



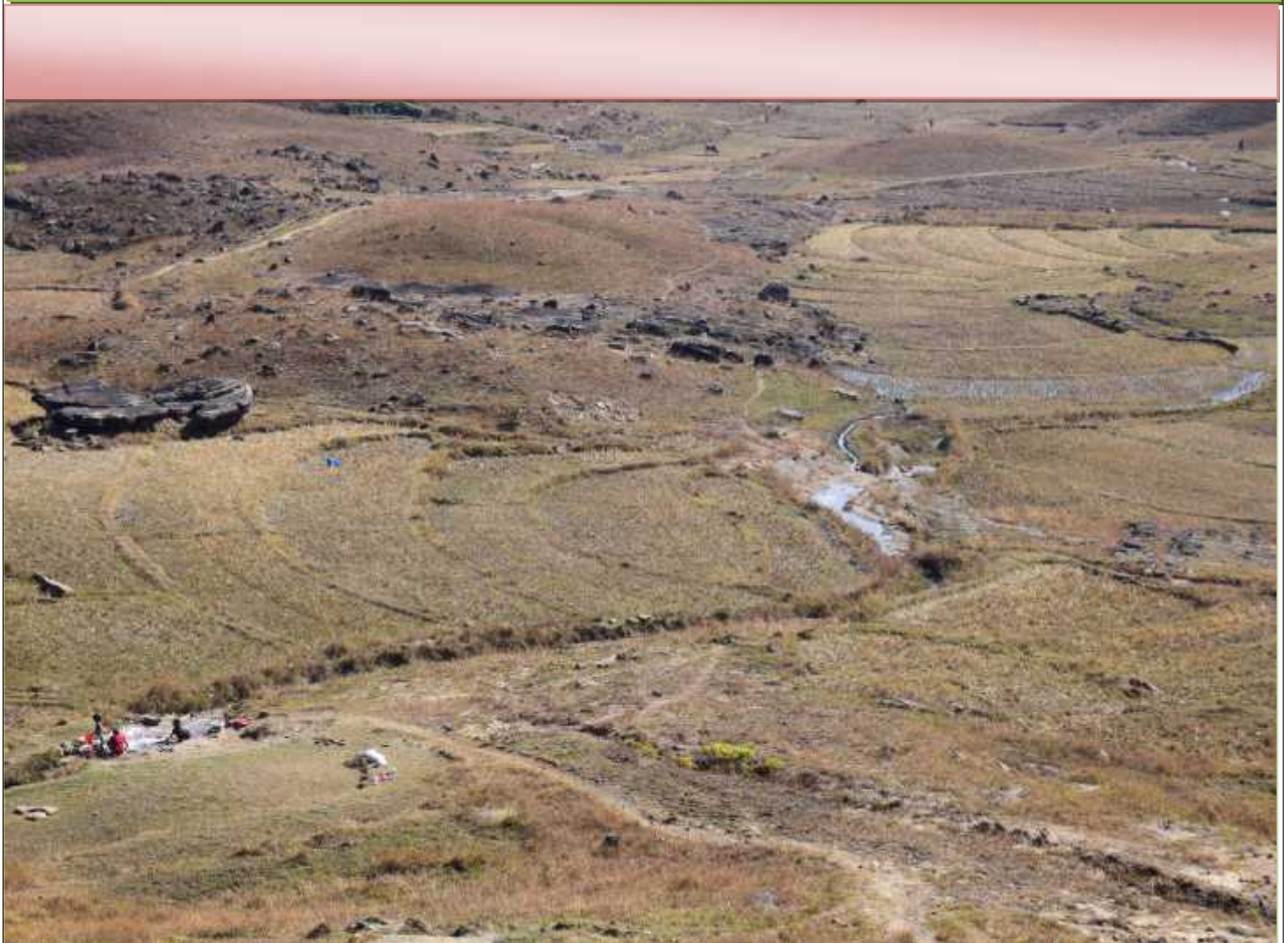
Department of Science & Technology
Ministry of Science & Technology
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NMSHE NATIONAL MISSION FOR
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ECOSYSTEM

MEGHALAYA
CLIMATE CHANGE CENTRE

Agriculture Vulnerability Profile of Meghalaya

District Level Vulnerability Assessment



Agriculture Vulnerability Profile of Meghalaya: *District Level Vulnerability Assessment*

1. Characteristics of the State of Meghalaya

Meghalaya is located between 24°57' to 26°10' N and 89°46' to 92°53' E and spreads over an area of about 22,429 km². The temperature varies from 2°C to 35°C and receives the highest amount of rainfall in the country. The State houses Mawsynram and Cherrapunjee which are ranked as the wettest places in the world. The average rainfall at Cherrapunjee during the last 35 years has been 11,952 mm (470 inches) and there were several years when it was substantially more than this. The economy of Meghalaya is agrarian and the agriculture sector contributes 22% to the Gross State Domestic Product (GSDP) with 80% of the State's population depending directly and indirectly on agriculture, employment and income generation also depends on agricultural developmental activities to a great extent. Despite this, the Net Cropped Area is merely 9.76% of the total geographical area of the State. The State is extremely vulnerable to the impacts of changing climate and has faced the wrath of freak weather events in the recent past. The State is also prone to floods and soil erosion making the agriculture sector particularly vulnerable.

Urbanisation in Meghalaya is lower than the national average with an urban population of only 20.07% (Census Report, 2011). Majority of the State's population lives in rural areas. The State is divided into 11 districts with 46 Blocks.

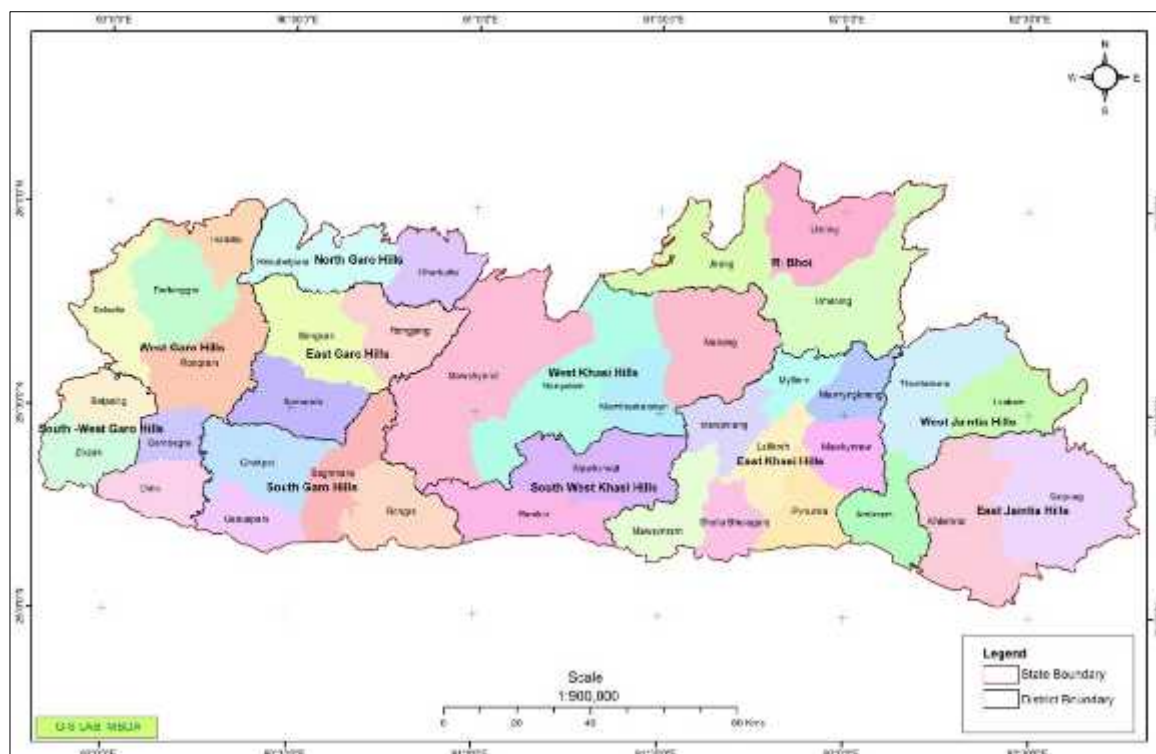


Figure 1.1: Map of Meghalaya

a. Physical features and Land Use Pattern

The State can be divided into three physiographic zones namely the Central Plateau Region (900-2000m elevations), the Sub-montane Plateau Region (<900m) which gradually merges with the plains in the West and North, and the Southern slopes which stretches sharply from the Central Plateau to the plains in Bangladesh.

Table 1.1: The land use pattern of the State is broadly characterised as follows:

Sl. No.	Land Use Land Cover	Area (in km ²)	% of Geographical area
1	Agricultural Land	2123.0	9.5
2	Settlements	811.4	3.6
3	Mining/Quarry	13.1	0.1
4	Lake/Ponds	12.5	0.1
5	River	201.0	0.9
6	Shifting Cultivation	424.0	1.9
7	Barren Rocky/Grassland	22.5	0.1
8	Gullied/Ravenous Land/Sandy Area	41.1	0.2
9	Scrub	1494.7	6.7
10	Forest	17285.6	77.1
	Total	22429.0	100.0

Source: GIS Lab, MBDA

b. Biological features

Meghalaya is a part of Indo-Myanmar bio-geophysical region, which is one of the mega biodiversity regions of the world. Nokrek Biosphere Reserve, Balphakram National Park, Nongkhylllem, Siju, and Baghmara Wildlife Sanctuaries and a large number of sacred groves found in different parts of the State are the main preserves of biodiversity.

Table 1.2: Table shows the six major categories of vegetation in Meghalaya

S. No.	Vegetation Type	Location
1.	Tropical Evergreen Forest	Spreads over the lower reaches of Khasi, Jaintia and Garo hills up to 1200m and usually occurs in high rainfall areas as well as near catchment areas
2.	Tropical Semi Evergreen Forest	Occupies the north and north-eastern slopes of the State up to an elevation of 1200m and with an annual rainfall of 1500-2000mm
3.	Tropical Moist and Dry Deciduous Forest	Very prominent vegetation of Meghalaya covering a large part of East and West Garo Hills, Ri-Bhoi districts etc., in areas of annual rainfall less than 1500mm and high temperature
4.	Grasslands and Savannahs	Secondary in nature and are prevalent in higher altitudes and are a result of removal of pristine forests
5.	Temperate Forests	Occupy the higher elevations (>1000m) with very high rainfalls (2000-5000 mm) along the Southern slopes of Khasi and Jaintia Hills
6.	Subtropical Pine forests	Confined to the higher reaches (900-1500 m) of the Shillong plateau in Khasi and Jaintia Hills

The rich floral diversity of Meghalaya harbours about 18% of the total flora of the country. About 40% of the total flora of the State is endemic (Khan et al., 1997). More than 110 mammal species are reported from forests of Meghalaya.

c. Socio-economic features

Meghalaya is inhabited by three major tribes namely, the Khasi, Jaintia and the Garo. As per Census Report, 2011, Meghalaya has a total population of 2,966,889. With a population growth of 27.95% in this decade, the State constitutes 0.25% of India's total population. Out of total population 595,450 (20.07%) people live in urban regions. The sex ratio in Meghalaya is fairly high with 1001 females per 1000 males in urban areas and in the rural regions female sex ratio per 1000 males was 986. The urban region has a higher average literacy rate of 90.79% as compared to the rural regions of 69.92%.

d. Climate

The State is influenced by the Southwest monsoon and the Northeast winter wind characterising a temperate type of climate. Meghalaya has four distinct seasons: Spring (March and April), Summer (May to September), Autumn (October, November) and Winter (December to February). Monsoon starts by the first week of June to the end of September and sometimes well into the middle of October with spells of breaks. The average rainfall in the State varies from 4000mm to 11,436mm with maximum rainfall occurring over the southern slopes of the Khasi Hills. Temperatures in the State ranges between 2°C to 32°C, depending on the location.

2. Indicators selected, rationale for selection and source of data

Table 2.1: Table below is a list of selected indicators for carrying out the Tier 1 type of vulnerability assessment for the agricultural sector at district level for the State of Meghalaya. It broadly outlines each of the 14 indicators along with the rationale behind their selection, functional relationship with vulnerability and the data source.

Indicators	Rationale for selection	Adaptive Capacity or Sensitivity	Functional relationship with Vulnerability	Source of data
% of Net Irrigated Area to Net Sown Area	High net irrigated area will reduce the dependence of agricultural practices on the climatic conditions; further it helps in increasing farmers' income by allowing cultivation even during the drier spells.	AC	Negative (-)	Net Irrigated Area: Water Resource Dept, GoM; Net Sown Area: District Irrigation Plan, NABCON (2016-20).
Variability in Foodgrain Crop Yield over past 10 yrs	A significant variability in yield of foodgrains reflects varied climatic conditions. Thus, more the yield variability over long	S	Positive (+)	Directorate of Economics and Statistics, GoM.

(2009-10 to 2018-19)	time period higher is the sensitivity.			
Drainage Density	A highly dense network of drainage will reduce the lack of adaptive capacity.	AC	Negative (-)	GIS Lab, MBDA, (2020)
% of Rural HHs with No Land ownership	Landless rural population are in general considered more vulnerable due to their lack of resources.	AC	Positive (+)	Socio-Economic and Caste Census (SECC), 2011.
% of Agricultural Area under slopes >45 degree	Steep topographical feature implies lack of availability of flat land and difficulty in access. Agricultural practices done on steep slopes are more likely to be adversely affected during landslide, cloud burst; and increases sensitivity.	S	Positive (+)	GIS Lab, MBDA, (2020).
% Share of Total Crop Produced in 2018-19 (both Agricultural & Horticultural crops)	Agricultural production is directly related to the agro-climatic conditions. Crop production is directly related to climate sensitivity; and a higher share of total crop production reflects lesser sensitivity.	S	Negative (-)	Directorate of Economics and Statistics, GoM.
Value of Output of Total horticulture (only perennial) / Value of agricultural output	Agriculture sector has the highest contribution to the State Gross Domestic Product and employment for the State. A higher ratio of horticultural output value to agricultural output value indicates more resilient agricultural practice; and also ensures a better economic profile.	AC	Negative (-)	State wise and item-wise estimates of value of output from agriculture and allied sectors (2011-12 to 2015-16) with base year 2011-12 2018 central

				statistics office ministry of statistics and programme implementation Government of India & Directorate of Agriculture, GoM
Livestock to Human Ratio	The livestock to human ratio indicates the diversity of economic activity, reducing the vulnerability in case of incidences of crop failure.	AC	Negative (-)	Livestock Census Report, 2012, AH&V Dept., GoM.; Census Report, 2011, Gol.
% Rural HHs having Kisan Credit Card (KCC) with limit of Rs.50,000 & above	Average farm income per acre of cultivated land per HHs having KCC is much higher in comparison to non-KCC farmers. This ensures better accessibility to resources and a higher income generation which increases the adaptive capacity.	AC	Negative (-)	Socio-Economic and Caste Census (SECC), 2011.
Road Density	Road connectivity allows quick transportation of human and good especially in times of calamities which aids in reducing the vulnerability.	AC	Negative (-)	GIS Lab, MBDA, (2020).
No. of Main & Local Markets / Geographical Area	A wider network of different market types spread over geographical area provides for easier access to market for varying goods and services; also promotes economic activities	AC	Negative (-)	Directorate of Economics and Statistics, GoM.

	and boosts regional development.			
Diversity Index of Main Income Source for Rural HHs	Greater the diversity index of main source of income for rural HHs, less is the dependency on a specific economic activity. A high Index therefore, indicates better adaptive capacity.	AC	Negative (-)	Socio-Economic and Caste Census (SECC), 2011.
Average person days/ HH employed under MGNREGA over last 5 years (2016-17 to 2020-21)	Population covered under the scheme have access to alternative source of income, in order to better sustain their livelihood and enhances adaptive capacity.	AC	Negative (-)	http://mnregaweb4.nic.in/netnrega/all_lvl_details_dashboard_new.aspx
No. of NRM works/ 1000 ha (under MGNREGS)	It ensures sustainable management of natural resources through activities such as soil and water conservation, irrigation and ground water recharge facilities, and plantation; besides it aids in generating employment opportunities in rural areas.	AC	Negative (-)	http://mnregaweb4.nic.in/netnrega/NRM_related_report.aspx?flag=eng&page=s&state_name=MEGHALAYA&state_code=21&fin_year=2017-2018&source=national&rbl=0&rbl_nrm=1&rbl_blk=0&Digest=5adaJ57qRt2RM6gWn/kCPQ

a. Indicator and Normalised Indicator Values

This section presents the actual values of the indicators used and their normalised scores for all the districts in the State. Normalisation is done depending on the indicators' functional relationship with vulnerability (either positive or negative) and the corresponding formula was used.

Table 2.2: Sub-indicator values and normalised scores for the indicator: Demographic characteristics, socio-economic and bio-physical.

The table is given as Annexure-I.

b. Weights assigned

Ideally unequal weights are assigned to each of the indicators based on their significance over other selected parameters through expert consultation and discussions. However, while conducting this assessment study the same exercise couldn't be carried out due to constraints imposed by the pandemic. Thus, unequal weights to each of the 14 indicators were assigned following the statistical method of Principal Component Analysis (PCA). The weights are determined by the factor loadings of the PCA; following table shows the derived weightage against each indicator which adds up to 100.

Table 2.3: Weights assigned to indicators which are to be multiplied with normalized scores.

S. No.	Indicators	Weights (WI)
1.	% of Net Irrigated Area to Net Sown Area	3
2.	Variability in Foodgrain Crop Yield over past 10 yrs (2009-10 to 2018-19)	6
3.	Drainage Density	8
4.	% of Rural HHs with No Land ownership	8
5.	% of Agricultural Area under slopes >45 degree	8
6.	% Share of Total Crop Produced in 2018-19 (both Agricultural & Horticultural crops)	6
7.	Value of Output of Total horticulture (only perennial) / Value of agricultural output	7
8.	Livestock to Human Ratio	8
9.	% Rural HHs having Kisan Credit Card (KCC) with limit of Rs. 50,000 & above	8
10.	Road Density	9
11.	No. of Main & Local Markets/Geographical Area	8
12.	Diversity Index of Main Income Source for Rural HHs	6
13.	Average person days/ HH employed under MGNREGA over last 5 years (2016-17 to 2020-21)	6
14.	No. of NRM works/ 1000 ha (under MGNREGS)	8
	Total	100

3. Vulnerability profile and ranking of Districts

Based on the normalised value of the indicators and their assigned weights, the Vulnerability Index (ranging between 0 to 1) was determined. The district with highest index value is said to be the most vulnerable out of all and hence is ranked first.

Table 3.1: Vulnerability index values and corresponding ranks of districts in the state of Meghalaya

Districts	Vulnerability Index	Ranking of Districts based on VI
East Jaintia Hills	0.784	1
South West Khasi Hills	0.778	2
West Khasi Hills	0.674	3
Ri Bhoi	0.655	4
East Khasi Hills	0.631	5
West Jaintia Hills	0.622	6
South Garo Hills	0.612	7
North Garo Hills	0.581	8
East Garo Hills	0.562	9
West Garo Hills	0.428	10
South West Garo Hills	0.245	11

Further, based on the vulnerability index value, the districts had been categorised into 5 classes namely **Very High** (0.68 to 0.78), **High** (0.57 to 0.68), **Medium** (0.46 to 0.57), **Low** (0.35 to 0.46) and **Very Low** (0.11 to 0.35).

Table 3.2: Distribution of districts on a vulnerability scale of Very Low to Very High Vulnerability Categories

Districts	Agriculture Vulnerability Index	Vulnerability Category
East Jaintia Hills	0.784	Very High
South West Khasi Hills	0.778	
West Khasi Hills	0.674	High
Ri Bhoi	0.655	
East Khasi Hills	0.631	
West Jaintia Hills	0.622	
South Garo Hills	0.612	
North Garo Hills	0.581	
East Garo Hills	0.562	Medium
West Garo Hills	0.428	Low
South West Garo Hills	0.245	Very Low

4. Map of districts with vulnerability ranking

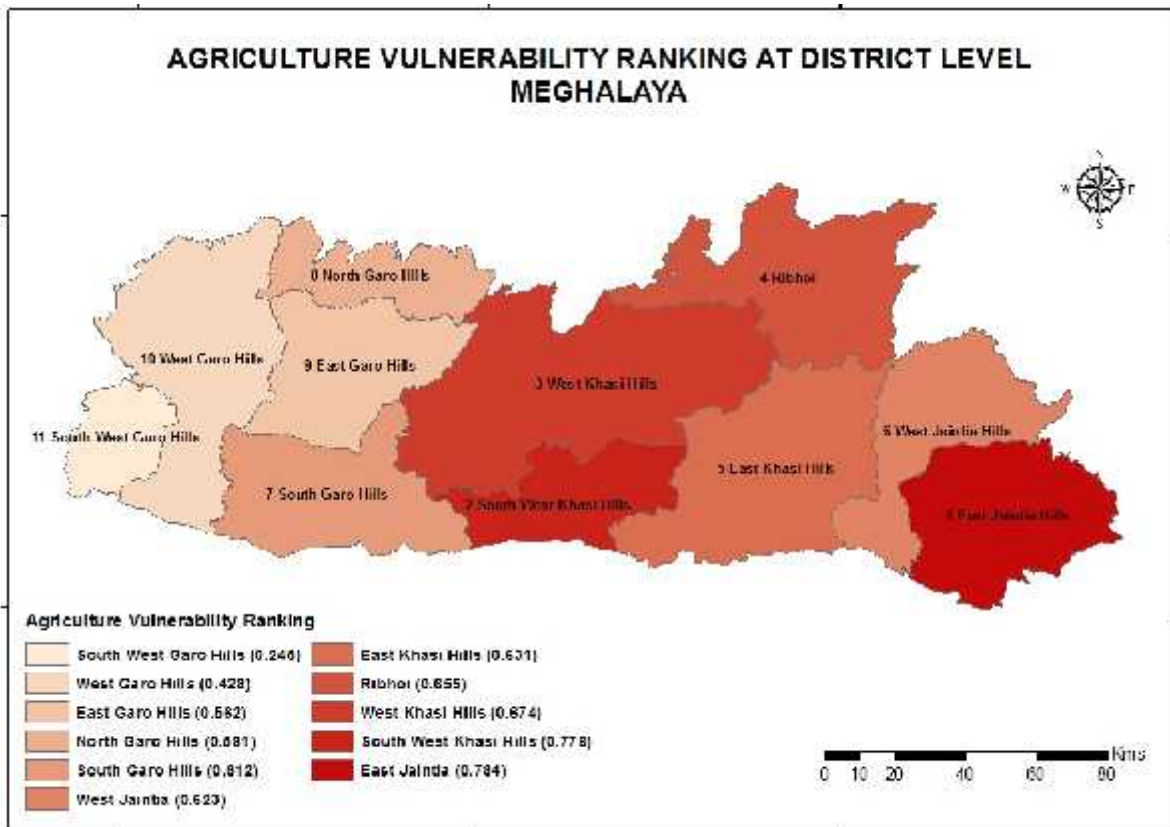


Figure 4.1: Map showing Agriculture Vulnerability Ranking of Meghalaya at District level

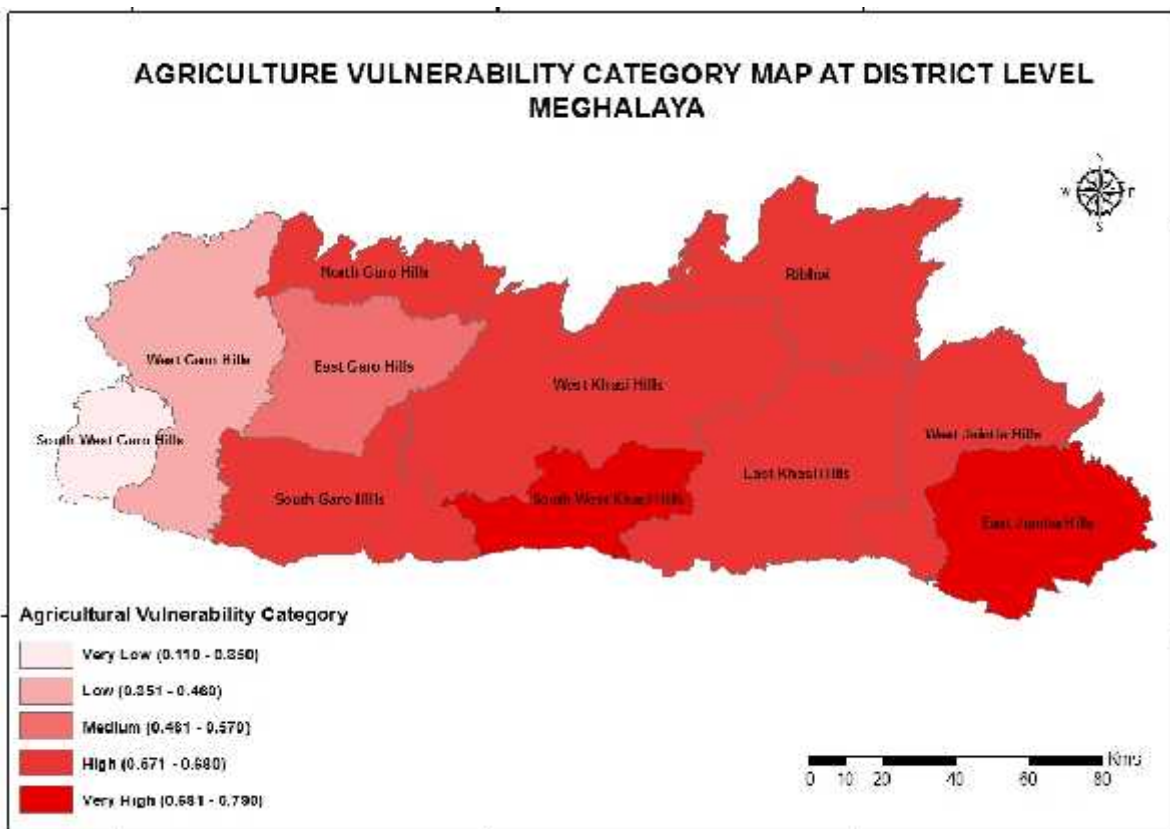


Figure 4.2: Map showing Agriculture Vulnerability Category of Meghalaya at District level

5. Major drivers of vulnerability

It is vital to understand the drivers of vulnerability which in other words are factors contributing to the high index value. Identification of vulnerability contributors is a crucial step towards addressing the gaps, prioritising adaptation strategies and in making well informed policy decisions. In the current assessment, out of 14, five indicators which contributes to **50% of the State's sectoral vulnerability** are - low percentage of Rural HHs having KCC with limit of Rs.50,000 & above (12%), less number of Main & Local Markets per Geographical Area (11%), lack of Road Density (10%), lack of number of NRM works per 1000 ha (9%) and low Livestock to Human Ratio (8%). It is interesting to observe that out of these five major contributors, top four can broadly be categorised as sub-indicators of 'Infrastructural Facilities and Amenities'.

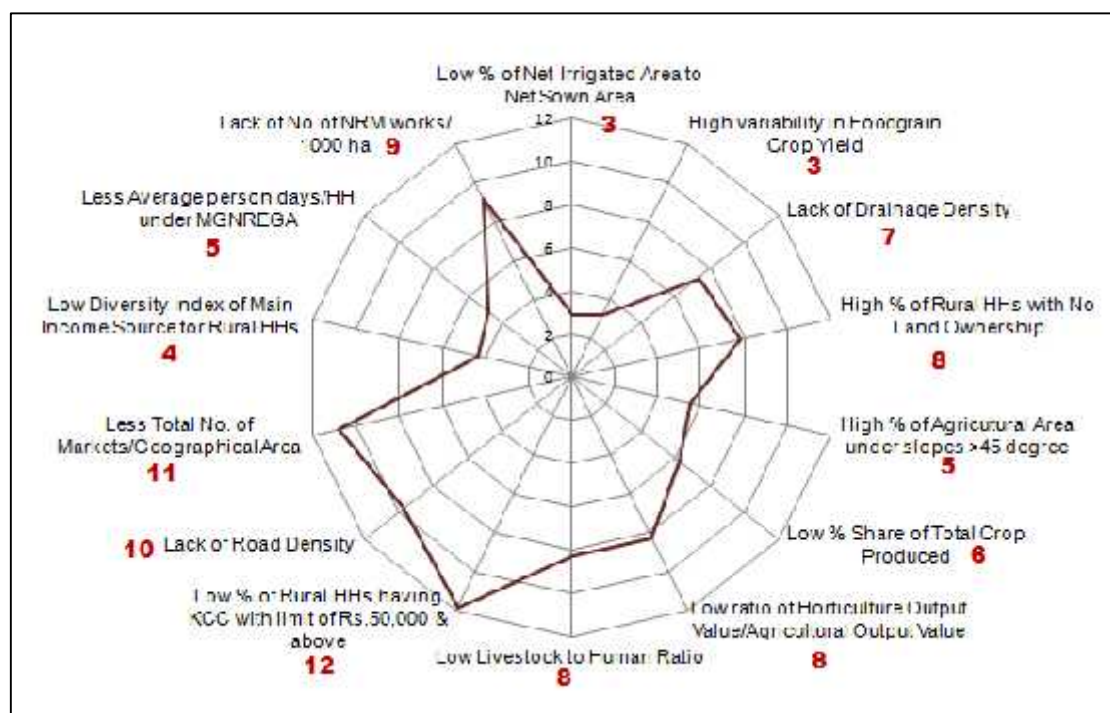


Figure 5.1: Drivers contributing to Agricultural Vulnerability in Meghalaya

Table 5.1: The major drivers of vulnerability for agriculture sector and their percentage contribution is detailed in the table below.

Drivers of Vulnerability	Contribution to VI (in %)
Low % of Rural HHs having KCC with limit of Rs.50,000 & above	11.83
Less Total No. of Markets/Geographical Area	10.74
Lack of Road Density	9.67
Lack of No. of NRM works/ 1000 ha	9.16
Low Livestock to Human Ratio	8.29
Low ratio of Horticulture Output Value/Agricultural Output Value	8.29
High % of Rural HHs with No Land Ownership	7.77
Lack of Drainage Density	7.33
Low % Share of Total Crop Produced	6.21

High % of Agricultural Area under slopes >45 degree	5.43
Less Average person days/HH employed under MGNREGA	4.82
Low Diversity Index of Main Income Source for Rural HHs	4.34
High variability in Foodgrain Crop Yield	3.20
Low % of Net Irrigated Area to Net Sown Area	2.91
TOTAL	100

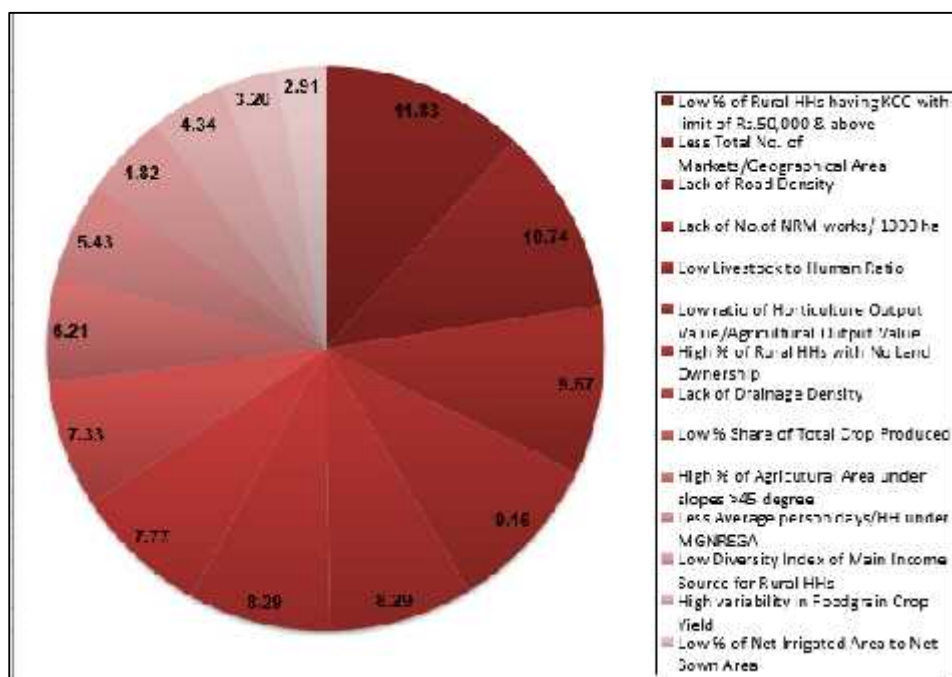


Figure 5.2: Pie chart showing the contribution (in percentage) made by each of the indicators in the sectoral vulnerability assessment for the State of Meghalaya

In this assessment of agriculture sector's vulnerability, each of the 11 districts was found to have a combination of drivers that added to its high vulnerability. For instance, the highest Vulnerability Index is for the district of **East Jaintia Hills (0.784)** wherein the major drivers contributing to such a **Very High category of vulnerability** are:

- Road Density (0.09);
- % of Rural HHs with No Land Ownership (0.08);
- Livestock to Human Ratio (0.08);
- % of Rural HHs having Kisan credit card with limit Rs.50,000 & above (0.08);
- No. of Main & Local Markets/Geographical Area (0.08); and
- No. of NRM works/1000 ha (0.08).

Thus, multiple indicators with high index values together form the causative factor in making East Jaintia Hills a Very Highly Vulnerable district of Meghalaya.

Likewise, the district of **South West Khasi Hills** is categorised under **Very Highly Vulnerable** and ranks second with a Vulnerability Index value of **0.778**. The major drivers for SWKH district are:

- % of Rural HHs having Kisan credit card with limit Rs.50,000 & above (0.08);
- Road Density (0.08);
- No. of Main & Local Markets/ Geographical Area (0.08); and

- No. of NRM works/1000 ha (MGNREGS).

Following EJK and SWKH, is the district of **West Khasi Hills** with a Vulnerability Index of **0.674**, and so categorised as a **Highly Vulnerable** district. The major drivers for WKH district are:

- %Rural HHs having Kisan credit card with limit Rs.50,000 & above (0.08);
- No. of Main & Local Markets/ Geographical Area (0.08); and
- Road Density (0.07).

A closer analysis reflects that all the 3 districts ranking highest in the agricultural vulnerability of Meghalaya i.e., EJK, SWKH and WKH, have four major drivers in common which are – % of Rural HHs having Kisan credit card with limit Rs.50,000 & above, Road Density, No. of Main & Local Markets/Geographical Area, and No. of NRM works/1000 ha.

Table 5.2: District wise contribution of each indicator to the sectoral vulnerability

Drivers	Agriculture Vulnerability Index										
	EGH	EJK	EKH	NGH	RB	SGH	SWGK	SWKH	WGH	WJK	WKH
% of Net Irrigated Area to Net Sown Area	0.03	0.03	0.01	0.01	0.00	0.02	0.01	0.02	0.03	0.01	0.01
Variability in Crop Yield past 10 yrs	0.02	0.02	0.02	0.03	0.01	0.03	0.02	0.06	0.00	0.00	0.00
Drainage Density	0.03	0.01	0.05	0.07	0.04	0.05	0.08	0.06	0.04	0.00	0.05
%Rural HHs with No Land Ownership	0.06	0.08	0.08	0.03	0.04	0.04	0.00	0.02	0.03	0.08	0.05
%Agricultural Area under slopes >45 degree	0.01	0.03	0.08	0.04	0.04	0.03	0.00	0.06	0.01	0.02	0.03
% Share of Total Crop Produced	0.04	0.06	0.00	0.05	0.03	0.05	0.04	0.05	0.00	0.05	0.04
Value of Total horticulture Output/Value of agricultural output	0.05	0.07	0.00	0.06	0.05	0.05	0.07	0.03	0.06	0.05	0.05
Livestock to Human Ratio	0.04	0.08	0.08	0.04	0.08	0.03	0.00	0.06	0.03	0.04	0.05
%Rural HHs having Kisan credit card with limit Rs.50,000 & above	0.07	0.08	0.08	0.07	0.08	0.08	0.00	0.08	0.08	0.08	0.08
Road Density	0.06	0.09	0.05	0.06	0.07	0.08	0.00	0.08	0.01	0.06	0.07
No. of Main & Local Markets/ Geographical Area	0.07	0.08	0.06	0.05	0.08	0.06	0.00	0.08	0.07	0.08	0.08
Diversity Index of Main Income Source for Rural HHs	0.06	0.01	0.01	0.02	0.01	0.03	0.00	0.05	0.01	0.03	0.04

Average person days/HH employed under MGNREGA over last 5 years	0.00	0.06	0.03	0.00	0.05	0.00	0.03	0.04	0.02	0.05	0.04
No. of NRM works/1000 ha (MGNREGS)	0.02	0.08	0.07	0.05	0.07	0.06	0.00	0.08	0.03	0.07	0.07
District Total Vulnerability Index	0.56	0.78	0.63	0.58	0.66	0.61	0.25	0.78	0.43	0.62	0.67

The above table (Table 5.2) illustrates district wise the contribution of each indicator to the sectoral vulnerability. The drivers which contribute *more than 0.056 index value* have been highlighted; it represents the focus areas or gaps in each district of the State which needs to be addressed through strategized development plans and adaptation actions.

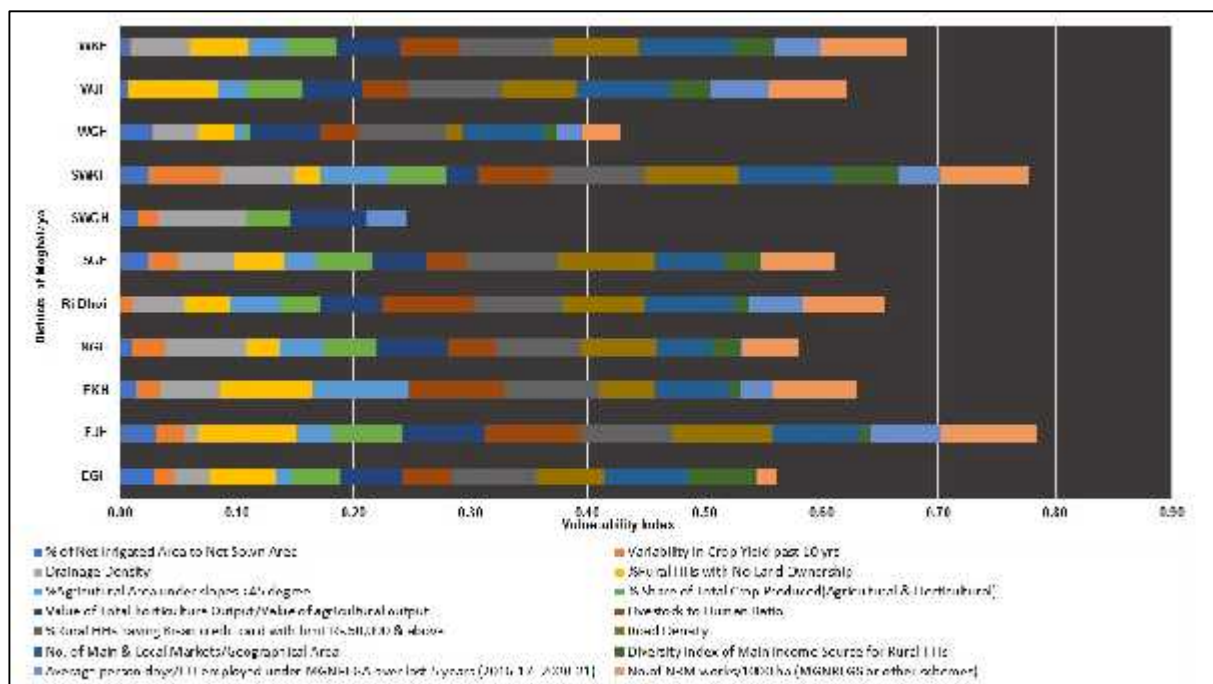


Figure 5.3: Stacked bar diagram shows contribution of all indicators to the total Vulnerability Index at district level

In conclusion, the agriculture vulnerability assessment based on fourteen indicators at district level reflects the level of vulnerability that a district is currently facing. The assessment has been crucial for identifying the different drivers which contributes in varying proportions to the vulnerability across the state of Meghalaya. District level information about the vulnerability drivers elaborated through this study would be useful in prioritising development and implementation of sustainable adaption measures and aid in reducing the climate vulnerability of the people and agricultural system in the State of Meghalaya.

6. Challenges, limitations and way forward

The assessment being solely based on secondary data, some of the data are outdated, especially that of the demographic and socio-economic indicators. Secondly, some indicators which would have depicted the agricultural scenario in the State in a better way could not be included in the assessment due to lack of data availability or its scale. Another major limitation faced in conducting this assessment study was the inability to conduct expert and or stakeholder consultations in order to discuss, evaluate and assign suitable weights for each indicator.

As a way forward, the findings of the report will aid the policy makers in – (a) identifying vulnerable districts in terms of agricultural sector and its drivers; (b) crucial sectors and inherent gaps which needs to be addressed through priority actions and long term planned interventions; (c) in better and informed allocation of resources, prioritisation of and thereby ensuring sustainable development of the sector.

In future, a State specific assessment can be carried out with an up-to-date spatial and temporal dataset.

Table 2.2: Sub-indicator values and normalised scores for the indicator Demographic characteristics

District	Indicators																												
	% of Net Irrigated Area to Net Sown Area		Variability in Foodgrain Crop Yield		Drainage Density		% of Rural HHs with No Land ownership		% of Agricultural Area under slopes >45 degree		% Share of Total Crop Produced (2018-19)		Value of Output of Total horticulture / Value of agricultural output		Livestock to Human Ratio		% Rural HHs having Kisan Credit Card(KCC) with limit Rs. 50,000 & above		Road Density		No. of Main & Local Markets / Geographic Area		Diversity Index of Main Income Source for Rural HHs		Average person days/HH employed under MGNREGA over last 5 years (2016-17 to 2020-21)		No. of NRM works/ 1000 ha		
	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV	NV	AV
EGH	5.84	0.93	0.261	0.28	0.92	0.41	77.70	0.66	4.70	0.17	7.63	0.70	2.08	0.76	0.47	0.50	0.97	0.92	1.30	0.66	0.01	0.87	0.52	1.00	79.46	0.00	8.46	0.20	
EJH	4.14	1.00	0.291	0.38	1.03	0.16	90.82	1.00	10.46	0.37	1.01	1.00	0.37	1.00	0.16	0.99	0.56	0.96	0.97	1.00	0.01	0.91	0.65	0.15	41.41	1.00	0.79	1.00	
EKH	17.22	0.44	0.280	0.34	0.81	0.66	88.42	0.94	27.93	1.00	22.97	0.00	7.45	0.00	0.15	1.00	0.34	0.99	1.41	0.56	0.01	0.78	0.65	0.17	62.62	0.44	1.95	0.88	
NGH	20.06	0.32	0.317	0.46	0.70	0.92	64.84	0.34	12.83	0.46	6.09	0.77	1.41	0.85	0.47	0.49	1.07	0.90	1.22	0.75	0.02	0.59	0.62	0.40	78.08	0.04	4.79	0.58	
Ri Bhoi	27.60	0.00	0.230	0.18	0.85	0.58	69.44	0.45	14.84	0.53	10.31	0.58	2.16	0.75	0.18	0.95	0.75	0.94	1.15	0.83	0.01	0.92	0.64	0.23	51.00	0.75	2.06	0.87	
SGH	9.18	0.78	0.300	0.41	0.82	0.64	71.60	0.51	9.26	0.33	5.32	0.80	2.75	0.66	0.53	0.40	0.43	0.98	1.00	0.97	0.01	0.72	0.60	0.51	78.86	0.02	2.97	0.77	
SWGK	16.50	0.47	0.262	0.28	0.66	1.00	51.68	0.00	0.06	0.00	9.04	0.63	0.92	0.92	0.78	0.00	8.78	0.00	1.96	0.00	0.04	0.00	0.68	0.00	58.20	0.56	10.43	0.00	
SWKH	9.42	0.77	0.479	1.00	0.74	0.83	62.06	0.27	19.70	0.70	4.60	0.84	4.76	0.38	0.30	0.76	0.33	0.99	1.04	0.94	0.00	1.00	0.54	0.90	56.75	0.60	1.44	0.93	
WGH	6.98	0.88	0.180	0.01	0.88	0.52	66.23	0.37	2.72	0.10	21.18	0.08	1.43	0.85	0.54	0.38	0.67	0.95	1.80	0.16	0.01	0.84	0.65	0.18	66.71	0.34	6.49	0.41	
WJH	22.51	0.22	0.177	0.00	1.10	0.00	87.38	0.91	8.31	0.30	5.06	0.82	2.29	0.73	0.48	0.47	0.25	1.00	1.23	0.74	0.01	0.97	0.59	0.57	48.47	0.81	2.52	0.82	
WKH	20.78	0.29	0.183	0.02	0.82	0.66	74.72	0.59	11.05	0.39	6.80	0.74	2.06	0.76	0.39	0.62	0.33	0.99	1.12	0.85	0.01	0.98	0.59	0.59	55.19	0.64	1.61	0.92	

* here, AV = actual value and NV = normalized value