



Klima-NE

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From the Desk of Zonal Project Director



Although the contribution from agriculture sector towards gross domestic product has declined marginally during 10th plan period, yet it remains the predominant sector for Indian economy. Over 75% of the people of the North East India directly depend on agriculture for their livelihood and food security. Therefore, better performance of agriculture has a direct and multiplier effect across the economy of the region. According to the agricultural experts of the country sustainable livelihood in hills could be achieved by focusing on the improvement of quality of household livelihood by harnessing local resources, which are compatible with the mountainous agro-climatic situation.

To enhance the resilience of hill agriculture covering crops, livestock and fisheries to climatic variability and changes through development and application of improved production and risk management technologies the KVKs are playing a vital role. The process involves demonstration of site specific technology packages on farmers' fields for adapting to current climate risks and enhancement of the capacity of all the stakeholders in climate resilient agricultural research and its application.

To achieve this goal of brining climate resilience in to Indian agriculture, in a coherent approach, the ICAR has instituted a national umbrella project in 2010 under the supervision of its NRM division. In this project 17 KVKs from 8 NE states are being involved, in the initial phase, to carry forward the 'Technology Demonstration' part of the program to demonstrate and motivate farmers with locally available technologies that can impart resilience in general rainfed agricultural practices. The program is being implemented by our KVKs in true spirit of its formulated objectives.

In this context, being the monitoring unit of NICRA at NE region, it is our duty to bring forward the efforts and accomplishments of our KVKs to regional and national focus. Hence, we are initiating publication of this quarterly news letter named *KLIMA-NE*, means climate of North East, truly devoted to the cause and spirit of NICRA project. We, hereby, sincerely thank our authorities from Council, Lead Centre CRIDA, Hyderabad and all organizations from NE Region, who are actively involved, for promoting and supporting the cause of common farmers at this need of the hour.

Regards.

A.K. Gogoi

The 'Team NICRA' from Zone-III

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State	Sl. No.	KVK & District	Program Coordinator	SMS	SRF
Arunachal Pradesh	1	Tirap	D.S. Chhonkar	All SMSs	-
	2	West Kameng	N.D. Singh		A.K. Singh
	3	West Siang	R. Bhagawati		-
Assam	4	Cachar	K.D. Singha	-do-	J.P. Sharma & T. Hussain
	5	Dhubri	C.K. Sarma		B.C. Nath & D. Sharma
	6	Dibrugarh	H.K. Bhattacharyya		R.R. Saikia & S.B. Phukan
	7	Sonitpur	P.C. Deka		S. Payeng & S. Yasmin
Manipur	8	Imphal East	T. Medhabati Devi	-do-	R. Salam & T.M. Chanu
	9	Senapati	S. H. Wani		T.L.S. Haokip & P. Kumar
Meghalaya	10	Ri-Bhoi	R. Bordoloi	-do-	A. Chakraborty & T.G. Devi
	11	West Garo Hills	T. Samajdar		C.T. Sangma & G.M. Marak
Mizoram	12	Lunglei	Lalmuanzovi	-do-	Lalrambeiseia & C.K. Dawngliana
Nagaland	13	Dimapur	A. Sharma	-do-	Asino Kehie
	14	Mokokchung	Bendangyanger		-
	15	Phek	R.K. Singh		R. Devi & S. Huidrom
Tripura	16	West Tripura	L.C. Patel	-do-	B.C. Das
Sikkim	17	East Sikkim	A.K. Mohanty	-do-	P. Shivakoty & S. Singh

A brief on NICRA (Technology Demonstration component) at NE region

The phenomenon of climate change is a hard felt reality now and the rainfed agriculture is facing the highest risk as it is resource poor and having limited flexibility to adjust against the adverse climatic affects. The NE region has a mean minimum/maximum kharif seasonal temperature regime of 23/31 °C, with the southern part being slightly cooler. Majority of the NE region receives about 1000–2000 mm of rainfall during the kharif season. The rabi seasonal mean minimum/maximum temperature regimes are about 9/24 °C. Most of the NE region receives about 200 mm of winter rainfall as well. Under impact of climate change the projected increase in minimum and maximum temperature in NE Region, during kharif season, is about 2 °C by 2030. However, in the southern parts of the NE region, maximum temperature is projected to increase by about 1.5 °C. The kharif seasonal rainfall is likely to reduce by about 10% in majority of the NE region. On the other hand, during rabi projected increase in temperature is about 2.5 °C and rainfall also is projected to increase by about 10%.

The negative impact of global climate change is very much pronounced in the NE region, which are already manifested through increased frequency of floods and droughts. This is making the natural resources, agriculture and natural biodiversity of this region in a spot of high botheration and vulnerability. Efforts are being made at individual level and more recently through a concerted endeavor made by Indian Council of Agricultural Research by floating an umbrella project during 2010. The project 'National Initiative on Climate Resilient Agriculture' (*NICRA*) is aimed at brining resilience in to the rainfed agricultural system of the country through a multi-faceted approach. Apart from basic and strategic research, the project has a third component i.e. 'Technology Demonstration', where through the networks of the KVKs, spread all over the country, the climate resilient technologies will be presented to the farming community. At present, 100 KVKs of the country, representing diverse agro-climatic conditions, have been involved in this process and among them 17 are from the North Eastern region. While doing so, stress is laid upon detecting the exact climatic stress of the region and to address them with locally available resource and technologies, as far as possible.

In brief, the Technology Demonstration component under NICRA at North Eastern region may be summarized as below:

- The 'National Initiative on Climate Resilient Agriculture' (NICRA) is presently undergoing at 17 KVKs of ZPD (Zone-III), representing different agro-climatic conditions with designated problem areas in 8 NE states.
- Implementation of Technology Demonstration component, under NICRA, in 17 KVK districts under Zone III started with an initial budget support of Rs. 546.30 lakh during FY: 2010-11. The sanctioned budget for FY: 2011-12 is Rs. 388.12 lakhs.
- The project lays focus on identification of major climatic constraints/vulnerabilities in farm sector and intervention with coping strategies on pilot test scale in representative village for developing location specific functional model of climate resilient agriculture.
- The project emphasizes farmers' participation in project management through formation of action committees while KVK's role will primarily center around technical support and facilitation.
- It aims at intensified application of ICT tools and larger participation of stakeholders.

Climatic vulnerabilities of selected districts of North East India and possible interventions

Identified climatic vulnerabilities with key interventions for the selected KVKs are:

- a) Water scarcity during dry spell
 - Vegetative mulching (biomass from nearby forests)
 - Water harvesting through farm ponds with water lifting devices
 - Jalkund and ponds are to promoted in community basis through CRMC
 - Renovation of defunct ponds
 - Low cost drip systems in high value crops with NHM
- b) Flood/ water logging
 - Flood tolerant varieties (paddy)
 - Drainage of excess water
 - Use proper agronomic management
 - Net fencing for fish ponds
- c) Frost problem
 - Poly-house (low cost) cultivation of vegetables and nurseries

Table: State wise distribution of NICRA KVKs in North Eastern region

State	District	Agro-climate	Vulnerability
Arunachal Pradesh	Tirap	Humid sub tropical	Water stress
	West Siang	Sub tropical	
	West Kameng	Temperate	Cold stress
Assam	Dibrugarh	Upper Brahmaputra Valley Zone	Floods
	Cachar	Barak Valley Zone	
	Sonitpur	North Bank Plain Zone	Drought
	Dhubri	Lower Brahmaputra Valley Zone	
Sikkim	East Sikkim	Humid sub tropical hill	Soil erosion & Water stress
Manipur	Senapati	Sub tropical plain	Drought/water stress
	Imphal East	mild tropical hill	
Meghalaya	Ri-bhoi	Mild tropical hill	Water stress
	West Garo Hills	Sub tropical hill	
Nagaland	Phek	High hill	Drought/water stress
	Dimapur	Mild tropical plain	
	Mokokchung	Mild hill	
Mizoram	Lunglei	Sub tropical hill	Water stress
Tripura	West Tripura	Mild tropical plain	Cyclones

Modules of interventions under Technology Demonstration component

Module I : Natural resource management

Interventions on in-situ moisture conservation, rainwater harvesting and recycling for supplemental irrigation, improved drainage in flood prone areas, conservation tillage, groundwater recharge and water saving irrigation methods.

Module II : Crop Production

Introducing drought/temperature tolerant varieties, advancement of planting dates of rabi crops in areas with terminal heat stress, water saving paddy cultivation methods (SRI, aerobic, direct seeding), frost management in horticulture through fumigation, community nurseries for delayed monsoon, custom hiring centres for timely planting, location specific intercropping systems with high sustainable yield index.

Module III : Livestock and Fisheries

Augmentation of fodder production during droughts/floods, improving productivity of CPRs, promotion of improved fodder/feed storage methods, preventive vaccination, improved shelters for reducing heat/cold stress, management of fish ponds/tanks during water scarcity and flooding.

Module IV : Institutional Interventions

Institutional interventions either by strengthening the existing ones or initiating new ones relating to seed bank, fodder bank, custom hiring centre, collective marketing, introduction of weather index based insurance and climate literacy through a village level weather station.

News on interventions' from across the NICRA-KVKs of NE Region

Mr. Rajib Buragohain, from Dibrugarh district of Assam, is now partially climate independent - H.K. Bhattacharya, KVK-Dibrugarh, Assam

A young farmer, of thirty years age, Rajib Buragohain from Phutahola village of Dibrugarh district of Assam is highly motivated and involved in farming activities to earn livelihood for his family but the income generated from the farm is not sufficient enough to meet the need of the family. He used to grow rice in 7 ha and vegetables in 8 ha area out of total 15 ha area he posses. Due to increasing fluctuations of aberrant weather in recent few years, his crops used to suffer a lot and sometimes, even, he struggles to get back the cost of cultivation.



Once the NICRA project was launched in his village under the supervision of KVK-Dibrugarh, he was advised to take up improved fodder cultivation in 1.2 ha of land. Fodder samplings of perennial grasses, viz. Guinea, Hybrid Napier, Para, Setaria were collected from Assam Agricultural University, Jorhat was provided to him under the project. Technology on fodder cultivation was given to him along with few other villagers as well. After 3-4 months of growing the fodder crops, the 1st cutting was ready to cut. Apart from feeding to his own livestock, he has started selling the fodder saplings to his co-villagers, which fetched him additional income in quick succession. His success inspired other villagers to go for fodder cultivation. Now, three more farmers have come forward and round the year fodder production is expected from the fodder bank of this village.



Looking at his progress and dedication in fodder cultivation, scientists from KVK provided him with a crossbred Jersey cow, on cost sharing basis, with a calf of 4 months old under the NICRA project. The animals were provided with concentrates as well as green grasses obtained from his fodder area. Accordingly, knowledge of livestock management and disease prevention was imparted on him through training. He is now following yearly vaccination for FMD and HS+BQ and supplementation of mineral mixtures and fertility inducers as prescribed by KVK Scientist. The cow is yielding on an average 10 litres of milk per day and he could manage to sell milk to increase the level of his income further.

Mr. Buragohain has now realized that through better utilization of his existing land, round the year, he can strengthen his economic standard. With proper planning and a little more effort, he could able to increase his annual income from Rs. 3000/- per month to Rs. 10000/-. Besides, he was happy that he could engage himself and his family throughout the year in farm activities. Now he is catering an ambition of developing a full fledged dairy unit, which will cater to the need of milk in his village. He is now an example to school dropouts, rural youths and farmers of his as well as near by villages.

Protected cultivation of off-season vegetables was supported by harvested rain water at Phek, Nagaland - R.K. Singh, R. Bharali and D. Borkotoky, KVK-Phek, Nagaland



The farmers of Nagaland have inherent problems like small land holding, poor yields due to rain dependence and lack of proper knowledge of modern techniques of agriculture. Polyhouse farming was thought to be an alternative and new technique as it reduces the dependency on rainfall and very suitable to make rational use of land and water resources. Potentially, polyhouse farming can help the farmers to generate income round the year by growing multiple crops. It also enables cultivation of off-season crops, thus fetching the farmers a higher price in the market. Normally, a polyhouse is constructed of a metal structure covered by polythene, but for the farmers with small land holding low cost polyhouse may be an ideal alternative in terms of cost.

Twenty farmers of the NICRA adopted Thipuzumi village of Phek district of Nagaland received training on construction of low-cost polyhouse and off-season vegetable cultivation followed by a demonstration under supervision of KVK-Phek. Thirteen low cost polyhouses with an average size of 36 m² were constructed using locally available low cost bamboo/wooden materials. Next to the polyhouse a small rain water harvesting pond was dugged to apply water as needed through micro irrigation system. The polythene and irrigation system were supplied by the KVK under the NICRA project and remaining cost of wooden and bamboo structures and labour were born by the concerned farmer.



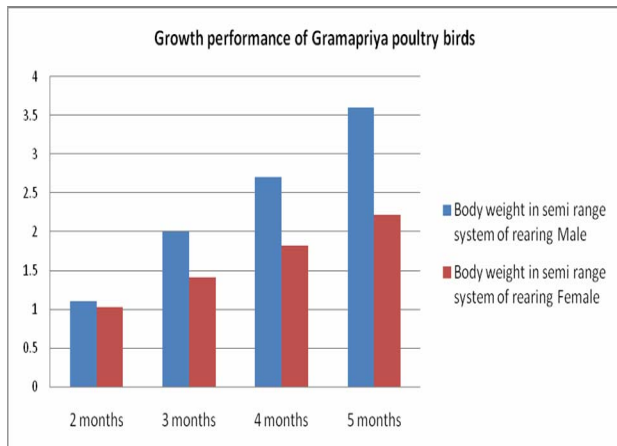
Though farmers of the Thipuzumi village were growing tomato, King chilli, brinjal etc. since long time, but was sufficient for their house hold consumption only. Naga chilli or King chilli is known for its high market value with an export potential in Nagaland and adjoining states. Mr. Vecusuyi a beneficiary started cultivation of King chilli under low cost polyhouse and he could earn an income of about Rs. 25,000/- obtained from one crop alone.

Another progressive farmer Mr. Sevehu has two polyhouses of total area of 676 m². He sells sapling of King chilli and kiwi and he is expecting to earn as high as Rs. 80,000/- in every season. Introduction of low cost poly houses and rain water harvesting and reuse through micro irrigation system paved the way to realize the good income by the farmers, irrespective of the kind of weather prevailing in the region.

Backyard poultry production by rural women with improved poultry has added to the nutritional as well as financial securities of East Sikkim farmers –
A.K. Mohanty, KVK- East Sikkim, Sikkim

After the selection of Nandok as adopted village under NICRA project in East Sikkim, it was found that the poultry production systems in Nandok and other nearby villages are traditional and poorly remunerative. Then KVK-East Sikkim made intervention with introduction of dual purpose improved birds, which can thrive well under poor feeding and management practices followed in village, can grow faster than indigenous birds and lay more eggs thus leading to improving the livelihood security of the poor. Finally, the *Vanaraja* and *Gramapriya* birds were identified for intervention, since they are of multiple colours, looked like indigenous birds and fetched better price in terms of meat and egg in the market.

In order to make the programme successful, KVK organized training and demonstration programmes on "Backyard poultry rearing" for farmers and farm women's. Exposure visits were also conducted to gain more practical knowledge particularly on *Vanaraja* and *Gramapriya* birds suitable for backyard rearing. After that KVK supplied 400 nos. of *Vanaraja* and 400 nos. of *Gramapriya* birds to 40 beneficiaries of the adopted village. The birds were also provided with timely vaccination, treatment etc. This was proved to be a successful venture among rural women and is becoming more popular nowadays.



As a success story of this enterprise, we can cite the example of Mrs. Pabitra Sharma of Nanduk village. With the excellent performance of *Gramapriya* backyard poultry, Mrs. Pabitra Sharma became very much enthusiastic to expand her entrepreneurial set up and on her own effort she purchased 100 more chicks from ICAR Sikkim Centre. She has also started hatching 10-12 eggs at a time by using local broody hens and sells chicks to other fellow farmers thus making a horizontal dissemination of the technology. Now Nandok village under 26 Naitam Nandok GPU in East Sikkim district has become a hub for backyard poultry production with improved birds. Mrs. Sharma has become a role model for the rural youths and farm women for taking improved backyard poultry as a potential practice for agro-preneurship development leading to sustainable livelihood security. Thus KVK, East Sikkim could make an excellent impact in improving the livelihood status of farming community of the region through relevant intervention of climate resilient technology through NICRA project.

Apiary is fetching additional income at West Garo Hills, Meghalaya

– T. Samajdar, KVK-West Garo Hills, Meghalaya

To augment the income of the farmers and to reduce the crop losses due to drought, seventeen numbers of bee hives with bee colonies were distributed to 3 individual farmers and 6 SHGs in the NICRA adopted village in December, 2011 with practical demonstration of scientific rearing. Till date 18 litres of honey has been harvested by the farmers and by selling them in the market they are able to earn a good remuneration to secure the livelihood, which otherwise was totally dependent on rainfed agriculture.



Rainwater harvesting (Jalkund) for growing vegetables crops i.e. cabbage, Tomato and Radish



Due to receipt of inadequate rainfall during winter the farmers of NICRA village in West Garo Hills were not able to cultivate winter vegetables in the hills. So, thirteen (13) nos. of *Jalkund* has been excavated at the village. The vegetable cultivation with the water stored in the *Jalkund* will be initiated in Rabi, 2012.



Economic security for farmers through ring wells and water harvesting structures in off season cucumber cultivation – Bendangyanger, KVK-Mokokchung, Nagaland

Cucumber is traditionally cultivated by farmers in their jhum fields as a mixed crop during the Kharif season (April to Sept) in Nagaland hills. However, due to its high seasonal availability, the value of the crop is very low. Farmers usually fetches low price, which is far below the cost of cultivation.

Aliba village of Mokokchung, Nagaland is well known for off season cucumber cultivation but, of late, the district is experiencing very long dry spells which leads to drying up of irrigation channels. The market demand for cucumber rises, but the production cannot meet the demand. Due to this constraint, area under this crop has got reduced drastically as many farmers gave up cucumber cultivation.



Off-season cucumber cultivation usually starts from the month of December and harvesting starts by April. But for the last 5 years, sowing of seeds was delayed up to February due to non availability of irrigation. This results in low return as the harvesting catches up with the normal season crop. However, with assured irrigation, made possible through harvesting of rain water under the NICRA project interventions, the farmers could start the sowing by early January.

The farmers start harvesting the crop by early April which continues till mid June. Very good revenue is already realised from the sale of cucumber. On an average, a farmer earns net income of Rs. 25,000/- to 35,000/- from off season cucumber in a single season. The project intervention also led to increase in the area under cucumber cultivation by over 50%.



Custom hiring centre is offering great help to poor farmers at North Pulinpur ADC village of West Tripura – L.C. Patel, KVK-West Tripura, Tripura

To assist the farmers of with essential farm implements in NICRA adopted North Pulinpur ADC village of West Tripura district, a custom hiring centre has been opened under Kami Humkrai Climate Risk Management Committee (KHCRMC) and it is functioning very well at present. The custom hiring centre is equipped with modern farm machineries and implements like pump set (2), power tiller (1), row paddy transplanter (1), sprayer (10), cono weeder (8), water cane (25), power thresher (1), wheel hoe (1), weed cutter (1), khurpi (25), hand transplanter (25), hand fork weeder (25), digital balance (1), soil and water testing kit (2), sickle (16) and rake (2). The most significant achievement of this village based custom hiring centre is that a sum of Rupees Eighteen Thousand and Forty Eight has already been generated as revenue through lending of the farm machines and implements to the local farmers of the village. The fund, so generated is being utilized to replace or to buy new implements by the vCRM.



Horticultural interventions at drought hit Manipur village is bringing smile to the face of the farmers – S.H. Wani, KVK-Senapati, Manipur



KVK-Sylvan at Senapati district of Manipur is one of the oldest KVKs in the Northeast region, serving the poor farmers since a long time through a concerted effort. As the region is chronically drought hit, cultivation of rainfed rice often suffers to varying extent. Hence, to protect the interest of the farmers, last year under the NICRA project, high value vegetables were planted immediately after harvesting of the rice crop. The vegetables could effectively utilize the residual soil moisture left in the rice field and also supplemented with harvested rain water in the farm pond.

As a case study we can cite about one farmer of the village, Mr. Peter Mao, who was suggested to undertake Broccoli cultivation based on the soil analysis report just after rice. He was accordingly imparted with training on improved cultivation practices of Broccoli and provided with the critical inputs in the month of August-Sept, 2011. By the end of January 2012, he could harvest about 27 quintals of Broccoli which fetched net income amounting to Rs 73,800 (rupees seventy three thousand and eight hundred) at farm gate price. Now, he has decided to convert, the area earlier used for growing less remunerative crops, to Broccoli cultivation. Similarly the scientists at KVK are looking forward for similar interventions in field of neighbouring farmers, which can provide opportunity to make effective use of what ever amount of water available during winter.

Farmers appreciated construction of Rock-fill dam and irrigation channel to divert water from natural drain to rice fields under NICRA project at a Dimapur village – A. Sharma, KVK-Dimapur, Nagaland

Krishi Vigyan Kendra, Dimapur ICAR Nagaland Centre, while conducting village survey and resource mapping under NICRA Project identified Langlung river as main source for irrigating 150 hectare of rice field covering 76 farming households. The villagers divert the water from the river with the help of rock fill dam supported by bamboo structures to two water harvesting pond then to their field by Kutcha irrigation channel. However, due to frequent washout by strong river current of the dam farmers were forced to spend 60-70% of their working days in repairing and renovation of the dam and irrigation channel leaving only 30-40% of their working days for cultivation practices.



Due to these reason, production and productivity of rice crops got seriously affected. Hence, initiative was taken under Natural Resource Management component of NICRA project during the financial year 2011-2012, to construct the Rock fill Dam using sausage wire and a concrete irrigation channel (1000 ft.) as a means to reduce the wastage of time in repairing and renovating the dam. Therefore, it is expected that farmers will utilize 80-90% of their working days in cultivation practices, which will subsequently increase the production and productivity of their crops.

Few selected photographs on NICRA activities



Demonstration on deep water and flood tolerant rice cultivar Panindra at Cachar district of Assam

Community paddy nursery raising at Dhubri district of Assam



High yielding toria cultivation, utilizing residual soil moisture, at Sonitpur district of Assam



Defunct ponds were repaired and converted to water harvesting and fish rearing ponds, at West Kameng district of Arunachal Pradesh



Successful harvesting of rain water through small and low cost tanks (Jalkunda), at West Siang district of Arunachal Pradesh

Liming of vegetable fields for effective soil acidity management at Tirap district of Arunachal Pradesh





Growing of lathyrus (cv. Bio-L-212) to promote crop diversification and ensure nutritional security at Imphal East district of Manipur



Promotion of improved livestock rearing on 'cost sharing basis' at Lunglei district of Mizoram

Some other important NICRA news

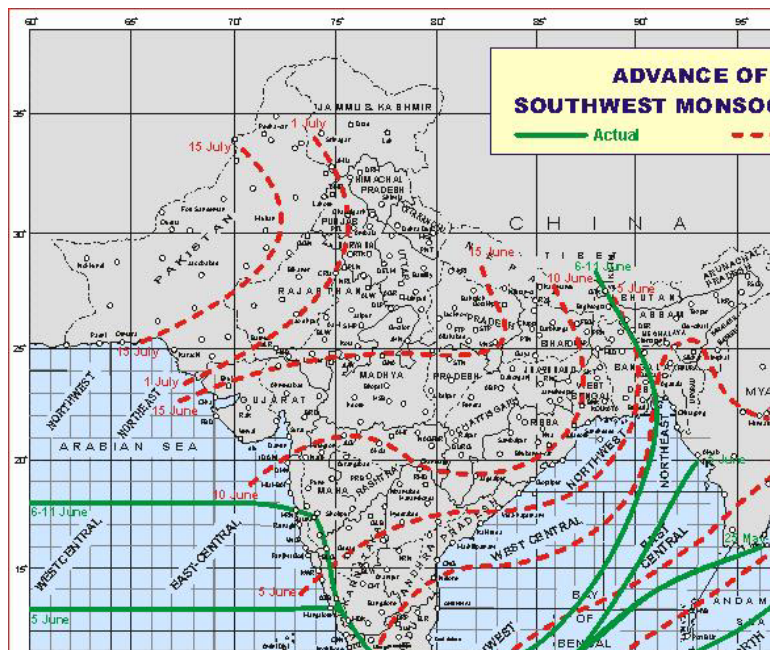


Inauguration of NICRA installed Automatic Weather Station (AWS) at KVK-Senapati, Manipur by Hon'ble Secretary, DARE and DG, ICAR Dr. S. Ayyappan on 12-5-2012. He was accompanied by Hon'ble DDG (AE) Dr. K.D. Kokate and Hon'ble VC, CAU Dr. S.N. Puri



Mid-term review workshop for KVKs from Zone-III under NICRA project was held at Guwahati during 23-24 March 2012

A report on South West Monsoon till June 12th 2012



Source: India Meteorological Department

The South West Monsoon has already covered North Eastern region, though it is arriving late by at least a week in many other places of the country. Moderate to heavy rainfall activities have been reported from most of the north eastern region. The 1st flash of flood has already inundated many places in the flood plains of Assam. The KVVs should take a serious look at the on going weather activities and accordingly advised to initiate contingency measures as warranted by the situation. At the same time advisories to the farmers may be issued with respect to normal farm practices, vaccination schedules for livestock etc.

*A report on rainfall receipt in NICRA districts of NE region
(from 1-3-2012 to 31-5-2012)*

District	Actual rainfall received (mm)	Normal rainfall (mm)	% Departure from normal	Category
Arunachal Pradesh				
West Kameng	302.5	534.3	- 43	Deficient
West Siang	387.0	545.5	- 29	Deficient
Tirap	704.5	786.6	- 10	Normal
Assam				
Dhubri	337.8	585.7	- 42	Deficient
Dibrugarh	624.3	642.1	- 3	Normal
Cachar	963.2	817.2	+ 18	Normal
Sonitpur	499.1	478.4	+ 4	Normal
Manipur				
Imphal East	308.7	438.9	- 30	Deficient
Senapati	No record	370.6		
Meghalaya				
Ri-Bhoi	276.2	446.2	- 38	Deficient
West Garo Hills	106.8	579.6	- 82	Scanty
Mizoram				
Lunglei	395.0	517.6	- 24	Deficient
Nagaland				
Dimapur	89.0	286.8	- 69	Scanty
Mokokchung	359.0	486.3	- 26	Deficient
Phek	204.9	307.6	- 33	Deficient
Sikkim				
East Sikkim	542.2	528.9	+ 3	Normal
Tripura				
West Tripura	381.4	626.2	- 39	Deficient

Source: India Meteorological Department

Acknowledgement: KVKs from whom we have received write-ups for this inaugural issue of 'Klima-NE' news letter- Dibrugarh, Dimapur, East Sikkim, Mokokchung, Phek, Senapati, West Garo Hills, West Tripura

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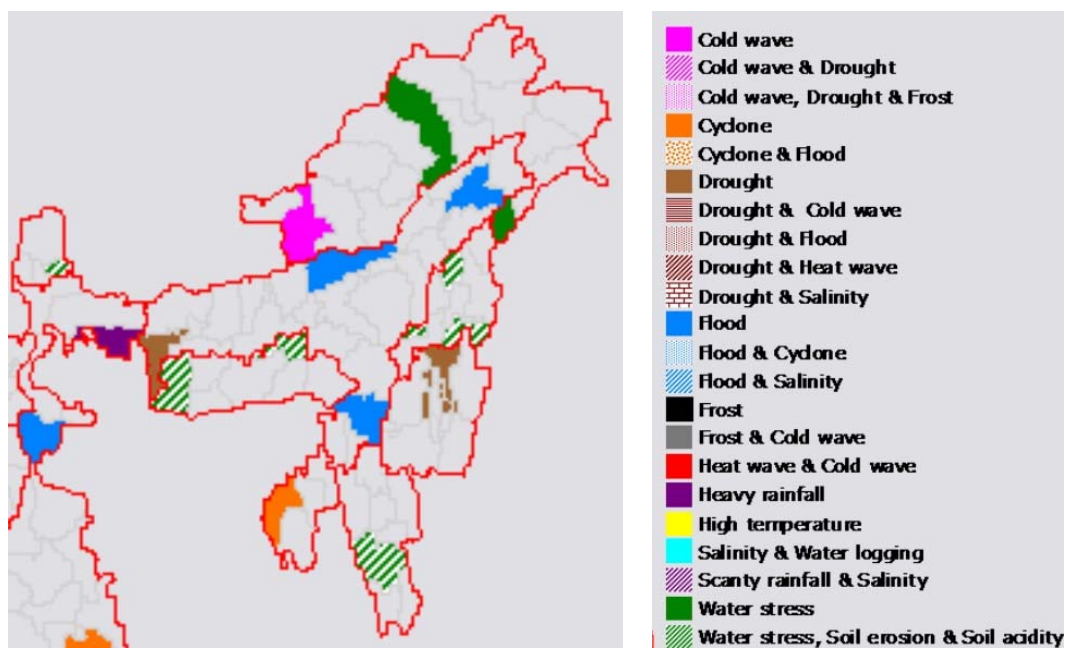


Fig: Map of North Eastern districts under NICRA intervention with their respective climatic vulnerabilities (Source: CRIDA, Hyderabad)

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