

4. Farming Systems of NE India

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4.1 Farming Systems of Arunachal Pradesh

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1. Farming Systems of East Siang

1. Farming Pattern

| Commodities | Law altitude, plains, less irrigated, loamy sand with tropical climate.(AES-I) | Medium altitude, foot hills regions, medium irrigated, heavy sandy loam, and with sub-tropical climate. (AES-II) | Higher altitude, High rainfed, reddish , sandy soil with sub-temperate climate.(AES-III) |
|--------------|--|--|---|
| Agriculture | Paddy, potato, mustard, ginger, chilly, brinjal soyabean, cucurbits and maize | Paddy, potato, ginger, maize, chilly, brinjal, soyabean, mustard and cucurbits | Paddy, ginger, potato, maize, chilly, millet, soyabean, brinjal and cucurbits |
| Horticulture | Pineapple, large | Orange, pineapple, large | Orange, pineapple, large- |
| | cardamom, black | cardamom, black pepper, | cardamom and black |
| | pepper and Banana | Banana | pepper and Banana |
| LIVESTOCK | cow, pigs, poultry, | Cow, pigs, poultry, goat, | Cow, pigs, poultry, goat, |
| | goats, Aquaculture. | Mithun, Aquaculture. | Mithun |

2. Summary of farming Systems

| | | | | | | Location |
|--------------|----------|----------|----------|-----------------|----------------------|-------------|
| Farming | Coile | Dainfall | Altitudo | Principal | Important fasturas | (area), |
| system | 50115 | Kaimaii | Annuae | crops/breeds | important reatures | extent of |
| | | | | | | area in ha. |
| Agri-AH- | Loamy- | 4611 | 130-180 | Paddy, Potato, | Rain fed irrigated, | Nari, |
| Horti- | sand | mm/yr | msl | Vegetable, | Deep Soil, | Ruksin, |
| Fishery | | | | Aquaculture, | Monoculture of | Mebo, |
| | | | | Pig, Poultry | Paddy, Tropical | Pasighat |
| | | | | | climate. | Sille-Oyan |
| Horti- Agri- | Gravelly | -do- | 155-752 | Citrus, Ginger, | Tropical to | Pasighat |
| AH | - Loam | | msl | TRC-Paddy, | Subtropical Climate, | Boleng |
| | | | | Maize | Rain fed irigated. | Koyu |
| | | | | | Hot summer and | Pangin |
| | | | | | moderately cool | Riga |
| | | | | | winter. | Rebo- |
| | | | | | | Perging |
| Agri-AH | Loamy | -do- | 130-342 | Paddy, Maize | Tropical to | Pasighat |
| | sand | | msl | Pig, Cattle, | Subtropical Climate, | Ruksin Nari |
| | | | | Poultry | Rain fed irigated. | Mebo Bilat |
| | | | | | | New Seren |
| | | | | | | Sille-Oyan |
| | 1 | | | 1 | | |

3. Agricultural characteristics of each farming System

| 3.1 | Boundaries | of | the | FS |
|-----|------------|----|-----|----|
| | | | | |

| Name of Agro-Ecological situations(AES) | Blocks | % of geographical |
|---|----------|----------------------|
| | | area of the district |
| AES-I | Nari | 2 |
| Low altitude, plains, less irrigated loamy sand with tropical | Ruksin | 8 |
| climate. | Mebo | 10 |
| | Pasighat | 3 |
| AES-II | Pasighat | 11 |
| Medium altitude, foot hills regions, medium irrigated, heavy | Mebo | 14 |
| sandy loam, and with sub-tropical climate. | Nari | 8 |
| | Ruksin | 2 |

Identification of different existing farming system and some representative circle:

| AES-I | AES -II | AES-III |
|----------------------------------|------------------------------|---------------------------|
| Pasighat – 155 msl, Ruksin – 133 | Boleng - 290 msl, Mebo – 342 | Pangin 397 msl, Rebo- |
| msl, Nari – 180msl, Bilat – 130 | msl, New Seren - 244 | Perging - 506 msl, Koyu – |
| msl, Sille-Oyan – 140 msl | | 627 msl, Riga – 752 msl |

3.2 Soils under the FS

| Agro-Ecological situations(AES) | Soil |
|---------------------------------|-------------------------------------|
| AES-I | Loamy sand. |
| AES-II | Heavy sandy loam |
| AES -III | Gravelly- Loam ,reddish, sandy soil |

3.3 Climates under the FS

| Agro-Ecological situations(AES) | Climate |
|---------------------------------|-----------------------|
| AES-I | Tropical climate |
| AES-II | Sub-tropical climate |
| AES -III | Sub-temperate climate |

3.4 Physiography under the FS

| Agro-Ecological situations(AES) | Physiography |
|---------------------------------|--------------------|
| AES-I | Plain |
| AES-II | Foot hills regions |
| AES -III | High hilly |

3.5 Irrigation facilities under the FS

| | Agro-Ecological situations(AES) | Physiography |
|----------|---------------------------------|------------------|
| AES-I | | Less irrigated |
| AES-II | | Medium irrigated |
| AES –III | | High rainfed |

3.6 Major crops and cropping intensity under the FS

| Farming System | Сгор | Cropping intensity |
|-----------------------|---|--------------------|
| Agri-AH-Horti-Fishery | Paddy, Maize, Bannana, Pineapple, Pig, | 100% |
| | Cattle, Poultry, IMC, Chinese carps | |
| Horti- Agri-AH | Citrus, Paddy, Ginger, Pig, Mithun, Poultry | 100% |
| Agri-AH | Paddy, Maize, Pig, Cattle, Poultry | 100 % |

3.7 Major cropping systems under the FS

| Farming System | Croping system |
|-----------------------|---|
| Agri-AH-Horti-Fishery | Paddy-Paddy, Maize-vegetable, vegetable-vegetable |
| Horti- Agri-AH | Citrus , Ginger |
| Agri-AH | Paddy-Paddy, Paddy-Mustard |

3.8 Land use pattern (ha) under the FS

| SI No. | Land use pattern | Land use pattern in representative village in each AES | | | | | | |
|--------|----------------------------|--|-----------|-------|---------|-------|---------|-------|
| | | | AES-I | | AES-II | | AES-III | |
| | | Nari | Sika-Tode | Kiyit | Yagrung | Siluk | Koreng | Rengo |
| 1. | Geographical area | 2770 | 1168 | 1118 | 1779 | 4635 | 1487 | 1742 |
| 2. | Cultivable area | 2350 | 1123 | 947 | 1639 | 3020 | 1463 | 1712 |
| 3. | Cultivated area | 154 | 273 | 540 | 389 | 175 | 92 | 170 |
| 4. | Cultivable waste | 20 | 350 | 184 | 100 | 995 | 300 | 300 |
| 5. | Current fallow | 15 | 280 | 89 | 50 | | | |
| 6. | Forest | 2100 | 20 | 99 | 1000 | 1500 | 1061 | 1220 |
| 7. | Pasture | 61 | 200 | 35 | 100 | 350 | 10 | 12 |
| 8. | Land put to non agri use | 200 | 15 | 49 | 10 | 450 | 5 | 15 |
| 9. | Land under misc. | 100 | 25 | 87 | 30 | 650 | 15 | 10 |
| 10. | Barren & uncultivable land | 120 | 5 | 35 | 100 | 515 | 4 | 5 |

3.9 Land holding pattern under the FS

Number of families according to size of operational land holding (ha) in representative village under each AES:

| SI | Size of operational land | AES-I | | AES-II | | AES-III | |
|-----|----------------------------|-------|------|--------|------|---------|------|
| No. | holding | No | Area | No | Area | No | Area |
| 1. | Landless | 11 | | 5 | | | |
| 2. | Marginal (1 or less than1) | 105 | 111 | 63 | 56 | 31 | 26 |
| 3. | Small (1 -2 ha) | 188 | 322 | 128 | 248 | 67 | 120 |
| 4. | Medium (2 -4 ha) | 47 | 175 | 31 | 107 | 14 | 66 |
| 5. | Large (4 -5 ha or above) | 26 | 359 | 8 | 153 | 7 | 50 |
| | Total | 377 | 967 | 235 | 627 | 119 | 262 |

3.10 Populations and socio-economic characteristics under the FS

| Blocks | | Total | % of | Male | Female | SC | ST | GEN |
|--------------|----------|-------------|----------|-------|--------|-----|-------|-------|
| | FS | population | literacy | | | | | |
| Boleng -Riga | Horti- | 8872 | 45.26 | 4599 | 4273 | 24 | 7721 | 1127 |
| | Agri-AH | | | | | | | |
| Pangin | Horti- | 7205 | 39 | 3746 | 3459 | 2 | 6547 | 656 |
| | Agri-AH | | | | | | | |
| Nari | Agri-AH- | 8370 | 44.79 | 4327 | 4043 | 22 | 6172 | 2176 |
| | Horti- | | | | | | | |
| | Fishery | | | | | | | |
| | Agri-AH | | | | | | | |
| Ruksin | Agri-AH- | 18355 | 49.0 | 9387 | 8968 | 47 | 13256 | 5052 |
| | Horti- | | | | | | | |
| | Fishery | | | | | | | |
| | Agri-AH | | | | | | | |
| Pasighat | Agri-AH- | 31615 | 61.0 | 16504 | 15111 | 417 | 15478 | 15720 |
| | Horti- | (9650)rural | | | | | | |
| | Fishery, | | | | | | | |
| | Horti- | | | | | | | |
| | Agri-AH | | | | | | | |
| Mebo | Agri-AH- | 12980 | 40.83 | 6702 | 6278 | 5 | 56.4 | 7371 |
| | Horti- | | | | | | | |
| | Fishery | | | | | | | |
| | Agri-AH | | | | | | | |
| Total | | 87397 | 27779.88 | 45265 | 42132 | 517 | 54778 | 32102 |

3.11 Adoption pattern for each crop/breed/other technology under the FS

| Farming System | Adoption pattern |
|-----------------------|------------------|
| Agri-AH-Horti-Fishery | Medium |
| Horti- Agri-AH | Low |
| Agri-AH | Medium |

3.12 General production constraints for each crop under the FS:

Paddy

Paddy is one of the major crops in all AESs in East-Siang district. Though the area under paddy cultivation is increasing in AES-II & III, but the productivity is not increasing as desired due to age old method of cultivation practices, hesitation to use chemical fertilizers and lack of awareness about the bio-fertilizers and organic –manures etc.

Maize

Maize is an important cereal crop in the district. The area under maize cultivation is increasing However, the yield is not increasing as expected due to poor management of the crop and non adoption of improved methods and non adoption of mixed cropping with legume crops.

Ginger

Ginger is one of the important cash crop of the district. Even for this, area under the crop is increasing, but the yield is decreasing in all the AES due to non adoption of improved variety and methods, the age old Nadia and Maran varieties are used in all the AES, which need to be altered with new improved varieties in all the AESs.

Mustard

Mustard is grown as oil seed in the district. Though the area under the crop is increasing, the yield is decreasing in all the AESs due to lack of awareness about the improved method of farming. Hhowever there is scope to increase the crop yield.

Soyabean

Soyabean is cultivated in all the AESs. Traditionally, it is grown as an intercrop with maize, yam and colocasia and upland paddy. Though the area under the crop is increasing, yield almost remains constant in all the AESs due to traditional cultivation practices.

Potato

Potato is grown as commercial crop as well as for home consumption in the district. It is generally grown under rainfed condition in all AESs .The productivity is decreasing. However, there is scope to improve the productivity in the district.

Chilly

Chilly is grown under rainfed condition in all the AESs in the district. Though the area under the crop is increasing gradually, the yield is not increasing as desired, due to traditional practices. It is grown as intercrop with ginger maize and upland paddy.

Orange

Orange is one of the sporadically grown fruit crop in the district. It is grown in AES-II & III. Though the area under the crop is increasing, productivity is decreasing due to non adoption of improved package of practices and non renovation of the old orchards.

Pineapple

Pineapple is grown in all the AESs in the district. Though area under the crop shows a gradual increase, yield is decreasing due to poor management.

Large cardamom

Large cardamom is grown as cash crop in the district. The area under the crop is not increasing in AES-I but it is increasing in AES-II&III, but the yield is decreasing due to lack of proper management of the crop.

Black Pepper

Black pepper is one of the important spice crops in the district. The area under the crop as well as the yield is not increasing due to non adoption of improved method of cultural practices. However there is scope to improve the crop in the district.

Livestock:

Cow

Cows are reared for purpose of plough animals and not for milk production. The cows are reared by almost all farm families in all AES-In the district. The trend in number of cows fluctuates from time to time due to disease epidemic and lack of knowledge about the animal health care and lack of technical experts in the representative villages.

Goat

The trend study of number of goats in the representative village indicated certain increase of the animal number. However the increase was not satisfactory due to poor management of the animal health and improper rearing practices in all the AESs in the district.

Pigs

Trend study of the number of pigs showed that the animal number decreased rather due to poor attention of the farmers towards scientific farming practices. The epidemical outbreaks occur from time to time in all the AESs in the district.

Fishery

Fish has got important place in the food of people of this region. It is also source of income for many families of the district. The aquaculture practices are not improving up to the mark due to lack of fish seed hatchery and feed industry. Availability of fish seed is the major constraints. There is a large scope for aquaculture mainly in the area of integrated farming.

Poultry

Poultry plays an important role in meeting up the demand of social obligation in the farming community. It is also a source of income for some farm families in representative village in all the AESs. The trend however fluctuates due to out break of Raniket disease from time to time in all AESs in the district. However there is large scope to increase the livestock production for table purpose as well as for market purpose. Awareness of the farmers is required to identify their unfelt needs.



1 Composite fish culture has been promoted in a big way by KVK, East Siang. The picture shows one such site in Sille Village, East Siang.



2 Unconventional crops are also introduced for better income generation in the district. Here Sugarcane Var. Krishna is seen in farmer field



3 Soyabean fields of East Siang



Indigenous Cotton Weaving technique practised by villagers



Rich harvest from a crop of Melon Var NDPKH1



Pineapple Planting going on in the villages

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2. Farming Systems of Lohit

1. Summary of farming Systems of Lohit:

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| Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|----------|---------------|----------|----------|----------------------|-------------------|-------------|
| system | | | | crops/breeds | features | (area) |
| | | | | | | extent of |
| | | | | | | area in ha. |
| FS-1 | Deep, well | Medium | Low | Agri - WRC/ | 1. Traditional | Scattered |
| (AES-I) | drained, | | altitude | upland paddy, | method of | on low |
| (Agri.+ | fine alluvial | | <150 m | Potato, mustard, | cultivation of | altitude |
| Horti.+ | clay loam | | from MSL | maize, soybean, | different crops. | flood prone |
| Animal | soil | | | local pulses, tea | 2. Unplanned | plain land |
| husb) | moderate | | | Horti. – Banana, | garden. | in |
| | soil erosion | | | Pineapple,citrus | 3. Lack of | Chongkham |
| | hazard, | | | Vegetables, | scientific | Namsai, |
| | acidic in | | | ginger, chili, betel | knowledge on | Piyong, |
| | nature and | | | vine) | management of | Lekang, |
| | plain flood | | | Animal Husb | cultivated crops. | Lathao, |
| | prone. | | | Cattle, pig, goat, | 4.Traditional | Mahadevpu |
| | | | | elephant, duck | management of | r area. |
| | | | | and poultry | animals | |
| | | | | | | |
| FS-2 | Deep, well | Medium | Low | Agri - WRC/ | 1. Traditional | Scattered |
| (AES-I) | drained, | | altitude | upland paddy, | method of | on low |
| (Agri.+ | fine alluvial | | <150 m | Potato, mustard, | cultivation. | altitude |
| Horti.+ | clay loam | | from MSL | maize, soybean, | 2. Unplanned | flood prone |
| Animal | soil, | | | local pulses, tea | kitchen garden. | plain land |
| husb.+ | moderate | | | Horti. – Banana, | 3. Lack of | in |
| Fishery) | soil erosion | | | Pineapple, citrus | scientific | Chongkham |
| | hazard, | | | vegetables, | knowledge on | Namsai, |
| | acidic in | | | ginger, chili, betel | management of | Piyong, |
| | nature and | | | vine | cultivated crops. | Lekang, |
| | plain flood | | | Animal Husb | 4. Farmers are | Lathao, |
| | prone. | | | Cattle, pig, goat, | practicing | Mahadevpu |
| | | | | elephant, duck | fishery in | r area. |
| | | | | and poultry | traditional way | |
| | | | | Fishery – Fish | without any | |
| | | | | species | scientific | |
| | | | | Rohu, Catla, | knowledge. | |

| | | | | Grass Carp, | | |
|----------|--------------------------------------|---------|----------|---|--|-----------------|
| | | | | Silver Carp and | | |
| | | | | Common Carp, | | |
| | | | | Local species | | |
| | | | | | | |
| FS-3 | Moderately | Medium | Mid | Agri - WRC/ | 1. Traditional | Scattered on |
| (AES-II) | deep to | to high | altitude | upland paddy, | method of | medium |
| (Agri.+ | deep, well | | 150- | Potato, mustard, | cultivation. | altitude foot |
| Horti.+ | drained, | | 200m | maize, soybean, | 2. Unplanned | hill, partially |
| Animal | Sandy loam | | from MSL | local pulses | kitchen garden. | flood prone |
| husb) | soil, | | | Horti. – | 3. Lack of | plain land in |
| | moderate | | | Banana, | scientific | Tezu, |
| | soil erosion | | | Pineapple ,citrus | knowledge on | Sunpura |
| | hazard, | | | vegetables, | management of | area. |
| | acidic in | | | ginger, chili, | cultivated crops. | |
| | nature and | | | betel vine | 4.Traditional | |
| | plain to foot | | | Animal Husb. – | management of | |
| | hill area, | | | Cattle, pig, goat, | animals. | |
| | partly flood | | | elephant, duck | | |
| | prone. | | | and poultry | | |
| | | | | | | |
| FS-4 | Moderately | Medium | Mid | Agri - WRC/ | 1. Traditional | Scattered on |
| (AES-II) | deep to | to high | altitude | upland paddy, | method of | medium |
| (Agri.+ | deep, well | | 150- | potato, mustard, | cultivation of | altitude foot |
| Horti.+ | drained, | | 200m | maize, soybean, | different. | hill, partially |
| Animal | Sandy loam | | from MSL | local pulses | 2. Unplanned | flood prone |
| husb.+ | soil, | | | Horti - Banana, | kitchen garden. | plain land in |
| Fishery) | moderate | | | pineapple, citrus | 3. Lack of | Tezu, |
| | soil erosion | | | vegetables, | scientific | Sunpura |
| | hazard, | | | ginger, chili, | knowledge on | area. |
| | acidic in | | | betel vine | management of | |
| | nature and | | | Animal Husb | cultivated crops. | |
| | plain to foot | | | Cattle, pig, goat, | 4. Farmers are | |
| | | | | | | |
| | hill area, | | | elephant, duck | practicing | |
| | hill area, partly flood | | | elephant, duck and poultry | practicing fishery in | |
| | hill area, partly flood prone. | | | elephant, duck and poultry Fishery – | practicing fishery in traditional way | |
| | hill area, partly flood prone. | | | elephant, duck and poultry Fishery – Rohu, Catla, | practicing fishery in traditional way without any | |
| | hill area, partly flood prone. | | | elephant, duck and poultry Fishery – Rohu, Catla, Grass Carp, | practicing fishery in traditional way without any scientific | |
| | hill area, partly flood prone. | | | elephant, duck and poultry Fishery – Rohu, Catla, Grass Carp, Silver Carp and | practicing fishery in traditional way without any scientific knowledge. | |
| | hill area, partly flood prone. | | | elephant, duck and poultry Fishery – Rohu, Catla, Grass Carp, Silver Carp and Common Carp, | practicing fishery in traditional way without any scientific knowledge. | |

| | Madavatalı | Llink | Llink | A ava: Unland | 1 Tue dition of | Casthousday |
|----------|----------------|-------|------------------|---|--|----------------|
| F3-3 | Moderatery | підп | nign altituda | Agri - Opianu | | Scattered on |
| (AES- | deep to | | altitude | paddy, maize, | method of | high altitude, |
| III) | deep well | | > 250m | millet, local | cultivation of | mid hill |
| (Agri.+ | drained, | | from MSL | pulses | different crops. | areas of |
| Horti.+ | black soil, | | | Horti – Orange, | 2. Small sized | Wakro area |
| Animal | high soil | | | Tapioca, | kitchen garden. | |
| husb) | erosion | | | colocasia, sweet | 3. Lack of | |
| | hazard, | | | potato, | scientific | |
| | acidic in | | | vegetables, | knowledge on | |
| | nature, mid | | | ginger, chili, | management of | |
| | hill area. | | | pineapple, | cultivated crops. | |
| | | | | banana | 4. Farmers are | |
| | | | | Animal Husb - | practicing | |
| | | | | Mithun, cattle, | fishery in | |
| | | | | pig, goat, | traditional way | |
| | | | | elephant, duck | without any | |
| | | | | and poultry | scientific | |
| | | | | | knowledge. | |
| FS-6 | Moderately | High | High | Agri - Upland | 1. Traditional | Scattered on |
| (AES- | deep to | - | altitude | paddy, maize, | method of | high altitude, |
| III) | deep well | | > 250m | millet, local | cultivation of | mid hill |
| (Agri.+ | drained, | | from MSL | pulses | different crops in | areas of |
| Horti.+ | black soil, | | | ' Horti – Orange, | haphazard way. | Wakro area |
| Animal | , hiah soil | | | Tapioca, | 2. Small sized | |
| husb.+ | erosion | | | colocasia. | kitchen garden. | |
| Fisherv) | hazard. | | | vegetables. | 3. Lack of | |
| ,, | acidic in | | | ainaer, chilli. | scientific | |
| | nature, mid | | | pineapple. | knowledge on | |
| | hill area | | | hanana | management of | |
| | | | | Animal Hush - | cultivated crops | |
| | | | | Mithun cattle | 4 Farmers are | |
| | | | | nia goat | practicing | |
| | | | | pig, gout, | | |
| | | | | elenhant duck | tishery in | |
| | | | | elephant, duck | tishery in | |
| | | | | elephant, duck and poultry Fishery - | traditional way | |
| | | | | elephant, duck and poultry Fishery – Roby, Catla | fishery in traditional way without any | |
| | | | | elephant, duck and poultry Fishery – Rohu, Catla, Grass Carp | fishery in traditional way without any scientific | |
| | | | | elephant, duck and poultry Fishery – Rohu, Catla, Grass Carp, Silver Carp and | fishery in traditional way without any scientific knowledge. | |
| | | | | elephant, duck and poultry Fishery – Rohu, Catla, Grass Carp, Silver Carp and | fishery in traditional way without any scientific knowledge. | |
| | | | | elephant, duck and poultry Fishery – Rohu, Catla, Grass Carp, Silver Carp and Common Carp, | fishery in traditional way without any scientific knowledge. | |

2. Agricultural characteristics of each farming System

2.1 Boundaries of the FS :

FS-1 and FS-2: Scattered in low altitude flood prone plain land in Chongkham, Namsai, Piyong, Lekang, Lathao, Mahadevpur area.

FS-3 and FS-4: Scattered on medium altitude foot hill, partially flood prone plain land in Tezu, Sunpura area.

FS-5 and FS-6 : Scattered on high altitude, mid hill areas of Wakro area

2.2 Soils under the FS :

FS-1 and FS-2: Deep, well drained, fine alluvial clay loam soil, moderate soil erosion hazard, acidic in nature and plain flood prone.

FS-3 and FS-4: Moderately deep to deep, well drained, Sandy loam soil, moderate soil erosion hazard, acidic in nature and plain to foot hill area, partly flood prone.

FS-5 and FS-6: Moderately deep to deep, well drained, black soil, high soil erosion hazard, acidic in nature, mid hill area.

2.3 Climate under the FS :

FS-1, **FS-2**, **FS-3** & **FS-4**: Sub-tropical climate with hot humid summer and moderately cool winter

FS-5 & FS-6: Sub-tropical moderately cool to cool climate throughout the year.

2.4 **Physiograhy under the FS :**

FS-1 & FS-2: Plains to somewhat undulating, low altitude flood prone plain land.

FS-3 & FS-4 : Undulating, moderate slope, foot hills

FS-5 & FS-6: Undulating, rocky hills with moderate to steep slope, dense forest cover, intercepted by fast flowing hilly streams.

2.5 Irrigation facilities under the FS :

all Farming systems are mainly rainfed, minor irrigation / gravitational irrigation in certain pockets from the perennial hilly streams under govt. or individual / community initiative.

2.6 Major crops and cropping intensity under the FS :

FS-1 and FS-2: WRC/ upland paddy, potato, mustard, maize, soybean, local pulses, tea, banana, pineapple, citrus vegetables, ginger, chilli, betel vine

FS-3 and FS-4 : WRC/ upland paddy, potato, mustard, maize, soybean, local pulses banana, pineapple ,citrus vegetables, ginger, chilli, betel vine

FS-5 and FS-6 : Upland paddy, maize, millet, local pulses, orange, tapioca, colocasia, vegetables, ginger, chilli, pineapple, banana.

2.7 Major cropping systems under the FS :

1. Transplanted paddy followed by Potato/Mustard is done in some areas.(FS-1,2,3,4)

2. Maize followed by rabi vegetables/mustard/other rabi crops is grown in few valley areas.

(FS-1, 2, 3 , 4, 5, 6)

3. Intercropping of Maize + Green gram is practiced on low altitude areas (FS-1, 2, 3, 4)

- 4. Intercropping of Orange+ Ginger is practiced on low altitude areas (FS-1,2,5, 6)
- 5. Intercropping of Orange+ Pineapple is practiced on low altitude areas (FS-1,2,5, 6)
- 6. Mixed cropping is also followed in some areas particularly in FS 5, 6.

2.8 Land use pattern under the FS :

Generally 4 types of land use patterns are observed in all Farming Systems.

Settlement land – Comparatively plain upland having water source, houses are scattered here and there, bamboo groove and minimum orchard area is a common feature of every household, patches of land are spared for community house , religious structure etc. Burial sites are situated outside the settlement area.

Agricultural land- These are comparatively plain / undulating or hills having cultivable moderate slopes nearby settlement area.

Forest land- These are uncultivable/uncultivated land on hill top or in deep valleys between two hills. These are meant for hunting and gathering as well as extraction of forest products like cane, bamboo, wood and wild edible food stuff.

Pasture & barren land- These are comparatively plain/ undulating or hills having moderate slope considered as reserve of the village for further expansion either for agriculture or settlement.

Agril. Activitiy wise land use classification:

Plain land- Field crops, fish pond

Undulating land / having moderate slope – Homestead, kitchen garden, fish pond, animal shed, *Jhum* cultivation

Upland having moderate to steep slope – Jhum cultivation and forestry.

2.9 Land holding pattern under the FS :

Individual / community (All FS)

Land for settled cultivation and orchard are individually owned. Land for jhum cultivation on the hills is under community/ clan ownership. However, this land could be owned by individuals through proper permission from concerned village heads.

2.10 **Populations and socio-economic characteristics under the FS :**

A number of tribes including ST and SC people live in Lohit district. The major tribes are Khampti, Misimi, Deori, Moran, Adi, etc. They live in traditional huts constructed from locally available materials. Well developed modern houses are common in plain land areas. **(All FS)** Educational level is mostly between schooling to graduate standard among the adults

(FS 1, 2). Educational level is mostly between schooling to XII standard among the adults (FS 5,6). The Khamptis, Deori, Moran tribes are scattered in low and mid altitude areas (FS-1,2,3,4). The Misimis are scattered in the high altitude hill areas

(FS-5,6). Most of the farmers of the district of all the farming system are resource poor. Their livelihood depends mainly on agriculture, horticulture, animal rearing, fishing, handicraft and minor forest product based activities.

2.11 Adoption pattern for each crop/breed/other technology under the FS :

All the crops and animals are grown/ reared under conventional management. Adoption of scientific intervention is hardly observed. The farmers expect a lot from live departments for seed, fertilizer, plant protection material, feed, medicine etc. Most of them could be categorized under laggard category with respect to technology adoption of any agricultural interventions.

2.12 General production constrains for each crop under the FS :

Agriculture :

- 1. Traditional cropping without scientific management practices (All FS)
- 2. Poor soil fertility (All FS)

3. Rodent, termite, stem borer, gall midge , gundhi bug, leaf folder, and leaf roller attack in paddy (All FS)

- 4. Poor yield of local varieties of paddy, pulses and oilseed (All FS)
- 5. Non adoption of fertility management practices in all crops (All FS).
- 6. Attack of stem borer/ top borer in maize (All FS)
- 7. Lack of irrigation facility (All FS)

8. Lack of knowledge regarding production and use of organic manures Lack and soil conservation techniques.

10. Lack of knowledge about IPM/ INM of different crops (All FS)

11. Lack of knowledge about scientific agronomic practices for different crops (All FS)

Horticulture:

1. Poor performance of local and of fruits and Vegetables (All FS).

2. Lack of availability of quality planting material citrus, pineapple, litchi (All FS).

3. Lack of knowledge about propagation technique of banana, citrus, litchi (All FS).

4. Lack of knowledge about scientific orchard management technology of citrus, pineapple (All FS).

5. Lack of knowledge about scientific nursery raising technique in vegs. (All FS)

6. Lack of knowledge about nutrient mgt. technique of citrus, litchi, pineapple, and banana (All FS).

7. Lack of knowledge about insect-pest & disease mgt. technique of fruits and vegetables (All FS).

- 8. Lack of knowledge on fruits & vegetables. Preservation & processing (All FS)
- 9. Lack of awareness on utilization of underexploited crops (All FS)
- 10. Lack of knowledge & awareness on scientific Of ornamentals flowers (All FS)

11. Lack of knowledge & awareness on cultivation of mushroom, (All FS).

Fishery

1.Lack of suitable region specific fish farming technology with respect to different altitude of Lohit district (FS- 5,6)

2. Lack of knowledge about different aspects of scientific fish culture (All FS)

- 3. Lack of knowledge about composite fish culture (All FS)
- 4. Lack of knowledge about low cost integrated fish farming systems (All FS)
- 5. Lack of awareness about scientific fish husbandry practices (All FS)

Animal Husbandry :

- 1. Parasitic infection of pig and goat (All FS)
- 2. Poor feeding in respect of cattle, poultry and pig (All FS)
- 3. Use of local breed of cattle, pig and poultry (All FS)
- 4. Lack of knowledge about scientific rearing system of poultry and pig (All FS)
- 5. Lack of knowledge on scientific disease management of cattle, pig & poultry (All FS 6)
- 6. Lack of knowledge about quality feed (All FS)
- 7. Use of local breeds of poultry and pig (All FS)
- 8. Lack of awareness about improved breeds (All FS)
- 9. Lack of knowledge about integration of different enterprises (All FS)



1 Rhizome rot disease management has become a major issue for Ginger farmers in Lohit. KVK asess the avaialable options for their microlocation suitability



2 KVKs provide major inputs for agricultural development in the district. Fish seed produced at KVK Lohit farm is shown above



3 FLD of latest Fishery technologies by SMS Fishery Science

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1. Summary of Farming Systems:

Based on the criteria listed, the agro-ecological situation was classified into homogeneous farming situations and thus furnished in the table below:

| Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|----------------|----------|----------------|---------------------|------------------|-------------|-------------|
| system | | | | crops/ breeds | features | (area). |
| | | | | | | Extent of |
| | | | | | | area in ha |
| Agriculture+ | 1. Loam | 1. Mean | 1. Balijan=459msl | Rice, Maize, | 1. family | 1. Itanagar |
| Livestock | to clay | annual | 2. Kimin=462msl | Orange , | farming | (1750 ha) |
| farming | loam | rainfall=261.4 | 3. doimukh=500msl | Pineapple, | 2. State | 2. balijan |
| (Agri-AH) | 2. loam | 7mm | | Local and | farming | (4330 ha) |
| | to sandy | 2. Total | 4. sagalee= 1079msl | Jersey cow, | (MBF, | 3. Kimin(|
| | loam | annual | | Hampshire and | Sagalee) | 3813 ha) |
| | | rainfall=3690. | | local Pig, | and SSF, | 4. Doimukh |
| | | 20mm | | poultry etc. | Sonajuli | (2880 ha) |
| | | | | | 3. Home | 5. Sagalee |
| | | | | | consumption | (3923 ha) |
| | | | | | and | |
| | | | | | commercial | |
| | | | | | farming | |
| | Loam to | Mean annual | 1. Balijan=459msl | Rice, Maize | 1. Family | Balijan |
| Agriculture + | sandy | rainfall=261.4 | 2. Kimin=462msl | Mustard, | farming | (4330 ha) |
| Horticulture | loam, | 7mm | 3. Doimukh = | Pineapple , | 2. Personal | 3. Kimin |
| | Loam to | 2. Total | 500msl | Ginger, | farming | (3813 ha) |
| | clay | annual | | Cabbage and | 3. Home | 4. Doimukh |
| | loam | rainfall=3690. | | chilly | comsumption | (2880 ha) |
| | | 20mm | | | and | |
| | | | | | commercial | |
| | | | | | farming | |
| Livestock | Loam to | Mean annual | 1. Balijan=459msl | 1. Both jersey | 1. Family | Balijan |
| farming + | clay | rainfall=261.4 | 2. Kimin=462msl | and local cow, | farming | (4330 ha) |
| Agriculture + | loam | 7mm | 3. 5. Itanagar | 2. Pigs | 2. Personal | 3. Kimin(|
| Horticulture | | 2. Total | (780 msl) | (Hampshire) | farming | 3813 ha), |
| | | annual | 4. sagalee= 1079msl | and local | 3. Home | Sagalee |
| | | rainfall=3690. | | 3. poultry. | comsumption | (3923 ha), |
| | | 20mm | | 4. Rice , Maize, | and | Itanagar |
| | | | | Orange, | commercial | (1750 ha) |
| | | | | Pineapple, | farming | |
| | | | | vegetables | | |
| Silviculture + | Loam to | Mean annual | 1 Kimin | 1. Teak, | 1. State | Kimin |
| Agriculture + | loamy | rainfall=261.4 | (462msl) | Gamari, | farming | (3813 ha), |
| Horticulture | sand, | 7mm | | Albizzia sp. | (SFRI, | Sagalee |
| | | | | | Itanagar) | (3923 ha), |

| | Loam to | 2. Total | 2. Itanagar | 2. Rice, Maize, | 2. family | Itanagar |
|---------------|---------|----------------|---------------------|------------------|---------------|------------|
| | strong | annual | (780 msl) | Sugarcane, | Farming | (1750 ha) |
| | clay | rainfall=3690. | 3. Sagalee= | Orange | | |
| | loam | 20mm | 1079msl | Pineapple | | |
| | | | | | | |
| Livestock | Loam to | Mean annual | 1. Balijan = 459msl | 1. Fisheries | 1. family | Balijan |
| farming + | loamy | rainfall=261.4 | 2. Kimin=462msl | (Rohu, catla, | farming | (4330 ha) |
| Fisheries + | sand, | 7mm | 3. Doimukh = | Mrigal). | 2. Commercial | 3. Kimin |
| Agriculture + | Loam to | 2. Total | 500msl | 2. Pig, Poultry, | farming | (3813 ha) |
| Horticulture | strong | annual | | Cattle | | 4. Doimukh |
| | clay | rainfall=3690. | | 3. rice Maize, | | (2880 ha) |
| | loam | 20mm | | Potato, | | |
| | | | | Pineapple, and | | |
| | | | | others locally | | |
| | | | | consumed | | |
| | | | | vegetables. | | |

1.1 FS-1: Agriculture + Livestock farming (Agri-AH)

- 1. Boundaries of the FS: Balijan, Itanagar, Kimin, Sagalee, Doimukh
- 2. Soils under the FS: Loam to clay Loam
- 3. Climate under the FS:
 - A. Sagalee: High to mid Hilla, subtropical to temperate zone
 - B. Itanagar, Balijan, Kimin and Doimukh: Foot hills to mid Hills subtropical Zone
- 4. Physiography under the FS:

A. Sagalee: Slightly too moderately erosion hazard, steep side slopes, under dense forest and shifting cultivation

B. Itanagar, Balijan, Kimin and Doimukh: Foot hills to slightly mid-hills, sub tropical evergreen forest, having slight erosion hazard, under paddy cultivation.

- 5. Irrigation facilities under the FS:
 - A. Channels from natural streams
 - B. Rainfall
 - C. Well, Tank, Hand Pump
- Major crops and cropping intensity under the FS: Rice, Maize, Sugarcane, Mustard, Ginger, Chilli

Cropping Intensity: 193.7%

- 7. Major cropping systems under the FS:
 - A. Cropping Sequence: 1. Paddy-Mustard (Double Cropping)
 - 2. Maize-Paddy-Potato (triple Cropping)
 - B. Intercropping : Rice+Maize
 - C. Mixed Cropping : Rice+Maize+Beans+Pumpkins+Chilli+Colocasia+Yams
 - D. Monocropping : Rice, Maize, Sugarcane, Tea, Potato

- 8. Land use pattern under the FS:
 - a. Gross cropped area: 30944ha
 - b. Net Area sown: 15970 ha
 - c. Fallow lands: 27000 ha
 - d. Cultivable Waste lands: 4100 ha
 - e. Forest cover: 1450 sq Km
 - f. Cropping Intensity: 193.7%
- 9. Land holding pattern under the FS: A. Classes of farmers and their agriculture holdings in the FS area are shown on the table given below:

| SI. No. | Farmers group | No. of farm families | Holding area |
|---------|-------------------------------|----------------------|--------------|
| 1 | Marginal (below 0.5 -1.0 ha) | 589 | 378.72 |
| 2 | Small (1.0-2.0 ha) | 991 | 1321.21 |
| 3 | Semi Medium(2.0-4.0ha) | 2923 | 8090.33 |
| 4 | Medium(4.0-10.0 ha) | 1408 | 7075.13 |
| 5 | Large(10.0-20.0 ha) | 107 | 1601.55 |
| 6 | All classes | 6018 | 18466.94 |

10. Populations and socio-economic characteristic under the FS:

- A. Population: 65165 Nos.
- B. Socio-economic characteristics:
 - 1. Source of Finance for farming: Self financing, bank loan, govt. Schemes
 - 2. Major source of Income:
 - A. Horticulture produces (oranges, Pear, Pineapple, local vegetables, chili, and ginger)
 - B. Animal Husbandry (sale of Mithun, pigs, poultry and cow milk in some pockets of area)
 - C. Agriculture (sale of surplus paddy and maize)
 - 3. Commercial commodities produce: Rice, Maize, Mithun, Pigs, and Poultry
- 11. Adoption pattern for each crop / breed/other technology under the FS

Rice: Paddy is one of the major crop under the identified FS and is widely cultivated in a Jhum land as well as low land area as WRC and Hilly area as TRC. Generally farmers adopt the indigenous way of cultivation except in WRC and TRC where proper irrigation method and timely weeding are followed.

Pigs: Generally Pigs are being raised in a scavenging system although it is observed that some farmers adopt the scientific way of Pig rearing in towns of the district for commercial purposes.

Mithuns: The farmers of the FS follow traditional method of mithun rearing, where in, mithuns are let loose freely to graze in the jungles. Occasionally, the mithun owner or the care taker pay visit to their mithun in jungle to offer common salt.

- 12. General production constraints for each crop under the FS
 - A). Rice:
 - 1. High infestation of Pest (Yellow stem borer and rice gundhi bug).
 - 2. Low yielding Local varieties.
 - B). Orange:
 - 1. Lack of quality planting materials
 - 2. Lack of technical know how.
 - C). Pig:
 - 1. Scavenging system of Pig rearing.
 - 2. Lower body weight gain and litter size.
 - 3. Use of indigenous non descript Pigs.
 - D). Mithun:
 - 1. Free range management system.
 - 2. Indiscriminate slaughter.

1.2 FS-2: Agriculture + Horticulture:

- 1. Boundaries of the FS: Balijan, Kimin, Doimukh
- 2. Soils under the FS: Loam to clay Loam, loam to sandy loam
- 3. Climate under the FS: Foot hills to mid Hills subtropical Zone
- 4. Physiography under the FS: Foot hills to slightly mid-hills, sub tropical evergreen forest, having slight erosion hazard, under paddy cultivation.
- 5. Irrigation facilities under the FS:
 - A. Channels from natural streams
 - B. Rainfall
 - C. Well, Tank, Hand Pump
- Major crops and cropping intensity under the FS: Rice, Maize, Oranges, Pineapple, Mustard, Ginger, Chilli
- 7. Major cropping systems under the FS:

| A. Crop | ping Sequence | : | 1. Maiz | e-Paddy-Mustard (Triple Cropping) |
|----------|------------------|---------|---------|---|
| | | | 2. Okra | -Pumpkin-Cabbage (Triple Cropping) |
| B. Inter | cropping | : | Rice + | Maize, Pineaplle + Ginger |
| C. Mixe | d Cropping | : | Rice + | Maize + Beans + Pumpkins + Chilli + Colocasia |
| | | | + Yams | 5 |
| D. Mon | o cropping | : | Rice, O | range, Mustard, Potato |
| Land us | se pattern under | the FS: | : | |
| a. | Gross cropped | area | : | 18200ha |
| b. | Net Area sown | | : | 10648 ha |
| с. | Fallow lands | | : | 18000 ha |
| d. | Cultivable Wast | e lands | : | 3200 ha |

- e. Forest cover : 800 sq Km
- f. Cropping Intensity : 171%

8.

- 9. Land holding pattern under the FS:
 - A. Classes of farmers and their agriculture holdings in the FS area are shown on the table given below:

| SI. no. | Farmers group | No. of farm families | Holding area(ha) |
|---------|-------------------------------|----------------------|------------------|
| 1 | Marginal (below 0.5 -1.0 ha) | 344.01 | 220.8 |
| 2 | Small (1.0-2.0 ha) | 587.1 | 772.5 |
| 3 | Semi Medium(2.0-4.0ha) | 1863.62 | 5420.0 |
| 4 | Medium(4.0-10.0 ha) | 844.38 | 3871.43 |
| 5 | Large(10.0-20.0 ha) | 66.9 | 939.5 |
| 6 | All clases | 3706.01 | 11224.23 |

B. Avg. size of Land holding of the farmers: 3441.41 ha

- 10. Populations and socio-economic characteristic under the FS:
 - A. Population : 27747 Nos.
 - B. Socio-economic characteristics:
 - 1. Source of Finance for farming: Self financing, bank loan, Govt. Schemes
 - Major source of Income: Horticulture produces (oranges, Pineapple, local vegetables, chilli, and ginger) Agriculture (sale of surplus Paddy, Mustard and Maize)
 - 3. Commercial commodities produce: Oranges, local leafy vegetables, Ginger, Chili, Rice, maize and Mustard.
- 11. Adoption pattern for each crop / breed/other technology under the FS

Rice: Paddy is one of the major crops under the identified FS and is widely cultivated in a Jhum any low land area as WRC and in Hilly area as TRC. Generally farmers adopt the indigenous way of cultivation except in WRC and TRC where proper irrigation method and timely weeding are followed.

Oranges: Orange is one of the Commercial crops which is being cultivated by the farmers of the Kimin circle. Farmers followed indigenous way of orchard management except few educated farmers who practice pest management and intercropping

Mustard: Mustard is widely cultivated as oil seed crop. It is cultivated as a Rabi crop in settled cultivation for commercial purpose as well as for home consumption. The farmers of Balijan circle fallowed contact farming based on Private- Private- Partnership for cultivation and marketing of mustard seeds.

Pineapple: The agro-climatic condition under the FS is favorable for growing of Pineapple crops. It has been observed that the farmers of the FS are cultivating Pineapple in traditional way in a small area with good productivity, the crop has been fetching good price in local market.

- 12. General production constraints for each crop under the FS
 - A). Rice:
 - 1. High infestation of Pest (Yellow stem borer and Rice gundhi bug).
 - 2. Low yielding local varieties.

- B). Orange:
 - 1. Lack of quality planting materials
 - 2. Lack of technical knows how.
- C). Mustard:
 - 1. Non availability of improved and hybrid variety.
 - 2. Marketing of harvested seeds
 - 3. Inadequate processing and sale units.
- D). Pineapple:
 - 1. Lack of technical know how
 - 2. Weed infestation

1.3 FS-3: Agriculture & Horticulture + Livestock farming

- 1. Boundaries of the FS: Balijan, Itanagar, Kimin, Sagalee, Doimukh
- 2. Soils under the FS: Loam to clay Loam
- 3. Climate under the FS:
 - A. Sagalee: High to mid Hills, subtropical to temperate zone
 - B. Itanagar, Balijan, Kimin and Doimukh: Foot hills to mid Hills subtropical Zone
- 4. Physiography under the FS:
 - A. Sagalee: Slightly to moderately erosion hazard, steep side slopes, under dense forest and shifting cultivation
 - B. Itanagar, Balijan, Kimin and Doimukh: Foot hills to slightly mid-hills, sub tropical evergreen forest, having slight erosion hazard, under paddy cultivation.
- 5. Irrigation facilities under the FS:
 - A. Channels from natural streams
 - B. Rainfall
 - C. Well, Tank, Hand Pump
- 6. Major crops and cropping intensity under the FS: Rice, Maize, Oranges, Pineapple, Sugarcane, Mustard, Ginger, Chilli
- 7. Major cropping systems under the FS:
 - A. Cropping Sequence : 1. Paddy-Mustard (Double Cropping)
 - 2. Maize-Paddy-Potato (Triple Cropping)
 - B. Intercropping : Rice+Maize
 - C. Mixed Cropping : Rice+Maize+Beans+Pumpkins+Chilli+Colocasia+Yams
 - D. Monocropping : Rice, Orange, Sugarcane, Tea, Potato
- 8. Land use pattern under the FS:
 - a. Gross cropped area: 30944ha
 - b. Net Area sown: 15970 ha
 - c. Fallow lands: 27000 ha
 - d. Cultivable Waste lands: 4100 ha
 - e. Forest cover: 1450 sq Km
 - f. Cropping Intensity: 193.7%

9. Land holding pattern under the FS: A. Classes of farmers and their agriculture holdings in the FS area are shown on the table given below:

| SI. No. | Farmers group | No. of farm families | Holding area |
|---------|-------------------------------|----------------------|--------------|
| 1 | Marginal (below 0.5 -1.0 ha) | 589 | 378.72 |
| 2 | Small (1.0-2.0 ha) | 991 | 1321.21 |
| 3 | Semi Medium(2.0-4.0ha) | 2923 | 8090.33 |
| 4 | Medium(4.0-10.0 ha) | 1408 | 7075.13 |
| 5 | Large(10.0-20.0 ha) | 107 | 1601.55 |
| 6 | All clases | 6018 | 18466.94 |

B. Avg. size of Land Holdings of the Farmers: 2873.378 ha

- 10. Populations and socio-economic characteristic under the FS:
 - A. Population: 65165 Nos.
 - B. Socio-economic characteristics:
 - 1. Source of Finance for farming: Self financing, bank loan, govt. schemes
 - 2. Major source of Income:
 - A. Horticulture produces (oranges, Pear, Pineaplle, local vegetables, chilli, and ginger)

B. Animal Husbandry (sale of Mithuns, pigs, poultry and cow milk in some pockets of area)

C. Agriculture (sale of surplus paddy and maize)

- 3. Commercial commodities produce: Oranges, Pear, local leafy vegetables, Rice, Maize, Mithuns, Pigs, and Poultry
- 11. Adoption pattern for each crop / breed/other technology under the FS

Rice: Paddy is one of the major crops under the identified FS and is widely cultivatedin Jhum and low land area as WRC and in Hilly area as TRC. Generally farmers adopt the indigenous way of cultivation except in WRC and TRC where proper irrigation and timely weeding are followed.

Oranges: Orange is one of the Commercial crops under FS which is being cultivated by the farmers of the Sagalee and Kimin circles. Farmers followed indigenous way of orchard management except few educated farmers who practiced pest management and intercropping.

Pigs: Generally Pigs are being raised in a scavenging system although it is observed that some of farmers adopt the scientific way of Pig rearing in major towns of the district for commercial purposes.

Mithuns: Mithun is a semi domesticated animal and every farmer of the FS owned Mithuns to show their social pride in the society. The farmers of the FS follow traditional method of mithun rearing, where in, mithuns are let loose freely to graze in the jungles. Occasionally, the mithun owner or the care taker pay visit to their mithun in jungle to offer common salt.

- 12. General production constraints for each crop under the FS
 - A). Rice:
 - 1. High infestation of Pest (Yellow stem borer and rice gundhi bug).
 - 2. Low yielding Local varieties.
 - B). Orange:
 - 1. Lack of quality planting materials
 - 2. Lack of technical know how.
 - C). Pig:
 - 1. Scavenging system of Pig rearing.
 - 2. Lower body weight gain and litter size.
 - 3. Use of indigenous non descript Pigs.
 - D). Mithun:
 - 1. Free range management system.
 - 2. Indiscriminate slaughter.

1.4 FS-4: Silviculture + Agriculture + Horticulture:

- 1. Boundaries of the FS: Sagalee, Kimin, Itanagar
- 2. Soils under the FS: Loam to clay Loam
- 3. Climate under the FS:
- 4. High to mid hills, subtropical to temperate zone and foot hills to mid hills subtropical Zone
- 5. Physiography under the FS:
 - A. Slightly too moderately erosion hazard, steep side slopes, under dense forest and shifting cultivation
 - B. Foot hills to slightly mid-hills, sub tropical evergreen forest, having slight erosion hazard, under paddy cultivation.
- 6. Irrigation facilities under the FS:
 - A. Channels from natural streams
 - B. Rainfall
 - C. Well, Tank, Hand Pump
- Major crops and cropping intensity under the FS: Teak, Gomari, Albizzia sp, Rice,Maize, Oranges, Pineapple, Mustard, Ginger, Chilli, Cropping Intensity:
- 8. Major cropping systems under the FS:

| Α. | Cropping Sequence | : 1. Maize-Paddy-Mustard (Triple Cropping) |
|----|-------------------|--|
| | | 2. Maize-Paddy-Potato (Triple Cropping) |
| В. | Intercropping | : Rice + Maize |
| C. | Mixed Cropping | : Rice + Maize + Beans + Pumpkins + Chilli + |
| | | Colocasia+ Yams + Gomar + Teak |
| D. | Mono cropping | : Rice, Orange, Mustard, Potato, Teak, Gomari, |
| | | |

- 8. Land use pattern under the FS:
 - a. Gross Cropped area : 14050 ha

Теа

| b. | Net Area sown | : | 8996 ha |
|----|------------------------|---|-----------|
| с. | Fallow lands | : | 15000 ha |
| d. | Cultivable Waste lands | : | 3200 ha |
| e. | Forest cover | : | 800 sq Km |
| f. | Cropping Intensity | : | 156% |

9. Land holding pattern under the FS: A. Classes of farmers and their agriculture holdings in the FS area are shown on the table given below

| SI. no. | Farmers group | No. of farm families | Holding area |
|---------|-------------------------------|----------------------|--------------|
| 1 | Marginal (below 0.5 -1.0 ha) | 359.19 | 231.32 |
| 2 | Small (1.0-2.0 ha) | 605.1 | 799.91 |
| 3 | Semi Medium(2.0-4.0ha) | 1664.49 | 5071.82 |
| 4 | Medium(4.0-10.0 ha) | 841.77 | 4405.3 |
| 5 | Large(10.0-20.0 ha) | 62.3 | 963.75 |
| 6 | All clases | 3533.57 | 11472.03 |

B. Avg. size of land holdings of farmers : 3822.02 ha

- 10. Populations and socio-economic characteristic under the FS:
 - A. Population : 54849 Nos.
 - B. Socio-economic characteristics:
 - Source of Finance for farming: Self financing, bank loan, Govt.
 Schemes
 - Major source of Income: Horticulture produces (oranges, Pineapple, local vegetables, chilli, and ginger) Agriculture (sale of surplus Paddy, Mustard and Maize)
 - 3. Commercial commodities produce: Teak, Gomorra, Oranges, and local leafy vegetables, Ginger, Chilli, Rice, Maize and Mustard.
- 11. Adoption pattern for each crop / breed/other technology under the FS

Rice: Paddy is one of the major crop under the identified FS and is widely cultivated in Jhum and low land area as WRC and in Hilly area as TRC. Generally farmers adopt the indigenous way of cultivation except in WRC and TRC where proper irrigation method and timely weeding are followed.

Oranges: Orange is one commercial crop under FS which is being cultivated by the farmers of the Kimin circle. Farmers followed indigenous way of orchard management except few educated farmers who practice pest management and intercropping

Mustard: Mustard is widely cultivated under the FS as oil seed crop. It is cultivated as a Rabi crop in settled cultivation for commercial purpose as well as for home consumption. The farmers of Balijan circle fallowed contract farming based on Private-Private- Patnership for cultivation and marketing of mustard seeds.

Pineapple: The agro-climatic condition under the FS is favorable for growing of Pineapple crops. It has been observed that the farmers of the FS are cultivating

Pineapple in traditional way in a small area with good productivity, the crops has been fetching good price in a local market.

Teak: Farmers of the FS largely adopt plantation of the Teak as forest tree on hill slope not suitable for crop cultivation. It gives returns 20-25 years after plantating.

- 12. General production constraints for each crop under the FS
 - A). Rice:
 - 1. High infestation of Pest (Yellow stem borer and Rice gundhi bug).
 - 2. Low yielding Local varieties.
 - B). Orange:
 - 1. Lack of quality planting materials
 - 2. Lack of technical know how.
 - C). Mustard:
 - 1. Non availability of improved and hybrid variety.
 - 2. Marketing of harvested seeds
 - 3. Inadequate processing and sale unit
 - D). Pineapple:
 - 1. Lack of technical know how
 - 2. Weed infestation
 - E) Forest trees (Teak, Gomari etc):
 - 1. Jhum cultivation causing loss in forest cover
 - 2. Inadequate documentation of plant resources (timber and non-timber forest produce)

1.5 FS-5: Livestock Farming + Fisheries + Agriculture + Horticulture:

- 1. Boundaries of the FS: Balijan, Kimin, Doimukh
- 2. Soils under the FS: Loam to clay Loam, loam to sandy loam
- 3. Climate under the FS: Foot hills to mid Hills subtropical Zone
- 4. Physiography under the FS: Foot hills to slightly mid-hills, sub tropical evergreen forest, having slight erosion hazard, under paddy cultivation.
- 5. Irrigation facilities under the FS:
 - A. Channels from natural streams
 - B. Rainfall
 - C. Well, Tank, Hand Pump
- 6. Major crops and cropping intensity under the FS: Rice, Maize, Oranges, Pineapple, Mustard, Ginger, Chilli,

Cropping Intensity:

- 7. Major cropping systems under the FS:
 - A. Cropping Sequence : 1. Maize-Paddy-Mustard (Triple Cropping)
 - 2. Maize-Paddy-Potato (Triple Cropping)
 - B. Intercropping : Rice + Maize

| | C. Mixe | d Cropping | : | Rice + | Maize + Beans + Pumpkins + Chilli + Colocasia |
|----|-------------------------------|-----------------|---------|---------|---|
| | | | | + Yams | 5 |
| | D. Mon | o cropping | : | Rice, O | range, Mustard, Potato |
| 8. | Land use pattern under the FS | | | : | |
| | a. | Gross cropped a | area | : | 18200ha |
| | b. | Net Area sown | | : | 10648 ha |
| | с. | Fallow lands | | : | 18000 ha |
| | d. | Cultivable Wast | e lands | : | 3200 ha |

- e. Forest cover : 800 sq Km
- f. Cropping Intensity : 171%
- 9. Land holding pattern under the FS: A. Classes of farmers and their agriculture holdings in the FS area are shown on the table given below:

| SI. No. | Farmers group | No. of farm families | Holding |
|---------|-------------------------------|----------------------|----------|
| | | | area(ha) |
| 1 | Marginal (below 0.5 -1.0 ha) | 344.01 | 220.8 |
| 2 | Small (1.0-2.0 ha) | 587.1 | 772.5 |
| 3 | Semi Medium(2.0-4.0ha) | 1863.62 | 5420.0 |
| 4 | Medium(4.0-10.0 ha) | 844.38 | 3871.43 |
| 5 | Large(10.0-20.0 ha) | 66.9 | 939.5 |
| 6 | All clases | 3706.01 | 11224.23 |

B. Avg. size of Land holding of the farmers: 3441.41 ha

10. Populations and socio-economic characteristic under the FS:

- A. Population : 27747 Nos.
- B. Socio-economic characteristics:
 - 1. Source of Finance for farming: Self financing, bank loan, Govt. Schemes
 - 2. Major source of Income:
 - A. Horticulture produces (oranges, Pineapple, local vegetables, chilli, and ginger)
 - B. Agriculture (sale of surplus Paddy, Mustard and Maize)
 - Commercial commodities produce: Oranges, local leafy
 - vegetables, Ginger, Chilli, Rice, Maize and Mustard.
- 11. Adoption pattern for each crop / breed/other technology under the FS Rice: Paddy is one of the major crop under the identified FS and is widely cultivated in a Jhum land as well as low land area as WRC and Hilly area as TRC. Generally farmers adopt the indigenous way of cultivation except in WRC and TRC where proper irrigation method and timely weeding are followed.

Oranges: Orange is one major commercial crop under FS which is being cultivated by the farmers of the Kimin circle. Farmers followed indigenous way of orchard

3.

management except few educated farmers who practiced pest management and intercropping.

Mustard: Mustard is widely cultivated under the FS as oil seed. It is cultivated as a Rabi crop in settled cultivation for commercial purpose as well as for home consumption. The farmers of Balijan circle fallowed contract farming based on Private-Private-Patnership for cultivation and marketing of mustard seeds.

Pineapple: The agro-climatic condition under the FS is favorable for growing of Pineapple crops. It has been observed that the farmers of the FS are cultivating Pineapple in traditional way in a small area with good productivity, the crop has been fetching good price in local market.

Poultry: There are two types of poultry farming widely adopted by the farmers:

1. Backyard farming or semi-intensive scavenging system (traditional method of rearing indigenous non-descript chickens)

2. Intensive small scale commercial broiler farming (200-500 capacity with poor management practices)

Cattle: Three types of cattle production system observed under the FS

1. Free Range or Open grazing System (No input: low-output system)

2. Restricted Grazing System9 No input: low-output system)

3. Intensive stall fed system (Medium input: Medium output system)

Fisheries: There is immense potentiality in shape of capture and culture resources under the FS. The main capture resources are in the form of rivers, streams, lakes, etc and culture potential resources are in the shape of ponds and tanks. Farmers under FS adopt Fish farming in backyard pond for home consumption as well as for commercial purpose. Few farmers adopt carp seed rearing in some pockets of the FS area.



DDK coverage of Ploughing by Mithun



Ear tagging for Insurance cover



Ploughig of field by Mithun- 1st time in India

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4. Farming Systems of Tirap

1. Summary of Farming systems :

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The farming systems identified in Tirap district are summarized below:

| Farming system | Soils | Rainfall | Altitude | Principal crops/ breeds | Important features | Location (area) |
|-------------------|-------------|----------|----------|----------------------------|--------------------------|--------------------|
| | | | | | | extent of |
| | | | | | | area in |
| | | | | | | ha. |
| FS-1 | Deep, well | Medium | Low | Agri - (WRC/ | Horticulture | |
| (Agri.+ | to | to high | altitude | upland paddy, | 1. Traditional method | Scattered |
| Horti. + | imperfectl | | <800 m | maize, millet, | of cultivation of fruits | on low |
| Piscicultu | y drained, | | from MSL | soyabean, | & vegetables on | altitude |
| re+ | fine loamy | | | mustard, local | foothills in haphazard | hill and |
| Animal | and | | | pulses, tea) | way. | valley |
| husb.+ | clayey- | | | Horti | 2. Unplanned kitchen | areas |
| Forestry) | skeletal | | | (Tapioca, | garden. 3. Prevalence | |
| | with | | | colocasia, | of few selected crops | |
| | moderate | | | sweet potato, | (tapiocia, | |
| | soil | | | vegetables, | colocasia,leafy | |
| | erosion | | | gimger, chili, | vegs.etc) | |
| | hazard ; | | | betel vine, | 4. Lack of scientific | |
| | moderate | | | citrus, | management of | |
| | to strongly | | | pineapple,bana | cultivated crops. | |
| | acidic, | | | na) | Pisciculture- | |
| | high in | | | Pisciculture - | Farmers are practicing | |
| | organic | | | Fish species | pisciculture in | |
| | matter | | | (Rohu, Catla, | traditional way. | |
| | content, | | | Grass Carp, | | |
| | poor in | | | Silver Carp and | Animal Husbandry | |
| | base | | | Common Carp) | 1. Cattle, Goat under | |
| | saturation. | | | Animal Husb. | free ranging system. | |
| | | | | - | 2. Pig under | |
| | | | | Cattle,pig,goat | scavenging system | |
| | | | | and poultry | 3. Poultry under | |
| | | | | Forestry - | backyard system | |
| | | | | | | |

| | | | | (Timbor troo | | |
|------------|-----------|---------|-----------|-----------------|--------------------------|---------------|
| | | | | fuel tree | | |
| | | | | luer tree, | | |
| | | | | bamboo, cane, | | |
| | | | | broom grass, | | |
| | | | | palm tree) | | |
| FS-2 | Deep, | Medium | Low | Agri - (WRC/ | Horticulture | Scattered |
| (Agri.+ | well to | to high | altitude< | upland paddy, | 1. Traditional method | on low |
| Horti. + | imperfect | | 800 m | maize, millet, | of cultivation of fruits | altitude hill |
| Animal | ly | | from MSL | soyabean, | & vegetables on | and valley |
| husb. + | drained, | | | mustard, local | foothills in haphazard | areas |
| Forestry) | fine | | | pulses, tea) | way. | |
| | loamy | | | Horti. – | 2. Unplanned kitchen | |
| | and | | | (Tapioca, | garden. 3. Prevalence | |
| | clayey- | | | colocasia, | of few selected crops | |
| | skeletal | | | sweet potato, | (tapiocia, | |
| | with | | | vegetables, | colocasia,leafy | |
| | moderate | | | gimger, chili, | vegs.etc) | |
| | soil | | | betel vine, | 4. Lack of scientific | |
| | erosion | | | ,citrus, | management of | |
| | hazard ; | | | pineapple,bana | cultivated crops. | |
| | moderate | | | na) | | |
| | to | | | Animal Husb. | Animal Husbandry | |
| | strongly | | | - | 1. Cattle, Goat under | |
| | acidic, | | | Cattle,pig,goat | free ranging system. | |
| | high in | | | and poultry | 2. Pig under | |
| | organic | | | | scavenging system | |
| | matter | | | Forestry - | 3. Poultry under | |
| | content, | | | (Timber tree, | backyard system | |
| | poor in | | | fuel tree, | | |
| | base | | | bamboo, cane, | | |
| | saturatio | | | broom grass, | | |
| | n. | | | palm tree | | |
| | | | | · | | |
| FS-3 | Moderate | Medium | Mid | Agri - (WRC/ | Horticulture | Scattered |
| (Agri.+ | ly deep | to high | altitude | upland paddy, | 1. Traditional method | on mid |
| Horti. + | to deep, | | 800- | maize, millet, | of cultivation of fruits | altitude hill |
| Piscicultu | well to | | 1300m | soyabean. local | & vegetables on | areas, |
| re+ | somewha | | from MSL | pulses & | foothills in haphazard | surrounded |
| Animal | t | | | oilseeds. tea) | way, 2, Unplanned | by dense |
| husb. + | excessive | | | Horti | kitchen garden. | forest |
| Forestry) | lv | | | (Tanioca | 3 Prevalence of few | 101000 |
| rorestry) | iy | | | (Tapioca, | J.FIEVALETICE OF TEW | |

| | drained, | | | colocasia, | selected crops | |
|-----------|-----------|---------|----------|-----------------|--------------------------|---------------|
| | loamy | | | sweet potato, | (tapiocia, | |
| | skeletal, | | | vegetables, | colocasia,leafy | |
| | fine- | | | gimger, chili, | vegs.etc) | |
| | loamy/fin | | | betel vine, | 4. Lack of scientific | |
| | e, | | | ,citrus, | management of | |
| | moderate | | | pineapple,bana | cultivated crops. | |
| | to | | | na) | Pisciculture- | |
| | severely | | | Pisciculture - | Farmers are | |
| | eroded; | | | Fish species | practicing pisciculture | |
| | moderate | | | (Rohu, Catla, | in traditional way. | |
| | to | | | Grass Carp, | Animal Husbandry | |
| | strongly | | | Silver Carp and | 1. Cattle, Goat under | |
| | acidic, | | | Common Carp) | free ranging system. | |
| | high in | | | Animal Husb. | 2. Pig under | |
| | organic | | | - | scavenging system | |
| | matter | | | Cattle,pig,goat | 3. Poultry under | |
| | content, | | | and poultry | backyard system | |
| | poor in | | | | | |
| | base | | | Forestry - | | |
| | saturatio | | | (Timber tree, | | |
| | n. | | | fuel tree, | | |
| | | | | bamboo, cane, | | |
| | | | | broom grass, | | |
| | | | | palm tree | | |
| FS- 4 | Moderate | Medium | Mid | Agri - (WRC/ | Horticulture | Scattered |
| (Agri.+ | ly deep | to high | altitude | upland paddy, | 1. Traditional method | on mid |
| Horti. + | to deep, | | | maize, millet, | of cultivation of fruits | altitude hill |
| Animal | well to | | 800- | soyabean, | & vegetables on | areas, |
| husb. + | somewha | | 1300m | local pulses & | foothills in haphazard | surrounded |
| Forestry) | t | | from MSL | oilseeds, tea) | way. | by dense |
| | excessive | | | Horti | 2. Unplanned | forest |
| | ly | | | (Tapioca, | kitchen garden. | |
| | drained, | | | colocasia, | 3.Prevalence of few | |
| | loamy | | | sweet potato, | selected crops | |
| | skeletal, | | | vegetables, | (tapiocia, | |
| | fine- | | | gimger, chili, | colocasia,leafy | |
| | loamy/fin | | | betel vine, | vegs.etc) | |
| | е, | | | ,citrus, | 4. Lack of scientific | |
| | moderate | | | pineapple,bana | management of | |
| | to | | | na) | cultivated crops. | |

| | severely | | | Animal Husb. | | |
|------------|---------------|---------|----------|--------------------|--------------------------|---------------|
| | , eroded ; | | | _ | Animal Husbandrv | |
| | moderate | | | Cattle.pig.goat | 1. Cattle, Goat under | |
| | to | | | and poultry | free ranging system. | |
| | strongly | | | . , | 2. Pig under | |
| | acidic, | | | Forestry - | scavenging system | |
| | high in | | | , (Timber tree, | 3. Poultry under | |
| | organic | | | fuel tree, | backyard system | |
| | matter | | | bamboo, cane, | | |
| | content, | | | broom grass, | | |
| | poor in | | | palm tree | | |
| | base | | | | | |
| | saturatio | | | | | |
| | n. | | | | | |
| FS- 5 | Shallow | Medium | High | Agri - (Upland | Horticulture | Scattered |
| (Agri.+ | to deep, | to high | altitude | paddy, maize, | 1. Traditional method | on high |
| Horti.+ | well to | | > 1300m | millet, | of cultivation of fruits | altitude hill |
| Piscicultu | excessive | | from MSL | soyabean, local | & vegetables on | areas, |
| re+ | ly | | | pulses) | foothills in haphazard | surrounded |
| Animal | drained, | | | Horti. – | way. | by dense |
| husb.+ | loamy | | | (Tapioca, | 2. Unplanned | forest |
| Forestry) | skeletal/ | | | colocasia, | kitchen garden. | |
| | clayey, | | | sweet potato, | 3.Prevalence of few | |
| | skeletal/ | | | vegetables, | selected crops | |
| | fine, | | | gimger, chili, | (tapiocia, | |
| | moderate | | | betel vine, | colocasia,leafy | |
| | to severe | | | citrus, | vegs.etc) | |
| | erosion | | | pineapple,bana | 4. Lack of scientific | |
| | hazard; | | | na) | management of | |
| | moderate | | | Pisciculture - | cultivated crops. | |
| | to | | | Fish species | Pisciculture- | |
| | strongly | | | (Rohu, Catla, | Farmers are | |
| | acidic, | | | Grass Carp, | practicing pisciculture | |
| | high in | | | Silver Carp and | in traditional way. | |
| | organic | | | Common Carp) | | |
| | matter | | | | | |
| | content, | | | | Animal Husbandry | |
| | poor in | | | Animal Husb. | 1. Cattle, Goat under | |
| | base | | | - | free ranging system. | |
| | saturatio | | | Cattle,pig,goat | 2. Pig under | |
| | n. | | | and poultry | scavenging system | |

| | | | | | 3. Poultry under | |
|-----------|-----------|---------|----------|-----------------|--------------------------|---------------|
| | | | | | backyard system | |
| | | | | Forestry - | | |
| | | | | (Timber tree, | | |
| | | | | fuel tree, | | |
| | | | | bamboo, cane, | | |
| | | | | broom grass, | | |
| | | | | palm tree | | |
| FS- 6 | Shallow | Medium | High | Agri - (Upland | Horticulture | Scattered |
| (Agri.+ | to deep, | to high | altitude | paddy, maize, | 1. Traditional method | on high |
| Horti. + | well to | | > 1300m | millet, | of cultivation of fruits | altitude hill |
| Animal | excessive | | from MSL | soyabean, local | & vegetables on | areas, |
| husb.+ | ly | | | pulses) | foothills in haphazard | surrounded |
| Forestry) | drained, | | | Horti. – | way. | by dense |
| | loamy | | | (Tapioca, | 2. Unplanned kitchen | forest |
| | skeletal/ | | | colocasia, | garden. 3. Prevalence | |
| | clayey, | | | sweet potato, | of few selected crops | |
| | skeletal/ | | | vegetables, | (tapiocia, | |
| | fine, | | | gimger, chili, | colocasia,leafy | |
| | moderate | | | betel vine, | vegs.etc) | |
| | to severe | | | ,citrus, | 4. Lack of scientific | |
| | erosion | | | pineapple,bana | management of | |
| | hazard; | | | na) | cultivated crops. | |
| | moderate | | | Animal Husb. | | |
| | to | | | - | Animal Husbandry | |
| | strongly | | | Cattle,pig,goat | 1. Cattle, Goat under | |
| | acidic, | | | and poultry | free ranging system. | |
| | high in | | | | 2. Pig under | |
| | organic | | | | scavenging system | |
| | matter | | | Forestry - | 3. Poultry under | |
| | content, | | | (Timber tree, | backyard system | |
| | poor in | | | fuel tree, | | |
| | base | | | bamboo, cane, | | |
| | saturatio | | | broom grass, | | |
| | n. | | | palm tree | | |
| | | | | | | |

2. Agricultural characteristics of each farming system

1. Boundaries of the FS:

FS-1 & FS-2: Scattered on valley and foothills surrounded by hills & forest FS-3 & FS-4: Scattered foothills and low altitude hills surrounded by hills & forest FS-5 & FS-6: Scattered medium to high altitude hills surrounded by hills & forest

2. Soils under the FS:

FS-1 & FS-2: Deep, well to imperfectly drained, fine loamy and clayey- skeletal with moderate soil erosion hazard; moderate to strongly acidic, high in organic matter content, poor in base saturation

FS-3 & FS-4 : Moderately deep to deep, well to somewhat excessively drained, loamy skeletal, fine- loamy/fine, moderate to severely eroded ; moderate to strongly acidic, high in organic matter content, poor in base saturation

FS-5 & FS-6: Shallow to deep, well to excessively drained, loamy skeletal/ clayey, skeletal/ fine, moderate to severe erosion hazard; moderate to strongly acidic, high in organic matter content, poor in base saturation

3. Climates under the FS:

FS-1, FS-2, FS-3 & FS-4: Sub-tropical climate with hot humid summer and moderately cool winter

FS-5 & FS-6: Sub-tropical moderately cool to cool climate throughout the year

4. Physiography under the FS:

FS-1 & FS-2: Plains to somewhat undulating, low altitude hills with moderate slope, narrow valley (from extension of Brahmaputra valley)

FS-3 & FS-4: Undulating, moderate to steep slope, agricultural land & dense forest cover, intercepted by fast flowing hilly streams.

FS-5 & FS-6: Undulating, rocky hills with steep slope, dense forest cover, intercepted by fast flowing hilly streams.

5. Irrigation facilities under the FS:

All 6 FS: Majority rainfed; minor irrigation / gravitational irrigation in certain pockets from the perennial hilly streams under govt. or individual / community initiative.

6. Major crops and cropping intensity under the FS:

FS-1, 2: Agri - (WRC/ upland paddy, maize, millet, soybean, mustard, local pulses, tea)

Horti. – (Tapioca, colocasia, sweet potato, vegetables, ginger, chili, betel vine, citrus, pineapple, and banana)

FS-3, 4: Agri - (WRC/ upland paddy, maize, millet, soyabean, local pulses & oilseeds, tea)

Horticulture: – (Tapioca, colocasia, sweet potato, vegetables, gimger, chili, betel vine, citrus, pineapple, and banana)

Agri - (Upland paddy, maize, millet, soyabean, local pulses)

Horti. – (Tapioca, colocasia, sweet potato, vegetables, gimger, chili, betel vine, citrus, pineapple, and banana)

7. Major cropping systems under the FS: Dominantly mixed cropping.

(i) In the 1st year *jhum* plots millet and maize are sown along with a host of other crops (tapioca, colocasia, sweet potato, ginger, local pulses, beans etc.)- (All FS)
(ii) In the 2^{nd} year upland paddy is sown alongwith few other crops and the plots are left fallow for next 3-4 years. (All FS)

(iii) Transplanted paddy followed by summer vegetables is done in some pockets. (FS-1, 2)

(iv) Maize followed by rabi vegetables/mustard is grown in few valley areas (FS-1, 2)

(v) Intercropping of arecanut + betel vine with tea plantation is practiced in low altitude slopes. (FS-1, 2) Pineapple is also grown as intercrop with arecanut and on hill slopes for local sale. (FS-1, 2)

(vi) Fruits (banana, papaya, citrus pineapple etc.) are grown as homestead without any scientific layout. (All FS)

(vii) Betel vine is grown either as homestead or in nearby forest on timber trees. (FS-1, 2, 3, 4)

8. Land use pattern under the FS:

Generally 4 types of land use patterns are observed in all Farming System.

Settlement land – Comparatively plain upland having water source, houses are scattered here and there, bamboo groove and minimum orchared area is a common feature of every household, patches of land are spared for community house like Morong (bachelors dormitory), religious structure etc. Burrial sites are situated outside the settlement area.

Agricultural land- These are comparatively plain / undulating or hills having cultivable moderate slopes nearby settlement area.

Forest land- These are uncultivable/uncultivated land on hill top or in deep valleys between two hills. These are meant for hunting and gathering as well as extraction of forest products like cane, bamboo, wood and wild edible food stuff.

Pasture & barren land- These are comparatively plain/ undulating or hills having moderate slope considered as reserve of the village for further expansion either for agriculture or settlement.

Agril. Activitiy wise land use classification:

Plain land- Field crops, fish pond

Undulating land / having moderate slope – Homestead, kitchen garden, fish pond, animal shed, *Jhum* cultivation

Upland having moderate to steep slope – Jhum cultivation and forestry.

9. Land holding pattern under the FS: Individual / community (All FS)

Land for settled cultivation and orchard are individually owned. Land for jhum cultivation on the hills is under community/ clan ownership. However, these lands could be owned by individuals through proper permission from concerned village heads.

10. Population and socio-economic characteristics under the FS:

Mainly 3 schedule tribes (Nocte, Wancho & Tutsa) lives in Tirap. They live in traditional huts constructed from locally available materials. Educational level is mostly between schooling to XII standard among the adults. The Nocte and Wancho are

scattered in low and mid altitude hill ranges (FS-1, 2, 3, 4). The Tutsa are scattered in the high altitude hill ranges (FS-5, 6). All are generally resource poor jhumias. Their livelihood depends mainly on agriculture, horticulture, animal rearing, fishing, handicraft and minor forest product based activities.

11. Adoption pattern for each crop/breed/other technology under the FS:

All the crops and animals are grown/ reared under conventional management. Adoption of scientific intervention is hardly observed. The farmers expect a lot from govt department for seed, fertilizer, plant protection material, feed, medicine etc. Most of them could be categorized under late adopters to laggard with respect to technology adoption in all agricultural intervention.

12. General production constraints for each crop under the FS Agriculture:

- 1. Traditional mixed cropping without scientific management practices (All FS)
- 2. Poor soil fertility (All FS)
- 3. Rodent, termite, stem borer, gall midge, gundhi bug, leaf folder, and leaf roller attack in paddy (All FS)
- 4. Poor yield of local varieties of paddy, pulses and oilseed (All FS)
- 5. Non adoption of fertility management practices in all crops (All FS).
- 6. Attack of stem borer/ top borer in maize (All FS)
- 7. Lack of irrigation facility (All FS)
- Lack of knowledge regarding production and use of organic manures
 Lack of knowledge regarding soil conservation techniques.
- 10. Lack of knowledge about IPM/ INM of different crops (All FS)
- 11. Lack of knowledge about scientific agronomic practices for different crops (All FS)

Horticulture:

- 1. Poor performance of local and undescript var.of fruits and Vegs. (All FS)
- 2. Lack of availability of quality planting material citrus, pineapple, litchi (All FS)
- Lack of knowledge about propagation technique of banana, citrus, litchi (All FS).
- 4. Lack of knowledge about scientific orchard management technology of citrus, pineapple (All FS)
- 5. Lack of knowledge about scientific nursery raising technique in vegs. (All FS)
- 6. Lack of knowledge about nutrient mgt. technique of citrus, litchi, pineapple, and banana, mango (All FS)
- Lack of knowledge about insect-pest & disease mgt. technique of fruits and vegetables (All FS)
- 8. Lack of knowledge on fruits & vegs. Preservation & processing. (All FS)
- 9. Lack of awareness on utilization of underexploited crops. (All FS)
- 10. Lack of knowledge & awareness on scientific Of ornamentals flowers (All FS)
- 11. Lack of knowledge & awareness on cultivation of mushroom. (All FS)

Pisciculture :

- 1. Lack of suitable region specific fish farming technology with respect to different altitude of Tirap district (FS- 1, 3, 5)
- 2. Lack of knowledge about different aspects of scientific fish culture (FS-1, 3, 5)
- 3. Lack of knowledge about composite fish culture (FS- 1, 3, 5)
- 4. Lack of knowledge about low cost integrated fish farming systems (FS- 1, 3, 5)
- 5. Lack of awareness about scientific fish husbandry practices. (FS- 1, 3, 5)

Animal Husbandry:

- 1. Parasitic infection of pig and goat (All FS)
- 2. Poor feeding in respect of cattle, poultry and pig. (All FS)
- 3. Use of local breed of pig and poultry (All FS)
- 4. Lack of knowledge about scientific rearing system of poultry and pig (All FS)
- Lack of knowledge on scientific disease management of cattle, pig & poultry (All F S)
- 6. Lack of knowledge about quality feed (All FS)
- 7. Use of local undescript breeds of poultry, and pig (All FS)
- 8. Lack of awareness about improved breeds (All FS)
- 9. Lack of knowledge about integration of different enterprises (All FS)



Method Demonstration on Seeding Treatment of Paddy

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5. Farming Systems of West Kameng

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Summary of farming Systems

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| Farming | Soils | Rainfall | Altitude | Principal | Important features | Location |
|-----------------|--------|----------|----------|-----------------|---------------------------|----------|
| system | | | | crops/breeds | | (area), |
| | | | | | | extent |
| | | | | | | of area |
| | | | | | | in ha. |
| Highland mixed | Sandy- | Heavy | 200 to | Maize, paddy, | Moderate to extensive | 5195 |
| farming system | loamy | | 3000 m | tomato, potato, | poverty prevails. 70% | |
| (Agri-Horti-AH- | | | MSL | vegetables, | of the district comes | |
| Fishery) | | | | pulses | under this farming | |
| | | | | apple, kiwi, | system. Soil and water | |
| | | | | orange, cattle, | conservation under | |
| | | | | goat, pig, | this farming system is | |
| | | | | sheep, fish | poor, erosion and the | |
| | | | | | decline of soil fertility | |
| | | | | | can pose grave threat | |
| | | | | | to household survival. | |
| Sparse | Sandy- | Medium | 3000 to | Potato, | Moderate poverty | 2227 |
| (Mountain) | loamy | rainfall | 7090 m | buckwheat, | prevails. 30% of the | |
| Farming system | | & snow | MSL | cattle, Yak & | district comes under | |
| (Agri-AH) | | fall | | sheep | this farming system | |

2. Agricultural characteristics of each farming System

1. Boundaries of the FS:

| | A) | Highland mixed farming system | hland mixed farming system (Agri-Horti-AH-Fishery | | | | |
|----|---------|-------------------------------|---|------------------------------|--|--|--|
| | | E: East Kameng district | | W: Bhutan | | | |
| | | N: Sparse (Mountain) Farming | system of this district | S: Assam | | | |
| | | NE: East Kameng district | | SE: East Kameng & Assam | | | |
| | | SW: Bhutan & Assam | | NW: Tawang district | | | |
| | B) | Sparse (Mountain) Farming sys | stem (Agri-AH): | | | | |
| | | E: East Kameng district | W: Tawang district | | | | |
| | | N: China (Tibet) | S: Highland mixed farm | ning system of this district | | | |
| | | NE: East Kameng district | SE: East Kameng distri | ct | | | |
| | | SW: Bhutan & Tawang district | NW: Tawang district | | | | |
| 2. | Soils u | inder the FS: | | | | | |
| | A) | Highland mixed farming system | n: Sandy-loamy, Acidic | soil, Red soil. Medium | | | |
| | | To low fertile | | | | | |
| | B) | Sparse (Mountain) Farming sys | stem:Sandy-Ioamy, Acid | ic soil, Red soil. | | | |
| | | Medium to low fertile | | | | | |

.......

3. Climates under the FS:

| A) | Highland | mixed | farmir | ng syste | m: | Heavy r | rainfall | , 9 | Snowfall | in | winter | season |
|----|-----------|---------|---------|----------|-------|-----------------|----------|-----|----------|-----|--------|---------|
| | above 20 | 00 m | MSL, | Humid, | Mild | tropica | l hill | to | Temper | ate | -sub | alpine, |
| | Temperati | ure ran | ging fr | om -0.5 | to 34 | ^₀ C. | | | | | | |

B) Sparse (Mountain) Farming system: Medium rainfall, Heavy snowfall in winter season, Humid, Temperate sub-alpine to alpine, Temperature ranging from -5 to 15 $^{\circ}$ C.

4. Physiography under the FS :

A)

- A) Highland mixed farming system: Hilly tract
- B) Sparse (Mountain) Farming system: Extreme hilly tract

5. Irrigation facilities under the FS :

| High | and mixed farming system: | | |
|--------|----------------------------------|---|--------|
| Area | under irrigation | : | 631 ha |
| Irriga | ation potential | : | 572 ha |
| Sour | ce of irrigation: | | |
| a. | Local stream available | : | NA |
| b. | Sparse (Mountain) Farming system | : | NIL |

6. Major crops and cropping intensity under the FS:

| | A) Hi | ghland mixed farming system : | | Maize, | paddy, tomato, potato, |
|----|-------|-----------------------------------|---|---------|------------------------------------|
| | | | | Vegeta | ables, pulses, apple, kiwi, orange |
| | | | | with 1 | 25 cropping intensity of 25. |
| | B) Sp | oarse (Mountain) Farming system : | | Potato | and buckwheat with cropping |
| | | | | intensi | ty less than 100. |
| 7. | Majo | or cropping systems under the FS: | : | | |
| | A) | Highland mixed farming system | | : | Multiple cropping systems |
| | B) | Sparse (Mountain) Farming system | n | : | Mono-cropping systems |
| 8. | Land | l use pattern under the FS: | | | |
| | A) | Highland mixed farming system | | : | Individual, community and |
| | | | | | lease system. |
| | B) | Sparse (Mountain) Farming system | n | : | Individual, community and |
| | | | | | lease system. |
| 9. | Land | l holding pattern under the FS: | | | |
| | A) | Highland mixed farming system | | : | Less than 1 ha |
| | | | | | |

B) Sparse (Mountain) Farming system : Less than 1 ha

10. Populations and socio-economic characteristics under the FS:

A) Highland mixed farming system: Sparsely populated with a population density of nearly 13 persons per Sq. Km. Ruminant livestock are an important part of this system as they provide draught power, milk, manure and cash income. Almost cent per cent population is tribal where prevalence of poverty is moderate to extensive. About 80 per cent of the population is engaged in agriculture and allied sector.

B) Sparse (Mountain) Farming system: Very sparsely populated with population density only 3 persons per Sq. Km. Main occupation is the livestock husbandry specially yak and sheep with potato and buck wheat cultivation. Poverty tends to be moderate overall, although more prevalent in remote areas.

11. Adoption pattern for each crop/breed/other technology under the FS:

- A) Highland mixed farming system:
 - Crop : Indigenous/local variety
 - Breed : Indigenous/local variety
 - Technology : Indigenous
- B) Sparse (Mountain) Farming system:
 - Crop : Indigenous/local variety
 - Breed : Indigenous/local variety
 - Technology : Indigenous

12. General production constraints for each crop under the FS:

A) Highland mixed farming system:

i) Maize, Paddy and Soybean: Inferior seed quality, Traditional cultivation system, less land holding, high incidence of pests and weeds, poor adoption of improved farm technology, acidic soil, improper irrigation system, poor economic condition of the farmers.

ii) Apple, Kiwi, Orange and Walnut: Inferior planting materials, Traditional cultivation system, high rainfall, less land holding, high incidence of pests and weeds, poor adoption of improved farm technology, acidic soil, improper irrigation system, poor economic condition of the farmers, drastic variation in temperature, low sunshine hour, lack of water harvesting devises.

B) Sparse (Mountain) Farming system:

iii) Potato and Buckwheat: Inferior seed quality, Traditional cultivation system, less land holding, poor adoption of improved farm technology, acidic soil, improper irrigation system, poor economic condition of the farmers.



FLD on Soyabean (Kharif 2009)



OFT on Bio-control of diamond back moth



OFT on Bottle gourd Var. Narendra Rashmi



OFT on fruit harvester



OFT on Pulses

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6. Farming Systems of West Siang

1. Summary of farming Systems

| SI. | Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|-----|--------------|-------------|-----------|----------|----------------|-------------|-------------|
| No | System | | | | crops/breeds | features | (area), |
| | | | | | | | extent of |
| | | | | | | | area in ha. |
| 1. | Agri - | Alluvial; | 2500mm | 50-100m | Paddy/common | Accessible | 280 ha |
| | Fishery | Sandy | average | | carp | for all | |
| | | loam | per annum | | | types of | |
| | | | | | | farmers | |
| 2. | Agri- Hort | Alluvial; | 2500mm | 50-100m | Paddy, cole | Sustainabl | 1330 ha |
| | | sandy | average | | crops | e and | |
| | | loam | per annum | | | permanent | |
| | | | | | | farming | |
| 3. | Horticulture | Lateritic; | 2500mm | 50- | Khasi | A good | 430 ha |
| | | acidic soil | average | 1200m | mandarin, | scope for | |
| | | | per annum | | banana | hilly areas | |
| 4. | Animal | Alluvial, | 2500mm | 40- | Cross bred and | Additional | 550 ha |
| | Husbandry | Lateritic, | average | 1200m | indigenous | income for | |
| | | Sandy | per annum | | breeds of | farmers | |
| | | loam; | | | Cattle, Goat, | | |
| | | acidic soil | | | Poultry/H. | | |
| | | | | | Friesian and | | |
| | | | | | Jersey cow. | | |

2. Agricultural characteristics of each farming System

| Agriculture | Paddy fish | Wet Rice | Horticulture | Integrated |
|-----------------------------|-----------------|--------------|------------------------|----------------------|
| characteristics | farming | cultivation | | Animal |
| Boundaries of the FS | | Provide | d in Chapter - 3 | |
| Soils under the FS | Alluvial; Sandy | Alluvial; | Lateritic; acidic | Alluvial, Lateritic, |
| | loam | Sandy loam | soil | Sandy loam; acidic |
| | | | | soil |
| Climates under the FS | Subtropical | Subtropical | Subtropical | Subtropical |
| Physiography under the | | low land mi | id lands to high lands | |
| FS | | Low land, m | | |
| Irrigation facilities under | Yes | Yes | Scanty | Moderate |
| the FS | | | | |
| Major crops and cropping | Paddy (100%) | Paddy (100%) | Banana,Oranges | Not systematic |
| intensity under the FS | | | (80%) | |

| | - | | | |
|--|---|-----------------|-----------------|-------------|
| Major cropping systems under the FS | Double | Double | Inter | Mixed |
| | cropping | cropping | cropping | cropping |
| Land use pattern under the FS | | 5865 ha | | N/A |
| Land holding pattern under the FS | Private/Own land | | | |
| Populations and socio-economic | Majority are small farmers with an approximate 746 no | | | mate 746 no |
| characteristics under the FS | families. | | | |
| Adoption pattern for each crop/breed/other | | Nealiaible ta | o marginal | |
| technology under the FS | | | | |
| General production constraints for each crop | Lack | of regular mont | thly product/si | innly |
| under the FS | | | | |



FLD on Rejuvenation of Old Declined Khasi Mandarin Orchard



FLD on Rice (Luit) in Malinithan



Oyster mushroom cultivated at KVK, West Siang



Weeding of rice under FLD

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7. Farming Systems of Dibang Valley

| Eauming | | | | Drineinel | Tmportant | Location |
|--------------|---------|----------|----------------|--------------------|--------------|----------------|
| Farming | Soils | Rainfall | Altitude | Principal | Important | (area), extent |
| system | | | | crops/breeas | reatures | of area in ha. |
| Agriculture | Sandy | Mean | Roing –Koruno | Rice, Maize, | Agriculture | Roing – |
| + | loam | annual | = 140 msl | Zinger, Mustard, | crops are | Koronu CD |
| Horticulture | to clay | rainfall | .Dambuk - | Millet, Orange, | mainly | Block 11197.65 |
| | loam. | 351.94 | Paglam | Pineapple, Kiwi, | grown for | ha |
| | | mm. | =120msl | Banana , Potato | home | |
| | | total | Hunli – Desali | Vegetables Etc. | consumptio | Dambuk – |
| | | annual | = 2614.85 msl. | | n and | Paglam = |
| | | rainfall | | | surplus are | 6577.89 ha |
| | | 4223.20 | | | sold to the | |
| | | mm | | | market. | Hunli – Desali |
| | | | | | Most of the | = 4243.50 ha. |
| | | | | | horticultura | |
| | | | | | l crops are | |
| | | | | | grown as | |
| | | | | | commercial | |
| | | | | | crop | |
| Agriculture | - do- | -do - | -do - | Rice, Maize | | Roing – |
| + | | | | ,Ginger, Mustard, | | Koronu CD |
| Livestock | | | | Local Cattle, Pig, | Do | Block |
| | | | | Poultry Etc | | 11197.65ha |
| | | | | | | Dambuk – |
| | | | | | | Paglam = |
| | | | | | | 6577.89 Ha. |
| | | | | | | Hunli – Desali |
| | | | | | | = 4243.50 Ha. |
| Agriculture | -do - | -do - | -do - | Rice, Maize, | Commercial | Roing – |
| + Fishery | | | | Ginger, mustard, | as well as | Koronu CD |
| | | | | Indian Major | home | Block |
| | | | | carps (IMC), | consumptio | 11197.65ha |
| | | | | Integrated fish | n. | Dambuk – |
| | | | | farming. | | Paglam = |
| | | | | | | 6577.89 Ha. |
| | | | | | | |
| | | | | | | Hunli – Desali |
| | | | | | | = 4243.50 Ha. |

1. Summary of farming Systems :

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| Agri+Horti | - do- | -do - | -do - | Rice, Maize, | -do- | -do- |
|------------|-------|-------|-------|------------------|------|------|
| +Livestoc | | | | Ginger, Mustard, | | |
| k+Fishery | | | | Indian Major | | |
| +Others | | | | carps (IMC), | | |
| | | | | Integrated fish | | |
| | | | | farming, Cattle, | | |
| | | | | Poultry etc. | | |

2. Agricultural characteristics of farming Systems:

- 1. Boundaries of the FS : Roing Koronu, Hunli Desali and Dambuk Paglam
- 2. Soils under the FS : Sandy Loam to Clay Loam
 - Climates under the FS : ubtropical to Subtemperate.
- 4. Physiography under the FS:

3.

- A. Slightly too moderately erosion hazard, steep sideSlopes, under dense forest and shifting cultivation
- B. Foot hills to slightly mid-hills, sub tropical evergreen forest, having slight erosion hazard, under paddy cultivation.
- Irrigation facilities under the FS: Channel connected to natural water sources.
 Natural water harvesting structures.
- Major crops and cropping intensity under the FS; Rice, Maize, Ginger, Mustard,
 Orange, Banana, Pineapple etc and the cropping intensity is 112%
- 7. Major Cropping Systems under the FS:

| Monocropping | : | Rice – Maize – Zinger |
|-------------------|---|------------------------------|
| Double Cropping | : | Maize – Potato |
| | | Maize - Rapeseed |
| | | Rice - Vegetables |
| Multiple Cropping | : | Maize – Mustard – Vegetables |
| | | Maize – Paddy – Potato. |
| Inter-Cropping | : | Maize – Blackgram |
| | | Maize – Greengram |
| | | Rice – Maize |

Mixed Cropping:Maize+ Rice+Blackgram+Greengram+Vegetables.8.Land use pattern under the FS:

| Land u | Land use pattern under the FS: | | | | | | |
|--------|--------------------------------|---|-----------|--|--|--|--|
| 1. | Gross cropped area | : | 25024 ha | | | | |
| 2. | Net Area sown | : | 22408 ha | | | | |
| 3. | Fallow lands | : | 1166 ha | | | | |
| 4. | Cultivable waste lands | : | 1450 ha | | | | |
| 5. | Forest cover | : | 324436 ha | | | | |
| 6. | Barren lands | : | 7220 ha | | | | |
| Croppi | ng intensity | : | 112% | | | | |
| | | | | | | | |

9.

| SI. No. | Farmers group | No. of farm families | Holding area |
|---------|-------------------------------|----------------------|--------------|
| 1 | Marginal (below 0.5 -1.0 ha) | 2929 | 2435 |
| 2 | Small (1.0-2.0 ha) | 1964 | 5558 |
| 3 | Medium(4.0-10.0 ha) | 1134 | 9142 |
| 4 | Large(10.0-20.0 ha) | 326 | 6432 |
| 5 | All clases | 6353 | 23567 |

10. Land holding pattern under the FS

10. Populations and socio-economic characteristics under the FS:

50448 (Male - 27156, Female - 23292)

11. Adoption pattern for each crop/breed/other technology under the FS:

Rice: Paddy is one of the major crops under the identified FS and is widely cultivated in a Jhum land as well as low land area as WRC and Hilly area as TRC. Generally farmers adopt the indigenous way of cultivation except in WRC and TRC where proper irrigation method and timely weeding are followed.

Maize: Maize is one of the major crops which are grown through the year. Most of the varieties grown are local and the replacement ratio is very low.

Ginger: It is one of the major commercial crops grown in the district and is the highest producer in the entire state.

Oranges: Orange is a major commercial crop under FS which is being cultivated by the farmers of the district. Farmers followed indigenous way of orchard management except few progressive farmers who practiced pest management and intercropping. Production of Orange is also highest in the last two years.

Mustard: Mustard is widely cultivated under the FS as oil seed crop. It is cultivated as a Rabi crop in settled cultivation for commercial purpose as well as for home consumption.

12. General production constraints for each crop under the FS:

- A) Rice:
 - 1. High infestation of Pest (Yellow stem borer and Rice Gundhi bug).
 - 2. Low yielding Local varieties.
 - 3. Lack of technical know how on production process.
- B) Maize;
 - 1. Unavailability of improved varieties.
 - 2. Low replacement ratio on newly developed varieties.
 - 3. Lack of marketing facilities.
 - 4. Lack of technical know how of production process.
- C) Ginger:
 - 1. Lack of improved varieties.
 - 2. High infestation of Ginger rhizome rot.
 - 3. Lack of marketing facilities.
 - 4. Lack of technical know how of production process.

- D). Orange:
 - 1. Lack of Quality Planting materials
 - 2. Lack of technical know how.
 - 3. Lack of proper marketing channels.
- E). Mustard:
 - 1. Non availability of improved and hybrid variety.
 - 2. Marketing of harvested seeds
 - 3. Inadequate processing and sale unit



Diagnostic visit-maize



Diagnostic visit-paddy nursery



Diagnostic visit-tea



OFT on Rhizome rot disease management in Ginger.

Blank



4.2 Farming Systems of Assam

Blank



1. Summary of Farming Systems:

| Farming | Soil | Rainfall | Altitude | Principal | Important | Location |
|-----------|------------|----------|-----------|--------------------|------------------|----------------|
| system | | | | crops/breeds | features | (area), extent |
| | | | | | | of area in ha |
| Agri- | Alfisols & | 1725.3 | 200-300 | Rice, Mustard, | FS is basically | Covers 14% of |
| Horti-AH- | Ultisols | mm – | meters | Potato, Maize | practiced by | the total |
| Seri | (Loan- | 2212.5 | above msl | vegetables, | the farmers | geographical |
| | clay) | mm | | coconut, | living under | area of the |
| | | | | Arecanut, cow, | foot hills, old | district |
| | | | | pig, poultry-Eri, | mountain | |
| | | | | Som, Mulberry | valley alluvial | |
| | | | | | plain AES. | |
| | | | | | Upland crops | |
| | | | | | are also grown. | |
| Agri- AH- | Alfisols & | 1725.3 | 200-300 | Rice, pig, | FS is basically | Covers 21% of |
| Horti | Ultisols | mm – | meters | vegetables, | practiced by | the total |
| | (Sandy- | 2212.5 | above msl | coconut, | the farmers | geographical |
| | loam) | mm | | Arecanut, | living under | area of the |
| | | | | Banana | foot hills, old | district |
| | | | | | mountain | |
| | | | | | valley alluvial | |
| | | | | | forest AES, | |
| | | | | | forest areas. | |
| Agri-AH | Entisols | 1725.3 | 90 meters | Rice, potato, | FS is basically | Covers 19% of |
| | (sandy- | mm – | above msl | Toria, Cow, | practiced by | the total |
| | sandy | 2212.5 | | poultry, duck | the farmers in | geographical |
| | loam) | mm | | | flood prone, | area of the |
| | | | | | recent riverine, | district |
| | | | | | alluvial plain & | |
| | | | | | flood free old | |
| | | | | | riverine, | |
| | | | | | alluvial middle | |
| | | | | | plain AES | |
| Agri-AH- | Inceptisol | 1725.3 | 80 meters | Rice, jute, pulse, | FS is basically | Covers % of |
| Fish | s (sandy | mm – | above msl | Rapeseed, | practiced by | the total |
| | loam-clay | 2212.5 | | wheat, Cow, | the farmers in | geographical |
| | loamloam | mm | | poultry, duck, | flood prone, | area of the |
| | | | | Fish | recent riverine, | district |

| | | | | | alluvial plain & flood free old riverine, alluvial middle plain AES. Very deep water situation prevails in flood prone areas | |
|------------|----------|----------|--------|----------------|---|-------------------|
| Agri- | Entisols | 1725.3mm | 80 | Rice, pulse, | FS is basically | Covers 0.5% of |
| Horti-Fish | (Silty | - 2212.5 | meters | Rapeseed, | practiced by | the total |
| | loam) | mm | above | Coconut, | the farmers | geographical area |
| | | | msl | Arecanut, Fish | living under | of the district |
| | | | | | Beel AES. | |
| | | | | | Water logging | |
| | | | | | low lying areas | |
| | | | | | covered with | |
| | | | | | water hyacinth. | |

a. Agricultural characteristics of each farming system

i. Boundaries of the FS

| Farming System | Spread over |
|--------------------|---|
| Agri-Horti-AH-Seri | Covers 14% of the total geographical area of the district. Jalah, |
| | Gobardhana & Chakchaka Blocks |
| Agri-AH-Horti | Covers 21% of the total geographical area of the district Jalah, |
| | Gobardhana & Chakchaka Blocks |
| Agri-AH | Covers 19% of the total geographical area of the district. Bhabanipur, |
| | Sarukhetri, Paka Betbari, Gomafulbari, Barpeta, Chenga, Rupsi & |
| | Mandia Blocks |
| Agri-AH-Fish | Covers 45.5 % of the total geographical area of the district. Bajali, |
| | Bhabanipur, Chakchaka, Barpeta, Chenga & Mandia Blocks |
| Agri-Horti-Fish | Covers 0.5% of the total geographical area of the district. Sarukhetri, |
| | Paka Betbari & Chakchaka Blocks |

ii. Soils under the FS

| Farming System | Spread over |
|--------------------|-------------------------------------|
| Agri-Horti-AH-Seri | Old Alluvial, sandy loam |
| Agri-AH-Horti | Sandy & clay loam |
| Agri-AH | Old Alluvial Sandy loam |
| Agri-AH-Fish | Old Alluvial Sandy loam |
| Agri-Horti-Fish | Peat soils, Clay & sandy loam soils |

| Farming System | Climate |
|--------------------|---------------------|
| Agri-Horti-AH-Seri | Humid, sub-tropical |
| Agri-AH-Horti | Humid, sub-tropical |
| Agri-AH | Humid, sub-tropical |
| Agri-AH-Fish | Humid, sub-tropical |
| Agri-Horti-Fish | Humid, sub-tropical |

iii. Climates under the FS

iv. Physiography under the FS

| Farming System | Physiography |
|--------------------|------------------------|
| Agri-Horti-AH-Seri | Medium to highland |
| Agri-AH-Horti | Medium to highland |
| Agri-AH | Medium land & Low land |
| Agri-AH-Fish | Medium land & Low land |
| Agri-Horti-Fish | Medium to low land |

v. Irrigation facilities under the FS:

| Farming System | Irrigation facilities |
|--------------------|---------------------------------|
| Agri-Horti-AH-Seri | Minor irrigation, LLP, STW |
| Agri-AH-Horti | Minor irrigation, LLP, STW |
| Agri-AH | Minor irrigation, LLP, STW, DTW |
| Agri-AH-Fish | Minor irrigation, LLP, STW, DTW |
| Agri-Horti-Fish | LLP, STW |

vi. Major crops and cropping intensity under the FS

| Farming System | Major crops and cropping system |
|--------------------|---|
| Agri-Horti-AH-Seri | Rice, Mustard, Potato, vegetables, Coconut, Arecanut, Eri, Som, |
| | Mulberry |
| Agri-AH-Horti | Rice, Vegetables, Coconut, Arecanut, Banana |
| Agri-AH | Rice, Potato, Toria |
| Agri-AH-Fish | Rice, Jute, Pulse, Rapeseed, Wheat |
| Agri-Horti-Fish | Rice, Pulse, Rapeseed, Coconut, Arecanut |

vii. Major cropping system under the FS

| Farming System | |
|--------------------|---------------------------------------|
| Agri-Horti-AH-Seri | i) Paddy-Paddy-Rabi vegetables/Castor |
| | ii) Paddy-Rabi vegetables-Potato |
| | iii) Paddy-Paddy-Mustard |
| Agri-AH-Horti | i) Paddy-Paddy-Rabi vegetables |
| | ii) Paddy-Rabi vegetables-Potato |

| | iii) Paddy-Summer vegetables-Paddy |
|-----------------|------------------------------------|
| Agri-AH | i) Paddy-Paddy-Mustard |
| | ii) Paddy-Paddy |
| Agri-AH-Fish | i) Paddy-Jute-Mustard |
| | ii) Paddy-Paddy-Pulse/Wheat |
| | iii) Paddy-Jute |
| Agri-Horti-Fish | i) Paddy-Paddy-Pulse |
| | ii) Paddy-Paddy-Mustard |
| | iii) Paddy-Paddy-Rabi vegetables |

| a. | Land use pattern under the FS | : | NA |
|----|--|---|----|
| b. | Land holding pattern under the FS | : | NA |
| c. | Population and socio-economic characteristics under the FS | : | NA |
| d. | Adoption pattern for each crop/breed/other technology under the FS | : | NA |

e. General production constraints for each crop under the FS

| SI. No. | Farming System | Production Constraints | | | | |
|---------|--------------------|--|--|--|--|--|
| 1. | Agri-Horti-AH-Seri | Rice – Lack of irrigation facilities, imbalanced use of fertilizer, | | | | |
| | | low adoption of HYV, less plant population/unit area, incidence of | | | | |
| | | pest & diseases, occurrence of floods | | | | |
| | | Mustard -Less availability of quality seeds of HYV, low adoption | | | | |
| | | of HYV, non-adherence to scientific package | | | | |
| | | Potato – Less availability of quality planting material, | | | | |
| | | occurrence of pest & diseases, rainfed culture & non-adherence | | | | |
| | | to recommended irrigation schedule | | | | |
| | | Vegetables - Less availability as well as unreliable source | | | | |
| | | quality inputs, high incidence of pest & diseases, indiscriminat | | | | |
| | | use of fertilizers & pesticides, non adherence to scientific | | | | |
| | | package of practices | | | | |
| | | Coconut & Arecanut - Haphazard planting, non adoption of | | | | |
| | | prophylactic measures against diseases & pests, imbalanced use | | | | |
| | | of nutrients, ignorance in selection of planting materials, non | | | | |
| | | compliance with recommended agro-techniques | | | | |
| | | Eri, Som, Mulberry - Non availability of quality seeds & | | | | |
| | | planting material, Non compliance with recommended package, | | | | |
| | | lack of skills & expertise among growers for undertaking special | | | | |
| | | cultural operations | | | | |
| 2. | Agri-AH-Horti | Rice - Lack of irrigation facilities, imbalanced use of fertilizer, | | | | |
| | | low adoption of HYV, less plant population/unit area, incidence of | | | | |
| | | pest & diseases, occurrence of floods | | | | |
| | | Vegetables - Less availability as well as unreliable source of | | | | |
| | | quality inputs, high incidence of pest & diseases, indiscriminate | | | | |

| | | use of fertilizers & pesticides, non adherence to scientific |
|----|-----------------|---|
| | | package of practices |
| | | Coconut & Arecanut - Haphazard planting, non adoption of |
| | | prophylactic measures against diseases & pests, imbalanced use |
| | | of nutrients, ignorance in selection of planting materials, non |
| | | compliance with recommended agro-techniques |
| | | Banana – Dearth of quality planting material, persistence of |
| | | traditional methods of cultivation, occurrence of Panama disease |
| | | in epidemic form |
| 3. | Agri-AH | Rice - Lack of irrigation facilities, imbalanced use of fertilizer, |
| | | low adoption of HYV, less plant population/unit area, incidence of |
| | | pest & diseases, water logging in pockets |
| | | Potato - Less availability of quality planting material, occurrence |
| | | of pest & diseases, rainfed culture & non-adherence to |
| | | recommended irrigation schedule |
| | | Mustard - Less availability of quality seeds of HYV, low adoption |
| | | of HYV, non-adherence to scientific package |
| 4. | Agri-AH-Fish | Rice - Lack of irrigation facilities, imbalanced use of fertilizer, |
| | | low adoption of HYV, less plant population/unit area, incidence of |
| | | pest & diseases |
| | | Jute – Non adoption of recommended package, improper use of |
| | | nutrients, incidence of pests & diseases |
| | | Pulse - Non availability of quality seeds, non compliance with |
| | | recommended package |
| | | Mustard - Less availability of quality seeds of HYV, low adoption |
| | | of HYV, non-adherence to scientific package |
| | | Wheat - Non availability of quality seeds, lack of irrigation |
| | | facilities, non adoption of recommended package |
| 5. | Agri-Horti-Fish | Rice - Lack of irrigation facilities, imbalanced use of fertilizer, |
| | | low adoption of HYV, less plant population/unit area, incidence of |
| | | pest & diseases, occurrence of floods |
| | | Pulse- Non availability of quality seeds, non compliance with |
| | | recommended package |
| | | Mustard - Less availability of quality seeds of HYV, low adoption |
| | | of HYV, non-adherence to scientific package |
| | | Coconut & Arecanut - Haphazard planting, non adoption of |
| | | prophylactic measures against diseases & pests, imbalanced use |
| | | of nutrients, ignorance in selection of planting materials, non |
| | | compliance with recommended agro-techniques |

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........................ 2. Farming Systems of Cachar

1. **Summary of Farming Systems:**

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| | | | | | | Location |
|------------|------------|----------|---|-----------------|----------------|---------------|
| Farming | Soils | Painfall | Altitudo | Principal | Important | (area), |
| system | 30115 | Kaimaii | Annuale | crops/breeds | features | extent of |
| | | | | | | area in ha. |
| FS-1 | Old | 3200- | 92 ⁰ 24' E & 93 ⁰ | Rice, Potato, | Upland, | Naringpur, |
| (Agri- | mountain | 3500 mm | 15' E and | Mustard, | medium | Salchapra,Lak |
| Hort) | Alluvium, | | latitude 24 ⁰ | Pulses | land and | hipur, Sonai, |
| | sandy fine | | 22′N & 25 ⁰ 08′N | | low land | Udarbond |
| | loamy | | | | | 60024 ha |
| FS-2 | Old | 3200- | 92 ⁰ 24' E & 93 ⁰ | Rice, | Medium | Sonai, |
| (Agri- | riverine | 3500 mm | 15' E and | Vegetable, | land to low | Naringpur, |
| Hort) | Alluvium | | latitude 24 ⁰ | Potato, | land, | Katigorah, |
| | and Old | | 22′N & 25 ⁰ 08′N | Oilseed, Late | inundated | Udarbond |
| | mountain | | | Sali | during | |
| | Alluvium | | | | monsoon | 30279 ha |
| FS-3 | Peat soil, | 3200- | 92 ⁰ 24' E & 93 ⁰ | Rice (boro), | Perennial | Sonai, |
| (Agri- | organic | 3500 mm | 15' E and | Fisheries | water | Naringpur, |
| Fishery) | soil | | latitude 24 ⁰ | | logged | Katigorah, |
| | | | 22′N & 25 ⁰ 08′N | | situation | Udarbond, |
| | | | | | | Salchapra |
| | | | | | | |
| | | | | | | 17728 ha |
| | | | | | | |
| FS-4 | Non- | 3200- | 92 ⁰ 24' E & 93 ⁰ | Теа, | High land, | Sonai, |
| (Hort- | laterised | 3500 mm | 15' E and | sugarcane, | hillock | Naringpur, |
| Silvicultu | red soil, | | latitude 24 ⁰ | pineappl, fruit | ,detraital | Katigorah, |
| re) | Old | | 22′N & 25 ⁰ 08′N | trees, | valleys, | Salchapra |
| | mountain | | | vegetables | tillah with | |
| | Alluvium, | | | | narrow | 76238 ha |
| | fine loamy | | | | valley | |
| FS-5 | | 3000- | 92 ⁰ 24' E & 93 ⁰ | Reserved | Lower foot | Katigorah, |
| (Silvicult | | 4000 mm | 15' E and | forest , Sal , | hills/ hillock | Udarbond, |
| ure) | | | latitude 24 ⁰ | teak, bamboo | to high hill, | Salchapra, |
| | | | 22′N & 25 ⁰ 08′N | | reserved | Sonai, |
| | | | | | forest | Narsingpur |
| | | | | | | 193341 ha |

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AT 10

2. Agricultural characteristics of each farming System

1. Boundaries of the FS:

The FS is bounded by North Cachar Hills in the north, Mizoram in the south, Karimganj and Hailakandi districts and a part of Meghalaya state in the east and Manipur state in the west. The district is bounded by N C Hills in the north, Mizoram in the south, Karimganj and Hailakandi districts and a part of Meghalaya state in the east and Manipur state in the west.

2. Soils under the FS

| SI. | Soil type | Characteristics | Area in ha |
|-----|---------------|---|------------|
| No | | | |
| 1 | Old reverine | Light textured (varies from sandy to fine silty loam), silt | 26432 |
| | alluvium | deposition is common feature, pH comparatively higher | |
| 2 | Old mountain | Deep and heavy textured varying from silty to clay loam with | 135939 |
| | alluvium | moderate organic matter content. | |
| 3 | Non laterized | Confined to hilly areas, belonging chiefly to Tipam and Surma | 192582 |
| | red soil | groups of soil. More acidic than alluvial tract. | |
| 4 | Laterized red | Texture is sandy loam, rich in Fe and Al content, high in acidity | 15105 |
| | soil | | |
| 5 | Peat soil | Heavy textured, dark grey in colour, pH around 7.0, rice in | 7552 |
| | | organic matter. | |

3. Climates under the FS

| FS-1 | FS-2 | FS-3 | FS-4 | FS-5 |
|-------------------|-------------------|----------------|-------------------|-----------------|
| Warm and humid | Warm and humid | Warm and | The climate is | Warm , humid in |
| clime with high | clime with high | humid clime is | virtually same as | summer and dry |
| intensity raining | intensity raining | prevalent | Alluvial area of | in winter |
| during monsoon | during monsoon | | the zone. | |

4. Physiography under the FS:

The FS has an undulating topography characterized by hills, hillocks (tillah), wide plains and low lying water logged areas (natural depression) locally called *beels*. The river Barak ramifies the entire FS with their tributaries. Physiographically the Barak Valley zone may be divided into 8 classes ranging from

- high hills with elevation exceeding 300m to perennially water logged beels.
- 5. Irrigation facilities under the FS : River lift irrigation system 325 nos
- 6. Major crops and cropping intensity under the FS:
 - Crop: Paddy
 Rain fed lowland transplanted (Boro)
 Medium land transplanted (Kharif)
 Rain fed lowland transplanted (Boro)
 - Field Crop: Potato
 Rain fed alluvial rivirine belt (Resource rich)

Rain fed alluvial rivirine belt (Resource poor) Rain fed medium land (Resource rich)

- 3. Crop: Rajmah
 - a. Rain fed Upland (Resource rich)
 - b. Rain fed medium land (Resource rich)
 - c. Rain fed Upland (Resource poor)
 - d. Rain fed medium land (Resource poor)
- 4. Crop : Rajmah
- 5 Crop : Country bean
- 6. Crop : Brinjal
- 7. Crop : Cabbage
- 8. Crop : Cauliflower
- 9. Crop : Bannana
- 10. Crop : Pineapple
- 11. Plantation crop: Arecanut, coconut
- 7. Major cropping systems under the FS:

| FS-1 | FS-2 | FS-3 | FS-4 | FS-5 |
|------------------|------------------|-----------------|----------------|---------------------|
| Monocropping, | Monocropping, | Monocropping, | Monocropping, | Monocropping, mixed |
| Double cropping, | Double cropping, | Inter cropping, | Double | cropping. |
| Triple cropping, | Triple cropping, | mixed | cropping, | |
| Inter cropping | Inter cropping | | Inter cropping | |

- Land use pattern under the FS: In respect of crop area , the area is 31.01%. Area under forest 37.94, unutilized land area (Barren and uncultivable, fallow land and cultivable waste) is highest in the district with 62,161 ha.
- 9. Land holding pattern under the FS

| Holding size | Farmers no. | Area (ha) |
|--------------|-------------|-----------|
| Up to 1 ha | 73,319 | 52960 |
| 1 -2 ha | 28,482 | 42201 |
| 2-4 h | 6660 | 17258 |
| Above 4 ha | 890 | 4321 |

10. Populations and socio-economic characteristics under the FS

| Worker | Culti- | Agricul- | Livestock, | Mining | House- | Other | Construc- | Trade | Trans- | Other | Non |
|--------|--------|----------|------------|--------|--------|--------|-----------|-------|---------|---------|---------|
| | vators | tural | fishing, | and | hold | than | tion | and | port, | service | workers |
| | | labour | forestry | quar- | Indus- | House- | | com- | storage | | |
| | | | etc. | rying | tries | hold | | merce | etc. | | |
| | | | | | | Indus- | | | | | |
| | | | | | | tries | | | | | |
| 224394 | 102268 | 47168 | 35055 | 177 | 2952 | 4174 | 2022 | 7366 | 3841 | 19371 | 599121 |

| • | • | | | 5, | |
|--------------------|-----|-----|-----------|-----|------------------|
| | AFF | AFP | Beels and | PPC | Hills and forest |
| | | | hoars | | |
| Field crop | F | F | PF | NA | NA |
| | | | | | |
| Horticultural crop | F | PF | NA | F | PF |
| Vegetables | F | PF | PF | F | NA |
| Plantation crop | - | - | - | F | - |
| Forestry | - | - | - | - | F |
| Fisheries | PF | PF | F | - | - |
| Breed | F | PF | NA | PF | PF |
| Technology | PF | PF | PF | PF | PF |

11. Adoption pattern for each crop/breed/other technology under the FS

* PF: Partially followed, F: Full gap

- 12. General production constraints for each crop under the FS:
 - 1. Non availability of quality seed /planting materials.
 - 2. Non availability of input in time
 - 3. Lack of technical knowledge/ awareness
 - 4. Lack of irrigation facilities
 - 5. Lack of market facilities
 - 6. Flood
 - 7. Artificial insemination
 - 8. Quality food
 - 9. Lack of improved breed
 - 10. Inbreeding of pig and goat
 - 11. No availability of vaccine



OFT on INM in sali paddy

Method demonstration on fertilizer application in Coconut

ନ୍ଧାର୍ୟନ୍ଧାର୍ୟ



| AES-1 | AES-2 | AES-3 | AES-4 |
|------------------|---------------------|---------------------|---------------------------|
| Existing farming | Existing farming | Existing farming | Existing farming |
| systems | systems | systems | systems |
| Agriculture | Agri + Horti + A.H. | Agri + Horti + | Agriculture |
| + A.H. | | Fishery+ A.H. | |
| Agriculture | Agri + Horti + | Agri + Horti + A.H. | Agriculture + Horti |
| +Fishery + A.H. | Fishery | | |
| | Agri + Seri + Horti | | Agriculture + Horti +A.H. |

1. Summary of Farming systems:

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2. Basis/Criteria for identifying farming systems:

| 1. | Soils | : | Sandy to Sandy Loam | | | |
|----|------------------|-----|---|--|--|--|
| 2. | Rainfall | : | Av. Annual Rain fall: 2120 mm | | | |
| 3. | Physiography | : | The district has 5 distinct tracts viz. low hill, piedmont & hill | | | |
| | | | land area flood plain, Char land and Swampy areas. | | | |
| 4. | Altitude | : | 50-250 m above MSL | | | |
| 5. | Irrigation patte | rn: | By minor irrigation: 33159 ha and by major and | | | |
| | | | medium irrigation | | | |
| | | : | 24599 ha | | | |
| 6. | Temperature | : | Max: 36ºC; Min: 10ºC | | | |

3. Summary of farming Systems

Based on the criteria listed under the above items, the agro-ecological situation was classified into homogeneous farming situations and furnished in table as shown below.

| Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | Location (area), extent of |
|-------------------|-----------|----------|------------|---------------------------|-----------------------|----------------------------------|
| Agriculture | Candy | 2520 mm | F0 100 m | Daddy | Low land with | area in ha. |
| Agriculture | Sanuy | 2520 mm | 50 – 100 m | Pauuy, | LOW IAND WITH | NA |
| + A.H. | loam – | | MSL | winter/summer | lower | |
| Agriculture | Clay loam | | | vegetables | elevation | |
| +Fishery + | | | | | | |
| A.H. | | | | | | |
| Agri + Horti | Sandy | 1930 mm | 50 – 100 m | Paddy, | Upland with | NA |
| + A.H. | loam – | | MSL | winter/summer | medium | |
| Agri + Horti | Clay loam | | | vegetables | rainfall | |
| + | | | | | | |
| Fishery | | | | | | |

| Agri + Seri + | | | | | | |
|---------------|-----------|---------|------------|------------|-------------|----|
| Horti | | | | | | |
| | | | | | | |
| Agri + Horti | Sandy | 2130 mm | 50 – 100 m | Paddy, | Medium | NA |
| + Fishery+ | loam – | | MSL | winter/sum | upland with | |
| А.Н. | Clay loam | | | mer | medium | |
| Agri + Horti | | | | vegetables | rainfall | |
| + A.H. | | | | | | |
| Agriculture | | 2234 mm | 110 - 250 | Paddy, | Deepwater | NA |
| | | | m MSL | winter/sum | with high | |
| Agriculture | | | | mer | elevation | |
| + Horti | | | | vegetables | | |
| Agriculture | | | | | | |
| + Horti | | | | | | |
| +A.H. | | | | | | |

4. Agricultural characteristics of each farming System

- 1. Boundaries of the FS :
 - E: Sonitpur district W: Kamrup district N: Udalguri district
 - S: Kamrup and Morigaon district NE: Sonitpur district SE:Nagaon district SW:Kamrup district NW:Kamrup district
- 2. Soils under the FS : Sandy loam Clay loam
- 3. Climates under the FS :

The farming under Darrang district has a sub-tropical climate with semi-dry hot summer and clod winter. Dust storms are common in the southern part of the district during February to April of the year because of the proximity of the area to sand loads of the Brahmaputra. Generally, December and January are the coldest months of the year. The maximum rainfall generally occurs during a period of 4 months starting from May/June. The drainage system is inadequate in the monsoon. Recurrence of flood during monsoon due to heavy rainfalls in the district causes loss of crops and other properties almost every year. In recent years the district the experienced the heavy floods, to be precise, flash floods, due to heavy deforestation towards northern part. The people of the district, who mainly depend on rain water for their cultivation, are often badly affected on one hand by floods and on the other hand by occasional dry spell.

The annual rainfall varies from 1500 mm. to 2600 mm. Annual rainfall of the district in 1995 was 2449 mm. The district received maximum rainfall during the month May to September.

With respect of temperature, again the district is divided into belts in East-West direction. The middle belts are the hottest, where temperature goes up to 36° and the northern belts is the coolest, the temperature goes below 10° here. Other

parts experience temperature ranges $around 22^{\circ}$. The mean relative humidity here is around 82 %.

| 4. | Physi | ography under the FS | : | |
|----|-------------------------------------|-------------------------|----------|--|
| | Highl | ands | : | 180.00 ha |
| | Midla | nds | : | 216 .00 ha |
| | Lowla | inds | : | 254.10 ha |
| | Hilly | tract | : | 125.20 ha |
| 5. | . Irrigation facilities under the F | | | |
| | Area | under irrigation | : | 11,342 ha |
| | Irrigation potential | | | 57,758 ha |
| | Sourc | e of irrigation | | |
| | 1. | Rivers | : | 3 nos. |
| | 2. | Tanks | : | 91 nos. |
| | 3. | Bore wells | : | 15070 nos. |
| 6 | Maior | crops and cropping inte | nsity un | der the FS: Rice Wheat Pulses Jute Sugarcane |

Major crops and cropping intensity under the FS: Rice, Wheat, Pulses, Jute, Sugarcane, Vegetables etc. Cropping intensity: 180.3 %

| Major cropping systems under the FS: | | | | | | | |
|--------------------------------------|--|--|--|--|--|--|--|
| a. | Crop rotations followed | : | 1. Paddy- Mustard- Paddy | | | | |
| | | | 2. Paddy- Potato – Bhindi | | | | |
| | | | 3. Paddy – summer pulse –Cabbage/ | | | | |
| | | | cauliflower / knolkhol | | | | |
| | | | 4. Mustard- Ridge gourd/sponge | | | | |
| | | | gourd/bitter gourd/spine gourd | | | | |
| | | | 5. Paddy- Jute- Mustard/Lentil/sesamum | | | | |
| b. | Crop sequences followed | : | 1. Kharif Paddy – Rabi vegetables | | | | |
| | | | Summer vegetables – Rabi vegetables | | | | |
| | | | 3. Ahu Paddy – summer vegetables | | | | |
| с. | Inter-cropping done | : | 1. Bringal + Chilli | | | | |
| | | | 2. Ridge gourd + Sponge gourd | | | | |
| | | | 3. Potato + pumpkin | | | | |
| d. | Mixed cropping done, if any | : | 1. Radish + Mustard (leafy vegetables) | | | | |
| | | | 2. Pudina + Chilli | | | | |
| e. | Catch crops grown, if any | : | 1. Toria | | | | |
| | | | 2. Green gram | | | | |
| | | | 3. Coriander | | | | |
| Land us | se pattern under the FS | : | | | | | |
| a. | Gross cropped area | : | 132735ha | | | | |
| b. | Net Area sown | : | 73,619 ha | | | | |
| с. | Fallow lands | : | 6451 ha | | | | |
| d. | Cultivable waste lands | : | 8150 ha | | | | |
| | Major c a. b. c. d. e. Land us a. b. c. d. | Major cropping systems under the FS:a.Crop rotations followedb.Crop sequences followedc.Inter-cropping doned.Mixed cropping done, if anye.Catch crops grown, if anye.Catch crops grown, if anyLand use pattern under the FSa.Gross cropped areab.Net Area sownc.Fallow landsd.Cultivable waste lands | Major cropping systems under the FS:a.Crop rotations followed:b.Crop sequences followed:c.Inter-cropping done:d.Mixed cropping done, if any:e.Catch crops grown, if any:e.Catch crops grown, if any:Land use pattern under the FS:a.Gross cropped area:b.Net Area sown:c.Fallow lands: | | | | |

| e. | Forest cover | | : | 28353 ha |
|-----------------------------------|-----------------------|-------------------------|------------|--------------------------------------|
| f. | Barren lands | | | 35866 ha |
| g. | Cropping intensity | | | 180.3 % |
| Land holding pattern under the FS | | | : Avera | age size of land holding is 0.956 ha |
| Populat | ions and | d socio-economic charad | cteristics | under the FS: |
| a. | Total population | | | 834078 |
| b. | Area of the district | | : | 1427.49sq km |
| с. | Population density | | : | 533 |
| d. | Literacy percentage | | : | 47.51% |
| e. | Status of agriculture | | : | Rainfed and irrigated |
| f. | Farmers | | : | |
| | i. | Big farmers | : | 11522 nos. |
| | ii. | Small farmers | : | 37755 nos. |
| | iii. | Marginal farmers | : | 29686 nos. |
| | iv. | Agricultural labourers | : | 56,871 nos. |

11. Adoption pattern for each crop/breed/other technology under the FS:

| crop/breed | Practices/Technology | Adoption |
|-----------------------|----------------------|----------------|
| | | (Full/Partial) |
| Paddy | Recommended | Partial |
| Pulses | Recommended | Partial |
| Oilseeds | Recommended | Partial |
| Winter vegetables | Recommended | Full/Partial |
| Summer vegetables | Recommended | Full/Partial |
| Jute | Recommended | Partial |
| Wheat | Recommended | Partial |
| Crossbred cattle/pig/ | Recommended | Partial |
| goat | | |
| Pure breed of Birds | Recommended | Partial |
| Fish | Recommended | Partial |

12. General production constraints for each crop under the FS

Constraints for production of major field crops in Darrang District:

Paddy:

9.

10.

- 1. Low production and productivity:
 - Cultivation of local/ traditional varieties in case of Ahu and Sali paddy.

:

- Imbalance use of fertilizes with inappropriate methods.
- Low replacement rate of high yielding varieties seeds.
- Non availability of flood water submerged tolerant varieties.
- High infestation of rice hispa, stem borer, leaf blight.
- Excess and uneconomic use of irrigation water during summer.
- 2. Non availability of adequate and qualitative inputs in time.

- 3. No or very low use of organic manure.
- 4. Small and scattered land holdings.
- 5. Iron toxicity in some pockets.
- 6. Inadequate credit facility and negligible accessibility of farmers to the financial institutions.
- 7. No direct accessibility of farmers to markets and are bound to sale their produce to the retailers at low price.
- 8. Inadequate availability of market information.

Wheat:

- 1. No HYV seeds in the district except Sonalika which is susceptible to insectpests and diseases
- 2. Late sowing of seeds due to preparation of land after harvesting of *Sali* paddy
- 3. Occurrence of pre-monsoon rain during harvesting of the crop

Pulses:

- Uncertain weather condition viz. high rainfall during Kharif hampers timely land preparation and sowing of Kharif pulses and the rabi pulses suffers from moisture deficit stress particularly during reproductive phase. Summer pulses (green gram and black gram) receive rainfall during maturity state causes preharvest sprouting and lack of adequate moisture leads to delayed sowing of summer pulses.
- 2. Non availability of quality seed at time viz. non availability of delayed sown black gram varieties and uniform maturing green gram varieties.
- 3. Non adoption of improved production technology
- 4. Soil acidity.
- 5. Cultivated as rain fed crop in marginal and sub-marginal lands with less effort and inputs.
- 6. Infestation of insect pests and diseases. Pod borers, aphids etc are the major pest of all the pulses. Wilt in lentil, rust in pea, YMV, CLS and WB in black gram and green gram are serious diseases.
- 7. Lack of irrigation facility.
- 8. Stray animals.
- 9. Problem in seed storage due to infestation of stored grain pest.
- 10. Non availability of processing unit.
- 11. Unorganized marketing infrastructure.

Oil seeds:

 Uncertain weather condition viz. excess rainfall in Kharif causes water stagnation in crop fields and delays the sowing of kharif oilseeds like sesamam and groundnut and intermittent moisture stress in rabi due to absence of rainfall at the critical stages of crop growth.

- Non availability of quality seeds at proper time and in required amount. Farmers are compelled to grow locally available seeds of low yielding varieties which eventually reduce productivity and total production.
- 3. Non or low replacement of old seeds at periodical interval.
- 4. Poor nutrient and crop management practices.
- 5. Infestation of insect pest and diseases. Major pest like aphid, saw fly, jassids, thrips, leaf minor etc attack oilseeds drastically reduce their yields. Several fungal and viral diseases like blight, leaf spot, wilt, steam rot, root rot, yellow mosaic etc ruin these crops when conditions are favourable for them.
- 6. Cultivation of oil seeds mostly in less fertile and marginal land which account for the increased in area and total production but not productivity.
- 7. Cultivation of oil seed without irrigation.
- 8. Unorganized marketing infrastructure.

Jute:

- 1. Jute is generally grown under rain fed condition; delay of pre-monsoon rain often results in reduction jute area.
- 2. Non availability of quality seeds at proper time and this causes delay in sowing resulting in low yield.
- 3. Weed infestation in initial growth period of jute and there by high cost of weeding.
- 4. High infestation of insect pest viz. hairy caterpillars and semilooper and diseases like root rot, steam rot.
- 5. Non availability of sufficicient and good water for retting results in poor quality of fibre.
- 6. High labour intensive crop and hence high production cost.
- 7. Uncertain market price and lack of proper marketing facility for surplus produces.

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4. Farming Systems of Jorhat

1. Summary of Farming Systems:

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| Forming | | | | Principal | Important | Location (area), |
|-------------|-----------------|----------|----------|------------|----------------|----------------------|
| Farming | Soils | Rainfall | Altitude | crops/ | footures | extent of area in |
| system | | | | breeds | reatures | ha. |
| 1.Agri- | Soils sandy | Annual | | Ahu | This situation | Mainly distributed |
| Horti-Ani | loam in | average | | paddy, | is located | in Majuli Dev. |
| Hus- | surface layers | rainfall | | Summer | along the | Block, Ujanimajuli |
| Fishery | with coarse | 2000mm | | paddy | southern | Dev. Block, North |
| 2. Agri- | texture in sub | | | Rapeseed | bank of the | west, dev. Block, |
| Horti-Ani | soils | | | and | river | Titabar dev. Block |
| Hus | | | | mustard | Brahmputra | and Kaliapani |
| 3. Agri-Ani | | | | | and its | development block |
| Hus | | | | | tributaries | With an area |
| 4. Agri- | | | | | | of119429 ha. |
| Horti | | | | | | |
| | Soils are in | Annual | | Ahu and | This situation | It comprises partial |
| 1. Agri – | early stages | average | | Sali Paddy | comprises | area of three blocks |
| AniH us | of pedogenic | rainfall | | , | river islands | viz. Majuli , Ujani |
| 2. Agri- | development | more | | Rapeseed | and | majuli & North |
| Horti | as they are | than | | and | peripheral | West dev. Block |
| 3. Agri- | formed from | 2000mm | | Mustard, | areas of the | Total geographical |
| horti- | stratified | | | Potato | Brahmaputra | area is 16403 ha |
| Fishery | alluvial | | | | river and | i.e. 5.75 % of the |
| | deposite of | | | | susceptible | total geographical |
| | river flood. | | | | to regular | area of district. |
| | Surface layer | | | | floods | |
| | is sandy loam | | | | | |
| | and coarse | | | | | |
| | texture in sub | | | | | |
| | surface soils. | | | | | |
| 1.Agri- | soils are | The | | Sali rice, | This situation | The are is |
| Horti-Ani | sandy loam, | average | | pulse, | characterized | distributed over the |
| Hus-Seri- | loamy sand, | annual | | vegetables | by almost | six development |
| Fisery | loam in | rainfall | | and | level land | block namely |
| 2. Agri. | texture and | is 1,800 | | arecanut, | with gentle | Jorhat, Titabor, |
| Horti-AH | are young / | mm. | | pineapple | slope, which | Central Kaliapani, |
| Seri | immature. PH | | | and beetle | can be | East Jorhat and |
| 3. Agri | is slightly to | | | vine are | categorized | North West Total |
| Horti-Seri. | strongly acidic | | | major | as upland, | geographical area is |

| | | 1 | | | · . |
|-------------|----------------|----------|--------------|--------------------|-------------------|
| 4. Agri- | in reaction. | | horticulture | medium land, | ha |
| Horti -Ani | | | crop. | low land and | |
| Hus | | | | very low land | |
| Agri- | Soils are | Average | Теа, | The soils of this | It comprises of |
| Horti | mostly clay, | annual | autumn | situation are | partial area of |
| A.H. – | reddish to | rainfall | winter | alluvial in nature | four blocks |
| Seri-Fisery | pinkish on the | is less | paddy (Ahu | and having | namely |
| 2. Agri- | surface and | than | and Sali | undulating | Kaliapani, |
| Horti-A.H. | yellow to | 2,000 | rice). | topography with | Titabar, Jorhat |
| -Seri | yellowish red | mm. | Rapeseed | gentle slope | and East Jorhat |
| 3. Agri- | in the sub | | and | | varying in |
| Horti-Seri | surface. Other | | mustard, | | between 2.43% |
| 4. Agri- | variations in | | potato, | | to 38.32% |
| Horti-A.H. | soil texture | | citrus & | | across the |
| | such as clay | | vegetables. | | blocks. Total |
| | loam, loam | | | | geographical |
| | and sandy | | | | area is 22402 ha |
| | loam are also | | | | i.e. 7.86% of |
| | observed in | | | | total area of the |
| | this situation | | | | district and |

2. Agricultural characteristics of each farming System

1. Boundaries of the FS

| Farming system | Boundaries |
|----------------------------------|------------|
| Agri-Horti-Ani Hus-Fishery | 49145 ha |
| Agri-Horti-Ani Hus | 39867 ha |
| Agri-Ani Hus | 11974 ha |
| Agri-Horti | 14232 ha |
| Agri-Horti –Fishery | 820 ha |
| Agri-Horti-Ani Hus- Seri-Fishery | 57484ha |
| Agri-Horti-Ani Hus- Seri | 32338 ha |
| Agri-Ani Hus- Seri | 4896 ha |

2. Soils under the FS

| Farming system | Soils |
|----------------------------|--|
| Agri-Horti-Ani Hus-Fishery | Soils are sandy loam in surface layers with coarse |
| | texture in sub soils. PH is near neutral to slightly |
| | acidic, organic matter content is Low to medium |
| Agri-Horti-Ani Hus | Soils are sandy loam, loamy sand, loam in texture |
| | and are young / immature in surface layers with |

| | coarse texture in sub soils. PH is near neutral to |
|----------------------------------|--|
| | strongly acidic. Organic matter content is Low to |
| | medium |
| Agri-Ani Hus | Soils are in early stages of pedogenic development |
| Agri-Horti | as they are formed from stratified alluvial deposits |
| | of river flood. Surface layer is sandy loam and |
| | coarse texture in sub surface soils. PH is almost |
| | neutral |
| Agri-Horti –Fishery | Soils are sandy loam, loamy sand, loam in texture |
| | and are young / immature. PH is slightly to strongly |
| | acidic in reaction. |
| Agri-Horti-Ani Hus- Seri-Fishery | Soils are sandy loam, loamy sand, loam in texture |
| Agri-Horti-Ani Hus- Seri | and are young / immature. PH is slightly to strongly |
| | acidic in reaction. |
| | |
| | |
| Agri-Ani Hus- Seri | Soils are mostly clay, reddish to pinkish on the |
| Agri-Ani Hus- Seri | Soils are mostly clay, reddish to pinkish on the surface and yellow to yellowish red in the sub |
| Agri-Ani Hus- Seri | Soils are mostly clay, reddish to pinkish on the surface and yellow to yellowish red in the sub surface. Other variations in soil texture such as clay |
| Agri-Ani Hus- Seri | Soils are mostly clay, reddish to pinkish on the surface and yellow to yellowish red in the sub surface. Other variations in soil texture such as clay loam, loam and sandy loam are also observed in |

| Farming system | Climates |
|----------------------------------|---|
| Agri-Horti-Ani Hus-Fishery | Annual average rainfall 2000mm, Chronically flood |
| Agri-Horti-Ani Hus | affected. The highest wetted month May to |
| | September; and drier months are November to |
| | March with highest bright sunshine hours. |
| | Temperature varies in between 9.4°c in January to |
| | 32.5 °C in August. |
| Agri-Ani Hus | Annual average rainfall more than 2000mm. |
| Agri-Horti | Chronically flood affected. The highest wetted |
| | month May to September; and drier months are |
| Agri-Horti –Fishery | November to March with highest bright sunshine |
| | hours. Temperature varies in between 9.4°c in |
| | January to 32.5 °C in August. |
| Agri-Horti-Ani Hus- Seri-Fishery | Annual Average rainfall is less than 1800mm. |
| | Occasionally flood affected. The highest wetted |
| | month May to September; and drier months are |
| | November to March with highest bright sunshine |
| | hours. Temperature varies in between 9.4°c in |
| | January to 32.5 °C in August. |

3. Climates under the FS

| Agri-Horti-Ani Hus- Seri | Average annual rainfall is less than 2000mm.The |
|--------------------------|--|
| Agri-Ani Hus- Seri | highest wetted month May to September; and drier |
| | months are November to March with highest bright |
| | sunshine hours. Temperature varies in between |
| | 9.4°c in January to 32.5 °C in August. Warm and |
| | sub-humid to humid climate, Occasionally flood |
| | occurred. |

4. Physiography under the FS

| Farming system | Physiography |
|----------------------------------|---------------------|
| Agri-Horti-Ani Hus-Fishery | Medium |
| Agri-Horti-Ani Hus | Medium to Low land |
| Agri-Ani Hus | Low land |
| Agri-Horti | Low land |
| Agri-Horti –Fishery | Medium to low land |
| Agri-Horti-Ani Hus- Seri-Fishery | Medium to High land |
| Agri-Horti-Ani Hus- Seri | Medium to High land |
| Agri-Ani Hus- Seri | Medium to High land |

5. Irrigation facilities under the FS

| Farming system | Irrigation facilites |
|----------------------------------|----------------------|
| Agri-Horti-Ani Hus-Fishery | STW, River, Beel |
| Agri-Horti-Ani Hus | |
| Agri-Ani Hus | STW, Beel |
| Agri-Horti | STW, Beel |
| Agri-Horti –Fishery | Pond, Beel |
| Agri-Horti-Ani Hus- Seri-Fishery | STW, River, pond |
| Agri-Horti-Ani Hus- Seri | River,Beel and STW |
| Agri-Ani Hus- Seri | |

6. Major crops and cropping intensity under the FS

| Farming system | Major crop and cropping Intensity |
|----------------------------------|---|
| Agri-Horti-Ani Hus-Fishery | Ahu pady, Boro paddy, Rapeseed |
| Agri-Horti-Ani Hus | Ahu paddy, Rapeseed |
| Agri-Ani Hus | Ahu paddy, Boro paddy, Rapeseed |
| Agri-Horti | Vegetable, Rapeseed |
| Agri-Horti –Fishery | Rapeseed, Ahu paddy, Boro paddy |
| Agri-Horti-Ani Hus- Seri-Fishery | Sali paddy, Ahu paddy, vegetables |
| Agri-Horti-Ani Hus- Seri | Sali paddy, Ahu paddy, Muga rearing, Vegetables |
| Agri-Ani Hus- Seri | Sali paddy, vegetables |

7. Major cropping systems under the FS

| Farming system | Major cropping system |
|----------------------------------|--|
| Agri-Horti-Ani Hus-Fishery | Paddy-Oilseeds, Paddy-Paddy, Paddy-Garlic |
| Agri-Horti-Ani Hus | Paddy-Paddy, Paddy-Oilseed, Paddy - Rabi vegetables |
| Agri-Ani Hus | Paddy-Paddy, Paddy-Oilseed |
| Agri-Horti | Paddy-Oilseeds, Paddy-Garlic, Paddy- Rabi vegetables |
| Agri-Horti –Fishery | Paddy-Rabi vegetables, Paddy-Oilseed, |
| Agri-Horti-Ani Hus- Seri-Fishery | Paddy-Rabi vegetables, Paddy- wheat, Kharif |
| | vegetables-rabi vegetables |
| Agri-Horti-Ani Hus- Seri | Paddy, Paddy-Paddy, Paddy-pulse, Paddy -vegetables |
| Agri-Ani Hus- Seri | Paddy, Paddy-pulse, |

8. Land use pattern under the FS : NA

9. Land holding pattern under the FS

1.

Agri-Horti-Ani Hus-Fishery

| Category of farmers | Area (ha) |
|---------------------|-----------|
| Large farmers | 20149 |
| Small Farmers | 16709 |
| Marginal farmers | 10320 |
| Landless farmers | 1966 |

2. Agri-Horti-Ani Hus

| Category of farmers | Area (ha) |
|---------------------|-----------|
| Large farmers | 16345 |
| Small Farmers | 13555 |
| Marginal farmers | 8372 |
| Landless farmers | 1595 |

3. Agri-AniHus

| Category of farmers | Area (ha) |
|---------------------|-----------|
| Large farmers | 4909 |
| Small Farmers | 4071 |
| Marginal farmers | 2515 |
| Landless farmers | 479 |
4. Agri - Horti

| Category of farmers | Area(ha) |
|---------------------|----------|
| Large farmers | 3558 |
| Small Farmers | 4981 |
| Marginal farmers | 3131 |
| Landless farmers | 2562 |

5. Agri-Horti –Fishery

| Category of farmers | Area(ha) |
|---------------------|----------|
| Large farmers | 320 |
| Small Farmers | 369 |
| Marginal farmers | 98 |
| Landless farmers | 33 |

6. Agri-Horti-Ani Hus- Seri-Fishery

| Category of farmers | Area(ha) |
|---------------------|----------|
| Large farmers | 13796 |
| Small Farmers | 24143 |
| Marginal farmers | 14946 |
| Landless farmers | 4599 |

7. Agri-Horti-Ani Hus- Seri

| Category of farmers | Area(ha) |
|---------------------|----------|
| Large farmers | 9055 |
| Small Farmers | 13259 |
| Marginal farmers | 7438 |
| Landless farmers | 2587 |

8. Agri-Ani Hus- Seri

| Category of farmers | Area(ha) |
|---------------------|----------|
| Large farmers | 1469 |
| Small Farmers | 2056 |
| Marginal farmers | 1077 |
| Landless farmers | 294 |

9. Populations and socio-economic characteristics under the FS: NA

| Farming system | Crop | Adoption pattern | | | | |
|----------------------------|-----------|---------------------------|-------------------------------|--|--|--|
| | | Partial adopted | Not adopted | | | |
| Agri-Horti-Ani Hus-Fishery | Paddy | Variety method of | Line transplanting, seed | | | |
| Agri-Horti-Ani Hus | | sowing, fertilizer | treatment, weed management | | | |
| | | management, Pest and | | | | |
| | | disease management | | | | |
| | | and water managment | | | | |
| | Rapeseed | Variety, fertilizer, pest | Water management | | | |
| | | and disease | | | | |
| | | management | | | | |
| | Garlic | Variety, | Fertilizer, and Pest and | | | |
| | | | disease management water | | | |
| | | | management | | | |
| | Livestock | Feed management, | Breed up gradation, health | | | |
| | | sanitation and hygiene | care management | | | |
| | Birds | | Breed up gradation, feed | | | |
| | &Poultry | | management, health care | | | |
| | | | management sanitation and | | | |
| | | | hygiene | | | |
| Agri-Ani Hus | Paddy | Fertilizer, pest and | Variety, seed treatment, weed | | | |
| | | disease management | management | | | |
| | Rapeseed | Variety, fertilizer, pest | Water management | | | |
| | | and disease | | | | |
| | | management | | | | |
| | Livestock | Breed up gradation, | Feed management | | | |
| | | health care | | | | |
| | | management sanitation | | | | |
| | | and hygiene | | | | |
| | Birds | Breed up gradation, | Health care management | | | |
| | &Poultry | feed management | sanitation and hygiene | | | |
| Agri-Horti | Rabi | Variety, fertilizer, pest | Seed treatment water | | | |
| | vegetable | and disease | management | | | |
| | | management, | | | | |
| Agri-Horti –Fishery | Paddy | Variety, fertilizer, pest | Seed treatment, weed | | | |
| | | and disease | management | | | |
| | | management | | | | |
| | Rapeseed | Variety, fertilizer, pest | Water management | | | |
| | | and disease | | | | |
| | | management | | | | |

10. Adoption pattern for each crop/breed/other technology under the FS

| Agri Horti Api Hus Cori | Daddy | Variaty fortilizar pact | Sood traatment, wood |
|-------------------------|-------------|---------------------------|-------------------------------|
| | Paudy | variety, fertilizer, pest | Seed treatment, weed |
| Fishery | | and disease | management |
| | | management | |
| | Pumpkin | Variety and weed | Seed treatment fertilizer |
| | | management | management, pest and |
| | | | disease management |
| | Ridge guard | Variety and weed | Seed treatment water |
| | | management | management fertilizer, pest |
| | | | and disease management |
| | Potato | Variety, fertilizer, pest | Seed treatment water |
| | | and disease | management |
| | | management, | |
| | Livestock | Breed up gradation, | Feed management |
| | | health care | |
| | | management sanitation | |
| | | and hygiene | |
| | Birds | Breed up gradation, | Health care management |
| | &Poultry | feed management | |
| Agri-Ani Hus- Seri | Paddy | Variety, fertilizer, pest | Seed rate and seed treatment, |
| | | and disease | weed management |
| | | management | |
| | Pulse | Varity, seed rate | Method of sowing, seed |
| | | | treatment water management |
| | | | fertilizer, pest and disease |
| | | | management |
| | Livestock | Breed up gradation, | Feed management |
| | | health care | |
| | | management sanitation | |
| | | and hygiene | |
| | Birds | Breed up gradation, | Health care management |
| | &Poultry | feed management | |

11. General production constraints for each crop under the FS

| Farming system | Pro | duction constraints |
|----------------------------|-----|--|
| Agri-Horti-Ani Hus-Fishery | 1. | Lack of knowledge and skill for pest and disease |
| Agri-Horti-Ani Hus | | management and water management |
| | | Line transplanting is perceived as time consuming, |
| | | Labour intensive. |
| | 3. | Non availability of herbicide in small pack. |
| | 4. | Non availability of seed. |

| A suit A stille s | 4 | New worklahe little of a second |
|--|--|--|
| Agri-Ani Hus | 1. | Non availability of seed |
| | 2. | Non availability of improved breed |
| | 3. | Lack of knowledge about water management and |
| | | pest and disease management |
| Agri-Horti | 1. | Lack of knowledge about water management and |
| | | pest and disease management. |
| | 2. | Non availability of seed and other inputs in time. |
| Agri-Horti –Fishery | 1. | Lack of knowledge about water management and |
| | | pest and disease management. |
| | 2. | Non availability of seed and other inputs in time |
| Agri-Horti-Ani Hus- Seri-Fishery | 1. | Lack of knowledge and skill for pest and disease |
| | | management and water management |
| | 2. | Line transplanting is perceived as time consuming, |
| | | Labour intensive. |
| | 3. | Non availability of herbicide in small pack. |
| | 4. | Non availability of seed and improved breed |
| | 5. | Lack of knowledge about feed management, health |
| | | care management of livestock and birds. |
| | | |
| | | |
| Agri-Horti-Ani Hus- Seri | 1. | Lack of knowledge and skill for pest and disease |
| Agri-Horti-Ani Hus- Seri | 1. | Lack of knowledge and skill for pest and disease management and water management |
| Agri-Horti-Ani Hus- Seri | 1. 2. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, |
| Agri-Horti-Ani Hus- Seri | 1. 2. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. |
| Agri-Horti-Ani Hus- Seri | 1. 2. 3. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. |
| Agri-Horti-Ani Hus- Seri | 1. 2. 3. 4. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed |
| Agri-Horti-Ani Hus- Seri | 1. 2. 3. 4. 5. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health |
| Agri-Horti-Ani Hus- Seri | 1. 2. 3. 4. 5. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease management and water management |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. 1. 2. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. 1. 2. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. 1. 2. 3. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. 1. 2. 3. 4. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. 1. 2. 3. 4. 5. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health |
| Agri-Horti-Ani Hus- Seri Agri-Ani Hus- Seri | 1. 2. 3. 4. 5. 1. 2. 3. 4. 5. | Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. Lack of knowledge and skill for pest and disease management and water management Line transplanting is perceived as time consuming, Labour intensive. Non availability of herbicide in small pack. Non availability of seed and improved breed Lack of knowledge about feed management, health care management of livestock and birds. |

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5. Farming Systems of Kamrup

1. Summary of farming Systems

0 0 0

| | | | | | | Location |
|-------------|------------|-----------|----------|---------------------|--------------|-----------------|
| Farming | Coile | Deinfell | Altitudo | Principal | Important | (area), |
| system | Solis | Kalfilali | Altitude | crops/breeds | features | extent of |
| | | | | | | area in ha. |
| Agri-Horti | Clay | 1478 | 45 - 800 | Field crops: Rice, | Flood is the | Entire district |
| | loam, | | mts from | Rapeseed. Hort | regular | |
| | Alluvial, | | MSL | crops: Banana, | phonomena | |
| | Sandy | | | Arecanut, Coconut, | except | |
| | loam, | | | Vegetables, Betel | Goreswar | |
| | Red soil | | | vine etc. | and Boko | |
| | | | | | development | |
| | | | | | blocks | |
| Agri-Horti- | -Do- | 1478 | Do | Field crops: Rice, | Do | Entire district |
| AH | | | | Rapeseed. Hort | | |
| | | | | crops: Banana, | | |
| | | | | Arecanut, Coconut, | | |
| | | | | Vegetables, Betel | | |
| | | | | vine etc, local and | | |
| | | | | cross breed cows, | | |
| | | | | local goats & pigs | | |
| Agri-Horti- | Alluvial | 1478 | Do | Field crops: Rice, | Do | Entire district |
| AH-Fishery | soil, clay | | | Rapeseed. Hort | | |
| | loam | | | crops: Banana, | | |
| | | | | Arecanut, Coconut, | | |
| | | | | Vegetables, Betel | | |
| | | | | vine etc, local and | | |
| | | | | cross breed cows, | | |
| | | | | local goats & pigs, | | |
| | | | | common carp, silver | | |
| | | | | carp, mirika, | | |
| | | | | bhokua, etc | | |
| Horti-AH- | -Do- | 1478 | Do | Horti crops: | Do | Entire district |
| Fishery | | | | Banana, Coconut, | | excluding |
| | | | | Arecanut, Betel | | Rani |
| | | | | vine, Vegetables, | | development |
| | | | | Papaya, etc. AH: | | block |
| | | | | Local + Cross bred | | |
| | | | | cows, Local goat, | | |

| | | | | Pigs, Poultry, Duck + | | |
|-------------|---------------|------|----|-----------------------|----|-------------|
| | | | | Fishes | | |
| Horti- | Sandy loam, | 1478 | Do | Horti crops: Banana, | Do | Sualkuchi, |
| Sericulture | Red soil, | | | Coconut, Arecanut, | | Dimoria, |
| | Alluvial soil | | | Betel vine, | | Boko and |
| | | | | Vegetables, Papaya, | | Chayani |
| | | | | etc. + Eri, Muga and | | Barduar |
| | | | | mulberry | | developme |
| | | | | | | ntal blocks |

2. Characteristics of farming systems:

| Characteristics | FS1 | FS2 | FS3 | FS4 | FS5 |
|-----------------|-------------------|---------------|-------------------|-----------------|---------------|
| Boundaries | All | All | All | All | Sualkuchi, |
| | developmental | development | developmental | developmental | Dimoria, |
| | blocks of the | al blocks of | blocks of the | blocks except | Boko and |
| | district | the district | district | Rani dev. block | Chayani |
| | | | | | Barduar |
| | | | | | dev. Block |
| Soils | Clay loam, | Clay loam, | Clay loam and | Clay loam and | Sandy |
| | alluvial, sandy | alluvial, | alluvial, | alluvial, | loam, |
| | loam and red | sandy loam | | | alluvial and |
| | soil | and red soil | | | red soils |
| Climate | Subtropical | Subtropical | Subtropical | Subtropical | Subtropical |
| | humid, climate | humid, | humid, climate | humid, climate | humid, |
| | divided into four | climate | divided into four | divided into | climate |
| | distinct seasons | divided into | distinct seasons | four distinct | divided into |
| | namely pre | four distinct | namely pre | seasons namely | four distinct |
| | monsoon, | seasons | monsoon, | pre monsoon, | seasons |
| | monsoon, post | namely pre | monsoon, post | monsoon, post | namely pre |
| | monsoon and | monsoon, | monsoon and | monsoon and | monsoon, |
| | winter, max and | monsoon, | winter, max and | winter, max | monsoon, |
| | min | post | min | and min | post |
| | temperature | monsoon and | temperature | temperature | monsoon |
| | ranges 31.33°c | winter, max | ranges 31.33°c | ranges 31.33°c | and winter, |
| | to 33.00°c and | and min | to 33.00°c and | to 33.00°c and | max and |
| | 8.00°c to | temperature | 8.00°c to | 8.00°c to | min |
| | 13.50°c | ranges | 13.50°c | 13.50°c | temperatur |
| | respectively. RH | 31.33°c to | respectively. RH | respectively. | e ranges |
| | ranges from 70 | 33.00°c and | ranges from 70 | RH ranges from | 31.33°c to |
| | to 80% | 8.00°c to | to 80% | 70 to 80% | 33.00°c |
| | | 13.50°c | | | and 8.00°c |

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| | | respectively. | | | to 13.50°c |
|--------------|------------------|---------------|------------------|------------------|---------------------|
| | | RH ranges | | | respectively |
| | | from 70 to | | | RH ranges |
| | | 80% | | | from 70 to |
| | | | | | 80% |
| Physiography | Topography | Topography | Topography | Topography | Topography |
| rnysiography | composed of | composed of | composed of | composed of | composed |
| | plains and hills | plains and | plains and hills | plains and hills | of plains |
| | | | | | or plains |
| | channels and | ctroome | channels and | channels and | rivoro |
| | | streams, | | | nvers, |
| | marsny lands | channels and | marsny lands | marsny lands | streams, |
| | | marsny lands | | | channels |
| | | | | | and marshy |
| | | | | | lands |
| Irrigation | STW and Canal | STW and | STW and Canal | STW and Canal | STW and |
| facilities | irrigation | Canal | irrigation | irrigation | Canal |
| | | irrigation | | | irrigation |
| Major crops | Field Crops: | Field Crops: | Field Crops: | Field Crops: | Horti |
| and cropping | Rice, Rapeseed. | Rice, | Rice, Rapeseed. | Rice, Rapeseed. | Crops: |
| intensity | Horti Crops: | Rapeseed. | Horti Crops: | Horti Crops: | Fruits, |
| | Fruits, | Horti Crops: | Fruits, | Fruits, | Vegetables, |
| | Vegetables, | Fruits, | Vegetables, | Vegetables, | Flowers, |
| | Flowers, Spices, | Vegetables, | Flowers, Spices, | Flowers, Spices, | Spices, |
| | Tuber crops, Nut | Flowers, | Tuber crops, | Tuber crops, | Tuber |
| | crops | Spices, Tuber | Nut crops | Nut crops | crops, Nut |
| | | crops, Nut | | | crops. Seri: |
| | | crops | | | Som |
| | | | | | Castor, |
| | | | | | Mulberry |
| Major | Summer rice- | Summer | Summer rice- | Summer rice- | Perennial |
| cropping | Winter rice | rice-Winter | Winter rice | Winter rice | fruits |
| system | Autumn rice - | rice | Autumn rice - | Autumn rice - | <i>kharif</i> veg – |
| | Rapeseed/ | Autumn rice | Rapeseed/ | Rapeseed/ | r <i>abi</i> veg |
| | Pulses | - Rapeseed/ | Pulses | Pulses | Monocultur |
| | Autumn rice - | Pulses | Autumn rice - | Autumn rice - | e plants for |
| | Rabi Vegetables | Autumn rice | Rabi Vegetables | Rabi Vegetables | sericulture |
| | / Pulses/ | - Rabi | / Pulses/ | / Pulses/ | |
| | Rapeseed | Vegetables / | Rapeseed | Rapeseed | |
| | Summer | Pulses/ | Summer | Summer | |
| | vegetables - | Rapeseed | vegetables - | vegetables - | |
| | Rabi vegetebles | Summer | Rabi vegetebles | Rabi vegetebles | |

| | | / Dapagood / | (Danacaad / | |
|----------------------------|-------------------|------------------|------------------|--------------|
| | Paki | | | |
| Puises | KaDi | Puises | Puises | |
| | vegetebles / | | | |
| | Rapeseed / | | | |
| | Pulses | | | |
| Land used Cultivated | land, Cultivated | Cultivated land, | Cultivated land, | Cultivated |
| pattern culturable | land, | culturable | culturable | land, |
| waste, fallo | ow culturable | waste, fallow | waste, fallow | culturable |
| land, forest | t waste, fallow | land, forest | land, forest | waste, |
| land, pastu | re, land, forest | land, pasture, | land, pasture, | fallow land, |
| land put to | non land, | land put to non | land put to non | forest land, |
| agril use, | pasture, land | agril use, | agril use, | pasture, |
| miscellaneo | ous put to non | miscellaneous | miscellaneous | land put to |
| plantation, | agril use, | plantation, | plantation, | non agril |
| barren land | d miscellaneou | barren land | barren land | use, |
| | s plantation, | | | miscellaneo |
| | barren land | | | us |
| | | | | plantation, |
| | | | | barren land |
| Land holding Average la | nd Average land | Average land | Average land | Average |
| pattern holding 1.2 | 5 ha holding 1.25 | holding 1.25 ha | holding 1.25 ha | land |
| | ha | | | holding |
| | | | | 1.25 ha |
| Population Population: | Population: | Population: | Population: | Population: |
| and soicio- 16,14,107 | (all 16,14,107 | 16,14,107 (all | 15,35,961 | 3,45,343 |
| economic blocks) | (all blocks) | blocks) | (except Rani) | (Sualkuchi, |
| characteristics Socio-econ | omic: Socio- | Socio-economic: | Socio- | Boko, |
| composed | of economic: | composed of | economic: | Dimoria |
| low, mediu | m composed of | low, medium | Socio- | and |
| and high in | come low, medium | and high income | economic: | Chayani |
| groups | and high | groups | composed of | Barduar |
| | income | | low, medium | dev. Block) |
| | groups | | and high | Socio- |
| | | | income groups | economic |
| | | | groups | Socio- |
| | | | | economic: |
| | | | | composed |
| | | | | of low, |
| | | | | medium |
| | | | | |
| | | | | and high |

| | | | | | groups |
|-----------------|--------------------|-----------------|--------------------|--------------------|--------------|
| Adoption | Partial adoption | Partial | Partial adoption | Partial adoption | Partial |
| pattern for | of improved and | adoption of | of improved and | of improved | adoption of |
| each crops/ | recommended | improved | recommended | and | improved |
| Breeds/ Other | technologies for | and | technologies for | recommended | and |
| technology | all enterprises | recommende | all enterprises | technologies for | recommend |
| | | d | | all enterprises | ed |
| | | technologies | | | technologie |
| | | for all | | | s for all |
| | | enterprises | | | enterprises |
| General | Non availability | Non | Non availability | Non availability | Non |
| production | of inputs like | availability of | of inputs like | of inputs like | availability |
| constraints for | seeds, saplings, | inputs like | seeds, saplings, | seeds, saplings, | of inputs |
| each crops | seedlings, | seeds, | seedlings, | seedlings, | like seeds, |
| | fertilizers and | saplings, | fertilizers and | fertilizers and | saplings, |
| | agrochemicals, | seedlings, | agrochemicals, | agrochemicals, | seedlings, |
| | lack of | fertilizers | lack of | lack of | fertilizers |
| | irrigation, credit | and | irrigation, credit | irrigation, credit | and |
| | and marketing | agrochemical | and marketing | and marketing | agrochemic |
| | facilities | s, lack of | facilities | facilities | als, lack of |
| | | irrigation, | | | irrigation, |
| | | credit and | | | credit and |
| | | marketing | | | marketing |
| | | facilities | | | facilities |

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6. Farming Systems of Karimganj

The following farming systems were found in Karimganj district:

- 1. Agriculture + Horticulture + Fishery
- 2. Agriculture + Horticulture + Animal Husbandry
- 3. Agriculture + Fishery
- 4. Agriculture + Horticulture
- 5. Agriculture

Each farming system was homogeneous, in general for the following.

1. Soils

-

- 2. Rainfall
- 3. Physiography
- 4. Altitude
- 5. Irrigation pattern
- 6. Temperature

1. Summary of farming Systems :

| Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | Location (area), extent of area in ha. |
|-------------------|---------------|----------|----------|---------------------------|-----------------------|--|
| Agril+Hort.+ | Mainly old | 3200 | 16m AMSL | Rice | Uplands, | N. Karimganj |
| Fishery | mountain | mm | | | medium and | (N,E), S. |
| | alluvium, | | | | low lands, | Karimganj, |
| | sandy/ fine | | | | rice as | Badarpur (N,E), |
| | loamy, aqic | | | | monocrop or | Patharkandi |
| | udifluvents, | | | | double crop, | (N,C), R.K. Nagar |
| | fine clayey | | | | rice in | (W,C) |
| | typic | | | | sequence | |
| | Dystrochrepts | | | | with | (45683 ha) |
| | | | | | vegetables/ | |
| | | | | | potato/ | |
| | | | | | mustard/ | |
| | | | | | pulses in | |
| | | | | | upland and | |
| | | | | | medium | |
| | | | | | lands, <i>sali</i> | |
| | | | | | rice as | |
| | | | | | monocrop or | |
| | | | | | in sequence | |
| | | | | | with <i>ahu</i> in | |
| | | | | | low lands | |

| Agril.+ Hort. | Old riverine | 3350 | 16m AMSL | Rice | Medium to | N. Karimganj (E), |
|---------------|----------------|------|----------|--------------|---------------------|-------------------|
| + Animal | alluvium and | mm | | | low lands, | S. Karimganj |
| Husbandry | old mountain | | | | inundated | (E,W,C), |
| | alluvium, | | | | during | Badarpur (S,C), |
| | sandy/ fine | | | | monsoon, | Patharkandi (N), |
| | loamy, aqic | | | | ahu rice | R.K. Nagar (N,C) |
| | udifluvents, | | | | followed by | |
| | fine clayey | | | | late <i>Sali /</i> | (12654 ha) |
| | typic | | | | vegetables/ | |
| | Haploquepts | | | | potato/ oil | |
| | | | | | seeds, late | |
| | | | | | <i>sali</i> and | |
| | | | | | vegetables as | |
| | | | | | monocrops. | |
| Agril. + | Peat soil,/ | 3500 | 16m AMSL | Rice (Boro) | Perennially | N. Karimganj (N), |
| Fishery | organic soil, | mm | | | water logged | S. Karimganj |
| | fine loamy | | | | situation, | (N,E), Badarpur |
| | aeric | | | | water level | (E,S,W), R.K. |
| | Fluvaquents | | | | recedes | Nagar (N) |
| | | | | | during winter, | |
| | | | | | <i>boro</i> rice as | (3296 ha) |
| | | | | | monocrop, | |
| | | | | | natural | |
| | | | | | fisheries. | |
| Agril.+ Hort. | Mostly non- | 3332 | 16m AMSL | Теа, | High lands, | N. Karimganj |
| | laterized red | mm | | Sugarcane, | hillocks, | (E,W,C), S. |
| | soils, old | | | Pineapple, | detraital | Karimganj (E), |
| | mountain | | | Fruit trees, | valleys, tillas | Badarpur (E,S), |
| | alluvium, fine | | | vegetables | with narrow | Patherkandi (C), |
| | silty/ fine | | | | valleys, | R.K. Nagar (E,C) |
| | loamy typic | | | | piedmonts | |
| | Dystrochrepts, | | | | and | (64929 ha) |
| | sandy skeletal | | | | denundational | |
| | typic | | | | hills of both | |
| | udorthents | | | | Dupitila and | |
| | | | | | Tipam | |
| | | | | | groups, | |
| | | | | | Surama | |
| | | | | | group also | |
| | | | | | present. | |

| | | | | | 1 | |
|--------|------------------|------|----------|--------------|-----------------|-------------------|
| Agril. | Mostly, non- | 3332 | 16m AMSL | Reserved | Lower | N. Karimganj (S), |
| | laterized red | mm | | forest (Sal, | foothills/ | S. Karimganj, |
| | soils, laterized | | | Teak), Rain | hillocks to | Badarpur, |
| | red soil in N- | | | Forest | high hills, | Patherkandi (E,W, |
| | W side | | | (Bamboo, | mostly Surma | N-W), Lowairpoa, |
| | bordering | | | natural | group of | R.K. Nagar (W), |
| | Meghalaya, | | | vegetation) | soils, Dupitila | Durllavcherra |
| | sandy/ | | | | and Tipam | |
| | loanmy | | | | groups, | |
| | skeletal typic | | | | Reserved | (54338 ha) |
| | udorthents, | | | | forest and | |
| | coarse loamy | | | | mixed rain | |
| | typic | | | | forest, | |
| | Dystrochrepts, | | | | jhuming in | |
| | fine silty/ fine | | | | Southern | |
| | loamy typic | | | | Hills, mixed | |
| | Dystrochrepts | | | | cropping in | |
| | | | | | forest | |
| | | | | | villages. | |

* N = North, S = South, E = East, W = West, C = Central, N-W = Northwest

2. Agricultural characteristics of each farming System

1. Boundaries of the FS :

| E: R. K. Nagar | W: Patharkandi | N: Bada | arpur |
|------------------------------|----------------------|---------|------------|
| S: Lowairpoa & Durllavcherra | NE: Badarpur & Mahak | al | SE: Olivia |
| SW: Churiabari & Tilbhum | NW: Akbarpur | | |

2. Soils under the FS :

- Agriculture + Horticulture + Fishery: Mainly old mountain alluvium, sandy/ fine loamy, aqic udifluvents, fine clayey typic Dystrochrepts
- Agriculture + Horticulture + Animal Husbandry: Old riverine alluvium and old mountain alluvium, sandy/ fine loamy, agic udifluvents, fine clayey typic Haploquepts
- 3. Agriculture + Fishery: Peat soil / organic soil, fine loamy aeric Fluvaquents
- Agriculture + Horticulture: Mostly non-laterized red soils, old mountain alluvium, fine silty/ fine loamy typic Dystrochrepts, sandy skeletal typic udorthents
- Agriculture : Mostly non-laterized red soils, laterized red soil in N-W side bordering Meghalaya, sandy/ loanmy skeletal typic udorthents, coarse loamy typic Dystrochrepts, fine silty/ fine loamy typic Dystrochrepts.

3. Climates under the FS :

- 1. Agriculture + Horticulture + Fishery: The farming situation experiences warm and humid to sub-humid climate with high intensity range during monsoon. The annual rainfall is 3200 mm with variation from South to North ranging from 3000-4000 mm. The rainfall distribution pattern, however, is such that major precipitation received during monsoon flows out as surface flow through the river system. The summer is warm and humid while the winter is moderately cool and relatively dry. The monsoon and post-monsoon periods have erratic rainfall featuring late onset or early withdrawal resulting into periodic moisture stress situation. The mean minimum temperature in the situation ranges from 10°C in January to 20°C in August while the mean maximum temperature varies from 21°C in January to 33°C in August.
- 2. Agriculture + Horticulture + Animal Husbandry: The climate of this situation is by and large, similar to that of the previous situation. This situation experiences warm and humid summer and moderately cool and relatively dry winter on and average this situation receives an annual rainfall of 3200 – 3500 mm. The major precipitation is from June to September. Flood or water stagnation is the chief characteristics of this situation. The intensity and distribution of rains determine the time and severity of flood or water stagnation.
- 3. Agriculture + Fishery: Mostly warm-humid climate is prevalent throughout this situation during summer but the winter experiences relatively cool weather. The mean annual rainfall is about 3200 mm but it may vary from 3000-4000 mm. The situation receives precipitation mostly from May to September. As the situation is mostly surrounded by flood prone and flood free plains the overall climate including temperature, relative humidity is virtually same as in the case with the previous two situations.
- Agriculture + Horticulture: The climate of this situation is virtually same as the farming system 1 & 2. This situation also experiences warm and humid summer, moderately cool and dry winter.
- 5. Agriculture: The overall climatic condition is slightly different from the other situations. The situation experiences warm humid summer and dry winter, but the temperature goes down considerably in winter in comparison to other situations. There is also some differences in respect of average annual rainfall received by different parts of the situation. The hills and forests areas in Northwestern part and Northeastern part of the zone have rainfall above 4000 mm and 3000-4000 mm, respectively, whereas Southern part of the situation receives relatively lower rainfall of less than 3000 mm. Relative humidity, fog and mist are also more in the hilly areas.

4. Physiography under the FS :

- 1. Agriculture + Horticulture + Fishery : Surrounded by piedmonts and lower hills having red soils, the alluvial flood free plains is characterized by gentle slopes, leading to the existence of all the three types of land situations *viz.*, upland, medium land and lowland. The upland and medium lands within this situation are mainly utilized for homestead and cultivation. The water table in such areas is below 1m depth and water rarely stands more than 48h after the cessation of a downpour or irrigation. Lowlands, on the other hand, have water table within 1 m and may remain submersed to a height of 50 cm during peak monsoon. The situation has a network of rivers flowing into Barak and Kushiyara.
- 2. Agriculture + Horticulture + Animal Husbandry : It is characterized by gentle slopes in river banks. The medium and low lands are regularly inundated during rainy season and drainage is a problem in low lands. Floods may also extend to the previous farming system, depending on rainfall intensity and water discharge of the rivers. The flood plains, of course do not retain stagnant water round the year, while it is so in low lying areas locally called *Beels* and *Hoars*, which though separately categorized, lie in the inundated areas. Normally the flood prone areas have the lowest elevation from mean sea level among all the farming situations. The depth of water table in this situation is near the ground level.
- 3. Agriculture + Fishery: it is located mostly in lowermost elevation in flood free and flood prone alluvial plains, which in term has an intricate network of a number of perennial rivers. This farming system represents low lying depression (*Beels* and *Hoars*) where water remains almost throughout the year. Though in winter the water level may recede considerably in the *Beels* and *Hoars*, they rarely dry up totally.
- 4. Agriculture + Horticulture: The situation characteristically comprises of undulating plains with patches of piedmonts, low hills and tillah lands. In this situations narrow valleys denudational hills including detrital valleys are also interspersed. Besides, a large number of drains, streams, rivulets and tributaries of the river Barak also pass through this situation.
- 5. Agriculture: This situation includes high hills, low hills, and dissected foot hills, thin strips of detrital valleys and patches of undulating plains. The physiography is therefore extremely unevent in this situation. A very small portion of the forest in the lower altitude may also receive flood water. The hills have strips slopes and subjected to heavy soil erosion due to shifting cultivation, deforestation, coupled with heavy rain fall.

5. Irrigation facilities under the FS:

- 1. Agriculture + Horticulture + Fishery: The major source of irrigation is the river system (LIS). The utilization of the irrigation potential created through LIS (Lift Irrigation Scheme) and DTWS (Deep Tube Well System) is virtually negligible due to irregularities in power supply, drying up of sources, management lapses, etc. Through the situation has the greatest potential of ground water resources the water table being within 2m, the potential has not yet been exploited sufficiently. The situation however, does not have any modern drainage system, which is a serious problem in low lands. The river system is not sufficient to drain out stagnant water of the low lands during *Kharif* season. Total irrigated area is 2229 ha.
- 2. Agriculture + Horticulture + Animal Husbandry: Irrigation is a priority item in alluvial flood prone situation for successful cultivation of pre-flood and post-flood crops. Since the flood prone areas are mainly located in the banks of rivers and tributaries, there is a possibility of creating command areas through LIS. The water table in this situation is also near to the ground level (0-2m) indicating scope for minor irrigation projects such as STWS. Total irrigated area is 1336 ha.
- 3. Agriculture + Fishery: The situation does not need irrigation for *Kharif* season crops due to water stagnation by monsoon precipitation. Irrigation is, however, important for *boro* rice and *rabi* crops in the upper and sometimes middle reaches of the *beels* and *haors* due to recession of stagnant water to the bottom level during winter.
- 4. Agriculture + Horticulture: The plantation crops in *tillah* land areas are grown virtually under rainfed condition. With the existing irrigation scheme a portion of the upland flat areas of the situation is irrigated for raising field crops. Total irrigated area is 610 ha.
- 5. Agriculture: The source of irrigation water is the river system flowing through hilly terrain. No major irrigation scheme is operating in the situation. The situation is mainly rainfed.

6. Major crops and cropping intensity under the FS:

- Agriculture + Horticulture + Fishery: Major crops are- sali rice (winter rice), ahu rice (autumn rice), asra (shallow water winter rice), sugarcane, vegetables, French bean (as pulse crops), toria & betelvine (boros type). Cropping intensity is 170%.
- Agriculture + Horticulture + Animal Husbandry : Major crops are *ahu rice*, *sali rice*, asra, *boro* rice, pre-flood summer vegetables, post-flood *rabi* vegetables, potato, pulses (black gram, French bean etc.), rapeseed. The important vegetable crops are cole crops, brinjal, French bean (both as vegetable and pulse crop), amaranthus and ladies finger. Cropping intensity is 150%.

- Agriculture + Fishery: Major crops are *boro* rice and winter vegetables, asra in certain areas and toria as relay crop to a limited extent. Cropping intensity is 140%.
- 4. Agriculture + Horticulture: Major crops are plantation crops (Coconut, Arecanut and Tea), fruits, vegetables (both summer & winter), sugarcane, pineapple, banana, jackfruit, papaya, litchi, pulses, oilseed (toria), potato and spices. Rice is grown to a limited extent in flat valley lands. Cropping intensity is 130%.
- Agriculture: Major crops are fruit trees (jackfruit, myrobalans, jam, kul, orange, lemon, etc.), spices (turmeric, ginger and bay leaf), vegetables (gourds, sweet potato, and country bean), tea rubber, sugarcane, pineapple, betelvine, arecanut. Cropping intensity is 110%.

7. Major cropping systems under the FS:

a. Agriculture + Horticulture + Fishery

| System | Upland & Medium land | lowland |
|-----------------|---|------------------------------|
| Mono cropping | <i>Sali</i> rice | <i>Sali</i> rice |
| | Sugarcane | Asra rice |
| | Arhar | Colocasia (lowland type) |
| | Colocassia (upland type) | |
| | Betelvine (Boros type) | |
| Double cropping | Ahu rice – Sali rice | Ahu rice – Sali rice |
| | Ahu rice-winter vegetables/ brinjal | Sali rice/ asra rice-linseed |
| | Ahu rice-rape & mustard | Sali rice-niger |
| | Ahu rice-pulses | |
| | Ahu rice-potato | |
| | Summer vegetables- winter vegetables/ | |
| | brinjal | |
| | Sali seedbed-winter vegetables/ brinjal | |
| Triple cropping | Ahu seedbed-Sali seedbed-winter | |
| | vegetables | |
| | Early ahu-Sali rice-winter vegetables | |
| | Ahu rice-potato-amaranthus | |
| | Ahu rice-french bean-amaranthus | |
| Inter cropping/ | Arecanut-banana | Sali rice/asra rice- linseed |
| mixed cropping | Potato-french bean | |
| | Potato-vegetables | |
| | Arecanut-pineapple | |

Agriculture + Horticulture + Animal Husbandry

| Mono cropping | Ahu rice |
|---------------|------------------|
| | <i>Sali</i> rice |

b.

| | Asra rice |
|-----------------------|---------------------------------------|
| | Boro rice |
| | Rape & mustard |
| | Pulses |
| | Potato |
| | Winter vegetables |
| Double cropping | Early ahu-late sali rice |
| | Ahu rice – late sali rice |
| | Ahu rice – sali rice |
| | Ahu rice – potato |
| | Ahu rice – pulses |
| | Ahu rice – rape & mustard |
| | Ahu rice – winter vegetables |
| | Winter vegetables – summer vegetables |
| Triple cropping | Ahu rice – potato – amaranthus |
| | Ahu rice – French bean – amaranthus |
| Inter cropping/ mixed | Potato – vegetables |
| cropping | Potato – french bean |

c. Agriculture + Fishery

| Mono cropping | Boro rice |
|-----------------------|--------------------------------------|
| | Winter |
| Inter cropping/ mixed | Winter vegetables (in upper reaches) |
| cropping | Asra – toria (as relay crop) |

d. Agriculture + Horticulture

| Mono cropping | Теа |
|-----------------------|--|
| | Sugarcane |
| | Rubber |
| | Arecanut |
| | Coconut |
| | Pineapple |
| | Orange |
| | Betelvine |
| Double cropping | Summer vegetables – winter vegetables/ potato/pulses/toria |
| | Rice – <i>rabi</i> crops |
| Inter cropping/ mixed | Fruit trees (mixed) |
| cropping | Arecanut – pineapple |
| | Vegetables - spices |

| e. Agricult | e. Agriculture | | |
|-----------------------|--|--|--|
| Mono cropping | Теа | | |
| Rubber | | | |
| | Sugarcane | | |
| | Pineapple | | |
| Inter cropping/ mixed | Fruit trees (mixed) | | |
| cropping | Arecanut – pineapple – betelvine - Vegetables – spices | | |

8. Land use pattern under the FS:

| Land use pattern | Farming Systems | | | | | |
|---------------------|-----------------|--------------|---------|---------|-------|--------|
| (in ha) | Agri. + Hort. | Agri.+ Hort. | Agri.+ | Agri. + | Agri. | Total |
| | + Fishery | + Animal | Fishery | Hort. | | |
| | | Husbandry | | | | |
| Double cropped | 6240 | 1506 | 75 | 3867 | 108 | 11796 |
| area | | | | | | |
| Kharif crop area | 11061 | 3308 | 150 | 12477 | 534 | 27530 |
| Rabi crop area | 1883 | 287 | 1146 | 2419 | 276 | 6011 |
| Net sown area | 19184 | 5101 | 1400 | 18763 | 918 | 45366 |
| Plantation & Misc. | 464 | 151 | 0 | 8884 | 231 | 9730 |
| tree | | | | | | |
| Waste & Fallow land | 1455 | 322 | 385 | 14327 | 6204 | 22693 |
| Forest | 544 | 12 | 0 | 1907 | 45293 | 47756 |
| Non Agril. Uses | 4852 | 1967 | 140 | 2285 | 774 | 10018 |
| Total | 45683 | 12654 | 3296 | 64929 | 54338 | 180900 |

9. Land holding pattern under the FS:

| 1. | Agriculture + Horticulture + Fishery: | |
|----|---------------------------------------|-----------------|
| | Big farmers | = about 5 % |
| | Small & Medium farmers | = 10 % |
| | Marginal farmers | = 80 % |
| | Landless farmers | = 5% |
| 2. | Agriculture + Horticulture + Ar | nimal Husbandry |
| | Big farmers | = 4 % |
| | Small & Medium farmers | = 15 % |
| | Marginal farmers | = 76 % |
| | Landless farmers | = 5 % |
| 3. | Agriculture + Fishery | |
| | Big farmers | = 2 % |
| | Small & Medium farmers | = 18 % |
| | Marginal farmers | = 73 % |
| | Landless farmers | = 7 % |

| 4. | Agriculture + Horticulture | |
|----|----------------------------|--------|
| | Big farmers | = 3 % |
| | Small & Medium farmers | = 20 % |
| | Marginal farmers | = 71 % |
| | Landless farmers | = 6 % |
| 5. | Agriculture | |
| | Big farmers | = nil |
| | Small & Medium farmers | = 15 % |
| | Marginal farmers | = 75 % |
| | Landless farmers | = 10 % |

10. Populations and socio-economic characteristics under the FS:

- Agriculture + Horticulture + Fishery: The situation has the highest farm families of which about 80-85 % belong to small and marginal farmers. Not more than 5 % farmers have big holdings of more than 3 ha; about 3-5 % of the farm families are landless. Cultivators constitute the largest share (85.90%) of the occupational class.
- 2. Agriculture + Horticulture + Animal Husbandry: The pattern of socio-economic characteristics for the situation is by and large similar to that of previous situation. The rice farmers in this situation are, however, poor due to recurrent damage of the crop by the flood. The economic status of the vegetable growers, particularly those utilizing river banks for cultivation, is far better compared to rice farmers.
- 3. Agriculture + Fishery: Fish farming plays a vital role in the socio-economic life of the farmer of this system, because they cannot depend solely on Agriculture. The agricultural farmers particularly rice growers of various parts of this situation are generally poor as the harvest of the rice crop is not always assured. The most important feature of this situation is that the farmers cultivating crops in this situation have their homesteads away from it, as the situation is uninhabitable.
- 4. Agriculture + Horticulture: This situation is sparsely populated compared to above situations. The major area of this situation is under tea estates. The employees and workers of tea gardens constitute a large share of the population. The rest of the population in this situation comprises agricultural workers, labourers, service holders and businessmen.
- 5. Agriculture: The situation is vary sparsely populated and is inhabited mostly by tribal peoples belonging to different communities. On the whole, the tribal people in this situation are very poor. They depend basically on Agriculture (shifting cultivation) and forest produce. A large number of inhabitants are also engaged in labour intensive works under forestry department, stone mahals, sand mahals and bamboo mahals. Gradually the population in forest areas is increasing due to development of forest villages.

11. Adoption pattern for each crop/breed/other technology under the FS:

1. Agriculture + Horticulture + Fishery: The general adoption rate regarding use of HYV in *ahu* rice season is much higher (80 %) than those in *sali* rice season (less than 40 %) and wherever HYV is grown line transplanting is usually followed. Predominance of photoperiod sensitive tall traditional rice varieties in *sali* season is due to their better adoptability to occasional water stagnation, low fertilizer requirement, flexibility in time of transplanting and seedling age and congenial time of harvest in dryer months. The adoption rate of short duration HYV in normal *sali* season is very less. Long duration modern rice varieties are becoming progressively popular in single cropped *sali* area in particular. Weeding is practiced in *ahu* rice only.

The adoption rate in respect of recommended rice varieties, fertilizer application and other recommended practices for rice are, much higher than in the other situations. The use of fertilizer in vegetables is very high.

Varietal adoption for sugarcane is about 100 %. The adoption rate in respect of methods of planting, cultural and manurial practices including need based plant protection measures are also quite high. Adoption rate is, however, rather negligible for pulse crops as well as fruit crops. The plant protection measures for various crops are adopted by the farmers to a large extent.

- 2. Agriculture + Horticulture + Animal Husbandry: Adoption of recommended technology in this situation is very low for rice in general and *Sali* rice in particular. In *Ahu* season, the trend in adoption pattern is almost similar to that of the previous farming system. Preference of short duration high yielding varieties of rice in this situation and use of fertilizer is however restricted. Farmers preferred to grow photo-period sensitive tall traditional *Sali* rice varieties. As post flood *Sali* crop, the farmers have already adopted the recommended practice of growing Manohar sali as late transplanted crop with aged seedlings and closer spacing. The use of extremely short duration modern rice varieties as direct seeded post-flood crop is also gradually becoming popular among the farmers. In *Rabi* season, being free from flood, various vegetables are grown particularly in riverine tracts. Technology adoption in respect of fertilizer use and plant protection is very high for vegetables. Pulses, oil seeds and potato are also grown in this situation.
- 3. Agriculture + Fishery: Owing to water stagnation, there is very limited option for crops in this situation. Boro rice is grown after recession of water in winter. Traditional tall *Boro* rice varieties and short duration high yielding semi-dwarf modern varieties are grown by the farmers. Adoption of semi-dwarf varieties is generally for the upper reaches of the beel areas, whereas traditional types are grown in lower reaches. Rate of adoption of fertilizer and plant protection practices are confined to semi-dwarf modern varieties. In *kharif* season, only traditional tall photo-period sensitive asra (shallow-deep water winter rice) varieties are adopted in limited areas of the situation, virtually as a chance crop. Winter vegetables are adopted for growing in upper reaches

with the help of irrigation and recommended fertilizer and plant protection measures are widely adopted for vegetable crops.

- 4. Agriculture + Horticulture: The farmers of this situation being of diverse types varying from tea planters to marginal farmers, the rate of adoption of recommended technology widely varies. Tea estates occupy substantial area under the situation and the rate of adoption in this industrial crop is almost 100 per cent in respect of available technology. Input costs, labour and technology don't constitute any major constraint for this crop. The adoption of available technology for various fruit crop and arecanut is very low, particularly in respect of fertilizer application and plant protection measures. On the contrary, the rate of technology adoption is very high for vegetables. Recommended high yielding varieties of sugarcane are adopted for tillah land cultivation, but other recommended practices are adapted to a limited extend only.
- 5. Agriculture: The technology adoption is maximum for plantation crops like tea and rubber. The forest settlers from plain areas growing rice, pulses, oil seeds and vegetables in undulating plains and low valley lands within the situation and adopted the technologies to some extent.

12. General production constraints for each crop under the FS:

- 1. Agriculture + Horticulture + Fishery: The adoption rate of short duration HYV in normal sali season is very less because of the time of harvest coinciding with the rainy months is not congenial for large scale post harvest operations and there is no yield advantage over long duration traditional or modern varieties. The idea of growing short duration rice varieties in normal sali season for early harvest to accommodate timely rabi crop in rice tract is not always feasible due to late cessation of monsoon and clay nature of the soil. Occasional water stagnation occurs in the system. Weed infestation in ahu rice season is severe. Low fertilizer adoption in sali is due to low and erratic responses under uncontrolled field moisture situation. Excess use of fertilizers in vegetable crops. Modern scientific cultivation practices are not followed for growing pulse crops as well as fruit crops. Non-availability of fertilizers and plant protection chemicals on time and adulteration of the same is a one of the important constraints of production.
- 2. Agriculture + Horticulture + Animal Husbandry: The most important constraints of production are recurrence of flood from May to September and problems of drainage. The lack of assured irrigation during pre and post-flood periods is another important constraint. Use of fertilizer is very less in rice crop due to occurrence of flood. Normal *sali* rice crop is always a chance crop in this situation. Non-availability of fertilizers and plant protection chemicals on time and adulteration of the same is a one of the important constraints of production.
- 3. Agriculture + Fishery: Owing to water stagnation there is very limited option for crops in this situation except *boro* rice and vegetables in winter. Lack of high yielding modern varieties suitable to resist water stagnation in *kharif* season. Lack of suitable cold tolerant and early maturing *boro* varieties. Heavy pre monsoon showers in April-May

may completely damage the *boro* crop by inundation. Use of traditional tall *boro* rice varieties in lower reaches due to water stagnation. Non-availability of fertilizers and plant protection chemicals on time and adulteration of the same is a one of the important constraints of production.

- 4. Agriculture + Horticulture: The major constraints of production are lack of modern scientific cultivation of fruit crops, arecanut, pineapple and sugarcane. The tillah lands are not scientifically utilized for cultivation purposes. Non availability of fertilizers and plant protection chemicals on time and adulteration of the same is a one of the important constraints of production.
- 5. Agriculture: The tribal inhabitants of this situation are poor, illiterate and traditional and unaware of scientific agriculture such as terrace cultivation, contour cropping, etc. Jhuming is still prevalent. Traditional mixed cropping system (rice, pulses, oilseed and vegetables) is followed. Lack of soil and water conservation measures. Non-availability of fertilizers and plant protection chemicals on time and adulteration of the same is also an important constraint.



A view of the Betelvine cultivation at Dalugang



FLD on Rajmah



KVK Scientist visiting cashewnut orchard of Mr.Fakar Uddin, Dalugang, Karimganj



Lemon nursery of Md Habu Uddin Tapadar, Khola, Karimganj



Nursery of Mr. Topadar, Khola



SRI demonstration

BUGBBCGBBCG

7. Farming Systems of Kokrajhar

Agriculture is the means of livelihood of Kokrajhar district and contributes a major part in the district economy. It is characterized by low productivity and low income due to poor adoption of technologies, low access to credit and extension, vulnerability to risks, poor soil and water management practices, limited input supply and poor infrastructure. Agriculture development is the prime consideration for making radical changes in the district through the Marginal, Small and Landless farmers. The average size of operational land holdings in the district is 1.20 ha. The Gross Cropped Area of the district is 1, 77,394 ha as against the Net Cropped Area of 1, 08,167 ha with a cropping intensity of 164.20%.

Rice is the major crop and prevailing farming systems are basically rice based. The other important crops grown in the district are Rapeseed & Mustard, Sesamum, Niger, Maize, Jute, Black gram, Pea and cash crops like Ginger, Turmeric *etc.* Although rice is the main crop of the district, the production scenario is quite alarming. Productivity recorded is 1.18 t/ha against the state's average productivity of 1.41 t/ha. Traditional system of rice farming as such is not a viable enterprise in this district but appears to be unavoidable and essential. Besides rice, they traditionally operate fisheries & aquaculture, livestock & poultry farming and horticulture. In the district, double cropping is a regular practice in major parts of the cultivable land and triple cropping is also undertaken in certain pockets having assured irrigation facility.

Each farming system must be homogeneous, in general for the following:

- Soils: Soils are mostly sandy and light in texture, and acidic to neutral in reaction. Water holding capacity of the soil is poor due to low organic matter content. General fertility status of the soil is poor. The NPK status of soils is medium to rich, low to low to medium, respectively. Soils are highly eroded and usually deficient in Boron and Zinc. The low use of chemicals and fertilizers in the district offers scope for organic cultivation.
- b. Rainfall: The average annual rainfall of the district is 3127 mm against the state average of 2584.50 mm and the mean maximum and minimum temperature varies from 33-38°C and 8-10°C respectively. Because of high rainfall area, there is a great potential of crop diversification and intensification in the existing farming system.
- c. Physiography: The district has a total area of 3169.22 Sq. km. till recently the district had over 50 per cent of its geographical area covered by deep green forest. But the forest coverage has dwindled substantially due to unscrupulous and massive denudation. Most of the terrain in the district is scantily populated and thickly forested. The district is characterised by almost plain topography being flanked by foothills of Bhutan in the upper strip of north and high plain in the middle to lower strip towards the southern side with a gradation from north to south.
- d. Altitude

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e. Irrigation pattern: The Kokrajhar district has got 25.44% of the net sown area i.e. 21,846 ha under different sources of irrigation and 75.66% of cultivated land remains rain fed. There are only 11 nos of flow irrigation and 3 numbers of lift irrigation schemes are fully operational in the district. In fact, there is a huge potential for increasing area under irrigation.

 f. Temperature: The mean maximum and minimum temperature varies from 33-38°C and 8-10°C respectively.

| | | | | | | Location |
|---------------|----------|-----------|-----------|---------------------|-----------------|-------------|
| Farming | Soila | Doinfall | Altitudo | Principal | Important | (area), |
| system | 50115 | Kallildii | Alliude | crops/breeds | features | extent of |
| | | | | | | area in ha. |
| FS-1: | Alluvial | 3000 | Medium | Paddy, rapeseed, | Mostly | 48,000 ha |
| Agri - AH | soil | mm | and low | Maize, local breed | subsistence | |
| | | | elevation | of milch cattle, | nature of | |
| | | | | poultry, duckery | farming, using | |
| | | | | | local breeds | |
| | | | | | and | |
| | | | | | productivity is | |
| | | | | | very low. | |
| FS-2: | Alluvial | 2500 | Medium | Paddy, banana, | Crop | 16000 ha |
| Agri - AH | soil | mm | elevation | Assam lemon | | |
| | | | | Areacanut, | | |
| | | | | betevine, | | |
| | | | | vegetables | | |
| FS-3: | | 3200 | | Paddy, vegetables | High elevation | 15000 ha |
| Agri – AH - | | mm | | (pumkin, pointed | red soil, prone | |
| Forestry | | | | gourd, ridge gourd, | to high runoff | |
| | | | | bottle gourd etc.) | and erosion | |
| FS-4: | | 3500mm | | Paddy, banana, | High elevation | 13000 ha |
| Agri – Hort - | | | | Assam lemon, | eroded soil, | |
| AH | | | | Areacanut, | High runoff, | |
| | | | | betelvine, | forest villages | |
| | | | | vegetables etc. | | |
| FS-5: | | 3000mm | | Paddy, vegetables | Highly | 10,000 ha |
| Agri – Hort – | | | | (potato, cabbage, | productive, | |
| AH – Fishery | | | | brinjal, tomato, | | |
| | | | | cauliflower etc.) | | |

1. Summary of farming Systems

2. Agricultural characteristics of each farming System

1. Boundaries of the FS

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| SI. No. | Farming System | Boundaries |
|---------|----------------|------------|
| 1. | FS-1 | - |
| 2. | FS-2 | - |
| 3. | FS-3 | - |
| | | |

Farming Systems of North East India

| 4. | FS-4 | - |
|----|------|---|
| 5. | FS-5 | - |

2. Soils under the FS

| SI. No. | Farming System | Soils |
|---------|----------------|---|
| 1. | FS-1 | Moderately acidic, low to medium in NPK status, |
| | | clay loam in soil texture |
| 2 | FS-2 | Acidic, poor in NPK status, sandy loam |
| | | In texture |
| 3. | FS-3 | Moderately acidic, poor in NPK status |
| 4. | FS-4 | Moderately acidic, low to medium in NPK status, |
| | | sandy loam |
| 5. | FS-5 | Moderately acidic, medium in NPK status, clay |
| | | loam in texture |

3. Climates under the FS

| SI. No. | Farming System | Climates |
|---------|----------------|--|
| 1. | FS-1 | Warm and humid climatic condition, The average annual rainfall of the district is 3000 mm mean maximum and minimum temperature varies from 33-38°C and 8-10°C respectively |
| 2 | FS-2 | Warm and humid, sub tropical climate The average annual rainfall of the district is 3000 mm and mean maximum and minimum temperature varies from 33-38°C and 8-10°C respectively. |
| 3. | FS-3 | Warm and humid, sub tropical climate The average annual rainfall of the district is 3500 mm mean maximum and minimum temperature varies from 33-38°C and 8-10°C respectively |
| 4. | FS-4 | Warm and humid, sub tropical climate The average annual rainfall of the district is 2800 mm mean maximum and minimum temperature varies from 33-38°C and 8-10°C respectively |
| 5 | FS-5 | Warm and humid, sub tropical climate The average annual rainfall of the district is 3100 mm mean maximum and minimum temperature varies from 33-38°C and 8 |

4. Physiography under the FS

| SI. No. | Farming System | Physiography |
|---------|----------------|-----------------|
| 1. | FS-1 | Medium low land |
| 2 | FS-2 | Medium land |
| 3. | FS-3 | Hilly tract |
| 4. | FS-4 | High land |
| 5. | FS-5 | Low land |

5. Irrigation facilities under the FS

| SI. No. | Farming System | Irrigation facilities |
|---------|----------------|--|
| 1. | FS-1 | Mostly rainfed and source of irrigation is |
| | | Shallow tube well, river and strems. |
| 2 | FS-2 | Source of irrigation is Shallow tube well, river |
| | | and streams |
| 3. | FS-3 | Rainfed |
| 4. | FS-4 | Rainfed |
| 5. | FS-5 | Source of irrigation is Shallow tube well, river |
| | | and streams |

6. Major crops and cropping intensity under the FS

| SI. No. | Farming System | Major crops and cropping intensity(%) |
|---------|----------------|--|
| 1. | FS-1 | Paddy, rapeseed, Maize, local breed of milch |
| | | cattle, poultry, duckery (150%) |
| 2 | FS-2 | Paddy, banana, Assam lemon Areacanut, |
| | | betevine, vegetables (160%) |
| 3. | FS-3 | Paddy, vegetables (pumkin, pointed gourd, |
| | | ridge gourd, bottle gourd etc.), arecanut, |
| | | Gamari, Teak, Tita sappa, Sissoo etc.(120%) |
| 4. | FS-4 | Paddy, banana, Assam lemon, Areacanut, |
| | | betelvine, vegetables etc.(130%) |
| 5. | FS-5 | Paddy, vegetables (potato, cabbage, brinjal, |
| | | tomato, cauliflower etc.(125%) |

7. Major cropping systems under the FS

| SI. No. | Farming System | Major cropping system |
|---------|----------------|------------------------------------|
| 1. | FS-1 | Rice based cropping system |
| 2 | FS-2 | Rice based cropping system |
| 3. | FS-3 | Rice based farming system |
| 4. | FS-4 | Horticultural based farming system |
| 5. | FS-5 | Paddy cum fish farming system |

8. Land use pattern under the FS

| SI. No. | Farming System | Land use pattern |
|---------|----------------|---|
| 1. | FS-1 | Mostly paddy crops are grown. Jute, Mesta, |
| | | niger, rapeseed, Buck wheat are also grown. |
| 2 | FS-2 | Mostly horticultural crops such as Assam |
| | | lemon, pine apple, arecanut, banana and |
| | | vegetables are grown besides paddy crop |
| 3. | FS-3 | Along with horticultural crops, plantation of |
| | | forest tress are highly suitable |
| 4. | FS-4 | Mostly horticultural crops |
| 5. | FS-5 | Fish rearing with paddy, vegetables are |
| | | dominant under this farming system |

9. Land holding pattern under the FS

| SI. No. | Farming System | Land holding pattern |
|---------|----------------|--|
| 1. | FS-1 | Fragmented land holding and average land |
| | | holding size 1.2 ha |
| 2 | FS-2 | Fragmented land holding and average land |
| | | holding size 1.2 ha |
| 3. | FS-3 | Fragmented land holding and average land |
| | | holding size 1.2 ha |
| 4. | FS-4 | Fragmented land holding and average land |
| | | holding size 1.2 ha |
| 5. | FS-5 | Fragmented land hoding average land |
| | | holding size 1.2 ha |

10. Populations and socio-economic characteristics under the FS

| SI. No. | Farming System | Population and socio-economic |
|---------|----------------|---|
| | | characteristic |
| 1. | FS-1 | Mixed population and subsistence level of |
| | | farming |
| 2 | FS-2 | Tribal population dominated and mostly |
| | | practiced by the small and marginal farmers |
| 3. | FS-3 | Tribal population dominated area and |
| | | subsistence nature of farming |
| 4. | FS-4 | |
| 5. | FS-5 | Mixed population, mostly dominated by the |
| | | large farmers |

11. Adoption pattern for each crop/breed/other technology under the FS

| SI. No. | Farming System | General Production constraints |
|---------|----------------|--|
| 1. | FS-1 | Poor yield of paddy due to use of local |
| | | varieties |
| 2 | FS-2 | Poor nutrient status resulting low yield. |
| 3. | FS-3 | Lack of assured irrigation facility |
| 4. | FS-4 | Lack of quality seed materials |
| 5. | FS-5 | Poor yield of milk. Meat, eggs due to use of |
| | | local breeds |

12. General production constraints for each crop under the FS



A team of KVK Scientists visiting farmer's field



Arecanut seedling



Banana plantation



Banana Plantation of Mr. Brahma Innovative farmer



Rice field of innovative farmer



Fishery pond of Innovative farmer



Rice field of Innovative farmer





The impact of training

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8. Farming Systems of Nagaon

1. Summary of Farming Systems :

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| | | | | | Important | Location |
|-------------|------------|-----------|----------|----------------|-----------------|-------------|
| Farming | Soila | Dainfall | Altitudo | Principal | features | (area), |
| system | Solis | Kallilali | Altitude | crops/breeds | (Irrigated & | extent of |
| | | | | | Rainfed Area) | area in ha. |
| AES-I | | | 50.2 m | Crops: Paddy, | Rainfed area: | 75,138 |
| Agriculture | Sandy- | <1200 | above | Jute, | 61.27% | |
| Agri-Horti- | Clay loam | mm to> | MSL | Greengram, | Irrigated area: | |
| AH | i.e. Sandy | 2200 mm | | Blackgram, | 38.73% | |
| Agri-AH- | loam, Clay | | | Rapeseed, | | |
| Fishery | loam | | | Summer, Kharif | | |
| | | | | & Rabi | | |
| | | | | Vegetables. | | |
| | | | | Animal | | |
| | | | | Component: | | |
| | | | | Goat, Cattle, | | |
| | | | | Buffalo, Pig, | | |
| | | | | Fowl & Duck | | |
| AES-II | | <1000 | 50.2 m | Crops: Paddy, | Rainfed area: | 35,990 |
| Agri-Horti- | Clay, Clay | mm to> | above | Jute, | 82.95% | |
| AH | loam, | 1500 mm | MSL | Greengram, | Irrigated area: | |
| Agri-Horti- | Alluvial | | | Blackgram, | 17.05% | |
| AH- Seri | Soil, | | | Rapeseed, | | |
| Agri-Horti- | Sandy | | | Summer, Kharif | | |
| AH- Fishery | Loam | | | & Rabi | | |
| | | | | Vegetables. | | |
| | | | | Animal | | |
| | | | | Component: | | |
| | | | | Goat, Cattle, | | |
| | | | | Buffalo, Pig, | | |
| | | | | Fowl & Duck | | |
| AES-III | Clay | < 1200 | 50.2 m | Crops: Paddy, | Rainfed area: | 74,001 |
| Agri-Horti | Sandy | mm to > | above | Jute, | 78.18% | |
| Agri-Horti- | Loam | 2200 mm | MSL | Greengram, | Irrigated area: | |
| AH | | | | Blackgram, | 21.82% | |
| Agri- | | | | Rapeseed, | | |
| Fishery | | | | Summer, Kharif | | |
| Agri- | | | | & Rabi | | |
| Beekeeping | | | | Vegetables. | | |

| | | | | Animal | | |
|-------------|------------|---------|-----------|---------------|-----------------|----------|
| | | | | Component: | | |
| | | | | Goat, Cattle, | | |
| | | | | Buffalo, Pig, | | |
| | | | | Fowl & Duck | | |
| AES-IV | Clay loam, | < 1200 | 50.2 m | Crops: | Rainfed area: | 65,623 |
| Agri-Horti- | Sandy, | mm to > | above MSL | Paddy, Jute, | 88.46% | |
| AH | Sandy | 2200 mm | | Greengram, | Irrigated area: | |
| Agri-Horti- | Loam | | | Blackgram, | 11.54% | |
| AH Fishery | | | | Rapeseed , | | |
| Agri- | | | | Summer, | | |
| Beekeeping | | | | Kharif & Rabi | | |
| | | | | Vegetables. | | |
| | | | | Animal | | |
| | | | | Component: | | |
| | | | | Goat, Cattle, | | |
| | | | | Buffalo, Pig, | | |
| | | | | Fowl & Duck | | |
| AES-V | Clay, Clay | < 1200 | 50.2 m | Crops: | Rainfed area: | 1,22,699 |
| Agri-Horti- | loam, | mm to > | above MSL | Paddy, Jute, | 100% | |
| AH- Fishery | Alluvial | 2200 mm | | Greengram, | | |
| Agri-Horti- | | | | Blackgram, | | |
| AH- | | | | Rapeseed, | | |
| Sericulture | | | | Summer, | | |
| Agri-Horti- | | | | Kharif & Rabi | | |
| AH | | | | Vegetables. | | |
| | | | | Animal | | |
| | | | | Component: | | |
| | | | | Goat, Cattle, | | |
| | | | | Buffalo, Pig, | | |
| | | | | Fowl & Duck | | |

2. Agricultural characteristics of each farming System

- 1. Boundaries of the FS (District):
 - E: Golaghat, W: Morigaon,
 - N: River Brahamaputra, S: Hills of Karbi Anglong.
 - Soils under the FS : Entisols, Inceptisols, Alfisols and Ultisols.
- Climates under the FS : Climate can be divided into four distinct seasons viz. premonsoon, monsoon, post monsoon and winter. Pre monsoon occurs from March to May. The rainfall during this period arises from 20-30% of total precipitation. The monsoon season starts from June – August. The precipitation varies from 60-70% of

2.

the total. The post monsoon extends from Sept- November, characterized by fall of temperature and rainfall. The winter season starts from December to February and characterized by fall of temperature and rainfall with occasional cool breeze. The average maximum and minimum temperature recorded were 38° C and 8° C respectively. Relative Humidity varies from 87.9% to 96.7% in the morning time and 48.1% to 76.0% in the evening time. The average RH in rainy season remain above 80% but in summer it goes down to 60%.

| 4. | Physiography under the FS | 5: | | | | |
|----|-------------------------------------|----|-------------------------|--|--|--|
| | Highlands | : | 32.85 (in thousand ha) | | | |
| | Midlands | : | 228.53 (in thousand ha) | | | |
| | Lowlands | : | 37.39 (in thousand ha) | | | |
| | Hilly tract | : | 74.68 (in thousand ha) | | | |
| 5. | Irrigation facilities under the FS: | | | | | |
| | Area under irrigation | : | 14929 ha | | | |
| | Irrigation potential | : | 25057 ha | | | |
| | Rivers | : | 14 nos | | | |
| | Tanks | : | 303 nos | | | |
| | STW | : | 39071 nos | | | |
| | DTW | : | 91 nos. | | | |
| | Pond | : | 3224 nos | | | |
| | Others | : | 5999 nos | | | |

 Major crops and cropping intensity under the FS: Paddy, Jute, Greengram, Blackgram, Rapeseed, Summer, Kharif & Rabi Vegetables; Cropping Intensity: 192%

7. Major cropping systems under the FS:

| Crop rotations followed | : | 1. | Ahu Rice- Sali Rice- Vegetables- Jute- Sali Rice- |
|-----------------------------|---|----|---|
| | | | Toria |
| | | 2. | Ahu Rice- Sali Rice- Wheat- Jute- Sali Rice- |
| | | | Lentil |
| | | 3. | Jute- Sali Rice- Smmer Pulses- Sali Rice- Boro |
| | | | Rice |
| Crop sequences followed | : | 1. | Sali Rice- Boro Rice |
| | | 2. | Ahu Rice- Sali Rice- Vegetables |
| | | 3. | Jute- Sali Rice - Toria |
| Inter-cropping done, if any | : | 1. | Brinjal + Coriander |
| | | 2. | Potato + Pumpkin |
| | | 3. | Potato + Brinjal |
| Catch crops grown, if any | : | 1. | Toria |
| | | 2. | Summer Greengram |
| | | 3. | Coriander |
| | | 4. | Vegetables |
| | | | |

8. Land use pattern under the FS:

| Gross cropped area | : | 271285 ha |
|------------------------|---|---------------------------------------|
| Net Area sown | : | 217805 ha (80.29% of cultivated area) |
| Fallow lands | : | 9468 ha |
| Cultivable waste lands | : | 11154 ha |
| Forest cover | : | 90342 ha |
| Barren lands | : | 5320 ha |
| | | |

9. Land holding pattern under the FS:

| Size of holding | Nos. | Area (Ha.) |
|--------------------|-------|------------|
| a) Less than 1 Ha. | 99288 | 117080 |
| b) Between 1&2 Ha. | 74446 | 87810 |
| c) Above 2 Ha. | 73465 | NA |

10. Populations and socio-economic characteristics under the FS:

| Total p | opulation | : | 23, 14,629 (As per Census, 2001) | | |
|---------|---------------|---|--|------------|--|
| Populat | tion density | : | 620 person/sq km | | |
| Literac | y percentage | : | 58.39% in rural areas and 85% in urban areas | | |
| Farmer | S | | : | | |
| a. | Big farmers | | : | 8334nos | |
| b. | Small farmers | | : | 68515 nos. | |
| - | Manainal famo | | | 101001 | |

- c. Marginal farmers : 101001 nos.
- d. Agricultural labourers: 77113 nos.
- 11. Adoption pattern for each crop/breed/other technology under the FS:

| crop/breed | Practices/Technology | Adoption | | |
|----------------------------|----------------------|----------------|--|--|
| | | (Full/Partial) | | |
| Paddy | Recommended | Partial | | |
| Pulses | Recommended | Partial | | |
| Oilseeds | Recommended | Partial | | |
| Winter vegetables | Recommended | Full/Partial | | |
| Summer vegetables | Recommended | Full/Partial | | |
| Jute | Recommended | Partial | | |
| Wheat | Recommended | Partial | | |
| Crossbred cattle/pig/ goat | Recommended | Partial | | |
| Pure breed of Birds | Recommended | Partial | | |
| Fish | Recommended Partial | | | |

12. General production constraints for each crop under the FS

Paddy:

- 1. Low production and productivity:
 - Cultivation of local/ traditional varieties in case of Ahu and Sali paddy.
 - Imbalance use of fertilizes with inappropriate methods.
 - Low replacement rate of high yielding varieties seeds.

- Non availability of flood water submerged tolerant varieties.
- High infestation of rice hispa, stem borer, leaf blight.
- Excess and uneconomic use of irrigation water during summer.
- 2. Non availability of adequate and qualitative inputs in time.
- 3. No or very low use of organic manure.
- 4. Small and scattered land holdings.
- 5. Iron toxicity in some pockets.
- 6. Inadequate credit facility and negligible accessibility of farmers to the financial institutions.
- 7. No direct accessibility of farmers to markets and are bound to sale their produce to the retailers at low price.
- 8. Inadequate availability of market information.

Pulses:

- Uncertain weather condition viz. high rainfall during Kharif hampers timely land preparation and sowing of Kharif pulses and the rabi pulses suffers from moisture deficit stress particularly during reproductive phase. Summer pulses (green gram and black gram) receive rainfall during maturity state causes preharvest sprouting and lack of adequate moisture leads to delayed sowing of summer pulses.
- Non availability of quality seed at time viz. non availability of delayed sown black gram varieties and uniform maturing green gram varieties.
- 3. Non adoption of improved production technology
- 4. Soil acidity.
- 5. Cultivated as rain fed crop in marginal and submerginal lands with less effort and inputs.
- Infestation of insect pests and diseases. Pod borers, aphids etc are the major pest of all the pulses. Wilt in lentil, rust in pea, YMV, CLS and WB in black gram and green gram are serious diseases.
- 7. Lack of irrigation facility.
- 8. Stray animals.
- 9. Problem in seed storage due to infestation of stored grain pest.
- 10. Non availability of processing unit.
- 11. Unorganized marketing infrastructure.

Oil seeds:

- 1. Uncertain weather condition viz. excess rainfall in Kharif causes water stagnation in crop fields and delays the sowing of kharif oilseeds like sesamam and groundnut and intermittent moisture stress in rabi due to absence of rainfall at the critical stages of crop growth.
- Non availability of quality seeds at proper time and in required amount. Farmers are compelled to grow locally available seeds of low yielding varieties which eventually reduce productivity and total production.

- 3. Non or low replacement of old seeds at periodical interval.
- 4. Poor nutrient and crop management practices.
- 5. Infestation of insect pest and diseases. Major pest like aphid, saw fly, jassids, thrips, leaf minor etc attack oilseeds drastically reduce their yields. Several fungal and viral diseases like blight, leaf spot, wilt, steam rot, root rot, yellow mosaic etc ruin these crops when conditions are favourable for them.
- 6. Cultivation of oil seeds mostly in less fertile and marginal land which account for the increased in area and total production but not productivity.
- 7. Cultivation of oil seed without irrigation.
- 8. Unorganized marketing infrastructure.

Jute:

- 1. Jute is generally grown under rain fed condition; delay of pre-monsoon rain often results in reduction jute area.
- 2. Non availability of quality seeds at proper time and this causes delay in sowing resulting in low yield.
- Weed infestation in initial growth period of jute and there by high cost of weeding.
- 4. High infestation of insect pest viz. hairy caterpillars and semilooper and diseases like root rot, steam rot.
- 5. Non availability of sufficient and good water for retting results in poor quality of fibre.
- 6. High labour intensive crop and hence high production cost.
- 7. Uncertain market price and lack of proper marketing facility for surplus produces.



Assessing results of FLD on rice in farmer fields



Practical training on fish farming

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9. Farming Systems of Nalbari -

1. Summary of farming Systems :

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| | | | | | | Location |
|----------|---------|----------|----------|----------------------------|---------------|-------------|
| Farming | Seile | Deinfell | Altitude | Principal crops/breeds | Important | (area), |
| system | 50115 | Rainfall | | | features | extent of |
| | | | | | | area in ha. |
| Agri- | Sandy | 2029 | 89 m | Rice, Toria, Pulses, Jute, | Mostly flood | 35% |
| Hort-AH- | loam to | mm | | Sugarcane, Potato, Kharif | free area | |
| Fishery | Clay | | | and Rabi vegetables, | having high | |
| | loam | | | Assam lemon, Banana, | potential of | |
| | | | | Coconut, Arecanut, | increasing | |
| | | | | Poultry & Duck- | productivity, | |
| | | | | Indigenous, Improved, | well | |
| | | | | Cow- indigenous, Cross | developed | |
| | | | | breed, Local buffalo, | soil, no | |
| | | | | indigenous & exotic fish | major | |
| | | | | | nutrient and | |
| | | | | | water stress | |
| | | | | | during rabi | |
| | | | | | season; | |
| | | | | | mostly | |
| | | | | | practiced by | |
| | | | | | resource rich | |
| | | | | | farmers. | |
| Agri- | Sandy | 2029 | 89 m | Rice, Toria, Pulses, Jute, | Some risk of | 22% |
| Hort-AH | loam to | mm | | Sugarcane, Potato, Kharif | flood, Low | |
| | Clay | | | and Rabi vegetables, | nutrient and | |
| | loam | | | Assam lemon, Banana, | water stress | |
| | | | | Coconut, Arecanut, | during rabi | |
| | | | | Poultry & Duck- | season; | |
| | | | | Indigenous, Improved, | mostly | |
| | | | | Cow- indigenous, Cross | practiced by | |
| | | | | breed, Local buffalo | resource | |
| | | | | | poor | |
| | | | | | farmers. | |
| Agri- | Sandy | 2029 | <=89 m | Rice, Toria | Most of the | 24% |
| Hort- | loam to | mm | | Pulses, Jute, | soils are not | |
| Fishery | Clay | | | Sugacane, Potato, Kharif | well | |
| | loam | | | and Rabi vegetables, | developed, | |
| | | | | Assam lemon, Banana, | mostly | |
| | | | | Coconut, Arecanut, | practiced by | |
|---------|---------|------|--------|--------------------------|----------------|-----|
| | | | | indigenous & exotic fish | resource | |
| | | | | | poor farmers | |
| Hort-AH | Loamy | 2029 | < 89 m | Kharif and Rabi | Recurring | 19% |
| | sand to | mm | | vegetables, Assam | flood | |
| | Sandy | | | lemon, Banana, | affected | |
| | loam | | | Coconut, Arecanut, | areas, Soil is | |
| | | | | indigenous & exotic fish | recent | |
| | | | | | origin, | |
| | | | | | suffers from | |
| | | | | | nutrient and | |
| | | | | | water stress | |
| | | | | | during rabi | |
| | | | | | season; | |
| | | | | | mostly | |
| | | | | | practiced by | |
| | | | | | resource | |
| | | | | | poor farmers | |

2. Agricultural characteristics of each Farming System

- 1. Boundaries of the FS: Provided in Chapter 3
- 2. Soils under the FS: NA

| Farming system | Soils |
|----------------------|--------------------------|
| Agri-Hort-AH-Fishery | Sandy loam to Clay loam |
| Agri-Hort-AH | Sandy loam to Clay loam |
| Agri-Hort-Fishery | Sandy loam to Clay loam |
| Hort-AH | Loamy sand to Sandy loam |

- 3. Climates under the FS: Provided in Chapter 3
- 4. Physiography under the FS: Provided in Chapter 3
- 5. Irrigation facilities under the FS: Provided in Chapter 3
- 6. Major crops and cropping intensity under the FS

| Farming system | Principal crops/breeds |
|----------------------|--|
| Agri-Hort-AH-Fishery | Rice, Toria, Pulses, Jute, Sugarcane, Potato, Kharif and Rabi |
| | vegetables, Assam lemon, Banana, Coconut, Arecanut, Poultry & |
| | Duck-Indigenous, Improved, Cow- indigenous, Cross breed, Local |
| | buffalo, indigenous & exotic fish |
| Agri-Hort-AH | Rice, Toria, Pulses, Jute, Sugarcane, Potato, Kharif and Rabi |
| | vegetables, Assam lemon, Banana, Coconut, Arecanut, Poultry & |

| | Duck-Indigenous, Improved, Cow- indigenous, Cross breed, Local | | | | | |
|--------------------|--|--|--|--|--|--|
| | buffalo | | | | | |
| Agri-Hort- Fishery | Rice, Toria | | | | | |
| | Pulses, Jute, | | | | | |
| | Sugacane, Potato, Kharif and Rabi vegetables, Assam lemon, Banana, | | | | | |
| | Coconut, Arecanut, indigenous & exotic fish | | | | | |
| Hort-AH | Kharif and Rabi vegetables, Assam lemon, Banana, Coconut, | | | | | |
| | Arecanut, indigenous & exotic fish | | | | | |

7. Major cropping systems under the FS

| Automn paddy followed by winter paddy followed by vegetables | | |
|--|--|--|
| | | |
| addy followed by winter paddy | | |
| ldy followed by Vegetables | | |
| -,, -5 | | |
| ddy followed by winter paddy followed by vegetables | | |
| Idu fallowed by pulse | | |
| idy Tollowed by pulse | | |
| addy followed by winter paddy | | |
| | | |
| ldy followed by oilseeds | | |
| followed by vegetables | | |
| | | |
| | | |
| | | |



Harvesting of Rice Varieties - NBR2, NBR3 & Jaymoti under OFT on Cold Tolerant Boro Rice Varities



Seedling root treatment of Azospirillum at Panigaon, Nalbari, Crop-Sali Rice

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10. Farming Systems of Sivasagar

1. Summary of FS

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| Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | Location (area), extent of area in ha. |
|-------------------|-------|----------|----------|------------------------|-----------------------|--|
| Agri- | | | | Rice, | Plains | 1.3 lacs |
| Horti-AH- | * | ** | *** | Sugarcane, | | |
| Fishery | | | | Veg, Tea, | | |
| | | | | Diary, Pig etc. | | |
| AH-Horti- | * | ** | *** | Rice, Mustard, | Flood | 58723 |
| Agri | | | | Livestock | | |
| Agri- | | | | Rice, Pulse, | Flood free | 23965 |
| Horti-AH- | * | ** | *** | Horti, AH | | |
| Fishery | | | | | | |
| Horti-AH | * | ** | *** | AH, Horti & | | 4840 |
| | | | | Veg. | | |
| AH-Agri- | | | | Rice, Wheat, | Mostly | 9434 |
| Horti | * | ** | *** | Mustard, Pulse, | River bank | |
| | | | | Horti, AH | | |

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* Almost all soils are Old alluvial and recent alluvial

** Provided in Chapter – 3, *** Provided in Chapter – 3,

2. Agricultural characteristics of each farming System

1. Boundaries of the FS

| AES I | AES II | AES III | AES IV | AES V |
|--------------------|---------------------|-----------------|------------|-------------|
| Amguri, | Amguri, Sivasagar, | Amguri, Nazira, | Amguri, | Sivasagar, |
| Sivasagar, Nazira, | Nazira, Gaurisagar, | Sonari, | Nazira, | Gaurisagar, |
| Sonari, Pachim | Lakuwa | Sapekhati, | Sonari, | Demow |
| Abhoipur, | | Pachim Abhoipur | Sapekhati, | |
| Lakuwa, | | | Pachim | |
| Sapekhati, | | | Abhoipur | |
| Gaurisagar, | | | | |
| Demow | | | | |

2. Soils under the FS

| AES I | AES II | AES III | AES IV | AES V |
|--------------|----------------|---------------------|--------|--------------|
| Old Alluvial | Alluvial flood | Alluvial flood free | Hill | New alluvial |
| | prone | (High land) | | |

| 3. | Climates | under | the F | S |
|----|----------|-------|--------|---|
| 5. | Chinaces | anaci | cire i | - |

| FS - 1 | FS - 2 | FS - 3 | FS - 4 | FS - 5 |
|----------------|----------------|----------------|----------------|----------------|
| Hot wet summer |

4. Physiography under the FS

| FS - 1 | FS - 2 | FS - 3 | FS - 4 | FS - 5 |
|-----------------|-----------------|-----------------|------------------|------------------|
| Topography | Topography | Topography | Gradually slopes | Gradually slopes |
| gradually slope | gradually slope | gradually slope | down towards | down towards |
| down towards | down towards | down towards | Brahmaputra | Brahmaputra |
| Brahmaputra | Brahmaputra | Brahmaputra | | |

5. Irrigation facilities under the FS

| FS - 1 | FS - 2 | FS - 3 | FS - 4 | FS - 5 |
|--------------|----------|--------|--------|--------|
| Shallow Tube | STW, DTW | STW | | |
| Wells, DTW | | | | |

6. Major crops and cropping intensity under the FS

| FS - 1 | FS - 2 | FS - 3 | FS - 4 | FS - 5 |
|------------------|------------------|----------------|------------------|--------------|
| Rice, | Paddy, Veg, | Paddy, AH, Tea | Maize, Arecanut, | Paddy, |
| Vegetables, Tea, | Potato, Mustard, | | Orange, | Vegetables, |
| Seri, AH, Fish | AH, Seri, Tea | | Vegetables, | Potato, |
| | | | Lemon | Banana, |
| | | | | Arecanut, AH |

7. Major cropping systems under the FS

| FS - 1 | FS - 2 | FS - 3 | FS - 4 | FS - 5 |
|--------|--------|--------|--------|--------|
| | | | | |

Sali Paddy followed by Vegetables , Sali Paddy followed by Ahu paddy, Sali Paddy followed by oilseed crops, Sali Paddy followed by potato/pea

8. Land use pattern under the FS

| AES I | AES II | AES III | AES IV | AES V |
|-------|--------|---------|--------|-------|

For Sali paddy, Ahu paddy, oilseed and vegetables, horticultural crop, Fishery, vety, goatery, diary & poultry

9. Land holding pattern under the FS

| AES I | AES II | AES III | AES IV | AES V |
|-------|--------|---------|--------|-------|
| | | | | |

Marginal farmers to big farmers (0-3.5 bighas)- landless (3.5-7.5 bighas)- small (7.5-15 bighas)- marginal Above 15 bighas- Big farmers

Farming Systems of North East India

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10. Populations and socio-economic characteristics under the FS

| AES I AES II AES III AES IV AES V | AES II AES III AES IV | AES V |
|-----------------------------------|-----------------------|-------|
|-----------------------------------|-----------------------|-------|

Farmers, business, service & mixed Population density = 395/ sq km

11. Adoption pattern for each crop/breed/other technology under the FS

| AES I AES III AES III AES IV AES V | |
|------------------------------------|--|
|------------------------------------|--|

Sali-70%, Ahu-50%, Vegetable-75%, Horti-40%, Fishery-40%, Vety-50%, Seri-30%

12. General production constraints for each crop under the FS

| AES I | AES II | AES III | AES IV | AES V | |
|-------|--------|---------|--------|-------|--|
|-------|--------|---------|--------|-------|--|

- 1. Flood problem
- 2. Pest & disease problem
- 3. Lack of improved seed
- 4. Lack of irrigation facilities
- 5. Marketing facilities
- 6. Draught conditions
- 7. Fragmented land holding pattern
- 8. Free stray cattle at Rabi season
- 9. Soil erosion



Training on sericulture

Training on soil health management

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11. Farming Systems of Tinsukia

The farming systems in the district are :

- a. Agri Horti
- b. Agri Horti Fishery
- c. Agri Horti Annimal Husbandry
- d. Agri Horti Silviculture

Each farming system was homogeneous, in general for the following:

- a. Soils
- b. Rainfall
- c. Physiography
- d. Altitude
- e. Irrigation pattern
- f. Temperature

The important agricultural crops covering major net area cultivated in the district are Winter paddy, Autumn paddy, Rape & mustard and pulses, mainly black gram and green gram. Among horticultural crops, Orange, potato, Ginger, Pineapple, Areacanut, Black peeper, Banana, Kharif and Rabi vegetables are grown extensively throughout the district.

The district has tremendous potential areas for the development of fishery, consisting of natural water bodies like rivers, beels, ponds, community tanks and vast stretch of low lying areas suitable for undertaking scientific fish farming. Livestock rearing is an important enterprise in Tinsukia district. Cattle, goat, pig and poultry birds constitute the majority livestock population. Sericulture is being taken-up in 197 villages with 4220 families engaged in 'Eri', 828 families engaged in 'Muga', and 238 families engaged in Mulberry activities.

| Farming | Soils | Rainfall | Altitude | Principal | Important | Location, |
|--------------|---------|----------|------------------|-------------------|-----------------|------------|
| System | | | | Crops/breeds | Features | extent of |
| | | | | | | area in ha |
| Agri-Horti | Med. to | Annual- | 147.83 to 148.30 | Rice, citrus, | Organic matter | |
| | upland | 2000mm | m MSL | vegetables | rich soil under | |
| | | | | | AES 1 | |
| Agri-Horti- | Low to | 2200 mm | 147.83 to 148.30 | Rice, vegetables | Undulating soil | |
| Fishery | med. | | m MSL | | with med. org. | |
| | | | | | matter | |
| Agri - Horti | Med. to | 2100 mm | 147.83 to 148.30 | Milch cattle with | Fodder rich | |
| - Animal | up land | | m MSL | cross breed | area | |
| Husbandry | | | | | | |
| Agri – Horti | Low to | 2200 mm | 147.83 to 148.30 | Rearing of Eri, | Silk & Muga | |
| - | med. | | m MSL | Silk & Muga | threads are of | |
| Silviculture | | | | | superb quality | |

1. Summary of farming systems

2. Agricultural characteristics of each farming system:

1. Boundaries of the FS:

| E: Arunachal, | W: Dibrugarh, | N: Dhemaji, |
|---------------------------|--------------------------|----------------|
| S: Dibrugarh & Arunachal, | NE: Dhemaji & Arunachal, | SE: Arunachal, |
| SW: Dibrugarh, | NW: Dibrugarh & Dhemaji | |

- 2. Soils under the FS: Fine loamy mixed hyperthermic Typic Haplustept
- 3. Climates under the FS: Humid Subtropics
- 4. Physiography under the FS: Nearly level (0 1% slope)
- 5. Irrigation facilities under the FS: Mostly rain-fed (Sometimes through shallow tubewell)
- 6. Major crops and cropping intensity under the FS: Rice and (1.10%)
- 7. Major cropping system under the FS: Rice Toria Vegetables
- 8. Land use pattern under the FS: Monocrop of rice with/or vegetables, fisheries, Annimal husbandry etc.
- 9. Land holding pattern under the FS: 0.3 to 1 hectare
- 10. Population and socio-economic characteristics under the FS: The total population in the district is 9, 68,383 out of which 83.52% live in rural areas. The total no. of house holds in the district is 841927 nos. (12% large, 38% small, 39% marginal and 11% landless).The population density is 254 per sq. km. with a sex ratio of 910 females per 1000 males. The schedule caste population constitutes about 3.33% (21,835) while schedule tribe is 6.85% (66,307) of the total population. The literacy rate is 63.45% (6, 14,461). The percentage of worker to the total population is 33.31% out of which 3.0% is agricultural workers and the rest 30.31% belongs to non-agricultural workers.
- Adoption pattern for each crop/breed/other technology under the FS: 60% field crops,
 25% horticultural crop, 10% fishery and rests for other allied commodities.
- 12. General production constraints for each crop under the FS:
 - Gap in yield of crops like paddy, mustard, blackgram, pea, potato etc.
 - Low profitability from Agril. Crops due to rise in production costs, unorganized marketing and lack of minimum support price.
 - Gap in yield of vegetable crops due to lack of knowledge and skills in nutrient management, non-adoption of IPM/INM, low use of organic manures
 - Low yield in spices due to lack of knowledge in improved technology, non replacement of seed materials, and non adoption of INM practices.
 - Poor productivity of fruit crops due to inadequate care and maintenance of crop
 - Low productivity of milch cattle, problems in pig rearing, poultry etc.
 - Breed up-gradation technology of local cattle is not gaining desired momentum
 - Technological gap of fish production technology
 - Low expansion of sericulture programmes is due to pesticidal affect on Eri, Muga and silk worms.



FLD on Sesamum

FLD on Toria (Flowering) - TS-36

FLD on Toria (Harvesting stage)-TS-36



Integrated farming

Method demonstration

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4.3 Farming Systems of Manipur

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1. Farming Systems of Bishnupur

1. Farming Systems in Bishnupur district

Farming system is a resource management strategy to achieve economic and sustained production to meet diverse requirement of farm household while preserving resource base and maintaining a high level environment quality.

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There is a limitation on horizontal expansion of land for agriculture in Bishnupur district. So the only alternative left is vertical expansion through various farm enterprises such as crop + livestock, crop + horticulture, rice + fish, rice + fish + piggery etc. which required less space and time but give high productivity and ensures periodic income, especially for the small and marginal farmers of the district.

Basis/ Criteria for identifying farming systems were:

1. Soils

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- 2. Rainfall
- 3. Physiography
- 4. Altitude
- 5. Irrigation pattern
- 6. Temperature

2. Summary of farming systems

| Farming | Soil | Rainfall | Altitude | Principal | Important | Local |
|-----------------|-----------|----------|-----------|---------------------|----------------------|-------------|
| system | | | | crop/breeds | features | (area), |
| | | | | | | extent of |
| | | | | | | area in ha. |
| 1. Agriculture | Sandy | Medium | 828.2m | Rice-potato/ | Better use of growth | 1500 |
| | clay loam | (1200- | above the | mustard/ | resources including | |
| | to clay | 1400mm) | MSL | pea/ | light nutrients and | |
| | loam | | | black gram | water. | |
| | | | | Rice+Soybean | Suppression of | |
| | | | | Maize+Soybean | weeds, reduce plant | |
| | | | | | and disease | |
| | | | | | incidence. Yield | |
| | | | | | stability and high | |
| | | | | | economic return | |
| 2. Horticulture | Clay | Medium | 828.2m | Banana+turmeric/ | Banana/Guava/ | 900 |
| | loam, | (1200- | above the | Ginger | Tree bean given | |
| | slightly | 1400mm) | MSL | Tree bean+turmeric/ | shade to ginger and | |
| | acidic | | | Ginger | turmeric. Better | |
| | | | | Guava+turmeric/ | utilization of | |
| | | | | Ginger | resources | |
| | | | | Pineapple+guava | improvement of soil | |
| | | | | +turmeric/ | health and agro- | |
| | | | | Ginger | ecosystem. Yield | |

| | | | | | stability and high | |
|-------------|--------------|---------|-----------|-------------------|-------------------------|------|
| | | | | | economic return. | |
| 3. Agri- | Clay loam | Medium | 828.2m | Maize+banana | Utilized the vertical | 2000 |
| Horti. | | (1200- | above the | +alocasia | space more | |
| | | 1400mm) | MSL | Rice+Rice bean | effectively. The tree | |
| | | | | Sugarcane+Mustard | bean have foliage | |
| | | | | +Onion | tolerant of strong | |
| | | | | Tree bean+ginger/ | light and high | |
| | | | | Turmeric+guava | evaporative demand | |
| | | | | | and give required | |
| | | | | | shade to | |
| | | | | | ginger/turmeric. | |
| | | | | | Yield stability and | |
| | | | | | high economic | |
| | | | | | return. | |
| 4. | Sandy clay | Medium | 828.2m | Maize+banana | Alocasia, banana | 2300 |
| Agri+Horti- | loam to clay | (1200- | above the | +alocasia+pig | stem and maize are | |
| culture | loam | 1400mm) | MSL | (Hampshire) | fed to pigs. The litter | |
| +livestock | | | | | of pigs serves as | |
| | | | | | manure for banana | |
| | | | | | and other crops. | |
| 5. Agri+ | Clay loam, | Medium | 828.2m | Rice+magur+IMC | Fish fingerlings of | 3500 |
| Fishery | slightly | (1200- | above the | | IMC are release in | |
| | acidic | 1400mm) | MSL | | the paddy fields in a | |
| | | | | | ring bunded fields | |
| | | | | | during their growth | |
| | | | | | and put back in the | |
| | | | | | ditches around when | |
| | | | | | the paddy fields | |
| | | | | | become dry. | |

- 3. Agricultural characteristics of each farming System
 - 1. Boundaries of the FS



- Soils under the FS : Alluvial soil and acid soil
- Climates under the FS :
 Sub-tropical, sub-temperate and humid
- Physiography under the FS : Highland, Midlands and lowlands
- 5. Irrigation facilities under the FS Rainfed
- 6. Major crops and cropping intensity under the FS :

| SI.No. | Principal Crops | Area (in ha) | Production | (Productivity |
|--------|-----------------|--------------|------------|---------------|
| | | A=000ha) | (in tones) | (kg/ha) |
| 1. | Rice | 24390 | 55.77 | 2,286 |
| 2. | Maize | 680 | 1.25 | 1,838 |
| 3. | Wheat | 310 | 0.38 | 1,225 |
| 4. | Potato | 1250 | 12.44 | 9,952 |
| 5. | Sugarcane | 1450 | 80.00 | 55,172 |
| 6. | Kharif oilseed | 690 | 0.62 | 898.5 |
| 7 | Rabi oilseed | 4570 | 3.94 | 862 |
| 8 | Kharif pulses | 1050 | 0.84 | 800 |
| 9 | Rabji Pulses | 3780 | 2.90 | 767 |
| 10 | Cabbage | 484 | 12.44 | 623.9 |
| 11 | Cauliflower | 385 | 2.07 | 336.5 |

| | 7. | Major c | ropping systems under | the FS : | | | | |
|--|-----|----------------------------------|--------------------------------------|----------|-----------|---|--|--|
| | | Rice+p | otato, Rice+mustard, Ri | ce+pea, | Rice+s | oyabean, Rice+blackgram | | |
| | 8. | Land use pattern under the FS : | | | | | | |
| | | 1. | Gross cropped area | : | 42,366 | ha. | | |
| | | 2. | Net Area sown | : | 38,671 | ha. | | |
| | | 3. | Fallow lands | : | 200 ha | | | |
| | | 4. | Cultivable waste lands | : | 325 ha | | | |
| | | 5. Forest cover | | : | 35,490 ha | | | |
| | | 6. Barren lands | | : | 225 ha. | | | |
| | | 7. | Cropping intensity | : | 109.5 9 | % | | |
| | 9. | Land h | olding pattern under the | FS | : | 1 to 2 ha. | | |
| | 10. | Populat | opulations and socio-economic charac | | | under the FS : | | |
| | | Population | | | | 2, 08,368 | | |
| | | Averag | e fragmentation intensit | у | : | 4-5nos | | |
| | | Existing land tenure system(s) | | | : | More than half of the land is cultivating | | |
| | | | | | | by tenants | | |
| | | Source(s) of finance for farming | | | : | Rank 1. Self | | |
| | | | | | | Rank 2. Money Lander | | |
| | | Main so | ource of income for farm | ers | : | Rank 1. Agriculture | | |
| | | | | | | Rank 2. Fisheries | | |
| | | | | | | Rank 3. Livestock & Poultry | | |
| | | Comme | ercial commodities produ | lced | : | Rank 1. Fish | | |
| | | | | | | Rank 2. Vegetable | | |
| | | | | | | Rank 3. Milk | | |

Adoption pattern for each crop/breed/other technology under the FS : 11.

a. Livestock holding pattern for small farmers

| SI. No. | Animal/bird | Average nos possessed | Rank according to nos |
|---------|-------------------------|----------------------------|-----------------------|
| | | | possessed |
| 1 | Cattle | 5 | Birds |
| 2 | Birds | 500 | Pigs |
| 3 | Pigs | 10 | Cattles |
| 4 | Buffalo | 2 | Buffalo |
| 5 | Goat | 2 | Goat |
| | b. Livestock holding pa | ttern for marginal farmers | |

Livestock holding pattern for marginal farmers

472

| SI. No. | Animal/bird | Average nos possessed | Rank according to nos |
|---------|-------------|-----------------------|-----------------------|
| | | | possessed |
| 1 | Cattles | 2 | Birds |
| 2 | Birds | 100 | Cattles |
| 3 | Pigs | 2 | Pigs |
| 4 | Buffalos | 1 | Buffalo |
| 5 | Goats | 1 | Goat |

Farming Systems of North East India

| SI. No. | Animal/bird | Average nos possessed | Rank according to nos possessed |
|---------|-------------|-----------------------|------------------------------------|
| 1 | Cattles | 1 | Birds |
| 2 | Birds | 20 | Cattles |
| 3 | Pigs | 1 | Pigs |
| 4 | Buffalos | 1 | Buffalo |
| 5 | Goats | 1 | Goat |

c. Livestock holding pattern for Agricultural labourers

12. General production constraints for each crop under the FS :

Lack of irrigation facilities and unavailability of crop inputs including good seeds are the major constraints faced by the farmers in Bishnupur district.



Distribution of Java citronella from KVK



Training on cultivation of vegetable under poly-house

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2. Farming Systems of Churachandpur

1. Summary of farming systems

*

| Farming | Soil | Rainfall | Altitude | Principal | Important features | Local |
|-------------|---------|----------|----------|--------------------|--------------------------|---------|
| system | | | | crop/breeds | | (area), |
| | | | | | | extent |
| | | | | | | of area |
| | | | | | | in ha. |
| 1. | Clay | Medium | 1000 - | Rice-potato/ | Better use of growth | NA |
| Agriculture | loam | (2000- | 1500 m | mustard/Maize | resources including | |
| | to fine | 3500m | above | pea/black gram | light nutrients and | |
| | loam | m) | MSL | Rice+Soybean | water. | |
| | | | | Maize+Soybean | Suppression of weeds, | |
| | | | | | reduce plant and | |
| | | | | | disease incidence. | |
| | | | | | Yield stability and high | |
| | | | | | economic return | |
| 2. Horti- | Clay | -do- | -do- | Banana+turmeric/Gi | Tree bean given shade | NA |
| culture | loam, | | | nger/Tree | to ginger and | |
| | | | | bean+turmeric/ | turmeric. Yield | |
| | | | | Ginger | stability and high | |
| | | | | +turmeric/Ginger | economic return. | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 3. Agri- | Clay | -do- | -do- | Maize+banana | Utilized the vertical | NA |
| Horti. | loam | | | +alocasia | space more | |
| | | | | Rice+Rice bean | effectively. The tree | |
| | | | | Sugarcane+Mustard | bean have foliage | |
| | | | | +Onion | tolerant of strong light | |
| | | | | Tree bean+ginger/ | and high evaporative | |
| | | | | Turmeric+guava | demand and give | |
| | | | | | required shade to | |
| | | | | | ginger/turmeric. | |
| | | | | | Yield stability and high | |
| | | | | | economic return. | |

| 4. Agri- | -do- | -do- | -do- | Maize+Banana | Alocasia, banana | NA |
|-----------|------|------|------|----------------|-------------------------|----|
| Horticult | | | | +Alocasia+Pig | stem and maize are | |
| ure-AH | | | | (Hampshire) | fed to pigs. The litter | |
| | | | | | of pigs serves as | |
| | | | | | manure for banana | |
| | | | | | and other crops. | |
| 5. Agri- | -do- | -do- | -do- | Rice+Magur+IMC | Fish fingerlings of IMC | NA |
| Fishery | | | | | are release in the | |
| | | | | | paddy fields in a ring | |
| | | | | | bunded fields during | |
| | | | | | their growth and put | |
| | | | | | back in the ditches | |
| | | | | | around when the | |
| | | | | | paddy fields become | |
| | | | | | dry. | |

2. Agricultural characteristics of each farming System



1. Boundaries of the FS

2. Soils under the FS

| SI. No. | Soil Type | Characteristics | Area |
|---------|------------|--|------|
| 1 | Fine Loamy | Fine loamy soil are found in most of the foot hills and near | - |
| | | river banks of Churachandpur district. This soil is suitable for | |
| | | most of the crops mainly vegetables crops. | |
| 2 | Clay | Clay soil is found in the low land area of Churachandpur | - |
| | | district of Manipur. Paddy is the main crop for this soil. | |

| 3 | Laterite | Most of the hill soil of Churachandpur district are laterite. | - |
|---|----------|---|---|
| | | Jhum cultivation are practiced and upland paddy and other | |
| | | vegetables, fruits and forests are grown. | |

- 3. Climates under the FS : Sub-tropical and Tropical
- 4. Physiography under the FS : Highland, Midlands and lowlands
- 5. Irrigation facilities under the FS : Rainfed
- 6. Major crops and cropping intensity under the FS

| Name of crops | Area(ha) | Production (MT) |
|---------------|----------|-----------------|
| Wet paddy | 6218 | 33734 |
| Jhum paddy | 14330 | 21495 |
| Pulses | 1144 | 1507 |
| Oilseeds | 1706 | 2047 |
| Maize | 5647 | 8471 |
| Potato | 2236 | 678 |
| Sugarcane | 271 | 21680 |
| Pineapple | 1730 | 12000 |
| Banana | 240 | 1860 |
| Orange | 280 | 1120 |
| Lemon | 1120 | 2643 |
| Рарауа | 250 | 1575 |
| Passion fruit | 800 | 9000 |
| Turmeric | 880 | 550 |
| Ginger | 8415 | 2930 |
| Tomato | 500 | 2500 |

Major cropping systems under the FS
 Rice + potato, Rice + mustard, Rice + pea,

Rice + Soyabean, Rice + blackgram

8. Land use pattern under the FS

| Items | Area(ha) |
|----------------------|----------|
| Total built up area | 9928 |
| Total abandoned land | 190447 |
| Total forest area | 118092 |
| Jhum land | 29323 |
| Waste Land | 98424 |
| Total water bodies | 2144 |

| Road network coverage area | 3581 |
|----------------------------|------|
| | * |

Source: State Remote Sensing Application, Imphal

| Land hol | ding pattern | under the FS |
|----------------------------|--------------|--------------|
|----------------------------|--------------|--------------|

| SI. No. | Type of farmer | Average family | Area |
|---------|---------------------|----------------|------|
| 1 | Small farmers | 5005 | 6090 |
| 2 | Marginal farmers | 9090 | 4890 |
| 3 | Semi medium farmers | 1235 | 2705 |
| 4 | Medium farmers | 35 | 170 |
| 5 | Large farmers | Nil | Nil |

10. Populations and socio-economic characteristics under the FS:

Population: 2, 27,905.

Socio-economic characteristics:

Agriculture sector has a predominant place in the economy of the district contributing to a major share of the State domestic product and providing employment to 67% of the working force. Permanent cultivation is practiced in every few pockets of the district while jhum cultivation is widely adopted. Paddy is the predominant crop constituting about 65% of the grass cropped area. Apart from paddy, pulses, maize, ginger, potato, turmeric and oilseeds are grown. Majority of the farming community has small and marginal land holdings. In order to boost agricultural products to meet the demands of the growing population, the 9 policy envisages doubling of food production by 2007-08. During the last five years, the district data on food grain production indicates negligible increase in the production. The District Agriculture Office has taken up Departmental scheme on oilseed development programme (227 ha) and pulse development programme (38 ha) and centrally sponsored mini-kit programme.

| Existing land tenure system(s) | : | Land belongs to traditional hereditary |
|------------------------------------|---------|--|
| | | village chiefs |
| Source(s) of finance for farming | : | Rank 1. Local Money Lender |
| | | Rank 2. Society |
| | | Rank 3. Banks |
| Main source of income for farmers: | Rank 1. | Agriculture |
| | Rank 2. | Wages |
| | Rank 3. | Livestock & Poultry |
| Commercial commodities produced: | Rank 1. | Passion fruit |
| | Rank 2. | Pineapple |
| | Rank 3. | Vegetables |

- 11. Adoption pattern for each crop/breed/other technology under the FS
 - For a rural based economy like Churachandpur district, development of animal husbandry plays a vital role in the upliftment of socio economic condition of the rural population. The development of that sector which include rearing of livestock such as cattle, poultry, piggery, fishery etc is important to meet the basic nutritional requirement. Traditionally rearing of poultry bird, pigs and diary animals is a mere backyard activity where local species are reared. It is taken as a subsidiary occupation for the farming community. However with urbanization and increase in population and with introduction of commercial poultry farming, dairy development and piggery there is a switch to this intensive farming as a source of gainful employment. The demand for milk, egg and meat can be met only through commercialization of diary, poultry, piggery and other activities. As per the livestock census 2003 the district has the following livestock and poultry population. The state as a whole produced 70820 tonnes of milk, 16360 tonnes of meat and 743.29 lakh eggs during the year 2001-2002. Production of milk, egg and meat is quit low in the district. Despite the efforts of the state govt. to develop this sector, poultry products in particular is required to be imported from other states to meet the growing demand
- General production constraints for each crop under the FS :
 Lack of irrigation facilities and unavailability of crop inputs including good seeds are the major constraints face by the farmers in the district.



Distribution of Fish seed and pelleted feed for FLD (Fisheries)



On-farm Testing (OFT) Title Studies on induced breeding of common carp (Cypeimus carpio) using syringe

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3. Farming Systems of Senapati

1. Summary of FS:

| Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|-----------------|----------|----------|----------|-----------------------|----------------|-------------|
| System | | | | crops/breeds | features | (area), |
| | | | | | | extent of |
| | | | | | | area in ha. |
| Agriculture | Alluvial | - | 900 - | Paddy | Local & | 25200 ha. |
| (Mono culture) | soil | | 3000m | | Improved var. | |
| Agriculture | Laterite | - | 900 - | Maize + bean | Local var. | 1120 |
| (mixed culture) | | | 2500m | | | |
| Livestock + | - do - | - | - do - | Piggery + Maize + | Local breed & | - |
| Agriculture | | | | Calocasia | Var. | |
| Agro-forestry | - do - | - | - do - | Forest tree species, | Local cultivar | - |
| | | | | Passion fruit, | | |
| | | | | Cabbage etc. | | |
| Agri+Horti+Liv | - do - | - | - do - | Maize, Passion fruit, | - do - | - |
| estock | | | | Potato, Poultry etc. | | |
| Agri + Hort. | - do - | - | - do - | Rice, Plum, peach, | - do - | - |
| | | | | Passion fruit etc. | | |



Guava Nursery at KVKcampus.



Kiwi Fruit at KVK-Campus.



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Parkia roxburghii Nursery at KVK- Campus.



Vaccination of Pig against swine fever under Livestock vaccination Programme





Each farming system was homogeneous, in general for the following.

- a. Soils Black, red and laterite soils.
- b. Rainfall 1600-2100 mm.
- c. Physiography- High Altitute
- d. Altitude 913 m-3114 m (MSL)
- e. Irrigation pattern Rainfed
- f. Temperature (3- 33 degree celcius)

1. Summary of farming Systems

| Farming | Soils | Doinfall | Altitudo | Principal | Important | Location (area), |
|--------------|----------|----------|--------------|--------------|-------------|-----------------------|
| system | Solis | Rainfall | crops/breeds | | features | extent of area in ha. |
| Agriculture | Black, | 1600- | 913- | Rice- | To produce | - |
| | red & | 2100 | 3114m | Bean/mustard | more farm | |
| | laterite | mm. | | | produce | |
| Horticulture | -do- | -do- | -do- | Potato + | To produce | - |
| | | | | bean/maize | more income | |

2. Agricultural characteristics of farming Systems :

- 1. Boundaries of the FS : Provided in Chapter 3
- 2. Soils under the FS : Black, red and laterite soils.
- 3. Climates under the FS : Sub-Himalayan humid, sub-temperate
- 4. Physiography under the FS: High Altitute
- 5. Irrigation facilities under the FS: Rainfed condition
- 6. Major crops and cropping intensity under the FS: Rice,potato,vegetables,sweet potato,Til seed 153.02
- 7. Major cropping systems under the FS: Rice base system /Horticulture based system
- 8. Land use pattern under the FS: Crop based cropping system
- Land holding pattern under the FS: Wholly leased and partly leased, wholly otherwise operated
- 10. Populations and socio-economic characteristics under the FS:
 - Population: 1, 40,778.

Average size of land holdings: 1.25ha.

Existing land tenure systems: wholly owned and self operated holding.

Agriculture is the main source of income with commercial commodities produce are potato, lemon, ginger, turmeric

- 11. Adoption pattern for each crop/breed/other technology under the FS: Adoption ranges from 30-40 % in crops as well as animal husbandry.
- 12. General production constraints for each crop under the FS: Availability of Critical inputs, seeds, planting materials and marketing.

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4.4 Farming Systems of Meghalaya

Blank

1. Farming Systems of Ri-Bhoi

The existing farming systems in the district are Agri + Horti + AH + Fishery, Agri + Horti + AH, Agri+Horti, Agri+Horti+AH+Seri, Agri + Seri + Horti + AH

1. Summary of farming Systems

| | | | | | | Location |
|----------------------|-------|----------|----------|--------------------|--------------------|----------|
| Farming | | | | Principal | Important | (area), |
| system | Soils | Rainfall | Altitude | crons/breeds | features | extent |
| system | | | | ciops/bieeds | Teatures | of area |
| | | | | | | in ha. |
| In AES I | Clay | - | 150-300 | 1.Crops: - | In EFS-I, the | 48,570 |
| there are | loam | | MSL | Paddy, Maize, | percentage of | |
| two Existing | soil | | | Oilseeds,Pine- | Resource Poor (RP) | |
| farming | | | | Apple,Spices(ging | farmers is as | |
| system | | | | er,turmeric,Black | follows | |
| viz, EFS I | | | | pepper and | Agri-18.7%, Horti- | |
| &EFS II. | | | | chillies),Banana, | 24.1%, A.H-20.5% | |
| EFS I | | | | Tomato, oranges, | AND fishery-4.5%. | |
| Comprises of | | | | floriculture, | The percentage of | |
| Agri+Horti+ | | | | other vegetables, | RR (Resource Rich) | |
| A.H+Fishery | | | | coconut, | farmers are – | |
| ,EFS II | | | | strawbery and | Agri-4.6%,Horti- | |
| comprises of | | | | betel nut | 5.6%,A.H-89.4% | |
| Agri+Horti+ | | | | 2.A.H & Vety: - | and Fishery-3.8% | |
| A.H+Fishery | | | | Cow, pigs, Goat, | In EFS-II, the | |
| | | | | Poultry | percentage of RP | |
| | | | | 3.Fishery: - | farmers is | |
| | | | | Common carp, | Agri-11.9%, Seri- | |
| | | | | Magur, Grass carp, | 12.3%, Horti- | |
| | | | | Rohu, Catla, | 11.5% and A.H- | |
| | | | | Puthia | 11.9% | |
| | | | | Sericulture: - | The percentage of | |
| | | | | Mulberry, Eri silk | RR farmers are | |
| | | | | worm | Agri-4.6%, Horti- | |
| | | | | | 4.3% | |
| | | | | | | |
| In AES | Sandy | - | 300-600 | 1.Crops | In EFS-I, the | 85,730 |
| II ,there are | loam | | msl | Paddy, Maize, | percentage of | |
| two existing | Soil | | | Pineapple, Spices | Resource poor (RP) | |
| farming | | | | (Ginger, Turmeric, | farmers are | |
| systems.The | | | | Black pepper and | Agri-67.4%, Horti- | |
| y are EFS | | | | chillies), Banana, | 19.3%, A.H-89.4% | |

| Г <u> </u> | 1 | | | | |
|---|--------------|-----------------|---|---|----------|
| 1- | | | tomato, Oranges, | and Seri-40% | |
| Agri+Horti+ | | | floriculture, other | The percentage of | |
| AH+Sericult | | | vegetables, Tea, | Resource rich | |
| ure, | | | Strawberry, | farmers is Agri- | |
| EFS II- | | | Betel vine and | 24.3%, Horti- | |
| Horti+Agri+ | | | Betel nut | 139.5%, A.H-3.5% | |
| AH+Fishery | | | A.H & Vety: - | and Fishery-15.4% | |
| | | | Cow, Pig, Goat | In EFS-II, the | |
| | | | and Poultry | percentage of RP | |
| | | | Sericulture: - | farmers in | |
| | | | Mulberry, Eri silk | Horti- 257.2%, | |
| | | | worm | Agri-54.5%, A.H- | |
| | | | Fishery: -Catla, | 75.7%, fishery- | |
| | | | Rohu, Grass carp | 31.22% | |
| | | | and common carp | The percentage of | |
| | | | | RR farmers are | |
| | | | | Horti-176.5%, | |
| | | | | Aari-17.2%, A.H- | |
| | | | | 11.44%, fisherv- | |
| | | | | 20.9% | |
| | Candy | 600 100 | | | |
| | Sanny | 600 = -100 | 1 (Trons | In FFS-I the | 1 10 500 |
| III AES | Joam | 600=-100 msl | 1.Crops Paddy Maize | In EFS-1, the | 1,10,500 |
| III ALS | loam | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed | In EFS-I, the percentage of Resource poor (RP) | 1,10,500 |
| III AES III, there are two | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed | In EFS-I, the percentage of Resource poor (RP) | 1,10,500 |
| III, there are two existing | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), | In EFS-I, the percentage of Resource poor (RP) farmers are | 1,10,500 |
| III AES III, there are two existing farming | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- | 1,10,500 |
| III, there are two existing farming systems. Th | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinial, Citrur | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% | 1,10,500 |
| III AES III, there are two existing farming systems. Th ey are EFS | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- | 1,10,500 |
| III, there are two existing farming systems.Th ey are EFS I:- | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - | In EFS-1, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of | 1,10,500 |
| III AES III, there are two existing farming systems. Th ey are EFS I:- Agri+Horti+ AH+Bee | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, | Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, | In EFS-1, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, EFS II: | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, Bee keeping, | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- 17.1%, Horti- | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, EFS II: Horti+Agri+ | Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, Bee keeping, Fishery: - | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- 17.1%, Horti- 15.8%, A.H-34% | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, EFS II: Horti+Agri+ AH+Fishery | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, Bee keeping, Fishery: - Negligible in EFS I | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- 17.1%, Horti- 15.8%, A.H-34% and Bee keeping- | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, EFS II: Horti+Agri+ AH+Fishery | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, Bee keeping, Fishery: - Negligible in EFS I and 10% In EFS II | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- 17.1%, Horti- 15.8%, A.H-34% and Bee keeping- 10% | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, EFS II: Horti+Agri+ AH+Fishery | loam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, Bee keeping, Fishery: - Negligible in EFS I and 10% In EFS II | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- 17.1%, Horti- 15.8%, A.H-34% and Bee keeping- 10% In EFS-II, the | 1,10,500 |
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| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, EFS II: Horti+Agri+ AH+Fishery | Ioam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, Bee keeping, Fishery: - Negligible in EFS I and 10% In EFS II | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- 17.1%, Horti- 15.8%, A.H-34% and Bee keeping- 10% In EFS-II, the percentage of RP farmers in Horti-49.2%, Agri- | 1,10,500 |
| III AES III, there are two existing farming systems.Th ey are EFS I:- Agri+Horti+ AH+Bee keeping, EFS II: Horti+Agri+ AH+Fishery | Ioam Soil | 600=-100 msl | 1.Crops Paddy, Maize, Oilseed (Soybean), Ginger, tomato, Chillie, Bean, Brinjal, Citrus, Banana A.H & Vety: - Poultry, Goat, BuffaloandPig, Bee keeping, Fishery: - Negligible in EFS I and 10% In EFS II | In EFS-I, the percentage of Resource poor (RP) farmers are Agri-47.7%, Horti- 30.2%, A.H-80.2% and Bee keeping- 60% The percentage of Resource rich farmers is Agri- 17.1%, Horti- 15.8%, A.H-34% and Bee keeping- 10% In EFS-II, the percentage of RP farmers in Horti-49.2%, Agri- 40.6%, A.H- | 1,10,500 |

| | | | | | | The percentage of |
|----|-------|---------|----------------------|------------|-----------------|---|
| | | | | | | RR farmers are |
| | | | | | | Horti-24.6%, Agri- |
| | | | | | | 12.5%, A.H-40%, |
| | | | | | | fishery-10% |
| 2. | Agric | ultural | characteristics o | f farmin | g Systems : | |
| | 1. | Bound | aries of the FS: - | | | |
| | | E: Ka | rbi Anglong 🛛 🔪 | N: West | Khasi Hills | N: Kamrup dist & Goalpara |
| | | S: Eas | t Khasi Hills | | | |
| | 2. | Soils u | inder the FS : | C | lay loam aoil, | ,Sandy loam soil |
| | 3. | Climat | es under the FS : | S | ub-tropical,S | ub-temperate and Humid |
| | 4. | Physio | graphy under the | FS: A | .E.S-I: tropic | al Hill Zone |
| | | | | A | .E.S –II: Sub | Tropical Hill Zone |
| | | | | A | .E.S-III: Mixe | ed Sub tropical Hill zone |
| | 5. | Irrigat | ion facilities under | the FS: | Rainfe | d |
| | 6. | Major | crops and cropping | g intensit | ty under the f | FS: |
| | | The m | ajor crops under t | he FS are | e | |
| | | Rice, F | Rapeseed, Mustard | l, Turmer | ric, Castor, Gi | nger, Millets, Tea leaf, Arecanut Banana, |
| | | Potato | and Citrus Fruits. | The crop | ping intensity | y is 100 per cent |
| | 7. | Major | cropping systems | under th | e FS: | |
| | | The m | ajor cropping syst | ems und | er the FS are | : |
| | | i) | Crop rotations fo | llowed : | 1. | Rice-Cowpea, Sweet Potato |
| | | | | | 2. | Rice-Tomato |
| | | | | | 3. | Rice-mustard |
| | | ii) | Crop sequences | followed | : 1. | Rice |
| | | | | | 2. | Rice-Pea |
| | | | | | 3. | Rice-Vegetables |
| | | | | | 4. | Maize-mustard |
| | | | | | 5. | Rice-Mustard-Tomato |
| | | iii) | Inter-cropping fo | ollowed : | 1. | Maize + French Bean |
| | | | | | 2. | Ginger + Beans |
| | | | | | 3. | Ginger + Black gram |
| | | | | | 4. | Maize + Soybean |
| | | iv) | Mixed cropping f | ollowed: | 1. | Rice + Maize + Lentil + Beans + Leafy |
| | | | | | | vegetables + Pineapple |
| | | | | | 2. | Rice + Maize + Soybean + Chillies + |
| | | | | | | Cole crops |
| | | v) | Catch crops grow | vn : | 1. | Ginger |
| | | | | | 2. | Potato |
| | | | | | 3. | Turmeric |
| | | | | | 4. | Paddy |

8. Land use pattern under the FS

The land use pattern under the FS is as follows

- 1. Slopes below 50 % towards foot hills assigned to agricultural crops
- 2. Slopes between 50-70 % for horticulture
- 3. Slopes over 100 % to be used for forestry/ Silvi pastoral crops
- 9. Land holding pattern under the FS : Mostly fragmented Populations and socioeconomic characteristics under the FS : 90 % of the Farmers are having education up to Class IX and their mind set is traditional, average family income is Rs 3000-4000 per month. Social participation is moderate having low level of change proneness, inadequate linkage with developing agencies/organizations.
- 10. Adoption pattern for each crop/breed/other technology under the FS: Partial adoption on various technologies, tendency to rely on organic farming
- 11. General production constraints for each crop under the FS: Mostly lack of awareness on latest scientific technologies on various crop & low risk bearing abilities are the major constraints under the FS.



Recording of data pertaining to OFT



Land preparation under FLD on Tomato



Recording of data pertaining to OFT

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4.5 Farming Systems of Mizoram

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1. Farming Systems of Aizawl

1. Summary of farming Systems

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| Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|--------------|--------|----------|----------|----------------|------------------|--------------|
| system | | | | crops/breeds | features | (area), |
| | | | | | | extent of |
| | | | | | | area in ha. |
| Agriculture | -Loamy | Min-2550 | 858 Mt | Upland & | -Staple food | The |
| | -Sandy | Max-3200 | to | wetland | -varieties used | cropping |
| | loam | | 1231 Mt | Paddy | for crops are | situation is |
| | | | | Maize | improved and | totally rain |
| | | | | Pulses | local. | fed. |
| | | | | Oilseeds | | |
| | | | | Sugarcane | | |
| Agriculture | -do- | -do- | -do- | -Paddy | Production is | |
| + | | | | -Maize | based on | |
| Horticulture | | | | -Pulses, | requirement | |
| | | | | -banana, | and suited to | |
| | | | | -рарауа, | climatic | |
| | | | | -pineapple, | condition. | |
| | | | | -vegetable and | | |
| | | | | flowers. | | |
| Horticulture | -do- | -do- | 858 - | -Beans | Local and | |
| i) | | | 1231 mt. | -Cabbage | improved | |
| Vegetables | | | | -Tomato | varieties are | |
| | | | | -Cauliflower | used. | |
| | | | | -Cucurbits | Production is | |
| | | | | -Potato | based on local | |
| | | | | | market | |
| | | | | | requirement. | |
| ii) Fruits | -do- | -do- | -do- | -Orange | Large | |
| | | | | -Banana | production and | |
| | | | | -Passion fruit | climate is | |
| | | | | -Papaya | suited for all | |
| | | | | -Jackfruit | this crops. | |
| | | | | -Citrus | | |
| | | | | -Pineapple | | |
| iii) Flower | -do- | -do- | -do- | -Anthurium | Suited for hilly | |
| | | | | -Orchid | condition | |
| | | | | -Rose | Mizoram is | |
| | | | | -Hibiscus | well known | |

| | | | | | for | |
|-------------|--------|------|-----------|------------------|--------------------------|-------------|
| | | | | | Anthurium | |
| | | | | | and Orchid | |
| iv) Spices | -do- | -do- | -do- | -Turmeric | - Low growth | Backvard |
| iv) Spices | 40 | 40 | uo | Cingor | proformed by | Suctor |
| | | | | | | system |
| | | | | -bird eye chill. | | |
| | | | | | -More growth | |
| | | | | | & less | |
| | | | | | preferred | |
| v) Poultry | -do- | -do- | -do- | -Local Coiler | -Meat & egg | Backyard |
| | | | | | purpose | system |
| vi) Agri | Loamy, | -do- | 858 - | -Paddy | -Crops grown | - |
| | Sandy | | 1231 mt | -Maize | for staple | |
| + | loamy. | | | -Pulses | food. | |
| | | | | -Piggery | -Piggery and | |
| Animal | | | | -Cattle | poultry | |
| Husbandry | | | | -Poultry | practices for | |
| | - | | | | backyard | - |
| | | | | | system. | |
| | | | | | - | |
| | | | | | | |
| | | | | | | |
| vii) | -do- | -do- | 858 - | -Mulberry. | -Bamboo are | 6 ha. Area |
| Sericulture | | | 1231 mt. | -Мида | used for | under seri- |
| Schedicare | | | 1201 1110 | -Rri | house | culture |
| _ | | | | -Tasar | nurnoses | culture |
| | | | | | - Wood used | |
| Agro- | | | | | for building | |
| Agro- | | | | - Bamboo | | |
| Torestry | | | | | and furniture | |
| + | | | | | making and | |
| | | | | | for handicraft | |
| | | | | | industry and | |
| Bee keeping | | | | | house | |
| | | | | | construction. | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | -The farming | |
| viii). Fish | -do- | -do- | -do- | -Catla | system | -153 ha. |
| | 40 | | | | | |
| cum paddy | 40 | | | -Rohu | adopted in | |
| cum paddy | | | | -Rohu -Mrigal | adopted in small due out | |

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| | | | | -Silver carp -Grass carp -Common carp at 15:30:15:20:15 ratio. -Local paddy. | pond. | |
|--------------|------|------|------|--|-------------|----------|
| | | | | | | |
| ix). | -do- | -do- | -do- | -Vegetable & | -Milk and | Under |
| Horticulture | | | | fruits | meat | backyard |
| + | | | | -Cross breed of | purpose | system. |
| Cattle | | | | Jersey | -Meat and | |
| + | | | | -Holstein | egg purpose | |
| Poultry | | | | -Coiler | | |

2. Agricultural characteristics of each farming System

- 1. **Boundaries of the FS:** Aizawl District is situated in the Northern part of Mizoram. It is bounded on the North by Assam state on the South by Serchhip.
- Soils under the FS : Soils of the district are: (1) Very deep, dark loam to yellowish red, clay loam to clay, very strongly acidic, well drained.(2) Deep yellowish brown to brownish yellow, clay loam to sandy clay loam, strongly acidic poorly drained. (3) Dark yellowish loam to yellowish brown, clay loam & strongly acidic.
- 3. Climates under the FS: The district comes under sub-tropical and sub- humid region. The climate of Aizawl is generally cool in summer and not very cold in winter. The area is under direct influence of monsoon. The district receives maximum rainfall during May-Sept. The average rainfall is 208 cm.
- 4. Physiography under the FS: Aizawl district is situated in the Northern part of Mizoram between 24o 25' 16.04" and 23o 18' 17.78" N latitudes and 92o37' 03.27 and 93011' 45.69"E longitudes. The district is bounded on the east by Champhai district and Manipur state and on the west by Mamit district and Kolasib district, on the North by Assam state and on the South by Serchhip. The total area is 3576.31 sq km and accounts for 16.96% of the total area of the state.
- 5. **Irrigation facilities under the FS:** The status of irrigation in the district is very poor because here, agriculture is done almost in rain fed condition. Lack of water harvesting structures also found here.
- 6. **Major crops and cropping intensity under the FS :** Major crops grow are rice, ginger, sugarcane , mustard, pulses like soyabean, rice bean, cowpea, banana, citrus,

chow chow etc. however, other crops like sesamum, turmeric, & Assam lemon are known also taken up on a smaller scale. The cropping intensity of district is 115%

- Major cropping systems under the FS: Four major cropping systems have been identified (1) Crops production (2) Field crops + Animal Husbandry (3) Horticulture + Agriculture (4) Crops + Horticulture + Animal Husbandry.
- Land use pattern under the FS : The land use pattern of the district; Forest area covers 48.98%, land put ot non agril use is 17.33%; net sown area covers 14.81% barren and uncultured land covers 12.58%, cultivable waste covers 4.80%, permanent pastures is -0.34%.
- 9. Land holding pattern under the FS: The size of land covers by an individual/ family in the district has been classified into four groups; (1) Medium=120 nos having 4-10 ha of land (2) Semi-medium = 950 nos having 2-4 ha of land (3) Small = 5920 nos having 1-2 ha of land (4) Marginal = 9178 nos. having below 1 ha of land.
- 10. **Population and socio-economic characteristics under FS:** The population of Aizawl district is 3, 39,812. The population density is 95/sq km, the literacy percentage of Aizawl district is 96.5%. About 60% of the district population resides in the Aizawl city and its sub urban areas. The rest 40% lives in rural areas who are predominately farming families.
- 11. Adoption pattern of each crop/breed/other technology under the FS: The adoption pattern for improved agricultural practice is slow. Low awareness has been experienced regarding high yielding varieties of different crops, low management practices, low awareness regarding SHGs, lack of improved and good quality breeds, financial problems, non availability of improved varieties of differenced crops are the main reasons..

12. General production constraints for each crop under the FS:

- a. The major problems which hamper the production are disease, insect pest, weeds.
- b. Shifting cultivation is the major constraint, which cause soil erosion and nutrient loss.
- c. Lack of location specific high yielding variety is also one constraint.
- d. High cost of transportation is also one problem.
- e. Lack of water harvesting structure is also one main production constraints.
- f. Water stress during summer lead-in to decline and less fruiting of some fruits.
- g. Poor economic condition of farmer's lead-in to poor crop management.

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2. Farming Systems of Kolasib

Summary of farming Systems. 1.

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| Farming System | Soil | Rainfall | Atitude | Principal Crops/Breads | Important features | Location (area) extent of area in Ha |
|-------------------|-------------|----------|------------|---------------------------|-----------------------|---|
| FS-1 | Clay loam | 253 cm | 700-950 m | Paddy, ginger | Jhum | 35223 |
| Agri-Horti | | | | Maize | | |
| FS-2 | Clay loam | 253 cm | 700-950 m | Hatkora, | Jhum/ | 28178 |
| Horticulture | | | | Banana | Terrace | |
| FS-3 | Sandy clay | 247 cm | 300-700 m | Arecanut | WRC/ | 30820 |
| Agri-Horti- | loam | | | Hatkora | Terrace | |
| Plantation | | | | Oilpalm | | |
| FS-4 | Sandy loamy | 247 cm | 36 m – 300 | Paddy Pulses | WRC, area | 44030 |
| Agri-Horti- | | | m | Oilseeds Pine | | |
| Plantation | | | | apple Oilpalm | | |

2. Agricultural characteristics of each farming system:

| SI.No. | Headings | FS 1 | FS 2 | FS 3 | FS 4 |
|--------|-----------------------------|--|---|--|--|
| 1. | Boundaries | N.Hlimen to Lungdai Range. | Zanlawn- Khamrang to Thing dawl | Kolasib-Vairengte to Pangbalkawn. | Hortoki,Bairabi- Phaisen- Saiphai. |
| 2. | Soils | Clay loam | Clay loam | Sandy clay loam | Sandy loam |
| 2 | Climata | Rainfall 253 cm. | 253 cm | 247 cm | 247 cm |
| э. | Climate | Temp. 10-30 ^O C | 10-30 ⁰ C | 15-36 ⁰ C | 15-36 ⁰ C |
| 4. | Physiographic | 700-950 m | 700-950 m | 300-700 m | 36-300 m |
| 5 | Irrigation facilities | Rainfed | Rainfed | Rainfed and Irrigated | Rainfed and Irrigated |
| 6. | Major Crops | Jhum- Paddy,Ginger, Maize | Jhum- Paddy,Maize,Ha tkora Banana,Orange ,Chillies | Paddy,Maize,Area cunut (Hatkora, Oil Palm) | Paddy, Maize, Pineaple, Oilseeds,Pulses,Oi I Palm |
| | Cropping intensity. | 100% | 100% | 110 | 120% |
| 7. | Major Cropping System | Mixed Cropping of Paddy,maize,ses amum Chillies&Veg.in Jhum | Mixed Cropping in Jhum & Sole Cropping of Horti fruits | Paddy + Pulses/Oilseed / Winter Vegetables. | Paddy + Winter Maize/ Rabi Pulses/Oilseeds/V eg. |
| 8. | Land Use Pattern | Mostly Jhum. | Jhum and Orchard. | Jhum and Permanent. | Jhum and Permanent. |
| 9. | Land Holding Pattern | No permanent land Holding except few Orchards. | Marginal - Medium | Marginal to Medium | Marginal to Large |

| 10. | Population & Socio- economic characte- ristics | 9950 about 90% Depends on Agri and allieds. | 11874 about 85% Depends on Agri and allieds. | 20872 about 72% depends on Agri and allieds | 11624 about 80% depends on Agri and allieds |
|-----|--|--|---|---|---|
| 11. | Adoptation pattern for each crop/breed/ Other Technology. | Very slow adaptation as most of the areas is Under Jhum. | Slow adoptation. | Slow adoptation but some farmers had aware of it. | Slow adoptation but some farmers had aware of it. |
| 12. | General production constraints for each Crop. | No improve practices can be applied due To Jhum practice. | 1)Lack of Soil & water Conservation measures. 2) Poor knowledge of Proper management. 3) Lack of INM. | Lack of INM Lack of IPM Lack of improved inputs/ tools and machineries. Poor knowledge of Proper management. | Lack of improved inputs/ tools and machineries. Lack of IPM Lack of INM Poor knowledge of Proper management. |



Comunity Rice Nursery for Double Cropping

Model Organic Farm

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3. Farming Systems of Lawngtlai

1. **Summary of farming Systems**

. .

| SI. | Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|-----|--------------|-------------|----------|----------|-----------------|-------------|-----------|
| No | System | | | | crops/breeds | features | (area), |
| | | | | | | | extent of |
| | | | | | | | area in |
| | | | | | | | ha. |
| 1. | Agri - Hort | Alluvial; | 2558mm | 30-100m | Paddy, Cole | Sustainable | 1192.5 ha |
| | | sandy loam | average | | crops | and | |
| | | | per | | | permanent | |
| | | | annum | | | farming | |
| 2. | Horticulture | Lateritic; | 2558mm | 61-900m | Banana, | A good | 340 ha |
| | based | acidic soil | average | | Citrus, Passion | scope for | |
| | | | per | | fruit, Cabbage. | hilly areas | |
| | | | annum | | | | |
| 3. | Animal | Alluvial, | 2558mm | 40- | Indigenous & | Additional | 180 ha |
| | Husbandry | Lateritic, | average | 1200m | Exotic breeds | income for | |
| | based | Sandy loam; | per | | of Cattle, | farmers | |
| | | acidic soil | annum | | Goat, Poultry | | |
| | | | | | & Piggery | | |

Agricultural characteristics of each farming System 2.

| Agriculture characteristics | Agri-Horti | Horticulture | АН | | | |
|------------------------------------|--|-------------------------|----------------------------|--|--|--|
| Boundaries of the FS | Given in Chap | Given in Chapter 3 | | | | |
| Soils under the FS | Alluvial; | Lateritic; acidic soil | Alluvial, Lateritic, Sandy | | | |
| | Sandy loam | | loam; acidic soil | | | |
| Climates under the FS | Subtropical | Subtropical | Subtropical | | | |
| Physiography under the FS | Low land, mic | l lands to high lands | | | | |
| Irrigation facilities under the FS | Yes | Scanty | Moderate | | | |
| Major crops and cropping | Paddy | Citrus, Banana, | Not systematic | | | |
| intensity under the FS | (107%) | Passion fruit, Mustard, | | | | |
| | | Cabbage, chilli (107%) | | | | |
| Major cropping systems under | Double | Mixed cropping | Mixed cropping | | | |
| the FS | cropping | | | | | |
| Land use pattern under the FS | 29680 ha | | N/A | | | |
| Land holding pattern under the | Private/Own land | | | | | |
| FS | | | | | | |
| Populations and socio-economic | Majority are marginal farmers with an approximate 14232 family | | | | | |
| characteristics under the FS | head | | | | | |

| Adoption pattern for each | Negligible to marginal |
|--------------------------------|---|
| crop/breed/other technology | |
| under the FS | |
| General production constraints | Unfavourable topography, remoteness of the district, lack of |
| for each crop under the FS | infrastructures such as road and power, lack of rain water |
| | harvesting structure, lack of manpower, high labour cost, lack of |
| | proper land use planning, lack of raw material and un-organized |
| | markets. |

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4. Farming Systems of Lunglei

Each farming system was homogeneous, in general for the following.

- a. Soils: Entisols, Ultisols and Inceptisols
- b. Rainfall: High, Medium and Low
- c. Physiography : Highland, Midland, Lowland and Hilly tract
- d. Altitude: High, Medium and Plain lands
- e. Irrigation pattern: Rainfed and Irrigated
- f. Temperature: Winter 8-24⁰ C and summer 18-32⁰ C

1. Summary of farming Systems

| | | | | | | Location |
|-------------------|---------------|-----------|----------|---------------------------|-----------------------|-------------------|
| Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | (area), extent |
| - | | | | | | of area |
| | | | | | | in ha. |
| Agriculture | Alluvial, | Medium to | 35-120m | Paddy, | Permanent | 859.45 |
| (Wet Rice | sandy | High | | Vegetables, | farming is | |
| Cultivation) | loam & | | | Oilseeds | practised | |
| | sandy clay | | | | | |
| | loam | | | | | |
| Agriculture+ | Alluvial | Medium to | 35-120m | Paddy, | Easily acceptable | 221.19 |
| Fishery | sandy | High | | Composite fish | to small farmers | |
| (Paddy + | loam & | | | farming | | |
| Fishery) | sandy clay | | | | | |
| | loam | | | | | |
| Agriculture | Acidic, | Medium to | 35-1000m | Paddy, Maize, | The cultivators | 10575.99 |
| + A.H | sandy | High | | Pulses | have the | |
| | loam, | | | Piggery, | advantage of | |
| | Alluvial soil | | | Poultry | additional income | |
| Agriculture | Acidic & | Medium to | 121- | Paddy, Maize, | This is suitable | 538.09 |
| + | sandy | High | 1000m | Pulses | for hill farming | |
| Horticulture | loam | | | Orange, | | |
| | | | | Banana | | |

2. Agricultural characteristics of farming Systems :

1. Boundaries of the FS : Hill slop

:

- 2. Soils under the FS
- Hill slopes and Plain area.
 - 1. Alluvial, sandy loam to sandy clay loam

- 2. Alluvial sandy loam to sandy clay loam
- 3. Acidic sandy loam, alluvial soil
- 4. Acidic sandy loam

- 3. Climates under the FS : Sub-Tropical in all Farming System. 4. Physiography under the FS : 1. Lowland 2. Lowland 3. Midland 4. Highland 5. Irrigation facilities under the FS: Rainfed/Irrigated 1. 2. Rainfed 3. Rainfed 4. Rainfed 6. Major crops and cropping intensity under the FS: 1. Paddy, Vegetables, 2. Paddy, Oilseeds 3. Paddy, Pulses 4. Paddy, Orange, Assam Lemon, Banana. Cropping intensity is 100%. Normally double cropping is not practiced. 7. Major cropping systems under the FS: 1. Paddy - Vegetables Mixed cropping 2. 3. Mixed cropping 4. Mixed cropping 8. Land use pattern under the FS : Cultivable area: 449648 Ha, Cultivated area: 21021 Ha, Cultivable waste: 428627 (Table 1.6). 9. Land holding pattern under the FS Marginal, Small and Big Farmers :
- Populations and socio-economic characteristics under the FS: The total population is 137223 and mainly consist of Scheduled tribes. Except a few, other farmers of the district are not well off.
- 11. Adoption pattern for each crop/breed/other technology under the FS: Not recorded
- 12. General production constraints for each crop under the FS : Lack of scientific awareness, financial problem and lack of inputs.



Demonstration of Composting



Training on making local rat traps



Ginger candy preparation

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5. Farming Systems of Mamit

1. Summary of farming Systems

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| | | | | | | | Location |
|-----------|-------------------|-------------|----------|----------|---------------------------|-----------------------|------------------------------|
| SI. No | Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | (area), extent of area |
| | | | | | | | in ha. |
| 1. | Agri-fishery | Alluvial; | 2500mm | 42-100m | Paddy/common | Accessible | 280 ha |
| | | Sandy | average | | carp | for all | |
| | | loam | per | | | types of | |
| | | | annum | | | farmers | |
| 2. | Agri-Horti | Alluvial; | 2500mm | 42-100m | Paddy, cole | Sustainable | 1330 ha |
| | | sandy | average | | crops | and | |
| | | loam | per | | | permanent | |
| | | | annum | | | farming | |
| 3. | Horticulture | Lateritic; | 2500mm | 50- | Hatkora, | A good | 340 ha |
| | | acidic soil | average | 1200m | banana, khasi | scope for | |
| | | | per | | mandarin | hilly areas | |
| | | | annum | | | | |
| 4. | Animal | Alluvial, | 2500mm | 40- | Cross bred and | Additional | 250 ha |
| | Husbandry | Lateritic, | average | 1200m | indigenous | income for | |
| | | Sandy | per | | breeds of | farmers | |
| | | loam; | annum | | Cattle, Goat, | | |
| | | acidic soil | | | Poultry/H. | | |
| | | | | | Friesian and | | |
| | | | | | Jersey cow. | | |

2. Agricultural characteristics of each farming System

| Agriculture | Paddy fish | Wet Rice | Horticulture | AH-Poultry |
|---------------------------|------------------|--------------------|------------------------|-------------|
| characteristics | farming | cultivation | | |
| Boundaries of the FS | Provided in Cha | pter – 3 | | |
| Soils under the FS | Alluvial; | Alluvial; Sandy | Lateritic; acidic soil | Alluvial, |
| | Sandy loam | loam | | Lateritic, |
| | | | | Sandy loam; |
| | | | | acidic soil |
| Climates under the FS | Subtropical | Subtropical | Subtropical | Subtropical |
| Physiography under the FS | Low land, mid la | ands to high lands | | |
| Irrigation facilities | Yes | Yes | Scanty | Moderate |

| under the FS | | | | | | |
|------------------------|--|--------------------------------------|----------------------|----------------|--|--|
| Major crops and | Paddy (100%) | Paddy (100%) | Hatkora, Banana, | Not systematic | | |
| cropping intensity | | | Arecanut (80%) | | | |
| under the FS | | | | | | |
| Major cropping systems | Double | Double cropping | Inter cropping | Mixed cropping | | |
| under the FS | cropping | | | | | |
| Land use pattern under | 45858 ha (1.6.1 | $45858 \text{ bs} (1.6.1 \pm 1.6.2)$ | | | | |
| the FS | 45050 nu (1.0.1 | | | | | |
| Land holding pattern | | | | | | |
| under the FS | | | | | | |
| Populations and socio- | Majority are sm | all farmers with an a | approximate 7614 fam | ily head | | |
| economic | | | | | | |
| characteristics under | | | | | | |
| the FS | | | | | | |
| Adoption pattern for | | | | | | |
| each crop/breed/other | Nonligible to marginal | | | | | |
| technology under the | | inginai | | | | |
| FS | | | | | | |
| General production | | | | | | |
| constraints for each | Lack of regular monthly product/supply | | | | | |
| crop under the FS | | | | | | |

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6. Farming Systems of Saiha

Each farming system was homogeneous, in general for the following.

a. Soils

-

- b. Rainfall
- c. Physiography
- d. Altitude
- e. Irrigation pattern
- f. Temperature

1. Summary of farming Systems

| | | | | | | Location |
|------------|-----------------|----------|----------|------------------|-----------------|-----------|
| Farming | | | | Principal | Important | (area), |
| System | Soils | Rainfall | Altitude | crons/breeds | features | extent of |
| System | | | | crops/breeds | reatures | area in |
| | | | | | | ha. |
| Agri-Horti | Loamy | 2500 | 500 - | Paddy, Maize, | Sustainable & | 2500 ha |
| | skeletal, Mixed | mm/yr | 1280 M | Ginger | Permanent | |
| | Hyperthermic | | | | | |
| Agri | Fine loamy, | 2500 | 30 - 250 | Paddy,pulses,oil | Sustainable & | 1000 ha |
| | Mixed | mm/yr | М | seeds | Permanent | |
| | Hyperthermic | | | | | |
| Horticul - | Loamy | 2500 | 250 - | Banana, citrus, | A good scope | 3200 ha |
| ture | skeletal, Mixed | mm/yr | 1000 M | orange | for hilly areas | |
| | Hyperthermic | | | | | |
| | | | | | | |
| AH | Alluvial, | 2500 | Not | Indigeneous & | Additional | 550 ha |
| | Lateritic, | mm/yr | Systema | Exotic breeds of | income for | |
| | Sandy loam; | | tic | cattle, poultry, | farmers | |
| | acidic soil | | | piggery & goats | | |

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2. Agricultural characteristics of each farming System

| Agriculture characteristics | Agri-Horti | Agriculture | Horticulture | AH-Poultry |
|--------------------------------|-------------------|--------------------------|-----------------------|-----------------|
| Boundaries of the | E: Myanmar W: Law | vngtlai N: Lunglei Dist. | S:Myanmar | & Lunglei Dist. |
| FS | NE: Myanmar SE: M | Iyanmar SW: Lawngtla | i Dist. NW: Lawngtlai | |

| Soils under the FS | Loamy skeletal, mixed hyperthermic | Fine loamy, mixed hyperthermic | Loamy skeletal, mixed hyperthermic | Loamy skeletal, mixed hyperthermi c | | |
|--|---|--|--|---|--|--|
| Climates under the FS | Subtropical | Subtropical | Subtropical | Subtropical | | |
| Physiography under the FS | Low land, mid lands | to high lands | | | | |
| Irrigation facilities under the FS | Nil | Yes | Nil | Nil | | |
| Major crops and cropping intensity under the FS | Paddy, Maize, Ginger (103.65%) | Paddy, Pulses, Oil seeds (107.63%) | Banana, Mandarin- Orange, Citrus (107.63%) | Not systematic | | |
| Major cropping systems under the FS | Mixed Cropping | Double Cropping | Mixed Cropping | Not systematic | | |
| Land use pattern under the FS | 10-35% slope areas | 0-10% slope areas | 10-35% slope areas | Not systematic | | |
| Land holding pattern under the FS | Owned land | Owned land | Owned land | Owned land | | |
| Population and socioeconomic characteristics under the FS | Majority are small and marginal farmers with an approximate 6324 families | | | | | |
| Adoption pattern for each crop/breed/other technology under the FS | Negligible | | | | | |
| General production constraints for each crop under the FS | Unfavourable topography, remoteness of the district, lack of infrastructures such as road and power, lack of rain water harvesting structure, lack of manpower, high labour cost, lack of proper land use Planning. | | | | | |

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7. Farming Systems of Serchhip

1. Summary of farming Systems

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| | | | | | | Location |
|--------------|--------------------------------|-----------------|------------|----------------|--------------|-----------|
| Earming | | Rainfall | Altitude | Bringinal | Important | (area) |
| cystom | Soils | | | crops (broods | features | extent of |
| system | | | | crops/breeds | | area in |
| | | | | | | ha |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Agriculture | | | | | WRC:No | |
| | | | | | adequate | 1485 ha |
| | | | | Rice(WRC & | irrigation | |
| | <u>Valley:</u> Sandy | | | Jhum), Maize, | facilities | |
| | loam to clayey | | 500 - 800 | Sugarcane, | Rainfed: | 4608 ha |
| | loam, poor in | | 500 000 | Soy bean, | Erratic | |
| | bases, | | | Rapeseed and | rainfall | |
| | moderately | | | Mustard | often reduce | |
| | acidic (pH 5.5- | Total | | | productivity | |
| | 6.0, moderate | rainfall | | | | |
| | to high) in C- | during | | | Major | |
| | content, deep to very deep. | 2007: 2875mm | | | production | |
| | | | | | of Orange, | |
| | <u>Hill Slope:</u> | | | | Banana, | |
| | Loam to Clay | | | | Cabbage, | |
| | Loam, dark to | | | | Potato, of | |
| | dark brown in | | | Citrus | the state | |
| | color; highly | Total | | (Orange), | comes from | |
| | leached with a | | | Banana, | Serchhip | |
| | pH range of | durina | | Passion fruit, | District. | |
| Horticulture | about 4.5-5.5 | 2008 up | 500 - 1300 | Cabbage, | Large scale | Not |
| | (highly acidic); | to July: | 500 - 1500 | Potato, French | production | available |
| | high in carbon | 880mm | | Bean, Bird's | of organic | |
| | and potash but | 00011111 | | Eye Chilies, | Turmeric | |
| | low in | | | Ginger, | and Passion | |
| | phosphorus; | | | Turmeric | Fruit has | |
| | deep to very | | | | been | |
| | deep and well | | | | undertaken | |
| | drained. | | | | since 2007 | |
| | | | | | under | |
| | | | | | NPOF. | |
| | | | | | | |

| Sajeev M.V, V. | Venkatasubramanian | & A.K. | Singha |
|----------------|--------------------|--------|--------|
|----------------|--------------------|--------|--------|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------|---|---|-------------|--------------|---------------|-----------|
| | | | | Pig: Local, | Production | |
| | | | | Hampshire | of meat and | |
| | | | | cross, Large | egg are not | |
| | | | | white | sufficient to | |
| | | | | Yorkshire | meet the | |
| | | | | cross | need of the | Not |
| | | | 500 - 1300 | Poultry: | people. | available |
| Animal | | | | Local, | There is | avaliable |
| Husbandry | | | | Vencob, | great | |
| Trasbarrary | | | | Hubberd | potential for | |
| | | | | Cattle: | piggery and | |
| | | | Local, HF & | poultry | | |
| | | | | Jersey cross | farming. | |
| | | | | | Done mostly | |
| | | | | | in small | |
| | | | | | scale and | |
| | | | | | not as a sole | |
| | | | | Common | income | |
| Fichery | | | 500 - 800 | Carp, Silver | earner | Not |
| TISHELY | | | 500 - 800 | Carp, Grass | though | available |
| | | | | carp, Magur | there is | |
| | | | | | great | |
| | | | | | potential for | |
| | | | | | commercial | |
| | | | | | farming. | |
| Sericulture | | | 500-1000 | Muga & Eri | | 567ha |
| | | | | SIIK | | |

2. Agricultural characteristics of each farming System

| 1. | Boundaries of the FS | : | Generally bounded by forests and other farms. |
|----|------------------------------------|----------|---|
| 2. | Soils under the FS | : | Alluvial, sandy loam, clayey loam, acidic and |
| | | | moderately fertile. |
| 3. | Climates under the FS | : | 1. Humid temperate sub-alpine zone |
| | | | 2. Humid sub-tropical Hill zone |
| | | | 3. Humid mild-tropical Hill zone |
| 4. | Physiography under the FS: Fa | rms in t | he district fall under different |
| | Physiography including Highlan | lds, mid | lands, hilly tracts and a few plains. |
| 5. | Irrigation facilities under the FS | 5: Rive | rs, Small Streams and Rivulets. |
| | | | |

6. Major crops and cropping intensity under the FS: Rice, Citrus / M. Orange, Ginger,

Cabbage, Banana Bird's eye chilli (local), Potato, Passion Fruit Cropping intensity – 125%

| 7. | Major cropping systems under the FS | | Agriculture (W.R.C. Ihuming) |
|------------|-------------------------------------|---|---------------------------------|
| <i>,</i> . | | • | Horticulture (Vegetables, fruit |
| | | | nonceature (vegetables, nat |
| | | | orchards), Animal Husbandry, |
| | | | Fishery |
| 8. | Land use pattern under the FS | : | Mono cropping, mixed cropping, |
| | | | double Cropping |
| 9. | Land holding pattern under the FS | : | Private |

- 10. Populations and socio-economic characteristics under the FS: Not Available
- 11. Adoption pattern for each crop/breed/other technology under the FS: Adoption is very low due to lack of awareness and unavailability of high yielding and improved varieties.
- 12. General production constraints for each crop under the FS: Lack of improved seeds and high yielding varieties, lack of farm machinery, poor infrastructure leading to high cost of transportation and poor storage and irrigation facilities, lack of organized market channel, lack of knowledge in pest and disease management etc.



Construction of Low-cost Green House for FLD



Demonstration on Paddy reaper at Zawlpui



Diagnostic Visit (Buffalo treatment)

Farming Systems of North East India



OFT on mulching of pineapple

Sajeev M.V, V. Venkatasubramanian & A.K. Singha



Preparation of plot for SRI



Spacing of HQPM Cultivation



Staking of tomato



Tomato Megha I & II ready for harvesting

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4.6 Farming Systems of Nagaland

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1. Farming Systems of Dimapur

The farming in the district is a mixture of Jhum cultivation and TRC followed by oilseed and cash crops. TRC paddy being main crop of the district is sown in May and harvested in last week of November or first week of December.

The major cereal crops grown in district are paddy and maize. With an annual production of 63330 MT, this accounts about 21.98% of total states production. Dimapur district is called as "Rice bowl" of Nagaland. The area under rice cultivation in the district is 20.77% against the total rice area (35520 hectares, Source: Directorate of Agriculture, Govt. of Nagaland) of the state, with an annual productivity of 2.0 (Jhum paddy) 3.0 (TRC) MT. Maize occupies 11670 hectares, with the average productivity of 1.69 MT/ha. grown in Kharif as well as in Rabi. Wheat is also grown in some pockets of district covering only 410 ha area with the productivity of 0.975MT /ha.

Wet Rice Cultivation

Wet rice cultivation is generally followed in valley or low land areas of the district. The land for wet rice cultivation is prepared by ploughing with bullocks and power tillers (only in medium and large land holdings). Irrigation is provided by construction of channels in some areas, while rainfall is the major source of irrigation. 25-30 days old seedlings of paddy are transplanted in June/ July. Application of fertilizers and pesticides is found to be negligible. However, use of fertilizers and pesticides are reported from the areas neighbouring Dimapur town.

Jhum Paddy

Jhum field, after cutting and burning the jungles, are ploughed manually with spade and seeds are broadcasted in the month of April- May after the on set of monsoon. Jhum paddy is harvested in the month of October.

Pulses production system

During 2007-08, the district had total pulse production of 10500 MT from an area of 9040 hectares. Among the pulses, the major are pigeon pea, green gram and black gram. Beans are cultivated during Kharif whereas pea, lentil and gram are grown in Rabi season. Some of local bean (rice bean) varieties are also cultivated in the district.

Oilseed production system

Soyabean, sesamum, and rapeseed/mustard are the predominant oilseed crops, widely cultivated by the farmers. The improved varieties of oilseeds being cultivated by the farmers are: Soybean variety JS-335, groundnut var. ICGS-76, sesamum var. Till-1, sunflower var. Modern and Hybrid-21, mustard var. TS-38, M-27 and B-9, linseed J-23 and JLS-9. Sesamum is grown in Kharif in Jhum fields along with maize and in plain area (1000ha) of district. Soybean covering an area of 6950 ha is the major oilseed crop of district in kharif season.

Mustard and rapeseed are generally cultivated as Rabi crop covering the maximum (14500ha) area. Mustard is grown in Jhum fields as well as in TRC plots after harvest of paddy. Few farmers cultivate this crop at commercial scale and sell it in weekly markets. Linseed covers an area of 2700 ha after mustard in Rabi season. Linseed is grown in late harvested paddy plots generally in December first week to third week. The oilseed production the district is recorded to be 22500 MT during 2007-08.

Cash crop production systems

Major cash crops of the district are sugarcane, potato, ginger, and vegetables. Sugarcane is sown in April in valley or plain areas of district after onset of monsoon and harvested in February. As Sugar Mill of the district is closed down, farmers are selling their produce in local markets and some of them are engaged in jiggery preparation. Ginger is the mostly grown in Jhum fields of Medziphema block. During 2004-05 the area under ginger was reported to be 540 ha. However this year only 970 ha is under cultivation.

Potato is cultivated in an area of 600 hectares with the average productivity of 11.016 MT q/ha due to lack of irrigation. The potato is attacked by red ants and market quality is reduced and farmers are not willing to apply chemicals to control the ants. These problems discourage the farmers for area expansion under potato.

| system /breeds features (area) | |
|---|-------|
| extent | |
| | DT |
| area in | ha |
| Agri - Hort Loamy 1200 mm 250- Paddy , maize, A part of Medziph | ema |
| Multi-croppingsand350mSoybean, Ginger,block isblock; | |
| in Jhum fields MSL pineapple hilly terrain Area – | |
| 34,500 | ia. |
| | |
| Agri - Hort Sandy 1000 mm 250 m Paddy , maize, Valley or Dhansiri | bar |
| clay loam MSL Soybean, plain land block; | |
| Mono-cropping mustard, linseed, Area- 13 | ,000 |
| as well as cabbage, ha | |
| double cropping cucurbits, black | |
| gram, Arhar | |
| Agri - Hort Sandy 1000 mm 250 m Paddy , maize, Valley or Niuland | olock |
| clay loam MSL Soybean, plain land Area- 30 | ,500 |
| Mono-cropping mustard, linseed, ha | |
| as well as cabbage, tomato, | |
| double cropping cucurbits, black | |
| gram | |
| Agri - Hort Sandy 1000 mm 250 m Paddy , maize, Valley or Kuhubot | 0 |
| clay loam MSL Soybean, plain land block; | |
| Mono-cropping mustard, linseed, Area- 14 | ,700 |
| as well as cabbage, ha | |
| double cropping cucurbits, black | |
| gram | |

1. Summary of farming systems

2. Agricultural Characteristics of each farming system

1. Boundaries of the farming system

Multi-cropping farming system: This farming system is generally followed where Jhum paddy is cultivated on gentle slope of hills along with maize and colocasia. TRC paddy is also grown followed by mustard /linseed or maize in January. This system is followed in whole district (4 blocks).

Horticulture based farming system: Pineapple is grown on the slope of hills with colocasia and cucurbits as inter crop. King chilli is also grown in Jhum fields as inter crop. This system is followed in Medziphema block of district.

Mono cropping: This system of farming is generally followed in case of Wet Rice cultivation. Here paddy is the major crop, is cultivated in low land area of district almost in all the blocks. Some of farmers cultivate maize and ginger as mono-crops in their fields.

Mixed cropping: Vegetables like beans and leafy vegetables along with soybean and Nagadal are cultivated in plain areas of districts. The summer vegetables like Okra and cucurbits are very common. Other vegetables for e.g. brinjal, chilli and tomato are grown in winter season. This farming system is followed in Niuland, Kuhuboto and Dhansiripar blocks of district.

Double cropping: Here paddy is the main crop followed by mustard or linseed as secondary crop. Some times winter maize is taken as second crop.

2. Soils under the farming system: The soils of district are dominantly of loamy sand and clay loam soil with pH ranging from 4.5 - 6.0. The total soluble salt is with in normal limit. The organic carbon content is low-medium, available phosphorus is low-medium, available potassium is low-medium, magnesium is high, calcium is low, nitrate nitrogen is medium – high, sulphur is low-medium and ammonical nitrogen is low.

| Block | Loamy sand | | Character of soil | Sandy clay loam | | Character of soil |
|-------------|------------|------|-------------------|-----------------|-------|-------------------|
| | Area | % | | Area | % | |
| Medziphema | 34500 | 37.2 | | - | - | |
| | | | As stated above | | | As stated above |
| Dhansiripar | - | - | | 13000 | 14.00 | |
| Niuland | - | - | | 30500 | 32.90 | |
| Kuhuboto | - | - | | 14700 | 15.90 | |

Source - SREP, ATMA, Dimapur

3. Climates under Farming system: The district of Dimapur falls under humid-Sub-Tropical Agro-climatic Zone (ACZ) and receives southwest monsoon rain during summer and north east monsoon during winter. The annual average rainfall is about 1000mm and annual average maximum temperature is 26°C and minimum temperature is 21°C. The highest one day temperature is 40°C and lowest one day temperature recorded is 10°C.

4. Physiography under the Farming System: The major portion of Dimapur district lies in plain sector except Medziphema Block. The plain sector consists of 3 blocks namely Dhansiripar, Niuland and Kuhuboto having identical topography, rainfall, type of soil and

source of irrigations. Whereas, the Medziphema Block is at higher altitude to that of 3 (three) blocks. Based on the above factors two different Agro – Ecological Situation (AES) were identified. AES – I comprising of Dhansiripar, Niuland and Kuhuboto Block and AES – II covering Medziphema Block.

| Agio | | | | | | | | |
|------|----------|------------------------|-------------------------|-----------------------|--|--|--|--|
| SI. | Name of | Situation | Crops grown | Cropping pattern | | | | |
| No. | AES | | | | | | | |
| 1. | AES - I | High rainfall, lowland | Paddy, Maize, Soybean, | 1. Paddy- Mustard | | | | |
| | | area and Sandy Clay | Mustard, Linseed, Black | 2. Paddy – Maize | | | | |
| | | Loam | Gram, Cabbage. | 3. Paddy – Linseed | | | | |
| | | | | 4. Maize – Black Gran | | | | |
| | | | | 5. Soybean – Fallow | | | | |
| | | | | 6. Paddy - Cabbage | | | | |
| 2. | AES - II | High rainfall / upland | Paddy, Maize, Soybean, | 1. Paddy - Fallow | | | | |
| | | area and Loamy | Ginger | 2. Maize - Fallow | | | | |
| | | sand | | 3. Soybean – Fallow | | | | |
| | | | | 4. Ginger - Fallow | | | | |

Agro – Ecological situations identified

Source – SREP, ATMA, Dimapur

5. Irrigation facilities under the farming system

The district being in the assured high rainfall zone, the lands are sufficiently irrigated through natural precipitation and denudation from water bodies through gravitational means. The district is blessed with numerous perennial sources constituting the tributary network of Chathe River, Zubza River and Dhansiri River. These sources can be harnessed for irrigation purpose.

6. Major crops and cropping intensity under the farming system

Paddy and maize are the major crops in the district, followed by colocasia, leafy vegetables and cucurbits and okra in summer or rainy season; cauliflower, cabbage, and solanaeceous vegetables (brinjal, tomato and chilli), in winter season but only in a limited area. The cropping intensity in the district is 49.8% say 50%.

7. Major cropping systems under the farming system

Mono cropping: This system of farming is generally followed in case of Wet Rice cultivation. Here paddy is the major crop, is cultivated in low land area of district almost in all the blocks. Some of farmers cultivate maize and ginger as mono-crops in their fields.

Mixed cropping: Vegetables like beans and leafy vegetables along with soybean and Nagadal are cultivated in plain areas of districts. The summer vegetables like Okra and cucurbits are very common. Other vegetables for e.g. brinjal, chilli and tomato are grown in winter season. This farming system is followed in Niuland, Kuhuboto and Dhansiripar blocks of district.

Double cropping: Here paddy is the main crop followed by mustard or linseed as secondary crop. Some times winter maize is taken as second crop.

8. Land use pattern under the farming system

Multi-cropping farming system: This farming system is generally followed where Jhum paddy is cultivated on gentle slope of hills/ plains along with maize and colocasia. TRC paddy is also grown followed by mustard /linseed or maize in December or January. This system is followed in whole district (4 blocks). Vegetables are also cultivated in the district in Jhum fields, on an area of 1049 hectares only.

Horticulture based farming system: Pineapple is grown on the slope of hills with colocasia and cucurbits as inter crop. King chilli is also grown in Jhum fields as inter crop. This system is followed in Medziphema block of district.

| Particulars | | Dhansiripar | Kuhuboto | Niuland | Medziphema | Total |
|-------------|-----------|-------------|----------|---------|------------|-------|
| | | block | block | block | block | |
| Total ho | use holds | 4142 | 3182 | 7164 | 14274 | 28762 |
| Land | Large | 663 | 255 | 2363 | Nil | 3281 |
| holding | Medium | 1490 | 1050 | 1146 | 5281 | 8967 |
| | Small | 1036 | 891 | 1863 | 4996 | 8786 |
| | Marginal | 953 | 986 | 1791 | 3997 | 7727 |

9. Land holding pattern under the farming system

10. **Populations and socio economic characteristics under the Farming System**

| Name of the | Population | % | Male | Female | | Workers No. | | | Cate |
|-------------|------------|-------|-------|--------|-------|-------------|-------------|--------|------|
| block | (As per | of | No. | No. | | | | gorie | |
| | 2001 | Liter | | | Aari. | | Non – Aari. | | s |
| | Census | асу | | | | , ight. | | | |
| | Total) | | | | | | | | |
| | | | | | Male | Female | Male | Female | |
| Medziphema | 105014 | 79 | 53556 | 51455 | 42845 | 41165 | 10711 | 10290 | ST |
| Dhansiripar | 20322 | 78 | 10363 | 9956 | 8291 | 7965 | 2072 | 1991 | ST |
| Niuland | 34086 | 77 | 17384 | 16702 | 13907 | 13362 | 3477 | 3340 | ST |
| Kuhuboto | 20746 | 80 | 16597 | 4149 | 8464 | 8133 | 2116 | 2033 | ST |



Demonstration of paddy seeder



Farmer harvesting bottle gourd

Farming Systems of North East India



Farmer using paddy weeder

Farmer's uprooting nursery for SRI ICGS-76 in farmer's plot



Netting in fishery of farmer



Transplanting in SRI



Visit to Sitakie mushroom

nanana

2. Farming Systems of Kohima

1 Summary of farming Systems

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| Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | Location (area), extent of area in ha. |
|--------------------------------------|--|------------------|------------------|---|-----------------------|---|
| Agro Ecological System -I | Sandy loam to fine loamy rich humus soil | 143mm annualy | 1500- 3048MSL | | | Kohima & Jakhama block (52600 ha) |
| a) EFS-1 Agri - Animal Husbandry | | | | Paddy (TRC) & Pig | | |
| b) EFS-2 | | | | Paddy | | |
| Agri - Hort | | | | (Jhum), Potato & Colocassia+ chilly+Maize | | |
| c) EFS-3 | | | | Cow and | | |
| Agri - Animal Husbandry - Fishery | | | | fishery | | |
| Agro Ecological System -II | Sandy loam to fine loamy rich humus soil | 143mm annualy | 500- 1500MSL | | | Chiephoboz ou & Tseminyu block (106900 ha) |
| a) EFS-1 Agri - Animal Husbandry | | | | Paddy (TRC) Phaddy (Jhum) Colocassia+ chilly+Maize & Piggery | | |
| b) EFS-2 | | | | Passion fruits | | |
| Hort - Apiculture | | | | anu Oranye | | |
| d) EFS-3 | | | | Paddy (TRC) | | |
| Agri - Fishery | | | | + risilery | | |

EFS- Existing Farming System

2 Agricultural characteristics of each farming System

1. Boundaries of the FS

| SI. No | Name of Block | Area (ha) | % of geographical area of the district | Name of AES |
|--------|---------------|-----------|---|-------------|
| 1. | Kohima | 30900 | 19.37 | AES-I |
| 2. | Jakhama | 21700 | 13.6 | AES-I |
| 3. | Chiephobozou | 50500 | 31.66 | AES-II |
| 4. | Tseminyu | 56400 | 35.37 | AES-III |
| | Total | 159500 | 100 | |

2 Soils under the FS

Sandy loam to fine loamy rich, humus soil.

3 Climates under the FS

Sub tropical hill zone

4 Physiography under the FS

| SI. No. | Name of Block | Features |
|---------|---------------|------------------------|
| 1 | Kohima | Highland to mid land |
| 2 | Jakhama | Highland to mid land |
| 3 | Chiephobozou | Midland to hilly tract |
| 4 | Tseminyu | Lowland to hilly tract |

5 Irrigation facilities under the FS

| SI. No. | Rainfall area (ha) | Percent (%) | Irrigated area | | | | |
|---------|-----------------------|----------------|----------------|-------|------|--|--|
| | | | % | Ρ | A | | |
| AES-I | 52600 | 32.9 | 15 | 5000 | 1712 | | |
| AES-II | 106900 | 66.9 | 4.55 | 10000 | 2349 | | |

%- Share of the total area under irrigation, P- Potential area, A- Actual area irrigated

| SI.No | Crops | Cropping Intensity (%) |
|--------|--------------------|------------------------|
| AES-I | Paddy (TRC & Jhum) | 86.91 |
| | Ginger | 0.77 |
| | Potato | 5.76 |
| | Maize | 5.67 |
| | Chilly | 0.04 |
| | Soyabean | 0.85 |
| | Total | 100 |
| AES-II | Paddy (TRC & Jhum) | 95.15 |
| | Ginger | 1.06 |
| | Maize | 1.92 |
| | Soyabean | 1.17 |
| | Colocassia | 0.7 |
| | Total | 100 |

6. Major crops and cropping intensity under the FS

7. Major cropping systems under the FS

| SI. No. | Cropping System | Сгор |
|---------|-----------------|--|
| AES-I | Kharif | Paddy (TRC & Jhum), Ginger, Maize, Chilly, Soyabean |
| | Zaid | Photo |
| AES-II | Kharif | Paddy (TRC & Jhum), Ginger, Maize, Chilly, Soyabean & Colocassia |

8 Land use pattern under the FS

| SI. No. | Geographical area (Sqkm) | Cultivable area | Cultivated area | Cultivable waste | Current follow |
|---------|-----------------------------|-----------------|-----------------|---------------------|-------------------|
| AES-I | 526 | 26720 | 5194.1 | 10114.45 | 3103.31 |
| AES-II | 5069 | 54251 | 10545.7 | 20535.5 | 3300.67 |

| SI. No. | Forest (ha) | | Pasture (ha) | Land put to non agriculture | Land under Misc. plantation | Barren and uncultivable land (ha) |
|---------|-------------|-------|--------------|-----------------------------------|-----------------------------------|---|
| | Reserved | Open | | use (ha) | | (wasteland) |
| AES-I | Nil | 13228 | Nil | 6814.5 | 1492.64 | 264 |
| AES-II | Nil | 26857 | Nil | 13835.5 | 8512.34 | 3077.6 |

| SI. No. | Land Holding | | | | | | | | |
|---------|-------------------------|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|
| | Larg | e | Medi | um | Sm | all | Margi | inal | Landles s |
| | No. of holdings % | Area (ha) | No. of holdings % |
| AES-I | Nil | Nil | 8.57 | Nil | 94.29 | Nil | 109.1 | Nil | Nil |
| AES-II | 29.18 | Nil | 58.33 | Nil | 22.14 | Nil | 90.31 | Nil | Nil |

9 Land holding pattern under the FS

10 Populations and socio-economic characteristics under the FS

| SI. No. | Population as per 2001 census | Category | Workers Nos | | | |
|---------|-------------------------------|----------|-------------|--------|------|--------|
| | | | A | gri | Non- | Agri |
| | | | Male | Female | Male | Female |
| AES-I | 75389 | ST | 31964 | 30066 | 7991 | 5366 |
| AES-II | 75389 | ST | 30814 | 31041 | 7779 | 3449 |

11 Adoption pattern for each crop/breed/other technology under the FS

Same as given in above (Summary of farming system)

12 General production constraints for each crop under the FS

| AES-I and AES-II | 1 | Non availability of quality seeds |
|------------------|---|-----------------------------------|
| | 2 | Preference for local seedlings |
| | 3 | Poor irrigation facilities |
| | 4 | Financial problems |
| | 5 | Marketing constraints |
| | 6 | Pest and diseases management |
| | 7 | Low income of farmers |
| | 8 | Less availability of inputs |
| | 9 | Poor management |

| 10 | Scarcity of man power |
|----|-------------------------------------|
| 11 | Failure of enterprise |
| 12 | Risk of failure |
| 13 | Lack of Knowledge |
| 14 | Indigenous method of farming system |
| 15 | Less input of mechanization |
| 16 | Lack of cold storage facilities |



Farmers' participation – Learning by doing: Training on Land preparation



Frontline demonstration on Pea (Rachna) in farmer field



Rural Youth actively participating in the practical session on Soil testing

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3 Farming Systems of Mokokchung

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1 Summary of farming Systems

- 65

| Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | Location (area), extent of area in ha. |
|---------------------------|---|----------------------|---------------|---|--|--|
| Agri – Horti | Red sandy loam, Red Clay loam | 3000 – 2500 mm | 150 - 1650 | Paddy, Tapioca, Maize, Passion fruit, Ginger, Orange, Banana | Agri crops are mostly for home consumption and horti crop are for cash income | 33144.6 |
| Agri – AH | -do- | -do- | 150-1650 | Paddy, Tapioca, Maize, Local cross bred cows | Agri products & By product are fed to the animals and the Animals contribute to nutrient supplement and financial security | 38668.7 |
| Agri - Fishery | -do- | -do- | 150-1000 | Paddy, Tapioca, Maize, Passion fruit, Ginger, Orange, Banana, IMC & exotic carp | Agri product provides food security and the topography of the area is suitable for taking up fish culture | 16572.3 |
| Agri - AH - Fishery | -do- | -do- | 150-1650 | All the above mention item | To make available all possible needs | 22096.4 |

2 General production constraints for each crop under the FS

- 1. Lack of technical knowledge
- 2. Non availability of improved HYV seeds in time
- 3. Lack of marketing network and infrastructure
- 4. High cost of labour inputs
- 5. Lack of readily available credit facilities.

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A Demonstration on bee hive division

Knol Khol (EWV) in farmer field

Rice bean in field



Rice Var. SARS – 2 in farmer field

Sweet Corn (Komal) in field

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1 Summary of farming systems

Agro-ecological situation (AES) have been identified based on the criteria defined above and identified AESs have been classified into the homogeneous farming situations for the district Phek, Nagaland. Identified farming situations grouped as Farming systems are being furnished in the following table.

| Farming System | Soils | Rainfall | Altitude | Principal | Important | Location |
|--|--------------------------------------|------------|---------------|---|---|---|
| | | (cm/annum) | (M) | Crops/breeds | features | Area(ha) |
| Agri – Hort – AH – Fishery Zabo system (Integrated Farming system) | Clay loam to clay | 150- 170 | 1500- 1800 | Forest cover, Paddy, Maize Beans, Pea, Cowpea, Arahar, Nagadal, Cabbage Banana, Pear, Peach, Plum, Garlic, Potato, Buffalo, Cattle and Fish | Integration of different components, viz. Forestry, Cereals, Pulses, Vegetable, Livestock and Fisheries | Kirkuma R D Block (6500 ha) |
| Agri – Silvi – Hort - Pastural | Sandy Ioam, to Clay Ioam | 180-200 | 1500- 2000 | Forest & Fodder trees like Ficus spp, Bauhinia spp., Legistroma etc., Fodder grasses like Broom grass, Napier etc.Maize Banana, Pear, Peach, Plum, Mandarin, Passion fruit Mithun, Cattle | Integration of forest, fodder crops, fruit trees and Livestock | Pfutsero, Chozuba and Milluri sub- divisions (13,500 ha) |

| Agri – Hort – Plantation (Tea) based | Loam | 160-180 | 1000- 1600 | Maize, Millets, Jobstears, Potato Chillies, Pumpkin Mandarin, Passion fruit, Large cardamom, Tea | Replenishing the nitrogen requirement of the crops with Alder trees | Pfutsero, Chozuba and Milluri sub- divisions (5,600 ha) |
|--|-----------------------------|---------|---------------|--|--|---|
| Agri+Horti Jhum | Sandy Ioam to Ioam | 160-180 | 1000- 1600 | Jhum Paddy, Maize, Millets Banana, Papaya, Beans, Cowpea, Chow chow Pea, Garlic, Potato, Cabbage | Slash and burn the vegetation and now jhumming cycle has reduced to 3- 6 yrs from 15-25yrs | In entire district (22,500 ha) |
| Agri – Hort - Fishery Pani-kheti System | Clay loam to clay | 150-180 | 600- 1400 | Paddy, Pea, Summer vegetables, Fish | Paddy cum fish farming | Entire district (13,520 ha) |

2. Agricultural characteristics of each farming System

A. ZABO system (Integrated Farming system) of Agri – Hort – AH - Fishery

Boundaries of the FS: Zabo literally means "impounding of water" also known as "RUZA" is prevalent in Kikruma Development Block of the Phek district. The area surrounded by two rivers "Seidzu" and "Khuzha" is traditionally under this system. In this farming system combination of forest, livestock and fisheries are integrated with well founded conservation base.

Soils under the FS: Red and red laterite soil group is predominantly available, which texturally varies from clay to clay loam.

Climates under the FS: Rain fall is moderate to high with average rainfall of 150-170 cm per annum. Temperature is moderate with high humidity. Average temperature in winters is about 4-6 0 C and in summers it ranges from 18 - 260 C.

Physiography under the FS: Moderate hills with gentle slope have been observed.

Irrigation facilities under the FS: Construction of water harvesting pond is an important feature of this farming system. The pond generally constructed in middle adjacent to the catchment area. Certain farmers also go for construction of water harvesting pond in lower area where it is being used for fish farming and irrigating to paddy fields. Indigenously bamboo was being used to carry the water from pond to the fields but nowadays pipes are also being commonly used.

Major crops and cropping intensity under the FS: Zabo is one of the indigenous farming systems which have combination of forest, agriculture, livestock and fisheries. Trees of forest species like Alder, Oak, Ficus spp. Albizia spp. Bahunia spp. Pinus spp. Delbergia spp. Bamboo spp. etc. are commonly taken on the top of the slope. Fruit plants like Banana, Pear, Peach, Plum, Passion fruit are also grown. Maize, Millets and Paddy are the common cereal crops which are being grown in this farming system. Maize is taken on the slope however paddy is taken on terraces and foot hills. Among the pulses Nagadal, Beans, Pea, Cowpea, are commonly grown. Vegetables like Potato, Cabbage, Sweet potato, Chillies etc. are also taken. Livestock is an important component of this system. Buffalo and cattle specifically Thotho are the main livestock, which are taken adjacent to the pond in a confined area. Local and exotic carp spp. are raised in ponds and common carps and local fishes are taken in paddy fields.

In most of the area mono cropping is practiced but in certain area where the irrigation facilities are available, pulses like pea and vegetables such as potato, cabbage, mustard leaf, sweet potato, chillies etc. are being taken. The overall cropping intensity of the Zabo farming system is about 140%.

Major cropping systems under the FS: Mono cropping- Rice, Rice-Pea, Maize +Beans, Maize +Cabbage – Potato, Maize +Beans – Potato

Land use pattern under the FS: The land use pattern of the farming system is divided into Forest area, Orchards, Agri-Horti. crops, Livestock and Fishery.

Land holding pattern under the FS: Zobo system of farming is mainly practiced by the big and marginal farmers as it is cost intensive. This system is also practiced on community land where the small and marginal farmers are the main stake holder.

Populations and Socio-economic characteristics under FS: About 7 % of the total population of the district is engaged in Zabo farming system comprising big and marginal farmers.

Adoption pattern for each crop/ breed/other technology under the FS: Zabo is one of the indigenous farming system prevalent in Nagaland and the adoption pattern of the components such as forest, agricultural crops, livestock are traditional whereas improved technology for water harvesting and fish culture is being adopted. Now the resource rich farmers are also using high yielding and hybrid varieties seeds particularly in vegetables.

| Crops | Constraints |
|--------|---|
| Paddy | Poor nursery raising technique |
| | High seed rate |
| | Low yield of local varieties |
| | Non availability of high yielding/hybrid varieties |
| | Improper weed management |
| | Insect, pest and diseases infestation |
| | No use of organic/inorganic amendments against insect, pest and diseases. |
| Maize | Low yield of local varieties |
| | Non availability of high yielding/hybrid varieties |
| | High seed rate |
| | Cob borer infestation |
| | Stem borer infestation |
| | Nutrient deficiency |
| Arahar | Low yield of local varieties |

General production constraints for Zabo farming system.

Farming Systems of North East India

| | Non availability of high yielding varieties |
|---------------|--|
| | Wilting of seedlings |
| | Inadequate pest and disease management |
| Peas | Low yield of local varieties |
| | Non availability of high yielding varieties |
| | Powdery mildew occurrence during winter |
| Sweet potato | Low yield of local varieties |
| | Non availability of high yielding varieties |
| Cabbage | Insect, pest and diseases infestation like cabbage butterfly larvae, aphids, cut |
| | worm |
| | No use of organic/inorganic amendments against insect, pest and diseases. |
| Potato | Low yield of local varieties |
| | Non availability of high yielding varieties |
| | No seed treatment |
| | Red ant infestation |
| | Late blight disease infestation |
| Banana | Poor quality of fruit of local varieties |
| | Non availability of quality planting material of better marketable quality varieties |
| | Pseudostem rot of banana |
| | Sigatoka leaf spot |
| | Pseudostem borer and weevil infestation |
| | Nutrient deficiency |
| Passion fruit | Improper training resulting in low yield |
| | Collar rot disease |
| | Infestation of woodiness virus |
| | Bacterial leaf spot |
| | Insect infestation like mite, fruit borer |
| | Nutrient deficiency |
| Pear | Non availability of quality planting material |
| | Leaf spot |
| | Poor marketing facility |
| Peach | Non availability of quality planting material |
| Plum | Non availability of quality planting material |
| Mithun | Deforestation and shrinking of forest area |
| | Parasitic infestation |
| | Attack from wild animals |
| | Occurrence of epidemics like FMD |

| Buffalo | Poor genetic make up of milk production trait |
|---------|--|
| | Epidemics of infectious diseases like FMD |
| | High rate of worm infestation in buffalo calves |
| Cattle | Low milk yield in local breed "Thotho" |
| | Poor body weight gain in local breed. |
| | Non availability of better germplasm |
| | Epidemics of infectious diseases like FMD |
| Fish | Non availability of quality fingerlings |
| | Occurrence of skin disease |
| | Unawareness about Physico- Chemical parameters of soil and water of fishponds. |
| | Improper Pre stocking measures |
| | |

B. Agri – silvi – hort - pastural farming system

Boundaries of the FS: Agrisilvihortipasture is a traditional farming system where various components of farming like crops and animal husbandry are blended with forest environment to get the maximum output. This farming system is prevalent in all the four sub division i.e. Pfutsero, Chozuba, Phek, and Melluri and is practiced on the hillocks. In this farming system integration of livestock and crops with natural forest cover is followed.

Soils under the FS: Sandy loam - loam textured soil is predominantly available.

Climates under the FS: Moderate to high with average rainfall of 170-200 cm per annum. Temperature is low with high humidity.

Physiography under the FS: This system is practiced on high hills with moderate to steep slopes

Irrigation facilities under the FS: No specific irrigation facilities are normally available in this system but the water from the streams is channelized and used for irrigation.

Major crops and cropping intensity under the FS: Agrisilvihortipasture is an indigenous system of farming practiced by the local people from time immemorial. In this system, crops and livestock component are taken along with natural forest cover. Maize is major cereal crop grown in the system, however Banana, Mandarin, Passion fruit, Pear, Peach, Plum are the main horticultural crops. In certain pockets cabbage and beans are also being taken as mixed crop with maize. Forest & Fodder trees like Ficus spp, Bauhinia spp., Legistroma etc. and Fodder grasses like Broom grass, Napier and Guinea grass. are also grown with Livestock component like Mithun and Cattle. Cropping intensity in this system is 100%.

Major cropping systems under the FS: Mono cropping and mixed cropping system is followed in Agrisilvihortipastural system.

Land use pattern under the FS: The land use pattern of the farming system is divided into Forest area which normally being used for grazing of Mithun and cattle. Orchards and Livestock.

Land holding pattern under the FS: Agrisilvihortipastural system of farming is mainly practiced by the big farmers. This system is also practiced on village community land.

Populations and Socio-economic characteristics under FS: About 15 % of the total population of the district is engaged in Agrisilvihortipastural system. Mainly the resource rich and marginal farmers adopt this system .

Adoption pattern for each crop/ breed/other technology under the FS: Agrisilvihortipastural is an indigenous farming system practiced by the local people in the district and the adoption pattern of the components such as forest, agricultural crops, livestock are traditional.

| Crops | Constraints |
|---------------|---|
| Maize | Low yield of local varieties |
| | Non availability of high yielding/hybrid varieties |
| | High seed rate |
| | Cob borer infestation |
| | Nutrient deficiency |
| Beans | Low yield of local varieties |
| | Non availability of high yielding varieties |
| Cabbage | Insect, pest and diseases infestation |
| | Non availability of organic/biological control agent against insect, pest and diseases. |
| | Poor marketing |
| Banana | Poor quality of fruit of local varieties |
| | Non availability of quality planting material of better marketable quality varieties |
| | Pseudostem rot of banana |
| | Sigatoka leaf spot |
| | Pseudostem borer |
| | Nutrient deficiency |
| Passion fruit | Improper training resulting in low yield |
| | Collar rot disease |
| | Infestation of woodiness virus |
| | Bacterial leaf spot |
| | Insect infestation like mite, fruit borer |
| | Nutrient deficiency |
| Mandarin | Poor nursery raising technique |
| | Poor weed management |
| | Poor insect and disease management |
| | Severe nutrient deficiency |
| | Non availability of high quality planting material |

3. General production constraints for Agri – silvi – hort - pastural system

| - | |
|--------|---|
| Pear | Non availability of quality planting material |
| | Leaf spot |
| | Poor marketing facility |
| Peach | Non availability of quality planting material |
| | Poor marketing facility |
| Plum | Non availability of quality planting material |
| | Poor marketing facility |
| Mithun | Deforestation and shrinking of forest area |
| | Parasitic infestation |
| | Attack from wild animals |
| | Occurrence of epidemics like FMD |
| Cattle | Low milk yield in local breed "Thotho" |
| | Poor body weight gain in local breed. |
| | Non availability of better germplasm |
| | Epidemics of infectious diseases like FMD |

C. Alder based farming system (Agri – Hort – Plantation (Tea) based)

Boundaries of the FS: Alder based farming system is mainly practiced in Pfutsero and Chozuba sub division. In this system crops are grown along with alder trees which supply atmospheric nitrogen to the crop.

Soils under the FS: Loam soil is widely available under this system.

Climates under the FS: Moderate rainfall of 160-180 cm per annum. Temperature is low with high humidity.

Physiography under the FS: Moderate to steep terrain, mid hills to high hills.

Irrigation facilities under the FS: No specific irrigation facilities are normally available in this system but the water from the streams are channelized by bamboo and used for irrigation.

Major crops and cropping intensity under the FS:

Maize, Millets, Potato, Sweet potato, Pumpkin, Large cardamom and Tea are grown along with alder trees. Cropping intensity in this system is 110%.

Major cropping systems under the FS: Mono cropping system, Mixed cropping system is followed in this system.

Land use pattern under the FS: The land use pattern of the farming system comprises of agricultural and horticultural crops integrated with alder trees.

Land holding pattern under the FS: Alder based farming system is mainly practiced by the big and marginal farmers. This system is also practiced on community land by the village people.

Populations and Socio-economic characteristics under FS: About 6 % of the total population of the district is engaged in Alder based farming system. Alder based farming system is mainly practiced by the big and marginal farmers.

Adoption pattern for each crop/ breed/other technology under the FS: Alder based farming system is a primitive farming system practiced by the local people in the district and the adoption pattern of the components are traditional.

| Crops | Constraints |
|----------------|--|
| Maize | High seed rate |
| | Non availability of high yielding/hybrid varieties |
| | Cob borer infestation |
| | Nutrient deficiency |
| Millets | Low yield of local varieties |
| Potato | Low yield of local varieties |
| | Non availability of high yielding varieties |
| | Red ant infestation |
| Sweet potato | Low yield of local varieties |
| | Non availability of high yielding varieties |
| Pumpkin | Low yield of local varieties |
| | Non availability of high yielding varieties |
| | Insect, pest disease infestation |
| Large cardamom | High insect , pest and diseases |
| | Deficiency of nutrients |
| Теа | Poor weed management in the garden |
| | Heavy insect pest and disease occurrence |
| | Poor nutritional management |
| Passion fruit | Improper training system |
| | Collar rot disease |
| | Infestation of woodiness virus |
| | Grease spot on leaf |
| | Bacterial leaf spot |
| | Insect infestation like mite and fruit borer |
| | Nutrient deficiency |

General production constraints for Alder based farming system.

D. Jhum system (Agri – Hort)

Boundaries of the FS: Jhum or shifting cultivation which was considered as an promising system of cultivation in olden days, lately due to population pressure on land the jhuming cycle has reduced to 3-5 years from earlier jhuming cycle of 15-25 years. This farming system is prevalent in all the four sub division i.e. Pfutsero, Chozuba, Phek, and Melluri and is practiced on slopes of the hills. It is still the main cultivation practice of the local inhabitant occupying the major area under cultivation. In this system number of crops are grown on the same piece of land at the same time.

Soils under the FS: Sandy loam to loam are the predominant textural class of soil present in this system.

Climates under the FS: Moderate rainfall of 160-180 cm per annum. Temperature is moderate with high humidity.

Physiography under the FS: Jhum cultivation is practiced in low to high hills with moderate to steep terrain.

Irrigation facilities under the FS: This system is solely dependent upon rainfall.

Major crops and cropping intensity under the FS: Mixed cultivation of various cereal crops like Paddy, Maize, Millets etc., pulses like Beans, Cowpea, Pea, fruits and vegetables like Banana, Papaya, Cabbage, Potato Ginger, Garlic, Turmeric etc. are grown. Cropping intensity of this farming is 120%. Major cropping systems under the FS: Mixed and relay cropping systems are followed in this farming

system.

Land use pattern under the FS: The land use pattern of the farming system comprises of agricultural and horticultural crops.

Land holding pattern under the FS: Jhum cultivation is mainly practiced on community land by small and marginal farmers. However, certain resource rich farmers also go for jhuming.

Populations and Socio-economic characteristics under FS: About 35% of the total population of the district is engaged jhum cultivation. Jhum cultivation is mainly practiced on community land by small and marginal farmers

Adoption pattern for each crop/ breed/other technology under the FS: Jhum cultivation is a primitive farming system practiced by the local people in the district and state as a whole. The adoption pattern of the various components is traditional and primitive.

| Crops | Constraints |
|-------|---|
| Paddy | Poor nursery raising technique |
| | High seed rate |
| | Low yield of local varieties |
| | Non availability of high yielding/hybrid varieties |
| | Insect, pest and diseases infestation |
| | Non availability of organic/biological control agent against insect, pest and |
| | diseases. |
| Maize | High seed rate |
| | Low yield of local varieties |
| | Non availability of high yielding/hybrid varieties |
| | Cob borer infestation |
| | Nutrient deficiency |

3. General production constraints for Jhum system
| Millets | Low yield of local varieties |
|---------|--|
| | Non availability of high yielding/hybrid varieties |
| | Nutrient deficiency |
| | Crop damage by birds |
| Cabbage | Insect, pest and diseases infestation |
| | Non availability of organic/biological control agent against insect, pest and |
| | diseases. |
| | Poor marketing |
| Potato | Low yield of local varieties |
| | Non availability of high yielding varieties |
| | Red ant infestation |
| Beans | Low yield of local varieties |
| | Non availability of high yielding varieties |
| Cowpea | Low yield of local varieties |
| | Non availability of high yielding varieties |
| Peas | Low yield of local varieties |
| | Non availability of high yielding varieties |
| | Powdery mildew occurrence during winter |
| Banana | Poor quality of fruit of local varieties |
| | Non availability of quality planting material of better marketable quality varieties |
| | Pseudostem rot of banana |
| | Sigatoka leaf spot |
| | Pseudostem borer |
| | Nutrient deficiency |
| Рарауа | Low yield of local varieties |
| | Non availability of high yielding varieties |
| | Nutrient deficiency |
| | Incidence of viral diseases |
| Ginger | Soft rot disease |
| | Solt for discuse |

E. Panikheti (Agri – Hort – Fishery)

Boundaries of the FS: Panikheti system is also known as wet land terrace cultivation is an indigenous system of cultivation in the district. This system of cultivation developed by Chakhesang tribe of Phek district, Nagaland and is being practiced in all the four sub division i.e. Pfutsero, Chozuba, Phek, and Melluri on mid and low hills. This is bacically rice based cropping system where paddy is grown on terraces. Bunds and terraces control soil erosion, loss of top soil and nutrients.

Soils under the FS: Clay loam to clay soil texture are the predominant textural class of soil present in this system.

Climates under the FS: High rainfall of 160-200 cm per annum. Temperature is moderate with high humidity.

Physiography under the FS: Foot hills and terraces with low to gentle slope.

Irrigation facilities under the FS: Paddy is basically high water requiring crop, though rain water is sufficiently available but where paddy cum fish culture is taken in this system, water is brought from high hills by diverting through main channels/sub channels ensuring 10-15cm water depth. Sometimes bamboo channels are also used to divert/carry water to terraces.

Major crops and cropping intensity under the FS: Paddy is the major crop but on bunds colocasia and yams are also cultivated. Fish culture in small water ponds dig out in the middle of terraces is used for rearing of common carps to fetch additional income and water management. This is most significant aspect of panikheti system.

Major cropping systems under the FS: Mono cropping is the significance of this system and only rice is taken.

Land use pattern under the FS: The land use pattern of the farming system comprises of paddy cultivation and fish farming.

Land holding pattern under the FS: Panikheti is mainly practiced by all group of farmers having small to large holdings.

Populations and Socio-economic characteristics under FS: About 30 % of the total population of the district is engaged in panikheti. This system is basically followed by farmers of all socioeconomic categories.

Adoption pattern for each crop/ breed/other technology under the FS: Panikheti is a traditional farming system developed by Chakhesang tribe in the district and now being practiced by all the tribes. The adoption pattern of the various components is traditional and primitive.

4. General production constraints for Panikheti

| Crops | Constraints |
|-------|---|
| Paddy | Poor nursery raising technique |
| | High seed rate |
| | Low yield of local varieties |
| | Non availability of high yielding/hybrid varieties |
| | Insect, pest and diseases infestation |
| | Non availability of organic/biological control agent against insect, pest and diseases. |
| Fish | Non availability of quality fingerlings |
| | Occurrence of skin disease |



Planting in OFT on Banana



Garden pea FLD



Vaccination against RD2



Vermicomposting

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5 Farming Systems of Tuensang

Each farming system was homogeneous, in general for the following.

- 1. Soils 2. Rainfall 3. Physiography
- 4. Altitude 5. Irrigation pattern 6. Temperature

Map of Agro-Climatic Zones of Tuensang:

-82

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High hills and rolling topography is the nature of this district. Considering Altitude as the primary parameter and rainfall and soil as the secondary the district in categorized into two Agro-Climatic Zones.

- 1. Sub-Tropical Hill Zone (AES I) : This zone includes those areas which has an Altitude ranging from 1000m-1500m from the Mean Sea Level.
- 2. Sub-Alpine Temperate Zone (AES II) : This zones includes those areas which has an altitude ranging from 1500m-3500m from the Mean Sea Level.

1 Summary of farming systems

| Farming system | Soils | Temp | Rainfall | Altitude | Principal | Important features | extent of area in ha |
|-------------------------|--------|-----------|------------------------|------------------|--|-----------------------|-------------------------|
| | | | | | Crops/breeds | | |
| Agri - Hort | Acidic | 5C to 30C | 1000mm to 2500mm | 1000- 3500msl | Cereals, potato, veg., garlic, chillies, Rajmah/ beans, Mustard, Ginger, Groundnut, Colocasia, Topioca, Banana, Mango, guava, pears, passion fruit, peach, pine apple, Apple etc. | | |
| Agri - Hort - A.H | Acidic | 5C to 30C | 1000mm to 2500mm | 1000- 3500msl | Cereals, potato, veg., cole-crops, Rajmah / beans, soyabean, Rice bean, Ginger, soyabean, Groundnut, Mustard, Pea, Colocasia,Topi oca, Banana, apple, plum, guava,Mango, passion fruit, peach, Poultry, goatry, diary, piggery (mainly Indigenious & Mix breeds) | | |

| | | | | | etc | |
|--|--------|-----------|------------------------|------------------|--|--|
| | | | | | | |
| | | | | | | |
| Agri - Hort - A.H - Fishery | Acidic | 5C to 30C | 1000mm to 3000mm | 1000- 1500msl | Cereals, potato, Winter veg., garlic, chillies, Rajmah /beans, Ginger, Soyabean, Groundnut, Mustard, Pea, Colocasia, Tapioca, Banana, Mango, guava, pears, passion fruit, peach, pine apple etc, Poultry, goatery, dairy, piggery (mainly Indigenous & Mix breeds) and fishery. | |
| Agri - Hort - A.H - Sericulture | Acidic | 5C to 30C | 1000mm to 3000mm | 1000- 1500msl | Cereals, potato, Winter.veg., garlic, chillies, Rajmah/ beans, Ginger, Groundnut, Colocasia Tapioca, Banana, Mango, guava, pears, passion fruit, peach, pine apple, Poultry, goatery, dairy, piggery (mainly Indigenous & Mix breeds) and sericulture (Iri & Muga) | |

2 Agricultural characteristic of each farming system

- 1 Boundaries of the FS : Provided as map
- 2 Soils under the FS.

The Soils of Tuensang are moderately deep to deep, Loamy -skeletal, fine loamy to fine in texture and moderately to severely eroded. The soils are moderately to strongly Acidic, high in organic matter and low in exchangeable bases.

- 3 Climates under the FS
 - 1. Sub-Tropical hill climate.
 - 2. Sub-alpine temperate climate.
- 4 Physiography under the FS. Not available.
- 5. Irrigation facilities under the FS.
 - 1. Rivers
- 6 Major crops and cropping intensity under the FS.
 - Cereals, potato, Veg., cole-crops, Rajmah / beans, soyabean, Rice bean, Groundnut, Ginger, Soyabean, Mustard, Pea, Colocassia, Tapioca, Banana, apple, plum, guava, Mango, Passion fruit, peach etc. Cropping intensity : 100% (for 60% of the farmers) and 200% (for 40% of the farmers) mainly form Shamator Block.
- 7 Major cropping systems under the FS.

Crop rotations followed:

- 1. Jhum Paddy / Rajmah (in Jhum field).
- 2. Maize + Beans / Rajmah.
- 3. TRC / Mustard or Pea.
- 4. Cereals / Soyabean.
- 5. Potato / Maize+Rajmah.
- 6. Cabbage / Millets.
- 7. Cereals / Garlic.
 - (Apart from this most of the fields are kept fallow in both Jhum & TRC). Crop sequences followed:
 - 1. Cereals / Beans
 - 2. Cereals / Mustard or Pea.
 - 3. Cabbage / Cereals (Millets).

Inter-cropping done:

- 1. Maize + Rajmah (Kholar).
- 2. Maize + Soyabean.
- Mixed cropping done:
- 1. Jhum Paddy + Maize + Vegetables + Beans + Colocassia + Topioca Etc.

(In jhum field almost all crops that are used in the district are grown mixed in the same piece of land in the same year).

8. Land use pattern under the FS

| Gross cropped area | : | 23334 ha. |
|--------------------|---|------------|
| Net Area sown | : | 17448 ha. |
| Fallow lands | : | 5886 ha. |
| Cultivable Lands | : | 2176921 ha |
| Forest cover | : | 77468 ha. |
| Barren lands | : | NA |
| | | |

Land Holding Pattern under FS.

Land holding system either for settlement or for cultivation purposes is same to all the tribes of Nagaland. With respect to cultivation, clans will have distinct community land holdings which will be shared among families within their respective clans. Landless families will be leased with certain area in the Jhum cycle by the villagers. An average of 8-9 yrs Jhum cycle is being followed in Tuensang district. However, this Jhum cycle is being gradually reduced due to increase in land to population ratio. During each Jhum cycle the entire land is divided as per community land holdings and different Agricultural cultivation are carried out for 1-2 yrs and it is left fallow till next Jhum cycle.

Populations and Socio-Economic characteristics under the FS.

Socio-economic Features

The total population of the district is 1, 85,036 as per the 2001 census. The total number of rural population is 1, 56,840 and the urban population is 28,196. Literacy rate is 51.30% (Male =55.97 % Female = 45.12 %).

| | | 20 | 001 |
|----------------|-----------------|------------|---------------------|
| State/District | Area in Sq. kms | Population | Density / sq. km |
| Nagaland | 16,579 | 19,88,636 | 120 |
| Tuensang | 2446 | 1,85,036 | 75.6 |

Area, population and Density of Tuensang District

*Source: Statistical Handbook of Nagaland 2004, Directorate of Economics & Statistics, Government of Nagaland

General production constraints for each crop under the FS.

| Existing | Constraints | Gaps Identified | | | |
|--------------------|---|--|----------------------------|--|--|
| Farming System. | | Research | Extension | | |
| | Dependency on Monsoon / Rainfed Farming. Traditional System Of cultivation/Shifting/ | Technology Assessment, Refinement through On Farm Trials/On Station Trials/ On Location Specific Trials on the Gaps/ constraints identified: Improved Cultivation Systems through diversification and | Technology refinement & | | |

| | Jhum Cultivation. | intensification. | Dissemination |
|----------------|-----------------------|--|---------------------|
| | | | through: |
| 1. Agri - Hort | Poor Economic/ | Economically viable Technologies for | 1 Turinin a |
| | Resources | resources management. | 1. Training |
| | Management. | Integrated pest, disease and | 2. Demonstration |
| | Poor/no soil and | Nutrient/soil management/soil | |
| | Nutrient | conservation Technology. | 3. Awareness camps. |
| | Management. | Introduction of Location specific | 4. Field days. |
| 2. Agri - | Poor/No Irrigation | improved Inputs/ Seeds etc. | |
| Hort - A.H | Facilities | | 5. EXHIBITIONS. |
| | Poor Seeds qualities/ | Improved cropping System. | 6. Exposure visit |
| | Non availability of | Production Technology for crops. | - - |
| | Improved | | 7. Entrepreneursnip |
| | Seeds/planting | Seed Production & Post harvest | Development. |
| | Materials. | | 9 April Clinic |
| | Random Cropping | Introduction of improved packages of | 8. Agri-Clinic |
| | System. | practices/ technology for better | 9. Linkage with |
| | New secole bility of | production. | finance |
| | Inputs and improved | Identification of Agricultural Tools and | Agency |
| | Tools/ High cost of | implements for hill agriculture / Farm | , igeney i |
| | Inputs. | mechanization. | |
| | Poor/no Disassos | | |
| | and Pest | | |
| | Management. | | |
| | | | |
| | Poor Post harvest | | |
| | Hanagement. | | |
| | Poor/no | | |
| | Transportation and | | |
| | Marketing facilities | | |
| | Subsistence | | |
| | Farming. | | |
| | | | |
| | Lack of Improved | | |
| | production | | |
| | Technology. | | |
| | - | | |

| Existing Farming | Constraints | Gaps Identified | |
|---------------------------------------|--|---|--|
| System. | | Research | Extension |
| | Non- availability of improved breeds/ fingerlings. | | Training. Demonstration |
| 3. Agri - Hort - A.H - Fishery. | Non availability of Hatchery units. Poor hatchability of fish & iri / muga eggs. Traditional free ranging of Cattles. Open system of rearing Livestock's | Introduction of improved breed/Exotic breeds. Scientific management of Livestock and fisheries. Sericulture Production technology. Stocking density. Integrated Farming System | Awareness camps. Field days. Exhibitions. Exposure visit Entrepreneurship Development. |
| 4. Agri - Hort - A.H - Sericulture | Traditional / Indigenous methods of management of livestock's & ponds. Inadequate Veterinary services. | | 9. Linkage with finance Agency. 10.Training & demonstration on spawn / fry / fingerling |
| | Above all lack of Awareness, Technological know- how, poor economy and Extension System of dissemination of Technology seemed to be the main constraints in every Existing Farming System in the District. | | production & composite fish Culture. 11.Veterinary Services. |



Cabbage var. Royal Challenger in field

Jhum paddy SARS1



OFT on King Chilli

Soyabean JS335 in field

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6 Farming Systems of Wokha

Summary of farming Systems 1

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| AES | Farming system | Soils | Rainfall | Altitude | Principal crops/breeds | Important features | Location (area), extent of area in ha. |
|-------------|-------------------------------------|--|--|----------------|--|--------------------------------|---|
| AES-I | Agriculture | Red loamy & brown forest soil or sub montane soil | 156.10 mm(Av monthly rainfall | 750- | Rice, maize, sugarcane, passionfruit, orangeetc | Easy availabilit y of | 70,000 |
| | Agri - Hort | | | 1350 MSL | | market | (Approx.) |
| | Agri - Fishery | Residual | | 165-720 | Rice, maize, , banana, iackfruit, | Potential area where all | |
| AES- II | Agri –Hort - Fishery | soil/Lateritic soil | -do- | MSL | pineapple common | Agri and allied | |
| 11 | Agri –Hort - Animal Husbandry | | | | carp, grass carp, pig, poultry, | can be taken up | 60,000 (Approx.) |
| | | | | | etc | | |
| | Agriculture | | | | Rice, maize, | | |
| | Agri – Hort | | | 110-304 MSI | tea, mango, | Availabilit v of | |
| AES- III | Agri – Hort - Fishery | Alluvial soil | -do- | hoe | poultry cattle, banana, | market towards | 32,800 |
| | Agri - Animal Husbandry | | | | carp, grass carp arecanut etc. | state | (Approx.) |

2 Agricultural characteristics of each farming System

Boundaries of the FS Agriculture* Agri.+Horti.** Agri.+Fishery Agri.+Horti+Fishery*** Agri+Horti+A. Husbandry

Map attached

Agri.+A. Husbandry

| Soils under the FS | | |
|-------------------------|---|--|
| Agriculture* | : | Red loamy and alluvial soil |
| Agri.+Horti.** | : | Red loamy and alluvial soil |
| Agri.+Fishery | : | Residual soil/Lateratic soil and Alluvial soil |
| Agri.+Horti+Fishery*** | : | Residual soil/Lateratic soil and Alluvial soil |
| Agri+Horti+A. Husbandry | : | Residual soil/Lateratic soil |
| Agri.+A. Husbandry | : | Alluvial soil |
| | | |

Climates under the FS

| Agriculture* | : | Temp-25-30oC(Summer) 10-20oC(Winter) |
|-------------------------|---|--------------------------------------|
| Agri.+Horti.** | : | Temp-25-30oC(Summer) 10-20oC(Winter) |
| Agri.+Fishery | : | Temp-20-25oC(Summer) 8-10oC (Winter) |
| Agri.+Horti+Fishery*** | : | Temp-25-30oC(Summer) 10-20oC(Winter) |
| Agri+Horti+A. Husbandry | : | Temp-20-25oC(Summer) 8-10oC (Winter) |
| Agri.+A. Husbandry | : | Temp-25-30oC(Summer) 15-20oC(Winter) |

Physiography under the FS

| Agriculture* | : | Highland and lowland |
|-------------------------|---|-----------------------|
| Agri.+Horti.** | : | Highland and lowland |
| Agri.+Fishery | : | Mid hills |
| Agri.+Horti+Fishery*** | : | Mid hills and lowland |
| Agri+Horti+A. Husbandry | : | Mid hills |
| Agri.+A. Husbandry | : | Lowland |

Irrigation facilities under the FS

| Agriculture* | : | Rainfed & Diversion dam |
|-------------------------|---|-------------------------|
| Agri.+Horti.** | : | Rainfed |
| Agri.+Fishery | : | Rainfed |
| Agri+Horti+A. Husbandry | : | Rainfed |
| Agri.+Horti+Fishery*** | : | Rainfed & Diversion dam |
| Agri.+A. Husbandry | : | Rainfed & Diversion dam |



Boundaries of Farming systems

Major crops and cropping intensity under the FS

| Agriculture* | : | Rice, maize, Rapeseed & Mustard. soybean etc |
|----------------|---|---|
| Agri.+Horti.** | : | Rice, maize, Passionfruit, Orange, mango, banana, |

vegetables etc

| Agri.+Fishery | : | Rice, maize, common carp, grass carp etc |
|------------------------|---|---|
| Agri.+Horti+Fishery*** | : | Rice, maize, banana, coconut, arecanut, vegetables, |
| | | common carp, grass carp etc |
| Agri+Horti+AH | : | Rice, maize, banana, orange, vegetables, Pig, poultry etc |
| Agri.+AH | : | Rice, maize, cow, goat, Pig, poultry etc |





Populations and socio-economic characteristics under the FS

 Severe deforestation leading to land degradation
 Lack of quality planting materials of important Agri-Horti Crops
 Low Productive performance of indigenous livesteck and

4. Low Productive performance of indigenous livestock and poultry

- 5. Insect-pest incidence in important Agri-Horti Crops
- 6. Lack of farm Mechanization
- 7. Lack of Awareness for improved Agri. and allied activities

NB:

Agri.+Horti.**

Agri.+Fishery

Agri+Horti+AH

Agri.+AH

Agri.+Horti+Fishery***

- * FS practiced in both AES-I & III
- ** FS practiced in both AES-I & III
- ** FS practiced in both AES-II & III



Demonstration on application of Bordeaux mixture





Demonstration on SRI



FLD on contour bunding



Layout of agroforestry system



Method of soil sampling



Mushroom cultivation



OFT on cucumber





Practical training on flower making



Water pH meter demonstration

Farming Systems of North East India



1 Summary of Farming systems

| Farming system | Soil | Rainfall | Altitude | Principal crops/breeds | Important features | Location (area), extent of area in ha |
|---------------------------------|-------|----------|----------|---------------------------|-----------------------|---|
| FS -I Agri – Hort – AH | Sandy | Moderate | 450 | Rice, Maize/ Pig | | 8000ha. |
| FS- II | Sandy | High | 1500 | Rice, Pig | | 5000ha. |
| FS- III | Black | High | 2250 | Rice, Maize/ Mithun | | 3334ha. |

2. Agricultural characteristics of each Farming system

Dikhu

Boundaries of Farming System.

| a) | FS - I | | |
|----|---------|----|-----------|
| | | E: | kuluto |
| | | N: | okokchung |
| b) | FS - II | | |
| | | E: | Asuto |

N:

c) FS - III

| E: | Aghunato | W: | Chu cho Rive |
|----|----------|----|--------------|
| N: | Akuloto | S: | Tezu River |

W:

S:

w:

S:

oyang River

Zunheboto

toizu

VK

Soils under the Farming system

| FS- I | \rightarrow | Sandy |
|---------|---------------|--------------------|
| FS- II | \rightarrow | Sandy |
| FS- III | \rightarrow | Black |
| Climate | under t | the Farming system |
| FS- I | \rightarrow | Subtropical |
| FS- II | \rightarrow | Subtropical |
| FS- III | \rightarrow | Temperate |
| | | |

Physiography under the Farming system

| FS- I | \rightarrow | Foot hill |
|-----------|---------------|---|
| FS- II | \rightarrow | Mid hill |
| FS- III | \rightarrow | High hill |
| Irrigatio | on facilit | ies under the Farming system |
| FS- I | \rightarrow | Tank, Stream, River and Minor irrigation channel |
| FS- II | \rightarrow | Tank & Minor irrigation channel |
| FS- III | \rightarrow | Tank & Minor irrigation channel |
| Major c | rops and | d cropping intensity under the Farming system |
| FS- I | \rightarrow | Paddy, Maize , CI \rightarrow 100% |
| FS- II | \rightarrow | Paddy, Maize, Soybean , CI $ ightarrow$ 100% |
| FS- III | \rightarrow | Paddy, Maize, Kholar, CI $ ightarrow$ 100% |
| Major c | ropping | system under the Farming system |
| FS- I | \rightarrow | Paddy + Maize + Soyabean + Vegetable Crops |
| FS- II | \rightarrow | Paddy + Maize + Soyabean + Vegetable Crops |
| FS- III | \rightarrow | Paddy + Maize + Soyabean + Vegetable Crops |
| Land us | e patter | n under the Farming system |
| FS- I | \rightarrow | Self, Leased out, Leased in, Share cropper |
| FS- II | \rightarrow | Self, Leased out, Leased in, Share cropper |
| FS- III | \rightarrow | Self, Leased out, Leased in, Share cropper |
| Land ho | olding pa | attern under the Farming system |
| FS- I | \rightarrow | Large possession of land under Gaon Bora (Village Head) |
| FS- II | \rightarrow | Large possession of land under Gaon Bora (Village Head) |
| FS- III | \rightarrow | Large possession of land under Gaon Bora (Village Head) |
| Populat | ions and | socio-economic characteristics under the Farming system |
| FS- I | \rightarrow | 60000 and 50% depend on agriculture and allied |
| FS- II | \rightarrow | 50000 and 75% depend on agriculture and allied |
| FS- III | \rightarrow | 44909 and 85% depend on agriculture and allied |

Adoption pattern for each crop/breed/other technology under the Farming system

- $\mathsf{FS-II} \rightarrow \qquad \mathsf{Early} \ \mathsf{Adopter}$
- FS- III \rightarrow Early Majority



Farmer applying Trichogramma OFT on rabbitery by KVK

PRA at Phisumi village

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4.7 Farming Systems of Sikkim

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1. Farming Systems of North Sikkim

Each farming system was homogeneous, in general for the following.

| 1. | Soils | : | acidic |
|----|--------------------|---|--------------------------------------|
| 2. | Rainfall | : | between 120-355mm |
| 3. | Physiographic | : | steep rocky terrain |
| 4. | Altitude | : | Low-0-500m |
| | | | Mid-501-800m |
| | | | High-801 and above. |
| 5. | Irrigation pattern | : | rain fed |
| 6. | Temperature | : | between -5° to 28° |

In general the farming system of the whole of North Sikkim is of the same kind which consists of Agriculture, Horticulture and Animal Husbandry. The farming system is based on the agro-ecological situation which has been classified according to the different altitudes of the district. The district has been divided into three agro-ecological systems mainly low altitude, mid altitude and high altitude. The farming system in all the three altitudes are the same taking into consideration that al the other factors like soil (acidic in all), rainfall (between 120-355mm), physiographic (steep rocky terrain), irrigation pattern (rain fed mostly) and temperature (between -5^o to 28^o).

| Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|--------------|--------|-----------|-----------|-----------|------------------|-------------|
| system | | | | crops/ | features | (area), |
| | | | | Breeds | | extent of |
| | | | | | | area in ha. |
| Agriculture+ | Acidic | Between | Low-0-500 | Maize, | Rocky terrain | 39345.231 |
| Horticulture | | 120-355mm | Mid-501- | paddy, | with snow clad | ha. |
| + Animal | | | 800m | wheat, | mountains and | |
| Husbandry | | | High-801 | soybean, | very little land | |
| | | | and above | orange, | for agriculture | |
| | | | | cardamom. | purpose. | |

1. Summary of farming Systems

2. Agricultural characteristics of farming Systems :

| 1. | Boundaries of the FS: | | | | |
|----|---------------------------|------------------|-----------|---------------------|---------------------|
| | E: China | W: Nepal | | N: China | S: S.Sikkim |
| | NE: China | SE: East Sikki | m | SW: West Sikkim | NW: China |
| 2. | Soils under the FS | | : | acidic | |
| 3. | Climates under the FS | | : | sub-tropical –temp | erate climatealpine |
| 4. | Physiographic under th | ne FS | : | steep rocky terrain | |
| 5. | Irrigation facilities und | er the FS | : | rain-fed | |
| 6 | Major crops and cropp | ing intensity un | dar tha F | S: Maize naddy w | heat souhean |

6. Major crops and cropping intensity under the FS: Maize, paddy, wheat, soybean,

orange, cardamom.

7. Land use pattern under the FS :

mostly fallow land, mountainous terrain with very little land for agricultural purpose.

self, no tenure system.

- 8. Land holding pattern under the FS :
- 9. Populations and socio-economic characteristics under the FS: 41023.
- 10. Adoption patterns for each crop/breed/other technology under the FS: low
- 11. General production constraints for each crop under the FS:
 - Unaware of organic cultivation techniques and its importance
 - Blight and stem borer management in cardamom
 - Poor irrigation facilities
 - Lack of hill oriented research work in agricultural field
 - Lack of proper and organic management in citrus
 - Lack of Integrated Pest & Disease management practice in crops in general
 - Most of the areas are Non-terraced Hilly, Cliffy and low depth soil land



Training need Analysis done with the participant Farmers forming group system



Agro service centre



Soy-Paneer Plant



OFT on Paddy



OFT on Garden Pea

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2. Farming Systems of West Sikkim

1. Summary of farming Systems

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| SI.No. | Agro ecological Situation | Characteristics | Major Farming System | Major crop |
|--------|---------------------------------|------------------|-------------------------|----------------------------------|
| 1. | AES-I | High altitude | 1.Hort. + AH | Pea, Potato, cardamom, |
| | | (1501-6500m | | Cabbage,Cymbidium, Lilium, |
| | | from MSL), | | Cow, sheep, Pig,goat |
| | | Temperate and | 2. Agri. + Hort. + AH | Maize, Rajma, fingermillet, Pea, |
| | | sub alpine | | Potato, cardamom, |
| | | condition, | | Cabbage,Cymbidium, Lilium, |
| | | experience low | | Cow, sheep, Pig,goat |
| | | temperature and | | |
| | | most of the land | | |
| | | are rainfed | | |
| 2. | AES-II | Medium altitude | 1. Agri. + Hort. + AH | Maize, wheat, fingermillet, |
| | | (801-1500m | | Buckwheat, Mustard, Potato, |
| | | from MSL), | | cardamom, Orange, Ginzer, |
| | | Temperature | | beans, Cow, Pig, goat, Poultry |
| | | 10-25ºC, | 2.Agri + AH | Maize, wheat, fingermillet, |
| | | irrigated by | | Buckwheat, Mustard, Potato, |
| | | springs | | Cow, Pig, goat, Poultry |
| 3. | AES-III | Low altitude | 1. Agri. + Hort. + AH | Maize, wheat, fingermillet, |
| | | 300-800 m | | Buckwheat, Mustard, Potato, |
| | | Temperature: | | cardamom, Orange, Ginzer, |
| | | 15°C-30°C | | beans, Cow, Pig, goat, Poultry |
| | | | 2.Agri + AH | Maize, wheat, fingermillet, |
| | | | | Buckwheat, Mustard, Potato, |
| | | | | Cow, Pig, goat, Poultry |

AES-I

| Farming | Soils | Rainfall | Altitude | Principal | Important | Location |
|------------|----------|----------|----------|---------------|----------------|----------------|
| system | | | | crops/breeds | features | (area). Extent |
| | | | | | | of area in ha. |
| | Sandy | 2000- | 1501- | Cardamom, | cultivation on | * |
| Hort. + AH | loam, | 3000mm | 2500m | Pea, Potato, | slope upto | |
| | gravelly | | from MSL | Cabbage, | 50%, | |
| | loam, | | | Cauliflower, | experiencing | |
| | clayey | | | Radish, cross | heavy rainfall | |
| | loam | | | breed cow | during summer | |

| | | | | (Jersey HF), | and other | * |
|--------------|----------|-------|----------|----------------|--------------------|---|
| | | | | Pig (local), | seasonal rains. | |
| | | | | Goat (local) | The | |
| | | | | | temperature | |
| | | | | | ranges from 2- | |
| | | | | | 20 ⁰ C. | |
| | Sandy | 2000- | 1501- | Cardamom, | -do- | |
| Agri + Hort. | loam, | 3500m | 2500m | Pea, Potato, | | |
| + AH | gravelly | m | from MSL | Cabbage, | | |
| | loam, | | | Cauliflower, | | |
| | clayey | | | Radish, Maize, | | |
| | loam | | | Millet, Rajma, | | |
| | | | | Buckwheat, | | |
| | | | | cross breed | | |
| | | | | cow (Jersey | | |
| | | | | HF), Pig | | |
| | | | | (local), Goat | | |
| | | | | (local) | | |

AES-II

| | Candu | 1 5 0 0 | 001 | awa a a lawa a d | The sum and an a- | * |
|--------------|--------|---------|----------|------------------|--------------------|----------|
| | Sandy | 1500- | 801- | cross breed | it experience | * |
| Agri + Hort. | loam, | 2500m | 1500m | Maize, wheat, | heavy rainfall | |
| + AH | Clayey | m | from MSL | Paddy, | during summer | |
| | loam | | | Soyabean, | and dry spell | |
| | | | | Sikkim | for a period of | |
| | | | | mandarin, | 3-4 months | |
| | | | | cardamom, | during winter | |
| | | | | Ginzer, Beans, | and spring. All | |
| | | | | cole crops, | the block of the | |
| | | | | Potato, cow | district has the | |
| | | | | (Jersey HF), | portion of their | |
| | | | | Pig (local), | areas under | |
| | | | | Goat (local) | this AES. The | |
| | | | | | temperature | |
| | | | | | ranges from 7- | |
| | | | | | 32 ⁰ C. | |
| | Sandy | 1500- | | Maize, wheat, | | |
| Agri + AH | loam, | 2500m | | Paddy, | | |
| | Clayey | m | | Soyabean, | | |
| | loam | | | cow (Jersey | | |
| | | | | HF), Pig | | |

| | | (local), Goat | |
|--|--|---------------|--|
| | | (local) | |

AES-III

| | Sandy | 1500- | Upto | Maize, wheat, | It experience | * |
|--------------|--------|-------|----------|----------------|--------------------|---|
| Agri + Hort. | loam, | 2500m | 800m | Paddy, | heavy rainfall | |
| + AH | Clayey | m | from MSL | Soyabean, | during summer | |
| | loam | | | Sikkim | and dry spell for | |
| | | | | mandarin, | a period of 3-4 | |
| | | | | Ginzer, Beans, | months during | |
| | | | | cole crops, | winter and | |
| | | | | Potato, cow | spring. All the | |
| | | | | (Jersey HF), | block of the | |
| | | | | Pig (local), | district has the | |
| | | | | Goat (local) | portion of their | |
| | | | | | areas under this | |
| | | | | | AES. The | |
| | | | | | temperature | |
| | | | | | ranges from 7- | |
| | | | | | 32 ⁰ C. | |
| | Sandy | 1500- | Upto | Maize, wheat, | -do- | |
| Agri + AH | loam, | 2500m | 800m | Paddy, | | |
| | Clayey | m | from MSL | Soyabean, | | |
| | loam | | | cow (Jersey | | |
| | | | | HF), Pig | | |
| | | | | (local), Goat | | |
| | | | | (local) | | |

*Area of Every block, Gram panchayat of the district are under different AES, therefore the data is not available.

2. Agricultural characteristics of each farming System

| | Ag+Hort+ AH | Ag+AH |
|---------------------------------|-------------------------------|--------------------------------|
| Boundaries of the FS | _ | _ |
| Soils under the FS | Sandy loam, Clayey Loam | Sandy loam, Clayey Loam |
| Climates under the FS | Temperate and sub temperate | Sub temperate and sub tropical |
| Physiography under the FS | Slopy land more than 30 % | Well terraced land for Paddy |
| | slope | cultivation |
| Irrigation facilities under the | Irrigation facilities is less | More in paddy growing area |
| FS | | |
| Major crops and cropping | Maize, paddy, potato, | Maize, paddy, wheat, Mustard, |

| cardamom, Ginzer, Sikkim | Ginzer, Sikkim mandarin, cross |
|---------------------------|---|
| mandarin, cross breed cow | breed cow, backyard poultry, |
| | goat |
| Multiple cropping | Monocropping |
| | |
| Maximum cropped area | Less cropped area and more |
| | cultivable waste |
| Land holding is less | More |
| | |
| Less population and | More population economically |
| economically sound | strive |
| | |
| High | Low |
| | |
| | |
| | cardamom, Ginzer, Sikkim mandarin, cross breed cow Multiple cropping Maximum cropped area Land holding is less Less population and economically sound High |



HQPM-1 AT KVK FARM



HQPM-1 FIELD DAY



HQPM-1 FIELD VISIT BY ADG (AE) AND PD, MAIZE DIRECTOR



ORANGE ORCHARD

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4.8 Farming Systems of Tripura

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1. Farming Systems of West Tripura

1. Summary of farming Systems

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| | | | | | | Location |
|-------------|------------|----------|----------|--------------------|--------------------|-------------|
| Farming | Calla | Deinfell | | Principal | Important | (area), |
| system | 50115 | Rainfall | Altitude | crops/breeds | features | extent of |
| | | | | | | area in ha. |
| 1. | Sandy | NA | NA | Paddy, summer | Irrigated and | Khowai, |
| Agri-Horti- | loam and | | | & winter | rainfed | Teliamura |
| Pisci-AH | sandy clay | | | vegetables, | condition, river | and Dukli |
| | loam | | | oilseeds, pulses, | belts | |
| | | | | Indian major & | | |
| | | | | minor carps, | | |
| | | | | poultry birds, | | |
| | | | | milch cattle, | | |
| | | | | goat, pig duck | | |
| | | | | etc. | | |
| 2. | Sandy | NA | NA | Paddy, summer | Rainfed, river | Teliamura, |
| Horti-Agri- | loam and | | | & winter | belt, alluvial | Khowai and |
| AH | Sandy clay | | | vegetables, | belt, market | Melaghar |
| | loam | | | oilseeds, pulses, | availability | |
| | | | | poultry birds, | | |
| 3. | Sandy | NA | NA | Paddy (2 crops) | Monocrop, | Bishalgarh |
| Agriculture | loam | | | | rainfed, partly | and Khowai |
| | | | | | irrigated | |
| 4. AH | Sandy | NA | NA | Poultry birds and | Hillock, market | Khowai and |
| | loam and | | | pig | availability, well | Jirania |
| | sandy clay | | | | drainage facility | |
| | loam | | | | | |
| 5. | Clay loam | NA | NA | Paddy, summer | Presence of | Teliamura, |
| Horti- | | | | & winter | natural water | Melaghar |
| Pisci- | | | | vegetables, | bodies, Good | and Jirania |
| Agriculture | | | | Indian major & | road | |
| | | | | minor carps | transportations | |
| 6. AH- | Sandy clay | NA | NA | Pig, goat, poultry | Market | Tulasikhar |
| Poultry- | loam | | | birds, paddy, | availability, | and Khowai |
| Agri-Horti | | | | mustard, maize, | tribal dominated | |
| | | | | colocasia, | area, river belts, | |
| | | | | banana, pine | foothills | |
| | | | | apple | | |
| | | | | | | |

| 7. | Sandy clay | NA | NA | Rubber, | Jhum | Mandai, |
|--------------|------------|----|----|-------------------|---------------------|-------------|
| Agri-Horti- | loam | | | pineapple, | cultivation, tribal | Jirania and |
| Silvi- | | | | banana, teak, | dominated hills. | Teliamura |
| Pastoral- | | | | karoi, bamboo, | | |
| Livestock | | | | citrus | | |
| 8. | Sandy clay | NA | NA | Rubber and tea | Tribal dominated | Bishalgarh |
| Plantation | loam | | | | hills | |
| based | | | | | | |
| (Rubber) | | | | | | |
| 9. | Sandy clay | NA | NA | Rubber, pig, | Tribal dominated | Khowai |
| Plantation- | loam | | | poultry bird. | hills & presence | |
| Pisci- | | | | | of bunds in the | |
| Livestock | | | | | hills. | |
| 10. | Sandy clay | NA | NA | Summer and | Market | Mohanpur |
| Horticulture | loam | | | winter vegetables | availability, | and |
| | | | | | presence of | Melaghar |
| | | | | | water overflow, | |
| | | | | | well drainage | |
| | | | | | facility | |
| | | | | | | |

2. Agricultural characteristics of farming Systems :

- 1. Boundaries of the FS : NA
- 2. Soils under the FS : Acidic for all FS
- 3. Climates under the FS : Humid sub-tropical for all FS
- 4. Physiography under the FS

(a) FS 2, 3, 5, 8, 9 and 10 falls under lowlands and river belts.

:

- (b) FS 4, 5, 6 and 7 falls under undulating to hilly highland of narrow and broken plateau.
- (c) FS 7 falls under Hill ranges.
- 5 Irrigation facilities under the FS:
 - (a) FS 1, 2, 3, 4 and 5 has overflow irrigation,
 - (b) FS 1, 2, 3, 4, 6, 8 and 10 has lift irrigation,
 - (c) FS 1, 2, 3 and 4 have canal irrigation,
 - (d) FS 1, 2, 3, 4 and 10 has STW,
 - (e) FS 1 to 10 is also rainfed.

6. Major crops and cropping intensity under the FS:

Major crops of FS 1 are paddy, summer & winter vegetables, oilseeds and pulses, FS 2 are paddy, summer & winter vegetables, oilseeds and pulses, FS 3 is paddy, FS 5 are paddy, summer & winter vegetables, FS 6 are paddy, mustard, maize, colocasia, banana and pine apple, FS 7 are rubber, pineapple, banana, teak, karoi, bamboo and citrus, Fs 8 are rubber and tea, FS 9 is rubber and FS 10 are summer and winter vegetables. The cropping intensity of each FS is not available but of the district as whole is 173 per cent.

- Major cropping systems under the FS: Mono and mixed cropping for all FS
- 8. Land use pattern under the FS : Not available
- 9. Land holding pattern under the FS: Small and marginal land holding in all FS
- 10. Populations and socio-economic characteristics under the FS: NA
- 11. Adoption pattern for each crop/breed/other technology under the FS: NA
- 12. General production constraints for each crop under the FS Constraints for all FS are :
 - (a) Lack of improved inputs like seed, agro-chemicals, breeds etc.
 - (b) Low land holding capacity,
 - (c) Non availability of farm machineries for small holdings,
 - (d) Transportation problem,
 - (e) Rain fed condition,
 - (f) Traditional methods of cultivation.



Netting for Regular Fish Health Check



Problem Tree Prepared By Farm Women



SRI at Farmers' Field



Soil & Water Testing Laboratory at KVK, West Tripura



Village Mapping Through PRA



Transplanting of Rice By Farm Women

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