



WEST KHASI HILLS DISTRICT Inventory of Agriculture

2015



Correct Citation: Bhalerao A.K., Kumar B., Singha A. K., Jat P.C., Bordoloi, R., Deka Bidyut C., 2015, West Khasi Hills district inventory of Agriculture, ICAR-Agricultural Technology Application Research Institute, Umiam, Meghalaya, India

Published by: The Director,
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FOREWORD

The ICAR-Agricultural Technology Application Research institute, Zone-III with its headquarters at Umiam, Meghalaya is primarily responsible for monitoring and reviewing of technology assessment, refinement, demonstrations, training programmes and other extension activities conducted by the *Krishi Vigyan Kendras* (KVKs) in North East Region, which comprises of eight states, namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The directorate also serves as feedback mechanism to research and extension systems while maintaining a very close liaison with ICAR headquarters and has made significant progress in research, capacity building and other extension activities which ultimately contributes for the planned growth and development of North Eastern Region of India.

Through this District Agriculture Inventory publication, an attempt has been made to compile and publish information about KVK district and agriculture in district, in a meaningful and comprehensive manner. It will be very useful for all stakeholders of agriculture in district. The inventory encompasses the information regarding geography of district; basic data about agriculture and district population, crops, institutional resources, agriculture relates schemes in district which also covers agriculture, fishery and livestock sector. The district inventory in the form of e-publication will surely increase the digital presence and penetration of KVKs. The inventory will also serve the communication needs of farmers and youth in district as it contains contact numbers and address related information to access various developmental agencies in district.

I congratulate the efforts of staff of KVK for collecting and compiling such a large volume of information in systematic manner. I also acknowledge the efforts of editors and other staff members of this institute for publishing this document on our website.

Umiam
18-03-2016

(Dr. Bidyut C. Deka)
Director,
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PREFACE

The synthesized compilation in the form of informative publication is of much value for decision making. The compiled information in this publication will immensely help farmers and other stakeholders of agriculture and allied sector of a district such as line departments, research organizations, planners, policy makers, input providers etc. Through this document, we are trying to provide entire gamut of information related to district and its agriculture setting for the benefit of farming community of the North Eastern Region. The connectivity related issues in the North Eastern region makes the information inaccessible to most of stakeholders. Therefore, the *Krishi Vigyan Kendras* in each district of North East region undertook this cumbersome task to compile the district Agricultural Inventory. This publication provides the latest information about district, agriculture and other essential constituents.

We, the editors of this publication, earnestly thank and acknowledge the contribution of all compilers i.e. Programme coordinator, Subject Matter Specialists and Programme Assistants of KVK West Khasi Hills for taking part in compiling the huge information to shape up West Khasi Hills District Inventory of Agriculture-2015. We also thank all officers of ICAR H.Q. for guiding us time to time and motivating us to complete this publication.

We, the editors, dedicate this publication to the farming community of West Khasi Hills District and we look forward to contribute more for the betterment of farming community in entire North East Region. We also welcome the suggestions for further improvement.

Umiam
18-03-2016

Editors

From the Desk of Programme Coordinator, KVK West Khasi Hills



The Inventory of Agriculture of West Khasi Hills District is created with the aim of providing vital and detailed information to various stakeholders, especially the farming community to help them progress in their various farm based activities. A majority of the farmers lack information about various technologies that can be adopted, assistance provided in the form of schemes/activities and hence owing to their reluctance to approach the concerned departments, they are unable to bring about better and improved changes to their means of livelihood. It is a very huge task to disseminate information to the farming community based on their specific needs. The farmers are also unaware of the various Research and Development organizations in the District. Lack of flow of information between the farmers and the implementing agencies leads to a distinct stagnancy of valuable information flow and services that would otherwise be helpful to the farming community and can also prevent a gap in the adoption of latest technologies. Owing to this very reason, there are innumerable delays in the adoption of new and better technologies as there is poor transfer of information. Thus to ensure sustainability in agriculture, wide adoption of modern technologies by the farming community is a necessity.

There is a great need to ensure dispersion of various knowledge and practical facts to the farmers to keep them well informed and practically proficient. This publication is a compilation of all activities, initiatives and organizations which are relevant to the District's Agriculture scenario. Addresses for communication to various organizations providing services has also been included in order to assist the farmers in receiving vital inputs and those that are keen to contribute to the farming community. We ensure that whatever information that might have been excluded will be compiled in the next publication.

The authors sincerely thank to all the staff of KVK and various departments for their joint effort in making this publication possible and hope this Endeavour will benefit the farming society. We also are deeply thankful to the District Officers, West Khasi Hills of various departments for assisting us in providing the necessary facts.

The farming community is the backbone of our economy and we dedicate this publication for their cause. Any suggestions and corrections will be highly appreciated for further improvement.

(Dodo Pasweth)

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CHAPTER-I

DISTRICT IN GENERAL

West Khasi Hills District lies in the central part of the state of Meghalaya and is situated between approximately 25 degrees 10' and 25 degrees 51' N Latitude, and between 90 degrees 44' and 91 degrees 49' E Longitude. It is bounded on the North-West by Kamrup District of Assam, on the North-East by Ri Bhoi District, on the east by East Khasi Hills District, on the south by Bangladesh and South West Khasi Hills district, the erstwhile Mawkyrwat Civil Sub-Division, on the west by East Garo Hills and South Garo Hills Districts. The district comprises an area of about 5,247 sq Km which is 23 percent of the total area of the state. Nongstoin, covering an area of about 76.00 sq. Km, is the Headquarter of the district.

West Khasi Hills District, presently the largest district of Meghalaya, was carved out of the erstwhile Khasi Hills District on the 28th October, 1976. In the same year, on 10th November, the Mairang Civil Subdivision was inaugurated, whereas the Mawkyrwat Block was converted into an Administrative unit. With the upgradation of Mawkyrwat into a full-fledged Sub-division on June 26th 1982, the district then comprises of three sub-divisions (including the Sadar sub-division), one Administrative unit viz., Mawshynrut which came into being on the 9th February, 1996 and 6 (six) C & R D Blocks viz., Nongstoin, Mairang, Mawkyrwat, Mawshynrut, Ranikor including Mawthadraishan Block which was created on the 20th March, 2001. The district was later bifurcated into two districts-the present West Khasi Hills District and new South West Khasi Hills District headquarter at Mawkyrwat comprising 2 (two) C & R D Blocks viz., Mawkyrwat and Ranikor C & R D Block

At present the West Khasi Hills District consists of four community and Rural Development Blocks namely:

- i. Mairang Community & Rural Development Block
- ii. Nongstoin Community Development Block
- iii. Mawshynrut Community Development Block
- iv. Mawthadraishan Community Development Block

According to 2011 census, West Khasi Hills had a population of 385,601 of which male and female were 194,628 and 190,973 respectively. There was change of 30.25 percent in the population compared to population as per 2001. In the previous census of India 2001, West Khasi Hills District recorded increase of 33.05 percent to its population compared.

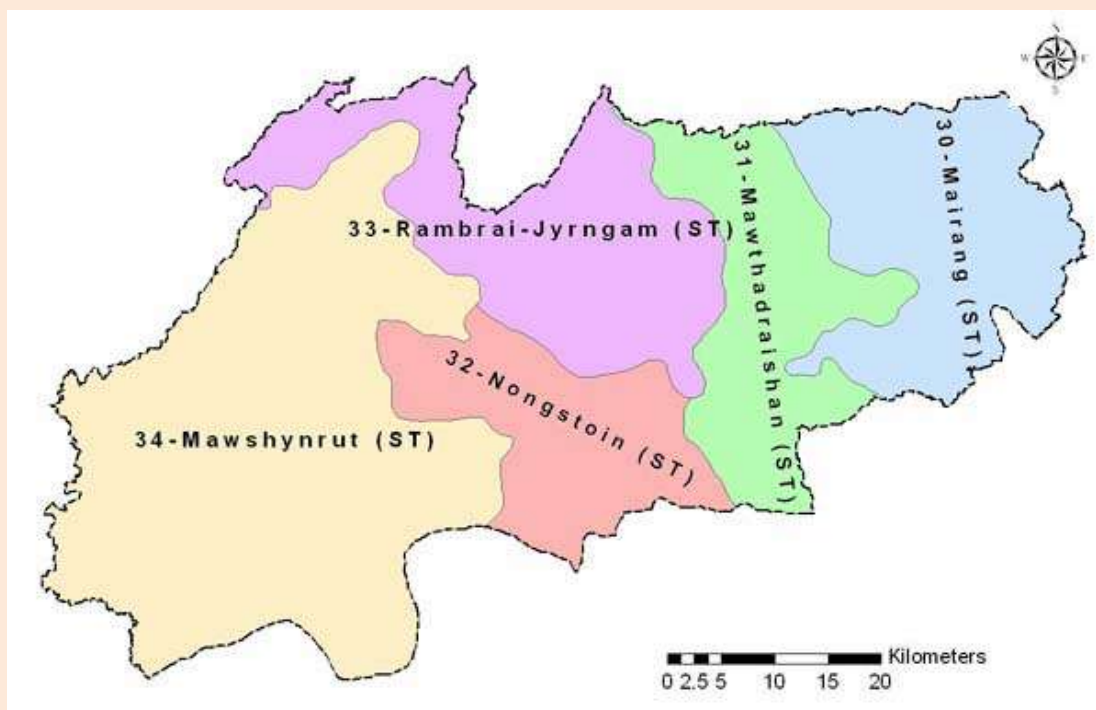


Fig: Location of West Khasi Hills District

CLIMATE

The climate of the district is mildly tropical in the northern and southern foothills, while in the central upland zone, the climate is temperate and places at medium altitude in the northern, western and southern parts of the district, experience sub-tropical climate. The district is influenced by the South- West monsoon and rainfall is assured during summer, but differs greatly in intensity from area to area within the district. The South-West monsoon normally sets in the second week of June and extends up to second week of October. The district receives some share of rain from North-East monsoon from the third week of October till

first week of December. The major share of rainfall is received from May to August. The average rainfall ranges from 1200 mm to 3000 mm per annum. The details of climate are given in Table.

Table: Climate of West Khasi Hills

Months	Jan	Feb	March	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Average max. temperature(^o C)	13.23	17.95	21.64	24.95	26.17	27.03	27.25	27.07	25.99	24.37	20.23	15.72
average min. temperature(^o C)	7.63	10.84	13.51	17.30	17.60	18.57	19.02	18.64	17.94	15.06	10.39	8.69
Precipitation(mm)	6.82	15.30	76.04	189.30	357.00	630.74	534.52	758.86	410.30	158.24	10.00	1.60

Source: Directorate of Agriculture, Meghalaya, Shillong, {Average rainfall and Temperature of 5 yrs (2009-2013)}

TOPOGRAPHY

The District lies in the central part of the State of Meghalaya and is situated between approximately 25 degrees 10' and 25 degrees 51' N latitude, and between 90 degrees 44' and 91 degrees 49' E longitude. It is bounded on the north-west by Kamrup district of Assam, on the north-east by Ri Bhoi district, on the east by East Khasi Hills district, on the south by Bangladesh and South West Khasi Hills district, the erstwhile Mawkyrwat Civil Sub division, on the west by East Garo and South Garo Hills districts. The district comprises an area of about 5,247 sq.kms which is 23 percent of the total area of the state. Nongstoin, covering an area of about 76.00 Sq. Kms, is the Headquarter of the District.

FOREST

According to Forest Survey of India (FSI) Report, 2003 the actual forest cover in Meghalaya is 16,839 sq. km which accounts for 75.08 % of the State's total geographical area, leaving only about 24 % nonforest land. The FSI had also classified forests into three categories viz Very Dense, Moderately Dense and Open Forest . West Khasi Hills have 40.3% of dense forest and 59.7% open forest out of 73.51% total forest cover in the district.

Table: Details of forest in West Khasi Hills

Geographical area (sq.km)	Forest cover (sq.km)					
5,247	Dense Forest		Open forest		Total	
	Area	%	Area	%	Area	%
	1555	40.3	2,302	59.7	3857	73.51

Source: Forest Survey of India (2003)

WATER RESOURCE

The department of water resources was created out from the Directorate of Irrigation on the 25th August 2009.

The main function is the implementation of irrigation projects consisting of surface flow and lift irrigation schemes in all districts of the state.

DEMOGRAPHY

The population of the district as per 2011 census is 38, 3461 with a higher male population. The population density per sq.km. is 409. The population of the district has increased from 2001 to the present level, registering an increase of 7.31 per cent. The overall literacy rate is 77.87% with higher literacy in males (78.53%) and lower (77.19%) in females.

HEALTH CARE SECTOR

The district has 1 government hospital, 5 community health centres and 17 primary health centres. There are 64 M.C.W centres.

LOCAL BODIES AND RURAL DEVELOPMENT:

The Urban Local bodies in the State include Municipal Board and Town Committees. Though there are no rural local bodies like the Mahkuma Parishad, the Anchalik Panchayat and the Gram Panchayat in Meghalaya but traditional institutions like Syiemship, Daloiship and Nokmas exist in the rural areas. The Municipal Boards and Town Committees are governed by the Assam Municipal Act, 1956, since adopted, and the Establishment and Administration of Town Committees Acts such as the Garo Hills District (Administration of Town Committee) Act, 1956; the United Khasi and Jaintia Hills District (Establishment of Town Committee) Act, 1960; and the Jaintia Hills Autonomous District (Establishment and Administration of Town Committees) Act, 1975.

The Village Durbar is the administrative unit at the village level and enjoys full freedom in planning and developing the area under its jurisdiction. They are also known as the Local Self Government. The District comprises of Eight Syiemships viz., Nongstoin, Nongkhlaw, Maharam, Myriaw, Rambrai, Mawiang, Langrin, Nobosophoh, together with the three Sordarships of Jyrngam, Riangsih and Nonglang. The people of the district have their distinct Dialects of about 23 in number. Majority of these dialectical groups, understand Khasi, which is common or link language of the people. The Khasi are predominant inhabitants of West Khasi Hills District. The Khasi traditional institution or the Syiemships is an organization dealing with preserving the cultures, traditions and customary laws for maintaining peace and order and to bring social equality within the people and to provide rules and conditions for the people, to bring peace, security social understanding and social existence among the people. Thus, it focuses more on the social welfare rather than improving the economic life of the people. At present all the developmental schemes and projects are implemented by the concerned State Department directly to the village.

Rural development: The organisational set up in the development sector in the district is headed by the DC and assisted by the ADC (Dev) in the District Head Quarter and by the BDO's at the four C & RD block Head Quarters at Nongstoin, Mairang, Mawshynrut and Mawthadraishan. Each BDO in turn is assisted by technical extension officers drawn from various departments such as Agriculture, Veterinary, Statistics, etc. Formulation of technical plans and estimates at Block level is looked after by subordinate Engineers and Sectional Assts.. Each Block is divided into fifteen Gram Sevak Circles under the charge of the Gram Sevak. Another important wing of the developmental set-up is the DRDA which is an autonomous agency with the Deputy Commissioner as its Chairman and the Project Director from the ADC level. The Project Director is assisted by the Executive Engineer and the Subordinate Engineer on one hand and by a number of Assistant Project Officers in-charge of DWCRA and monitoring, etc. on the other.

CHAPTER II

AGRICULTURAL SCENARIO OF THE DISTRICT

Agricultural scenario of the District

More than 80% of the total population in West Khasi Hills is agrarian as their main backbone of livelihood is basically agriculture. Rice, Maize, potato and ginger are the main crops grown in West Khasi Hills.

CROPS

Agriculture and allied activities provide income and employment for the people in West Khasi Hills. Monocropping in lowland areas and mixed cropping in upland areas are the features of agriculture in the district. The details of land use pattern in West Khasi hills is given in table and figure. Depicts the percentage of land use under different categories.

Table: land use pattern of West Khasi Hills

Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable waste land	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
Area ('000 ha)	52.47	36.66	20.65	7.44	NA	14.47	4.35	4.86	1.89	4.77

Source: Directorate of Agriculture, Meghalaya, Shillong

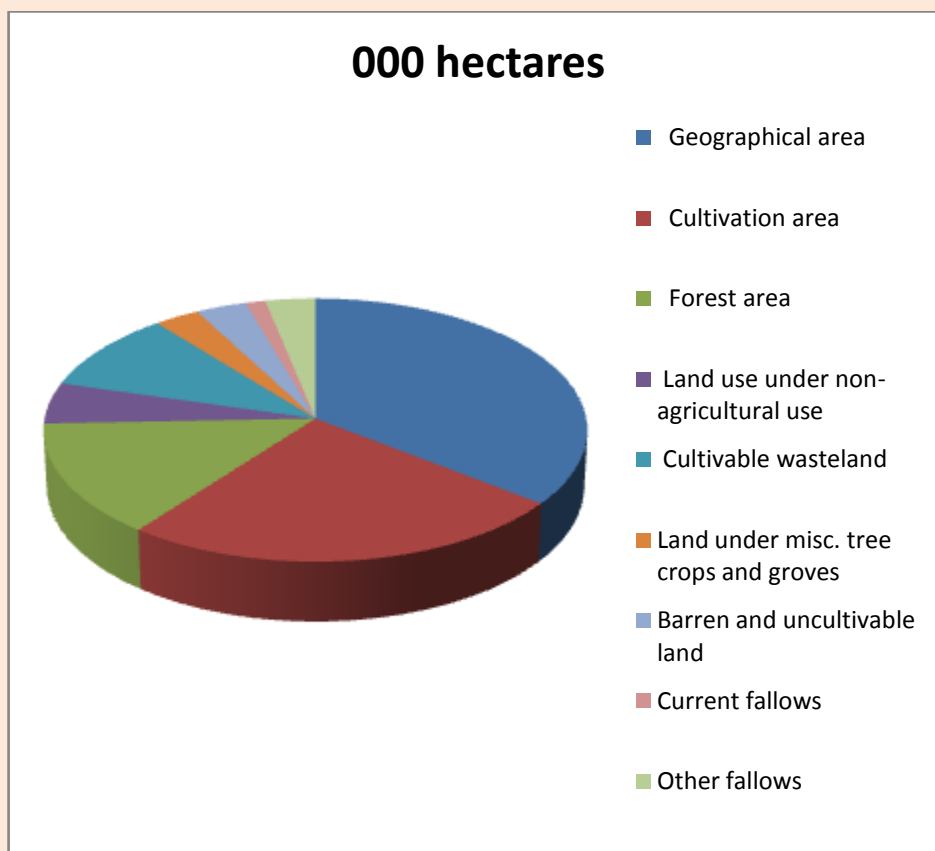


Fig: Per cent of land area under different categories in West Khasi Hills District

As per the statistics (2013-14) the total cultivated area under irrigation is 4367.18 hectares. The major source of irrigation is canal. The details of crops and area under irrigation in give in table

Table: Land share of major crops under irrigation in West Khasi Hills

1.7	Sl. No.	Major field crops cultivated	Area ('000 ha)							
			<i>Kharif</i>			<i>Rabi</i>				
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
		Rice	-	7763	7763	52	-		-	7815
		Maize	-	4255	4255	-	-	-	-	4225
		Soyabean	-	25	25	-	-	-	-	25

		Millets	-	-	-	232			-	232
		Rabi pulses	-	-	-	-		-	-	
		Pea	-	-	-	28				
		Cowpea	-	-	-	5				33
		Sesamum	-	-	-	28		-	-	28
		Rape & Mustard	-	-	-	28		-	-	28
		Tobacco	-	-	-	32		-	-	32

Sl. No.	Horticulture crops - Fruits	Area ('000 ha)		
		Total	Irrigated	Rainfed
1	Pineapple	727	-	727
2	Citrus fruits	1169	-	1169
3	Banana	785	-	785
4	Papaya	39	-	39
Others (specify)			-	
	Horticulture crops - Vegetables	Total	Irrigated	Rainfed
1	Potato	5437	-	5437
2	Sweet potato	1319	-	1319
3	Ginger	332	-	332
	Tapioca	649	-	649
4	Black Pepper	102	-	102
5	Chillies	47	-	47
6	Turmeric	70	-	70

7	Arecanut	1224	-	1224
8	Rubber	-	-	-
9	Coffee	-	-	-

Source: (2011-12) Directorate of Agriculture, Meghalaya, Shillong

Table: Details of soil series and crops grown in WEST KHASI HILLS

Sl. no.	Soil classifications	Series	Physiographic situation	Elevation Mts. above MSL	Soil depth	Land capability subcl asses	Irrigability	Productivity potential	Suggested land-uses.	Area in Ha	Mapping units*/ (locations)
Warm per-humid Agro-Eco Sub Region with thermic temperature regime											
1	2	3	4	5	6	7	8	9	10	11	12
1	Fine loamy, mixed, thermic Typic Humaquepts	Laitdom	Inter hill valleys	1625	Very deep	IVw	Moderately suitable	Medium	Paddy, vegetables	14312	(Mairang)
2	Coarse loamy, mixed, thermic Typic Udorthents	Langkyrdem	Escarpment (steeply sloping 30-50%)	1500	Moderately deep	Vllles	Not suitable	Medium	Vegetative cover	23399	07
2	Fine, mixed, thermic Typic Haplohs	Mairang	Side hill slopes (moderate 8-15%)	1600	Very deep	Ille	Marginally suitable	Medium	Forest plantations	21469	02 (Mairang)

	umults										
4	Coarse loamy, mixed, thermic Typic Dystrudepts	Mawlein	Upper hill slopes (moderate)	1500	Moderately deep	Illes	Marginally suitable	Low	Forest plantations	25527	(Marshilling Mawkyrwat)
5	Loamy skeletal mixed, thermic, Typic Dystrudepts	Nongspung	Hill slopes (moderate)	1450	Moderately deep	Vlls	Moderately suitable	Low	Forest plantations	48730	3, 4, 8. (Nongspung)
6	Fine, mixed thermic Typic Kandihumults	Nongstoin	Hill slopes (moderate)	1250	Deep to very deep	Ille	Marginally	Medium	Forest, horticultural with erosion control	80166	03, 04, 05. (Nongstoin)
7	Coarse loamy, mixed thermic Humic Dystrudepts	Syntein	Escarpment (steep slopes)	1600	Moderately deep	Vllle	Not suitable	Low	Forest, grass cover, erosion control.	35099	07 (Nongnah)
9	Fine, mixed, thermic, Typic Kandihumults	Umkrem	Hill slopes (moderate 8-15%)	1145	Deep to very deep	Illes	Marginally suitable	Medium	Forest, horticultural with erosion control	38291	01
10	Fine loamy, mixed thermic, Typic	Umthlu	Gently sloping hill top (gently	750	Deep to very deep	Vis	Not suitable	Medium	Forest plantations		05

	Dystrud tpts		sloping 1 – 3 %)								
Warm per-humid Agro-Eco Sub region with hyperthermic temperature regime.											
1	2	3	4	5	6	7	8	9	10	11	12
1 1	Fine, mixed, hyperthermic Aeric Endoaquepts	Ramjongiri	Valley	100	Deep	IVw	Moderately suitable	Medium	Paddy, vegetables	9488	18
1 2	Loamy skeletal , mixed, hyperthermic Humic Dystrud epts	Baghmara, mawshun	Hill slope (moderately steep 30-50%)	350	Deep	Vlls	Not suitable	Medium	Forests, plantations with erosion checks	26215	11, 20.
1 3	Fine loamy, mixed, hyperthermic Humic Dystrud epts	Bajenn gdoba	Undulating upland (moderately sloping 8-15%)	70	Deep	Ille	Marginally suitable	Medium	Horticultural with erosion checks	19955	09, 10.
1 4	Fine, mixed, hyperthermic Typic Endoaquepts	Dewan kata	Piedmont plains(level)	75	Deep	IVw	Moderately suitable	Medium	Paddy, pulses, vegetables	14231	16, 18
1 5	Coarse loamy, mixed, hyperthermic	Tura peak	Side hill slope (moderate 15 -	1180	Moderately deep	Vls	Not suitable	Low	Vegetative cover for ero-	27606	22, 23

	ermic Typic Udorth ents		30 %)						sion control.		
1 6	Fine, mixed, hyperth ermic, Humic Dystrud epts	Mynkre	Hill slope (moder ate slope)	700	Dee	Vlls	Not suitabl e	Low	Vegetat ive cover to con- trol erosion	2532	19
1 7	Fine, mixed hyperth ermic Cumulic Humaq uepts	Mawsh ynrut	Inter hill vlley (nearly level)	1300	Deep	IVw	Moder ately suitabl e	Mediu m	Paddy, pulses, vegetab les	5653	17
1 8	Fine, mixed, hyperth ermic Typic Kandihu mults	Nongen ram	Hill slope (moder ately steep 15-30%)	550	Deep	IVe	Not suitabl e at prese nt	Mediu m	Forest, horticul tural with erosion control	23167	11,12.
1 8	Fine, mixed, hyperth ermic Typic Kandihu mults	Nongpo h	Hill slopes (moder ately steep 15 – 30%)	550	Very deep	lles	Moder ately suitabl e	Mediu m	Maize, pulses, horti- cultural with erosion check	17567	13, 21.
2 0	Fine loamy mixed hyperth ermic Humic Dystrud	Pathatk linang	Valley (gently sloping 1 – 3 %)	775	Very deep	IVs	Moder ately suitabl e	Mediu m	Cereals, pulses vegetab les.	8479	17, 24.

	epts										
1	2	3	4	5	6	7	8	9	10	11	12
2 1	Coarse loamy, mixed, hyperthermic Humic Dustrud epts	Mawshun	Escarment (steeply sloping)	400	Deep	Villes	Not suitable	Low	Afforestation,	6915	20
2 2	Coarse loamy, mixed, hyperthermic Ultic Haplud alfs	Rongram	Side hill slope (steeply sloping 30-50 %)	500	Deep	Villes	Not suitable	Medium	Forest plantations	20865	21
2 3	Clayey skeletal , mixed hyperthermic Typic Kanhapl udults	Ganggangiri	Undulating hills (moderately sloping 8-15%)	275	Deep	Vls	Not suitable	Low	Forest	4590	22
2 4	Fine, mixed, hyperthermic Typic Kandihu ults	Umsooin (Umsning)	Hill slopes (moderately sloping 15-30 %)	950	Deep to very deep	Illes	Marginally suitable	Medium	Upland agricultural & horticultural with erosion control	7412	10

***Mapping units** - Soil resource map of Meghalaya, NBSS& LUP PUBLICATIONS.

Paddy and other major agricultural crops are grown in valley and inter valley physiographic regions. Horticultural crops are grown in hill slopes and forest plantations in side hills slopes or steep slopes. Some steeply slopes which are not suitable for cultivation has only vegetative cover.

The main food grain crops grown in the district are Paddy, Maize and Millets. Though the major areas under these crops are grown with traditional varieties of crops, the department has now been able to motivate the farmers to take up crops of high yielding varieties like IR 36, Pusa-221, Megh-I, Megh-II and U S-I by supplying quality seeds, fertilizers, etc., at 50% subsidized rates

Area, production and productivity of major crops in West Khasi Hills District

Table: District Agriculture Crops:

Sl No	CROPS	Area (ha)	Production (metric tonnes)	Average yield (kg/ha)
1.	Rice :	55	131	3382
	Autumn	5980	10858	1816
	Winter	21	47	2238
	Spring			
TOTAL		6056	11036	1822
	Wheat	5	7	1400
	Maize	3079	5847	1899
	SMALL MILLETS:			
	Finger millet	173	206	1191
	Foxtail millet	42	57	1357
	Pearl millet	48	58	1208
TOTAL SMALL MILLETS		263	321	1221
	PULSES			
	Pea	56	122	2179

	Cowpea	15	24	1600
	TOTAL PULSES	71	146	2056
TOTAL FOODGRAINS		9474	17357	1832
	Oilseeds:			
	Sesamum	35	41	1171
	Rape & mustard	33	32	970
	Soybean	43	47	1093
TOTAL OILSEEDS		111	120	1081
	Other crops :			
	Sugarcane	10	28	2800
	Tobacco	41	60	1463
GRAND TOTAL		9636	17565	1823

Source: (2014-15) Directorate of Agriculture, Meghalaya, Shillong

The main commercial crops grown in the district are Potato, Ginger, chow chow, Turmeric, Oilseed, Black Pepper, Arecanut and Betel Leaves. To increase the area and production of commercial crops, the department is providing good varieties of Potatoes, like Kufri Jyoti, Kufri Megha, Fibreless varieties of ginger, Nadia and Lakadong variety of turmeric and some exotic variety of black pepper brought from Kerala.

Table: Horticulture Crops

SI No	CROPS	Area (ha)	Production (metric tonnes)	Average yield (kg/ha)
	Citrus fruits:			
	Khasi mandarin	1151	5954	5173
	Assam lemon	57	126	2211
	Pomelon	28	94	3357
	TOTAL CITRUS FRUITS:	1236	6174	4995
	Pine Apple	771	4859	6302
	Banana	801	4579	5717
	Papaya	55	331	6018
	TOTAL FRUITS	2863	15943	5569
	TUBER CROPS			
	Potato	5801	55326	9537
	Sweet potato	1437	5064	3524
	Tapioca	812	5562	6850
	TOTAL TUBERS	8050	65952	8193
	SPICE CROPS :			
	Ginger	352	3376	9591
	Turmeric	110	542	4927
	Chillies	62	66	1065
	Black pepper	114	98	860
	TOTAL SPICES	638	4082	6398
	PLANTATION CROPS:			
	Arecanut	1376	1514	1100
	Rubber	339	37	109

	Coffee	32	11	344
	TOTAL PLANTATION CROPS	1747	1562	894

Source: (2014-15) Directorate of Agriculture, Meghalaya, Shillong

Among the horticultural crops, khasi mandarin, banana, and pineapple are grown in the district though some temperate fruits like Plum, Pear and Peach are grown in the upper region; they are yet to take off on commercial scale. To encourage farmers to take up more Horticultural crops, planting materials at 50% subsidized rate are being provided by government. Besides, PP Chemicals /Fertilizers, etc., are also provided to rejuvenate old orange orchards affected by Die Back disease

Table: Vegetable Crops:

SI No	CROPS	Area (ha)	Production (metric tonnes)	Average yield (kg/ha)
	Peas	45	334	7422
	Beans	65	459	7062
	Carrot	45	605	13444
	Cabbage	95	1238	13032
	Cauliflower	47	730	15532
	Turnip	43	650	15116
	Radish	52	746	14346
	Beet root	25	218	8720
	Brinjal	26	240	9231
	Bottle gourd	37	490	13243
	Pumpkin	152	2466	16224
	Tomato	43	606	14093
	Knol khol	23	298	12565

	Capsicum	47	234	4979
	Lettuce	26	174	6692
	Cucumber	52	257	4942
	Mustard (leaves)	51	330	6471
	Coriander	28	93	3321
	Onion	43	322	7488
	Bitter gourd	57	444	7789
	Teasle gourd	40	344	8600
	Ridge gourd	52	546	10500
	TOTAL VEGETABLES	1094	11815	10800

Source: (2012-13) Directorate of Agriculture, Meghalaya, Shillong

In spite of the fact that vegetable seeds are being provided by government at 50% subsidized rate, this sector has not been able to make much progress. The reason may be due to cattle problem, where, during winter season, being the peak period for vegetable cultivation, cattle could not be restricted from roaming free, thereby, destroying and treading the sprouting crops.

Multi cropping:

To make use of the irrigation facilities provided by the irrigation wing in the command area of Kynshi, Umyiap, Aradonga and Manai, a multi-cropping programme was taken up by the department where paddy, potato and vegetables could be grown continuously in the same year. To boost up production in the district this scheme is being encouraged, where farmers are being supplied with seeds, free of cost and also 50% subsidized rate.

LIVESTOCK

The district populations are mainly engaged in livestock rearing as a source of protein supplement and generation of income. The main livestock reared are poultry and pigs as backyard farming.

Table: Production and productivity of livestock including poultry in West Khasi Hills District

Category	Population	Production ('000 tonnes)	Productivity
Cattle			
Crossbred	498	1.01 ML	
Indigenous	95150	5.17 ML	
Pigs			
Cross bred	14123	1633.28	
Indigenous	43296		
Buffalo	5849		
Goats	43097	46.48	
Sheeps			
Cross bred	441		
Indigenous	2820		
Rabbits	22		
Poultry			
Desi	371054	132.26 (lakhs)	
Improved	27881		
Ducks	118	1.09 (lakhs)	
Turkeys and others	Nil		
Category	Population	Production ('000	Productivity

		tonnes)	
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Improved	27881		
Ducks	118	1.09 (lakhs)	
Turkeys and others	Nil		

Source: livestock census 2012 Meghalaya , Directorate of economics and statistics

FISHERIES

The District has vast inland fishery resources and has great potential for the development of fisheries. There are 10 nos of major rivers and streams that stretch 710 km. With an average rainfall of 1200 mm to 3000 mm per annum, rain water can be impounded in ponds and use for fish culture. Even though with such resources, the demands for fish in the market far outweighs the supply and therefore have to import fish from Andhra Pradesh.

The Government of Meghalaya has identified fisheries as a key sector and launched the Meghalaya State Aquaculture Mission (MSAM) in 2012. Under this mission, a large water area in the state has been brought for fish culture.

In West Khasi Hills District, the total water area assisted under MSAM is 99.5 ha which includes 970 nos. of individual ponds and 5 nos. of community ponds. There are 5 nos. of fish ponds under convergence of MSAM with other Departments covering an area of 3.5 ha which will be implemented shortly. The area covered under the 1000 ponds scheme of the Fisheries Department is 67.45 ha. There are 2 nos. of Govt. fish farm in the District. There are also 3 nos. of fish sanctuaries which aims at conserving the indigenous and endemic fish species. According to the Fisheries Department, fish production (2014-15) in the District is 386 MT.

CHAPTER III

CONSTRAINTS IN AGRICULTURAL PRODUCTION

CROPS

Agricultural productivity in the state is fairly low, Specialization is limited by the extent of the markets, which has forced every village into self-sufficiency, producing everything they need to survive irrespective of their comparative advantages in production. This means that no village has the incentive to produce a marketable surplus because of the limited scope of markets, a direct consequence of the lack of mobility of goods because of the lack of connectivity.

Thus, a possible way to increase land and labour productivity is from specialisation in crop cultivation, which can be achieved only by intensifying trade, first within the district and subsequently within the state. There is considerable scope for increasing agricultural productivity from specialisation in production. There will be several impacts of such an increase in productivity. First, the district will have to depend less on the outside world for food, and hence there will be a lower rate of leakage of income from the district. The direct consequence of this will be the increased multiplier effect on income generation. Second, it will raise the income of farmers, enabling them to invest more on land development and skill formation. Third, it may help develop some agro-based industry in the state. The last aspect is important for the future development of the state, which currently has very little scope for mineral-based industrialization.

Almost any effort to increase productivity will require phasing out of jhumming and replacing it with settled cultivation. The indirect benefits from the replacement of jhumming will be that the percentage of the fallow land to overall cultivable land will be progressively reduced. Production of horticulture and floriculture products will also require modernisation of farm techniques and expansion of irrigation facilities.

Table: Factors affecting productivity of major crops:

Sl. No	Crop	Constraints
	Paddy	Use of low yielding local variety, High humidity prevailing in the region during most part of the year causes quality deterioration of the seed, Heavy, erratic and torrential rain causes recurrent flood in many parts of the region.
	Maize	The highest income loss was due to non-availability of quality seed and lack of knowledge of suitable technologies
	Millets	Abiotic stresses such as drought, soil acidity, soil salinity, and high temperatures during the time when seedlings are just starting to grow and when the plants are flowering. Various fungal and pseudo-fungal diseases. Weeds also can significantly reduce productivity in millets.
	Pulses	The non-availability of seeds of high-yielding varieties in the desired quantities The imbalance in NPK consumption ratio would likely aggravate the already existing soil fertility problems. A number of diseases and insect pests which cause heavy losses resulting in poor production. Technological stagnation is primarily responsible for the backwardness of pulses

	Potato	High cost of production, unavailability of resistant potato varieties for continuous use and low keeping quality of potato varieties as the most serious constraints respectively in potato production.
	Ginger	<p>Cultivation is being practised on steep slopes under jhum/ bun (raised beds) system in rainfed conditions without adoption of soil and water conservation & heavy rains and earthing works associated</p> <p>with the cultural operations and harvesting accelerate the erosion reducing the fertile soils into abandoned wasteland. Non-availability of quality planting material</p> <p>Cultivators in this regions are resource poor and have low produce holding capacity. Lack of storage facilities at farm, non-existence of organised marketing system/ growers association etc force the growers to sell their produce just after harvesting through commission agents. Sale in village markets (weekly markets), city markets are very limited</p>
	Turmeric	<p>Cultivation is being practiced on steep slopes under jhum/ bun (raised beds) system in rainfed conditions without adoption of soil and water conservation & heavy rains and earthing works associated</p> <p>with the cultural operations and harvesting accelerate the erosion reducing the fertile soils into abandoned wasteland.</p> <p>Non-availability of quality planting</p>

		<p>material</p> <p>Cultivators in this regions are resource poor and have low produce holding capacity. Lack of storage facilities at farm, non-existence of organised marketing system/ growers association etc force the growers to sell their produce just after harvesting through commission agents. Sale in village markets (weekly markets), city markets are very limited</p>
	Khasi mandarin	<p>Total absence of planting rootstock, lack of information for identifying promising citrus species having potential commercial utility, unprecedented nutrient mining triggered through absence of balanced fertilization and large scale erosion of top fertile soil exposing the subsurface and a variety of insect/pests (trunk borer) fungal and bacterial diseases.</p>
	Banana	<p>Non availability of good quality and disease free planting material.</p> <p>Lack of awareness to increase the water and fertilizer use efficiency in banana</p> <p>Indiscriminate application of inorganic fertilizers has lead to severe nutritional imbalances</p>
	Pineapple	<p>Unreliable market, pest and disease control, difficulty in accessing labor, and high weed competition with plants is the main constraint followed by lack of access to cash credit</p>

LIVESTOCK

The farming community engaged in livestock rearing faces constraints like non-availability of fodders and high cost of concentrate feeds. Also the system of farming practiced by the people is out dated and hence severely affects the production performances and health of the livestock. The people mostly rear local breeds of livestock characterized by low productivity in terms of meat, milk and meat. There is constraint in procuring improved breeds of livestock thereby affecting the production potential which in turn have a negative impact on the income of the farmers.

FISHERIES

The uneven terrain in most places makes it difficult and expensive to construct fish pond and therefore most ponds are small. Lack of scientific knowledge and technical knowhow by the fish farmers has made fish culture unproductive. But the biggest constraints is the unavailability of quality fish seed at the required time and also quality feed which has a direct effect on fish production. Fish seed from Govt. farms (State and ICAR) are insufficient to provide to the growing demand and hence at present most of the farmers have to rely on private supplier. The private supplier however, has to bring fish from outside the State and hence it is expensive and also there is huge mortality by the time it reaches the farmers. Readymade formulated feed are not heard of and even the commonly used feed like mustard/ground nut oil cake are very hard to find and they are unavailable in most of the local markets of the District. Rice/wheat bran which is commonly available is also expensive

CHAPTER- IV

INSTITUTIONAL SUPPORT FOR AGRICULTURAL DEVELOPMENT OF THE DISTRICT

There are several institutions in the district devoted for the development of agriculture and related fields. State government departments, government undertakings, national institutes and many voluntary organizations are very active and contribute substantially towards the overall agricultural development of the district.

CROPS

1. Department of Agriculture

The State Department of Agriculture has a network of establishments in the district to cater to the needs of the farming community. The department has following offices in the district:

i. District Agriculture Office

This is the apex office to supervise and monitor agricultural development activities in the district the agriculture crops. The office is located at Nongstoin. The District Agriculture Officer is the Head. He is assisted by Assistant Directors of Agriculture and Agriculture Development Officers in performing the day to day activities of the department.

Address for communication

District Agriculture Officer

West Khasi Hills District, Nongstoin- 793119

Ph: 9436928937

ii. District Horticulture Office

This is the apex office to supervise and monitor agricultural development activities in the district or the horticulture crops. The office is located at Nongstoin. The District Horticulture Officer is the Head. He is assisted by Assistant Directors of Agriculture and Horticulture Development Officers in performing the day to day activities of the department.

The **Horticulture Hub** located at Mairang and Nongstoin in the District is under the supervision of this office.

Address for communication

District Horticulture Officer

West Khasi Hills District, Nongstoin- 793119

iii. Experimental tea centre:

An Experimental Tea Center was established in 1976-77 at Riango, under Mawshynrut Development Block where an area of 2.72 Hectares was put under plantation of tea crops on experimental basis. The varieties of tea tried here, include Betjan, Nanda Debi, Tengamine, Stock-449, Manipur, Poly Clonal, TV-1, 9, 14, 16, 17 and 18, AV-2, TK-78, B-157 and 668. It is found that the quality of tea produced in this experimental plot is very good and, at present, the green leaves produced in the farm are sold to the nearest tea factory at Boko, Assam. Out of the varieties grown here, Poly Clonal, Betjan, Nanda Devi and Tengamine are doing well in terms of yield and quality.

iv. Minor Irrigation

The Irrigation wing of the Agriculture Department seeks to provide assured water to the farmers during the lean season, along with proper utilization thereof, and to optimize agricultural production through better management of land and water in the command areas.

v. Agricultural Mechanization in West Khasi Hills District

The main objective of this wing of the agriculture department is for hiring out of agricultural machineries like Power Tillers, Tractors, Bull dozers, to the Small and Marginal Farmers in the district at 60% subsidy. Recently, the government has introduced a loan-cum- subsidy scheme whereby small and marginal farmers have been encourage coming forward and buying their own power-tillers and tractors at subsidized rates.

vi. Soil Conservation in West Khasi Hills District

Through the different range offices located at Nongstoin, Mairang, Riangdo the Department has been able to implement various schemes for Conserving Soil and water for a balance ecological development in the district. The main schemes implemented by the department are

- a) General Areas Soil Conservation Scheme
- b) Jhum Control/Jhumias Rehabilitation Scheme
- c) Water Management Project
- d) Central Sector Scheme

2. Krishi Vigyan Kendra (KVK), West Khasi Hills

Krishi Vigyan Kendra (KVK) otherwise known as Farm Science Centre **or Ka jaka ai jinghikai ia ka rep ka riang bad ri jingri bathymmai** (in local language) is a noble concept developed by Indian Council of Agricultural Research (ICAR) which was rest upon a solid base of transfer of technology from laboratory to farmer's field with respect to Agriculture, Horticulture, Animal Husbandry, Floriculture, Bee keeping, Mushroom Cultivation, Broiler Farming and allied subjects.

ICAR emphasized on the Research on Agriculture and allied subject during 1960's to generate new technology for increasing crop production in different Agroclimatic zones of the country.

As per the recommendations of Mohan Singh Mehta Committee during 1974 K.V.K.s were established in different states for easy and active participation of farmers through Front Line Demonstration (FLD) and On Farm Trial (OFT). Gradually working guidelines are prepared to make all K.V.K.s as the light house for the rural people.

Location & Establishment:

KVK West Khasi Hills of Meghalaya is located at the Dorbar Hall of Hima Mawiang Syiemship (presently), Nongshillong, 28 KMs to Nongstoin on Shillong-Nongstoin National Highway-44E Roadside. This KVK started functioning on the 25th February, 2009.

a) Mandates

- i. To conduct On Farm Testing trials for identifying technologies in terms of location specific sustainable land use systems.
- ii. To organize Front Line Demonstrations on various crops to generate production data and feedback information in farmers' fields.
- iii. To organize trainings to update the extension personnel with emerging advances in agricultural research on regular basis.
- iv. To organize short and long term vocational training programmes in agriculture and allied fields for the farmers and rural youth with emphasis on learning by doing for higher farm production and generating self-employment opportunities to the youth.

b) Programmes

i. Training programmes

The KVK is imparting regular training programmes of various duration in agriculture and allied fields for farmers, farm women and rural youth. There are two types of training programmes: scheduled training programmes for which training topics and dates are fixed by the Kendra and applications are invited from the farming community and youth for the programmes through wide publicity in print and electronic media. The second type of training programmes are organised to meet the specific demands from individual farmer, farmers' groups, voluntary organizations, development departments, etc.

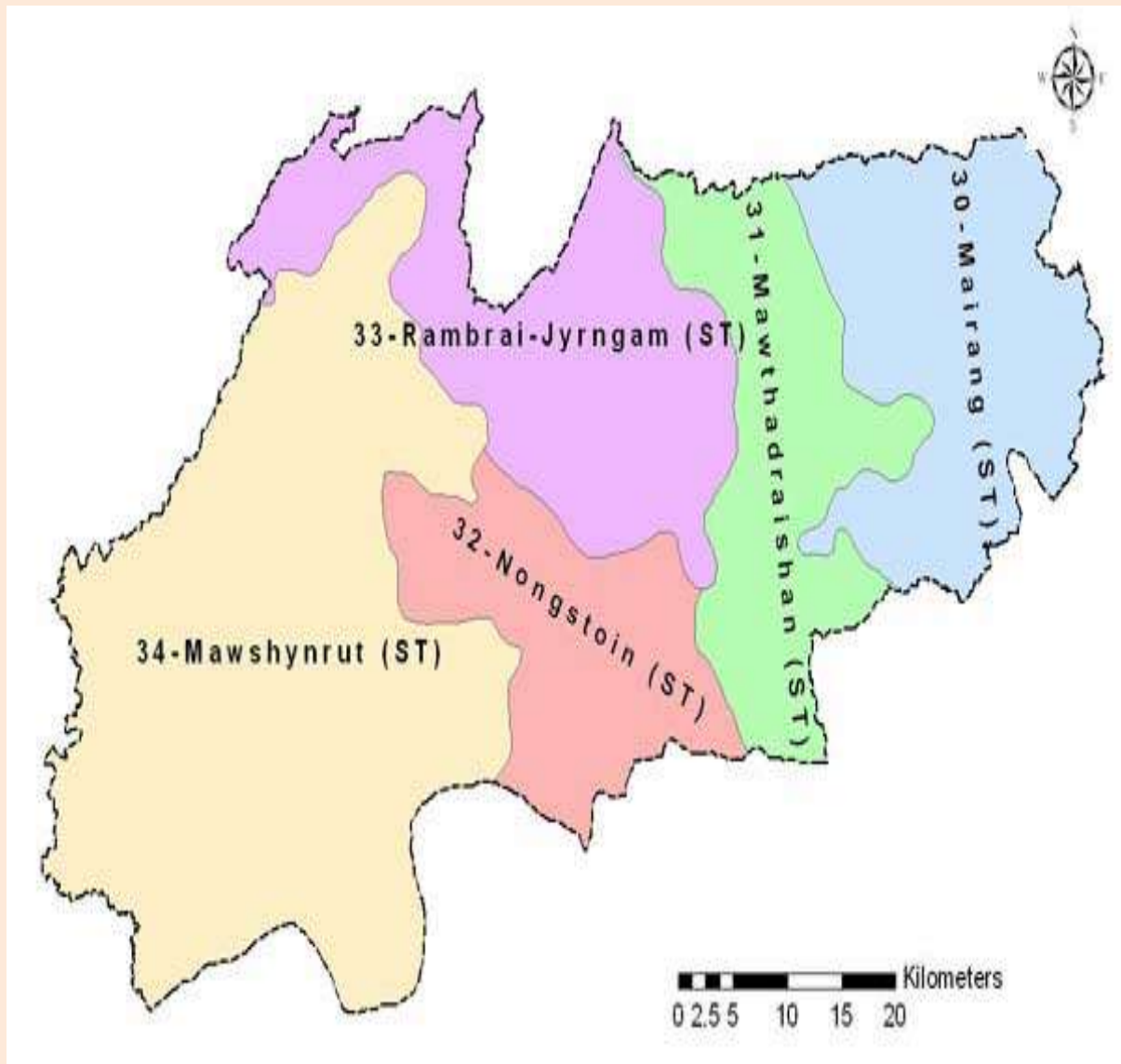


Fig: the location and operational area of KVK, West Khasi Hills

The major topics of the training programmes conducted at KVK are as follows:

Horticulture

- 1) Post harvest handling and management of various horticultural crops
- 2) Nursery raising of vegetable crops
- 3) Off season vegetable production under protected cultivation
- 4) Management of quality planting materials of horticultural crops
- 5) Value addition of fruits and vegetables
- 6) Techniques of flower arrangement and dry flower making.

- 7) value addition of meat pickle
- 8) Unconventional organic pesticide preparations and application of organic manure and vermicomposting
- 9) Introduction to various types of indigenous technical knowledge (ITK)
- 10) Forest nursery techniques and management of vegetable crops
- 11) Citrus plant management
- 12) Integrated farming system

Animal Husbandry

- 1) Care and management of sick animals.
- 2) Conservation of fodder.
- 3) Vaccination and deforming of livestock and poultry.
- 4) Management of milch animals.
- 5) Backyard poultry production.
- 6) Rabbit management
- 7) Scientific management of piggery.
- 8) Diseases of poultry and its prevention and control.
- 9) Scientific goat rearing
- 10) Scientific housing system for poultry.(2)
- 11) Low cost piggery housing system
- 12) Silage making

FISHERIES

- 1) Site selection, layout and construction of ponds for hill Aquaculture.
- 2) Composite fish culture.
- 3) Integrated fish farming
- 4) Feed and feeding management/ Fish Feed formulation using locally available ingredients
5. Carps breeding and hatchery management
6. Method of seed nursing and management for augmenting production/ Carp seed rearing at backyard pond
7. Fish health management in hill Aquaculture

8. Scope and importance of ornamental fish in Meghalaya/ Ornamental fish culture

Agronomy

1. System of rice intensification
2. Integrated Nutrient Management in rice
3. Uses of rice by-product
4. Potato cultivation in NEH Region
5. Vermicomposting and preparation of low cost organic manures
6. Soil testing

Plant protection

1. IPM on ginger
2. Cultivation of oyster mushroom
3. Integrated Pest Management in rice
4. Demonstration for cultivation of oyster mushroom
5. Production and use of biocontrol agents and biopesticides
6. Integrated pest and disease management in horticultural crop
7. Mushroom spawn production
8. Integrated disease and pest management in paddy
9. Repair and maintenance of plant protection equipment

Agricultural Extension

1. Self help group
2. Farm management
3. Entrepreneurship in Agriculture
4. Procedures for Project preparation & writing
5. Skill development for farmers

ii. Front Line Demonstration

Organizing Front Line Demonstrations on newly released technologies in horticultural, field crops, fisheries and animal sciences under farmers' field conditions to generate production data and feedback information is one of the mandates of the Kendra.

iii. On Farm Testing

On Farm Testing programmes aim at testing the new technologies developed at research centers in the fields of crops, horticulture, animal husbandry and fisheries to ensure their suitability and sustainability to specific locations and to suggest or modify or refine the technology in real farm situations with the active participation of the farmers.

iv. Farm Advisory Services

The Kendra organizes field visits as per the requirements of farmers to solve specific field problems. The Kendra also encourages the farmers in remote and distant locations to use communication media to contact the centre to solve their immediate field problems. The website <http://iasf-originally.rhcloud.com/ias/> is at present use as KMAS (Kisan Mobile Advisory Services).

v. Farmers Study Tours

The Kendra organizes study tours for farmers to various research centres and fields of progressive farmers for 'seeing and studying'.

vi. Farmer's visit to the Kendra

Farmers are encouraged to visit the Kendra in person to discuss and solve their specific field problems and to get hands-on knowledge on the latest technologies available in agriculture and allied fields.

vii. Exhibitions, Kisan Melas, Camps, etc.

The KVK regularly participates in exhibitions organized by local and statutory bodies, depicting its various activities and providing on the spot consultancies to the visitors. Farmers and others visit the pavilions of the KVK and avail the facilities offered there, including supply of elite planting materials.

viii. Other extension activities

The Kendra also organizes the following programmes:

1. Field days
2. Film shows
3. World food day
4. World environment day
5. Publication of popular articles
6. Veterinary activities-vaccination
7. Radio talks
8. Documentation of Indigenous Technical Knowledge (ITK)

Address for communication

Programme Coordinator

Krishi Vigyan Kendra, West Khasi Hills, Nongshillong

P.O. Nongstoin-793119

e-mail: kvkwkh@gmail.com

website: <http://kvkwestkhasihills.nic.in>

Ph: 9089209170

3. Agricultural Technology Management Agency (ATMA)

Agricultural Technology Management Agency (ATMA) is a registered society of key stakeholders involved in agricultural activities for sustainable agricultural development in the district. It aims at integrating research and extension activities and decentralizing day-to-day management of the public Agricultural Technology System (ATS). At state-level, it operates

under the guidance of a Governing Board that determines programme priorities and assesses impact of programmes. The ATMA is constituted by drawing members from all research and extension units within the district such as Zonal Research Stations or sub-stations, Krishi Vigyan Kendras and the key line Departments of Agriculture, Animal Husbandry, Fisheries, Sericulture, Agro industries, etc. The State Agriculture Management Extension and Training Institute (SAMETI) is the agency formed at the state level to provide human resources development support for the effective functioning of the ATMA at district level.

The West Khasi Hills District ATMA office is located in the District Headquarter at Nongstoin and the Deputy Commissioner is the chairman.

a) Objectives

1. To identify location specific needs of farming community for farming system based agricultural development.
2. To set up priorities for sustainable agricultural development with a farming systems approach.
3. To draw plans for production based system activities to be undertaken by farmers/ultimate users.
4. To execute plans through line departments, training institutions, NGOs, farmers organizations and allied institutions.
5. To coordinate efforts being made by various line departments, NGOs, farmer's organizations and allied institutions to strengthen research extension-farmers linkages in the district and to promote collaboration and coordination between various State funded technical departments. Institutional support for agricultural development of the district
6. To facilitate the empowerment of farmers/producers through assistance for mobilization, organization into associations, cooperatives etc. for their increased participation in planning, marketing, technology dissemination and agro-processing etc.
7. To facilitate market interventions for value addition to farm produce.

b) Functions

1. Strategic planning
2. Networking and co-ordination
3. Integrated extension delivery
4. Information management
5. Farmer facilitation and empowerment
6. Training and capacity building
7. Fund management
8. Participatory technology development
9. Monitoring and evaluation

Address for communication

Project Director, ATMA

West Khasi Hills, Nongstoin

P.O. Nongstoin-793119

Ph- 9436335203

4. Banking institutions

The financial sectors in the district have special schemes for the promotion of agriculture and allied fields in the district. These institutions are :

1. State Bank of India
2. Meghalaya Rural Bank
3. Meghalaya Cooperative Apex Bank Limited
4. HDFC Bank

5. Farmers clubs and voluntary organizations

There are several voluntary organizations and farmers groups very active in the district with the aim of overall development of the farming community like Nongstoin Social Service Society, Nongstoin; Wellspring Social Service Society, Mairang.

6. NERCORMP

North Eastern Region Community Resource Management Project (NERCORMP) is a livelihood and rural development project aimed to transform the lives of the poor and marginalized tribal families in North East (NE) India. NERCORMP is a joint developmental initiative of the North Eastern Council (NEC), Ministry of DONER, Govt. of India and International Fund for Agricultural Development (IFAD). Its broad objective can be summarized as follows:

"To improve the livelihoods of vulnerable groups in a sustainable manner through improved management of their resource base in a way that contributes to the preservation and restoration of the environment"

The project adopts a holistic approach of development with two broad focus areas:

Social mobilization, organization and capacity building to tap and realize the great latent potential of the communities by employing time tested their traditional value systems and culture

Intervene with the economic and social activities and infrastructure with predominant thrust on income generating activities to achieve economic transformation

The project operates in three states and six districts viz: Assam (Karbi Anglong and North Cachar Hills), Manipur (Ukhrul and Senapati) and Meghalaya (West Garo Hills and West Khasi Hills).

NERCORMP completed its first phase in 2008 and the second phase i.e. NERCORMP II started its operations in July 2010. The third phase plans to include two districts each in Arunachal Pradesh (Tirap and Changlang) and Manipur (Chandel and Churachandpur).

During the first phase, the project covered 860 villages, reached out to 39,161 households, and established 1012 Natural Resource Management groups (NaRM-Gs) and 3168 Self Help Groups (SHGs) covering a total of 2,35,000 people.

NERCORMP II is targeted to cover 400 villages covering a total of 20000 households and establish 2000 Self Help Groups (SHGs) and 400 Natural Resource Management groups

(NaRM-G) in the existing districts of NERCORMP I.

The project has a Regional Society headquartered in Shillong, to supervise and support the district teams, who implement the project in the field.

Major project activities:

a) Capacity Building of Communities and Participating

Agencies: Institutional strengthening of community institutions (CBOs) and strengthening the capacity of participating agencies viz. NGOs, Line Depts etc.

b) Economic and Livelihood Activities: Promote viable income generation activities (IGAs) for poor households through production of field crops, horticulture, forestry, livestock, fisheries, and non-farm activities using sustainable and environmentally friendly practices.

c) Extension and Technology Transfer: Reorient the extension services towards a client oriented and demand driven extension system, which is based on participatory extension methods. Promote the establishment of a network of village volunteers at the village or cluster level through training, who in turn will extend services at the community level.

d) Credit: The project provides revolving fund for credit support to the communities through SHGs, NaRM-Gs or district level Micro Credit Institutes that is developed in the project areas.

e) Social Sector Activities: Improving access of communities to safe drinking water and better health care and sanitation; providing awareness to the communities about different social sector schemes of the Govt. and its importance.

f) Village Roads and Rural Electrification: Assist communities to upgrade and construct village roads for better access to their villages and facilitate movement of produces to markets and also provide electricity to a number of households through Project support for connection to the existing grids or by piloting renewable energy plants wherever feasible.

g) Community Based Bio-diversity Conservation/ Natural Resource Management& Communication : Assisting communities to conserve their unique

and natural resources and biological diversity, strengthen indigenous institutions and institutionalizing new conservation practices; strengthen the information sharing system and documentation of good practices of the project.

h) Convergence with ongoing Government schemes/programmes: The projects give emphasis on convergence with government and non-government agencies and also facilitate to meet the shortfall of financial and technical support available in the project vis-a-vis community demands.

i) Marketing Support: The project facilitates in selection of activities and constitutes marketing committees within the NaRM groups. The project also created marketing infrastructures like marketing & collection sheds, IVRs etc, in order to facilitate sell of both farm and non-farm products. The project also facilitates value addition of the marketable surplus and establishing value chain to match the demand and supply.

Address for communication

NERCORMP,

West Khasi Hills,

Nongstoin-793119

7. MBDA (Meghalaya Basin Development Authority)

The MBDA (Meghalaya Basin Development Authority) had been set up with the express purpose to address such matters. The MBDA was set up in March, 2013. The MBDA is headed by the Chief Secretary, Government of Meghalaya. The MBDA has identified that natural resources and river basins provide ideal opportunities for providing multi-livelihoods to people in the rural areas. It is no secret that the poorer sections of the rural community have hardly had a stake in the village economy. They have often been left out of the loop of development and this has pushed them to the brink of impoverishment. For mere survival, they have had to exploit the environment around them to eke out a bare subsistence. They have barely been able to voice the grievances that they have to live with each day. The MBDA seeks out to redress these problems and lend a voice to those that have not been

heard. Not only is the MBDA concerned with poverty alleviation but in order to achieve this it must make sure that it done without degradation to the environment. A livelihood thus comprises the capabilities, assets (including both material and social resources), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.

Available opportunities must be taken to promote enterprise along the value chain. This not only enhances the economics of the village community as a whole but it also protects the minor farmers from grave exploitation. This two pronged effects is clearly what MBDA is trying to implement through the various programmes that fall under it specifically, the **IBDLP (Integrated Basin Development and Livelihood Programme)**. It is of the notion that each member of the village community must be a stakeholder irrespective of his wealth or position in the hierarchy. The MBDA is thus responsible for the strategies taken and directing the overall implementation of the IBDLP programme.

To aid in the implementation of the IBDLP programme, the MBDA has set up certain pioneering institutes such as MIE (Meghalaya institute of Entrepreneurship), MIG (Meghalaya Institute of Governance) and MINR (Meghalaya Institute of Natural resources). Each institute functions in unison with the MBDA.

i. Meghalaya Institute of Entrepreneurship

This institute has been set up to facilitate rapid economic transformation by imparting entrepreneurship education. It also promotes micro and small enterprises involving the youth, women and other vulnerable groups in the state.

ii. Meghalaya Institute of Governance

This is the focal institute in the state of Meghalaya to guide governance reforms in the state, by bringing together and blending the power of knowledge, technology and people for good governance.

iii. Meghalaya Institute of Natural Resources

The Meghalaya Institute of Natural Resource is the institutional framework set up to address the issues regarding sustainable natural resources use by strengthening the capacity of the concerned stakeholders particularly, the farmers and other entrepreneurs who are directly depending on the natural resources for earning their livelihoods.

Framework programmes are an essential element in the functioning of the MBDA. Through these frameworks, services are delivered. This not only streamlines the implementation of the different programmes that fall under the ambit of the MBDA but it also helps in identifying any gaps in the delivery of such services provided by other departments in the Government. The central framework, however, is knowledge management. Knowledge management seeks to promote a union of traditional knowledge and science. Any approach towards amelioration of the rural community must be holistic in approach. This not only empowers the village community but it also act as a continuum between the old and the new, the traditional and the modern.

Another important function of the MBDA is to fill the critical gaps that exist between the functioning of different governmental departments. Department convergence is an issue that is being addressed by MBDA so as to allow for smooth and efficient effectuation of any government schemes. One of the main objectives of the Basin Development Programme is to provide integrated services.

It is expected that convergence of other inter-sector schemes with the Basin Development Programme will enable better planning and effective investment in the state. Convergence also brings synergy between different government programmes and/or schemes in terms of their planning, process and implementation. It also helps in avoiding duplication of efforts by different agencies and thus saves resources in terms of time and money. If we seek to develop a holistic approach for the development of the river basin in Meghalaya, convergence with other departments and agencies is essential.

The aims and objectives for which the Authority is established are as under:

- a) To sustainably develop the river basin resources, which shall ultimately lead to promoting the sustainable livelihood and gainful employment opportunities for the residents of river basins, independent or through the convergence of initiatives? To, without any motives to earn profit, enhance and improve the livelihood for the poor in the state of Meghalaya.
- b) To increase sustainable income generating cultivation systems and establishment of micro/small scale/ medium scale bio-industrial units.
- c) To enable people's participation to select livelihood activities most suited to their resources, skills and interest.
- d) To address the felt needs and priorities of women and increase their participation in local institutions and decision making process.
- e) To promote micro finance including saving and thrift and micro insurance projects.
- f) To provide business development service including demonstration, training, consultancy and advisory service on all matters relating to technical, organizational, management commencement and expansion of the enterprise, purchasing techniques, production, purchases, sales, material and cost, quality control, marketing, advertising, publicity, personnel' information technology services, development and transfer, backward and forward business linkage promotion and horizontal linkage among enterprises, export and import to and for institutions/concerns/bodies/associations/corporations/public and local authorities/trusts/cooperative societies.
- g) To help in promoting sustainable enterprises at micro and small scale especially to the poor by way of providing equity, debt financing, leasing, insurance and other means and mechanisms that may be necessary for promoting livelihoods on the basis of basin resources.
- h) To rotate and utilize the resources of the authority for ongoing building up of new enterprises by exciting the enterprises that has achieved the sustainable scale and viability, through appropriate mechanisms.
- i) To act as a catalyst in facilitating mobilization of financial resources to micro/small/medium scale enterprises to benefit the poor.

Governing Council

- a) Chief Secretary to the Govt. Of Meghalaya (Chairman)
- b) Additional Secretary to the Govt. Of Meghalaya (Member) Labour and Soil and Water Conservation Department (Member)
- c) Additional Chief Secretary to the Govt. Of Meghalaya (Member) Finance/Power Department
- d) Principal Secretary to the Govt. Of Meghalaya (Member) Planning Department
- e) Principal Secretary to the Govt. Of Meghalaya (Member) Forest Department
- f) Commissioner to and Secretary to the Govt. Of Meghalaya (Member) Public Health Engineering Department
- g) Commissioner to and Secretary to the Govt. Of Meghalaya (Member) Forest and Environment Department, Planning Department
- h) Commissioner to and Secretary to the Govt. Of Meghalaya (Member) Agriculture/Fisheries Department.
- i) Commissioner to and Secretary to the Govt. Of Meghalaya (Member) Personnel Department

The greatest success that the programme has witnessed till date has been the vigorous involvement and participation of different stakeholders and this has only reinforced the belief in the hope that the aspirations of all shall ultimately be met.

The IBDLP programme is implemented with their operating stations in each and every block of the district.

LIVESTOCK

1. Department of Animal Husbandry & Veterinary

The Animal Husbandry and Veterinary Department was established in the District right from 1976-77 with the main objective of combating diseases in livestock and to encourage and assist the people of the district to take up farming in livestock on commercial scale so as to substantiate their income generating capacity. The main schemes are

- a) Piggery and Poultry Farming
- b) Animal Health Care
- c) Assistance to Educated Unemployed Youth

A net work of Veterinary Hospital and Dispensaries manned by qualified Veterinarian have been established in the district. These hospitals and dispensaries, besides undertaking treatment of ailing animals and birds, are taking preventive measures through immunisation for controlling specific diseases. To extend better health care service, Dispensaries and Veterinary Aid Centres have been established at convenient locations and are manned by suitable technical staff. At present the district has 1 veterinary hospital, 10 veterinary dispensaries, 8 veterinary aid centres and 2 mobile veterinary dispensaries. The District A.H & Veterinary Officer is the controlling officer of the above offices .

Also there is a District Disease Diagnostic Laboratory located at District headquarter Nongstion. A veterinary dispensary equipped with artificial insemination facilities is located at Mairang under Nonstoin.

Address for communication

District Animal Husbandry & veterinary Officer

District Veterinary Centre

Nongstoin- 793119

Phone:

2. Department of dairy development

The dairy department falls under the Veterinary department and at present there is only one chilling centre located at Nongstoin. During the year 2013-14 milk distribution was about 5.66 thousands litters annually but currently the chilling centre is non functioning owing to no supply of milk from the co-operative societies and farmers. There is little scope for dairy development in the district as the farming community mostly rear local cattle for meat purpose and there is very low consumption of milk by the people.

Address for communication

District Animal Husbandry & Veterinary Officer

District Veterinary Centre

Nongstoin- 793119

Phone:

e-mail:

3. Poultry Development centre

Poultry Farms at Nongstoin and Mairang have hatcheries for producing chicks for distribution to different District Poultry Farms and the farmers and other integrated private agencies for extension of poultry development programmes in the State.

The objective of these farms is to serve the purpose of experimentation, demonstration and production of eggs beside the main purpose for rearing chicks for distribution amongst the poultry rearers.

FISHERIES

1. Department of Fisheries

The Fisheries Department plays a very important role in the development of the fisheries sector in the District and State as a whole. The Government of Meghalaya has identified fisheries as a key sector and decided to help the people through the Fisheries Department in availing different schemes and projects. With plenty of natural resources, the Department is in the process of tapping them for fish culture.

Address for communication

Director of Fisheries

Directorate of Fisheries,

Shillong Meghalaya

Phone: 0364-2520321

Email: irsangma19@gmail.com

megpisc@gmail.com

Superintendent of Fisheries

West Khasi Hills,
Nongstoin, Meghalaya
Phone: 9863082072

2. Fish Farmer Development Agency (FFDA)

This is a district level agency constituted by the Government of Meghalaya. FFDA is a 'Government of India Scheme' implemented by the State Government intended for developing of fish culture in its jurisdiction. All the schemes of the Meghalaya State Aquaculture Mission (launched in 2012) are being implemented by the FFDA which works hand in hand with the Fisheries Department.

The Fish Farmers' Development Agency is an autonomous body created for the implementation of the Mission. The Minister (i/c. Fisheries) is the Chairman of the Agency. It will have a two-tier system of the organizational structure, one at the State level and other at the district level. The Director, Fisheries is the Chief Executive Officer (CEO) in all technical as well as administrative matters. At the District level, the Superintendent of Fisheries will function as the District Executive Officers (DEO) of the FFDA, who will be responsible for the implementation of the programmes of the Mission.

Address for communication

Director of Fisheries-cum-CEO, FFDA

Directorate of Fisheries,

Shillong, Meghalaya

Phone: 0364-2520321

Email: irsangma19@gmail.com

ffdameghalaya@gmail.com

Superintendent of Fisheries-cum-DEO, FFDA

West Khasi Hills,

Nongstoin, Meghalaya

Phone: 9863082072

3. Meghalaya State Aquaculture Mission

Meghalaya with its vast inland fishery resources offers tremendous scope for developing the fisheries sector, but lags behind in harnessing the potential of these natural resources. Though the state is predominantly a fish consuming State, the supply of fish is inadequate to meet its growing demand, making the State import fish from Andhra Pradesh. The Government of Meghalaya has identified fisheries as a key sector and has decided to launch the Meghalaya State Aquaculture Mission (MSAM) co-terminus with the Twelfth Five Year Plan period (2012-13 to 2016-17). The MSAM has the following major objectives:

- a) Development of existing water bodies and creation of additional water area for large scale fish production, including reclamation/rehabilitation of marshy and swampy lands,
- b) Conservation of native, endangered and traditional species of Meghalaya and developing breeding farms of commercially potential species on a large scale,
- c) Creation of mass awareness, capacity building, exposure training and skill development of all the stakeholders and technical support for long term sustainability of fishery sector,
- d) Capturing emerging opportunities in the fisheries sector.

Given the wide canvas, the Aquaculture Mission is divided into six Mini Missions for better focus and ease of implementation. Mini Mission I is related to “Area and Productivity Expansion”, which will be achieved through four sub components, viz., individual pond construction, community pond construction, development of marshy and swampy areas and bheels and reservoir fishery development. Mini Mission II is for “Critical infrastructure development”, which has five components: fish seed production, fish feed production, fish disease management, pre and post harvesting infrastructure and creation and strengthening of fishery and multi-purpose co-operatives. Fish seed production will be achieved through Government and private hatcheries and utilizing FRP technology as also inducting Israeli technology.

Establishing sanctuaries for conserving indigenous and endemic species of fish is the focus of Mini Mission III. Surveys for identifying the endangered species, orientation workshops and media campaigns will be organised under the Mission. The Mission will collaborate with

the Department of Tourism for boosting the objectives and targets of the Mission related to Mahaseer and other native species conservation. Mini Mission IV is for “Capacity Building” of farmers as well as officials, programme managers, multi-service providers, co-operators, etc. Mass mobilization campaigns and skill trainings for unemployed youth will be organised under this mini mission. Mini Mission V is titled “Mass media campaigns, documentation and outreach”, which will take care of two important activities, viz., awareness building about the Mission and publicity among the public and process documentation of the implementation and preparation of success stories.

Mini Mission VI deals with “Emerging opportunities in the fisheries sector”, which is an exclusive visionary component envisaged for tapping the emerging opportunities and addressing them with scientific backstopping. Ornamental fisheries, trout farming, introduction of freshwater prawn culture and new table species of fish and aqua tourism/ aqua parks/ sport fisheries will be the components under this mini mission.

The Aquaculture Mission will have functional convergence with programmes like MGNREGS, RKVY, NRLM, etc and thematic convergence with line departments like Water Resources, Soil and water conservation, Tourism, etc. The Mission proposes to develop a Management Information System vested with the responsibility to collect, store and retrieve relevant and timely information for planning, executing, monitoring and evaluating the Mission. Monitoring and evaluation will be an integral part of the project design, as they provide an opportunity for intervention during implementation and mid-course corrections. The approach of the Mission to engage civil society players can help serve the interests of the people of the state.

The social cost benefit analysis of the various components has been worked out to understand the income gains to farmers, employment gains and other gains to the society at large. The total requirement of funds for the Mission for implementing the various components has also been tentatively worked out and the possible share that could be mobilized from different sources such as RKVY, NFDB, NEC, NCDC, SPA, State Plan, etc has been elaborated.

The successful implementation of the Mission can result in balancing the demand and supply of fish in the state, thus achieving self-sufficiency. There is even possibility for export

once the production of fish exceeds demand. The impact of the scheme on employment generation will be quite significant.

The Aquaculture Mission is an integral part of the Integrated Basin Development and Livelihood Programme of the Government of Meghalaya and it is estimated that the investment of about Rs. 1200.00 crore would be required over the 12th Plan Period. The Mission will be launched co-terminus with the 12th Five Year Plan.

CHAPTER V

RESEARCH AND DEVELOPMENT

ORGANIZATIONS RELEVANT TO DISTRICT'S AGRICULTURE

A number of organizations with their head quarters/offices located in and outside the district and institutions with all India mandates carry out research and developmental activities in crops relevant to the district. The technologies and schemes can be adopted /availed by the farming community of the district. Moreover, the farming community is free to access to any technology developed by institutes under the Indian Council of Agricultural Research and State Agricultural Universities.

Crops

1. Central Potato and Research institute (CPRI)

The institute is situated in the heart of shimla city .the CPRI has 3 researches institute and 7 regional research stations in different potato growing areas of the country. These are located in different potato growing areas of the country viz. Shillong (Meghalaya), patna(bihar), modipurum(U.P) ,jalandar(Punjab), Gwalior(M.P)Kufri-pagu(H.P) and Ootacamund(Tamil nadu).

Mandates:

- 1) To undertake basic and strategic research for developing technologies to enhance productivity and utilization of potato.
- 2) To produce disease free basic seed of different information relevant to potato
- 3) To act as national repository of scientific information relevant to potato
- 4) To collaborate with national and international agencies in achieving the objectives
- 5) To provide consultancy in potato research and development

Address for communication:

Dr. Tusar Kanti Bag

Head

CPRS, Shillong

Phone: (0364)2560885

Fax: 2560097

Email: cprs.shillong@yahoo.co.in

2. Meghalaya Small farmers Agri-business Consortium (MgSFAC)

The small famers' agri- bussiness consortium (SFAC) was constituted in 1999 by the Government of India as a society under the Societies Registration Act 1860. Later the Meghalaya Small farmers agri- business consortium (MgSFAC) has been constituted as instructed by the government of India for the implementation of the Government of India centrally sponsored scheme named "Technology Mission on Integrated Development of Horticulture in North east" and registered on the 16th may 2001 under the Meghalaya Registration Act XII of 1983.

Objectives:

1. To catalyze agro-industrial growth in the country based on the principles of
 - a) Ecological sustainability
 - b) Economic efficiency
 - c) Social equity
2. To undertake or assist in undertaking programs for employment generation, growth and diversification of agriculture and agro based industries to increase for production and export of agricultural products, in both primary and processed forms.
3. To identify and promote post harvest
4. To promote organization of marketing chain both for domestic and expert marketing

5. To influence government policies for agriculture thereby increasing the flow of resources and augmenting the rate of capital formation in agriculture sector
6. To pave the way for establishment of integrated producers organization with forward and backward linkage
7. To prepare, print and publish papers, periodicals, monographs in furtherance of the objectives of the society

Address for communication:

Shri M. Syiem

Managing Director

Phone no: 9436703707s

Fax no: 0364-2520202

Email id: mgsfac@gmail.com

3. State Horticulture Mission

There is tremendous potential for the development of horticulture to generate income and employment for the farming community, a much more intense, focused and holistic strategy coupled with major investment is required. The mission will take up the task on conceptualizing, designing and executing projects in a systematic and focused manner.

Objectives:

1. Expand the area under horticulture by about 36000 hectares in five years covering nearly 90000 farmers.
2. Adopt holistic approach for the development of horticulture by providing support for irrigation, technology transfer and post harvest management.
3. Improve the productivity of the existing orchards by rejuvenating of senile plantations.
4. Develop entrepreneurship processing and marketing of horticulture products.
5. Develop farmer's organizations to derive the benefits of higher prices through exportation to outside areas of the country
6. Encourage the farmers to adopt organic production and assist them in certification

7. Introducing proper manage mental practices and replacing low grade varieties with high grade.

4. Sericulture and weaving Department

Sericulture and weaving in Meghalaya are the most important cottage based eco-friendly industries in the rural areas. Till date 15,900 families are involved in handloom activities and 16,000 families in sericulture farming. The infrastructure of the department was inherited from the earth while Assam government and it became a full fledged department under the Government of Meghalaya in the year 1974.

Address for communication:

Directorate of Sericulture and weaving
Nokrek building, Lower lachumiere
Shillong-793001
Phone no: 2223271

5. College of Post Graduate studies (CPGS), Meghalaya

The CPGS was established in the year 2007 with the sole objective of training Post graduate students of agriculture from North eastern states. Research carried out addresses the major issues pertaining to the agricultural development and upliftment of the farming community of the NEH region. In addition some prioritized areas of research are addressed under the Post graduate research programme.

Address of communication:

The Dean
College of Post Graduate Studies,
Umiam, Meghalaya
Phone: +91-364-2570614
Email i.d: deancpgs@gmail.com
Fax: +91-364-2570030

6. Central Tuber Crops Research Institute (CTCRI), NEH Programme

Tuber crops play a crucial role in the food and nutritional security of the people in the north eastern India. This project was implemented to enhance the food nutritional security and livelihood of the people of the NEH region. To start with the project was implemented in four NE states namely Meghalaya, Manipur, Nagaland and ICAR RC, Umiam and ICAR, KVK, Tura are the two implementing centres for tuber crop enhancement.

7. Department of water resources

The department of water resources was created out from the Directorate of Irrigation on the 25th August 2009.

The main function is the implementation of irrigation projects consisting of surface flow and lift irrigation schemes in all districts of the state.

Address of communication

Meghalaya water resources

Agriculture Complex, Cleve colony

Phone: 2211363

Email i.d: irri-meg@nic.in

8. Bio-Resource development Centre (BRDC), Meghalaya

The centre is manned by core-staff comprising of scientific, technical and administrative personnel headed by a scientist in charge. The centre identifies, formulates, executes and follow up projects on various aspects of conservation and sustainable utilization of bio-resources of the state. Its main function is to undertake research, field experimentations and development of value added products/technologies, conservation and sustainable utilization of bio resources of the state.

Address of communication

Nodal officer

Lower Iachumiere, Meghalaya, Shillong

Phone no: 0364-2505311

9. National Horticultural Research and Development Foundation (NHRDF)

The Foundation was established by National Agricultural Co-operative Marketing Federation of India Ltd. (NAFED) and its Associate Shippers of Onion on 3rd November, 1977 under Societies Registration Act, 1860 at New Delhi. The aim of establishment of NHRDF was to guide the farmers, exporters and others concerned for improving the productivity and quality of horticultural crops in order to make available sufficient quantity for domestic requirement and also to boost up export of onion and other such export oriented horticultural crops in the country.

Mandates

1. Undertake / conduct research or facilities in research and scientific investigations for the growth and development of varieties of various export-oriented horticultural crops.
2. Establish institutes, laboratories, research centers, model farms, and study teams for promoting better quality and higher yield of horticultural produce, better packaging, suitable transportation and shipping to improve the shelf-life of the produce, and conduct experiments and provide funds for such research work and to educate farmers and disseminate technical Know-how and results derived by conducting training programmes, seminars get-togethers, farmers' meets etc.
3. Investigate and conduct research experiments for assessing demands of the horticultural produce of the Indian origin in foreign countries by conducting extensive survey and undertake research and development of horticultural produce with export potential, and to motivate farmers to grow such varieties of horticultural produce with the object of further developing horticultural exports from India.
4. Prepare, edit, print, publish and circulate books, research papers and periodicals bearing upon the growth and development of horticultural produce or other scientific and research activities connected therewith, and to establish and maintain collections, libraries, statistics, scientific data and other information relating thereto.

5. Conduct all aspects of scientific research and developmental activities in the field of horticulture or otherwise conducive to the objectives of the NHRDF provided, however, that none of the activities of NHRDF will be undertaken for profit nor shall it involve any profit motive. Provided, however, that the NHRDF may receive nominal service charges, wherever found necessary in the interest of maintaining financial stability of the NHRDF.

6. The NHRDF shall provide extended services to the farmers in the form of research and developmental activities, namely seed development, vermicompost, biopesticide production and distribution, and other laboratory services for which NHRDF may collect revenue from the farmers so as to establish a revolving fund or credit to corpus fund for further expansion of research and developmental activities.

Address for communication

Director

National Horticultural Research and Development Foundation

Chitegaon Phata, Nashik-Aurangabad Highway

Darna Sangvi P.O.

Nashik-422001, Maharashtra

Phone: 02550-237816, 237551, 202422

Fax: 02550-237947

e-mail: nhrdf_nsk@sancharnet.in

Website: www.nhrdf.com

Deputy Director

National Horticultural Research and Development Foundation

No.7/275-G, I.B.Complex,

1st Floor, A.G.Road,

Kozhikode-673 001

Phone: 0495-2766832

e-mail: calicut@nhrdf.com

10. Commerce and Industry Department, Meghalaya

The primary function and objectives are supervision and control of District level functionaries i.e. the district industries centre's in implementation of various schemes and programmes of the department.

The basic objective is to act as the nodal promotional agency in the development of industries and industries activities. Besides the department also runs regular vocational training courses for the creation of skilled manpower.

Address for communication

Shri. W. Lanstang

Director of Commerce and industries,

Shillong, Meghalaya

Email i.d: industries-meg@nic.in

11. National Bank for Agriculture and Rural Development (NABARD)

NABARD is set up as an apex Development Bank with a mandate for facilitating credit flow for promotion and development of agriculture, small-scale industries, cottage and village industries, handicrafts and other rural crafts. It also has the mandate to support all other allied economic activities in rural areas, promote integrated and sustainable rural development and secure prosperity of rural areas. The bank also promotes and finances Vikas Vahini Volunteer (VVV) clubs, organizing the farmers. In discharging its role as a facilitator for rural prosperity NABARD is entrusted with:

1. Providing refinance to lending institutions in rural areas.
2. Bringing about or promoting institutional development.
3. Evaluating, monitoring and inspecting the client banks.

Besides this pivotal role, NABARD also:

1. Acts as a coordinator in the operations of rural credit institutions.
2. Extends assistance to the government, the Reserve Bank of India and other organizations in matters relating to rural development.

3. Offers training and research facilities for banks, cooperatives and organizations working in the field of rural development.
4. Helps the state governments in reaching their targets of providing assistance to eligible institutions in agriculture and rural development.
5. Acts as regulator for cooperative banks and RRBs.

Agricultural technologies supported by NABARD

1. Cultivation of horticultural crops under controlled conditions (poly house).
2. Micro irrigation system/ plasticulture in irrigation.
3. Vermicompost technology.
4. Biopesticides and biofertilizer.
5. Tissue culture for special crops.
6. Mushroom production under controlled condition.
7. Introduction of new medicinal and herbal crops [Natural Dye Crops (*Bixa*)].

Allied Activities:

1. Frozen semen bank/ laboratory
2. Calf rearing
3. Poultry feed
4. Crab culture/ fattening
5. Paddy fish culture
6. Fresh water prawn culture

Post Harvest/Agro-processing:

1. Pre-cooling and post harvest centre
2. Cold chain packaging
3. Aseptic packing and processing
4. Cryo technology
5. Modern Abattoirs

The bank operates in the district through its Assistant General Manager's Office located in Nongstoin District.

12. National Seeds Corporation, New Delhi

NSC was the first public sector organization, established in 1963, and remained virtually the only agency for seed production for around 13 years. Its role extended to several developmental programmes including training, quality control and extension activities in seeds. It undertakes production, processing and marketing of agricultural seeds. Its product range includes cereals, pulses, oilseed, fodder, fibre and vegetable crops. It also maintains a consultancy wing to render services in all the facets of seed development.

Services

1. Seed production.
2. Certification.
3. Seed quality control.
4. Seed processing, handling and packaging.

Inventory of Agriculture 2013

5. Seed marketing.
6. Information communication and public relations.
7. Sales promotion and advertising for seeds.
8. Project formulation and project management.
9. Training in all aspects of seed science.

Address for communication:

Chairman-cum-Managing Director

National Seeds Corporation Limited

Beej Bhawan, Pusa Complex

New Delhi-110 012

Phone: 011- 25846292, 011 25846292, 25846295, 25842672,
25841379, 25842383, 25843357, 25842460

Fax: 011- 25846462, 25842904

e-mail : nsc@indiaseeds.com

Website: www.indiaseeds.com

13. National Horticulture Board (NHB)

National Horticulture Board (NHB) was set up by the Government of India in 1984 as an autonomous society under the Societies Registration Act 1860 with a mandate to promote integrated development in horticulture, to help in coordinating, stimulating and sustaining the production and processing of fruits and vegetables and to establish a sound infrastructure in the field of production, processing and marketing with a focus on post harvest management to reduce losses.

Functions

1. Develop high quality horticultural farms in identified belts and make such areas vibrant with horticultural activity which in turn will act as hubs for developing commercial horticulture.
2. Develop post-harvest management infrastructure.
3. Strengthen Market Information System and horticulture database.
4. Assist R&D programmes to develop products suited for specific varieties with improved methods and horticulture technology.
5. Provide training and education to farmers and processing industry personnel for improving agronomic practices and new technologies. Promote consumption of fruits/vegetables in fresh and processed form, etc.
6. The board also extends market information and promotion services for horticulture crops with the following objectives:

Objectives

1. To generate information on wholesale prices, arrivals and trends in various markets of the country for important fruits, vegetables & flowers, etc.
2. To establish a nation-wide communication network for speedy collection and dissemination of market information data for its efficient and timely utilization.
3. To develop a sound marketing strategy especially by making use of statistics generated by various Marketing Boards/ APMCs for optimizing returns to the producers.

- 4.To analyze the trends of arrivals, prices and other related factors of the fruit and vegetable markets all over the country.
5. To collect and disseminate information on international prices prevailing in potential foreign markets.
6. To establish web-sites and internet connection through efficient channels/ systems for dissemination of national and international data.

Horticulture Promotion Services

1. Review the present situation of horticulture development in particular area/ State.
2. Development of primary/secondary data of various aspects on horticulture.
3. Identify constraints and suggest their remedial measures.
4. Development of short term and long term strategies for systematic development of horticulture.
5. Provide consultancy services, expert services & establishing labs etc. in pursuance thereof.

Address for communication

National Horticulture Board
1, 2 & 3, Trans Towers,
Lower Ground Floor,
Opp. Womens College, Vazhuthacaud,
Thucaud P.O,
Thiruvananthapuram-695 014
Tele/Fax 0471-2337578-79
e-mail : nhbvm@dataone.in
Website: www.nhb.gov.in

14. Indian Council of Agricultural Research (ICAR), Umiam, Meghalaya.

ICAR Research Complex for North Eastern Hill Region was established in the year 1975 by the Indian Council of Agricultural Research to provide an adequate research base for supporting agricultural development in the North Eastern Hill region of the country. It is the first institute of its kind setup by ICAR which encompasses all the disciplines of agriculture,

horticulture, animal sciences, agricultural engineering, agro forestry and fishery to cater to the research needs of the tribal areas of NEH Region.

Address for Communication:

ICAR RC - NEH Region.

Umroi Road, Umiam

Meghalaya. Pin - 793 103

Email: icarneh@gmail.com

Phone (0364) 2570257

Fax (0364) 2570355

LIVESTOCK

1. Department of Animal Husbandry & Veterinary Meghalaya

Animal Husbandry sector plays a vital role in agriculture based rural economy. The activities mainly constitute dairying, sheep rearing, goat rearing, piggery rearing and poultry keeping.

Vision: Sustainable growth of livestock, poultry and nutritional security and economical prosperity.

Mission: Conservation and development of animal generic resources and breed development accelerated productivity. Commitments

.

Objectives

1. Prevent, control, eradicate animal diseases and provide diagnostic, therapeutic & veterinary services.
2. Development of Feed and Fodder along with Quality Control.
3. Development of cattle, buffaloes, small ruminants, poultry and piggery.
4. Increase milk, meat and egg production with quality assurance.
5. Provide assistance to livestock, poultry farmers & entrepreneurs.
6. Improve livestock production technologies.
7. Encourage hygienic production system, processing and marketing milk, meat and eggs.
8. Veterinary & Dairy sciences.

9. Strengthening extension education activities.
10. Establishing/strengthening Veterinary Institutions with focus on backward area.

Activities

The Department is responsible for matters relating to livestock production, preservation, protection and improvement of livestock and dairy development, formulation of policies, Programs and implementation in the field of Animal Husbandry, Dairy Development and Veterinary Services.

The main focus of the activities is on:

1. Development of requisite infrastructure in the State for improving animal productivity.
2. Promoting infrastructure for handling, processing and marketing of milk and milk products.
3. Conservation and development of native breeds, Cross breeds.
4. Preservation and protection of livestock through provision of animal healthcare.
5. Strengthening of livestock Farms for development of superior germplasm.
6. Capacity building and human resource development.
7. Research and development activities.
8. Promote animal welfare activities.
9. Implement Socio-economic programs.

Address of communication:

The Director

Directorate of Animal Husbandry & Veterinary,
Shillong, Meghalaya

Phone: 91- 364 - 2548388

Fax: 91 - 364 -2547456

Email: ahvt-meg@nic.in

2. Government Livestock Farms

i. Cattle Farm: This is an integrated programme of Cattle Development including breeding, management practices and marketing of milk.

a. Intensive Cattle Development Project: The objective of the farm is to grade up local cattle through Artificial Insemination programmes with exotic breed, such as, Jersey and Holstein-Friesian to increase milk production.

b. Indo-Danish Project, Upper Shillong : The objective is to establish pure bred exotic herds (Holstein-Friesian) for development of cattle and multiplication of exotic breed to meet the requirement of breeding stock through improved Animal Husbandry practices.

c. Livestock Farm, Rongkhon: The objective is to build up foundation stock to meet the requirement of breeding material in the State and to support cross breeding programmes.

d. Regional Crossbred Cattle Breeding Farm, Kyrdemkulai : The objective is (i) to support crossbreeding programmes in the State, (ii) to impart training farmers and field staff for management in cross bred cattle, (iii) to supply pure bred and cross bred breeding stock to other States in the Region, and, (iv) Supply of milk to the Central Dairy, Mawiong.

E.Cattle Farm, Khliehtyrshi : The objective is (i) to support crossbreeding programmes in the State, (ii) to impart training farmers and field staff for management in cross bred cattle, (iii) to supply pure bred and cross bred breeding stock to other States in the Region, and, (iv) Supply of milk to the Central Dairy, Mawiong.

f. Buffalo Farm Songsak: The objective is to generate economic development to people of the area and motivate them to distribute high yielding variety genetic Stock in the public for the upliftment of the local Stock

ii. Pig farm : The objective of pig farms established in every district is mainly to produce improved breeding stock and supply such stock to the farmers. It is also to create awareness amongst the rural people to take up Piggery farming with improved breeding stock.

The farms are located at

- a) Nongpiur - East Khasi Hills
- b) Pynursla - -do-
- c) Laitryngew - -do-
- d) Mawryngkneng - -do-
- e) Thadlaskein - West Jaintia Hills
- f) Mairang - West Khasi Hills
- g) Nongstoin - -do-
- h) Nongkasen - -do-
- i) Rongjeng - East Garo Hills
- j) Gindo - West Garo Hills
- k) Dalu - -do-
- l) Masighat - South Garo Hills.
- m) Kyrdemkulai - Ri-Bhoi District

iii. POULTRY FARMS: The objectives is to meet the requirement of breeding stock, table and hatching eggs for the farmers as well as popularise modern poultry and duck keeping amongst the farmers including training and extension services.

The farms are located at

- a) Jowai - West Jaintia Hills
- b) Umsning - Ri-bhoi District
- c) Kyrdemkulai - -do-
- d) Mairang - West Khasi Hills
- e) Nongstoin - -do-
- f) Nongpiur - East Khasi Hills

- g) Williamnagar - East Garo Hills
- h) Rongkhon - West Garo Hills
- i) Asanaggre - -do-
- j) Mawryngkneng - East Khasi Hills

iv. Goat farms: The objective of the scheme is to rear improved sheep and goat to increase breeding stock to meet the requirement of sheep and goat in the State for meat purposes. Under the scheme, subsidy is provided to farmers for implementation of Goatery schemes. It aims at generating employment for the people and increase meat production. Saitsama - West Jaintia Hills.

The farms are located at
Nongshillong - West Khasi Hills.
Saitsama – Jaintia Hills

3. Training Institute

i. Veterinary Field Assistant Training centre, kyrdemkulai

The Department also has a training institute for providing one year training to selected students undergoing Veterinary Field Assistant course.

ii. Vocational Training Institute

At present there are two Vocational Training Institute one at Kyrdemkulai in Ri-Bhoi District and one at Rongkhon in West Garo Hills for providing 10 (ten) days training to the interested farmers.

FISHERIES

1. National Fisheries Development Board (NFDB)

National Fisheries Development Board under ministry of agriculture, government of India was established to work towards a blue revolution with a focus on increasing the fish

production of the country by extending assistance to various agencies for implementation of activities under Inland, Brackish water and Marine sectors. NFDB provides assistance for intensive aquaculture in ponds and tanks, fisheries development in reservoirs, strengthening of domestic markets, etc.

Address for Communication:

National Fisheries Development Board
MaitriBhavan Huda Commercial Complex,
Ameerpet Hyderabad-500 038,
Andhra Pradesh
Phone: 040-23737256/23731128
Fax: 040-23737208
e-mail: info.nfdb@nic.in
Website: www.nfdb.ap.nic.in

2. Central Institute of Freshwater Aquaculture (CIFA)

The Central Institute of Freshwater Aquaculture (CIFA), the premier ICAR Institute for research, training and extension in freshwater aquaculture has been contributing to the growth of Indian freshwater aquaculture sector with many programmes and initiatives for sustained development. The mandate of CIFA is to conduct basis, strategic and applied research in freshwater aquaculture; to enhance production efficiencies through incorporation of biotechnological tools; to undertake studies on diversification of aquaculture species and systems and to provide training and consultancy services.

Address for Communication:

Director
Central Institute of Freshwater Aquaculture
Kausalyanga, Bhubaneswar-751002, Odisha, India
Phone: 91-674-2465421, 2465446
FAX: 91-674-2465407

E-Mail: cifa@ori.nic.in

Website: www.cifa.in

Regional research Center

Central Institute of Freshwater Aquaculture

(Indian Council of Agricultural Research)

A/5 (Phase III), Santal Para, P.O. Kalyani,

District: Nadia - 741 235, West Bengal

Ph.: 033 – 25826508

3. ICAR Research Complex for North Eastern Hill Region

ICAR Research Complex for North Eastern Hill Region was established in the year 1975 by the Indian Council of Agricultural Research to provide an adequate research base for supporting agricultural development in the North Eastern Hill region of the country. It is the first institute of its kind setup by ICAR which encompasses all the disciplines of agriculture, horticulture, animal sciences, agricultural engineering, agro forestry and fishery to cater to the research needs of the tribal areas of NEH Region.

Address for Communication:

ICAR RC - NEH Region.

Umroi Road, Umiam

Meghalaya. Pin - 793 103

Email: icarneh@gmail.com

Phone (0364) 2570257

Fax (0364) 2570355

4. Directorate of Coldwater Fisheries Research (DCFR)

The Directorate of Coldwater Fisheries Research, a premier research institute of Indian Council of Agricultural Research for the coldwater fisheries and aquaculture is working towards the development of coldwater fisheries sector and it is the only national facility in the country to take up the research investigation on capture and culture aspects with a focus on exotic and indigenous coldwater fish species.

Address for Communication:

DIRECTORATE OF COLDWATER FISHERIES RESEARCH

(Indian Council of Agricultural Research)

AnusandhanBhawan, Industrial Area,

Bhimtal - 263136, Distt: Nainital, Uttarakhand, India

Phone: +91-5942-247280, 247279

Fax: +91-5942-247693

Email: director@dcfr.res.in; dcfrin@rediffmail.com; dcfrin@gmail.com

5. Central Inland Fisheries Research Institute (CIFRI)

The Central Inland Fisheries Research Institute (CIFRI) located at Barrackpore on the eastern bank of River Ganga (Bhagirathi), 20 KM away from Kolkata is the oldest premier research institute in the field of inland fisheries research and training in India. The main objectives of the institute were to conduct investigations for a proper appraisal of inland fisheries resources of the country and to evolve suitable methods for their conservation and optimum utilization. While fulfilling the above objectives, the Institute directed its research efforts towards understanding the ecology and production functions of inland water bodies available in the country like a river systems, lakes, ponds, tanks, reservoirs and floodplain wetlands. These studies have unraveled the complex tropic structure and functions vis-à-vis the environmental variables in different aquatic ecosystems.

Address for Communication:

Barrackpore (HQ)

The Director

Central Inland Fisheries Research Institute

Monirampur (Post)

Barrackpore

Kolkata, West Bengal - 700 120

Phone: 91-033-25921190/25921191

Fax: 91-033-25920388

E-mail: cifri@vsnl.com

Guwahati

The Officer-in-charge

North Eastern Regional Centre of CIFRI,

Housefed Complex, Central Building,

4th Floor, Beltola Basistha Road,

Dispur, Guwahati 781006, ASSAM

Phone : Off. : 0361 2224893/2228486

Fax : 0361 2228486 E-mail : wetland@cifri.gov.in

CHAPTER- VI

PLANS AND SCHEMES FOR PROMOTION OF AGRICULTURE

CROPS

1. National Bank for Agriculture and Rural Development (NABARD)

Plans

a. Farmers Clubs

Farmer's club programme was launched by NABARD in 1982. The main functions of Farmers clubs are

- i. To spread the message of development through credit
- ii. Assist in technology transfer and capacity building of farmers
- iii. Propagation of repayment ethics
- iv. Help the process of village development by preparation of village development plan
- v. Develop better banker borrowers relationship and
- vi. Bring about socio economic development of the village.

In Meghalaya as on 31 March 2005 there are only 21 Farmers clubs. Out of these only nine clubs are active. For the year 2005-06 State level Bankers' Committee has allotted a target of formation of 30 clubs. NABARD has organized sensitization programme for banks on Farmers clubs. Banks may chalk out an Action Plan for formation of more Farmers clubs in the State

b. Joint Liability Groups – Means to Better Access to Credit

Absence of adequate security sometimes creates a major hurdle for small and marginal farmers and other poor section people in securing loans. The inability to provide collateral often excludes them from the purview of credit. Keeping this in view a pilot project on financing Joint Liability Groups (JLGs) was initiated by NABARD for developing effective credit products for mid segment clients, which reduce risk and transaction costs for the bank and also introduce a greater degree of flexibility for the credit user to determine credit needs and parameters. Joint Liability Group will be an assembly of 5-10 member clients (new or existing) informally recognized by bank as a Group. A group serves as collective guarantor for loans extended to individual members. Although there is good scope, Banks in the State are yet to finance JLGs.

c. Centrally Sponsored Rainwater Harvesting Scheme for SC/ST farmers

Recognizing the need to create additional water bodies through harvesting of rainwater, for irrigation and other alternative uses, such as recharging of ground water, fish culture, stopping wasteful flow of rain water etc, the concept of rain water harvesting structures has been evolved. In order to support the SC/ST farmers to create such water bodies, the Government of India has announced a special scheme in the Union Budget namely, Rain Water Harvesting Scheme for SC/ST farmers for achieving the accelerated growth of irrigation potential, thus improving the per capita income of these farmers in the country. All the States and Union Territories are covered under the scheme.

It is proposed to set up one-lakh rain water structures during the remaining X Five Year Plan (2004-05 to 2006-07). 50% of the refinance will be provided from Government of India which will be through NABARD. There is no down payment or margin money under the scheme. All individual SC/ST farmers will be eligible under the scheme.

d. Capital Investment Subsidy Scheme for Commercial Production Units of Organic Inputs under “National Project on Organic Farming”

In order to arrest deterioration of soil health due to increasing and indiscriminate use of synthetic fertilizers/pesticides, emphasis is being given world-over to promote organic farming which is the holistic production management system, based on basic principle of minimizing the use of external inputs, avoiding the use of synthetic fertilizers and pesticides. In the context of the global thrust on organic farming practices and environmental safety, it is imperative to augment the production of quality organic inputs to meet the growing demand of plant nutrients in the country. Accordingly, Capital Investment Subsidy Scheme for Commercial Production units for Organic Inputs under “National project on Organic farming” has been introduced by the Government of India for implementing during Tenth Five Year Plan period, with effect from 15.02.2005.

Biogas fuel, Bio fertilizers, Vermiculture hatcheries, Fruit & Vegetable waste compost unit are eligible for assistance under the scheme. The subsidy of 25% is provided under the scheme. The margin money and term loan are 25% and 50% respectively. The subsidy is released by NABARD to the eligible banks.

e. Back ended Credit Linked Subsidy Scheme for Promotion of Tree Borne Oilseeds

The tree borne oilseeds can be grown and established in the wastelands and varied agro-climatic conditions and have immense domestic and industrial utility such as in agriculture, cosmetics, pharmaceutical, bio-diesel, substitute to cocoa butter, etc. The estimated requirement of jatropha oil, as a source of bio-diesel for 20% blending with HSD, alone is expected to 13.8 MMT by the year 2011-12 in the country.

Therefore, with a view to promoting the commercial cultivation of these tree species as also to provide forward and backward linkages for promotion of the TBOs, the Govt. of India has

launched the Back ended Credit Linked Subsidy Scheme for promotion of Tree Borne Oilseeds (TBOs).

The scheme is implemented through National Oilseeds and Vegetable Oil Development (NOVOD) Board, under the Ministry of Agriculture, Govt. of India. Under the scheme the eligible activities are establishment of seed procurement centers, installation of multipurpose pre-processing and processing facilities, installation of oil expeller and nursery raising and commercial plantation. The scheme provides 30% back ended subsidy. 100% refinance eligible to the banks from NABARD.

f. Scheme for Development/Strengthening of Agricultural Marketing Infrastructure, grading and Standardization

India has made rapid strides in food grain production as also in fruits and vegetables production. However, the lack of adequate post harvest management and marketing facilities have resulted in glut in the market and consequent distress sale as also heavy post harvest losses to the tune of 25-30%. National Agricultural Policy, inter-alia emphasized the need for development of a whole gamut of agricultural marketing operations, including strengthening of the infrastructure, techniques for preservation, storage etc. In this backdrop, the Expert Committee on strengthening and developing of agriculture marketing and the Inter-Ministerial Task Force constituted by the Government of India, made a number of recommendations not only for improving the existing regulated agricultural marketing network but also to promote a parallel marketing network in the private and co-operative sector. Accordingly, the Ministry of Agriculture and Co-operation, Government of India, has launched a credit-linked back ended subsidy “Scheme for development/Strengthening of Agricultural Marketing Infrastructure, Grading and Standardization” to improve the existing regulated agricultural marketing network as also to promote marketing network in the private and cooperative sector.

Infrastructure for collection/assembling, drying, cleaning, grading, standardization, sanitary & phytosanitary (SPS) measures and quality certification, labeling, packing, ripening chambers, retailing and wholesaling, value addition facilities (without changing the production form), etc, excluding transport facilities, Market user common facilities like

shops/offices, platforms for loading/unloading/assembling and auctioning of produce, parking sheds, internal roads, garbage disposal arrangements, boundary walls, drinking water, sanitation arrangements, weighing and mechanical handling equipments, etc. are eligible for assistance.

g. Agri-clinics and Agri-business centre's scheme

With the support of NABARD and the government of India a scheme for setting up of agri-clinics and agri-business has been launched to augment support and extension services for agriculture

Objectives of the scheme:

- a) To supplement efforts of public extension by necessarily providing
- b) extension and other services to the farmers on payment basis or free of cost as per business model of agri-preneur, local needs and affordability of target group of farmers
- c) To support agricultural development; and to create gainful self-employment opportunities to unemployed agricultural graduates, agricultural diploma holders, intermediate in agriculture and biological science graduates with PG in agri-related

h. Micro Credit

Since NABARD's debut in micro Finance a decade and half ago, it has been catalyzing the banking system in the country to join hands progressively with informal delivery channels to give SHG-Bank Linkage the necessary momentum. During 2004-05, this has resulted in 5,39,365 new SHGs being credit linked with mainstream banks thus registering a 49% growth over the previous year increasing the cumulative number of SHGs credit linked with banks to 16,18,456. The active participation of women (90%), and timely loan repayment (95%) continue to be prominent features of the programme. The year witnessed an all round growth in the SHG-Bank Linkage programme in many States. Proactive measures such as enlisting partnerships, capacity building of partner agencies, etc., served to expand the programme. The programme thus enabled an estimated 24.3 million poor households in the country gain access to micro Finance from the formal banking system.

NABARD has been instrumental in facilitating the formation and nurturing of SHGs, involving all possible partners in the arena. Realizing the task involved to be process oriented, NABARD has cautiously involved voluntary agencies, bankers, socially spirited individuals, other formal and informal entities and also government functionaries to promote and nurture such groups. The focus was on building capacities of the partners and providing assistance in meeting the incremental costs of nurturing of SHGs. Bank also extended extensive support for arranging and conducting awareness creation and capacity building programmes for the SHG members in association with identified resource NGOs.

The programme of linking Self Help groups (SHGs) with the banking system has emerged as a major finance programme in the country. Accordingly, the Union Budget for 2005-06 proposed to enhance the annual target of credit linkage to 2.5 lakh SHGs during 2005-06 from 2 lakh SHGs.

i. Capital Investment Subsidy Scheme for Vegetable and Fruit Market Waste compost, and Biofertilizers – Biopesticides Production Units

In view of the increasing and indiscriminate use of synthetic fertilizers and pesticides and deteriorating soil health and productivity, the concept of organic farming is gaining importance world-over. The present day intensive agriculture practices have resulted into soil fatigue, and gradual deterioration of soil health. To overcome these growing problems emphasis is being given to restore soil health by reducing the use of chemical inputs and increasing the use of biological and organic inputs. Nutrient mobilization and plant protection through natural and biological route should be the first option followed by chemical option to fill the gap. Growing awareness for safe and healthy food has underlined the importance of organic farming, which is a holistic production management system based on basic principle of minimizing the use of external inputs and avoiding the use of synthetic fertilizers and pesticides

j. Swarojgar Credit Card (SCC)

Objective/Purpose: The scheme aims at providing adequate and timely credit (working capital or block capital or both) to small artisans, handloom weavers, service sector, fisherman, self-employed persons, rickshaw owners, other micro-entrepreneurs, etc. from

the banking system in a flexible, hassle free and cost effective manner. The facility would also include a reasonable component of consumption needs.

The Beneficiaries under the scheme will be issued a Credit Card and a Passbook similar to that of KCC. This will serve as an identity card as well as facilitate recording of the transactions on an ongoing basis. The Passbook would contain the repayment schedule of the term loans also. A passport size photograph of the card holder will be affixed on the card as the space provided for. SHGs can also be issued cards in their name and they will be liable jointly and severally for repayment.

2. Vegetables and fruit promotion

a. Meghalaya Agriculture Marketing Board

The State Agricultural Produce Marketing Act was enacted in the year 1980 and the State Agricultural Marketing Board was set up in 1983 with its headquarter at Shillong, to develop marketing infrastructural facilities and to provide marketing support to the farmers in the State.

Board's mandate is:-

1. Implementation of the provisions of the Act for better regulation of buying and selling of notified agricultural produce in the State.
2. Provision of infrastructural facilities in each new regulated market after acquisition of land with amenities like godown, auction platform, traders shop, retailers shop, rest house for farmers, bank, post office, internal roads etc.
3. General improvement in the marketing efficiency and promoting discipline among the trading community and other market functionaries by introducing the licensing system in the market yards.
4. Provision for the financially weak market committees in the form of grants and loans etc. to enable them to discharge their functions and duties effectively.
5. Propaganda and publicity on matters relating to regulated marketing of agricultural and horticultural produce in the regulated market.

6. Provision of facilities for grading and standardization of agricultural produce in the markets.

7. Training of officers and staff members of the market committees.

8. Adoption of suitable measures and device to promote the interest of the committee for general improvement in the marketing of agricultural produce and to safeguard the interest of the growers and the licensees.

9. Formulation and adoption of policies to facilitate control over market committees without hindering their day to day functions.

Classification of Commodities:-

The Board has classified all the commodities into 9 Groups;

Group I Jute(Bale and Unbale), Cotton (Ginned and Unginned), Mesta

Group II Paddy, Rice, Chira, Khai, Wheat and Wheat products, Maize, Other Millets, Paddy Husks, Rice Bran and Polish

Group III Sesamum or Til, Mustard

Group IV Mandarin, Orange, Other Citrus Fruits, Pineapple, Banana, Papaya, Pear, Plum, Peach

Group V Potato, Sweet Potato, Tomato, Leafy & Fresh Vegetables, Yam

Group VI Turmeric(Whole or Powdered), Ginger, Chillies(Dry and Green), Black Pepper, Betel nut, Betel Leaf, Tezpatta

Group VII Eggs, Poultry, Cattle, Sheep, Goats, Buffaloes, Milk, Butter and Cream, Ghee, Wool, Hide and Skin

up VIII Timber, Bamboo, Grass broom, Resin wood (Dhuplakri)

up IX All types of Fishes(Excluding canned fish)

b. Meghalaya Commercial Crops Development Board (MCCDB)

The MCCDB came into existence by an Act. The MEGHALAYA ACT 6 of 1997 (As passed by the Meghalaya Legislative Assembly). This received the assent of the Governor on the 3rd May 1997 and was published in the Gazette of Meghalaya Extraordinary issue dated 3rd May. 1997.

Aims and Objectives of the Board:

The Board has been set up with the main objective to promote cultivation of Horticultural and Plantation crops so as to uplift the economic condition of the farming population of Meghalaya and thereby developing the economy of the State. In the process, the Board gradually expects to bring about an end to harmful practices of jhum farming. It is the duty of the Board to promote by such measures, as it thinks fit, for the cultivation, processing and marketing of commercial crops listed below, in the State of Meghalaya. Measures to be taken by the Board without prejudice are as follows:-

- i. Advising cultivation in land use and land development particularly for cultivation of commercial crops;
- ii. Motivating cultivators to take up cultivation of commercial crops and assisting them with technical advice;
- iii. Advising any person interested in setting up processing units and assisting him in establishing linkage with other processing units or with the Commodity Board;
- iv. Assisting cultivators to procure quality seeds, planting materials and other inputs;
- v. Exploring, as far as practicable, new cultivation technology;
- vi. Creating marketing infrastructure and finding outlets for the purpose ; and
- vii. Assisting, with advice, any person engaged in cultivation, processing or marketing of commercial crops in getting financial assistance from Bank or other financial institutions or assistance from Commodity Boards.

The Board has been left with the freedom to adopt any other measures in order to discharge its duty in a meaningful manner. The major objectives of the Board are:

- i. Promoting cultivation, processing and marketing of commercial crops through financing and technical assistance;
- ii. To establish marketing infrastructures and developing the marketing channels for commercial crops;
- iii. To promote and facilitate adoption of new technology including adoption of improved seeds, planting materials, inputs etc,;
- iv. To motivated farmers through all-round-assistance for cultivation of commercial crops, and

- v. To motivated through all-round-assistance potential entrepreneurs, co-operatives, farmers associations etc. to set up processing units as well as marketing infrastructure.

Commercial Crops to be taken up by the Board:

According to the Act, the commercial crops to be taken by the Board are:-

(1) Potatoes (2) Tapioca (3) Broomsticks (4) Tezpatta (5) Cotton (6) Rubber (7) Tea (8) Coffee (9) Cashew nut (10) Black Pepper (11) Ginger (12) Turmeric (13) Betel leaf (14) Areca nut (15) Citrus fruits (16) Temperate fruits (17) Edible bamboo (18) Medicinal or Aromatic plants and any other crops the State Government may specify by Notification.

3. Spices board

North Eastern States offer immense potential for large-scale cultivation of spices. It is anticipated that the region can create exportable surpluses at competitive prices so that the top slot occupied by the country in the international spice market would be maintained. It also gives large-scale employment opportunities and wealth creation in the area.

i. Production Development schemes

- a. Development of Herbal Spices
- b. Large Cardamom Development
- c. Production of Organic Pepper
- d. Setting up of Vermicompost Units
- e. Organic Cultivation of Lakadong Turmeric
- f. Organic Cultivation of Ginger

ii. Post harvest improvement of spices schemes

- a. Supply of Driers for drying Ginger and Turmeric
- b. Construction of Warehouse-cum-Cold Storages
- c. Construction of Large Cardamom Curing Houses

4. State government schemes

a. Directorate of Agriculture

i. Basic Agriculture Training Centre

The scheme was introduced in the year 2013 and valid upto the year 2016. The main objective of the scheme is to provide short term vocational training for educated unemployed youths in agriculture enterprises

ii. Farmer's Training Institute (including clusters)

Objective: FTI conducts specialized training in new areas where farmers were hither to unexposed like news techniques and new technology including exposure and field tours to agriculturally advanced States.

iii. Seed farm – Production of Cereals, Pulses, Oilseeds etc.

Objective: Focused and high quality seed production of cereals, pulses and oilseeds etc. Pattern of Assistance: Supply of quality seeds to farmers for demonstration or for sale at 50% subsidy.

iv. Bio Control Laboratory

Objective: to control pests and diseases including weeds and rodents through bio control agents.

v. Soil testing laboratory

Objective: For analyzing soil samples preceding application of fertilizer in correct dosage in farmer's field and to issue farmers with soil health card. Pattern of **Assistance:** Free soil testing to all farmers.

vi. Winter Cropping & Development of Cultivable Land

Objective: To ensure and motivate production and productivity of varied crops by exploiting the existence of irrigation projects and rain fed areas from mono cropping to vibrant multiple cropping pattern at farmer's field in clusters.

vii. Accelerated Maize Dev. Programme through cluster approach

Objective: To achieve notable increase in Maize production by adopting crop and location specific production technology through cluster approach

viii. Jute technology mission

Objective: To supply quality seeds to farmers at 50% subsidy and to take up demonstration programmes on jute.

ix. Fertilizer Distribution

Objective: To improve the soil nutrient potentiality in order to obtain higher crop productivity in the State. Transport subsidy for ferrying fertilizers from Guwahati railhead to the district headquarters, is also made available for the farmers to relieve them to a large extent.

x. Organic Manures

Objective: To popularize use of organic manures and also to provide subsidy to farmers for purchase of organic manures.

xii. Plant Protection including IPM

Objective: Aim to control pests and diseases through use of chemicals and to popularize use of integrated pest management techniques in farmer's field.

xii. Supply of Power Tillers/Pumps etc

Objective: To provide subsidized sale of power tillers and power pump set for farmers.

xiii. Land Reclamation

Objective: To reclaim land waste land/land development for cultivation of rice for small and marginal farmers.

xiv. Integrated Farming in Micro Watershed

Objective: The scheme is to popularize the concept of integrated farming in watershed areas.

xv. State Rice Mission

Objective: Increase rice production and productivity in the state to meet the consumption requirement and to bridge the deficit between demand and availability to consumers.

xvi. Agriculture Information Unit.

Objective: To strengthen agriculture extension programme by disseminating news on the latest scientific and farmer friendly methods of cultivation. Organizing crop seminars, crop competition, kisan mela and incentivizing farmers through provision of farmer's awards in various categories.

xvii. Implementation of E Governance.

Objective: To usher a conducive environment for transformation of the departments core services delivery systems and to facilitate better citizen friendly services

xviii. Agriculture Engineering (Mechanical)

Objective: To provide hiring of power tillers and paddy reapers to farmers at 60% subsidy.

xix. Popularizing of improved agriculture implements etc.

Objective: To accelerate agro production, improved implements are given to the farming community at 50% subsidy.

xx. Corpus fund on crop insurance (RKBY)

Objective: To provide insurance and financial aid to farmers for failure of notified crops following unforeseeable calamity, and acquaint farmers with latest technology to help stabilize farm income in critical years.

xxi. Special Development Programme for areas border Assam

Objective: To uplift small and marginal farmers residing in areas bordering Assam with suitable crop enterprises

b. Directorate of Horticulture

i. Plantation Development (Areca nut, Cashew nut, Coconut).

Objective: To boost up the area and production of plantation crops like Areca nut, Cashew nut, Coconut in the State adopting new strategies in line with the tea package scheme. Assistance is provided for raising plantation of minimum area of 0.5 Ha for a period of three years.

ii. Spices Development- Ginger, Turmeric, Black Pepper, Large Cardamom, Coriander, Cinnamon and Chillies.

Objective: To assist Spice growers by distribution of quality planting materials.

iii. Tuber Crops Development- Potato, Tapioca, Colocasia.

Objective: To boost up production of potato by providing quality HYV seeds, chemicals and equipments at 33% subsidy. The scheme also aims to popularize and encourage cultivation of tapioca, colocasia, sweet potato etc.

iv. Mushroom Development – Regional Centre for training and production of mushroom.

Objective: Training to farmers in the method of mushroom cultivation, production and supply of quality spawn and pasteurized compost to farmers for crop production

v. Indigenous Crops Development.

Objective: To identify and document indigenous plants and the areas where potential species of commercially viable varieties are abundant; domesticating and raising them in selected cultivator's land or in Government run farms for research and multiplication programmes.

vi. Tea Development Scheme.

Objective: The Scheme aims at continuing tea plantation in the tea development centre and to raise seedlings in the nurseries for subsequent release to the farmers.

vii. Horticulture Information Scheme.

Objective: To give strong support to agriculture extension programmes by communicating agriculture information on scientific methods of cultivation etc. to extension staff and farmers through various media.

viii. Vegetable Development Scheme.

Objective: To promote vegetable production in the State by providing high yielding/hybrid seeds of different crops; provision of garden tools at 33% subsidy including demonstration in farmer's field.

ix. Development & Maintenance of Orchard cum Horti Nurseries.

Objectives: For production and multiplication of good, high yielding, diseased free planting materials for distribution to farmers.

x. Fruit Development (including Citrus, Fruits).

Objective: To promote fruit production in the State by providing improved planting materials, budded plants of different fruit trees; provision of plant and grafts, garden tools, implements at 33% subsidy including demonstration in farmer's field.

xi. Floriculture Development Scheme.

Objective: To motivate the farmers to take up floriculture as a commercial venture through distribution of planting materials and other inputs at 50% subsidy.

xii. Development of Strawberry Cultivation.

Objective: To provide farmers with quality and improved varieties of strawberry planting materials so as to encourage area expansion under this crop such that commercialization horticulture under this crop is achieved.

xiii. Vegetable Garden Development scheme.

Objectives: To make available nutritious crops to every household having available kitchen garden of more than 200 Sq. Meters area for cultivation of organic vegetables.

xiv. Maintenance of Horticulture hubs

Objective: To meet the various operational and running costs of maintaining the various horticulture hubs set up in the State.

xv. Fruit Processing Centre.

Objective: For utilization of surplus fruit and vegetables and conversion of the same to Marketable processed products like jam, jelly, squashes, thereby creating a market for fruit growers.

xvi. Post harvest marketing

Objective: Creating of post harvest marketing infrastructure in the State including rural market hubs/farmer's market.

c. State Horticulture Mission

Meghalaya has three factors conducive for the development of horticulture – a large extent of land suitable only for horticultural crops, diversity in agro-climatic factors making a variety of fruits, spices and plantation crops feasible and established tradition of growing horticultural crops making further expansion easy. Given the tremendous potential for the development of horticulture to generate income and employment for the farming community, a much more intensive, focused and holistic strategy, coupled with major investments, is needed. The Mission will take up the task of conceptualizing, designing and executing projects in a systematic and focused manner.

Objectives of Horticulture Mission

The Horticulture Mission has the following objectives:

- a) Expand the area under horticulture by about 36,000 hectares in five years covering nearly 90,000 farmers. This will add 20 % to the existing area under horticulture.
- b) Adopt holistic approach for the development of horticulture by providing support for irrigation, technology transfer and post harvest management.
- c) Improve the productivity of existing orchards by rejuvenation of senile plantations, introducing proper management practices and replacing the low grade varieties with high grade.
- d) Develop farmers' organizations to derive the benefits of higher prices through exporting to outside areas in the country and outside and converting some of the crops into organic.
- e) Develop cold chain for high value and perishable crops and provide access to the cold chain through development of collection centres at appropriate locations.
- f) Develop entrepreneurship in processing and marketing of horticulture products.
- g) Strengthen the existing horticulture farms to produce adequate planting material and convert them as hubs so that they can create spokes and link to the cold chain.

- h) Encourage the farmers in organic production and assist them in certification.
- i) Improve the productivity of existing orchards by rejuvenation of senile plantations, introducing proper management practices and replacing the low grade varieties with high grade.

Implementation Process

Implementation of the Horticulture Mission requires a separate administrative set up because of the massiveness of the Programme. A separate administrative structure will be created at the State, district and block levels. There is also a need to identify the land to be taken up for development and care will be taken to avoid lands that will result in adverse impact on environment.

The following steps will be taken before commencing the plantation activity:

- a) The implementation will begin with Mass Mobilization Campaigns to make the people aware of the new areas that can be developed under the Mission. The assistance of NGOs can be availed for the purpose with some lump sum payment for the activity.
- b) Plantation crops will be developed in clusters so that SHG can be formed for each cluster.
- c) Beneficiaries in a cluster will form into groups for effective implementation of the Programme.
- d) It is preferable to have one acre for each beneficiary, but because cluster approach is followed, area more than one acre may sometimes have to be allowed.
- e) The area identified for a cluster will have water sources. If it is not presently available, it may be developed under convergence with MGNREGS. However, expenditure for bringing water to the individual field can be met from the Mission. The cost of such expenditure will not exceed Rs. 10,000 per acre.
- f) Based on the estimated cost of cultivation per acre, each beneficiary will be provided 60% of the cost in the form of assistance, 25% in the form of bank loan and the balance is the contribution of the beneficiary. The contribution of the beneficiary will be in the form of labour required for the development of the plantation or own material used.

g) After selecting the beneficiaries, they will be provided with the material for fencing and vermin-compost. They have to make the field ready for plantation. The vermin-com- post will be ready and fencing work will be completed. Then planting material will be provided. Plantation activity can be taken up under convergence with MGNREGS so that the beneficiaries need not invest their own funds much.

The Meghalaya State Horticulture Mission will be implemented by the Meghalaya Horticulture Development Agency (MHDA), an autonomous body created for the implementation of the Mission. The Minister of agriculture will be the Chairman of the Agency and the Commissioner and Principal Secretary, Agriculture and Horticulture will be the Deputy Chairman. Principal Secretary, Rural Development will also be a member to facilitate convergence with MGNREGS.

It will have a two tier system of organizational structure, one at the State level and the other at the District level. The Director, Horticulture is the Chief Executive Officer (CEO) at the State level. In view of the heavy work pressure in the Department for implementation of other State and Central Schemes, an additional Director will be appointed as the Deputy Chief Executive Officer (DCEO) to take care of all the technical and administrative matters. However, the DCEO will be of the rank slightly below the director and will have all the powers to take decisions regarding implementation with proper information to the Director Horticulture.

At the district level the DHO will be the nodal officer with separate office and staff for the implementation of the Mission. The District Mission Office will be run by an Assistant Director who will be taken on deputation from the Department with horticulture back ground. In addition to this, there will be two Programme managers and two deputy Programme managers with B.Sc. horticulture. The HDO in the block will be the nodal officer at the block level who will be assisted by 2-4 multiple service providers appointed on contract basis for the period of the Mission. They will possess a minimum qualification of class XII.

Monitoring and Evaluation

The MSHM will organize monitoring in two steps and evaluation again in two steps. The first step in monitoring is conducting the base line census survey of all the beneficiaries to obtain their socio – economic characteristics and the lands identified for the development of horticulture. The second step will be the collection of information for the MIS. Evaluation will be entrusted to a third party and it will be conducted in three stages. The first stage of evaluation will be after completing one year of implementation. This will help to identify the deficiencies in implementation. The second evaluation will be the mid-term appraisal conducted after the completion of second year. It will focus more on the aspects not touched in the first evaluation and also the benefits derived by the farmers covered in the first year. The third and final monitoring and evaluation report will be at the end of the fifth year. The sample size of the evaluation study will be 1000 farmers in the first year, 1500 farmers in the second year and 1500 farmers for the final evaluation.

Departmental activities

Honey processing and promotion of bee keeping industry

Apiculture is one of the specific missions under the IBDLP which can play a crucial role in poverty reduction, employment generation and livelihood promotion. The Apiculture Mission is being initiated across the State in a convergent mode with the Department of Commerce and Industries. The Mission has been designed to spur initiatives integrative with Meghalaya's biophysical attributes to confer livelihood improvement through gainful employment of the local populace. It was conceived as a mission -mode apiculture development strategy underpinned by intensified honey production, domain expansion of honey product development, creation of market linkages for profitable marketing of honey and honey products, and community engagement for creating an effective and sustainable income source through infrastructural and human capacity development.

The broad objectives are:

- a) To intensify honey production in the state in terms of enhanced production and productivity;
- b) To expand the demand for honey in the emerging social matrix;

- c) To motivate traditional beekeepers for adoption of modern and scientific beekeeping practices to increase the productivity of honey;
- d) To motivate unemployed youth to take up beekeeping enterprise as a means of self employment and sustainable economic source;
- e) To engage the community into the modern beekeeping enterprise by way of mobilizing the support of local community leaders in the promotion of beekeeping enterprise for Improvement of livelihood standard and preservation of environment;
- f) To upgrade the skill and knowledge of the beekeepers by conducting awareness, educational and motivational Programme so as to enhance the quality of honey and beeswax
- g) Production through the use of appropriate technologies;
- h) Domain expansion of honey product development and other bee products;
- i) To promote the availability of various support services for bee keepers;
- j) To motivate entrepreneurs towards the establishment of enterprises for value -added honey and other product development, create financial and market linkages; and
- k) To develop institutional system involving bee farmers and government functionaries to effect better coordination relating to production system, management and marketing of products.

5. Centrally sponsored schemes

i. Horticulture Mission for North East & Himalayan states (HMNEH) previously under the name of Technology Mission for Development of Horticulture in North East India (TMH-NE)

The Centrally Sponsored Scheme “Technology Mission for Integrated Development of Horticulture in North Eastern States” ,is being implemented on an “end-to-end approach:” taking into account the entire gamut of horticulture development with all backward and forward linkages. Government of India has now approved the implementation of Technology Mission for Integrated Development of Horticulture in North Eastern States including Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttarakhand (TMNE) during XI Plan. As per the approval of GOI, the scheme is being implemented in the name of “Horticulture Mission for North East & Himalayan States (HMNH)”.

In Meghalaya large variety of fruits, vegetables, spices, plantation crops, and medicinal & aromatic plants are grown. The tropical, sub- tropical and temperate fruits include mandarin orange, pineapple, banana, lemon, guava, pear and plum. Vegetables, both indigenous and exotic are grown across a wide range of agro climatic zones. The higher altitudes provide a conducive ecosystem to grow traditional vegetables like potato and cole-crops, as well as sweet potato and tapioca. Spices such as black pepper, turmeric, ginger and chilies grow abundantly. Plantation crops - tea, cashew nut, coconut and areca nut have been performing well and offer good scope for area expansion.

Since the launching of the HMNEH scheme the horticulture budgets has been effectively doubled, this has facilitated major area expansion, introduced new crops and technologies and provided visibility and focus for horticulture. Newly introduced projects on strawberry, coloured capsicum, and floriculture proved success. It has been observed that successes in farmer's field on different horticultural crops can be attributed mainly due to the intervention of the HMNEH Scheme. Success stories of recent years laid here in will set as great examples for those who endeavor in the related field to excel and succeed in what they are striving in.

The objectives of the scheme are:




- a) To improve the production and productivity of horticulture crops by harnessing the potential of the region.
- b) Special emphasis on “Low Volume, High Value, Less Perishable Horticulture Crops”.
- c) Horticulture based farming system to be developed, thereby providing viable and ample opportunities for employment, especially for women, besides improving the productivity of land.

The programme under the Scheme has been evolved in consultation with all the stakeholders, including the State Governments and NGOs and strives to address the following issues:

- a) Technology and technological development


- b) Demonstration of technologies
- c) Production of quality planting material
- d) Organic farming
- e) Efficient water management
- f) Plant health.


The Scheme covers:-


-  Plantation works
-  Area expansion
-  Post harvest management, processing, value addition including that of medicinal and aromatic plants, marketing and exports.

The Horticulture Technology Mission has a structure of four Mini Missions viz.

Mini Mission-I for Research: Coordinated and implemented by ICAR,.

 Mini Mission-II for Improving Production and Productivity: Coordinated by DAC and implemented by the Agriculture / Horticulture Departments of the States.

 Mini Mission-III for Post-harvest Management, Marketing and Export: Coordinated by DAC and implemented by NHB, DMI, NCDC, NAFED and APEDA.

 Mini Mission-IV for Processing and Marketing of Processed Products: Coordinated and implemented by MFPI.

These Four Mini-Missions of the scheme are being implemented under the supervision and technical guidance of above mentioned coordinating agencies. Each coordinating agencies submits an action plan for the year indicating requirements of allocations to the Central Government in January each year, in order to facilitate Mission-wise allocations of funds for the year.

ii. Rashtriya Krishi Vigyan Yojana (RKVY)

The area of focus of this programme is for the development of Rain fed Farming Systems in and outside watershed areas as also integrated development of watershed areas, wastelands, river valleys and for activities relating to enhancement of crop production and popularization of micro-irrigation systems. The thrust area is to protect the loss of topsoil, improving soil fertility, enhancing crop production, land and water productivity of watershed areas comprising of wastelands, river valleys and the eco-system as a whole. The programme is implemented with the Department of Agriculture as the Nodal Agency.

Objectives

- ✚ To incentivize the States so as to increase public investment in Agriculture & Allied Sectors.
- ✚ To provide flexibility & autonomy to States in the process of planning and executing Agriculture & Allied Sector Schemes
- ✚ To ensure the preparation of agriculture plans for the Districts and the States based on agro-climatic conditions, availability of Technology and natural resources.
- ✚ To ensure that the local needs/ crops/ priorities are reflected in the agricultural plans of the states.
- ✚ To achieve the goal of reducing the yield gaps in important crops, through focused interventions.
- ✚ To maximize returns to the farmers in Agriculture & Allied Sectors.
- ✚ To bring about quantifiable changes in the production & productivity of various components of Agriculture & Allied Sectors by addressing them in a holistic manner.

The proposed schemes under RKVY mainly comprise of the following:

- a. Soil & Water Conservation for enhancing crop production & productivity in river valley/ valley bottom lands.
- b. Soil & Water Conservation for improving crop production & productivity of cultivated Jhum & Bun lands including abandoned Jhum & Bun lands.
- c. Soil & Water Conservation for restoring & reclaiming cultivable wastelands affected by mining & quarrying
- d. Soil & Water Conservation for improvement of traditional water conservation & distribution system for enhanced crop production.

iii. Watershed Development Project in Shifting Cultivation Areas (WDPSCA)

The scheme was implemented from the year 1995-96 onwards. It is a 100% Central assistance through the Ministry of Agriculture & Co-operation, Government of India. The main thrust of the project is as follows:

- ✚ Protect hill slopes of jhum areas through soil and water conservation measures on a watershed basis.
- ✚ Encourage and assist jhumia families to develop jhum land for productive uses with improved cultivation and suitable package of practices leading to settled cultivation.
- ✚ Improved socio-economic status of jhumia families through household/land-based activities.
- ✚ Mitigate ill effects of shifting cultivation by introducing appropriate land use as per land capacity and improved technologies.

iv. Integrated Watershed Management Programme (IWMP)

During 2009-10, the Government of India, Ministry of Rural Development, Department of Land Resources, has approved for treatment of 30,000 hectares in 18 watershed projects of the State. Subsequently, the Department of Land Resources, Ministry of Rural

Development, Government of India approved 52,000, 37,500 and 38,870 hectares of area for treatment during 2010-11, 2011-12 and 2012-13 respectively.

The Central and State share for the IWMP projects is in the ratio of 90:10.

The main objectives of this programme are as follows:

- ✚ To dissipate soil and water erosion and surface run-off
- ✚ To harvest/ recycle surface runoff and rainwater
- ✚ To enhance soil moisture regime/ water holding capacity
- ✚ To promote sub-surface flow, base flow and ground water recharge
- ✚ To improve soil health and tilth
- ✚ To improve production and productivity

v. National Project on Management of Soil Health and Fertility.

The Government is promoting soil test-based balanced and judicious use of chemical fertilizers, bio-fertilizers and locally organic manures like farmyard manure, compost, Nadep compost, vermi compost and green manure to maintain soil health and its productivity. The Centrally Sponsored Scheme on Balanced and Integrated Use of Fertilizers, since subsumed under the Macro Management of Agriculture Scheme, provides for the promotion of soil test-based application of chemical fertilizers, strengthening of soil testing facilities in the country and setting up of compost plants for conversion of biodegradable waste into organic manure. Now, Balanced and Integrated Use of Fertilizers is taken out from the purview of Marco Management of Agriculture Scheme and now named as “National Project on Management of Soil Health and Fertility” with an outlay of Rs 429.85 crore for 11th Five Year Plan period.

The National Project on Management of Soil Health and Fertility (NPMSF) is the new scheme and comprises three main components. These components are: A) Strengthening of Soil Testing Laboratories (STLs) B) Promoting Use of Integrated Nutrient Management, and C) Strengthening of Fertilizer Quality Control Laboratories. New Scheme (NPMSF) for 11th Five Year. A STRENGTHENING OF SOIL TESTING LABORATORIES i Setting up of new Soil Testing Laboratories (Static) – Physical Target during 11th Plan Period 500 Nos ii Strengthening of Existing Soil Testing Laboratories – during 11th Plan Period 315 Nos iii

Capacity Building through training of STL staff/extension officers/farmers and field demonstration/ workshop etc. on balanced use of fertilizers – during 11th Plan Period 5,000 trainings for STL Staff and Field Functionaries, 1,000 trainings for farmers and 1,500 Field Demonstrations. iv Creation of Data Bank for site specific Balanced Use of Fertilizers - v Adoption of village by STLs (10 Villages each) through Frontline Field Demonstration (FFD) – during 11th Plan Period 8000 villages vi Preparation of Digital District Soil Maps and Global Positioning System (GPS) based Soil Fertility Monitoring – during 11th Plan Period 500 digital district soil maps

B PROMOTING USE OF INTEGRATED NUTRIENT MANAGEMENT

i Promotion of Organic Manuring – during 11th Plan Period 0.5million ha ii Promotion of Soil Amendments (lime/basic slag) in Acidic Soils – during 11th Plan Period 0.5 million ha iii Promotion and Distribution of Micronutrients – during 11th Plan Period 0.5 million ha

C STRENGTHENING OF FERTILIZER QUALITY CONTROL LABORATORIES (FQCLS)

i. (a) Continuation of Central Fertilizer Quality Control & Training Institute Faridabad (CFQC& TI)/Regional Labs- during 11th Plan ii. (b) Strengthening of CFQC &TI/Regional Labs including setting up of 4 new Regional Labs- during 11th Plan iii. Strengthening/upgradation of the existing Fertilizer Quality Control Laboratories – during 11th Plan Period 63 Nos. iv. Setting up of new Fertilizer Quality Control Laboratories by State Governments .

vi. Special Jute Development Programme (SJDP)

The programme has been implemented in two parts, one as Centrally Sponsored Part implemented by the different state governments and the other as Central Sector Part implemented by different organizations with direct funding from the Ministry.

Objectives: of SJDP are to raise the productivity and improvement in quality of fibre. The strategy adopted for SJDP involves

- i) Distribution of agricultural inputs having a positive correlation with the productivity.
- ii) Creation of additional retting facilities by way of excavation of retting tanks and motivating the farmers for larger use of fungal culture for up-grading the quality of jute at post-retting stage.
- iii) Conduction of problem oriented package demonstration; and
- iv) Organizing farmers' training camp, etc.

vii. National Horticulture Board (NHB)

Aims & Objectives of NHB Schemes

The broad aims & objectives of all the above mentioned schemes are as under : -

1. Development of hi-tech commercial horticulture in identified belts
2. Development of modern post-harvest management infrastructure as integral part of area expansion projects or as common facility for cluster of projects
3. Developments of integrated, energy efficient cold chain infrastructure for fresh horticulture produce.
4. Popularization of identified new technologies / tools / techniques for commercialization / adoption, after carrying out technology need assessment.
5. Assistance in securing availability of quality planting material by promoting setting up of scion and root stock banks / mother plant nurseries, carrying out accreditation/ rating of horticulture nurseries and need based imports of planting material.
6. Promotion and market development of fresh horticulture produce.
7. Promotion of field trials of newly developed/ imported planting materials and other farm inputs, production technology, PHM protocols, INM and IPM protocols, and applied R&D programmes for commercialization of proven technology.
8. Promotion of applied R & D for standardizing PHM protocols, prescribing critical storage conditions for fresh horticulture produce, bench marking of technical standards for cold chain infrastructure etc.
9. Transfer of technology to producers/farmers and service providers such as gardeners, farm level skilled workers, operators in cold storages, work force carrying out post harvest management including processing of fresh horticulture produce, and to the master trainers
10. Promotion of consumption of horticulture produce and products.
11. Setting up Common Facility Centers in Horticulture Parks and Agri-Export Zones.
12. Strengthen market intelligence system by developing, collecting and disseminating horticulture database

13. Carrying out studies and surveys to identify constraints and develop short and long term strategies for systematic development of horticulture and providing technical services including advisory and consultancy services.

viii. National Watershed Development Project for Rainfed Areas (NWDPA)

Objectives: The main objective of the scheme are as under: - conservation, development and sustainable management of natural resources. Enhancement of agricultural production and productivity in a sustainable manner. Restoration of ecological balance in the degraded and fragile rain fed ecosystems by greening these areas through appropriate mix of trees, shrubs and grasses. Reduction in regional disparity between irrigated and rain fed areas and creation of sustained employment opportunities for the rural community including the landless

Main components: The main components include: - Preparatory phase: Entry point activities Institution and capacity building Detailed Project Report (DPR) , Watershed Works Phase: Watershed development works Livelihood activities for the asset less persons, Production system and micro enterprises • Consolidation phase

ix. Integrated Pest Management (IPM)

Objective: The scheme aims to popularise Integrated Pest Management (IPM) approach among farming community to promote use of bio pesticides by imparting training to master trainers, extension workers and farmers. Scheme is implemented in 21 States and one Union Territory with 26 Centres.

x. National agricultural insurance scheme

Objectives of the scheme are:

- a) To provide financial support to the farmers in the event of crop failure due to natural calamities.
- b) to restore his credit eligibility for the next crop season; and
- c) to ensure stable production of crops

b. Livestock

1. Assistance to States for control of animal diseases (ASCAD)

Under this component, assistance is provided to State / Union Territory Governments for control of economically important diseases of livestock and poultry by way of immunization, strengthening of existing State Veterinary Biological Production Units, strengthening of existing State Disease Diagnostic Laboratories, holding workshops/seminars and in-service training to Veterinarians and Para-veterinarians. The programme is being implemented on 75:25 sharing basis between the centre and the states; however, 100 % assistance is provided for training and seminar/workshops. The states are at liberty to choose the diseases for immunization as per the prevalence and importance of the disease in their state / region. Besides this, the programmes envisage collection of information on the incidence of various livestock and poultry diseases from States and Union Territories and compile the same for the whole country. The 10th plan allocation for this scheme is Rs. 255.00 crores.

2. Livestock Insurance Scheme

The Livestock Insurance Scheme, a centrally sponsored scheme, which was implemented on a pilot basis during 2005-06 and 2006-07 of the 10th Five Year Plan and 2007-08 of the 11th Five Year Plan in 100 selected districts. The scheme is being implemented on a regular basis from 2008-09 in 100 newly selected districts of the

country. Under the scheme, the crossbred and high yielding cattle and buffaloes are being insured at maximum of their current market price. The premium of the insurance is subsidized to the tune of 50%. The entire cost of the subsidy is being borne by the Central Government. The benefit of subsidy is being provided to a maximum of 2 animals per beneficiary for a policy of maximum of three years. The scheme is being implemented in all states except Goa through the State Livestock Development Boards of respective states. The scheme is proposed to be extended to 100 old districts covered during pilot period and more species of livestock including indigenous cattle, yak & mithun.

The Livestock Insurance Scheme has been formulated with the twin objective of providing protection mechanism to the farmers and cattle rearers against any eventual loss of their animals due to death and to demonstrate the benefit of the insurance of livestock to the people and popularize it with the ultimate goal of attaining qualitative improvement in livestock and their products.

3. Professional Efficiency Development (PED): -

Objective: It is to regulate veterinary practice and to maintain register of veterinary practitioners as per the provisions of Indian Veterinary Council Act, 1984 (IVC Act). The scheme envisages establishing Veterinary Council of India at the Centre and the State Veterinary Councils in those states, which adopted the Indian Veterinary Council Act, 1984. At present it is implemented in all the States and Union Territories except Jammu and Kashmir. 100 % Central Assistance is providing to the VCI and the Union Territories and 50 % to the states. The 10th plan allocation for this component is Rs. 30.00 crores.

4. National project for cattle and buffalo breeding (NPCBB)

Genetic improvement is a long term activity and Government of India has initiated a major programme from October 2000, “National Project for Cattle and Buffalo Breeding”(NPCBB) over a period of ten years, in two phases each of five years duration, with an allocation of Rs 402 crore for the 1st phase and Rs 775.87 crore for 2nd Phase. National Project for Cattle and Buffalo Breeding envisages genetic up gradation and development of indigenous breeds on priority basis.

Objectives: (a) to arrange delivery of vastly improved artificial insemination service at the farmers doorstep;
(b) to progressively bring under organized breeding through artificial insemination or natural service by high quality bulls, all breedable females among cattle and buffalo within a period of 10 years;
(c) to undertake breed improvement programme for indigenous cattle and buffalo breeds so as to improve their genetic qualities as well as their availability.

Components: (a) Streamlining storage and supply of Liquid Nitrogen by sourcing supply from industrial gas manufacturers and setting up bulk transport and storage systems for the same,
(b) Introduction of quality bulls with high genetic merit,
(c) Promotion of private mobile A.I. service for doorstep delivery of A.I.,
(d) Conversion of existing stationery government centres into mobiles centres,
(e) Quality control and certification of bulls and services at sperm stations, semen banks and training institutions,
(f) Study of breeding systems in areas out of reach of A.I. and
(g) Refresher training to existing AI workers, basic training to rural unemployed youth, training to professionals and organization of farmer's orientation programmes
(h) Institutional restructuring by way of entrusting the job of managing production and supply of genetic inputs as well as Liquid Nitrogen to a specialized autonomous and professional State Implementing Agency.

5. Integrated Dairy Development Project (IDDP) in Non-Operation Flood, Hilly and Backward Areas':

The scheme was modified during March 2005. The modified scheme has been named as 'Intensive Dairy Development Programme' (IDDP) and is being implemented in hilly and backward areas and also in the districts, which received less than Rs.50.00 lakh for dairy development activities during Operation Flood, programme. The funds are now released directly to the implementing agency i.e State Dairy Federation / District Milk Union.

Objectives:

- a. Developing milch cattle.
- b. Increasing milk production by providing technical input services.
- c. Creating infrastructure to improve procurement, processing and marketing of milk in a cost effective manner.
- d. Ensuring remunerative prices to the milk producers, by strengthening dairy cooperative societies at village level.
- e. Generate additional employment opportunities.
- f. Improving social, nutritional and economic status of residents of comparatively disadvantaged areas.

6. Intensive Cattle Development Project (ICDP)

The ICDP was started as a Special Development Programme during Third Five Year Plan. It was envisaged to locate the projects in the breeding tracts of indigenous breeds of cattle and buffaloes and in the milk sheds of large dairy projects. The establishment of ICDPs was linked with the dairy plants so as to enable the dairy plants to collect and process milk to their full capacities. Each ICDP was expected to cover one lakh breedable female bovine population and to provide necessary inputs and technical services.

Activities of ICDP

- i. The activities include conducting Bench mark survey, Controlled breeding, Veterinary aid and disease control, Feeds and fodders and Dairy extension.
- ii. The ICDP was considered as the most determined effort to increase milk production and productivity of cows and buffaloes. However, the Programme Evaluation Organization (1970-71) in its evaluation report indicated that the ICDPs also did not succeed in accomplishing their [objectives](#). The reasons identified were
 - ✚ Considerable time lag in providing organizational structure and various inputs
 - ✚ Set back in transferring ICDPs to state sector with financial cuts resulting in dilution of inputs and
 - ✚ Wastage of semen to the tune of 30 - 40 percent of the semen supplied to project area.

iii. In addition, a dairy extension officer post created in each and every ICDP to give fillip to the extension activities was not filled up in most of the ICDPs. Even in those places where they were posted were not involved in [education](#) of livestock owners and instead their activities were confined mostly to supply of inputs or other non-extension activities.

iv. At present the ICDPs in many states are merged with the Animal Husbandry programmes and no funds are allocated separately to ICDPs.

c. Fisheries

Schemes under the Meghalaya State Aquaculture Mission (MSAM) of the Department of Fisheries, Govt. of Meghalaya and fish Farmer Development Agency (FFDA)

1. Area Expansion through individual ponds

Name of the Programmes/activities	Project Cost for 0.1 Ha (Rs)	Subsidy 60% (Rs)	Bank Loan 25 % (Rs)	Own Contribution 15 % (Rs)
Area Expansion through individual ponds	90,399	54,000	22,500	13,899

2. Area Expansion through Community water Bodies

Norms of the scheme:

The minimum water area eligible for financial assistance shall be 0.5 hectares subject to a maximum of 2 hectares with a water depth of 1.5 meters to 2 meters deep. If the Community etc. wants to have a bigger pond, the cost for the area beyond 2 hectares has to be completely borne by the Community etc. Applicants must have the financial capacity to bear 40% of the project cost, as also the capacity to make investment for other minor infrastructure and inputs, as the case may be, depending upon the location. For ponds

larger than 2.0 hectares additional costs would have to be borne entirely by the communities themselves.

Financial assistance under the scheme will be

Sl. No.	Size (Ha)	Project Cost Rs.	Subsidy 60% Rs.	Community's contribution 40% Rs.
1	0.5 ha	2,50,288/-	1,50,173/-	1,00,115/-
2	1.0 ha	4,92,916/-	2,95,750/-	1,97,166/-
3	1.5 ha	7,35,874/-	4,41,524/-	2,94,350/-
4	2.0 ha	9,78,832/-	5,87,299/-	3,91,533/-

Fish Seed Production through Private Hatcheries

Name of the Programmes/activities	Project Cost for 2 Ha (Rs)	Subsidy 60% (Rs)	Bank Loan 25 % (Rs)	Own Contribution 15 % (Rs)
Fish Seed Production through Private Hatcheries	16.00 Lakhs	9.60 lakh	4.00 lakh	2.40 lakh

Norms of the scheme:

- I. The minimum farm area eligible for financial assistance shall be 2 hectares. The farm area of 2 (two) hectares shall include nursery ponds, rearing ponds, stocking tanks, brood-stock tanks, godown, hatchery, etc.
- II. Financial assistance under the scheme is as per the NFDB's unit cost of Rs 16.00 lakh each, of which subsidy will be 60% i.e. Rs 9.60 lakh, 25% credit linkage with MCAB/ Other

banks financing the project i.e. Rs 4.00 lakh and 15% own contribution of the farmer partner i.e Rs 2.40 lakh.

- III. The unit cost of Rs 16.00 lakh is for the construction of the hatchery, nurseries, rearing ponds, broodstock tanks, godown, etc.
- IV. The financial assistance / loan will be in the form of medium term loan with repayment period of 5 years including gestation period of 1 year i.e. the entire amount of the loan will have to be repaid in 4 equal yearly instalments. The interest on the loan will have to be repaid as per the norms of the sanctioning bank.
- V. Each hatchery should have a production capacity of 1 crore spawn, converted into 40 lakh fry and finally 24 lakh fingerlings.
- VI. The applicants should have the financial capacity to bear 15% of the cost of the construction of the hatchery, nurseries, rearing ponds, etc as his/her own contribution.

3. Fish Seed Production through FRP (Fabricated Re-enforce Plastic) Technology

Norms of the scheme:

- I. The minimum farm area eligible for financial assistance shall be 1(one) hectare. The farm area of 1(one) hectare shall include nursery ponds, rearing ponds, stocking tanks, brood-stock tanks, godown, installation FRP hatchery, etc.
- II. Financial assistance under the scheme is at a unit cost of Rs 3,95,640/- each, of which subsidy will be 60% i.e. Rs` 2,37,384/-, 25% credit linkage with MCAB/ Other banks financing the project i.e. Rs 98,910/-and 15% own contribution of the farmer partner i.e Rs` 59,346/-.
- III. The unit cost of Rs 3,95,640/- is exclusively for the cost of 1 (one) unit of FRP to be procured from CIFA ,Bhubaneswar .
- IV. The financial assistance / loan will be in the form of medium term loan with repayment period of 5 years including gestation period of 1 year i.e. the entire amount of the loan will have to be repaid in 4 equal yearly installments. The interest on the loan will have to be repaid as per the norms of the sanctioning bank.

- V. Each FRP will have the production capacity of 30 lakhs Spawns annually i.e.4-5 cycle operations which will give about 10 lakhs fingerlings annually.
- VI. The applicants should have the financial capacity to bear 15% of the actual cost of the FRP and the other components viz nursery, rearing, stocking and installation cost of FRP etc. will have to borne separately by the beneficiaries concerned.
- VII. On being selected the entrepreneurs will have to deposit the 15% own contribution to MCAB and the Department will indent the FRP from CIFA, Bhubaneswar who would also be called to assist the entrepreneurs for installation, if necessary.
- VIII. Freight Charge, Installation costs of FRP is to be borne by the entrepreneurs concerned

5. Fish Feed Production through Private Entrepreneurs

Name of the Programmes/activities	Project Cost for 1 Ha (Rs)	Subsidy 60% (Rs)	Bank Loan 25 % (Rs)	Own Contribution 15 % (Rs)
Fish Feed Production through Private Entrepreneurs	18 lakhs	10.8 lakhs	4.50 lakhs	2.70 lakhs.

Norms of the scheme:

- I. The minimum farm area eligible for financial assistance shall be 0.5 ha. This area is meant for construction of 49 sq. m warehouse and the rest will be for loading / unloading of materials, parking space, quarters, etc.
- II. It should have motorable road for transport of raw materials.
- III. Financial assistance under the scheme is as per NFDB's unit cost of Rs. 18 lakhs each, of which subsidy will be 60% i.e., Rs. 10.8 lakhs, 25 % credit linkage with MCAB/ Other banks financing the project i.e. Rs. 4.50 lakhs and 15% own contribution of partners i.e. Rs. 2.70 lakhs.

- IV. The financial assistance / loan will be in the form of medium term loan with repayment period of 5 years including gestation period of 1 (one) year i.e. the entire amount of the loan will have to be repaid in 4 equal yearly installments. The interest on the loan will have to be repaid as per the norms of the sanctioning bank.
- V. Each Feed Mill should have a production capacity of 300 - 500kg/day.
- VI. The applicants should have the financial capacity to bear 15% of the cost for the construction of the Fish Feed Mill, etc as his/her own contribution.
- VII. Fixation on the price of the Fish Feed so produced will be worked out by the Department with the beneficiaries.
- VIII. The revenue generated from the sale of the feed will exclusively go to the beneficiaries.

6. Establishment of fish sanctuaries in the State of Meghalaya

Norms of the scheme:

- I. Financial investment will be made by the Department to create sanctuaries in the potential areas/part of the rivers streams etc. having facilities for creation of water pool in flowing water with a minimum area of 0.1 ha or 100 running meters and a minimum depth of 1.5 – 2 meters during dry season.
- II. The investment will be to a maximum of Rs 5 lakhs on each sanctuary which will be exclusively on fishery oriented activities. Viz creation of water pool, construction of Watch-tower/ view point, purchase of fish seeds, Signboards and other materials such as Jungle boots, Search lights, uniforms, raincoats etc for the personnel engaged in patrolling duties.
- III. If necessary, the level of the water pool will be raised by construction of Mini- Barrages. These Barrages will be constructed by utilising the locally available materials with least

disturbance to the natural environment. The Length and width of the Mini-Barrages to be constructed will depend on the conditions of each site.

- IV. The Communities/Self-Help-Groups etc. selected as partners, will have to contribute in terms of labour wherever necessary.
- V. The objective is for enhancement of the existing stocks in the selected sanctuaries and introduction of other species is restricted.
- VI. Other expenditure involved, such as construction of footpaths, approach roads, cafeteria, Watch tower etc. will be dove-tailed with C&RD, Tourism, P.W.D. Department etc.
- VII. An area 200 meter upstream and 100 meter downstream will be prohibited from any fishing activities.
- VIII. On completion the sanctuaries will be handed over to the NGOs/Self Help Groups/ Communities etc. for management who would run them in conformity with conditions laid down by the Department with no further investment to be made by the Department in the project.
- IX. Commitment of the Communities / NGOs etc. to manage the project after investment will be one of the key criteria for selection. An agreement in this regard will be signed between FFDA / Department of Fisheries with the selected organizations prior to the implementation of the scheme.
- X. The revenue earned from the various activities of the sanctuaries will exclusively go to the NGOs / Self Help Groups / Communities who have been authorized by the Department to manage these sanctuaries. Such revenues will help the organizations to meet the expenditure in the management of the sanctuaries and thereby making the project sustainable.

CHAPTER VII

FARM MACHINERY SUITABLE TO THE DISTRICT

1. Power tiller

This is the only advanced farm machinery used by the farmers either purchase by the farming community through subsidy from the Department of Agriculture or hire from the office of District Agriculture Officer, Nongstoin and KVK, West Khasi Hills.



Picture 1:

Power tiller used by the farmer for land preparation in the lowland paddy field

2. Local tools and implements



Picture 2: Local tools & implements (*Khoh, star, kiah, shang, prah, mohkhiew, polo, wait, shylliah, thlong & synrei etc.*) used in different agricultural activities

These are the common and easy available tools used by the farming community in the district and very few of the community could buy the farm machinery like power tiller, tractor

CHAPTER-VIII

ANNEXURE

1. Telephone directory of important agriculture and related departments /offices in West khasi Hills Distrcit

Sub- divisional Agriculture Officer

P.O: Mairang, West khasi Hills Distritc

Pin Code: 793120, std code: 03657, tel no: 00222748,

Office of the Sub-divisional Officer PHE

P.O: Mairang West Khasi Hills District

Pin Code: 793120, STD Code: 03657, Tel no: 222233.

District Horticulture Officer,

West Khasi Hills, Nongstoin.

Tel no: 03654-222564

Divisional Soil & Water Conservation Officer,

West Khasi Hills, Nongstoin

Tel no: 953654 235236

District Animal Husbandry & Veterinary Department,

West Khasi Hills, Nongstoin

Tel no: 036542 222290

General Manager, District Industries Centre,

West khasi Hills,Nongstoin

Tel no: 03564 222247

District Statistical Officer

West khasi Hills,Nongstoin

Tel no: 09436710450

District Handloom Officer

West khasi Hills,Nongstoin

Tel no: 03654 222709

Supt. of Fisheries

West khasi Hills,Nongstoin

Tel no: 09436105960

II Preparation of safer pesticides for common use

a.Insecticides

1. Use of garlic extract

It can be used as a repellent for insects that damage your crops and vegetations. Make a fine garlic paste and then extract only the juice from it using a muslin cloth or a sieve . to

this extract , you can add 50 ml of water and immediately spray or sprinkle in the field. Remember to use fresh mixture for every spraying

2. Use of tobacco extract

Soak the tobacco leaves in 50 ml of water or you can even crush the leaves into fine paste and then mix with 50 ml of water. The prepared solution to be used immediately.

3. Use of trap crops

Planting of marigold flowers along with vegetables crops reduce the incidence of aphids and thrips. Planting of mustard after every 5-10 rows of cabbage or cauliflower also reduces incidence. Trap cropping of mustard and radish reduces the incidence of cabbage borers. Intercrop cabbage and tomato reduce infestation of pests in cabbage

4. Use of baking soda

Mix one spoon of baking soda in 3 liters of water. Add one drop or two drops of liquid soap .add one tea spoon of vegetable oil spray this solution to the plant. Effective against powdery mildew.

b. Preparation of common fungicides

1. Bordeaux mixture (1%)

Dissolve 1 kg of powdered copper sulphate crystals in 50 litres of water. In another 50 litres of water, prepare milk of lime with 1 kg of quick lime. Pour the copper sulphate solution into the milk of lime slowly stirring the mixture all the while. Test the mixture before use for the presence of free copper, which is harmful to the plants, by dipping a polished knife in it. If the blade shows a reddish colour due to the deposits of copper, add more lime till the blade is not stained on dipping. Always use wooden, earthen or copper vessels for the preparation of Bordeaux mixture. In order to confer sticking qualities to Bordeaux mixture, rosin washing soda mixture, may be added. The addition of the sticker is particularly recommended for sprayings conducted during rainy season. For preparing the mixture, 10 litres of water out of 100 litres required for preparing Bordeaux mixture may be kept apart. Boil 10 litres of water, preferably in an earthen pot and add 500 g of good quality washing soda (sodium

carbonate). Boil again until the solution becomes slightly dark in colour. Add 1 kg of powdered rosin (arpoos) in the boiling washing soda solution. Reduce the flame for avoiding frothing, foaming and spilling over. Boil the solution for 5-10 minutes till black bubbles appear. Cool the solution until the temperature reaches below 45°C. The cooled mixture (10 litres) is then added slowly to the prepared Bordeaux mixture (90 litres) under vigorous stirring.

2. Bordeaux paste

Dissolve 100 g of copper sulphate and 100 g of quick lime each in 500 ml of water separately. Mix together to make one litre of the paste.







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	Total = 9				



Group photo of staff, kvk West khasi Hills

DISCLAIMER:

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