

AGRICULTURAL SCENARIO OF DHEMAJI DISTRICT

1. Present status:

Dhemaji is the most remote district of the state of Assam is situated at the eastern most corner of the state. The geographical area of the district is 3,237 sq. km. with a population of 686133 as per 2011 census out of which 47% is general, 43% is Scheduled Tribes and 10% is Scheduled Caste population. The river Brahmaputra covers the southern border of the district and there are a series of about 20 rivers as its tributaries and thus making a watershed of its own. There are two sub-divisions of the District- Dhemaji & Jonai with 50 and 15 Gaon Panchayats respectively.

Agriculture, being the main occupation of the people, 85% of the population depends on agriculture. Rice is the staple food of the people of the district. Farmers usually go for cultivation of paddy as monoculture during the *Kharif* season. The district is marginally surplus in rice production.

Besides paddy crop, farmers use to grow oil seeds like mustard, sesamum, nizer, castor(for sericulture purpose), sunflower, ground nut etc; some other cereals like wheat, maize and crops like potato sugarcane, jute etc. The district is still to be self dependent in oil seeds and pulses production.

Areca nut, banana, pineapple, papaya, lime & lemon, coconut etc. are some of the major horticultural crops grown in the district. Different vegetable crops are also widely cultivated. Besides these, the district also produce spices like ginger, turmeric, onion, garlic, chilli, coriander and to some extent black pepper also.

There is very good scope for bringing an improvement in area as well as production of horticultural crops in the district. The northern part of the district, i.e. the foothills of Arunachal Pradesh and almost the entire Jonai Sub-Division has very good potential for growing horticultural crops.

Flood is a regular phenomenon of the district. The rivers Brahmaputra, Jiadhal, Gainadi, Simen, Tangani, Karha etc. flow vigorously during the rainy season causing heavy flood in a vast area of the district and thus use to damage a huge crop area every year.

1.1. Geographical location:

- i. Boundary : East- Arunachal Pradesh
: West- Lakhimpur district and the river Subansiri
: North- Arunachal Pradesh
: South – The River Brahmaputra
- ii. Longitude : 94 degree to 95 degree E
- iii. Latitude : 27.3 degree to 28 degree N
- iv. Height from MSL : 98.75 m

1.2. Area

- 1. Geographical area : 3,236.95 sq. km
: 3,23,695 ha
- 2. Total cultivable land : 1,27,684 ha
- 3. Net cropped area : 1,06,634 ha
 - a) Mono cropped area : 75,960 ha
 - b) Double cropped area : 51,640 ha
 - c) Triple cropped area : 26,000 ha
- 4. Grass cropped area : 1,81,280 ha
- 5. Cultivable fallow land : 12,490 ha
- 6. Non cultivable waste land : 10,430 ha
- 7. Home land : 51,780 ha
- 8. Forest and grazing : 53,224 ha
- 9. Water bodies : 44,136 ha
- 10. Sand deposited and silted areas : 3,830 ha
- 11. Areas under horticulture/ Plantation crop : 2,539 ha

12. Public uses, Institutions etc.	: 23,270 ha
13. Area under Tea gardens	: 52 ha

1.3. Climate:

i. Temperature	: Maximum - 37 degree Minimum - 10 degree
ii. Humidity	: 70 – 90 %

1.4. Fertility status:

pH	: 5.1-6.0
Organic Carbon	: High, above 0.75%
Available nitrogen	: High, above 543 kgN/ha
Available Phosphorus	: Low, below 22.5 kg P ₂ O ₅ /ha
Available potash	: Medium to low, below 336 kg K ₂ O/ha

1.5. Soil Texture:

Sandy Loam	: 46%
Loamy	: 44%
Clayey	: 10%

1.6. Land Classification

Medium	: 82623 ha- 67%
High	: 12490 ha- 10%
Low	: 17473 ha- 14%
Very Low	: 8737 ha- 7%
Sand and Silt deposited	: 2496 ha- 2 %

1.7. Population Pattern (2011 census): (Nos.)

Male	: 351249
Female	: 334884
Total	: 686133

1.8. No. of Farm Families: 124138 nos.

A. As per land holding pattern:

- i. Marginal (3 – 7.5 bigha) : 44689
- ii. Small (7.5 – 15 bigha) : 45931
- iii. Big (below 15 bigha) : 27312
- iv. Landless (below 3 bigha) : 6206

B. As per community:

- i. General : 58344
- ii. S.T. : 53379
- iii. S.C. : 12415

1.9. Cropping sequences followed:

- A. mono cropping:
 - a. Winter rice
 - b. Autumn rice
 - c. Rabi rice
 - d. Autumn+Bao
- B. Double cropping:
 - a. Autumn rice- Winter rice
 - b. Winter rice-Rabi crops
 - c. Winter rice-rabi vegetables
- C. Triple cropping:
 - a. Winter rice-Rabi- Autumn rice
 - b. Summer rice- winter rice-Rabi
 - c. Winter rice-Rabi-Vegetables
- D. Relay Cropping: Winter Rice- Pulses

1.10. Cropping intensity: 141%

1.11. Major Rivers:

Dhemaji Sub-Division: 1) Na-Nadi 2) Kumatia/Jiadhhal 3) Karha 4) Laipulia 5) Maridhal
6) Kanibil 7) Gainadi 8) Sissitangani 9) Jalakia Suti 10) dimow

Jonai Sub- Division: 1) Simen 2) Dekapam 3) Dikhari 4) Depi 5) Lali 6) Sile

1.13. Input supply agencies:

1. Assam seed corporation Ltd. (A.S.C)

2. Authorized retail sale dealers

i. Seeds : 62 nos.

ii. Fertilizes : 62 nos.

iii. Pesticides : 62 nos.

1.14. Field Management Committees(FMCs)/

Pathar Parichalana Samities (PPSs) : 1022 nos.

1.15. Cluster wise strength:

Dhemaji Subdivision: Cluster I: ADO : 7 nos.

AEA : 52 nos.

Jonai Subdivision: Cluster I: ADO : 4 nos.

AEA : 11 nos.

1.16. Dept. Training accommodation:

A. Supervisory Training Centre at Dhemaji 1no. Capacity : 50 nos.

B. Block Resource Centre 5 nos. Capacity 30 nos.

1.17. Nurseries:

<u>Name</u>	<u>Location</u>	<u>Area</u>	<u>Remarks</u>
1. Nemutenga Seed Farm	Machkhowa	44.5 Bigha	on lease since July/2000
2. Progeny Orchard	Jonai	1.5 Bigha	

1.18. Farm machineries & Infrastructure available

1. Power Tiller : 428 nos.

2. Tractor : 176 nos.

3. Village level Farm Machinery Bank : 1 no.

4. Agro Service Centre : 2 nos.

1.19. Area under assured irrigation (ha):

<u>Dhemaji</u>	<u>Jonai</u>	<u>Total</u>
4076	2718	6794 Ha (5.32%)

1.20. Area, Production and Productivity of some major crops during 2016-17:

<u>Crops</u>	<u>Area (HA)</u>	<u>Production (MT)</u>	<u>Productivity (kg/Ha)</u>
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1. Cereal**A. Rice:**

i. Autumn rice	11,070	20092	1815
ii. Winter rice	66,240	179841	2715
<u>iii. Summer rice</u>	<u>3,260</u>	<u>13773</u>	<u>4225</u>
Total	80570	213706	

B. Maize

285	674	2365
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2. Pulse

A. Black Gram	1076	708	658
B. Green Gram	314	222	707
C. Lentil	243	173	713
D. Pea	620	536	865
<u>E. Others</u>	<u>46</u>	<u>28</u>	<u>608</u>
Total	12299	1667	

3. Oil Seeds

A. Rape & Mustard	17218	21453	675
B. Sesamum	65	40	625
C. Castor	30	20	680
<u>D. Others</u>	<u>67</u>	<u>30</u>	<u>448</u>
Total	17380	21543	

4. Vegetables

A. Kharif	1810	22308	12,325
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<u>B. Rabi</u>	3,025	72975	24124
Total	4835	95283	
5. Horticulture Crops:	2360	30080	12872
6. Potato:	5985	44888	7500
7. Jute:	62	82	1333
8. Sugarcane:	207	7081	34211
9. Spices	1898	1545	814

2. Prospect of agriculture in Dhemaji district:

Agriculture is the indispensable sustenance for livelihood of more than 85% of the people in Dhemaji district. Paddy is the major crop occupies more than 55% of gross cropped area followed by mustard, blackgram, potato and maize. Bao paddy (deep water rice), red kernel rice cultivated in about 6000 ha area especially in flood affected area in the district able to catch the eye of the exporter, increasing demand in some developed countries. Vegetables and fruits are also cultivated in moderate scale. Piggery, poultry, goat rearing, fishery and sericulture are major agricultural allied activities in the district.

More than half of the district's income is from agriculture and allied fields. According to 2011 census, the total cropped area of the district is about 112170 ha provides full time employment to 52.35 per cent of total workers. There are about 231937 cultivators (73.21%) and 19181 agricultural labourers (6.05%) in the district. Heterogeneity in cultivation practices and diversity of cropping patterns are the important features of agriculture in the district. The diverse topography and agro climatic situation of the region has made it very conducive for cultivation of wide variety of agricultural and horticultural crops. It is significant to note that in the past 10 years people have started making experiments with different crops including horticulture that might be more beneficial.

The agriculture and allied sector in the district is merely rainfed. But the natural calamities (both draught and flood) are only the hurdles for agricultural activities in spite of hard labour and encouraging engagement of youth class in this sector. Water course originating from

hillock of Arunachal Pradesh are streaming through the district, which was earlier thought as blessing of nature but distressing now a day due to mass deforestation in the hillock.

The natural calamities such as flash flood, draught spell, unseasonal raining etc are reason for gradual distraction towards field activity. Despite of these weakness and threat there are some strength and opportunities in the district.

The main oilseed crop of Dhemaji district is Rapeseed which cover about 16 % of the gross cropped area of the district during 2014-15 with a productivity of 5.6 q/ ha. The farmers cultivate the local varieties of rapeseed and the high yielding varieties TS 36, TS- 38 etc are newly adopted by some farmers of the district. Other than rapeseed sesamum is also an oilseed crop grown in the district.

Dhemaji is traditionally rich in some horticultural production due to diverse and unique agro- climatic condition which is conducive for growing wide range of horticultural crops like vegetables, tuber, spices - ginger, turmeric, chili, garlic etc. plantation crops - coconut, arecanut, betelvine fruits crops- Banana, Assam lemon, Pine apple and other medicinal and aromatic plants. Horticultural crops comprise more than 17.44% of the gross cropped area of the district. Although large numbers of horticultural crops are cultivated on riverbanks and on foothills of the district but more important crops from the point of view of acreage are Banana, Arecanut, Betelvine, Potato and Rabi vegetables and Summer vegetables. Diversity in cultivation of horticultural crops has become possible due to presence of various types of soils and abundant rainfall. Most of the fruits and vegetables are cultivated in upland areas and in homestead gardens scale. The area under important horticultural crops of district has been increased significantly over the last 15 years while the productivity has remained more or less static with some exceptions.

3. SWOT analysis

Strength

- ❖ More than 85% of families engaged in Agriculture
- ❖ Active participation of Rural Youths in Farming
- ❖ High Literacy rate
- ❖ Existence of KVK for technological suport
- ❖ Existence of diversified land situation

- ❖ Flowing of natural water course across the district

Weakness

- Practice of Traditional cultivation method
- Lack of Infrastructural Facility and Technical intervention
- Least focus on allied vocations
- Small land holding & Poor economic status

Opportunity

- Accessible to nearby market of other district and state of Arunachal Pradesh
- Well connected Road connectivity
- Potential area for Double cropping

Threats

- Dry spell in critical crop stage
- Possible occurrence of Flood
- Shortage of agricultural labour
- Occurrence of disease and pest in epidemic level

4. Action plan to increase the income of the farmer

4.1 Increase in Area and Productivity of practicing crop

a. Paddy

Paddy is the major crop of the district occupies 80570 ha area which is more than 60% of gross cropped area. Out of total area under paddy, 66,240 ha are under Sali paddy and 14330 ha are under Ahu and summer paddy. Bao paddy (deep water rice), red kernel rice cultivated in about 6000 ha area especially in flood affected area in the district able to catch the eye of the exporter, increasing demand in some developed countries. Regarding variety of paddy crop the high yielding variety (HYV) such as Ranjit, Bahadur, Nilanjana, Mashuri etc. are cultivated only

about 36400 ha area which is 45.17% of total paddy area. As a result, the average productivity of the paddy is 2140 kg/ha. So, there is enough scope to increase the area (at least 60% of total) under HYVs to enhance production and productivity of paddy.

Specific approaches:

- Introduction of HYVs (*Ranjit, Bahadur, Shraboni, Gitesh, Numali & Keteki joha*)
- Introduction of HYV sub mergence tolerant paddy variety, Ranjit sub1 and Bahadur sub1
- Introduction of Gitesh variety as continent crop
- Introduction of medium duration HYVs to fetched the rice base cropping sequence
- Introduction of short duration HYVs for pre and post flood situation
- Improvement in cultivation practice (SHC based INM & IPM)
- Rice based Double cropping sequence
- Skill on Certified Seed production

b. Rapeseed and Mustard:

Rapeseed and mustard is the 2nd major field crop after paddy and occupies 17281ha area with a average productivity 560kg/ha. Traditionally the crop is grown in blood affected area after drain out of water as mono crop. Non- traditional area where paddy is grown during kharif can be converted to Rice-Toria double cropping sequence. Medium duration paddy varieties (130-135days) are available at present. Moreover, technologies on late sown toria varieties are also available.

Specific approaches:

1. Introduction of HYV Toria varieties including late sown varieties such as TS36, TS38, TS46, TS67, Jeuti etc.
2. Increase in area as Rice- Toria double cropping sequence
3. Introduction of HYV mustard short duration varieties such as NRCHB 101
4. Adoption of soil health card (SHC) based fertilizer application system
5. Skill training on INM and IPM practices

c. Blackgram:

Blackgram is the popular pulse crop in the district occupies 1076 ha with a productivity of 658kg/ha. The productivity is low due to non adoption of HYVs, non availability of quality seed material and lack of suitable late sown varieties. The crop is grown in upland situation as mono crop in a traditional way.

Specific approaches:

- Introduction of HYVs such as PU-31 and IPU-94-1 suitable for the district under normal sowing window (15th August to 15th September)
- Introduction of late sown blackgram varieties
- Skill training on INM and IPM practices
- Encourage for blackgram- summer vegetable cropping sequence

d. Maize:

Maize is the 2nd cereal crop grown in some pockets of the district in spite of suitable land situation in the district. Maize can be utilized as major component of livestock feed specially in locally managing pig feed. Presently this crop occupies only 285ha area.

Specific approaches:

- Awareness on maize cultivation including market potentiality
- Training on scientific cultivation of maize.
- Introduction and encouragement for blackgram- maize cropping sequence in upland situation
- Skill training on INM and IPM practices

e. Sesamum

Sesamum is the 2nd oilseed crop traditionally grown in some area of the district. This crop can be grown in marginal soil in both summer and kharif season. Despite of its suitability and market potentiality acreage of this crop is very low (below 100ha). Lack of awareness, suitable variety and cultivation practices etc are some reason of this less acreage.

Specific approaches:

- Awareness on sesamum cultivation including market potentiality
- Training on scientific cultivation practices
- Skill training on INM and IPM practices

f. Green gram:

The land situation of Dhemaji district is also suitable for green gram cultivation. Presently green gram is cultivated in 341 ha area with a productivity of 700kg/ha. There is scope to increase the area as well as productivity by introducing suitable variety.

Specific approaches:

- Awareness on green gram cultivation through demonstration
- Training on scientific cultivation practices
- Skill training on INM and IPM practices
- Introduction of suitable variety for cultivation in summer season

4.2. Crop diversification:

The agro ecological situation of Dhemaji district is suitable many other crop which has market potential. There are some crops growing in farmer's field but not in commercial scale or not in large acreage. Crop diversification is the most important intervention to be needed to increase the income level and to increase productivity per unit area. The crop diversification reduces the risk of changing climatic situation. Following are some crop may be recommended for commercial production with specific approaches

<u>Sl. No.</u>	<u>Crop</u>	<u>Specific Approaches</u>
1.	Sugarcane	<ul style="list-style-type: none">• Awareness and training on scientific cultivation practices• Demonstration

- Skill training on INM and IPM practices
 - Creation of facility in post harvest technique such as gur making and other secondary product
2. **Lentil**
- Awareness and training on scientific cultivation practices
 - Large scale Demonstration
 - Skill training on INM and IPM practices
 - Availability of quality seed material
 - Post harvest processing facilities to be created
3. **Lathyrus**
(grass pea)
- Awareness and training on scientific cultivation practices
 - Large scale Demonstration
 - Skill training on INM and IPM practices
 - Availability of quality seed material
 - Post harvest processing facilities to be created
4. **Groundnut**
- Awareness and training on scientific cultivation practices
 - Large scale Demonstration
 - Skill training on INM and IPM practices
 - Creation of storage facilities
5. **Chick pea**
- Awareness and training on scientific cultivation practices
 - Large scale Demonstration
 - Skill training on INM and IPM practices
 - Availability of quality seed material
 - Post harvest processing facilities to be created

6. **Buck wheat**
- Awareness and training on scientific cultivation practices
 - Large scale Demonstration
 - Skill training on INM and IPM practices
 - Availability of quality seed material
 - Post harvest processing facilities to be created

4.3. Intervention in Horticultural crop:

Although, there are some traditional horticultural crops due to diverse, unique and conducive agro- climatic condition for growing wide range of horticultural crops like vegetables, tuber, spices - ginger, turmeric, chili, garlic etc. plantation crops - coconut, areca nut, betel vine fruits crops- Banana, Assam lemon, Pine apple and other medicinal and aromatic plants; large scale production is very limited from the acreage point of view. All these Horticultural crops comprise only 17.4% of the gross cropped area of the district. Traditionally all these horticultural crops are cultivated on household *bari* system more particularly fruits crop such as Banana, Areca nut, Betel vine, Jack fruit, Litchi, Coconut, Guava and other minor fruits. On the other hand, commercial vegetable (Rabi and summer) are generally grown on riverbanks and foothills of the district. It is also good signing that, few educated youth are coming forward for commercial production system of vegetable in rice based double cropping and of fruits crop as plantation crop. Diversity in cultivation of horticultural crops has become possible due to presence of various types of soils and abundant rainfall. The area under important horticultural crops of district has been increased significantly over the last 10 years while the productivity has remained more or less static with some exceptions.

To increase the income level of the farm family adoption of horticultural crop is indispensable as more benefit cost ration compare to field crops. Considering the small and marginal nature of holding, financial institution such as bank should be hazard free for farmer and implementation of different development schemes should in proper way. Following are some specific plan to increase the income of farmers through horticultural activities:

4.3.1. Rabi vegetable:

- ❖ Increase area under rice- vegetable double cropping sequence

- ❖ Introduction of SHC base fertilizer application system of practicing crop
- ❖ Adoption of INM and IPM technology
- ❖ Introduction of high value vegetables such as Capsicum, Brocoli etc
- ❖ Establishment of cold storage facilities

4.3.2. Summer vegetable:

- ❖ Increase area under rice- vegetable, black gram/green gram/ sesamum- vegetable double cropping sequence
- ❖ Introduction of SHC base fertilizer application system of practicing crop
- ❖ Adoption of INM and IPM technology
- ❖ Area increase under cucurbitous vegetable
- ❖ Use of poly mulching for weed and water management

4.3.3. Organic vegetable production

- ❖ Imparting knowledge and skill through hands on training
- ❖ Demonstration on *in situ* organic inputs production
- ❖ Increase area under organic cultivation

4.3.4. Fruits production:

- Establishment of nursery for quality planting material production
- Establishment of mother plant block and identification of mother plant within the district for propagation of quality saplings
- Introduction of market led production system
- Programme to increase area under
 - Banana
 - Pineapple
 - Assam lemon
 - Coconut
 - Areca nut
 - Guava
 - Papaya

➤ Apple ber/ Thailand ber

- Cultivation of watermelon in sand and silt deposited area
- Introduction of high value fruits crop, straw berry

4.3.5. **Homestead garden/ bari:** Homestead garden or bari is an unique production system based on traditional knowledge. Validation of indigenous technological knowledge (ITK) in horticulture development particularly in *bari* system is very important. Restructuring of *bari* in multistoried and mixed cropping concept increase the production in per unit area.

4.3.6. Spice crop

Ginger, Turmeric and Garlic are major spice crop in Dhemaji district. Turmeric and Ginger are cultivated in homestead garden. Along with other vegetable crop garlic is grown in riverbank area.

Specific approaches

- ✓ Introduction of HYV ginger (Nadia) and turmeric (Megha turmeric) that have market potential
- ✓ Establishment of market linkage
- ✓ Establishment of small scale processsing units for turmeric

4.3.7. **Off season production system:** Facilities for off season vegetable production should be created. Poly house along with drip irrigation facilities should be created at least one unit in each village

4.3.8. **Hydroponics:** Hydroponics is the modern production system with efficient use of resources

- Skill training on hydroponics culture
- Demonstration

- Facilitates for availability of tools required

4.4 Income through agri based allied vocation: There are some allied vocation which help in fetching income with high benefit cost ratio.

<u>Sl. No.</u>	<u>Crop</u>	<u>Specific Approaches</u>
1	Mushroom cultivation	<ul style="list-style-type: none"> • Awareness and training on scientific cultivation practices • Demonstration • Skill training on year round production • Establish one district level spawn production unit
2	Fruits and vegetable processing unit (secondary agriculture)	<ul style="list-style-type: none"> • Skill training on <ul style="list-style-type: none"> Pickle production Jam and jelly production Juice production Dry vegetable production • Organization and mobilization of women SHGs • Facilitates for tools and implements
3	Vermi-compost and other organic inputs production	<ul style="list-style-type: none"> • Mobilization of rural youth • Skill training on vermi-compost and other organic inputs production • Facilitates for tools and implements
4	Honey production	<ul style="list-style-type: none"> • Linkage of honey bee rearing with toria and vegetable cultivation • Skill training on honey production • Creation of facilities for processing and marketing
5	Rice and rice product (secondary)	<ul style="list-style-type: none"> • Conversion of traditional knowledge to commercial unit • Skill training on packing and marketing

agriculture)

- Facilitates for tools and implements

4.5. Post harvest technology and processing unit

- Establishment of rice mill at farmers field level for processing of specialty rice “red kernel bao paddy” cultivated organically
- Facilitates for small scale oil expeller
- Facilities for sugarcane processing unit
- Facilities for lentil processing unit

4.6. General approaches

- **Infrastructure Facility:** Creation of infrastructure is the prime requisites for desired development in agriculture. Cold storage facilities, Road linkage from farm to market, seed storage facilities at district level etc are prime requisites for desired development in agriculture
- **Irrigation facility:** Out for total cultivable area only 5.32% area has irrigation facility. Therefore, an effective action plan is required to cover more area under irrigation facilities.
- **Marketing facility:** Organized Market facilities has to created at least in Gogamukh, Dhemaji, Silapathar, Simen chapori and Jonai to eliminate middle man.
- **Functional linkage with other departments**
- **Skill training to entrepreneurs**
- **Social concern: Stray cattle is another major problem the district need to be solve through mobilization of the society**
- **Farm mechanization:** For timely completion of farm operation farm mechanization is very important. Shortage of labour in agricultural field becomes a threat to agricultural development. Now a day different farm tools and machineries has been developed need to be facilitates through establishment of custom hiring center at *panchayat* level.
- **Village resource centre**
- **ICT based initiatives**
- **Activate PPS**