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Strategic Document
on
Problems and Prospects of Agriculture in Lawngtlai District, Mizoram

KVK Lawngtlai District
Lawngtlai
Mizoram

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on
Problems and Prospects of Agriculture in Lawngtlai District, Mizoram

Editor-in-Chief

Dr. C. Lalfakawma(Sr. Scientist & Head)

Publication members

Mrs. Sheela Tayeng(SMS, Agri. Extension)

Dr. Lalthazuali(SMS, Animal Science)

Mr. Samson Sairengpuia Sailo(PA, Computer)

Mr. Malsawmkima Vanchhawng(PA, Farm Manager)

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KRISHI VIGYAN KENDRA (KVK)

Lawngtlai District, Lawngtlai, Chawnhu. 796891

kvklawngtlai@gmail.com

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Preface

Agriculture is the backbone of Mizoram's economy, and Lawngtlai District, located in the southernmost part of the state, holds immense potential for Agricultural growth and development. This strategic document aims to provide a comprehensive analysis of the challenges and opportunities facing Agriculture in Lawngtlai District.

The district's fertile soil, favorable climate and rich biodiversity offer a unique advantage for cultivating a wide range of crops. However, despite its potential, the Agricultural sector in Lawngtlai faces numerous challenges, including limited infrastructure, inadequate irrigation facilities and insufficient market access.

This document seeks to:

1. Identify the key problems hindering Agricultural development in Lawngtlai District.

2. Analyze the prospects and opportunities for agricultural growth.

3. Develop strategic recommendations for addressing the challenges and leveraging opportunities.

By examining the complex interplay of factors influencing Agriculture in Lawngtlai, this document aims to inform policy decisions, guide development interventions and support sustainable Agricultural practices that benefit local communities.

(DR.C.LALFAKAWMA)

Senior Scientist & Head
KVK, Lawngtlai District

STRATEGIC DOCUMENT ON PROBLEMS & PROSPECTS OF AGRICULTURE IN LAWNGTLAI DISTRICT, MIZORAM

Introduction:

Lawngtlai District is one of the eleven administrative Districts in Mizoram. The district comprises two Autonomous District Councils *viz.* Lai Autonomous District Council and Chakma Autonomous District Council whose Headquarters are Lawngtlai and Kamalanagar, respectively. Lawngtlai district has a pleasant climate. It is generally cool in summer and not very cold in winter. In winter the temperatures varies from 8 ºC to 24 ºC and in summer, it is between 18 ºC to 32 ºC. Relative humidity is highest during the south-west monsoon and heavy rainfall is usually received during the month of May to September every year. The average annual rainfall is about 2,947 mm.

The District is located in the South West part of Mizoram having international boundaries with Bangladesh in the west and Myanmar in the east. Lunglei and Saiha District bounded the district in the north and south, respectively. The district lies between 92.30^0 - 93^0 E Longitudes and 21.58^0 - 22.60^0 N latitudes. The District headquarters – Lawngtlai is connected by National Highway No.54 and it is about 296 kms from Aizawl. The total geographical area is 2557.10 sq.km and accounts for 12.13% of the total geographical area of the State of Mizoram. The total population of Lawngtlai district during 2011 census is 1,17,894 and the density of population is 46 persons Sq. Km. The literacy rate is lowest among the districts of Mizoram which is 65.9 %.

Table 1: AREA AND POPULATION OF LAWNGTLAI DISTRICT

BLOCK-WISE AREA,DISTRIBUTION OF POPULATION,DECADAL GROWTH RATE,SEX RATIO AND POPULATION DENSITY (2011 CENSUS)						
Sl. No	**Particulars**	**Chawngte**	**Lawngtlai**	**Bungtlang "S"**	**Sangau**	**District Total**
1.	Area (Sq.km)	686.35	770.84	534	565.91	2,557.1

2.	Population (Total)	45,307	38,722	17,126	16,739	1,17,894
	a). Males	23,457	19,857	8,847	8,438	60,599
	b).Females	21,850	18,865	8,279	8,301	57,295
	c).Rural	45,307	17,892	17,126	16,739	97,064
	d). Urban	-	20,830	-	-	20,830
3.	% Decadal growth rate of Population	31.21	(-)0.94	NA	19.8	60.14
4.	Sex ratio (females per 1000 males)	931	950	936	984	945
5.	Population Density (Per Sq.km)	66	50	32	30	46

Source: Statistical Handbook Lawngtlai District, 2018

Agriculture is the mainstay of majority of the farmers who are practicing Jhum system of cultivation. However, a few farmers are taking up Wet Rice Cultivation, Horticulture, Animal Husbandry, Fishery and Sericulture as their means of livelihood in some villages. Major crops grown are Rice (WRC & Jhum), Ginger, Maize, Sugarcane, Soyabean, Chilli, Banana, Turmeric and Vegetables etc. However, the yield of these crops is comparatively lower than the national average. The average soil pH is 5.7.

Table 2: AREA, PRODUCTION AND YIELD OF PRINCIPAL AGRICULTURAL CROPS, LAWNGTLAI DISTRICT

Sl. No	**Name of Crop**	**2016 - 2017**			**2017 - 2018**		
		Area (ha)	**Production (MT)**	**Yield (Kg/ha)**	**Area (ha)**	**Production (MT)**	**Yield (Kg/ha)**
1.	**Rice**						
	1. Jhum	3,212	3,883	1,208.9	3,035	3,641.3	1,199.76
	2. WRC-Kharif	2,369	5,267	2,223.3	2,302	5,117.76	2,223.17
	3. WRC-Rabi	154	334.8	2,174.02	137	298.05	2,175.54
	4. Total	5,735	9,484.8	5,606.22	5,474	9,057.11	5,598.47
2.	Maize	587	1,684.81	2,870.2	754	2,166.43	2,873.24

3.	Pulses	256.4	304.45	1,187.4	524.8	605.27	1,153.33
4.	Oilseeds	289	213.4	738.4	330	247.92	751.27
5.	Sugarcane	58	2,025.54	34,923.1	54	1,852.86	34,312.22

Source: Statistical Handbook Lawngtlai District, 2018

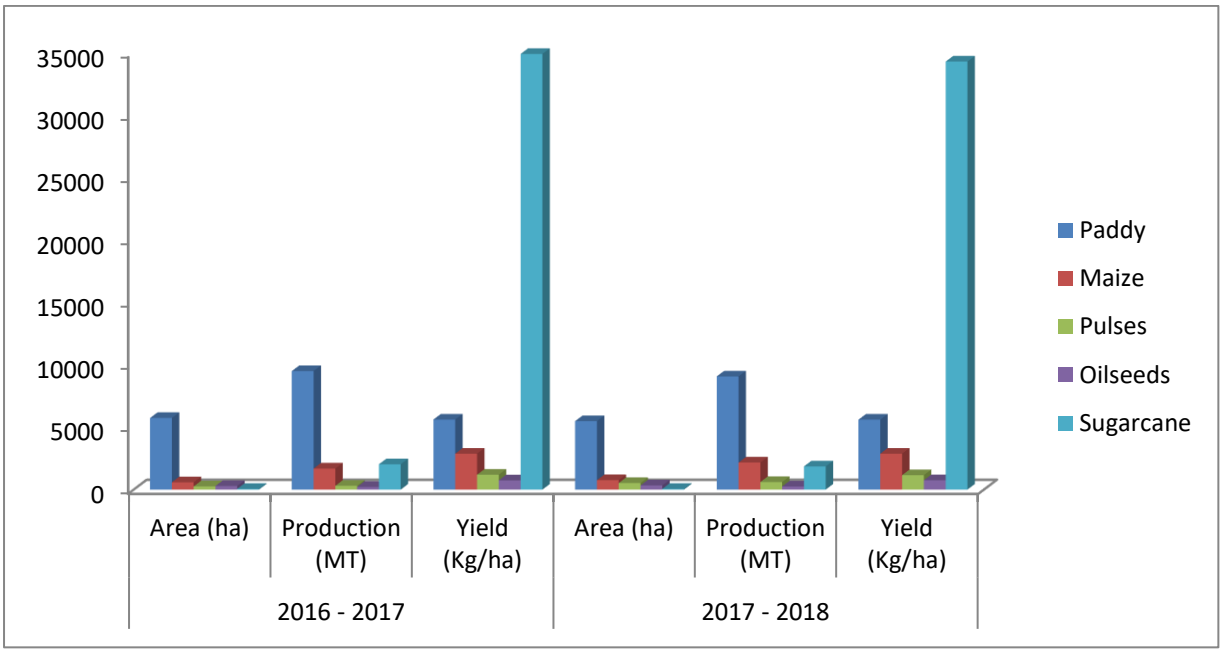


TABLE 3: AREA AND PRODUCTION OF FISH, LAWNGTLAI DISTRICT

Sl.no	Particulars	Unit	2016 - 17	2017 – 18
1.	No. of Fish farms	-	2,100	2,133
2.	Area under aquaculture (ha)	Ha	759.19	762.49
3.	Fish Production (Culture sector)	Tonnes	835.53	841.04
4.	No. of hatchery unit	-	1	1

Source: Statistical Handbook Lawngtlai District, 2018

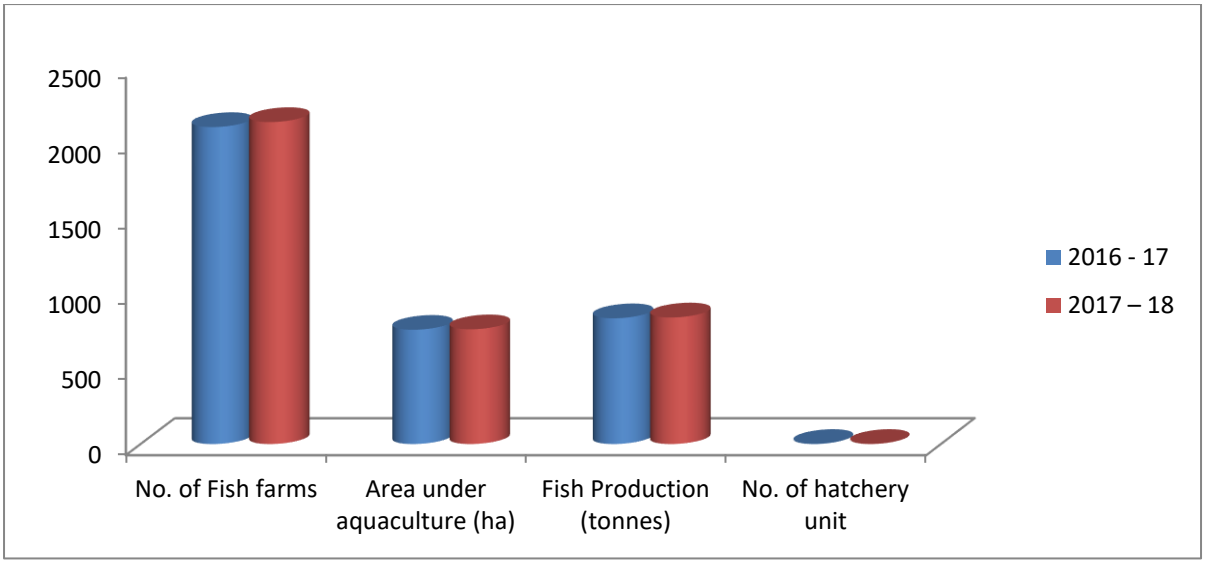
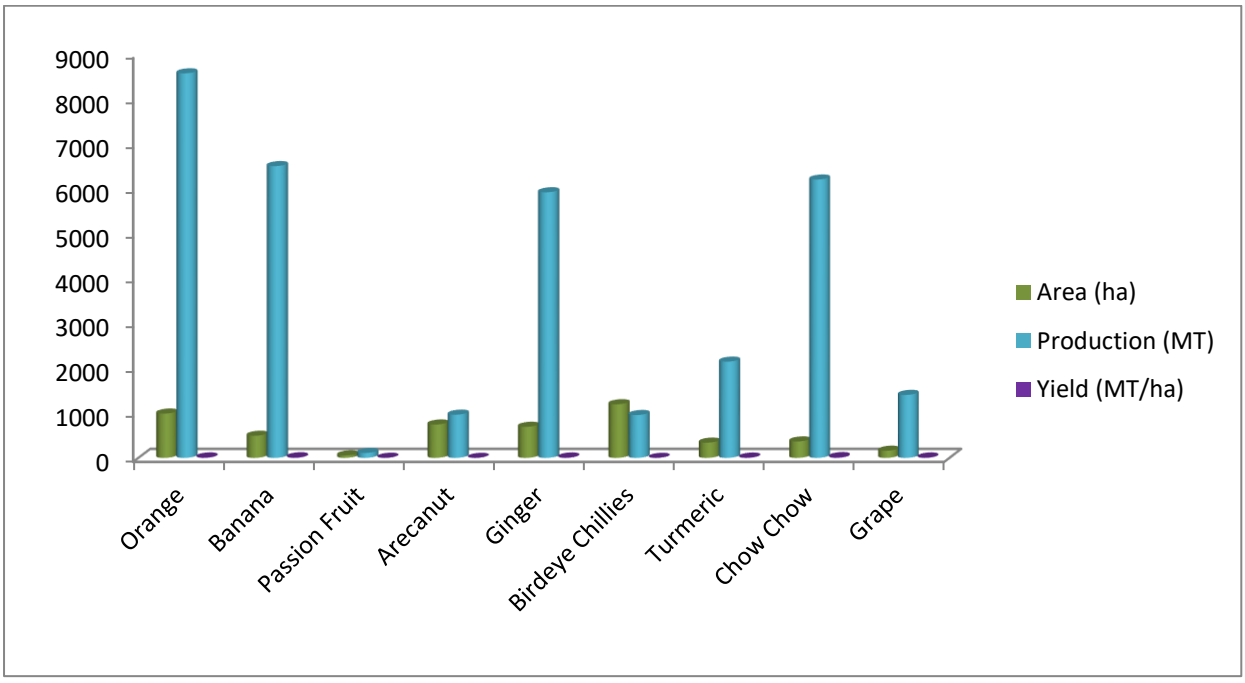

2500
2000
1500
1000
500
0
No. of Fish farms
Area under aquaculture (ha)
Fish Production (tonnes)
No. of hatchery unit
2016 - 17
2017 – 18

TABLE 4: AREA, PRODUCTION AND YIELD OF PRINCIPAL HORTICULTURAL CROPS, LAWNGTLAI DISTRICT

Sl. No	Name of Crop	2016 - 2017			2017 - 2018		
		Area (ha)	Production (MT)	Yield (MT/ha)	Area (ha)	Production (MT)	Yield (MT/ha)
1.	Orange	871	3,508	5.23	985	8,570	9.57
2.	Banana	490	6,500	13.26	492	6,500	13.21
3.	Passion Fruit	53	108	2.03	55	110	2.0
4.	Arecanut	742	940	1.26	742	960	1.29
5.	Ginger	688	5,923	8.61	691	5,916	8.56
6.	Birdeye Chillies	1192	937	0.79	1,192	953	0.80
7.	Turmeric	337	2,138	6.33	338	2,139	6.32
8.	Chow Chow	363	6,190	17.05	365	6,200	16.98
9.	Grape	156	1,370	8.78	159	1,400	8.80

Source: Statistical Handbook Lawngtlai District, 2018

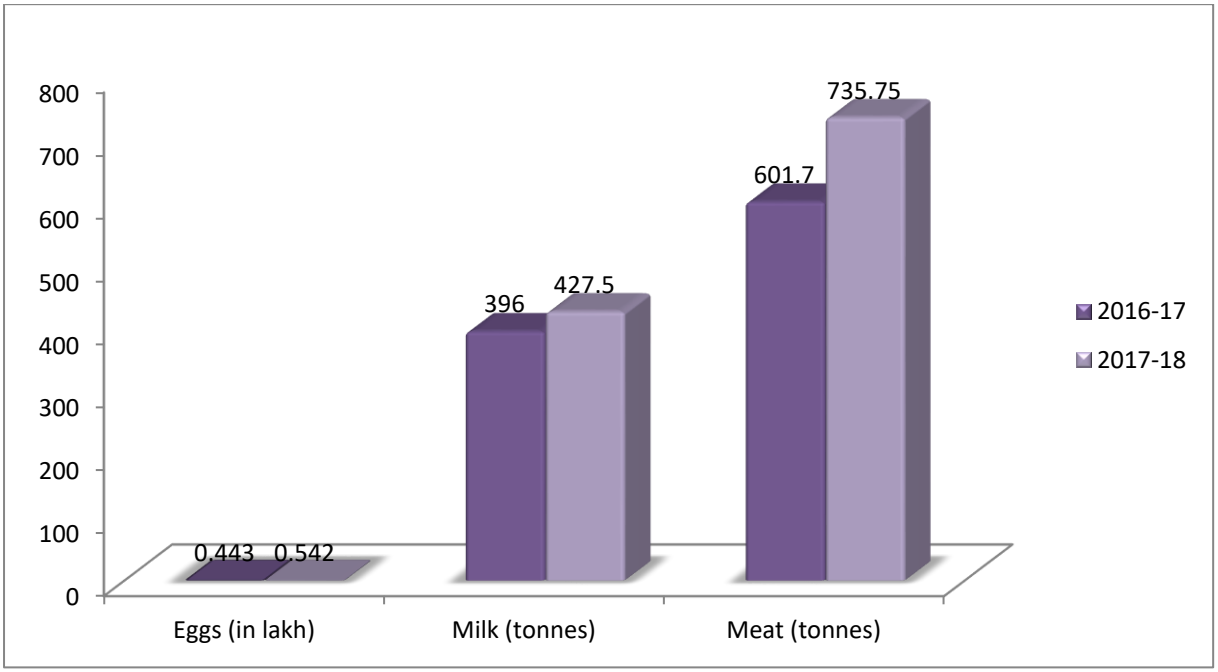


Area, Production & yield of Principal Horticulture crops in Lawngtlai District during 2017-18

TABLE 5: PRODUCTION OF EGGS, MILK AND MEAT, LAWNGTLAI DISTRICT

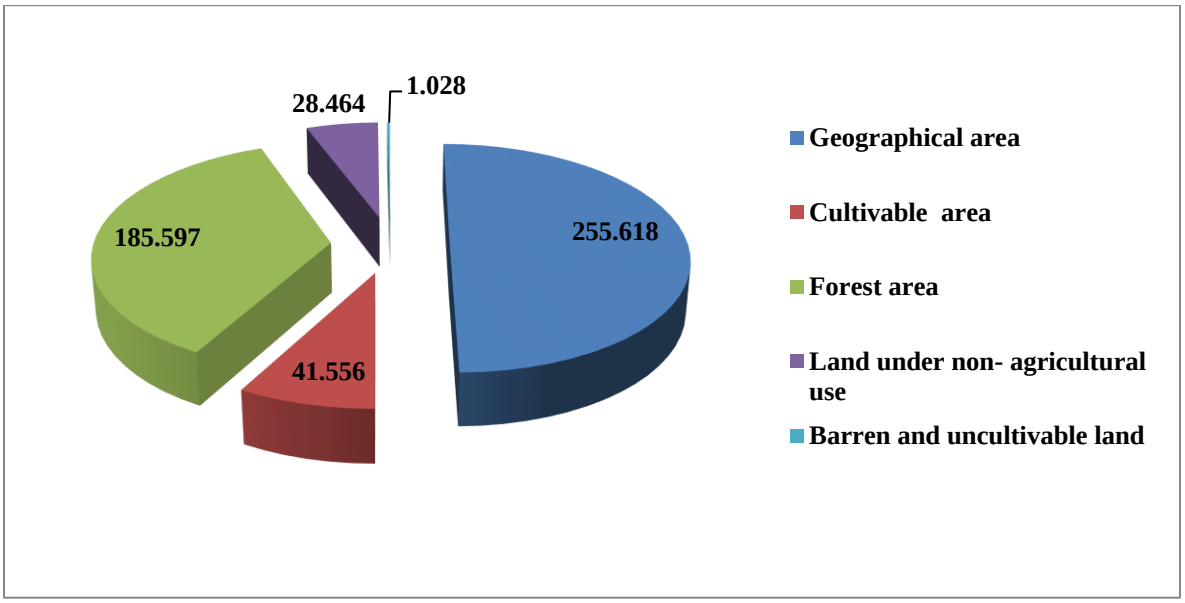
Sl. No	Particulars	Unit	2016-17	2017-18
1.	**Eggs**	Lakhs Nos.		
	1. Desi		0.148	0.162
	2. Improved		0.295	0.38
	3. **Total**		**0.443**	**0.542**
2.	**Milk**	Tonnes		
	1. Crossbred		144	180
	2. Indigenous		252	247.5
	3. **Total**		**396**	**427.5**
3.	**Meat**	Tonnes		
	1. Cattle		201.6	252.5
	2. Buffaloes		13.9	15.2
	3. Mithun		2.94	3.36
	4. Goats		8.08	9.93
	5. Pigs		304.82	368.13
	6. Poultry		69.73	69.73
	7. **Total**		**601.7**	**735.75**

Source: Statistical Handbook Lawngtlai District, 2018

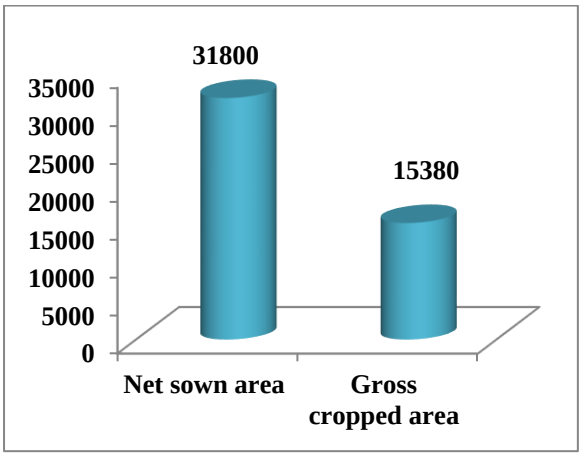


Production of Eggs, Milk and Meat in Lawngtlai District during 2016-17 and 2017-18

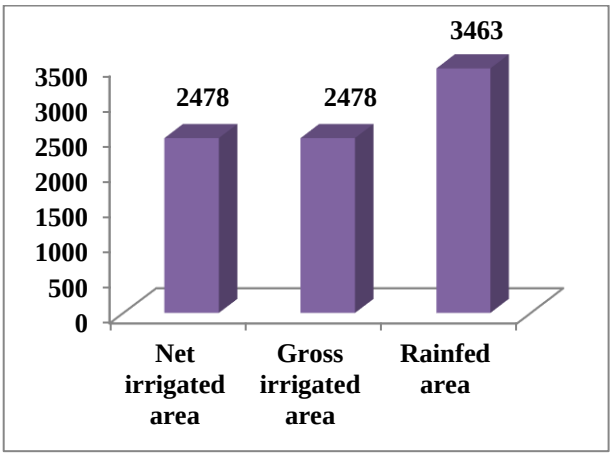
Land Use Pattern of Lawngtlai District:



Land Use Pattern ('000 ha)



Agriculture Land Use (ha)



Irrigation (ha)

Source: Directorate of Agriculture (Crop Husbandry), Gov't of Mizoram 2017-18

A. Problems of Agriculture in Lawngtlai District:

1. Lack of knowledge on modern method of farming and poor understanding of the resources:

- Farmers of the district are not aware of the latest technologies
- Lack of awareness for productive and efficient inputs
- Lack of awareness on management of common pests and diseases of major crops grown in the district
- Lack of knowledge on importance of preparation and management of nursery for horticultural crops
- Lack of awareness on nutritional gardening
- Unawareness of off-season and hi-tech production technologies
- Improper utilization of farm resources
- Many farmers are still reluctant to change their poor farming techniques and agricultural practices.

2. Existing of acidic soil:

- Low fertility of soil due to the availability of toxic elements in the acidic soil of the region, acidic soil restricted the growth and development of plant leading to poor productivity of crop production.

3. Late onset and early cessation of rain:

- Rainfall is variable in the region, when the monsoon sets in late, the sowing of crops are delayed resulting in poor yield. The rains may cease very early in the season exposing the crop to drought during flowering and maturity stage which may reduce the crop yield considerably.

4. Soil erosion and degradation of land:

- During monsoon season due to heavy rainfall, running water cause soil erosion removing the top soil in the low lying areas and slowly degraded the soil resulting to decrease in the soil quality of hill areas.

5. Seeds and planting materials:

- Lack of improved variety seeds
- No reliable agency for purchasing good quality seeds
- Absence of nursery who sells planting materials
- Owing to the remoteness of the district, procurement of improved seeds and planting materials are inadequate

- Ignorance of farmers in preserving indigenous seed

6. Short supply of local vegetables:

- Supply of local produce is deficient during the dry and off seasons.
- Difficulty of accessing irrigation water is one reason why vegetables cannot be grown during the dry season, and during rainy seasons, plant diseases can break out in open fields.

7. Neglect of crop rotation:

- Successful conduct of agricultural operations depends upon a proper rotation of crops. Most farmers are illiterate and do not understand the importance of crop rotation. Since they are not aware, they use the same type of crop and, consequently, the land loses its fertility considerably and also results in occurrence of pest and diseases.

8. Insufficient use, conservation and management of land:

- People in rural area lack proper knowledge of potential of land resources in their community.
- The community-based organizations have not been able to adequately formulate the concept of future agricultural development using locally available resources.
- The farmers also do not understand the best way to use and manage their land resources. Moreover, there is lack of recognition of the value of the land as a resource.
- Jhum cultivation is still the preferred cultivation. Absence of proper management of newly developed farm land and land converted from Jhum, and unsustainable practices result in soil losses and degradations. Impact of increased pressure on land, particularly forest land led to shrinkage of 10 years Jhum cycle to 3-4 year cycle lowering productivity and production thus rendering Jhum practice uneconomical.
- Existing of shifting cultivation**:** Farmers are still practicing shifting cultivation which resulted in large scale deforestation, soil and nutrient loss, and invasion by weeds and other species and indigenous biodiversity has been affected to a large extent.

9. Remoteness and inaccessibility:

- Most of the farm lands are in a remote places and inaccessibility leading to difficulties in transportation of farm input/product which result in higher crop production.

10. Small size or insufficient & fragmentation of land holding:

- Most farmers are having small land holding and in many places, most of the lands are cultivated by poor farmers which belong to rich people leading to poor yielding in crop production.
- Due to small, scattered and fragmented land holdings, there is problem in carrying out improved technologies in a compact and comprehensive manner.
- Commercial plantation of any cash crops requires compact/ cluster of sizeable areas in a particular location to facilitate better flow of input-output of farm produce, marketing, etc. This could not be achieved partly due to mal-land tenure system in the district.
- Because of fragmentation of land holdings, a lot of time and labour is wasted in moving seeds, manure and implements from one piece of land to another.
- Irrigation becomes difficult on such small and fragmented fields.
- A lot of fertile agricultural land is wasted in providing boundaries which results in lack of concentration on improvement

11. Time Constraints:

- Due to lack of farmer's awareness on timely report of their problems like pest and diseases management and timely availability of farm inputs due to communication problems, crop production can be hampered badly.

12. Labour inadequacy:

- On steep slopes, cultivation, harvesting and transportation require intensive labour forces.
- Farming requires manpower to produce higher yields. Lack of skilled manpower is a significant constraint faced by the farmers in the district.
- The demand for daily labours are very high in the farm but due to shortage of workers which may be due to prevalence of urbanization resulting in higher in labour charges which is hard for the farmers to afford it and affected cost of crop production.

13. Low cropping intensity:

- Majority of farmers are practicing mono-cropping. Most of the WRC area are also cultivating rice once in a year and kept fallow during winter season. Double cropping is not feasible as the winter temperature is low due to late harvesting of rice.

14. Lack of water resources in the dry season:

- Poor water-harvesting structures and almost no irrigation facilities.
- Most of the rain water drains out from the watershed areas leaving very small fraction percolating into the soil. Those percolated water is the actual source of stream/ river in the lean period. Since ground water storage on the sloping catchments area is too small, most of the small streams dry up after 1 to 2 months of monsoon.
- Because of lack of sufficient water harvesting structure, most of the Agriculture & horticulture fields cannot be irrigated during the dry season which hampers the production and productivity.
- Only 2,478 ha is under Irrigated condition, most of which are under low lying area.

15. Lack of improvement in farm mechanization:

- Most farmers are facing difficulties in large scale production of crops due to lack of improved farm tools and mechanization. Farmers are still using simple tools and conventional tools and implements like wooden plough, sickle etc which results in huge wastage of human labour and in low yields per capita labour force.

16. Shortage of fodder and feed:

- There is acute shortage of fodder especially green nutritious fodder, which is major cause of low productivity of livestock in hilly area. The main reasons for low productivity is insufficient and low quality fodder and feed including grazing facilities.

17. Inadequate and use of inputs, manures, plant protection chemicals & fertilizers:

- Farmers do not have the purchasing power for inputs etc more so even if they have, there are no proper shops or dealers of this kind within the District and had to depend on Government supply which is not sufficient. Farmers lack awareness on use of inputs and are ignorant about it
- Inadequate use of manures like cow dung and chemical fertilizers leads to much less production.

18. Absence of post-harvest management facilities:

- Absence of post-harvest management facilities in the district results in post-harvest losses such as crop spoilage, loss of sale and reduced market price for produce.
- The main post harvest processing is Sun Drying at farm level using polyethylene sheets.

19. Non-existence of storage facilities:

- Absence of storage facilities compels the farmers to sell their produce immediately after the harvest at low price. Culled fruits and vegetables generally go waste or are sold at throwaway prices.
- The only storage facilities available are Farmers Farm house and Homemade Go-downs. There is no Cold Storage facility.

20. Lack of Organized Agricultural Marketing:

- There is no proper regulated marketing system, wholesale or retail chain. Lack of commercial knowledge and information results in exploitation of farmers by a handful of middlemen and traders.
- Non availability of fixation of price of farm produce, lack of the Government policies to buy back the Farmers produce.
- The basic infrastructure facilities such as transport and communication, power and electricity, capital overheads, credit and financial institution are totally inadequate in the district.
- The marketing is largely unorganized and dominated by the private traders due to the absence of proper implementation of market regulation act in the district.
- Due to lack of marketing infrastructure, shortage of storage facilities and poor road conditions as well as poor road linkage with the headquarters of district, the villagers are deprived from the actual benefits of their agricultural produce. Most of the roads of the villages are seasonal and during rainy seasons their roads are almost cut off from the market place.
- The villagers still follow the traditional system of agriculture and the qualities of produce are not standardized. There is no proper record on surpluses of agricultural produced.
- The initiatives of the government as well as NGO's for improving market infrastructure and organizational support are not sufficient to develop the conditions of the villages of the district.

21. Inadequate transport:

- Road transport plays a very crucial part in Hill areas. Maximum cropping intensity is during monsoon, however due to heavy rain and most of the roads are not all weather roads, Transportation problem is largely faced so, farmers have to transport their farm produce by head load in most of the areas which is very expensive and time consuming.

22. Lack of processing plant/unit:

- Lawngtlai district is not having any viable and functional processing unit. All the agricultural produces, livestock or fishery products have to be disposed off hurriedly to avoid damages which prevented the farmers from getting maximum profit for their harvest.
- Lack of the Government policies to buy back the Farmer's Agriculture Produce in large quantities like Maize and Soya bean for Livestock and Poultry feeds due to lack of Feed Processing Plant in the district. This also results in high cost of concentrate feeds in the market as it was procured from other district and neighbouring states.

23. **Premature fruit drops due to hailstorm** is a big problem. As a result, substantial quantity of mango and vegetables are lost before they attain proper maturity stage.

24. Prevalence of under nutrition:

- Lawngtlai is Mizoram's most backward and disaster prone district with 35.3% stunted, 21.3% underweight and 5.9% severely wasted (low weight for height) children under 5 (highest on all count in Mizoram)

25. Poor productivity due to rearing of indigenous Livestock and Poultry and inadequate availability of improved breed of Livestock and Poultry.

26. Lack of knowledge on feed management and high cost of concentrate feeds:

- Majority of the farmers do not afford to buy concentrate feed and they normally offered locally available feeds without vitamins and mineral supplements to their Livestock & Poultry. This results in poor production and lower benefit cost ratio.

27. Poor housing system resulting in poor production.

28. Non availability of proper animal health care in the remote villages due to bad road condition.

29. Lack of awareness in production of Livestock and Poultry scientifically in more remote areas.

30. Lack of Poultry Hatchery:

- There is a problem for the farmers in adoption of new technology introduced as there is no means for further multiplication of the superior germplasm due to lack of Hatchery.
- Lack of Hatchery in the district also results in a huge gap between demand and supply of Eggs within the district.

- The cost of chicks from the local market (Broiler & Layers) is very high as it was mostly procured from other District and other neighboring states.

31. Lack of well-equipped quarantine facilities to check disease outbreak especially for Piggery farmers.

32. Lack of Proper Slaughter House & Modern Meat shop:

- Pork retailing market in rural market is through informal system with least concern for hygienic measures. There is inadequate infrastructure and pork is sold in open air. The need for effective supervision and training on scientific methods of slaughter and handling of pork, slaughter house and modern meat shop as food safety measures is the need in view of the present scenario.

33. Financial Constraints of farmers:

- Many young farmers are ready to perform farming to feed the ever growing population of the district but farming is capital intensive and although farmers do not like debt, many operations and cost of farm inputs are very high especially for newer ones, they have limited ability to undertake profitable investment with only own funds.
- Lack of financial assistance to the farmers through financial institutions to promote large scale Pig, Poultry and Dairy farming.
- Poor financial condition of farmers to take up fish farming.

34. Scarcity of exotic fingerlings and absence of ice plant

35. Scarcity and high cost of fish feed

36. Acidity of water body for fish

37. Siltation of fish ponds due to the practice of shifting cultivation

38. Competition with other districts and foreign countries like Bangladesh and Myanmar

39. Natural calamities such as flood, landslides/landslip etc

B. Prospects of Agriculture in Lawngtlai District:

1. The diverse agro climatic conditions ((humid temperate sub-alpine zone, humid sub-tropical hill zone and humid mild tropical zone), varied soil type, and abundance of rainfall offer immense scope for cultivation and conservation of different types of Agricultural and Horticultural crops.

2. Promotion of modern agro technique to replace traditional system or improved traditional system will ensure better economic turnover within the district.

3. Promotion of mini-mechanization suitable for hill farming such as mini power tillers, brass cutter extensions, hand held machineries and tools to reduce labour. Labour intensive Traditional/Jhum practice needs to be improved to ensure better economical gain.

4. Promotion of rain water harvesting structures and micro irrigation to conserve water for irrigation during the long dry period. Low cost Water storage like Jhalkund was found efficient in collection of rainwater stored it later for irrigation.

5. Promotion of seed production firm whether Government or private needs to be established for distribution of quality seeds and planting materials. Modern improved seed bin must be introduced for safe and better seed storage.

6. Promotion of improve cultivation system to boost harvest of well performance crops like Maize, Oilseed crops (Soybean, Sesamum, Groundnut and Rapeseed) Pulses (Arhar, Rice bean, Field Pea Cow pea and French Beans) which are mostly grown as mix crop in Jhum with low harvest.

7. Promotion of IPM & INM to provide low cost effective control of pest and disease along with nutrient management ensure better economic return for the poor farmers

8. Promotion of Regulated market chain, Go-downs, Cold Storage, proper fixation of price will ensure economic growth for the farming community with the upcoming international Sea-river-road route trade route (The Kaladan Road Project). Improvement of farm link roads to all weather roads will certainly boost the agriculture economy within the district.

9. Promotion of cottage processing units will ensure less wastage of harvest and better income by value addition thereby creating employment to rural communities especially the women groups and improve the nutritional and economic status of rural communities. Promotion of low cost solar drier equipments for quicker drying will reduce harvest loss especially for Spice and condiments and boost economic return.

10. Under India's Look East Policy, the Kaladan Multi-Modal Transit-cum-Transport Project which was initiated to build transport communication to link Kolkata port with the north eastern region via Mizoram (Hruitezawl, Lawngtlai District)which would facilitate bulk International trade via Sittwe port (Myanmar) opening up contiguous markets is almost complete. Through this waterway, Lawngtlai district has vast potential for commercial cultivation of tropical (avocado, banana, etc), sub-tropical (banana, mandarin orange, mangoes, passion fruit, papaya, pineapple, etc.) and sub-temperate (squash) crops.

11. Abundant rainfall throughout the year and availability of unexploited fertile soil enables cultivation of agricultural and horticultural crops which hold promise.

12. Shifting cultivation areas can be easily converted into horticultural area which is highly remunerative for replacing subsistence farming thereby alleviating poverty level in rainfed, dry land, hilly, arid and coastal agro-ecosystems.

13. High potential for production of high value and low volume crops which have a great prospective of value addition, foreign exchange earnings and make higher contribution to gross domestic product (GDP) from a limited land area.

14. Apart from human food, most of the vegetables grown in the district have the potential for processing industry for value addition, and also by-products provide feed to Pig, Poultry, Cattle and Fish.

15. Growing horticultural crops produce higher biomass than field crops per unit area resulting in efficient utilization of natural sources.

16. Production of Agricultural Crops:

I. Cereal production:

1. Organic rice: tremendous scope for organic rice production.
2. Area expansion: large area still available for area expansion by terracing hill and valley area.
3. HYV Rice and Maize: large scope for replacing indigenous seed with HYV Rice and Maize for more production.
4. Ideal climate for Maize: Climate of Lawngtlai district provides a unique opportunity for year round cultivation of Maize.
5. If Maize sector in the region is given adequate boost, the pig and poultry industry in the region will also get equally benefited due to lower feed cost.
6. Maize can also be grown under rice fallow land under limited irrigation condition.
7. Maize is highly beneficial for both consumption and economic purpose.

II. Oilseed production:

1. Rice fallow land can be utilized to promote oilseed cultivation.
2. There is vast scope for extending crop area under oilseeds through intercropping and sequential cropping with the aim of maximum profit and enhancing area of oilseeds.
3. Cropping intensity can be increased by cultivating oilseed during Rabi season.
4. Honeybee rearing for enhancing crop yield through pollination, besides, it also generates additional income to farmers.

III. Pulses production:

1. Pulses enrich soil fertility by adding nitrogen to the soil and also improve soil structure by their deep root system.
2. Pulses are the cheapest source of protein and balancing human dietary needs.
3. Most of the pulses can be grown as intercrop.
4. Short duration varieties of pulses are fit for the multiple cropping system and thereby the cropping intensity can be increased manifolds
5. The green fodder of most of the pulses is also rich in protein and is palatable to the cattle.
6. Ability to fix atmospheric nitrogen makes pulses an important crop in the agricultural system.

17. Agro-climatic condition of Lawngtlai district is suitable for rearing of various Livestock species & Poultry.

18. Majority of the people of Lawngtlai district are non-vegetarian. Thus, there is a high demand for meat and eggs.

19. Farmers are interested and have indigenous technical knowledge on Livestock & Poultry rearing.

20. Good market demand for Livestock and Poultry products.

21. Some crops like maize, mustard, Soyabean etc are grown by the farmers which can be used for Livestock and Poultry feeds.

22. Popularization of improved breed of Pig and Cattle and up-gradation of indigenous breed through systematic breeding and Artificial Insemination.

23. There is a good opportunity for formulation of economic rations for Pig and Poultry by using locally available feed resources.

24. Opportunity existed for the promotion of slaughter house & modern meat shop by product processing, value addition and marketing.

25. Vast area of land is available for the establishment of ponds.

26. Perennial source of water is readily available.

27. Climatic condition is suitable for development of fishery.

28. High demand for fish and majority of farmers are willing to take up fish farming.

C. Strategies or Actionable Points:

1. Replacement of Jhum with modern technologies like SALT, agro forestry, land use planning, settled farming system.

2. Cultivation of high yielding variety crops, intensive culture with appropriate fertility management system.

3. Integrated approach for insect pest, disease, weeds and rodent through IPM, INM packages.

4. Improvement of road linkage, processing units, post harvest storage units, value addition and better market linkage.

5. Establishment of Agri-related institutions, On Farm trials and Front line demonstrations.

6. Employment generation for rural communities through cottage industries, Bank credit facilities for farmers.

7. Adoption of Integrated water management:

- Provision for micro-irrigation, popularization of water-harvesting structure, farm pond or dug out pond and Jal-kund.
- Mulching with locally available grasses, crop residues, forest shrubs, etc during dry period.

8. Adoption of Integrated nutrient management (INM):

- A live healthy soil with proper cropping patterns, crop residue management (Vermi-composting, green manuring, etc.), application of organic manures and bio-fertilizers, effective crop rotation, and judicious use of chemical fertilizers can sustain optimum productivity over the years.

9. Adoption of Integrated pest management (IPM):

- Emphasis should be given on use of resistant/tolerant varieties suited to local situation.
- Avoid mono-cropping and mono culture practices.
- Use of trap crops fits well in IPM.
- Use of physical traps and repellants, pheromone traps and poison baits would be very imperative.
- Encourage predators, parasitoids, etc. for effective suppression of pests/ diseases.
- Emphasis should be given on use of bio pesticides and botanical pesticides.
- Chemical pesticides, fungicides and weedicides should be used judiciously and on need based only.

10. Replacement of monoculture with double cropping and intercropping to a bigger extend.

11. Development of terrace cultivation, contour bunding/ trench, log wood bunding, cover cops and organic manures to check soil erosion.

12. Motivation of farmers through demonstration and on farm trial and various Extension activities for better adoption of new technologies by the farmers.

13. Adoption of improved agricultural tools and mini-mechanized farming wherever applicable to reduce labour.

14. Better Government intervention for market linkage and establishment of cold storage facilities.

15. Establishment of Government or Private Seed production firm for quality seeds and planting material within the reach of Poor farmers in the District.

16. Hi-tech Horticulture:

- Hi-tech horticulture is the modern technology which is less dependent on the environment, capital intensive and has the capacity to improve the productivity and quality of horticultural crops.
- Adoption of this technology will ensure the food and nutritional security of ever increasing population and shrinking of land and water resources day by day, and to cope up with erratic and extreme type of weather events in impending climate change scenario. This includes micro-propagation, micro-irrigation, fertigation, protected cultivation (greenhouse/ poly-house, plastic mulching, low tunnel, etc.), mechanization, nutrition modeling, and use of remote sensing.

17. Setting up of Post harvest management and processing:

- Facilities such as post harvest handling, cold storage, drying, transportation, processing industries, packaging and marketing is required to reduce bulk transport and increase the income of the horticulture farmers.
- Post harvest management of produce, installation of new processing facilities/upgradation of technologies of existing facilities, value added products that can be produced from the produce, skill development among locals, food safety management systems of the facilities, development of logistics infrastructure, optimum business models for the established infrastructure etc.

18. Collection, characterization, conservation and utilization of germplasm:

- The district is blessed with rich-biodiversity of many vegetables. Hence, in the era of Plant Variety and Farmers' Right Act, collection, characterization and

conservation of available gene pools would provide royalty to farming community for commercial; utilization of available genetic resources. The utilization of available genetic resources will also assure the high productivity and well adaptability of developed varieties/ hybrids.

19. Diversity in research and development:

- Regeneration and cultural practices for many species need to be researched and standardized for their cultivation. Threatened species need immediate action for ensuring their continued existence.
- Identification and classification of threatened species need to be done.
- Richness of diversity of horticultural crop species is to be fully inventorized and documented.

20. Contract farming in potential zones:

- The district has vast tract of land that remain unutilized, which can be used for targeted production of horticultural crops to cater exclusively to the requirement of processing industries. Expansion of area under the targeted crops should be promoted through contract farming with the involvement of corporate sector. The supply of desirable raw materials for processing is key of the success of processing units and the quality of the processed products

21. Production of Agricultural Crops:

I. Cereal:

1. Popularization of terrace farming of rice.
2. Promotion of inputs such as seeds, micronutrients, farm machinery, PP chemicals through programmatic intervention.
3. Dissemination of technologies
4. Ensuring optimal stand establishment by adopting closer spacing in transplanted areas.
5. Cultivation of QPM hybrid Maize.
6. Intercropping with Potato and vegetable in winter Maize for additional income.
7. Promotion of Maize based processing industry (animal feed, ethanol, corn oil etc)
8. Seed production of QPM hybrid within the state.

II. Oilseed:

1. Increasing seed production and distribution of newly released varieties.

2. Low cost technologies with high impact on productivity resulting in higher income
3. Technologies with high impact that involve reasonable investment with high return on investment (ROI), with emphasis on eco-friendliness, high input use efficiency
4. Utilizing rice fallow areas
5. Area expansion under protective irrigation
6. Area expansion through diversification of low yielding cereals, use of rice fallows and intercropping.
7. Promotion of new varieties through FLDs.
8. Increasing seed replacement rate with varietal replacement.
9. Creation of oil extracting unit
10. Establishment of seed hub of oilseed.
11. Strategies with emphasis on quality improvement and value addition leveraging technologies with a bearing on the employment through skill/ entrepreneurship development.

III. Pulses:

1. Encouraging line sowing in place of broadcasting.
2. Use of short duration varieties under late sown condition.
3. Survey and surveillance for disease and insect pest.
4. Production and distribution of quality seeds to increase seed replacement rate.
5. Emphasis on 100% seed treatment with fungicides.
6. Developing irrigation facilities to cover more area.
7. Post harvest technology: Storage of pulses' grains is prone to damage due to storage grain pests causing huge economic losses.
8. Integrated crop management technologies: Local specific integrated pulses production
9. Technologies have been developed for all major pulses.
10. Integrated nutrient management: Proper nutrient management based on soil analysis is important for maximizing productivity of pulses.
11. Promotion of bio-fertilizers and bio-inoculants: Legume seed treatment of host specific Rhizobium along with recommended dose of phosphoric fertilizer.

22. Increasing mechanization:

- Mechanization would play a key role in modernization of agriculture due to its benefits of improved labour efficiency and productivity, efficient use of expensive farm inputs, reduction of human drudgery and timeliness of operations.

23. Establishment of Cold storage units at specific location:

- Small and marginal farmers can adopt Zero energy cool chamber as it requires very low or minimal electricity or or power to operate nor any skilled person to operate, maintains low temperature and high humidity. They can store their daily harvesting instead of selling to middle man at cheapest rate.

24. Setting up of processing and value addition unit at certain places will enable the surplus products of livestock and fishery and culled fruits and vegetables to be converted into pulps and value added products during the season and later they can be used to prepare various tertiary processed products

25. The premature fruit drops of mango can be utilized if processed into value added products such as pulp, pickle, chutney, dried powder, etc

26. Popularization of kitchen/backyard garden

- To curb the problem of shortage of fresh fruits and vegetables.
- To improve nutritional status.
- To increase the purchasing power through savings on food bills

27. Enhanced milk, meat and egg production:

- Introduction and popularization of improved breed of Livestock and Poultry.
- Identification of superior breeds suitable for the region and thereby improving the existing indigenous stocks through cross breeding.
- Popularization of Artificial insemination for up gradation of indigenous Cattle and Pig.
- Establishment of Pig Breeding Units and strengthening of the Govt. farms to supply superior Piglets to the farmers.

28. To disseminate technical knowhow on management of Livestock and Poultry to farmers by conducting short-term training programmes and demonstrations.

29. Establishment of Feed processing unit:

- Identify locally available resources and establishing diet especially Tapioca, Sweet potato, Soyabean and Maize
- Standard formulation of balanced ration incorporating locally available feed resources.

30. Enhanced production of quality feed and fodder by popularizing production of high yielding fodder varieties.

31. Provision of Animal health care by organizing Animal health camp from time to time.

32. Provision of financial assistance to the needy and interested farmers to go for large scale Livestock & Poultry farming through financial institutions & various central sector schemes.

33. Renovation of fallow and barren lands for fodder production.

34. Improved Veterinary healthcare facilities for prevention and control of animal diseases by Vaccination against important diseases, regular and timely deworming and improvement of veterinary healthcare infrastructure.

35. Popularisation of Dairy Farming:

- Other than milk and meat, Cattle provide large share of draught power, the dung produced from Dairy farming is an important organic manure.

36. Practice/Popularization of Integrated farming system

37. Establishment of Poultry Hatchery so that the farmers can get adequate number of improved variety of Poultry at a lower price.

38. To provide better collection, processing and marketing infrastructure by establishing Modern meat shops and Slaughter House

39. To make producers and consumers aware of the benefits of clean and hygienic animal products by organizing training programmes for milk, egg and meat producers.

40. Extension services to popularize fish farming.

41. Establishment of cold storage facility (Ice plant).

42. Popularization of value added fish products.

43. Establishment of Fish hatcheries.

44. Improvement of agricultural marketing:

1. **Co-operative marketing**: In Lawngtlai district ,maximum farmers are small and marginal and the existence of so many problems in respect of agricultural marketing, co-operative marketing would be the only and right solution in this respect. The objectives of co-operatives are to produce agricultural product and to distribute agricultural inputs at a reasonable price. It can duly collect agricultural produce from the farmers, grade and standardize them, store them, transport and sell them at a point of time when the price is more.

2. **Regulated markets**: The objective of regulated markets is to remove ill market practices, to reduce marketing changes and to ensure fair prices for the farmers. The regulated market is managed by a committee of representatives from state government, local bodies,

traders, brokers and farmers. They issued licenses, fix brokerage rates and ensure use of standard weights. Regulated market can be great help in removing the defects and to save the farmers from exploitation by the intermediaries and ensure fair prices for their produce.

3. **Public distribution**: The objective of public distribution system is to procure produce directly through its outlets at fair price and distribute throughout the district at fixed price.

4. **Market information and extension network**: It is important to develop information and extension network for ensuring smooth supply of quality inputs to the farmers. Strengthening of market information through broadcasting and any other means is highly beneficial for farmers in the district.

5. **Financial Assistance**: Financial assistance is required for meeting expenditures relating to agricultural farming to maintain livelihood and for improving holding capacity of produce to make the best use of marketing opportunities.

6. **Grading and standardization**: Proper grading and standardization not only improve the quality but also reduce wastage, attract buyers and ensure better price for agricultural produce. Grading of agricultural produce induces the farmers to grow quality products on the one hand and the buyers find no difficulty in identifying a suitable one for paying right price on the other.

7. **Storage facilities**: Proper storage is an important aspect of agricultural marketing. To carries agricultural produce outside the village; it is necessary to provide adequate storage facilities to hold till better price is not offered. A proper and adequate storage not only enhance the bargaining power of the farmers but it is also ensuring better prices for agricultural produce.

8. **Transport facilities**: For successful agricultural farming, an essential requirement is the availability of transport which can carry agricultural produce to markets at low cost, easily and speedily. Traditional system of transport is in fact has little relevance with present state of agricultural marketing. Diesel operated quick moving transport is therefore needed for effective agricultural marketing.

9**. Standard weight**: The need for using standard weights throughout the country is a must. Lack of use of standard weights would continue to keep agricultural marketing into an undesirable state of affairs. Despite the introduction of metric weights throughout the country since 1962, the use of old system of weight still persists. It is hopeful that metric system of weights is accepted by all concerned.

POLICY ISSUES TO BE ADDRESSED IN LAWNGTLAI DISTRICT

The Lawngtlai district of Mizoram lies in the South Western part of the state. It has a population of 1,17,894 out of which 16 % of the population resides in the Lawngtlai town and the rest 84% live in sub urban and rural areas. Like most of other districts, the percentage of rural population is much higher than urban population. However the district capital being the district headquarters as well, there is a good scope for marketing of agricultural produces. The state of Mizoram does not have much resources and scope for employment generation except in the government services which at present seems to be much over-staffed. As such the rural communities are left with no choice but opt for agriculture and allied activities. About 90% of the rural populations therefore are directly or indirectly dependent on Agriculture. However, the productivity per area and the income obtained by the farmers are much lower as compared to other state. In order to overcome the problem faced by the farmers of this district, the following issues need to be addressed.

1. **Potential Area Activity:** As the district is comprised of steep hills, the fertile cultivable areas generally lie on the base of the hills. The small hills and small streams running in between them make accessibility very difficult for transportation of inputs and produce for the farmers. So, good roads are badly needed for connecting the villages and the cultivable area.
2. **Good seeds and other inputs:** Most of the seeds and other inputs are presently supplied by state departments. However the inputs cannot reach the farmers in proper time in most of the seasons. The inputs are also not available in sufficient quantity, which generally is due to lack of fund on the part of the department. As such supply of sufficient quantity of HYV seeds and other inputs in proper time are needed to be addressed urgently.
3. **Settlement of Jhumias:** Of all the farmers of the district, only about 15% practiced permanent/settled cultivation. The rest 85% have no option but go for Jhuming. Jhuming involves slash and burns method which is primitive and harmful for the ecology. Steps have been taken to wean away the people from it. However, the success is not very satisfactory till today. Out of all the Jhumia family, about 50% will be able to be motivated to go for settled farming provided assistance is given to them for construction of terraces coupled with rain water harvesting structures. More fund is needed so that the number of settled cultivators could be increased from 15% to about 45%.

4. **Severe soil erosion:** The topography, soil type and high rainfall in the district lead to severe soil erosion. The top soils are removed leaving the soil poorly fertile. An action in the form of effective soil and water conservation measures is urgently needed to conserve soil and moisture.
5. **Problem of soil acidity:** High rainfall and high slope percentage resulted in the removal of basic salts from the soil, leading to high soil acidity. The acidity has a profound effect on permanent orchards and farming system in acid soil. Nutrient elements are retained by soil particles which preserved the crops from getting enough nutrition. The normal correction measure taken up is liming which is found to be very effective by the farmers. Hence, heavy demand is seen at all times. However, the cost of slaked lime including transportation charges put the supply beyond the reach of majority of farmers. A sufficient supply of slaked lime at reasonable price is urgently called for.
6. **Processing units:** The district, rather the whole state of Mizoram, is not having any viable and functional processing units. All the agricultural produce, livestock or fishery products have to be disposed off hurriedly to avoid damages, which prevented the farmers from getting maximum profit from their harvest. Creating a number of agro-processing and value addition units would greatly help to improve the economic condition of the farmers.
7. **Cold storage:** The district is ideal for producing crops like potato, orange, banana, passion fruit and various vegetables which exceed the requirement during the peak season. However, lack of storage facilities prevented the farmers from getting maximum returns for their produce. This is especially true for the fish farmers Establishment of cold storage would greatly help the farming community.
8. **Market shed and organization:** Presently, the farmers directly transport their produces to the district headquarters where disposal is made direct to either middleman or consumers. A good marketing system\organization that help the farmers is lacking. A good farmers' godown/warehouse for storing the produce and a good organization that helps in the management of the produce is needed.
9. The farmers of the district are very much in need of find for infra-structural development, farm mechanization, purchase of seeds and other inputs, etc. Although there are numbers of credit institution (banks like SBI. Co-operative banks etc) other facilities are not sufficient at sometimes they are reluctant to come forwards to help the farmers.

POPULATION BASE PROJECTION OF DEMAND-SUPPLY ANALYSIS UPTO 2030

Table 6: Demand- Requirement Estimates based on growth trends of last ten years population (2001 – 2011) in thousand tonnes in Lawngtlai District, Mizoram (assuming 0.99 rate of decline in growth rate every year with base year 2011 Census Population of 117894)

Year	Population	Growth rate	Cereal	Pulses	Oilseeds	Fruits	Vegetables	Fish	Meat	Milk	Egg (Lakh)
2024	2,17,441	1.04	31.74	1.73	2.38	7.93	23.80	1.13	2.37	10.87	391
2025	2,27,925	1.04	33.27	1.82	2.50	8.31	25.00	1.18	2.48	11.40	410
2026	2,38,914	1.04	34.88	1.91	2.61	8.72	26.16	1.24	2.60	11.94	430
2027	2,50,433	1.04	36.56	2.00	2.74	9.14	27.42	1.30	2.73	12.52	450
2028	2,62,507	1.04	38.32	2.10	2.87	9.58	28.74	1.36	2.86	13.12	472
2029	2,75,163	1.04	40.17	2.20	3.01	10.04	30.13	1.43	3.00	13.75	495
2030	2,88,429	1.04	42.11	2.30	3.15	10.52	31.58	1.50	3.14	14.42	519

***Source: ICMR RDA 2010:** Per capita consumption: Milk-50kg/yr; Meat: 10.9kg/yr; Egg: 180 nos/yr; Pulses: 8kg/yr; Vegetables: 300g/day; Oil: 30g/day; fruit:100g/day; Cereals:400g/day; Fish:100g/week*

Table 7: Demand (D) – Supply (S), Gap – Production and requirement Estimates of Agricultural commodities based on last five years growth rate (2013-2018) in thousand tonnes in Lawngtlai District, Mizoram

Year	Cereal			Pulses			Oilseeds			Fruits			Vegetables		
	D	S	Gap (D-S)	D	S	Gap (D-S)	D	S	Gap (D-S)	D	S	Gap (D-S)	D	S	Gap (D-S)
2024	31.74	18.41	-13.32	1.73	0.79	-0.93	2.38	0.35	-2.02	7.93	6.97	-0.95	23.80	18.50	-5.29
2025	33.27	19.05	-14.21	1.82	0.88	-0.94	2.50	0.36	-2.14	8.31	7.15	-1.15	25.00	19.56	-5.43
2026	34.88	19.80	-15.07	1.91	0.94	-0.97	2.61	0.37	-2.24	8.72	7.33	-1.38	26.16	20.47	-5.68
2027	36.56	20.68	-15.87	2.00	1.00	-1.00	2.74	0.37	-2.36	9.14	7.49	-1.64	27.42	21.22	-6.19
2028	38.32	21.49	-16.82	2.10	1.05	-1.04	2.87	0.38	-2.50	9.58	7.66	-1.91	28.74	22.07	-6.66
2029	40.17	22.21	-17.95	2.20	1.11	-1.08	3.01	0.38	-2.62	10.04	7.84	-2.19	30.13	23.01	-7.11
2030	42.11	22.98	-19.12	2.30	1.16	-1.13	3.15	0.39	-2.75	10.52	8.01	-2.50	31.58	23.90	-7.67

Table 8: Demand (D) – Supply (S), Gap – Production and requirement Estimates of Livestock and fisheries commodities based on last five years growth rate (2013-2018) in thousand tonnes in Lawngtlai District, Mizoram

Year	Fish			Meat			Milk			Eggs (Lakh Nos)		
	D	S	Surplus (+)/ deficit (-)	D	S	Surplus (+)/ deficit (-)	D	S	Surplus (+)/ deficit (-)	D	S	Surplus (+)/ deficit (-)
2024	1.13	0.80	-0.32	2.37	1.45	-0.91	10.87	2.10	-8.76	391	192	-198
2025	1.18	0.82	-0.35	2.48	1.51	-0.96	11.40	2.23	-9.16	410	203	-206
2026	1.24	0.85	-0.38	2.60	1.55	-1.04	11.94	2.35	-9.58	430	213	-216
2027	1.30	0.88	-0.41	2.73	1.57	-1.15	12.52	2.46	-10.05	450	224	-225
2028	1.36	0.90	-0.45	2.86	1.60	-1.25	13.12	2.57	-10.54	472	235	-236
2029	1.43	0.93	-0.49	3.00	1.64	-1.35	13.75	2.70	-11.04	495	246	-248
2030	1.50	0.95	-0.54	3.14	1.68	-1.45	14.42	2.82	-11.59	519	257	-261

Contributors

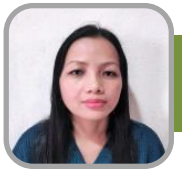
Dr. C.Lalfakawma, Sr. Scientist & Head

Dr Vanlalliani, SMS(Horticulture)

Mrs. Vanlalruati, SMS(Home Science)

Mrs. Sheela Tayeng, SMS(Agril. Extension)

Mr. Rualthankhuma, SMS(Agronomy)



Dr. Lalthazuali, SMS(Animal Science)

Mrs. Vanlalmalsawmi Sailo, SMS(Soil Science)

Technical Supporters

Mr. Samson Sailo
Prog. Asst.
(Computer)

Mr. Malsawmkima
Farm Manager

Mr.Jonathan Lalrinliana
Prog Asst.
(Agril Engg.)