

WEST GARO HILLS DISTRICT

Inventory of Agriculture 2015



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ICAR - Agricultural Technology Application Research Institute, Umiam (Barapani)
Ri- Bhoi District, Meghalaya - 793103



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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 Garo Hills for taking part in compiling the huge information to shape up West Garo 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 Garo 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



The Inventory of Agriculture of West Garo Hills District is expected to be benefitted to policy planners, scientists, researchers, farmers and all those who are concerned with the development of agriculture and related fields in the district. The district agricultural profile and information on various schemes which is in operation in the district are available through the publications of various line departments and agencies, but in a highly scattered form. As far as the farming community is concerned, getting information on their specific needs is still a herculean task. Information sharing with farmers would help them to technically advance in their farm-related activities. It is our own experience that a majority of the farming community is unaware of the programmes and schemes framed for them by the Governments which leads to non-functional of the programme. The most important constraint of the district is the mind-set of the farmers where new modern technologies in agriculture couldn't be easily acceptable and adoptable. In the present day, information is percolated only to a handful of farmers who are resource-rich and highly progressive. The agricultural economy of the district can improve only when modern technologies are largely adopted by the farming community. It is also noted that the farmers are unaware about the various institutions and organizations, plans and schemes engaged in agricultural research and development activities in their own localities. In this publication, we have attempted to compile all the available information on various research and development organizations, plans and schemes relevant to the district's agriculture. We are fully aware about the importance of updating the contents periodically to include changes that are likely to happen due to policy changes. We assure to include any information that might have been omitted in the present compilation in our future versions of the publication. The authors place on record their sincere gratitude to all the staff of KVK, West Garo Hills and ICAR- NEH Region, Umiam, Meghalaya who has directly or indirectly contributed to publication of this compilation in the present form. We express our sincere thanks to the District Agricultural Officer, District Horticulture Officer, District Sericulture Officer, District Statistical Officer, District Animal Husbandry and Veterinary Officer and various Institutions and Organizations in the district for providing the necessary information. We dedicate this publication to the cause of the farming community of West Garo Hills district, Meghalaya and we are happy if suggestions are made by the users for further improvement.

(Tanmay Samajdar)

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CHAPTER-I. DISTRICT IN GENERAL

West Garo Hills is one of the largest district of Meghalaya located in the western part of the State. The Garo Hills district was divided into two districts, viz. the West Garo Hills district and the East Garo Hills district in October 1976. The erstwhile West Garo Hills district was further divided into two administrative districts of West and South Garo Hills on June 1992. The West Garo Hills district was further divided into two administrative district of West and South West Garo Hills on 7th August, 2012. The district headquarters of West Garo Hills is Tura. The West Garo Hills district has two sub-division and six development blocks with an area of 2,93,400 ha and population of 4, 70,796 (2011 census). The district is pre-dominantly inhabited by the Garos, a tribe with a matrilineal society belonging to the Bodo family of the Tibeto-Burman race tribes. Other indigenous inhabitants are the Hajongs, Rabhas, Koches, Rajbansis, Meches, Kacharis and Dalus. The district is also inhabited by Bengalis, Assamese, Nepalese, Marwaries, Biharis and people from other parts of India.



Source: District Administration Portal, Tura 2014

Fig: Location of West Garo Hills district

CLIMATE

The climate of the district is largely controlled by South-West monsoon and seasonal winds. The West Garo Hills district being relatively lower in altitude to the rest of Meghalaya, experiences a fairly high temperature for most part of the year. The average rainfall is 2800- 3300 mm of which more than two-thirds occur during the monsoon, winter being practically dry. The details of climatic condition of the district are depicted in Table.

Table: Recent climatic status of West Garo Hills district

Month	Total rainfall (mm)	Rainy days (No)	Avg. RH (%)		Avg. Temp. °C	
			Maximum	Minimum	Maximum	Minimum
January	00	0	89	68	23.45	13.06
February	54.8	4	83	67	23.85	12.89
March	20.6	2	87	64	29.35	15.93
April	115.4	6	88	50	33.2	23.1
May	337.4	16	75	66	29.52	21.7
June	756.6	19	80	59	28.37	21.1
July	307.4	20	77	59	29	22.12
August	585.3	24	78	60	28.1	20.83
September	645	17	80	56	28.9	21.63
October	37.4	4	77	50	30.39	23.32
November	00	0	86	56	29.27	22.23
December	00	0	89	62	26.68	20.22
Total/Avg	2860	112	82	60	28.34	20

Source: Automatic Weather Station, KVK, Tura (2014)

TOPOGRAPHY

The West Garo Hills district is mostly hilly with plains fringing the northern, western and the south-western borders. The district is situated approximately between the latitudes 90° 30' and 89° 40' E, and the longitudes of 26° and 25° 20' N. The West Garo Hills district lies on the western part of the state of Meghalaya bounded by the East Garo Hills district on the east, the South Garo Hills on the south-east, the North Garo Hills district on the north and South West Garo Hills on the south- west. There are three important mountain ranges in the districts of Garo Hills.

Tura Range: This is one of the most important mountain ranges in West Garo Hills. The Tura range is about 50 km long and extends in the east-west direction from Tura to Siju in the South Garo Hills district. The mountain peaks that are located in this range are Tura Peak, Nokrek Peak, Meminram Peak, Nengminjok Peak, Chitmang Peak. The highest peak of this range is the Nokrek (Altitude 1412 m above msl) lying 13 km south-east of Tura. To the west of the Tura range low hill ranges run from north to south, and to the north of the Tura range hill ranges run parallel to it, gradually increasing in height till they meet in the south. Now the entire Tura range comes under the management of **Nokrek National Park**: These high ranges are strictly protected as Catchment areas right from the time of British Administration in Garo Hills. There is no human habitation in the heart of these ranges which has now become an ideal home to various flora and fauna.

Arbella Range: Arbella Peak is 999 metres high. It lies on the northern side of Asananggre village on the Tura- Guwahati road. Most of the peaks in this mountain range fall in the East Garo Hills district.

Ranggira Range: This mountain range lies on the western fringe of the district and ends in Hallidayganj village. The height of this peak is 673 metres.

FORESTS

The district has mostly dense tropical mixed forest, and a small patch of temperate forest in the higher parts of the Tura range. The forest area in West Garo Hills district falls in two categories viz., reserved forest and protected forest. The details of forest cover in West Garo Hills district is given in table.

Table: Details of Forests in West Garo Hills district

<i>Particulars</i>	<i>Area (ha)</i>
Reserved Forest	

Hollaidanga Beat - Dibru Hills	1930
Nokrek Biosphere reserved	4748
Protected Forest	0
Tura Peak catchment area	3,95.691
Botanical Garden	4.95
Total	6781.641

Source: District Statistical Hand Book, 2015, Tura

WATER RESOURCES

River Systems: The Tura range forms watersheds in the West Garo Hills district, from which the rivers flows towards Bangladesh plains in the south and the Brahmaputra valley in the north and the west. The important rivers of the north group are the Kalu, Ringgi and the Didak. The important rivers of the southern group are the Bhogai, Dareng etc. The Tura range is also the source of the Simsang (Someswari), one of the major rivers of Meghalaya, whose valley is one of the most important features in the South Garo Hills.

Someswari: This is the largest and the second longest river in the whole district. The river is locally known as Simsang. It starts from Nokrek mountains and runs towards the east, passing through Rongrenggre, Williamnagar the headquarters of East Garo Hills district, Nongalbibra, Siju, Rewak and lastly Baghmara the headquarters of South Garo Hills district. The upper course of this river is not navigable due to the high number of cataracts and numerous huge stones. However the lower course has many deep pools and falls. They are Mirik, Matma, Kan'chru Suk, Jamiseng, Warisik, Bobra, Goka etc. The chief tributaries are Chibok, Rongdik, Rompa and Ringdi rivers.

Jinjiram: It starts from Derek village and its main tributary starts from Upot Lake. It runs towards the east connecting with Gagua river, then runs through the border of Goalpara district towards Phulbari and reaches Hallidayganj where it enters the Goalpara district. It is the longest river in the Garo Hills districts.

Kalu: Locally, this river is called Ganol. Its sources start from Tura peak and runs towards the west through Damalgre, Garobadha and Rangapani before it enters Goalpara district. Its chief tributaries are Dilni and Rongram rivers.

Didak: It stars from Anogre village and runs through Garo Hills district before it enters into Goalpara district.

Bogai: Locally known as Bugi, its source starts from the southern side of Nokrek Mountains and runs through Dalu village and enters into Mymensingh district in Bangladesh.

Rongai: Starts from Arabela peak and runs through Ringgegri village and then falls into Jinjiram river. Locally known as Ringge river.

Dareng or Nitai: The source is on the southern side of Nokrek Mountain. It runs southwards through Silkigri and enters into Bangladesh. It has many famous deep pools like Warima, Rong'ang, Bamon etc. where Bamon is the deepest. The chief tributaries are Kakija, Daji and Rompa.

DEMOGRAPHY

Table: Demographic features of West Garo Hills District as per 2011 census

<i>Sl. No.</i>	<i>Particulars</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
1.	Population	237024	233772	470796
2.	Scheduled Tribe	167379	168462	335841
3.	Scheduled Caste	3458	3257	6715
4.	Others	66187	62053	128240
5.	Literacy rate (%)	72	63	67
6.	Sex ratio (female/1000 male)	-	-	986
7.	No. of villages	-	-	1258
8.	Total Households	-	-	89,489
9.	Total Literates	140297	120615	260912
10.	Total illiterates	96727	113157	209884

Source: Census 2011

CULTURE AND EDUCATION

The educational infrastructure in the district comprises of schools for all levels. There are seven degree colleges in the district. There is a Law College and a College of Teacher's Education (B.Ed College) at Tura. There are 17 higher secondary schools, around 155 secondary schools, and 1770 upper primary and primary schools in the district. There also exists a Public School and Kendriya Vidyalaya at Tura. Other than that, there are vocational institutes at Tura like Regional Vocational Training Institute

(RVTI) and ITI. Montfort Centre for Education provides education to the physically handicapped persons, besides running regular training courses for teachers of special education for the physically handicapped students. At Tura, there is a campus of North Eastern Hill University. A College of Home Science under Central Agriculture University is also located at Sansanggre, Tura.

In Garo tribes, women are the owners of property thus making it a **matrilineal society**. There is a custom where the youngest daughter inherits the property from her mother and man shifts to his wife's place after getting married. The Garos, on the contrary, are divided into five matrilineal clans (*chatchi*) namely, *Areng, Marak, Momin, Sangma and Shira*. The other tribals are Hajong, Koch, Banai and Rabha are also resides in the district. Though the majority of the Garos are now converted to Christianity, yet they still practice their own traditional tribal religion known as “*Songsarek*”, which has its roots in traditional agricultural practices. The Garos traditionally follow their own religion known as Songsarek, which has roots in agriculture. They also have a belief system with an underlying principle of fear and dread of the supernatural powers, which led many scholars and researchers to wrongly think that the Garos are animists. The Songsarek belief is presided over by the Godhead known as “Dakgipa Rugipa Stugipa Pantugipa or Tatara Rabuga Stura Pantura”, or the Creator. Saljong is another deity which is more intimately concerned with human affairs. He is basically a sun god, the source of all gifts to mankind. Saljong is honoured with the Wangala celebrations. Another benign deity is Chorabudi, the protector of crops. The first fruits of the fields are offered to him. He is also honoured with a pig sacrifice whenever sacrifices are offered to Tatara- Rabuga. Living so close to nature, the early Garo people the world around them with a multitude of spirits called mite, some of them good and some of them capable of harming human beings for any lapses they might commit. Appropriate sacrifices are offered to them as occasions demand. The common and regular festivities are, of course, those connected with agricultural operations. Greatest among Garo festivals is the Wangala which is more a celebration of thanksgiving after harvest in which Saljong, the God who provides mankind with Nature's bounties and ensures their prosperity, is honoured. There is no fixed date for the celebration; this varying from village to village, but usually, the Wangala is celebrated in October. Preparations take place well before the date; items of food are among the first to be collected. The Nokma of the village takes the responsibility to see that all arrangements are in order. Rituals in his house and in the individual fields precede the feasting at which guests are literally force-fed by the hosts. A large quantity of food and rice-beer must be prepared well ahead. The climax of the

celebrations is the colourful Wangala dance in which men and women take part in their best clothes. Lines are formed by males and females separately and to the rhythmic beat of drums and gongs and blowing of horns by the males, both group shuffle forward in parallel lines.

HEALTH CARE SECTOR

The health infrastructure of the district includes 18 PHCs, 7 CHCs, 81 sub-centres, three dispensaries, two govt. hospital and two private hospitals. The availability of hospital beds is estimated to be 79 beds per one lakh population in the district. The population coverage of rural health centres in the district stands at 4375 persons per PHC/CHC/Sub-centre. The number of beds available in the government health institution is 90.

BANKING AND ALLIED SECTORS

Access to credit and banking facilities is an important indicator for socio-economic development. It has 24 State Bank of India branches, 10 Meghalaya Cooperative Apex Bank and 10 other banks. There are 10 Meghalaya Cooperative Apex Bank, 4 Meghalaya State Cooperative & Consumer Federation, 43 Primary Agriculture Cooperative Societies, 4 Primary Marketing Cooperatives (SAMCS), 15 Industrial Cooperative Societies, 21 Weaving Cooperative Societies, 16 Thrift Cooperative Societies, 21 Dairy Farming Cooperative Societies, 10 Fishery Cooperative Societies and 15 Multipurpose Cooperative Societies. All the leading banks have branches in all the main towns of the district. In respect of credit deployment, 52 percent of the total credit of the district is deployed in rural areas, while 48 percent of total district credit is deployed in the semi-urban areas.

LOCAL BODIES AND RURAL DEVELOPMENT

Administratively the district is divided into three subdivisions viz. Tura, Phulbari and Dalu. There are five revenue circles and six community development blocks (CD) in the district.

Table: Revenue Circles and Blocks in West Garo Hills district

Name of Revenue Circles	Name of Bocks
Selsella	Selsella
Dadenggiri	Dadenggiri
Tikrililla	Tikrililla
Rongram	Rongram
Gambegre	Gambegre
Dalu	Dalu

The total number of villages in the districts is 1258 of which 1172 are inhabited. The administration is carried on by the Executive Committee constituted under the Autonomous District Rules, the Committee being headed by the Chief Executive Member. There are two Executive Members under him. These functionaries share among themselves the entire responsibility of administration, their separate functions being defined. In short, in respect of the internal administration of the district they may be compared to the Ministers of the State Government in that they are elected to the Council and have particular subjects under their charge. The major subjects assigned to the Council are: Forests, Civil Works, Taxation, Revenue, Judicial, Transport and Education. The business of the house is conducted by the Chairman and Deputy Chairman, corresponding to the Speaker and the Deputy Speaker in the State Assembly.

In domestic matters, very wide powers are exercised by the Nokma of individual villages. He is the head or chief of the dominant clan within the territorial limits. At the grass root level, the village headman or locally called *Nokma* enjoys full freedom in planning and developing the area under his jurisdiction. They are also known as the Local Self Government. There are Laskars and Sardars recognized by District Council who have a certain measure of magisterial powers and rather more police powers. Sardars are appointed to assist the Laskars in the discharge of their duties. The institution of Laskarship has come under some criticism in recent years.

CHAPTER- II. AGRICULTURAL SCENARIO OF THE DISTRICT

Agriculture is the main occupation of the people of West Garo Hills district and rice, maize, cashewnut, arecanut and turmeric are the principal crops along with Jhuming and piggery farming for livelihood security for the people of the district.

CROPS

Agriculture and allied fields are the major income generating sources for more than 70% of population in the district. According to 2011 census, agriculture provides full time employment to 13.56 per cent of total workers. There are about 1, 20,740 cultivators and 39,725 agricultural labourers in the district. Heterogeneity in cultivation practices and diversity of cropping patterns are the important features of agriculture in the district. The details of land use pattern of the district other than forests are given in Table. Fig. depicts the per cent land area under different categories.

Table: Land use pattern of West Garo Hills (including South West Garo Hills) District

Classification of Land	Area (ha)
Total geographical Area	67,700
Net area sown	5,644
Area sown more than once	5,355
Total cropped area	20,999
Area under non-agricultural uses	2,380
Barren and uncultivable land	391
Land under misc. trees, crops and groves	4,185
Cultivable waste lands	4,711
Fallow land other than current fallows	5,067
Current fallows	10,614

Source: District Statistical Handbook, 2015 West Garo Hills. Tura.

- Forest
- Water logged land
- Land under still water
- Land under misc. trees, crops and groves
- Fallow land other than current fallows
- Area under non-agricultural uses
- Social forestry
- Barren and uncultivable land
- Cultivable waste lands
- Current fallows

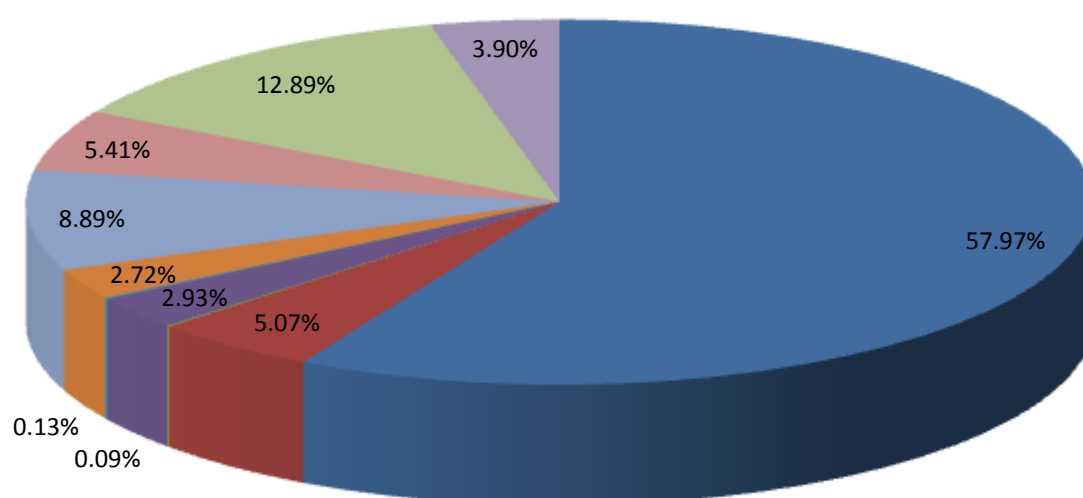


Fig: Per cent land area under different categories in West Garo Hills District

As per statistics, major area covered under rice and maize followed by rapeseed and mustard. However, among the horticultural crops, arecanut, pineapple and cashewnut are covered major portion of area in the district (Table).

Table: Area and Production and Productivity of Principal Crops (2013-14)

Sl. No.	Name of the Crops	Area(ha)	Prod.(MT)	Productivity (kg/ha)
1	Rice	28198	68623	2434
2	Maize	2834	4917	1735
3	Millets	950	506	533
4	Ginger	2271	11452	5043
5	Rape & Mustard	3953	7831	1981
6	Areca nut	4274	7929	1855
7	Sweet Potato	376	1187	3157
8	Banana	1503	18198	12108
9	Cashew nut	3353	7851	2341
10	Pineapple	3523	29008	8234
11	Oranges	1555	3375	2170

Source: District Statistical Handbook, 2015, West Garo Hills. Tura.

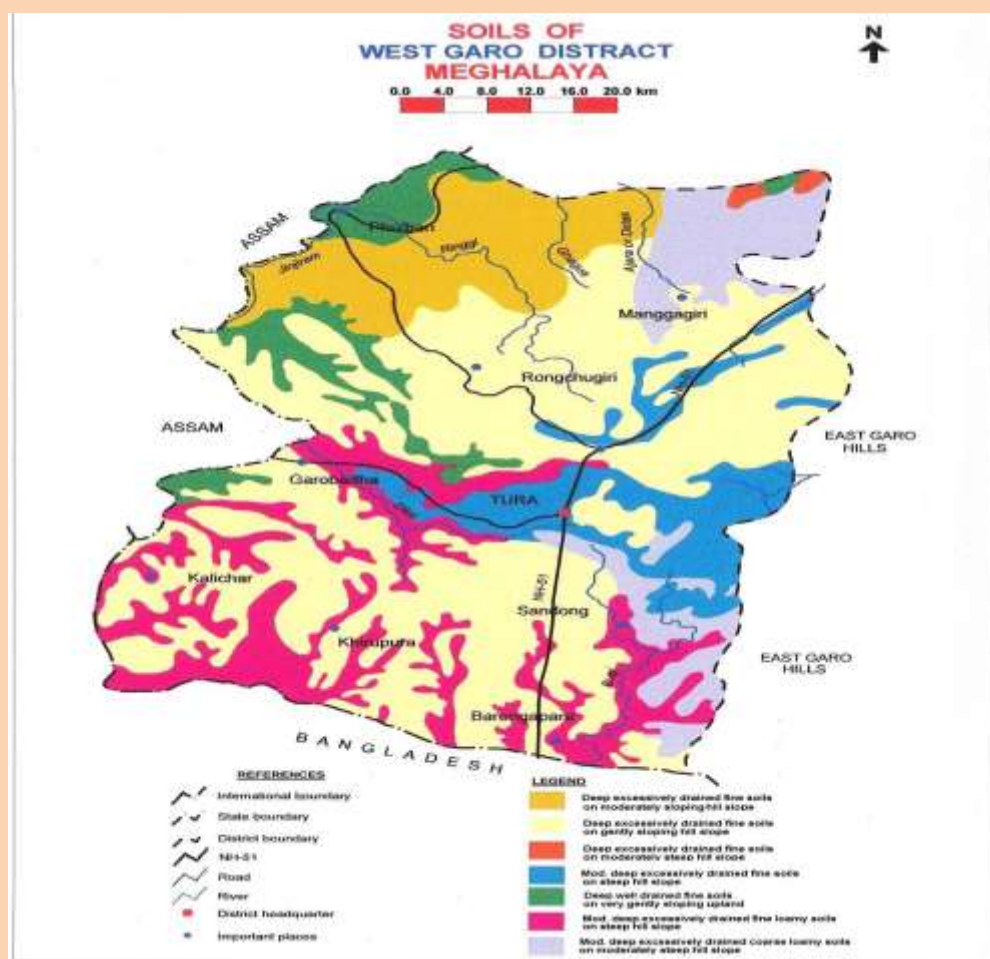
Irrigation has so far played only a minimal role in agriculture in the Garo Hills. The topography itself makes alignment and construction of channels difficult and comparatively costly. However, even in areas where the lay of the land is more favourable, irrigation is confined to areas bordering rivers and streams. Farmers in the hills have traditionally depended upon rainfall, the months of heavy rainfall being May to September. The abundant supply of rain during the growing season reduces the dependence on artificial alternatives, except during the brief dry spell before the monsoons. Wherever irrigation is feasible, the Department of Agriculture as well as the Soil Conservation Department has taken up a number of small-scale irrigation schemes and more are being investigated, especially to meet the needs of farmers in areas where double cropping is in vogue. Not a single major or medium irrigation project exists in the district. There are only minor irrigation schemes and hence agricultural development in the area is dependent on it. The existing irrigation schemes are based only on surface water. Majority of the projects are flow irrigation type as the district is hilly. The most important sources of irrigation in the district (72%) are canal/stream irrigation followed by open/bore well system in the district. Most of the about 52 nos.) of the minor irrigation projects are non-functional to partially functional in the district. Net area under irrigation in the district is 5330.6 ha (Table).

Table: Irrigation Statistics of West Garo Hills district

Particulars	Area(ha)
Net irrigated area	5330.6
Gross irrigated area	7802.40

Source: District Statistical Handbook, 2015, West Garo Hills Division, Tura.

The district shows different types of soil as the provenance differs widely. Red Gravelly Soil and Red Sandy Loam in the hilly slopes and Clayey Loam in the plains are the common soil types. The soils are acidic in nature and comparatively rich in organic matter and nitrogen but poor in phosphorous. The soil types in the district are depicted in fig.



Source: District Contingency plan, 2014

Fig: Soil Map of West Garo Hills, Meghalaya

LIVESTOCK

Livestock is important sector in the district. Pig is the most preferred animal for the farmers. Almost every household in the villages keeps 1 or 2 pigs for their emergency purpose. Pork is their preferred meat followed by beef, chickens and others. Landless and marginal farmers rear Pigs, poultry and goats as their alternate livelihood. Due to food habit, consumption of milk and milk products is less in the district. Very few tribal farmers are engaged in crossbred cows rearing, hence milk production is very less in Garo Hills. There are about 2, 63,343 cattle population including only 2344 numbers cross bred. Though, over the years the number of cross bred cattle is increasing. The details of livestock and poultry population and their productions are furnished in tables 8, 9, 10, 11, 12, 13, 14, 15 given below.

Table: Livestock Population in West Garo Hills

Sl No.	Name of livestock	Cross	Indigenous	Total (in nos)
1	Cattle	2344	260999	263343
2	Buffalo	-	-	11133
3	Sheep	20	7129	7149
4	Goats	-	-	138468
5	Horses and ponies	-	-	864
6	Pigs	2152	126194	128346
7	Rabbits	-	-	565

Source: Report on Integrated sample survey, Govt. of Meghalaya, 2011-12

Table 9: Poultry population

Sl No.	Name	Desi	Improved	Total
1	Chicken	565964	25131	591095
2	Duck	36037	1904	37941

Source: Report on Integrated sample survey, Govt. of Meghalaya, 2011-12

Table: Area (Sq.Km.) with Density of Livestock Population per Sq.Km

Area	Density of livestock population per Sq.Km.						
	Indigenous cattle	Cross bred cattle	Buffalo	Pig	Sheep	Goat	Poultry
3677	59	1	2	22	-	33	193

Source: Report on Integrated sample survey, Govt. of Meghalaya, 2011-12

Table: Milk production in West Garo Hills (2011-12)

SI No.	Name of livestock	Milk production (Tonnes)	Average Milk yield/day/animal (Kg)
1	Cattle (Indigenous)	8998	0.732
2	Cattle (Crossbred)	3687	8.36
3	Buffalo	882	0.932
	Total	13567	

Source: Report on Integrated sample survey, Govt. of Meghalaya, 2011-12

Table: Meat production (2011-12)

SI No.	Name of livestock/poultry	Meat production (Tonnes)	Average yield/animal (Kg)
1	Cattle	2560	87.55
2	Buffalo	198	116.7
3	Pig	1132	40.57
4	Sheep and Goat	162	8.9
5	Poultry	54	0.99
	Total	4106	

Source: Report on Integrated sample survey, Govt. of Meghalaya, 2011-12

Table: Egg production (2011-12)

SI No.	Name	Egg production (In lakhs)
1	Chicken	259.39
2	Duck	18.52
	Total	277.91

Source: Report on Integrated sample survey, Govt. of Meghalaya, 2011-12

FISHERIES

The West Garo Hills district of Meghalaya covers the maximum wetland area (24 %). The wetland area estimated is 7196 ha. The West Garo Hills district has two numbers of fish seed farm which produced about 0.221 millions of fish seed and production of inland fish of 3,93,484 tonnes.

CHAPTER- III. CONSTRAINTS IN AGRICULTURAL PRODUCTION

CROPS

The West Garo Hill district of Meghalaya are characterized by difficult terrain, wide variations in slopes and altitude. Land tenure systems and cultivation practices also are quite diverse. Agricultural production system is predominantly rain fed and mostly mono-cropped. Crop production is characterized by low input–low yield concept. Slash and burn agriculture is still predominantly practiced on steep slopes with reduced fallow cycle of 2-3 years against 10-15 years in the past. The basic issues facing agriculture in the district are low productivity, inadequate access to appropriate technologies and other external inputs, increased natural calamities, etc. The high cost of production due to hilly terrain is also one of the major constraints in crop cultivation. The farmers of the district are mostly small and marginal and mainly practice mono-cropping, thus neglecting the concept of mixed and multiple cropping systems leading to low agricultural productivity and insufficient production. Such small holdings are uneconomic and results in under-investment in agriculture leading to low input use and low production. Even though, the district is blessed with high rainfall, awareness on management of rain water harvesting practices is lacking among the farmers. The local farmers are having poor knowledge for adoption of improved technology in agriculture. Lack of infrastructure facilities is the main reasons for non-adoption of improved technology. Unavailability of quality seeds and other planting materials in time to farmers is also a major constraint. To make the district self-sufficient in food grain production without deteriorating the ecosystems, the improved crop production technology needs to be immediately adapted in farmers field. Integrated farming system and micro watershed approach are proved to be very efficient for management of natural resources and improvement in farm income. Due to lack of proper marketing channels; farmers of rural areas of the district face the problem of selling their produce timely and get minimum monetary return for their farm produce. Additionally, the farming practices are not responsive to the market demand, as most of the land races are traded through small scale informal marketing channels. Irrigation is another crucial constraint to agricultural production. The changes in climate results in frequent occurrence of drought and flood in the district every year, leading to further reduction in production of food grains. Crop-wise major production constraints are given in Table.

Table: Factors affecting productivity of major crops in West Garo Hills District

S/n	Crops	Constraints
1.	Field crops (Paddy, Maize, Wheat)	<ul style="list-style-type: none"> ✚ Climatic aberrations such as drought or flash flood during transplanting of paddy ✚ Incidence of bacterial sheath blight and bacterial streak in paddy ✚ High incidence of rice blast disease ✚ High infestation of pest (Grasshopper, Yellow stem borer, Gall midge, Case worm, Army worm, Gundhi bug) in Paddy ✚ No use of balanced fertilizers and micronutrients particularly zinc ✚ Lack of awareness about earthing up in Maize ✚ Use of low yield local varieties ✚ Poor knowledge about weedicide application ✚ Unscientific application of nutrients ✚ No proper maintenance of spacing ✚ Less productivity ✚ Lack of knowledge about high yielding paddy / hybrid varieties ✚ Improper management of insect, pests and diseases ✚ Lack of knowledge about seed treatment
2.	Vegetables (Cabbage, Cauliflower, Broccoli, Chilli)	<ul style="list-style-type: none"> ✚ Lack of quality planting materials ✚ Lack of balanced nutrition and irrigation ✚ Incidence of bacterial wilt and late blight of tomato ✚ Incidence of bacterial wilt in brinjal and chilli ✚ Poor knowledge of resistance varieties against pest and diseases ✚ Unscientific management of pest and diseases ✚ Poor market linkage. ✚ Low yield
3.	Pulses (Green gram, Black gram, Cowpea, Field pea, French bean)	<ul style="list-style-type: none"> ✚ Untimely sowing of the crop ✚ Unscientific management ✚ Less knowledge about nitrogen fixation and seed treatment with bio fertilizers ✚ No soil test ✚ Incidence of bacterial wilt diseases

S/n	Crops	Constraints
		<ul style="list-style-type: none"> ✚ Low productivity of the crop.
4.	Oilseeds (Toria, Mustard, Sesamum, Rapeseed)	<ul style="list-style-type: none"> ✚ Unavailability of quality seeds ✚ Improper fertilizer application ✚ Less oil content & low yield due to traditional cultivar. ✚ Infestation by aphids
5.	Spices (Ginger, Turmeric)	<ul style="list-style-type: none"> ✚ Incidence of Rhizome rot diseases ✚ Storage pests of seed ginger ✚ Improper nutrient management ✚ Low yield due to traditional practice of cultivation ✚ Incidence of leaf blotch diseases ✚ Lack of knowledge of seed treatment & nutrient management ✚ Low yield due to unscientific cultivation
6.	Tuber crops Colocasia, Elephant Foot Yam, Yam, Tapioca, Sweet Potato, Potato)	<ul style="list-style-type: none"> ✚ Use of local varieties ✚ Lack of balanced nutrition ✚ Low yield ✚ Lack of resistant varieties ✚ Incidence of early and late blight in potato ✚ Unscientific cultivation ✚ No proper maintenance of spacing
7.	Plantation crops (Cashew, Arecanut)	<ul style="list-style-type: none"> ✚ Lack of availability of quality planting materials ✚ No processing units ✚ Attack of stem borer and tea mosquito bug, senile and unproductive orchards in Cashew ✚ No proper rejuvenation in Cashew ✚ No proper nutrient and spacing maintenance ✚ Low yield ✚ Yellow leaf disease in arecanut ✚ Old and unproductive palms ✚ Threat to bud rot in arecanut ✚ Low knowledge about nutrient deficiencies.
8.	Fruit crops (Mango, Litchi, Banana, Jackfruit, Assam lemon, Khasi)	<ul style="list-style-type: none"> ✚ Fruit dropping ✚ Lack of knowledge about training and pruning in Khasi Mandarin ✚ No use of balanced fertilizers and micronutrients

S/n	Crops	Constraints
	Mandarin)	<ul style="list-style-type: none"> ✚ Lack of technical knowledge about value addition ✚ Lack of cold storage facilities ✚ Poor market linkage

LIVESTOCK

In livestock sector, productivity is much lower than expectation. Though pig rearing is the most common occupation of the tribal people in the district, the main drawback in this sphere is that most of the farmers prefer to rear inferior quality of stock of non-descript breeds. About 88% of the total pigs reared by villagers are non-descript local breed and only 12% are Cross Bred pig. Farmers also lack the technical knowledge of rearing animals in scientific way which leads to less production performance and less profit. Non availability of feed and fodder is another major constraint in livestock production. The feed resources used by the farmers in the district are not balanced in terms of protein and energy to meet the nutrient requirement of the animals leading to poor performance. The area under fodder is very minimal. Farmers mainly depend on permanent pastures and grazing lands, waste lands, fallows etc for grazing of animals. But, these resources have been dwindling over time. Also, the veterinary infrastructure in the district is inadequate in terms of quantity.

FISHERIES

SN.	Constraints
1.	Less number of ponds in the district in scientific way
2.	Non maintenance of stocking density
3.	Unavailability of quality fingerlings and feeds
4.	Rearing of fish without timely cleaning of ponds
5.	Lack of awareness campaign, seminars and trainings for transfer of technology about fish culture.
6.	Lack of financial support and services.
7.	Inadequate documentation and conservation of fish genetic resources.
8.	High siltation of rivers due to catchment area
9.	Lack of awareness for farmers' participation in fish culture.
10.	Poor market linkage
11.	Lack of awareness about Integrated farming systems
12.	No scientific hatchery management and fingerlings rearing

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.

CROP

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 (DAO)

This is the apex office to supervise and monitor agricultural development activities in the district. The office is located at Tura or head quarter of the district. The District Agricultural Officer is the Head. The farm is mainly involved in production and distribution of quality planting materials of coconut, arecanut, cashew, black pepper, ornamental and medicinal plants, fruit plants, vegetable seeds, etc. He is assisted by Deputy Directors or Director of Agriculture in performing seasonal or annually activities of the department.

Address for communication

District Agriculture Office, Hawakhana, Tura, West Garo Hills

E-mail: agriwgh-meg@nic.in

ii. Block Development Office (BDO)

All the 6 blocks in the district have one Block Development Officer, each to supervise the activities of Agriculture Development Officers/Horticulture Development Officers, Demonstrators, Gram Savaks etc. The main objective of the Block Development Office is to give all technical guidance to farmers related to agriculture and implementation of various schemes of the department at grassroot level. There are 80 Krishi Bhavans functioning in the district.

iii. District and Local Research Station and Laboratories, West Garo Hill

The laboratory is located at Sangsanggre, Tura. The DLRSL are analyses the soil samples and give suitable recommendations for improving soil fertility. Soil samples are collected through Farmers. The DLRSL conducts campaigns all over the district, collects soil samples from farmers' fields and analyse them and give suitable recommendation for improving soil fertility.

iv. Regulated Market, Garobadha

Regulated market occupies a place of paramount importance in the contemporary agricultural marketing scenario. Creations of marketing infrastructure like storage godown, auction platform, grading platform, internal roads, other supporting services and facilities, introduction of standardized marketing practices, elimination of unauthorized deductions, reasonable and standardized market charges, correct weighment, timely payment, settling of market disputes etc. are some of the parameters of successful functioning of regulated market. The market was formally inaugurated by the then Hon. Chief Minister, Shri. Salseng Marak on the 17th September 1996 which was a red letter day in the history of agricultural marketing in the State. Since 1996-97 till 2000-2001, the market has handled produces of about 1, 63,803 Metric Tonnes approximately, which is worth an estimated value of Rs.7200 Lakhs. The Market has also collected about Rs.71.46 Lakhs as market excess from the traders operating inside the regulated market.

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

The Kendra started functioning on 16 November 1980, under the administrative control of the Indian Council of Agricultural Research (ICAR) for NEH Region, Umiam. The Kendra is situated at Sangsanggre, Tura, about 4 km away from the district headquarters, on the Tura – Dalu road of the district. The operational area of KVK is the entire district and its location is depicted in Fig.

a) Mandates

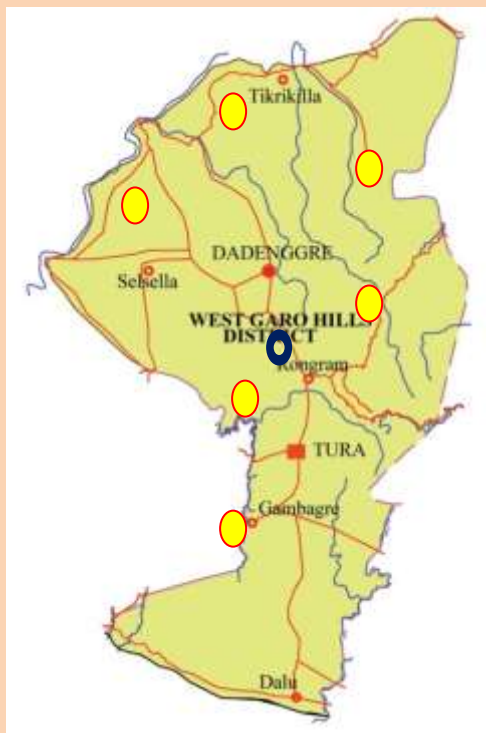
Technology Assessment and Demonstration for its wider Application and to enhance Capacity Development (TADA-CD). To implement the mandate effectively through creation of awareness about improved agricultural technologies, the following activities

be defined for each KVK. (a) On-Farm Testing (OFT) to assess the location specificity of agricultural technologies under various farming systems. (b) Out scaling of farm innovations through Frontline Demonstration (FLD) to showcase the specific benefits/worth of technologies on farmers' fields. (c) Capacity development of farmers and extension personnel to update their knowledge and skills in modern agricultural technologies and enterprises. (d) Work as Knowledge and Resource Centre for improving overall agricultural economy in the operational area. (e) Conduct frontline extension programmes and provide farm advisories using Information Communication Technology (ICT) and other media on varied subjects of interest to farmers. (f) Data documentation, characterization and strategic planning of farming practices.

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.



Source: District Administration portal, 2014

Fig: Location and operational area of KVK, West Garo Hills & South West Garo Hills, Meghalaya

The thematic areas of training programmes under different disciplines executed by KVK are as follows:

Horticulture

- + Plant propagation techniques
- + Homestead/ nutritional gardening
- + Protective cultivation (Green Houses, Shade Net etc.)
- + Vegetable cultivation
- + Nursery raising
- + Seed production of vegetables
- + Off-season vegetables
- + Production of low volume and high value crops
- + Training and Pruning
- + Layout and Management of Orchards
- + Cultivation of Fruit
- + Rejuvenation of old orchards
- + Production and Management technology of plantation crops
- + Production and Management technology of tuber crops

Agronomy

- ✚ Crop production
- ✚ Weed Management
- ✚ Resource Conservation Technologies
- ✚ Cropping Systems
- ✚ Crop Diversification
- ✚ Integrated Farming Systems
- ✚ Water management
- ✚ Seed production
- ✚ Integrated Crop Management

Soil Science

- ✚ Soil fertility management
- ✚ Soil and Water Conservation
- ✚ Integrated Nutrient Management
- ✚ Production and use of organic inputs
- ✚ Management of Problematic soils
- ✚ Micro nutrient deficiency in crops
- ✚ Nutrient Use Efficiency
- ✚ Vermiculture

Plant Protection

- ✚ Integrated Pest Management
- ✚ Integrated Disease Management
- ✚ Bio-control of pests and diseases
- ✚ Production of bio control agents and bio pesticides
- ✚ Mushroom production
- ✚ Bee Keeping

Animal Husbandry

- ✚ Dairy Management
- ✚ Poultry Management
- ✚ Piggery Management
- ✚ Rabbit Management
- ✚ Disease Management
- ✚ Feed management
- ✚ Sheep and goat rearing
- ✚ Fodder production

Home Science

- + Household food security by kitchen gardening and nutrition gardening
- + Designing and development for high nutrient efficiency diet
- + Minimization of nutrient loss in processing
- + Storage loss minimization techniques
- + Value addition
- + Income generation activities for empowerment of rural women
- + Rural Crafts
- + Women and child care
- + Tailoring and Stitching

Agricultural Extension

- + Leadership development
- + Group dynamics
- + Formation and Management of SHGs
- + Mobilization of social capital
- + Entrepreneurial development of farmers/youths

ii. Front Line Demonstration

Organizing Front Line Demonstrations on newly released technologies in horticultural, field crops, plant pathology, soil science, agricultural extension and animal sciences under farmers' field conditions to popularize and adoption of the new technology and generate production data and feedback information and which 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 centres 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. Plant and Animal Clinic

Krishi Vigyan Kendra organises plant and animal clinic to cater to the various needs of the farming community. An artificial insemination facility is also attached to the clinic to upgrade the genetic stock of local dairy animals. The clinic extends vaccination facilities to combat the communicable diseases in animals and poultry birds and organizes

animal health camps in association with the State Animal Husbandry Department and NGO. The clinic also offers consultation and door-step treatment of animals.

v. Farm Advisory Services

The expert of KVK 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.

vi. Farmers Study Tours/Exposure visit

The Kendra organizes study tours or exposure visit for farmers to various research centres and fields of progressive farmers for 'seeing is believing'.

vii. Farmer's visit to the Kendra

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

viii. Exhibitions, Kisan Melas, Camps, etc.

The KVK regularly organise and participates in exhibitions in collaboration with local and statutory bodies, depicting its various activities and providing on the spot consultancies to the visitors. The Kendra's stalls have bagged many awards. Farmers and others visit the pavilions of the KVK and avail the facilities offered there, including supply of elite planting materials.

ix. Kisan Mobile Advisory Service (KMAS)

Under these services, the experts from KVK always send the message related to various crops, livestock and allied activities to the farmers.

x. Production and supply of planting materials, breeds of animals and other technological inputs

The Kendra produces, supply and sells planting materials of vegetables, fruits and plantation crops. Improved breeds of cows, goats, etc. are also sold to the farmers. Other technological inputs like bio-control agents and bio-products are also made available to farmers.

xi. Other extension activities

The Kendra also organizes the following programmes:

- a) Field days
- b) Farmers day

- c) Film shows
- d) Seminars
- e) Foot and mouth disease eradication programme
- f) World food day
- g) Women in agriculture day
- i) Publication of popular articles
- j) Farmers Scientist Interaction Programme
- k) TV programme
- l) Method demonstration
- m) Vaccination & health care camp
- n) Exposure visit
- o) Scientist visit to farmers field
- p) Documentation of Indigenous Technical Knowledge (ITK) etc

Address for communication

Senior Scientist and Head

Krishi Vigyan Kendra

Sangsanggre P.O., Dobasipara-794005

West Garo Hills, Meghalaya

Phone: 03651-222535

Fax: 03651-222535

E-mail: kvkwestgarohills@gmail.com, kvkestgarohills@rediffmail.com

Website: www.kvkwestgarohills.nic.in

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 Garo Hills District ATMA office is located at Tura and the District Collector 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 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 clubs, SHGs 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 coordination between various State funded technical departments.
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

Sangsanggre, West Garo Hills

Dobasipara-794005

Phone: 0495-2370892

E-mail: atmawgh@gmail.com

4. Lead Bank

The Lead Bank Scheme provides leadership in initiating, streamlining and accelerating the process of development of the respective district by enlisting the co-operation of other banks and by maintaining continuous liaison with Government and quasi Government agencies. The State Bank of India Bank functions as the lead bank in the district.

Address for communication

General Manager
State Bank of India, Evening Branch
Lead Bank Office
Nakham bazaar, Tura-794001
West Garo Hills, Meghalaya

5. Other banking institutions

All nationalized banks and other financial sectors such as Meghalaya Rural Gramin Banks in the district have special schemes for the promotion of agriculture and allied fields in the district.

6. 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.

7. Colleges and vocational training Institutes

The district has one government polytechnic college located at Tura, West Garo Hills. The college offer various community development and self-employment generating programmes benefiting the youth. The RVTI, ITI and College of Home Science located at various places in the district offer specialized courses in agriculture and allied fields for students.

8. District Industries and Commerce Centre (DICC)

It provides a wide range of hand holding escort services in areas such as technology, skill up gradation, training, exposure visit, common production facilities, small financial assistance, supply and marketing support services.

9. Primary Agriculture Cooperative Societies

The Primary Agriculture Cooperative Societies works for the promotion and development of agriculture in the district. The society conducts agricultural exhibitions every year.

10. Food Processing and Nutrition Centre

There were two Food Processing and Nutrition Centre i.e. Polytechnique College and College of Home Science. The objective of this centre is to provide training in the field of home scale preservation of fruits and vegetables, preparation of weaning foods, bakery and confectionary food and nutrition education.

Address for communication

1. The Dean

College of Home Science, CAU
Chunmati, Sangsanggre, Tura
West Garo Hills, Meghalaya
Phone: 03651-233486

2. The Principal

Polytechnique College
Tura, West Garo Hills, Meghalaya
Phone: 9862680648

LIVESTOCK

1. Department of animal husbandry and veterinary

The Department of Animal Husbandry and Veterinary, West Garo Hills, Meghalaya is entrusted with the responsibility of all aspect of Livestock and Poultry Development, like, production, processing and marketing of livestock and poultry and their products

through augmentation of production of milk, meat, and eggs; animal health care and prevention of animal diseases, creation of suitable infrastructure for breeding, feeding and management of livestock and poultry. Besides, the Department is engaged in providing the required training and extension support to livestock producers so as to promote scientific rearing of livestock and poultry amongst them with consequent generation of employment avenues in the rural areas. The department has implemented following programmes for development of the overall livestock sector in the district.

a) Veterinary Services and Animal Health: The main objective of the Scheme is to render Veterinary Aid including preventive measures against specific and non-specific diseases including castration of scrub bulls. At present, 1 Veterinary Hospital, 17 Veterinary Dispensaries, 2 Veterinary aid centres, 3 Mobile Veterinary Dispensaries and 1 Vigilance are there in the district for this purpose.

b) Cattle Development: This is an integrated programme of Cattle Development including breeding and management practices. The main objective of the scheme is to enhance Milk production in the state by upgrading the local stock through cross breeding by adopting improved breeding practices by means of artificial insemination. One Cattle breeding farm were established (Livestock Farm, Rongkhon) with Exotic breeds like Jersey and Holstein-Friesian for maintenance of superior germplasm and production of inputs for supply to farmers.

c) Intensive Cattle Development Project: Artificial inseminations were carried out in the district to produce improved calves for augmenting Milk production. Frozen semen Technology had been introduced for Artificial Insemination programmes. One Liquid Nitrogen Plant had been installed at Tura for such purposes. The Department has been implementing various schemes for Cattle development which include distribution of calves, heifer, cows and young bulls to the selected farmers falling under different categories of general, educated un-employed youth and also for small / marginal farmers and agricultural labourers.

d) Poultry Development: The objective of the programme is to meet the requirement of breeding stock, table and hatching eggs. This also aims at improving the local breed by distribution of improved breed.

e) Piggery Development: The suitability of the climate, fondness to pork among the major section of the population and availability of good market for pork promises wide possibilities of development of the pig industry in the district. To upgrade the local pig germplasm, the department of Animal Husbandry and Veterinary had taken up

programmes to introduce improved breeds of pigs such as Saddle back, Hampshire, Large White Yorkshire, TND in the district. Two pig breeding farms were established (Dalu and Gindo) under this programme in West Garo Hills. These farms produce piglets and supply to farmers.

f) Feed and Fodder Development: There is a huge shortfall in green fodder production in the district. One Fodder Demonstration Farm (Tura) and one Fodder and Seed Production farm (Adugre) were established under this project to fulfil the fodder and seed requirement in Garo Hills.

2. Dairy Development

The objective of the programme is to make overall development in the Dairy sector. There is one “Dairy Plant” with 8000 litre capacity in West Garo Hills. Procurement and distribution of milk has been taken up by “District Society for Integrated Dairy Development Project (Megha), Tura.

3. Dairy Farming Cooperative Societies

The Dairy Farming Cooperative Societies undertakes several programmes to enhance milk production in the district. Under the Fodder Development Programme, the dairy farmers are given fodder seeds and root slips at scheduled rates and fertilizers in full subsidy. Incentives for fodder cultivation on commercial scale are provided to farmers and dairy co-operatives to take up massive fodder production. Assistance is also offered for conservation of fodder as silage and hay. There are 21 Dairy Farming Cooperative Societies in the district promoted by the department. The society extends assistance to sustain and develop these primary and establishment of model dairy farm units. Cattle feed, mineral mixture, clean milk production kit and vitamin supplements at subsidized prices are also distributed to deserving farmers. In order to adopt scientific management practices for rearing cows, Dairy Extension Officers and Dairy Farm Instructors conduct discussion classes, demonstration classes, film shows, exhibitions, cattle shows and seminars.

FISHERIES

The Department of Fisheries is an important productive sector under the Government of Meghalaya. The department implements all the development and management programmes envisaged by the Government in the fisheries sector. The Department has a major role to play in the economy of the State. In addition, the Department carries out a number of programmes and projects for the welfare of fisher folk. The fisheries

department has several agencies under its jurisdiction aiming at development of fisheries and welfare of fishermen.

Address for communication

The Superintendent of Fishery

Dakopgre, Tura

West Garo Hills, Meghalaya

CHAPTER-V. RESEARCH AND DEVELOPMENT ORGANIZATIONS RELEVANT TO DISTRICT'S AGRICULTURE

1. North-Eastern Hill University, Tura Campus

The NEHU, Tura campus was established in February 1996. The campus started with the department of English and Garo. The Department of Education was started in 2001 and the Department of Rural Development and Agricultural Production (RDAP) in 2002. The Department of Management was started from July 2006. Four Departments viz., Department of Agri-Business Management & Food Technology, [Department of Computer Applications](#), [Department of History & Archaeology](#) and Department of Horticulture was started from July 2012. The Master's degrees and research students working for their M.Phil. and Ph.D. degrees are also offered in NEHU Tura Campus.

2. College of Home Sciences, Central Agricultural University (CAU)

The jurisdiction of the College stretches to North Eastern Hill States. The mandate of the College includes imparting education in different branches of Home Science (Foods and Nutrition, Textile and Apparel Designing, Human Development & Family Studies, Family Resource Management, Extension Education & Communication Management) and Allied Sciences, to contribute in the advancement of learning and research in Home Science and allied Science in these regions. Along with these, mandates also include to undertake programme of extension education in the North East Region. To undertake other activities for the development of North Eastern Region and to establish linkages with line departments, other scientific institution located in the region, across the country as well as overseas in the areas of its domain.

Mission Statement

The college of Home Science's primary mission is to impart quality education in all branches in order to create proficient manpower for catering the needs of the society. The mission of the college also includes the delivering diversified subject matter content in accordance with the spectrum of philosophy of individual and social institution for building, sensitizing and applying socially relevant multi disciplinary knowledge and refining practices by developing scientific and technical skills for self-actualization and betterment of family and community in today's challenging world.

Goals

1. To impart Home Science education for improving the quality of life at micro, and macro level of the society with added emphasis on promoting professionalism among students.
2. To promote cognitive and effective learning among students for technology transfer to farm/rural families within the culturally relevant conditions and eco-based farming household system.
3. To strengthen teaching-extension-research linkages through family and community focused research for the holistic improvement in quality of farm/rural families.

Objectives

a. Food Science and Nutrition:

To develop knowledge and skill in micro and macro management of food science for ensuring nutritional security and safeguarding human health.

b. Human Development:

To develop knowledge and skill regarding development stages of life cycle, providing stimulative environment for human development and management of micro and macro resources for care of family and children with special needs.

c. Family Resource Management:

To develop knowledge of micro and macro family resources with emphasis on development of skills for management of eco-friendly household technologies for work simplification; for space management and aesthetic enrichment of the house and to empower with knowledge on family finance and consumer education.

d. Clothing and Textiles:

To develop knowledge of textiles and skill in apparel designing and clothing construction, value addition to apparels and eco-friendly textile products; clothing for special needs; knowledge of traditional textiles and skill on textile technologies for starting micro-enterprises.

e. Home Science Extension Education:

To understand the concept and nature of rural family centered development programmes; the methodologies for transfer of technologies to rural client and to develop skill in preparing and using communication materials for message delivery through varied media.

Future Goals & Objectives

1. To expand educational programmes by starting B.Sc Applied Nutrition & Dietetics, M.Sc & Ph.D degrees in all the areas of Home Science.
2. To Contribute in advance research activities
3. To popularise vocational training courses for the benefit of school dropout & unemployed youth.
4. To improve standard of living by imparting knowledge, and skills to the rural community through extension activities.
5. To establish close networking with advance National & International Institutions in the country and abroad for exchange of information as well as faculty & PG-students.
6. For effective & speed transfer of technology to rural community and strengthen the infrastructure needed.
7. To upgrade library facilities through e-journals, internet etc.
8. To upgrade laboratory infrastructure & facilities.
9. To strengthen the research work relevant to all Department.
10. To improve the performance of faculties exposing them to national & international training programme etc.

Short term & Long term Plan

Short term Plan:

1. To give quality education, knowledge and skill to the student in time for their regular degree course. To make them ready for competitive exams like JRF etc for their higher studies. The college is organizing JRF Mock test and giving counseling to the students for their placement and for better future avenues. Every year each dept. plan to conduct extension activities in the related field for betterment of life of the rural people.
2. Research work and Extension activities are other areas where faculty members are involved regularly.
3. Establishing college infrastructures viz. development of departmental and laboratory infrastructure including equipment, farmer's hostel and others.
4. Strengthening of existing academic programmes via. B.Sc. Home Science.
5. To upgrade functioning of student counseling and Placement Cell.
6. Starting Short-Term vocational/ course in other Departments also.
7. Development of experiential learning units etc.

8. Expand research and extension education activities to the entire state of North East.
9. Developing close networking with line departments and farmers.
10. Initiating high priority research relevant to this region.
11. Filling up of existing vacant positions of teaching and non-teaching staff.
12. Man power development through training of the staff (both teaching and non-teaching), participating in seminar, symposium & workshop, deputing faculty for higher study like Ph.D., Post-Doctoral Research exposure etc.

Under Long term Plan:

1. Under extension activity the college has adopted a village to disseminate knowledge and skills to the rural people to improve their economic status and livelihood.
2. Expansion of educational programme (introduce Master and Ph.D. Degree in all the different disciplines of Home Science)
3. Establishing advance study centres.
4. Faculty and student exchange programme with national and international institutions.
5. Income generation-establishing production units as well as service provider (consulting service).

Contact

Dr. P. Das, I/C

College of Home Science, CAU

Phone:-(03651)233486 (Office)

Telefax: - (03651) 232828

E-mail address: deancohsc@yahoo.co.in

3. Rubber Board, West Garo Hills, Meghalaya

Objectives:

To promote by such measures as it thinks fit the development of the rubber industry.

1. Without prejudice to the generality of the foregoing provision the measures referred to there in may provide for:
 - ✚ Undertaking, assisting or encouraging scientific, technological or economic research.
 - ✚ Training students in improved methods of planting, cultivation, manuring and spraying.

- ✚ The supply of technical advice to rubber growers
 - ✚ Improving the marketing of rubber.
 - ✚ The collection of statistics from owners of estates, dealers and manufacturers.
 - ✚ Securing better working conditions and the provision and improvement of amenities and incentives to workers.
 - ✚ Carrying out any other duties which may be vested with the Board as per rules made under this Act.
2. It shall also be the duty of the Board:
- ✚ To advise the Central Government on all matters relating to the development of the rubber industry, including the import and export of rubber.
 - ✚ To advise the Central Government with regard to participation in any international conference or scheme relating to rubber.
 - ✚ To submit to the Central Government and such other authorities as may be prescribed, half yearly reports on its activities and the working of this Act, and
 - ✚ To prepare and furnish such other reports relating to the rubber industry as may be required by the Central Government from time to time.

Address for communication

Dr. R.P. Singh
 Rubber Board
 Dakopgre -794002
 West Garo Hills, Meghalaya
 Phone: 03651-232413

4. Muga Silkworm Seed Organization, Central Silk Board, West Garo Hills

Objectives:

- ✚ To act as an apex Research Institute for providing research and developmental support for Muga and Eri sericulture.
- ✚ To conduct basic, strategic and applied research to increase production and productivity of silkworms and their host plants.
- ✚ Improvement of food plants as well as silkworm eco-races and hybrids.
- ✚ To conduct socio-economic research for assessing sustainability of newly developed technologies.

- ✚ To percolate the research findings to the end users through extension and training mechanism.

Activities:

- ✚ To exploration, collection, introduction and conservation of muga and eri food plants and silkworm germ plasm.
- ✚ To evolve suitable technologies and package of practices for improving productivity of muga and eri silkworms and their food plants.
- ✚ To work on germplasm improvement in muga and eri silkworm ecotypes through conventional breeding and through biotechnological approach.
- ✚ To promote collaborative inter-institutional research programmes with other research institutes located in North East.
- ✚ To develop suitable technologies on Muga and Eri post cocoons for easy extraction, product diversification and popularization of technologies for wider absorption.
- ✚ To organize extension programme in association with DOS of NE states through the nested units.
- ✚ To impart Training on Muga and Eri Rearing Technology, Seed Technology, Reeling and Spinning and organize the Refresher Course for DOS staff.

Address for communication

Mr. S.A.S.Rahman

Officer In Charge

Dakopgre -794002

West Garo Hills, Meghalaya

Phone: 08575014629

5. Coffee Board, West Garo Hills

Objectives

- + Carryout focused research on coffee to develop suitable coffee varieties and package of practices to achieve improved production, productivity and quality.
- + Undertake transfer of technology from lab to land through the extension network spread all over the country
- + Implement development plan programs like replanting, new planting and quality up gradation.
- + Carryout export promotion activities like participation in overseas trade fairs, organizing visit of roaster delegations to Indian Coffee tracts and cupping sessions.
- + Take up domestic promotion efforts involving the private sector to expand domestic consumption.
- + Establish and develop database on all aspects of the industry.
- + Dissemination of market information on a regular basis to various segments of the industry.
- + To give policy formulation advice to Government and the self-regulated industry
- + Provide necessary support to the planters in crisis and carryout necessary labour welfare measures
- + Conducting training programs which aims to develop and provide qualified cup tastes to various segments of the industry.
- + Carrying out necessary steps for the improvement of coffee quality.

Address for communication

Mrs. Pranabti Goswami

Senior Liason Officer

Araimile-794101

West Garo Hills, Meghalaya

Phone: 03651- 232204

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

It 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. In discharging its role as a facilitator for rural prosperity NABARD is entrusted with

- + Providing refinance to lending institutions in rural areas
- + Bringing about or promoting institutional development and
- + Evaluating, monitoring and inspecting the client banks

Besides this pivotal role, NABARD also:

- + Acts as a coordinator in the operations of rural credit institutions
- + Extends assistance to the government, the Reserve Bank of India and other organizations in matters relating to rural development
- + Offers training and research facilities for banks, cooperatives and organizations working in the field of rural development
- + Helps the state governments in reaching their targets of providing assistance to eligible institutions in agriculture and rural development
- + Acts as regulator for cooperative banks and RRBs

Objectives:

NABARD was established in terms of the Preamble to the Act, "for providing credit for the promotion of agriculture, small scale industries, cottage and village industries, handicrafts and other rural crafts and other allied economic activities in rural areas with a view to promoting IRDP and securing prosperity of rural areas and for matters connected therewith in incidental thereto".

The main objectives of the NABARD as stated in the statement of objectives while placing the bill before the Lok Sabha were categorized as under:

- + The National Bank will be an apex organisation in respect of all matters relating to policy, planning operational aspects in the field of credit for promotion of Agriculture, Small Scale Industries, Cottage and Village Industries, Handicrafts and other rural crafts and other allied economic activities in rural areas.
- + The Bank will serve as a refinancing institution for institutional credit such as long-term, short-term for the promotion of activities in the rural areas.
- + The Bank will also provide direct lending to any institution as may approved by the Central Government.
- + The Bank will have organic links with the Reserve Bank and maintain a close link with in.

Major Activities

- ✚ Preparing of Potential Linked Credit Plans for identification of exploitable potentials under agriculture and other activities available for development through bank credit.
- ✚ Refinancing banks for extending loans for investment and production purpose in rural areas.
- ✚ Providing loans to State Government/Non Government Organizations (NGOs)/Panchayati Raj Institutions (PRIs) for developing rural infrastructure. Supporting credit innovations of Non Government Organizations (NGOs) and other non-formal agencies.
- ✚ Extending formal banking services to the unreached rural poor by evolving a supplementary credit delivery strategy in a cost effective manner by promoting Self Help Groups (SHGs)
- ✚ Promoting participatory watershed development for enhancing productivity and profitability of rainfed agriculture in a sustainable manner.
- ✚ On-site inspection of cooperative banks and Regional Rural Banks (RRBs) and off-site surveillance over health of cooperatives and RRBs.

Role and Functions

NABARD is an apex institution accredited with all matters concerning policy, planning and operations in the field of credit for agriculture and other economic activities in rural areas.

- ✚ It is an apex refinancing agency for the institutions providing investment and production credit for promoting the various developmental activities in rural areas.
- ✚ It takes measures towards institution building for improving absorptive capacity of the credit delivery system, including monitoring, formulation of rehabilitation schemes, restructuring of credit institutions, training of personnel, etc.
- ✚ It co-ordinates the rural financing activities of all the institutions engaged in developmental work at the field level and maintains liaison with Government of India, State Governments, Reserve Bank of India and other national level institutions concerned with policy formulation.
- ✚ It prepares, on annual basis, rural credit plans for all districts in the country; these plans form the base for annual credit plans of all rural financial institutions.
- ✚ It undertakes monitoring and evaluation of projects refinanced by it.

✚ It promotes research in the fields of rural banking, agriculture and rural development.

Address for communication

Mr. S.K.Baruah
Deputy Development Manager
Fancy Valley, Tura-794001
West Garo Hills, Meghalaya
Phone: 03651-224925

CHAPTER-VI PLANS AND SCHEMES FOR PROMOTION OF AGRICULTURE

Several organizations are responsible for promotion of agriculture and allied fields through development and implementations of specific plans and schemes. The major plans and schemes of various institutions are briefly described below:

CROPS

1. Department of Agriculture

1. Centrally sponsored schemes under Agriculture

a. National Food Security Mission (NFSM)

Objectives:

1. Increasing production of rice, pulses and coarse cereals through area expansion and productivity enhancement in a sustainable manner.
2. Restoring soil fertility and productivity at the individual farm level and enhancing farm level economy and profits to restore confidence amongst the farmers.

Pattern Of Assistance: Extension, Technology demonstrations and support, Subsidy on inputs and implements, training.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers having sufficient available cultivable land on first come first serve basis

Whom to Contact

1. Agriculture Development Officer of respective CD Block/ Agriculture circle.
2. Sub Divisional Agricultural Officer
3. District Agricultural Officer.

b. National Project on Management of Soil Health and Fertility

Objectives:

Strengthening of Soil testing laboratories, promoting balance use of fertilizer and integrated nutrient management.

Pattern of Assistance: Awareness program, demonstration, supply of inputs, extension, soil testing services.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers having sufficient available cultivable land on first come first serve basis

Whom to Contact

1. Agriculture Development Officer of respective CD Block/ Agriculture circle.
2. Sub- Divisional Agricultural Officer.
3. Research Officer, Soil Testing Laboratory.
4. District Agricultural Officer.

c. Research Project on Rice (AICRP)

Objectives:

To conduct adaptive trials / experiments especially on paddy at different agro-zones involving farmers. Experimental research studies are also carried out at farmers' field involving different locations and altitudes. Farmers are also trained in the safe use of inputs, fertilizers, pesticides etc.

d. National Watershed Development Project for Rainfed Area (NWDPA)

Objectives:

The main objective of the scheme is:-

- i) Conservation, development and sustainable management of natural resources.
- ii) Enhancement of agricultural production and productivity in a sustainable manner.
- iii) Restoration of ecological balance in the degraded and fragile rainfed ecosystems by greening these areas through appropriate mix of trees, shrubs and grasses.

- iv) Reduction in regional disparity between irrigated and rainfed areas and
- v) Creation of sustained employment opportunities for the rural community including the landless.

e. Special Jute Development Programme.

Objectives:

The objective of the scheme is to increase the production and productivity of jute in the State including qualitative improvement of jute fibre.

Pattern of Assistance: The programme is 100% funded by the Government of India.

Eligibility Criteria: All states are eligible to avail this scheme.

How to Avail: The benefits of the scheme reach the farmers through State Departments of Agriculture.

Mode of Selection of Beneficiary(s): First come first serve basis subject to fulfilment of requisite criteria.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle.
2. Sub - Divisional Agricultural Officer.
3. District Agricultural Officer.

f. Integrated Pest Management (IPM)

Objectives:

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.

Pattern of Assistance The scheme is 100 percent centrally funded.

Eligibility Criteria: Any farmer of the States or Union Territories covered under the scheme can avail this policy.

How to Avail: Persons to be contacted The Plant Protection Adviser Directorate of Plant Protection, Quarantine & Storage, Govt. of the India, N.H. IV, Faridabd-121001 (Haryana), Fax No. 0129-5412125, PH. No. 01295413985.

g. Support to State Extension Programme for Extension Reforms (ATMA)

Objectives:

Providing autonomous institutions at the state, district block level. Adopting group approach, Addressing gender concerns, convergence with allied sectors through an integrated and broad based delivery system.

Pattern of Assistance: Awareness programme, extension, training and exposure visit

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture.

Mode of Selection of Beneficiary(s): Bonafide farmers having sufficient available cultivable land on first come first serve basis.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle
2. Sub Divisional Agricultural Officer
3. District Agricultural Officer
4. Project Director ATMA
5. Director MAMETI.

2. State Plan Scheme

i. Implementation of e -Governance

Objectives:

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

Pattern of Assistance: Training, Awareness programme, extension, Technology support.

Whom to Contact: Agriculture Information officer, Directorate of Agriculture.

ii. Seed Farm - Production of Cereals, Pulses, Oilseeds etc.

Objectives: 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 50percent subsidy.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.025 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers having sufficient available cultivable land on first come first serve basis.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle
2. Sub Divisional Agricultural Officer
3. District Agricultural Officer.

iii. Bio Control Laboratory

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

Pattern of Assistance: Supply of Bio control agents to farmers.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.025 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle

Mode of Selection of Beneficiary(s): Bonafide farmers having sufficient available cultivable land on first come first serve basis.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle
2. Sub Divisional Agricultural Officer
3. District Agricultural Officer.

iv. Integrated Farming in Micro Watershed

Objectives: To promote integrated farming activities for improved livelihood in complementary manner.

Pattern of Assistance: Training, Awareness programme, Extension, Technology support, Subsidy on inputs.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.025 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers having sufficient available cultivable land on first come first serve basis.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle
2. Sub - Divisional Agricultural Officer
3. District Agricultural Officer.

v. Training of Rural Educated Youth for Self-Employment in Farm Based Activities. (TREYSEFA)

Objectives: To open opportunities for rural educated unemployed youths and to take up agriculture as an enterprise for gainful employment

Pattern of Assistance: Trainees will be assisted with seed money to start their respective ventures on successful completion

Eligibility Criteria: Applicants residing in rural areas who have studied upto Class X, possessing agriculture land and desirous to set up own enterprises.

How to Avail: Bonafide farmers can apply in prescribed form through the District Agriculture Officer/ District Horticulture Officer of their respective district.

Mode of Selection of Beneficiary(s): Eligible applicants will be screened and selected by the respective District Agriculture Officer, District Horticulture Officer.

Whom to Contact:

1. District Agriculture Officer
2. District Horticulture Officer of the respective districts.

vi. Agriculture Academic Studies

Objectives: Sponsoring of seat for undergoing 4 years degree course in Agriculture/ Horticulture.

Pattern of Assistance: Sponsorship of seat, book grant and scholarship.

Eligibility Criteria: Students who have passed 10 + 2 in Science with Physics, Chemistry and Biology as a subject studied.

How to Avail: Students who have passed 10 + 2 in Science can apply in prescribed form as and when it is so advertised.

Mode of Selection of Beneficiary(s): By merit and based on the States Reservation Policy.

Whom to Contact: Applicant are advised to see the advertisement which will appear during April-May in major newspaper of the State.

vii. Winter Cropping and Development of Cultivable Land

Objectives: Aims at area expansion of cereal, pulses, oilseeds, and vegetables during Rabi season.

Pattern of Assistance: Training, Extension, Technology support, Subsidy on inputs.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.025 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers having sufficient available cultivable land on first come first serve basis.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle
2. Sub Divisional Agricultural Officer
3. District Agricultural Officer.

viii. Seed Testing Lab and Seed Certification

Objectives: To provide seed testing services for farmers and establishment of seed certification laboratory.

Pattern of Assistance: To provide seed testing services for farmers free of cost including seed certification services.

Eligibility Criteria: Bonafide farmers engaged in Agriculture.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Directorate of Agriculture
2. District Agriculture Officer
3. Sub-Divisional Officer
4. Agriculture Development Officer.

ix. Soil Testing Lab

Objectives: For analysing soil samples preceding application of fertilizer in correct dosage in farmer's field.

Pattern of Assistance: To provide soil testing services for farmers free of cost.

Eligibility Criteria: Bonafide farmers engaged in Agriculture.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Directorate of Agriculture
2. District Agriculture Officer
3. Sub-Divisional Officer
4. Agriculture Development Officer.

x. Plant Protection including IPM

Objectives: Aim to control pests and diseases including weeds and rodents.

Pattern of Assistance: Supply of pesticide and sprayers to farmers for sale at 50% subsidy. However, for endemic areas the same are supplied free of cost.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Directorate of Agriculture
2. District Agriculture Officer
3. Sub-Divisional Officer
4. Agriculture Development Officer.

xi. Special Development Programme for Areas Bordering Assam

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

Pattern of Assistance: Training, Awareness programme, Extension, Technology support, Subsidy on inputs.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle
2. Sub Divisional Agricultural Officer
3. District Agricultural Officer.

xii. Maize Development through Cluster Approach

Objectives: To achieve notable increase in Maize production by adopting crop and location specific production technology.

Pattern of Assistance: Supply of quality seeds to farmers for demonstration or for sale at 50% subsidy.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Directorate of Agriculture
2. District Agriculture Officer
3. Sub-Divisional Officer
4. Agriculture Development Officer.

xiii. Agriculture Information Unit

Objectives: To strengthen agriculture extension programme by disseminating news on the latest scientific and farmer friendly methods of cultivation.

Pattern of Assistance: Free distribution of information leaflets, package of practices, booklets etc., including sponsoring Farmers Group, SHG to exposure programmes like trade fairs, expos, exhibitions in and outside the State.

Eligibility Criteria: Bonafide farmers engaged in Agriculture.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Does not arise. All farmers can avail publication materials on first come first serve basis

Whom to Contact:

1. Sectoral Officer, Directorate of Agriculture
2. District Agriculture Officer
3. Sub-Divisional Officer
4. Agriculture Development Officer.

xiv. Farmers Training Institute

Objectives: Farmers Training Institute - FTI conduct specialized training in new areas where farmers were hitherto unaware including conducting exposure visit and field tours to agriculturally advanced States.

Pattern of Assistance: Farmers are imparted specialized training at the centre including in farmers field. Exposure programmes and field tours are also conducted for farmers group.

Eligibility Criteria: Bonafide farmers engaged in Agriculture.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis

Whom to Contact:

1. Sectoral Officer, Directorate of Agriculture
2. District Agriculture Officer
3. Sub-Divisional Officer
4. Agriculture Development Officer

xv. Jute Technology Mission

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

Pattern of Assistance: 50% subsidy on inputs.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

The District Agriculture Officer of the concerned district/ Sub-Divisional Agriculture Officer.

xvi. Basic Agriculture Training Centre

Objectives: To provide short term vocational training for educated unemployed youths in agriculture enterprises.

Pattern of Assistance: Free short term training to educated unemployed rural youths.

Eligibility Criteria: Educated unemployed rural youths who are interested in starting farm based activities and having owned or leased agriculture land.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis

Whom to Contact:

The District Agriculture Officer of the concerned district/ Sub-Divisional Agriculture Officer.

xvii. Agriculture Engineering (Mechanical)

Objectives: To provide hiring of power tillers and paddy reapers to farmers at 50% subsidy.

Pattern of Assistance: Providing 50% subsidy for purchase of improved farm machinery and implements.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

The District Agriculture Officer of the concerned district/ Sub-Divisional Agriculture Officer.

xviii. State Rice Mission

Objectives: To increase rice production and productivity in the state, to meet the consumption requirement and to bridge the deficit between demand and availability to consumers.

Pattern of Assistance: Providing Training, Awareness programme, Extension, Technology support, Subsidy on inputs.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Agriculture Development Officer of a CD Block/Agriculture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Agriculture Development Officer of respective CD Block/ Agriculture circle
2. Sub Divisional Agricultural Officer
3. District Agricultural Officer.

xix. State Food Security Mission

State Food Security Mission is being implemented by the Government of Meghalaya to boost states food production with maximum people's participation. In agriculture sector, schemes are being implemented to increase rice, vegetable, milk and egg production. Under this scheme, the Department of Agriculture is giving topmost priority to increase rice and vegetable production. The department is implementing other various schemes like sustainable rice development programmes with thrust to group farming; paddy development schemes being implemented through centrally sponsored macro-management scheme; production bonus; free electricity; paddy procurement and organic vegetable cultivation, vegetable development scheme through State Horticulture Mission.

2. Soil & Water Conservation Department

The programmes/schemes implemented by the Department include both Centrally Sponsored Schemes as well as State Plan Schemes.

1. State Plan Schemes

a. Soil and Water Conservation in general areas

This scheme covers the general areas outside those not specifically covered by other packages of schemes of the Department. Its main objective is to reduce soil erosion hazards, land degradation and conservation of water, where individuals/groups of farmers are targeted. Activities taken up under this Scheme include terracing and reclamation, erosion control, water conservation and distribution, afforestation, cash/horticulture crops development works, water harvesting works, farm ponds, conservation works in urban areas, etc.

b. Watershed Management Programme

The programme aims for treating the micro watersheds on an integrated approach. The activities include treatment of arable land, non-arable land and drainage lines.

2. Centrally Sponsored Schemes

i. Integrated Wasteland Development Programme (IWDP)

The scheme is funded by Department of Land Resources, Ministry of Rural Development, Government of India with 91.66% as Central Share and 8.34% as State Share. With an intention of involving village communities in the implementation of Watershed Development Projects (WDP) under IWDP, the Ministry of Rural Development (MoRD), Government of India, adopted the WDP Guidelines (1995) which was subsequently revised in 2001 (WDP Revised Guidelines, 2001) and later evolved the New Guidelines for Hariyali (2003) which are under implementation w.e.f. April 1, 2003.

There are 112 projects sanctioned for treatment in 439 micro-watersheds covering a total area of 2, 21,225.00 hectare with a total cost of Rs.13, 053.25 lakh.

ii. 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, and 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.
- ✚ Promote sub-surface flow, base flow and ground water recharge.
- ✚ To improve soil health and tilth.
- ✚ To improve production and productivity.
- ✚ To promote generation and gainful employment opportunities.

3. Department of horticulture

Objectives

- ✚ Popularization of new technologies/tools/techniques for commercialization/ adoption.
- ✚ Introduction of new concepts to improve farming systems.
- ✚ Upgradation of skills by exchange of technical know-how.

- ✦ Consolidating research efforts for specific problems.
- ✦ Identification/collection, rapid multiplication & popularization of indigenous crops and other flora of horticultural importance with emphasis on domestic and export promotion.
- ✦ Familiarization and exposure towards the newer scientific concepts/ temper and research & development from hitherto unknown, unexplored and traditional status of farming and post-harvest management on to the modern lines.

The various schemes under the department of horticulture are

1. State Plan

a. Capacity Building of Departmental Personnel

Objectives:

The scheme aims to equip departmental officers and staffs with the latest technical know-how and skills including upgrading knowledge in the field of horticulture.

Eligibility Criteria: Open for departments employees only.

Whom to Contact: Respective controlling officer.

b. Grant in Aid to Agri and Horti Society

Objectives: Promotion and popularization of floriculture and other horticulture activities in the State.

Pattern of Assistance: Grant in aid to duly registered society for conducting exhibitions on floriculture including Marketing Support.

Eligibility Criteria: Must be a duly registered society under the Societies Registration Act.

c. Implementation of e –Governance

Objectives:

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

Pattern of Assistance: Training, Awareness programme, Extension, Technology support

Whom to Contact: Assistant Director (PP) Directorate of Agriculture.

d. Establishment of Directorate of Horticulture (TFC)

Objectives:

To meet the infrastructural costs associated with up scaling horticultural development in the State.

Pattern of Assistance: PPP Mode

Eligibility Criteria: All service providers as per terms and conditions floated in the EOI.

How to Avail: Separate EOI will be floated by the department.

Whom to Contact: Director of Horticulture, Meghalaya, Shillong.

e. Organic Manures including Vermicomposting and Compost Pit

Objectives:

To affirm that vermiculture, vermicompost and composting of organic matters are viable alternative manures to chemical fertilisers and to motivate farmers in this line. Field trials of availability recycled organic manures are given priority.

Pattern of Assistance: Establishing vermicompost units free of cost for farmers including supply of bio-fertilizers at 50% subsidy.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

f. Plant Protection including IPM

Objectives:

Aim to control pests and diseases including weeds and rodents of horticultural crops by distribution of pesticides and equipment's at 50 percent subsidy.

Pattern of Assistance: Supply of pesticide and sprayers to farmers for sale at 50 percent subsidy. However, for endemic areas the same are supplied free of cost.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

g. Plantation Development (Areacanut, Cashewnut, Coconut)

Objectives:

To provide financial assistance to the farmers, 33 percent subsidy for purchasing of planting materials, polypipes. Financial assistance at 50 percent subsidy for construction of arecanut bookage tank.

Pattern of Assistance: One year assistance

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): first come first serve basis on their application and feasibility of land.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

h. Spices Development - Ginger, Turmeric, Black Pepper, Cardamon, Coriander, Cinnamon and Chillies

Objectives:

To assist spice growers by distribution of quality planting materials, plant protection chemicals including tools and implements at 50% subsidy.

Pattern of Assistance: Subsidy of inputs and implement to farmers for sale at 50 percent subsidy.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

i. Tuber Crops Development - Potato, Tapioca, Colocasia etc.

Objectives:

To boost up production of potato by providing quality HYV seeds, chemicals and equipment's at 50% subsidy. The Scheme also aims to popularised and encourage cultivation of tapioca, colocasia, sweet potato etc.

Pattern of Assistance: Supply of HYV seeds, pesticides and sprayers to farmers for sale at 33% subsidy. Assistance of Rs. 3,300 /- for an area of 0.2 ha is also provided.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectares or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

j. Mushroom Development

Objectives:

To train farmers in mushroom cultivation, to supply quality spawn and pasteurised compost to farmers.

Pattern of Assistance: Supply of spawns at 50% subsidy and compost at 30% subsidy.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

k. Tea Development

Objectives: To continue experimental plantation of tea and to find the possibility of growing tea economically as well as in commercial scale. Seedlings are raised in the experimental station and distributed free to farmers.

Pattern of Assistance: Seedlings are offered for sale at the rate of Rs.1.00 per tea seedling and one time financial assistance at the rate of Rs.10, 000 per hectare. PP chemicals, equipment's, brush cutters, harvesters etc. on sale at the rate of 50 percent subsidy.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

I. Indigenous Crops Development

Objectives:

To identify and document indigenous plants and the areas where potential species of commercially viable varieties are abundant, domesticating and raising them in selected cultivators land or in Government run farms for research and multiplication programme.

Pattern of Assistance: Free distribution of planting materials, fertilisers, micro nutrients and other inputs.

Eligibility Criteria: All categories of farmers who have sufficient land to cultivate and not resell the subsidy inputs provided by the Government.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

m. Marketing and Quality Control - Marketing Facilities

Objectives:

Collection and reporting of reliable and accurate data on market intelligence and market sentiments for important agricultural commodities in the State, to be utilised for formulation and implementation of agriculture price policies.

Pattern of Assistance: Sale of storage bins, metallic bins etc. at 50% subsidy.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle or the District Horticulture Officer.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Directorate of Horticulture
2. District Horticulture Officer
3. Assistant Director of Horticulture (Marketing)
4. Horticulture Development Officer

n. Horticulture Information Scheme

Objectives:

To provide support to horticulture extension programmes through different media.

Pattern of Assistance: Printing of leaflets, package of practices and conducting publicity campaign, exhibitions, festivals etc.

o. Vegetable Development Scheme

Objectives:

To promote vegetable production through HYV seeds and seedlings, including demonstration in farmer's field.

Pattern of Assistance: Supply of seeds/seedlings and garden tools at 33 percent subsidy. Demonstration on improved method of vegetable cultivation at the rate of Rs. 2,600 per farmer is provisioned.

Eligibility Criteria: Bonafide small and marginal farmers.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

p. Fruit Development Scheme

Objectives:

To boost the area and production of fruits through new plantation.

Pattern of Assistance:

1st.Year-	Rs. 15,000 per farmer/Ha
2nd.Year -	Rs. 10,000 per farmer/Ha
3rd.Year -	Rs. 9,000 per farmer/Ha
4th.Year -	Rs. 8,500 per farmer/Ha
5th.Year -	Rs. 8,000 per farmer/Ha

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

q. Vegetable Garden Development Scheme

Objectives:

To make available nutritious crops to every household having available kitchen garden of more than 200 sq. metres area for cultivation of organic vegetables.

Pattern of Assistance: Training, Awareness programme, Extension, Technology support, Subsidy on inputs

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.02 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Horticulture Development Officer of respective CD Block/ Horticulture circle.
2. District Horticultural Officer

r. Floriculture Development Scheme

Objectives:

To motivate the farmers to take up floriculture as a commercial venture through distribution of planting materials and other inputs.

Pattern of Assistance By providing good quality flower planting material at 50 percent subsidy and low cost polyhouse free of cost.

Eligibility Criteria: All bonafide farmers.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers having minimum area of 0.2 Ha, willing to invest for future expansion in terms of planting materials, infrastructures etc.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer
- 2.

s. Development of Strawberry Cultivation

Objectives:

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

Pattern of Assistance: Assistance to the selected government run farm and also a sale of 33 percent subsidies to the strawberry spokes.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.5 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture

Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

t. Integrated Basin Development (Horticulture)

Objectives:

To make available to the farmers good quality planting materials including other inputs with full package of practices free of cost.

Pattern of Assistance: Training, Awareness programme, Extension, Technology support, Subsidy on inputs.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Horticulture Development Officer of respective CD Block/ Horticulture circle.
2. District Horticultural Officer

u. Post-Harvest Marketing

Objectives:

Creation of post-harvest marketing infrastructure

Pattern of Assistance: Creation of infrastructural facilities for post-harvest marketing like Phytosanitary Laboratory, Grading Units etc.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

v. Fruit Processing

Objectives:

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.

Pattern of Assistance: Procurement of surplus fruits and vegetables from farmers and conversion of the same to value added products.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 0.2 hectare or more.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Office

w. Development and Maintenance of Orchard cum Horti Nurseries

Objectives:

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

Pattern of Assistance: Training, Awareness programme, Extension, Technology support, Subsidy on inputs.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 200 sq. metres.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Sectoral Officer, Department of Horticulture
2. District Horticulture Officer
3. Horticulture Development Officer

D. MISSION FOR INTEGRATED DEVELOPMENT OF HORTICULTURE

a. Horticulture Mission for North Eastern Hill (HMNEH)

The mission programmes are implemented in all the districts. The crops identified for development under the mission are mango, gooseberry, banana, pineapple, pepper, ginger, turmeric, nutmeg, cashew, cocoa, medicinal plants, flower crops and vegetables. Bee keeping and mushroom cultivation are also included in the programme. The main stake holders of the programme are Farmers, Self Help Groups, Krishi Vigyan Kendra, Non-Governmental Organizations, Department of Agriculture, Commodity Boards, Private Entrepreneurs, Public Sector Undertakings, etc. The SHM undertakes programmes on production and productivity improvement, post-harvest management and marketing. The components under plans and schemes for promotion of agriculture production and productivity improvement are establishment of nurseries for production of planting materials, establishment of new gardens, rejuvenation of existing plantations, protected cultivation, organic farming, technology dissemination and bee keeping.

The important programmes included under post-harvest management are establishment of integrated pack houses, sorting and grading units, cold storage, etc. Under the marketing development, establishment of rural markets, functional infrastructure for collection and grading, strengthening of wholesale market, market intelligence, extension quality awareness and extension activities for fresh and processed foods are envisaged. The implementation of the State Horticulture Mission Programmes is monitored at the State level by the Executive Committee chaired by the Agricultural Production Commissioner and also the Governing body under the Chairmanship of Minister for Agriculture. At the district level, District level Committee is constituted for implementing and monitoring of SHM programme under the chairmanship of District Collector. The Deputy Director of Agriculture (H) of district is the member secretary of the District level Committee.

Objectives:

Improving productivity, quality planting material, canopy management of fruits tree, support to marginal and small farmers, upscaling protected cultivation and drip irrigation.

Pattern of Assistance: Training, Awareness programme, Extension, Technology support, Subsidy on inputs, Improving marketability and Marketing support.

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land of at least 200 sq. metres.

How to Avail: Bonafide farmers can apply in plain paper through the nearest Horticulture Development Officer of a CD Block/Horticulture Circle.

Mode of Selection of Beneficiary(s): Bonafide farmers on first come first serve basis.

Whom to Contact:

1. Horticulture Development Officer of respective CD Block/ Horticulture circle.
2. District Horticultural Officer.
3. Managing Director MgSFAC
4. Director of Horticulture, Directorate of Horticulture

b. National Horticulture Board (NHB)

Objectives:

To provide focus on development of commercial horticulture in the State.

Pattern of Assistance: Formation of FPC/FPO/FIG and SHG, Venture capital assistances

Eligibility Criteria: Bonafide farmers engaged in Agriculture, possessing own or leased land.

How to Avail: Interested farmers, farmers groups, entrepreneurs are advised to contact Directorate of Horticulture and MgSFAC for details.

Mode of Selection of Beneficiary(s): Beneficiary should fulfill laid down criteria by NHB, growers association etc. with minimum of 25 nos. can apply.

Whom to Contact:

1. National Horticulture Board, (www.nhb.gov.in)
2. Managing Director, MgSFAC, (www.meghalayasfac.nic.in)
3. Director of Horticulture, Directorate of Horticulture.

E. Integrated Basin Development and livelihood promotion Programme (IBDLP)

A two-pronged strategy will be adopted to implement the IBDLP as below:

(i) Mission Mode Approach

The core of this strategy would be to launch independent missions for the specific sectors and organically merging them with the IBDLP. This process will be highly participatory, involving all the stakeholders dependent on natural resources for their livelihood as also the officials, professionals, experts and activists. The output will be implementable actions plans for enhancing production and productivity in various sectors.

The expected outcomes are:

- ✚ Progressive restoration of water-land-biomass balance
- ✚ Improved livelihood opportunities based on sustainable natural resources management (NRM)
- ✚ Profitable and productive enterprises and
- ✚ Good governance

As an example, the Aquaculture Mission has come up with a holistic plan for the area and productivity expansion by using the existing water resources of the state, while at the same time also creating space for conserving the natural water bodies, establishing the river sanctuaries which are safe havens for the native and indigenous fish species of the state. This will call for an understanding on the part of the communities about the need to preserve the native species of the fish which will call for a massive media strategy. Likewise, the whole of the Mission mode programmes will integrate the entire set of activities to make it a vibrant programme with multiple activities taking place under the umbrella of the IBDLP that will provide the requisite critical linkages and support for the Missions. A brief note on each of the Missions is provided below.

The following Missions will be put in place in the course of the 12th Plan period:

(a) Apiculture Mission:

Vision - Upscale and promote apiculture as an organized industrial enterprise so as to provide livelihood and gainful employment opportunities and to improve rural economy and the ecological system of the state.

Objectives

- ✚ To enhance honey production in the state
- ✚ To respond to the increasing demand for honey.
- ✚ To generate self-employment and sustainable economic development.
- ✚ To motivate beekeepers to adopt modern system of beekeeping as the traditional method is technically not feasible.
- ✚ To upgrade the skills of the beekeepers, so as to enhance honey production through the use of technologies and minimizing wastage.
- ✚ To promote the availability of various support services for bee keepers.
- ✚ To establish enterprises creating market linkages for promotion of honey and value added products.

Interventions

- ✚ Technology interventions: scientific bee keeping practices and structures, integrating technical and indigenous knowledge of bee keepers.
- ✚ Capacity building interventions- training, exposure visits workshops, etc.

- ✚ Market interventions- creating market linkages for honey based products by developing value chain.

(b) Aquaculture Mission:

Vision - To achieve self-sufficiency in fish production within the state, tapping the potential of water resources in the State thereby generating employment for the people and sustaining their livelihood.

Objectives

- ✚ Development of existing water bodies and creation of additional water area for large scale fish production.
- ✚ Reclamation/rehabilitation of marshy and swampy lands and bheels and other water area and developing them into modern fish production system.
- ✚ Creation of mass awareness, capacity building, exposure training and skill development of all the stakeholders, for long term sustainability of fishery sector.
- ✚ Conservation of native, endangered and traditional species of Meghalaya and developing breeding farms of commercially potential species on a large scale.
- ✚ Introduce and promote ornamental fisheries and also diversify the current range, so as to capture several emerging opportunities in the aquaculture sector viz., fresh water scampi culture, etc.
- ✚ Enhancement of water storage capacity through development of small water areas and micro-climate to sustain agricultural production.
- ✚ Extend all technical support at the door step of the stakeholders.

Interventions

- ✚ 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.
- ✚ Critical infrastructure development, which has five components, namely fish seed production, fish feed production, fish disease management, pre and post harvesting infrastructure and creation and strengthening of fishery and multi-purpose cooperatives.
- ✚ Establishing sanctuaries for conserving indigenous and epidemic species of fish.
- ✚ Capacity building of farmers as well as officials, programme managers, multiservice providers, co-operators, etc. Mass mobilization campaigns and skill trainings for unemployed youth will also be organized.

✚ 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.

✚ 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.

(c) Forestry and Plantation Crops Mission:

Vision - “To conserve forests and wildlife of the State in a manner which includes preservation and maintenance of the dense forests and habitats, as also up-gradation and restoration of degraded forests, with a view to ensure, (on a sustainable basis), a healthy natural environment, environmental stability, a robust ecological balance, sustained legitimate tangible and intangible benefits of forests to the people of the State”.

Objectives

✚ Up-gradation and restoration of degraded forests in catchment areas in the State.

✚ Restoration of refractory sites, such as Pynursla, Amlarem, Mawsynram, Mawkyrwat, Rangira and Arbela.

✚ Reclamation and restoration of abandoned degraded mining areas.

✚ Setting up permanent nurseries under all the social forestry divisions of the State.

✚ Evolution of a mechanism of conservation/protection of forest with participation of local people, as also to provide them gainful employment opportunities.

Interventions

✚ Integrated and multidisciplinary participatory planning and formulation of schemes involving activities such as agriculture, apiculture, horticulture etc; and implementation through Forest Development Agencies and JFMCs.

✚ Forest resources and livelihood promotion.

✚ Provide alternative sources of energy to reduce pressure on the existing forest for fuel wood collection.

✚ Catchment area treatment through preservation of very dense forests and increasing forest cover in moderately dense and open forest.

✚ Contain jhum cultivation in the already affected areas by propagating improved jhum cultivation practices and rehabilitate such areas through social forestry, energy plantations and other plantations.

✚ Building traditional and professional knowledge based and trade facilitation at the ground level to provide prior informed options to farmers enabling them to make rational choices.

✚ Development of Research Infrastructure for local species and creating gene bank.

(d) Horticulture Mission:

Vision - To help the farmers of the state to achieve increased production and productivity through technological interventions and support and service facilities to emerge as a “Horticulture Hub” of the North-East.

Objectives

✚ Identify and prioritize the pull factors for enhancing production and processing of horticultural commodities at specific locations.

✚ Established fully equipped nursery for production of quality planting materials of various horticultural crops.

✚ Organize capacity building training on modern production, post- harvest and value addition technologies among various stake holders.

✚ Establish convergence and synergy among various ongoing and planned government programmes in the field of horticulture development, and achieve horizontal and vertical integration of programmes by establishing forward and backward linkages.

✚ Promote ecologically sustainable intensification, economically desirable diversification and skilled employment for rural youth, including farm women.

✚ Promoting high value fruits and vegetable crops, and commercial floriculture in newer and potential areas and improving the performance of existing production system.

✚ Establishing well organized and fully equipped markets with efficient market functionaries and processing units for horticulture commodities at appropriate places for value gains.

✚ Developing entrepreneurship among the growers towards value addition through markets interventions for better prices of the produces and products.

Interventions

✚ **Production Enhancement-Resources and Production Management** - Diversify from traditional ways of cultivation/ plantation to orchards, vineyards, flowers and vegetable gardens, and disseminate appropriate technological information among the farmers for high-tech horticulture cultivation and precision farming.

✚ **Post-harvest and value addition Management** - Promote improved harvesting process, storage of farm produce, value addition through processing, grading and packaging, etc., by providing support for setting up post-harvest facilities such as pack house, ripening chamber, cold storages, Controlled Atmosphere (CA) storages, etc., processing units for value addition and marketing infrastructure.

✚ **Markets and marketing information Management** - Exploration of potential markets (domestic and external), simplified and collective marketing system, expanding marketing network, maintaining differential prices for organically produced products, improve easy accessibility to financial institution and provide cold chain transportation system for horticultural commodities. Explore feasibility of promoting National Dairy Development Board (NDDB) model of cooperatives to ensure support and adequate returns to farmers.

✚ **Supply Chain Management** - Strengthening all the levels of infrastructure such as the inputs delivery, minimizing post-harvest losses, procurement of surplus production, cold storage chains, better and efficient processing and marketing techniques, efficient storage, warehouse and credit facilities and competitive retailing would help in improving the supply chain, there by better prices to farm produce.

✚ **Capital Formation-Investment Management** - Exploit new opportunities to private participation in the production and marketing of high value farm products (vegetables, fruits, flowers and other similar products) through capacity building and entrepreneurship development.

✚ **Nature and Environment Conservation Technologies** - Conserve and promote natural resources, eco-system and traditional native plantation crops.

(e) Livestock Mission:

Vision - To have an efficient and sustainable production and marketing of livestock and livestock products for domestic and export markets.

Objectives

- ✚ To develop infrastructure and create conditions to increase production of animal food origin like milk, meat and eggs as well as to generate self-employment and enhance livelihood options.
- ✚ To improve production and protection of livestock and poultry as well as to ensure better practices in management, breeding and feeding.
- ✚ To build up adequate technical expertise with broader training facilities to communities, extension workers, SHG/Societies/NGO.
- ✚ To create facilities for marketing of livestock and poultry and their products through SHG/Society near to the producer's place so as to provide flow of sale at better prices.
- ✚ To strengthen the existing fodder production farm under State government and to encourage community fodder/forage farms.
- ✚ To provide full support for capacity building of officers, stakeholders and farmers on various aspects of management, healthcare, etc.

Interventions

- ✚ Production Enhancement-Transfer of technologies: promote crossbred and improved genesis of animals and poultry birds along with better feeding and health care management.
- ✚ Infrastructure Development: Establish and develop cattle, pig and goat breeding farms and poultry hatcheries at different strategic locations in the State to cater the need of improved breed by the farmers. Development of clean and hygienic slaughter houses, chilling plants, etc.
- ✚ Processing and value addition-Transfer of technologies: promote collection, chilling, processing and packaging of milk for providing quality milk and milk products
- ✚ Marketing Interventions: Promoting simplified collective marketing and transportation system for milk and animal products, expanding marketing network and improve easy accessibility to financial institution.

(f) Rural Energy Mission:

Vision - To develop and use non-conventional energy to meet power deficit in the state as well as to reach out to the villages which are not yet covered under the electrical grid network and to initiate joint operations of the public and private sector in conceptualizing and facilitating clean energy.

Objectives

- ✚ To impart knowledge and create awareness in the field of non-conventional energy to the general public especially in the rural areas.
- ✚ To promote and implement non-conventional energy sources for bridging deficit power requirements.
- ✚ To initiate energy conservation programmes aimed at providing local energy requirements, of villages and towns through a proper blend of conventional and non-conventional energy sources.

Interventions

- ✚ Awareness about non-conventional sources of energy.
- ✚ Sensitising the rural people about bio-energy and its utility.
- ✚ Capacity building interventions
- ✚ Developing solar and bio-energy.
- ✚ Developing Bio-fuel plantations.

(g) Sericulture Mission:

Vision - To strengthen the handloom industry and make it globally competitive, by facilitating and enabling technological up-gradation including pre-loom and post-loom section in addition to the manufacturing section, and product diversification with special emphasis to blend products and innovative marketing strategies.

Objectives

- ✚ To enhance silk production in the State.
- ✚ To create awareness among the rural populace particularly the women folk about silk activities and it's potential to alleviate poverty.
- ✚ To develop Community Mobilization/Sensitization and Capacity Building of market production.
- ✚ To expand the economic plantation coverage, including replacement of old and uneconomic plantation by high yielding varieties in case of mulberry and by improved local variety in respect of Eri and Muga.

Interventions

- ✚ Nursery creation for production of quality planting materials and seeds.
- ✚ Area expansion under mulberry

- ✚ Technology interventions to improve production and productivity of plantations.
- ✚ Up-gradation of existing production units.
- ✚ Development of infrastructure for quality silk production.
- ✚ Capacity building including exposure visits.
- ✚ Entrepreneurship Development.
- ✚ Value Chain Development in the sericulture sector.

(h) Water Mission:

Vision - To promote Integrated Water Resources Management in the State of Meghalaya and to conserve and use water judiciously.

Objectives

- ✚ To promote judicious utilization of water resources in the state in all the three sectors surface water, ground water and rain water.
- ✚ To integrate water resource planning so as to pool the resources as well as to develop water grid.
- ✚ To promote water bodies for irrigation, drinking water, fisheries, etc.
- ✚ To promote water use efficiency in all water sectors.
- ✚ To ensure adequate capacity building and training to all sections of stakeholders, technical officers and users.
- ✚ To develop and improve water bodies including rejuvenation of springs for enhancement of water storage so as to preserve water for adaptation and mitigation of climate change effect.
- ✚ To develop small multiple reservoirs and micro-hydels.
- ✚ To set up institutional structures for integrated water resource management.

Interventions

- ✚ Awareness and sensitisation programme for efficient water use.
- ✚ Development of Small and Multipurpose Reservoirs.
- ✚ Value chain development linked to water resource.
- ✚ Legislation and policy farming.
- ✚ Water quality control.

(ii) Integrated Approach

As indicated above, the independent missions of different sectors will organically merge and integrate with the programme. The following types of integration are envisaged:

✚ Inter-departmental Integration plan: Integration in this category would be to take up downstream activities after one department completes one activity. For instance, when Soil & Water Conservation Department completes the construction of a Small Multipurpose Reservoir, the Fisheries Department will release the fingerlings in the Reservoir while at the same time training and activating the community towards fisheries sector. Likewise, the C&RD Department will look into the need for construction of a connecting road to the reservoir and the tourism department will develop the requisite tourism infrastructure. In order to achieve maximum impact, it is possible to design projects, which have elements from several sectors. A typical watershed management programme would have components like Soil and Water Conservation, water harvesting, mini irrigation, bio mass regeneration, fisheries, livestock, agro processing and micro enterprise components, but properly sequenced.

✚ Convergence with Government of India's flagship programmes: For example, The State Rural Employment Agency is responsible for implementation of the MGNREGS in the state of Meghalaya. Several earthworks are being done under the MGNREGS. Fish pond construction can be undertaken under the MGNREGS in close coordination with the Fisheries Department, so that the ponds are technically suitable for Fisheries development. The input costs will be borne by the individuals or the Fisheries department, as the case may be; so as to reduce the burden on the MGNREGS with respect to the material component so is the case with B.R.G.F. another Government of India's Programme.

(iii) Accompanying Measures

The above missions will have the support of the accompanying measures as below, which are separately elaborated:

- ✚ Knowledge Management
- ✚ Natural Resource Management and Climate Change Adaptation
- ✚ Media and Outreach
- ✚ Capacity Building
- ✚ Infrastructure Development
- ✚ Institutional Development
- ✚ Financial Inclusion
- ✚ Market Access
- ✚ Policy support and Legislation
- ✚ Convergence

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

a. Micro Credit Innovations -Kisan Credit Card

NABARD formulated a Model Kisan Credit Card Scheme in consultation with major banks. As a pioneering credit delivery innovation, Kisan Credit Card Scheme aims at provision of adequate and timely support from the banking system to the farmers for their cultivation needs including purchase of inputs in a flexible and cost effective manner. Beneficiaries covered under the scheme are issued with a credit card and a pass book or a credit card cum pass book incorporating the name, address, particulars of land holding, borrowing limit, validity period, a passport size photograph of holder etc., which may serve both as an identity card and facilitate recording of transactions on an ongoing basis.

b. Swarojgar Credit Card (SCC) Scheme

Swarojgar Credit Card Scheme aims at providing adequate and timely credit whether working capital or block capital or both to small artisans, handloom weavers, self-employed persons etc. from the banking system in a flexible, hassle free and cost effective manner. Any income / employment generating scheme/project may be covered under the scheme. The facility may also include a reasonable component for consumption needs.

c. Farmers' Club Programme

NABARD promotes the formation of farmers' clubs enabling them adoption of newer farm technologies and empowering them for collective bargaining both for procuring inputs and selling their produce. The clubs are orienting them to establish better relationship with banks for suitable financial support in time of need.

d. Swarnjayanti Gram Swarozgar Yojana (SGSY)

In continuation of its efforts for poverty alleviation, Government of India introduced the Swarnjayanti Gram Swarozgar Yojana (SGSY) by restructuring various Self-employment programmes viz. IRDP, TRYSEM, DWCRA etc. It envisages formation of SHGs by 'Swarozgaries' and financing them by bank in different stages. It is a holistic scheme covering

all aspects of self-employment such as organisation of the poor into Self Help Groups, training, credit, technology, infrastructure and marketing. The scheme is funded by the Centre and State in the ratio of 75:25 and is being implemented by Commercial Banks, Regional Rural Banks and Co-operative Banks. DRDAs, NGOs, Technical Institutions etc. in the district and are involved in the process of planning, implementation and

monitoring of the scheme. NGO's assistance is sought in nurturing of SHGs as well as in monitoring the progress of Swarozgaries.

e. Scheme for setting up of Agri-clinic and Agribusiness centres

With the diversification and modernization of agricultural practices, there is a need to augment support and extension services for agriculture. For this purpose, a scheme for setting up agri-clinics and agribusiness centres by agriculture graduates has been launched by Government of India with the support of NABARD. These centres will provide a package of input facilities, consultancy and other services. They will strengthen transfer of technology and extension services and also provide self-employment opportunities to technically trained persons. MANAGE in Hyderabad is the nodal agency for imparting training under the scheme. List of trained graduates is sent to various banks in the region for financial assistance.

f. Scheme for "Capacity Building for Adoption of Technology (CAT)"

Technological up gradation and innovation have been the hall mark of Indian agriculture. NABARD has been in the forefront in facilitating and adoption of new technology by farmers/entrepreneurs through various institutions/ agencies like banks, corporates, NGOs, SHG and Farmers' Clubs. With a view to widen the horizon of new agro-technology, it was felt that traditional farmers may be motivated to adopt new technology by exposing them to innovative projects being implemented by various agencies in different parts of the country. Accordingly, it has been decided that NABARD would extend 100% support towards the cost of such exposure visit of the farmers to enable them to adopt new technology.

Address for communication

Deputy Development Manager

Tura, West Garo Hills, Meghalaya

Tel: 03651-224925

Email: nbtura@gmail.com

G. District Training Office (DTO)

i. Farmer Field Schools (FFS)

Farmer Field Schools are conducted for the purpose of helping farmers to discover and learn about field ecology, agronomy and to adopt integrated pest management. The discussions are carried out in the fields, which can be called the 'class room without walls'.

ii. Demonstrations

Demonstration is a very effective extension method to disseminate new technology. DTO demonstrates proven technologies to farmers to convince them about the feasibility and applicability of new practices. SHG farmers visit the demonstration plots to have a first-hand experience of the techniques. In addition to this, the outcome of the demonstrations is discussed in SHG meetings.

iii. Campaigns/ Exposure visit

DTO organises campaigns to create mass awareness and invoke collective action. Through campaigns, exposure visit, extension messages reach maximum number of people at the shortest possible time.

H. Rubber Board

There is a well-structured field establishment set up under the Rubber Production Department which renders free advisory and extension services to rubber growers on all aspects of rubber cultivation, production, processing and marketing and simultaneously attends to implementation of various development schemes as well. Field Offices located at all important rubber growing centres play important roles in extension activities.

Schemes in operation

1. Rubber Plantation Development Scheme in North East
2. Schemes for Assisting Planting and Upkeep
3. Scheme for popularising use of Low Volume Sprayers
4. Scheme for Improving Tapping
5. Schemes for Assisting Rubber Growers' Cooperatives
6. Scheme for Promoting Rubber Producers Societies (RPSs)

I. Meghalaya Khadi and Village Industries Board

The Board offers several financial schemes that bestow ample employment opportunities to the villagers. The schemes are intended to help the rural communities set up industrial units with minimal investment and yielding good returns. The Board restricts its assistance to only those products which are healthy and eco-friendly. Over the years the Board has assisted many village industrial units that provide innumerable employment opportunities to the villagers. In order to provide employment in the village industries sector, the Board established its own departmental units producing different

kinds of products. Besides the Board extends financial assistance to setup village industries units.

J. District Industries commerce Centre (DICC), West Garo Hills

The DICC is a nodal agency for implementing various government schemes as detailed below.

a) State Investment Subsidy

Objective: To attract investment in industrial sector Govt of Meghalaya providing assistance in the form of incentive based on the fixed capital investment made.

Eligibility: All new units, tiny, small, medium or large industrial units.

Pattern of Assistance:

Thrust (priority) sector industries (rubber based industries, IT, agro based business including food processing, readymade garments, tourism, light engineering, biotechnology and 100% EOUS) 15% of fixed capital investment subject to a ceiling.

b) Prime Minister's Rozgar Yojana

Objective: To provide self-employment opportunities to educated unemployed youth.

Eligibility: 8th Standard passed, age between 16 to 35 for SC/ST, ex-service men and women up to 45 years and family annual income up to ` 40,000/-

Project Cost:

For individuals: up to `1 lakh for business related projects and ` 2 lakhs for other projects

For partnership activities: up to `10 lakhs. The individual eligibility will be the criteria.

Activities covered: Industry, service, business and agriculture related activities (excluded direct cultivation, procurement of fertilizers etc.)

Pattern of Assistance:

Margin Money: the applicant has to invest 5 to 16.25 % of the project cost as the margin money, so that, when the subsidy and the margin money are added together amounting 20% of the total project cost.

c) Technology Development Fund Scheme

- i) Entrepreneurship Development Clubs
- ii) Incentive Schemes for Marketing SSI Products
- iii) Margin Money Loan for Cluster Development.

LIVESTOCK

A. Department of Animal Husbandry & Veterinary Department, West Garo Hills

The Animal Husbandry & Veterinary Department, West Garo Hills had implemented the Development Schemes for the upliftment of poor farmers and also for self-employment to the educated un-employed youth of West Garo Hills during 2010-11 by providing 50% Government contribution and 50% beneficiary contribution.

The following schemes were implemented during 2010-11 as follows:

a. Dairy Farming: The Dairy Farming has been divided into 2(two) Schemes, 1 (one) is for General especially for poor farmers and another is for educated un-employed youth for employment generation.

(i). Dairy Unit (General): An amount of Rs. 2,52,000/- as 50% Govt. contribution had been allotted @ Rs. 44,000/- per unit for 8 units during 2010-11 and out of this scheme 8 (eight) nos. of beneficiaries are benefited with the supplying of Dairy cows along with the feeds.

(ii). Dairy Unit(EUY):- An amount of Rs. 6,16,000/- had been allotted for 7(seven) nos. of educated un-employed youth of different places of West Garo Hills @ Rs. 88,000/- Govt. contribution and the 7(seven) nos. of educated un-employed youths are benefited with the supplying of inputs to them.

b. Piggery Farming: The Piggery Farming was sanctioned for general poor farmers.

Piggery Unit (General):- An amount of RS. 4, 50,000/- had been allotted for 18 (eighteen) nos. of beneficiaries @ Rs. 25,000/- per unit as Govt. contribution. In this scheme, 18 (eighteen) nos. of farmers of West Garo Hills have been benefited and the scheme is found to be successful.

c. Special Livestock Breeding Programme:

(i). Poultry Production 2010-11 – 50% Government contribution: An amount of Rs. 1,50,000/- was sanctioned during 2010-11 @ Rs.9,500/- per unit for 6 nos. of unit and the Kuroiler birds were distributed to 6 nos. of beneficiaries along with the equipment's and feeds @ 100 nos. of Kuroiler birds per beneficiary.

(ii). Piggery Production 2010-11 – 50% Government Contribution: An amount of Rs. 3,25,000/- was sanctioned during 2010-11 for 13 units @ Rs. 21,000/- per unit and the exotic breed of pigs were distributed along with the equipment's and feeds @ 1 boar (male pig) and 3 nos. of gilts (female pigs) per beneficiary.

d. Dairy Farming under BRGF: Besides the above schemes, the Dairy Scheme under BRGF has been implemented in West Garo Hills through Self Help Groups (SHG). An

amount of Rs. 72, 00,000/- has been allotted by DRDA, Tura and 10 (ten) nos. of SHG of different places of West Garo Hills are benefited with the supplying of milch cows along with the feed.

e) Assistance to State to Control Animal Disease (ASCAD): During the 10th Five Year Plan i.e. 2003-04 Government of India have formulated the action Plan to amalgamate the Schemes of Animal Disease Control and Systematic Control of Livestock Disease under one Scheme i.e. Assistance to State to Control of Animal Disease (ASCAD) with funding pattern of 75% Central share and 25% State share

f) National Project for Cattle and Buffalo Breeding – the Scheme continued to function with 100 % Central Assistance. This project is being implemented by the State Implementing Agency under the Department for improvement and upgrading local stock of milch cows through crossbreeding to enhance milk production in the district.

g) Livestock Insurance Scheme is also implemented by the State Implementing Agency with 100% Central Assistance. West Garo Hills has been selected during Phase II of the implemented project.

Table: Subsidy schemes

SI No.	Name of the Schemes	Plan/programme/activities under the scheme
1	Dairy Farming (50% Subsidy)	1.Distribution of a crossbred cow for dairy farmers 2. Educated Un-employed Youth: supply of 2 (two) crossbred cows per unit.
2	Poultry Farming (50%Subsidy)	1. To distribute 80 Nos. of 9 – 11 weeks old poultry bird per unit. 2. To distribute 200 Nos. of day old broiler chicks per unit. 3. To distribute 100 Nos. of Kuroiler birds per unit 4 Educated Un-employed Youth- To supply 900 Nos. Broiler DOC per unit 5. Educated Un-employed Youth-To supply 250 nos. Layers per unit
3	Goatery Unit (50% Subsidy)	Distribution of 5 nos. local female goat with 1 improved variety Male goat per unit.
4	Piggery Farming	1.To distribute 1 male and 2 female piglets of 3-4

SI No.	Name of the Schemes	Plan/programme/activities under the scheme
	(50% Subsidy)	months old per unit. 2. To distribute 16 Nos Piglets of 3-4 months old per unit for fattening purpose 3. Educated Un-employed Youth: 1 male and 5 female piglets per unit.
5	Subsidy Schemes for Special Livestock Breeding Programmes	Assistance to SF/MF/AL - Rearing of Crossbred Heifer
6	Subsidy for Livestock and Poultry feed for individual farmer or farmers of cooperative societies	1.Poultry Layer feed (Individual) 2. Cattle Feed for Dairy Co-operative Societies
7	Poultry Farming	Assistant to Self Help Group / Co-operative Society
	Pig farming	Assistant to Self Help Group / Co-operative Society

FISHERIES

A. Department of Fishery

Under the department of fishery the following ongoing scheme are

a. Community Fishery Development Project

Funding Pattern : 100%

Beneficiaries : Farmers

Benefits Types : Subsidy

How to Avail: Any Village/Community/Society/Collective Body of fish farmers having minimum water area of 0.50 ha or 5000 sq.m (Approx) can apply for the scheme. The subsidy will be distributed based on the feasibility of the project.

Validity of the Scheme

Introduced On: 01-Apr-2007

Valid Upto : 31-Mar-2016

Description: Financial Assistance for new Constitution/Renovation of Ponds/Tanks and providing subsidiary for inputs at 50 %.

CHAPTER- VII FARM MACHINERY SUITABLE TO THE DISTRICT

1. Adjustable Row Marker

It is suitable for marking rows at different spacing according to the crops to be sown. Sowing in rows facilitates intercultural operations like weeding, earthing, etc. easier and better. Row spacing can be adjusted between 20 to 60 cm by sliding the tynes on a cross bar. The cost of implement is Rs. 350/-.

❖	Dimension (Lx W x H), m	0.8x0.56x0.35
❖	No. of row	3
❖	Depth of operation, mm	70
❖	Draft, N	45
❖	Field capacity, ha/day	(a) 1.50 at 600 mm spacing (b) 0.50 at 200 mm spacing
❖	Labour requirement	17 man-h/ha



Fig: Adjustable Row Marker

2. Manually Operated Seed Drill

It is suitable for sowing seeds in rows at desired seeds rates for the crops of upland maize, paddy, mustard, linseed and groundnut etc. Its field capacity is 0.50ha/h at 20 cm row spacing. It saves 50% cost of operation and results in 5% increase in yield compared to conventional method of sowing behind country plough. The cost of the implement is Rs. 200/-

❖	Dimension (l x w x h), m	1.27x1.0x0.52
❖	Weight, kg	9
❖	Power source	Two persons
❖	Labour requirement	35 man-h/ha
❖	Hopper size, kg	2
❖	Seed metering	Fluted roller with narrow flutes for mustard and discs with 6 slots of 5x8x20mm of maize
❖	Power transmission	Through chain and sprocket from the ground wheel



Fig: Manually Operated Seed Drill

3. Bardoli Seeds Drill/ Metallic Tip Dibbler

Bardoli seeds drill is manual device suitable for putting seeds and fertilizers under terrace land conditions. Normal width of single furrow opener is 7.5cm and manual hand pressure is used to get the desired depth. The field capacity is 0.4 ha/day at 40 cm spacing and it costs Rs. 250/-. Metallic tip dibbler is used for dibbling maize and

other bold seeds on hill slopes. It helps in getting better output per unit time as compared to local dibbling stick. Seeds can be sown up to 7 cm depth as compared to 3-4 cm by to wooden/non metallic tip dibbler. Its field capacity is about 0.10 ha/day at 40 cm row-to-row spacing and it costs Rs. 70/-



Fig : Bardoli Seeds Drill/ Metallic Tip Dibbler

4. Hand Weeders

These are long handle weeders and allow performing weeding operation without bending the posture of the operator thus reducing drudgery to the operator and increase the capacity. These weeders are namely (1) circular blade weeder, (2) Garden rake, (3) V blade multipurpose weeder, (4) Grass slasher, (5) Long handle hand fork etc. costing Rs. 85/-, Rs. 100/-, Rs. 110/-, Rs. 72/-, and Rs. 85/- respectively. These weeders are suitable for weeding in paddy field, which are transplanted in lined. These can be used in standing water and collection of weeds can be done later using garden rake. With these implements, labour saving to the extent of 60% to 65% can be achieved over traditional methods.



Fig: Hand Weeders

5. Maize Sheller

It is manual operated sheller suitable for shelling maize from dehusked cobs. Shelling is done by holding the sheller in one hand and gradually inserting the cob into the sheller by the other hand with forward and backward twist. It is available in two shapes viz. tubular and octagonal type. An average person can shell around 30kg of grains per hour without any injury to palms as compared to only 10 to 12kg per hour by the traditional method of shelling by hand. It is made up of mild steel sheets welded in the form a round shape or bended in octagonal shape inside which, four tapered fins are provided for shelling. It saves 66% labour and operating time and 70% on cost of operation compared to shelling by traditional method. The cost of a maize sheller is Rs. 40/-.

❖	Dimension , mm	64 (dia) x 72 (length)
❖	Size of fins (lxbxh), mm	58 x 1.00 x 10-18
❖	Broken kernels, %	2.30
❖	Shelling efficiency, %	100
❖	Cleaning efficiency, %	100



Fig: Maize Sheller

6. Groundnut Decorticator

It is a manually operated oscillating type device developed at CIAE, Bhopal having rubber shoes with triangular productions for decortications of groundnut and castor pods to separate kernels. Separate concaves are provided for decortications of groundnut and castor. The husks are collected manually from the concave batch wise. It saves 98% labour on first of operation as compared to conventional method of shelling by hand. It cost Rs. 1500/-.

❖	Power source	One person
❖	Shelling capacity, kg/hr	68.0
❖	Weight, kg	15
❖	Shelling efficiency, %	98.0
❖	Dimension (l _x w _x h), m	0.5x0.25x1.11
❖	Concave clearance, mm	10-25
❖	Broken kernels, %	2.30
❖	Labour requirement, man-h/q	1.60
❖	Cost	Rs. 1500/-



Fig: Groundnut Decorticator

7. Paddy Operated Paddy Thresher

It consists of wooden drum having wire loop teeth spaced at regular interval in staggered fashion. The drum is rotated at a speed of nearly 400-500 rpm and it gets motion from the foot pedal through crank and gear arrangement. It saves 20% labour and 40% operating time as compared to conventional method of hand beating on a



wooden platform.

Fig : Paddy Operated Paddy Thresher

8. Hand Winnower

It is a manually operated hand winnower used for cleaning grains and separating the husk, dust and straw from paddy, wheat, grams etc. It has a gear where the speed of the fan can be adjusted. One person is required for the operation of this implement while another person release grains from a height so as to separate the husk from the grain by the air flow of the winnower.

❖	Dimensions (lxwxh), m	1.16 x 1.16 x 1.77
❖	Power source	One persons
❖	Cost, Rs.	2100/-
❖	weight, kg	29
❖	No. of vanes	4



Fig: Hand Winnower

9. Improved Sickle

It is a serrated blade sickle suitable for cutting grasses and harvesting of different crops like maize, paddy, wheat etc. The wooden handle has a bend at the rear end for better grip and to avoid hand injury during use. The blade is of self-sharpening type i.e. when the teeth wear out a simple grinding at rear face enables exposures of new teeth. The average field capacity is 0.018ha/h and it saves 26% labour and operating time and 27% on cost of operation compared to harvesting with local

sickle. It costs Rs. 30/- and cost of operation is Rs. 600/ha compared to Rs. 700/ha by non-serrated type sickle.

❖ Length of cutting edge, mm	225
❖ Weight, kg	0.25
❖ Radius of curvature, mm	260
❖ Labour requirement	80 man-h/ha

10. Wheel Hand Hoe

It is manually operated walking type device and it can be used for various farm operations right from opening furrows for sowing seeds to intercultural and earthing up operations depending upon the type of attachment used. It requires more than 20 cm row- to- row spacing for easy operation. Draft requirement varies from 2.5 to 3.0 kgf and field attachments. It saves 70-75% on labour and operating time and 80% on cost of operation and also results in 5-8 % increase in yield compared to conventional method of weeding using khurpi. It costs Rs. 500/- and cost of operation is Rs.300-400/ha.

❖ Dimensions (l x w x h), m	1.50 x 0.42 x 1.0
❖ Weight	7
❖ Field capacity, ha/day	0.32
❖ Field efficiency, %	90
❖ Weeding efficiency %	75
❖ Width of coverage, mm	300
❖ Depth of tilling, mm	15-20
❖ Labour requirement	20 man- h/ha



Fig 13: Wheel Hand Hoe

CHAPTER- VIII ANNEXURE

1. Telephone directory of important agriculture and related departments / offices in West Garo Hills District, Meghalaya.

SI No.	Name	Phone No.
1.	Conservator of Forest (Territorial and Wild Life)	9436999121
2.	Pro-Vice Chancellor, NEHU	9862062089
3.	Joint Director (Soil Department)	9436112259
4.	Superintending Engineer (Water Resources)	9436176372
5.	District Agriculture Officer	03651- 223843
6.	Superintendent Of Fisheries	9436316316
7.	Jt. Director of Sericulture & Weaving	9436101372
8.	Dist. Sericulture Officer.	03651- 232322
9.	Deputy Director, Rubber Board	9436114359
10.	Muga Silk Worm Organization	9435249027
11.	Coffee Board	03651 – 232204
12.	Central Silk Board	03651-242289
13.	Doordarshan Kendra, Tura	9874010591
14.	ADIPRO, Tura	03651- 222308
15.	All India Radio, Tura	9436114704
16.	Joint Director, Soil & Water Conservation, Tura	03651-232105
17.	District Horticulture Officer, Tura	03651- 220849
18.	District Statistical Officer, West Garo Hills, Tura	03651- 232457
19.	District Handloom Officer, Tura	03651- 221493
20.	CEO, Tura Municipal Board	03651- 222524
21.	Chairman, District Rural Development Agency, Tura	03651-223835

SI No.	Name	Phone No.
22.	Project Director, DRDA	03651-2224750
23.	Asst. Registrar of Coop. Societies, West Garo Hills, Tura	03651- 222404
24.	Asst. Agril Engineer, Sangsanggre, Tura.	03651- 222451
25.	Sub-Divisional Agril. Officer, Dadenggre Sub-Division	03651- 262206
26.	Executive Engineer(Irri), West Garo Hills,Tura	03651- 232243
27.	District AH & Vety. Officer, West Garo Hills, Tura	03651-223918
28.	Sub-Divisional AH & Vety. Officer, Dadenggre Sub-Division, Tura	03651- 262232
29.	Jt. Director, P & S, Meghalaya, Tura	03651- 232853
30.	Instructor, Vocational Training Centre, Tura	03651- 224451

✚ Departmental farms:

✚ Soil Testing Laboratories:

SI No.	Name	Phone No.
1.	District and Local Research Station and Laboratories, Sangsanggre, Tura	03651-22450

✚ AGMARK Grading Laboratories:

✚ Livestock farms:

SI No.	Name	Phone No.
1.	Manager, Pig Farm, Rongkhon, Tura	03651- 223607
2.	Manager, Poultry Farm, Rongkhon, Tura	03651 - 223260
3.	Manager, Feed Mill, Tura	03651- 222542

2. Calculation of Fertilizer and Pesticides in Agriculture

Application of fertilizer and pesticides in correct dose and amount are the prerequisites for getting optimum response in growth and management of pest and diseases in crops. It is very important to apply correct dose of nutrient to the crops as per soil fertility status. Calculation of accurate dose of chemicals required for field application particularly in case of pesticides and herbicides are still complicated and many a time difficult even for extension personnel to compute, leave aside the farmers. Accurate dose of application of chemicals would not only avoid over or under dose in crops but would also save resources and increase productivity. For field functionaries and farmers an easy method of computation should be made available avoiding the complexities in calculation. For example if a farmer has to apply 60 kg N in rice, he needs to apply 60×2.17 or 130 kg urea. This is very simple to understand and avoids the chances of any unforeseen mistake by the farmers.

Fertilizer dose calculation

The crop nutrient requirements are commonly recommended in terms of the nutrient values. For example, recommendation for rice is 80-60-40 NPK per ha. But the field application has to be on the basis of the quantities of commercial fertilizers required to meet the recommended rates of NPK. This conversion involves some amount of calculations.

Criteria to be considered while calculating the fertilizer dose:

1. Crop under consideration
2. Area to be fertilized
3. Type of fertilizer available
4. Method of application
5. Split application

Basic formula for fertilizer dose calculation:

100 x recommended dose

Quantity of fertilizer = _____

Nutrient content in fertilizer

Example 1

Calculate commercial fertilizer required to fertilize the rice crop through straight fertilizer using urea, single superphosphate (SSP) and muriate of potash (MOP). Recommended dose for rice is 80:60:40 kg NPK/ha.

Solution:

1. Urea contains 46% N

To supply 80 kg N $= (100 \times 80)/46$
 $= 173.6$ kg Urea

2. SSP contains 16% P

To supply 60 kg P $= (100 \times 60)/16$
 $= 375$ kg SSP

3. MOP contains 60% K

To supply 40 kg K $= (100 \times 40)/60$
 $= 66.6$ kg or 67 kg MOP

Example 2

Find out the quantity of fertilizer required to fertilize the rice crop through Diammonium phosphate (DAP), urea, muriate of potash (MOP). Recommended dose is 100:60:40 kg NPK to fertilize one hectare area of rice.

Solution:

Here DAP is as source for P (46 %) but it also contain N (18 %). Let us first apply P through DAP:

To supply 60 kg P $= (100 \times 60)/46$
 $= 130.4$ kg DAP

And amount of N

supplied through DAP $= (130.4 \times 18)/100$
 $= 23.5$ kg N

Rest of N i.e. $80 - 23.5 = 56.5$ is applied through urea (46 % N)
 $= (100 \times 56.5)/46$
 $= 122.8$ or 123 kg urea

K is supplied through MOP (60 % K)

To supply 40 kg K $= (100 \times 40)/60$
 $= 66.66$ or 67 kg MOP

Hence, 130.4 kg DAP, 123 kg urea and 67 kg MOP is required to fertilize the rice crop.

3. Conversion factors for nutrient to transform into required quantity of fertilizers

Nutrient Factor Name of Fertilizer

Nutrient	Factor	Name of Fertilizer
	17	urea
	56	Diammonium Phosphate (DAP)
	76	Ammonium sulphate
	17	Diammonium Phosphate (DAP)
	08	Triple Super Phosphate
	25	Single Superphosphate (SSP)
	67	Muriate of Potash (MOP)
	00	Sulphate of Potash
	00	Farm Yard Manure (FYM)
	00	Vermicompost

Based on the above factors to apply 80:60:40 NPK kg/ha, the farmers need to apply-

$80 \times 2.17 = 173.6$ kg urea/ha

$60 \times 6.25 = 375$ kg SSP/ha

$40 \times 1.67 = 66.8$ kg MOP/ha

4. How to economize fertilizer use?

1. The fertilizer recommendations should be based on soil test values.
2. Balanced use of fertilizer should be advocated for better economic returns.
3. Use of nitrogenous fertilizer in split doses economizes fertilizer use.
4. Micronutrient deficiencies should be corrected as and when needed.
5. Fertilizer schedule should be adopted for the whole crop sequence instead of a single crop.
6. To get the maximum benefit from the applied fertilizers, crops should be irrigated at the critical growth stages.

5. What is the calculation procedure for foliar sprays?

1. Suppose the recommended foliar spray of Urea is 2 % concentration.
2. 100 parts of spray solution should have 2 parts of Urea. To get this, 2 kg of urea should be dissolved in 100 liters of water or 2 kg of Urea in 100 liters of water
i.e., 20 g urea in 1 litre of water makes 2 % Urea solution.

3. If the amount of water required to cover one hectare is 500 liters, then a 2 % spray liquid is prepared by dissolving 10 kg of Urea in 500 liters of water.

6. Pesticides dose calculation

In preparing spray solution of pesticide to spray in the field, it is most important to add the correct amount of pesticide to the mix. Too little may result in a poor job, while too much may result in injury to the treated surface, illegal residues, or unnecessary expense. Being highly toxic, pesticides are not sold in its pure form. They are subjected to dilution with any carrier to avoid the hazards of poisoning to applicator or human being. Pesticides are commercially manufactured in various formulations (by adding various additives) like emulsifiable concentrates, water-dispersible powders, dusts, granules, solutions etc. The strength or active ingredient is mentioned on the label.

Directions for preparing final solution

are given on the label and very simple calculations are necessary.

Key points to be considered

1. Understand the importance of adding the correct amount of pesticide to a mix.
2. Learn to do correct calculations for mixtures of pesticides.

What is **active ingredient**?

It is the actual toxicant in commercial products which is directly responsible for its toxic effect.

What is **acid equivalent**?

It refers to the formulation that theoretically can be converted to the parent acid. Some herbicides are active organic acids like phenoxy acetic acid, picloram & chloramben and some are generally supplied in the form of their salts and esters as in 2, 4-D.

Some commercially available pesticides are-

Insecticides: Malathion 50EC, Metasystox 25EC, Phorate 10G, Carbofuran 3G, Imidacloprid 17 SL

Herbicides: Propanil 35EC, Benthiocarb, Nitrofen, Atrazine 50 WP, Simazine 60 WP, Paraquat 24WSC, Fluchloralin 45EC, Butachlor 50EC or 5G, Glyphosate 41WSC, 2, 4-D Ethyle ester 18 & 35 %, 2, 4-D Amine salt 58 & 72 %, 2, 4-D Sodium salt 80 & 85P, Cyhalofop butyl, Bisparibac sodium, Clomazone, etc.

Fungicides: Carbendazim 50 SC, Carbendazim 50 WP, Copper Oxychloride 50WP, Difenconazole 24.9EC, Dithianon 5SC, Hexaconazole 5, 10EC, Hexaconazole 5 SC, Mancozeb 80, 75 WP, Miclobutanil 10 WP, Propiconazole 10, 25 EC, Tebuconazole 24.9 EW, Tricyclozole 75 WP, Triadimefon 25 % WP, etc.

Pesticides are recommended in three ways for its field application such as amount of pesticides per hectare (kg/ha), amount of active ingredient or acid equivalent per hectare (kg a.i./ha) and concentration of solution to be applied (e.g. 0.07 % of Monocrotophos). Before application or purchase of pesticides it is always strike in the mind of farmers that how much amount of insecticides or herbicides or fungicides etc would be required for application on their farm of definite size so that he could purchase only the required amount.

Let us see the methods for calculating the pesticide dose with some example.

If pesticide dose is recommended as kg a.i./ha:

Rate of herbicides is given mainly in terms of a.i. or a.e. /ha

Rate of application

Quantity of material required per hectare = _____ x 100

Active ingredient in %

Example 3

Find out the quantity of Butachlor 50 EC to be sprayed in one hectare area of soybean as pre-emergence application, if rate of application is 2 kg a. i. /ha

2 x 100

+ Quantity of Butachlor /ha = ----- = 4.00 litre / ha
50

Example 4

Find out the quantity of Carbofuran 3G to be applied in one hectare area if rate of application is 0.35 kg a.i. /ha

0.35 x 100

+ Quantity of Carbofuran/ha = ----- = 11.66 i.e. 12.00 Kg granules / ha
3

For the calculation of this type we must know the a.i. present in the commercial product.

If recommended as kg/ha:

To spray one hectare with a hydraulic nozzle sprayer in good working condition and a 15 liter knapsack sprayer, one will need 300 liters of solution, i.e. 20 sprayer loads.

Example 5

To control all kinds of weeds in uncropped area, 1 liter of Round Up (Glyphosate) should be applied per hectare.

+ It means

1 liter = 1000 ml

20 sprayers (15 L each) per ha

$$1000 \text{ ml} / 20 = 50$$

i. e. 50 ml per 1 small knapsack sprayer and 20 loads will be required.

If recommended as % concentration:

By formulae

Volume of spray X % strength of pesticide

solution (litre) solution to be sprayed

Amount of pesticide = _____

% strength of pesticide given (a.i./l or kg)

✚ Example: Amount of Metasystox 25 EC when applied as 0.025 % solution

$$300 \times 0.025$$

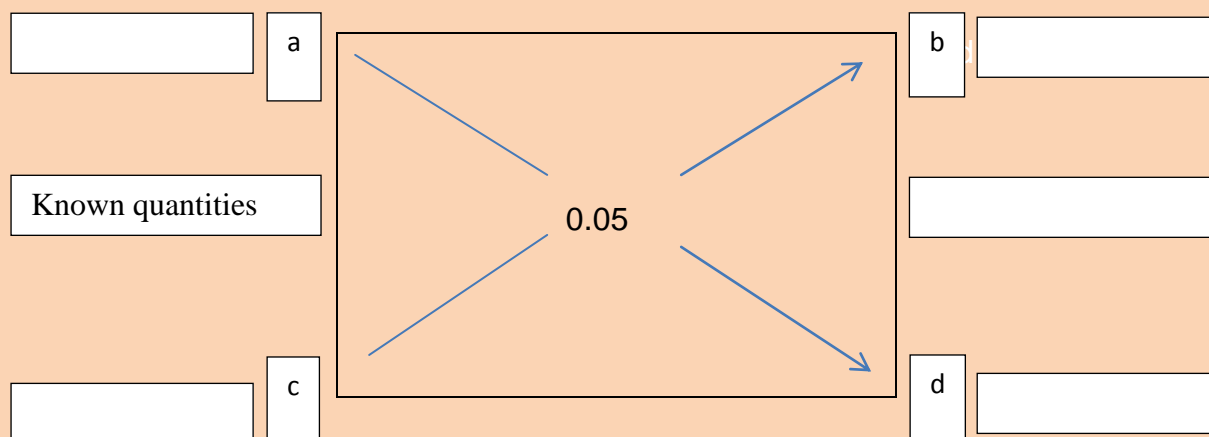
= _____

25

= 0.3 liter or 300 ml/ ha

By Pearson's square method:

Example: To prepare 0.05 % mixture from a pesticide with a.i. 35 EC.



To get the required amount of insecticide and water, subtract the smaller figure from the higher ones (i.e., $0.05 - 0 = 0.05$ and $35 - 0.05 = 34.95$), diagonally.

Put 0.05 opposite EC at **d** and 34.95 opposite water at **c** point.

This means that to make 0.05 % solution out of the endosulfan 35 EC, we require 0.05 part of endosulfan + 34.95 part of water.

Some more formula for herbicide calculation:

Small area

$$10 \times R \times A$$

$$\text{Herbicide rate (g)} = \frac{\text{Herbicide rate (g)}}{P}$$

Where,

R = Rate of Application (kg a.i./ha)

A = Area to be treated in Sq.m.

P = % a.i. in product

Large area

$$10 \times R \times A$$

$$\text{Herbicide rate (kg)} = \frac{\text{Herbicide rate (kg)}}{P}$$

Where,

R = Rate of Application (kg a.i./ha)

A = Area to be treated in ha

P = % a.i. in product

How to economize pesticides use?

1. The pesticides should be used only when the level of damage is above **economic threshold level** (ETL) values.
2. Cultural methods, use of resistant varieties should be encouraged
3. Possibility of applying more than one chemical together should be explored by studying their compatibility to save labour and time.
4. Balanced fertilization reduces pest problems.
5. Integrated pest and disease management reduces residue problem and economize their use.

7. Average nutrient content of common fertilizers

Material	Nutrient content (%)		
		P ₂ O ₅	K ₂ O
Ammonium sulphate	20.5	-	-
Ammonium Chloride	26.0		
Ammonium sulphate nitrate	26.0	-	-
Ammonium nitrate	33.5	-	-
Ammonium phosphate	20.0	20.0	-

Material	Nutrient content (%)		
		P ₂ O ₅	K ₂ O
Boronated SSP		16	
Calcium ammonium nitrate	20.5 / 25.0	-	-
Di- Ammonium Phosphate	18	46	-
Muriate of potash	-	-	50/60.0
Nitrate of soda	16.5	-	-
Potassium Sulphate		50.0	
Superphosphate (single)	-	18.0	-
Superphosphate (double)	-	35.0	-
Superphosphate (triple)	-	46.0	-
Urea	46.0	-	-
Urea Ammonium Phosphate	28	28	
Zinc coated urea	43.0		

8. Amount of nutrients in common organic manures/green manures and plant residues

Material	Nutrient content (%)		
	N	P ₂ O ₅	K ₂ O
Farm yard manure (FYM)	0.93	0.25	0.91
Pig manure	1.19	0.39	1.01
Poultry manure	1.87	0.54	2.15
Sheep manure	0.8-1.6	0.3-0.4	0.3-0.4
Compost	1.5	0.35	0.85
Vermicompost	1.02	0.60	0.18
Rockphosphate enriched compost	1.02	2.77	1.0
Mustard oil cake	4.8	2.0	1.3
Neem cake	5.2	1.1	1.5
Groundnut cake	7.0	1.5	1.5
Castor cake	4.3	2.0	1.3
Coconut cake	3.0	1.9	1.8
Rice straw	0.36	0.10	0.71

Material	Nutrient content (%)		
	N	P ₂ O ₅	K ₂ O
Groundnut stover	0.92	0.18	0.60
Rice bean stover	0.85	0.22	0.52
Ambrosia spp.	15	0.11	0.79
Eupatorium spp.	3.36	0.10	0.82
Azolla	2.38	0.51	2.75
Bone meal	3.5	21.0	-
Fish meal	4.1	3.9	0.3-1.5
Paddy Straw	0.36	0.08	0.71
Wheat Straw	0.53	0.10	1.10
Maize Stalks	0.42	1.56	1.65

9. Common Conversion Factors

1 kilogram (kg)	= 1000 grams (g) = 2.20 pounds (lb)
1 tonne (t)	= 1000 kilograms = 10 quintals (1q=100 kg)
1 pound (lb)	= 450 grams = 0.454 kg
1 ppm (mg/l, mg/kg)	= 1 part per million (10,000 ppm = 1%)
1 pound/ acre	= 1.12 kg/ha
1 teaspoon	= 5 ml or 5 grams water approx.
1 meter (m)	= 100 centimetres, 1cm = 10 millimetres (mm)
1 meter	= 1.1 yard, 1 yard= 0.91 meter = 91 cm
1 inch	= 2.54 cm, 1 foot= 12 inch, 1 yard= 3feet
1 acre	= 4840 sq. yards = 0.405 hectares
1 hectare	= 2.47 or about 2.5 acres
1 nali	= 200 sq. m
1 unit N in plant	= 6.25 units protein

P ₂ O ₅	= P x 2.29	P	= P ₂ O ₅ x 0.44
K ₂ O	= K x 1.20	K	= K ₂ O x 0.83
CaO	= Ca x 1.40	Ca	= CaO x 0.72
SO ₄	= S x 3.00	S	= SO ₄ x 0.33

Plants/hectare = 10,000 ÷ Area/plant. If trees are planted at a spacing of 5m x 5m, each tree takes up 25 sq. m. land, hence one hectare will accommodate 400 trees.

Area of rectangle	= length x breadth
Area of square	= side x side = side ²
Volume of a cube	= side ³
Volume of a rectangular box	= length x breadth x height
Volume of a sphere	= $\frac{4}{3} \pi r^3$ (r= radius, π (pi) = 22/7 = 3.14
Circumference of a circle	= $2 \pi r$
Area of a circle	= πr^2

10. Rating chart for soil test values of primary nutrients

Sl no.	Nutrient	Rating		
		Low	Medium	High
1.	Organic carbon (%)	≤0.5	0.51-0.75	>0.75
2.	Alkaline KMnO ₄ - N (kg ha ⁻¹)	≤280	281-560	>560
3.	Olsen's P (kg ha ⁻¹)	≤10	11-25	>25
4.	Ammonium Acetate- K(kg ha ⁻¹)	≤120	121-280	>280

🌈 Subject to minor variation as per local conditions

11. General recommendation doses of micronutrient fertilizers

Sl no.	Micronutrient	Material and doses for application	
		Soil application	Foliar spray
1.	Zinc	Zinc sulphate (25 kg ha ⁻¹)	0.5% zinc sulphate + 0.25% lime
2.	Iron	Ferrous sulphate (50 kg ha ⁻¹)	1% ferrous sulphate + 0.5% lime
3.	Copper	Copper sulphate (10 kg ha ⁻¹)	0.1% copper sulphate + 0.05% lime
4.	Manganese	Manganese sulphate (50 kg ha ⁻¹)	1% manganese sulphate + 0.25% lime
5.	Boron	Borax (10 kg ha ⁻¹)	0.2% borax

Source: Manual on Soil, Plant and Water Analysis by Dhan Singh, P.K. Chhonkar and B.S. Dwivedi, IARI, New Delhi

12. List of some important herbicides used in rice with recommended dose

S.No.	Herbicide	Recommended Dose (kg a.i/ha)
1.	Bensulfuron-methyl	50 – 60*
2.	Bentazon	1.0 – 2.0
3.	Benthiocarb	1.0 – 1.5
4.	Bisparibac sodium	30.00*
5.	Butachlor	1.0 – 1.5
6.	Cyhalofop butyl	190 – 280*
7.	Fluchloraline	1.00
8.	Metsulfuron -methyl 10% + Chloromuron-ethyl 10%	4.0*
9.	Metsulfuron-methyl	4 – 8*
10.	Oxadizon	0.5 – 0.75
11.	Pendimethalin	1.00
12.	Pretilachlor	0.4 – 0.5
13.	Pyrazosulfuron-ethyl	15 – 20*
14.	Trifluraline	1.00

Note: * indicate dose in gram











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	Supporting staff	Smt.Leno A. Sangma	Mali	-	



Group photo of staffs,kvk West Garo Hills

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