions that need to be answered and discussed by community in a **workshop/FGD**.
- The indicators are grouped in five areas:
  - **Landscape diversity and ecosystem protection** (4 questions)
  - **Biodiversity** (including agrobiodiversity) (3 questions)
  - **Knowledge and innovation** (4 questions)
  - **Governance and social equity** (4 questions)
  - **Livelihoods and well-being** (5 questions)

# Resilience indicators, what for?



THE RESULTS OF RESILIENCE ASSESSMENT ARE USED TO IDENTIFY CURRENT GAPS AND WAYS TO ENHANCE RESILIENCE (E.G. THROUGH LANDSCAPE RESTORATION, FARM DIVERSIFICATION, BETTER GOVERNANCE)



THE COMMUNITY CAN REACH CONSENSUS ON WAY FORWARD, MAKE AN ACTION PLAN, AND START INCREASING RESILIENCE OF THEIR LANDSCAPES, FARMING SYSTEMS, AND COMMUNITIES

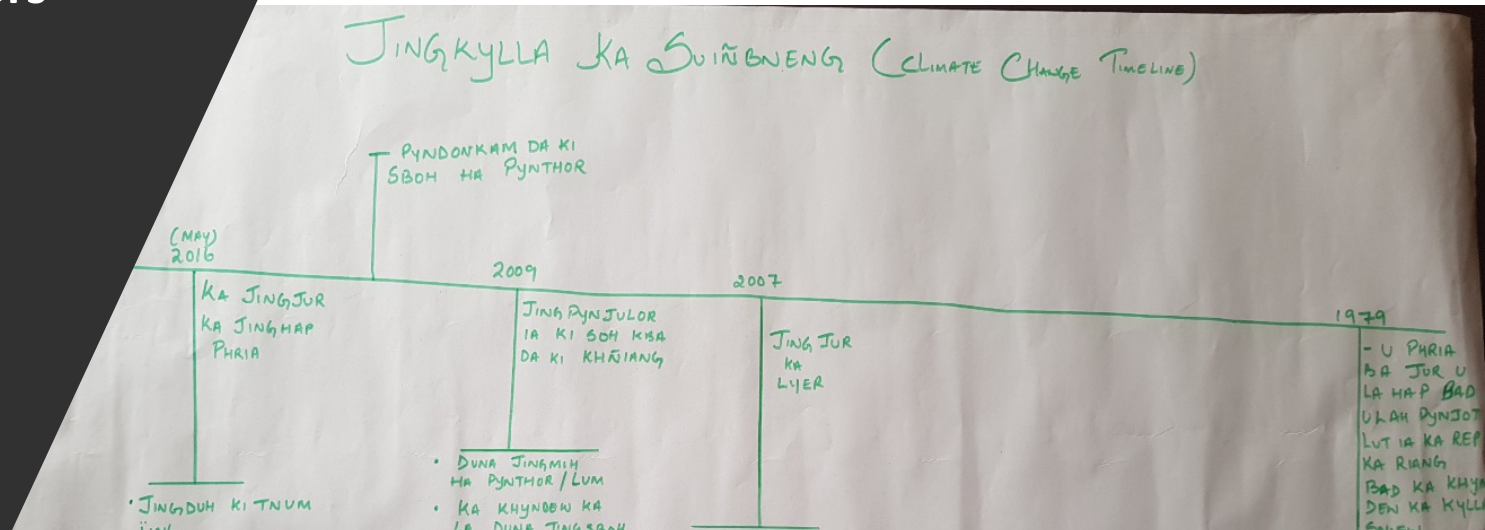
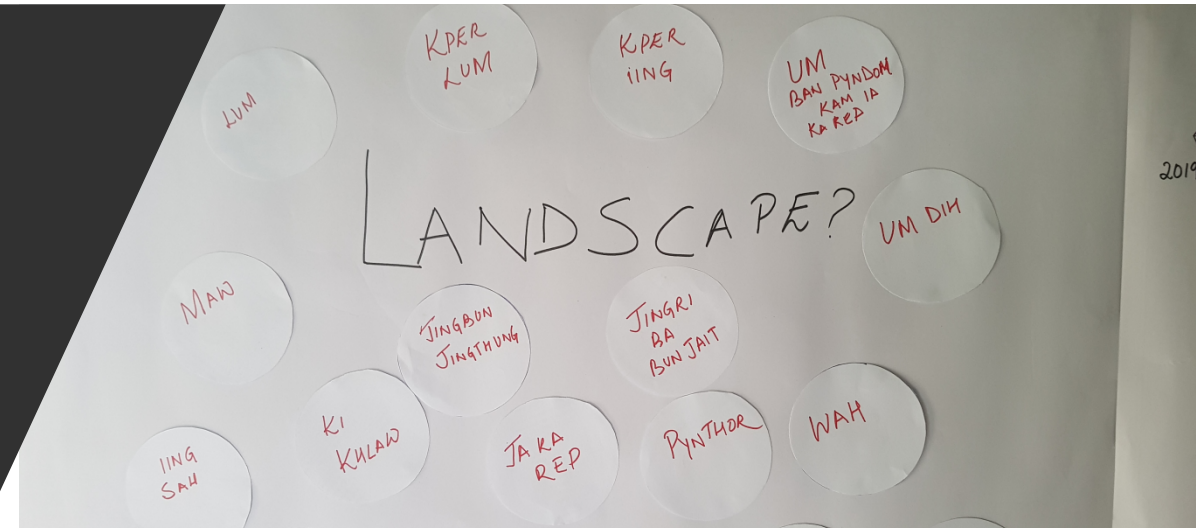
# Toolkit

This toolkit was developed as part of a Collaborative Activity by the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS), Bioversity International, Institute for Global Environmental Strategies (IGES), and the United Nations Development Programme (UNDP) under the International Partnership for the Satoyama Initiative (IPSI). The toolkit is based on the experiences of field testing of the first set of the indicators conducted by Bioversity International and UNDP. National Coordinators from the UNDP-implemented Global Environment Facility Small Grants Programme (GEF-SGP) in the twenty UNDP-COMDEKS countries provided valuable inputs to the development of the first set of the indicators, and have been playing a pivotal role in the testing of the indicators, capturing the perspectives of communities in the field.



# Procedure step by step

1. Introduction of the tool
2. Explanation of the landscape
3. Explanation of the climate change – Timeline drawing
4. Explanation of the resilience and adaptation
5. Asking 20 questions – resilience indicators
6. Rapid data analysis
7. Sharing the findings and brainstorming solutions with the community





FGD in Khweng

21.10.2019

10 participants

FGD in Umsawwar

28.11.2019

17 participants

Duration: 2.5 hours  
including sharing of results  
and brainstorming solutions.



# Timeline results

Year	Event	Impact in Khweng
<b>1979</b>	Hailstorm	All crops got destroyed; fertility of land seem to have decreased
<b>2007</b>	Windstorm	Houses were damaged; trees were uprooted
<b>2009</b>	Pest damage to paddy rice	Very poor yield of wet and hill paddy; fertility of paddy in subsequent year was low
<b>2016</b>	Hail storm	Houses were damaged; there was minimal impact to agriculture because crops were not sown yet
<b>Since the last decade</b>	Changing rainfall pattern	Less predictable rainfall pattern is causing some problems, but the farmers do not perceive to be impacted strongly as they have been doing multicropping and certain crops always perform better than the others

Year	Event	Impact in Umsawwar
<b>2007</b>	Heavy rainfall and windstorm	Top soil washed away by rainwater down the rivers; landslide in agricultural lands
<b>2010</b>	Less dew	Winter crops like green leafy vegetables suffered losses
<b>2011</b>	Windstorm	Trees were uprooted and houses were damaged
<b>2014</b>	Drought	Broom stick harvest suffered losses
<b>2015</b>	Drought	Crop harvest suffered losses
<b>2017</b>	Strong wind and hailstorm	School got damaged due to strong winds

# The results of the indicators and community ideas to strengthen the resilience

## KHWENG

## UMSAWWAR

Resilience component	Mean score	Rank	General trend	Solution	Mean score	Rank	General trend	Solution
1. Landscape Diversity & Ecosystem Protection	3,5 (worst)	5. (worst)	↓↓↑↑	- Stronger monitoring to ensure better protection of ecosystems. - Maintain landscape diversity by preventing encroachment to natural environment.	3.5	3.	→↑↓↑	- NA
2. Biodiversity	5 (best)	1. (best)	↑↑↑	- Measures to be taken to maintain the rich biodiversity.	4.3	2.	↑↑↑	- NA
3. Knowledge & Innovation	4	4.	↑↑→→	- Improve documentation of the agrobiodiversity in the village.	3.3	4.	↑↓→↑	- NA
4. Governance & Equity	4,3	3.	→→→↑	- Organise more social programmes to facilitate better cooperations amongst multistakeholders.	5.0 (best)	1. (best)	↑↑↑↑	- NA
5. Livelihood & Wellbeing	4,4	2.	↑↑↑↑	- More efficient implementation of infrastructure programs by the government is needed.	3.2 (worst)	5. (worst)	→↑↓↓↑	- NA

# Example of indicators for the weakest component in Khweng: Landscape Diversity and Ecosystem Protection

INDICATOR	QUESTION	SCORE	TREND	REASON/NOTE
<b>1. Landscape diversity</b>	Is the landscape composed of diverse natural ecosystems and land uses?	3	↓	Due to increasing population, there is a gradual decline in the landscape diversity
<b>2. Ecosystem protection</b>	Are there areas in the landscape which are protected under formal or informal protection?	4	↑	Water catchment and community forest are managed and protected
<b>3. Interactions between landscape components</b>	Are ecological interactions between different landscape components considered while managing natural resources?	3	↓	Residents are aware of the ecological interactions but there are some who disregard the importance of these interactions.
<b>4. Landscape recovery</b>	Does the landscape have the ability to recover and regenerate after extreme environmental shocks?	4	↑	The landscape has the capacity to regenerate after shock but it takes time

# Example of indicators for the weakest component in Umsawwar: Livelihood and Well Being

INDICATOR	QUESTION	SCORE	TREND	REASON/NOTE
<b>1. Socioeconomic infrastructure</b>	Is the socio-economic infrastructure adequate for the needs of the community?	3	→	Infrastructure has improved from the past with MGNREGA playing a very important role but is still inadequate
<b>2. Environment and human health</b>	What is the general health situation of local people also considering the prevailing environmental conditions?	4	↑	Visits of workers from PHC and organisation like NESFAS and World Vision has improved the health situation
<b>3. Income diversity</b>	Are households in the community involved in a variety of sustainable, income-generating activities?	2	↓	Except for farming and daily wage labour during off season there's not much variety of income generations activities
<b>4. Biodiversity based livelihood</b>	Does the community develop innovative use of the local biodiversity for its livelihoods?	2	↓	Only for subsistence and not for commercial purposes
<b>5. Livelihood mobility</b>	Are households and communities able to move around between different production activities and locations as necessary?	5	↑	Within the rules of village management council the community is free to move between different activities and locations

# Example of indicators for the strongest component in Khweng:

## Biodiversity

Indicator	Question	Score	Trend	Reason/Note
<b>5. Food system diversity</b>	Does the community consume a diversity of locally-produced food?	5	↑	Most of the crops are cultivated for own consumption. Wild edibles are also highly consumed by the community
<b>6. Maintenance of agrobiodiversity</b>	Are different local crops, varieties and animal breeds conserved and used in the community?	5	↑	The seeds of local crops are saved traditionally. The local seeds are more resilient than hybrid seeds according to the community.
<b>7. Resource management</b>	Are common resources managed sustainably?	5	↑	The common resources are under the protection of the village administration

# Example of indicators for the strongest component in Umsawwar: Governance and Equity

Indicator	Question	Score	Trend	Reason/Note
<b>6. Resource Rights</b>	Does the community have customary and/or formally recognized rights over land, pastures, water and natural resources?	5	↑	Customary rights are protected by the village council which thinks about the future generations
<b>7. Landscape governance</b>	Is there a multi-stakeholder landscape platform or institution able to effectively plan and manage landscape resources?	5	↑	Stakeholders like village council, SHG, women's group, youth group, VEC group have important stakes in landscape governance
<b>8. Social Capital</b>	Is there connection, coordination and cooperation within and between communities for the management of natural resources?	5	↑	Cooperation and coordination is very close
<b>9. Social and gender equity</b>	Is access to opportunities and resources fair and equitable for all community members, including women, at household, community and landscape level?	5	↑	The village council ensures fair and equitable access to all

# Summary of Findings of Khweng

- I. In Khweng community, the most resilient component was Biodiversity, followed by Livelihood and Well-being, Governance and Equity and Knowledge and Innovation.
- II. The least resilient component was Landscape Diversity and Ecosystem Protection.
- III. In terms of trends, the most positive trend across all indicators have two components, Livelihood and Wellbeing and Biodiversity. Then, Knowledge and Innovation is partially stable and partially increasing followed by Land Governance and Equity is rather stable with a slight improvement, and lastly Landscape Diversity and Ecosystem Protection reached 50% of increasing and 50% of decreasing indicators, so there should be taken action for reversing the downward trends.





# Summary of Findings of Umsawwar

- I. In Umsawwar community, the most resilient component was Governance and Equity followed by Biodiversity, Landscape Diversity and Ecosystem Protection, Knowledge and Innovation.
- II. The weakest component in the community is livelihood and wellbeing
- III. In terms of trends the indicators under Governance and Biodiversity followed by Biodiversity showed the most positive trends, in fact in all of them. Landscape Diversity and Ecosystem protection showed more stability with 50% of the indicators increasing with the remaining indicators showing a decrease or stable trend. Landscape Diversity and Ecosystem Protection had 50% of the indicators decreasing and other half stable or increasing.



# Strengths & Limitations

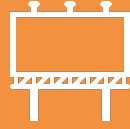
## **Strength of the tool:**

According to the facilitators who used the tool in the communities, the strength of the tool is that it covered all aspects of resilience that will help community to adequately map out an integrated resource management plans, it helps communities realise their strengths and weaknesses of their own village and the the tool enables communities to identify the solutions which could make them more resilient in future. This is extremely useful especially for those villages which suffer from rapid landscape changes and from low resilience.

## **Weakness of the tool:**

Although the tool is covering complex set of socio-ecological landscape components and different capitals, it is somewhat neglecting the issues of soil, agriculture and agroecology. This is a bit surprising as the tool is designed to be operated predominantly in the rural farming landscape. For example, at the beginning during the timeline, Khweng community often talked about soil fertility and that they are improving its fertility (and resilience) by organic matter. But this issue remained untouched during running the 20 resilience indicators.

# NESFAS way forward...



Sharing results to a larger audience in Khweng & Umsawwar and turning the results into a community action plan



Conducting RI in the villages of the fellows



Replicating the tool by the research team and FC in villages which might be suffering from low resilience (list of villages, workplan..)



Experienced facilitators could train other members of the staff