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## **Institutional arrangement and support for production of Anthurium in Mizoram**

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### **Abstract**

Anthurium mostly cultivated for their very beautiful and long lasting flowers and is one of the thrust horticultural crops of Mizoram because of many advantages including increasing demand for global market, ideal agro-climatic conditions, availability of groups of farmers having fertile land and assistance provided by the Horticulture Technology Mission for the North Eastern states etc. Presently, different international varieties of Anthurium are cultivated by the growers in Mizoram.

Anthurium cut foliage has a good market potential for export and even local market due to its colourful Spathe and Spadix. The plants are being grown along hill slopes under shade houses with the latest Dutch varieties with sprinkler irrigation and fertilizer like coco-peat etc. If the production technology is properly managed, it can generate a monthly income of Rs. 5000-25000/- for a single family. Besides the growers, it generates employment to the women of other families in terms of labour. In fact, floriculture can replace shifting cultivation to a large extent in many places of the North Eastern states if proper institutional arrangement is made.

**Keywords:** Anthurium, farmers, growers, floriculture, market

### **Introduction**

Mizoram is situated on the North eastern part of the country bounded by Myanmar in the East and South, Bangladesh and Tripura State in the West, Assam State and Manipur State in the North with very little productive land. Therefore most of the food-grains are imported from the neighboring states. Therefore it is very much essential to go for a possible crop diversification for their livelihood. Commercial Floriculture has a vast potential scope for large cultivation in Mizoram, the moderate climate being quite suitable. It has come up tremendously in recent years having export market. Anthurium, Rose, Lilium, Bird-of-Paradise, gladiolus, Chrysanthemum etc. can be grown successfully throughout the year.

With the Department of Horticulture, Government of Mizoram implementing the Technology Mission, providing assistance to the selected beneficiaries, there is a huge scope for expansion in the cultivation of commercial floriculture which is having a positive impact on the income level and the livelihood status of the grower, thereby contributing to the economic development of Mizoram <sup>[1]</sup>. There is a high demand for flowers within the state for special occasions, churches, functions, funerals, gifts, special occasion, weddings and home arrangements. A good number of cut flowers of anthurium has been produced and exported from Mizoram. Due to the increasing demand for cut flowers in India, increasing demand of anthurium cultivation are continually being exported from Mizoram. A large number of cut flowers of anthurium cultivars displaying an array of spathe colours (ranging from red, orange, pink, coral and white) are cultivated in order to meet the demand of the various market preferences in terms of colours, shades, floral sizes and shapes. Anthurium flowers from Mizoram have been gaining recognition in the national as well as international markets <sup>[2]</sup>.

Anthurium cultivation becomes very important in the global market cut flowers production on account of its beauty and relatively longer shelf life. It is mostly cultivated in tropical humid and moderate climate.

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<sup>1</sup> Economic Survey of Mizoram, (2010).

<sup>2</sup> F. Lalnumawia and Nuchhungi Khawlhing, (2011): Cultivation of anthurium in Mizoram, India: present scenario and future prospect

Anthurium ranked eleventh in the global flowers trade. In India anthurium cultivation which was mainly a hobby is transformed into a commercial business and is mostly cultivated in the coastal belts of South India, eastern and Western Ghats and the North-eastern States hilly region [3].

The eye-catching bloom of Anthurium is mere modified leaves called spathes. Soilless and protected cultivation have been developed for twenty years in tropical countries in order to improve yields and flower quality and to reduce phytosanitary problems, but the different parameters that govern flower formation are poorly understood [4].

Anthurium is a shade loving plant hence proper provision of light and shade is very important. For cultivation in tropical climate, shade nets with 75% shading is commonly used. It requires a highly organic well aerated medium with good water retention. However the secret of success for commercial cultivation is to have good drainage in medium used [5].

The vast majority of flowers are grown in Europe, Africa, Asia and South America and the consumer base comprises of Western Europe along with North America and Japan. There are clear signs that India can soon play a significant role in the world trade of flowers. India's exports are mainly to the Netherlands, Middle East and Far East countries [6].

India has an ancient heritage when it comes to Floriculture. Commercial floriculture is of recent origin. A consistent increase in demand for cut and potted flower has made floriculture as one of the most important commercial trades in Indian agriculture. Emphasis has been shifting traditional to cut flowers for commercial purposes. India has a great advantage in this labour intensive business due to the availability of skilled manpower at low costs [7].

Cultivation of Anthurium has not only brought about change in the horticulture scenarios of Mizoram but also uplifts the living condition of the growers to a great extent and further provides employment and regular income to the growers and unskilled labour [8]. The contribution of Floriculture to the Agriculture sector in Mizoram economy is continuously increasing from 0.01 per cent in 2004-2005 to 1.08 per cent in 2009-2010. Its contribution to the Agriculture sector is continuously increasing over the years which show that Floriculture is flourishing in the state [9].

## Materials and Method

Primary data was generated by field-based surveys on selected households in the study area with the help of schedules and questionnaires and the study concentrated on the production level and also focus on the pattern of assistance provided by the National Horticultural Board, Department of Horticulture, Government of Mizoram etc.

Various literatures were referred and the secondary data from the Economic Survey of Mizoram, various editions published by the Department of Planning & Programme Implementation, Government of Mizoram and Statistical

Handbook of Mizoram, various editions published by the Directorate of Economics and Statistics, Government of Mizoram were utilized and other published and unpublished literature regarding the study have been considered.

## Study Area

The study concentrated on two districts in Mizoram, Kolasib and Aizawl, for studying production of Anthurium. At present there are two blocks in Kolasib district and five blocks in Aizawl district. Out of these seven blocks two blocks, Bilkhawthlir of Kolasib and Tlangnuam of Aizawl district were selected for the study area.

**Sample:** The entire farmer households engaged in Anthurium production were given personal interview. A total of 55 Anthurium growers were interacted from Aizawl district and 45 samples from Kolasib district. Total samples of 100 numbers were taken for the study. Information for the rest of the study was taken from the Department of Horticulture, Department of Economics and Statistics, Economic survey of Mizoram: Department of Planning, Rural Development Department and available data and literature from various departmental websites, Village Councils and Zopar Pvt. Ltd etc.

**Tools and Techniques of Data Analysis:** Standard questionnaire was prepared to collect information from the sample of 100 growers of both Aizawl and kolasib district. The selection of the sample was based on the simple principle of availability. In the process of understanding the Institutional arrangements, concern officials of Horticulture Department, Government of Mizoram was interviewed. Also the Zo-Anthurium Growers were also interviewed. Since the study is mainly exploratory in nature, no standard statistical tools are used.

**Analytical Plan:** The analytical designs of the study were as follows:

- Analysis of the role of Institutional arrangement and problems faced by Anthurium growers with the help of primary data collected from the marketing agency for Anthurium flowers i.e Zopar Pvt. Ltd.
- Analysis of the extent of income derived from sale of Anthurium and data are cross-checked with the concerned officials of Horticulture department and the marketing agency i.e. Zoprt Export Pvt. Ltd. and the Anthurium Growers society.
- Analysis of the pattern of assistance provided was collected

**Indicators:** For analyzing the primary data, the following indicators were used.

**Sample profile:** The sample profile consists of the followings.

**Farmer's profile:** Name, Age, Sex, Educational status, Primary and Secondary Occupation.

**Role of floriculture (Anthurium Cultivation) in the household economy:** Total number of units, number of Anthurium plants per unit, age of units, amount of loan availed, Inputs like pesticides and fertilizers, Volume sold to

<sup>3</sup> (<http://Wikipedia.org>).

<sup>4</sup> (Scientia horticulture; Volume 98, page 23-25).

<sup>5</sup> N.P Singh, (2013): Anthurium cultivation under Naturally ventilated Playhouse for Cut Flower Production).

<sup>6</sup> (<http://www.indiaagronet.com/indiaagronet/exportimport/trends.htm> dt. 15/5/2011).

<sup>7</sup>([http://www.efreshindia.com/efresh/Headers/Images/pdf/Schemes National Horticulture Board.pdf](http://www.efreshindia.com/efresh/Headers/Images/pdf/Schemes%20National%20Horticulture%20Board.pdf) dt. 15<sup>th</sup> May 2011).

<sup>8</sup> S.B Singh and P. Punitha, (2012): Entrepreneurship Development through Anthurium Flower-A case study of Mizoram, North-East India

<sup>9</sup> Economic survey of Mizoram. (2008-2009).

Zopar, Traders, route of market, annual turnover, Problems faced and Utilization of income derived from Anthodium.

## Results and Discussion

**Institutional arrangement:** Institutional arrangement plays a very important role for the successful production of Anthurium in Mizoram.

### State Government's Initiatives

The Department of Horticulture, Government of Mizoram has initiated to encourage the framers to cultivate Anthurium under the Technology Mission for Integrated Development of Horticulture in North Eastern states in November 2002. Initially 24 growers were selected based on the availability of land and water source by the Department of Horticulture under the package. They were given necessary trainings and were provided quality planting materials, shade nets and other farm inputs.

All the planting materials imported from Anthura and Avo company, Netherland are subsidized by the department of Horticulture, Government of Mizoram bearing all the procurement cost and distributing free of cost to the selected growers under the financial assistance of the Technology Mission for Integrated Development of Horticulture in North-Eastern states.

**Technology Mission for Integrated Development of Horticulture in North-Eastern States:** Under the Technology Mission for Integrated Development of Horticulture in North-Eastern States, the National Horticulture Board aims to create infrastructural facilities for post-harvest management, marketing and export. For this, it has provided financial assistance to the Anthurium growers as - Back-ended capital investment subsidy @ not exceeding 20 per cent of the total project cost with a maximum limit of Rupees Twenty Five Lakhs per project under the scheme to these projects which are found technically and financially viable. However, for the North-Eastern/Tribal/hilly Areas, maximum limit of subsidy @ Rs 30.00 lakh per project. Cost of Land not exceeding 10 per cent of the project cost.

### Zopar Export Pvt. Ltd: Supply of Planting Materials

The Zopar Export Pvt. Ltd supplies tissue cultured planting materials from Anthura and Avo Company, Holland. They presented with a highly comprehensive range all year round. Besides the growers of Mizoram, Zopar Export Pvt. Ltd had also supply planting materials to Williamnagar of East Garo Hills, Meghalaya. They have fulfilled a number of functions for their retail florist customers, including product sourcing, brokering and handling, providing product information and being a source for credit.

All the planting materials are imported from Anthura and Avo company, Netherland by the Zopar Export Pvt. Ltd where the department of Horticulture, Government of Mizoram bears all the procurement cost and distribute free of cost to the selected growers under the financial assistance of the Technology Mission for Integrated Development of Horticulture in North-Eastern states. The planting materials are air lifted from abroad to India ultimately Aizawl, Mizoram.

## Zo-Anthurium Growers Society

The Anthurium growers of Mizoram formed a federation called Zo-Anthurium Growers Society who look after the overall activities of the growers for their welfare including marketing and act as a facilitator to the growers with Zopar agency and the Department of Horticulture. In 2006 September, at the International Flora Expo was held at Pragati Maidan, New Delhi Zo-Anthurium Growers Society received the second best display award from the state category. They mobilised the growers to attend the training and capacity building programme on Production practices organized by the Department of horticulture. Important communications are easily disseminated through Zo-Anthurium Growers Society.

## Anthurium Cultivation under study (Aizawl and Kolasib district)

### Profile of Anthurium Foliage

Cultivation of Anthurium has many stages of development right from planting the saplings, weeding, watering, manuring, application of pesticides and fungicides, harvesting and post harvesting which include cutting, cleaning, grading and packaging.

### Total Number of Units

In Aizawl district, there 16 households having 1 unit, 14 households having 2 units, 9 households having 3 units, 4 households having 4 units, 5 households having 5 units, 2 households having 8 units, 2 households having 10 units and 1 household having 20 units. The total number of units from Aizawl district of the study sample is 180.

In Kolasib district, there 39 households having less than 1 standard unit, 1 household having 1 unit, 3 households having 2 units, 2 households having 4units. The total number of units from Kolasib district of the study sample is 50. (Figure 1).

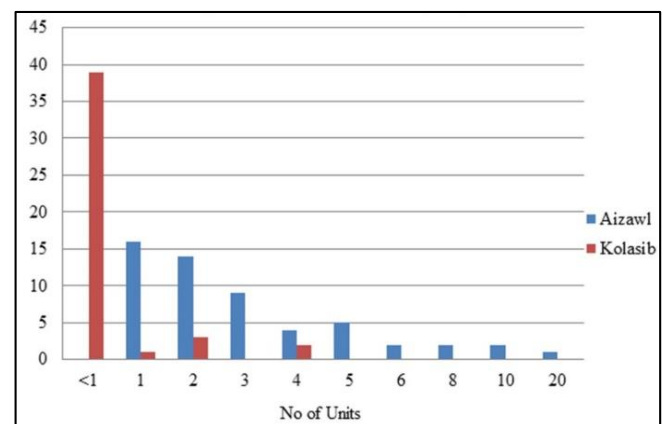


Fig 1: No of Units Vs Frequency

### Number of Plants

As already mentioned above in the cost-benefit analysis on the cultivation of anthurium i.e. Shade Net Structure and Galvanized Iron Structure, all the growers interviewed had cultivated using the Shade Net Structure. As per the Shade Net structure, each single unit contains 1000 number of Anthurium plants.

In Aizawl district, 16 units having 1000 plants, 14 units have 2000 plants, 9 units have 3000 plants, 4 units have 4000 plants, 5 units have 5000 plants, 2 units have 8000 plants, 2 units have 10,000 plants and 1 unit have 20,000 plants. The total number of plants from Aizawl district of the study sample is 1, 80,000 numbers.

In Kolasib district, there 39 units have less than 1000 plants, 1 unit have 1000 plants, 3 have 2000 plants, 2 units have 4000 plants. The total number of plants from Kolasib district of the study sample is 50,100 numbers (Figure 2).

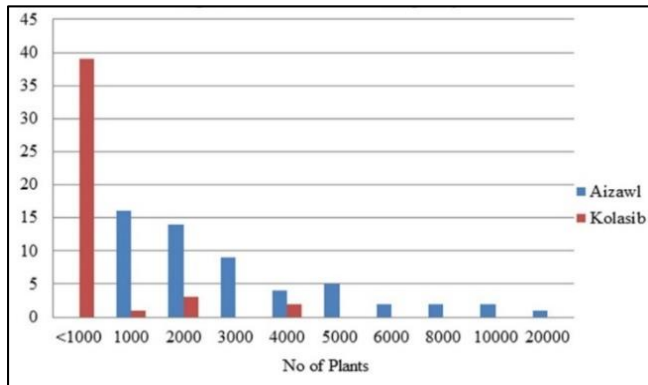


Fig 2: No of Plants Vs Frequency

**Age of Units**

In Aizawl district, the cultivation of Anthurium started in 2001, much ahead of other district of the state. Therefore for the study samples, none of the household was having units less than 3 years. 2 growers have a unit of 3 years, 3 growers have a unit of 4 years, 19 of them have a unit of 5 years, another 2 growers have a unit of 6 years, 17 of them have a unit of 7 years, another 3 growers have a unit of 9 years and 7 growers have a unit of 10 years. The total number of Anthurium growers selected from Aizawl district is 55.

In Kolasib district, the cultivation of Anthurium started in 2008, which is a replication of cultivation in Aizawl district. So, the age of the Anthurium unit was far younger than Aizawl district, none of the household was having units more than 3 years. The frequency of age of units is 39 of the growers have a unit of just 1 year, 2 growers have a unit of 2

years, another 2 growers have a unit of 3 years and one grower have a unit of 5 years and another 1 grower have a unit of 6 years. The total number of Anthurium growers selected from Kolasib district is 45 (Figure 3).

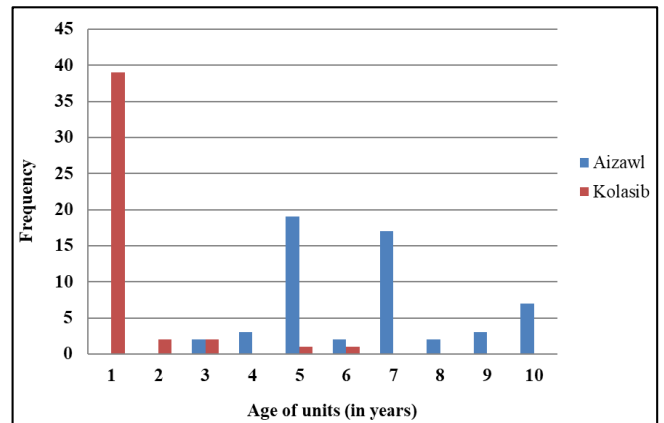


Fig 3: Age of units (years) Vs frequency

**Cost-Benefit analysis of Anthurium Cultivation**

Cost and benefit of anthurium is calculated by using simple principle of comparison between the Shade Net Structure and the Galvanised Iron structure.

The standard estimate for the cost economics of Anthurium under the Shade Net Structure and Galvanized Iron (GI) structure may be obtained from table 1. The Shade Net has a unit 1000 plants with an area of 100 square meters whereas the Galvanized Iron has a unit of 2000 plants with an areas 200 square meters. Internal rate of return for single unit under the Shade net structure is 38 per cent (Table 2) whereas under the galvanized Iron structure, the internal rate of return for single unit is 37 per cent (Table 4).

It is roughly estimated that the growers on an average yield a regular income of Rs. 7000-8000 per month which generate constant income not only to the growers but also provide employment opportunities to other families as well.

No. of units in the cluster: 1

Area in sqm for each unit: 100

No. of plants per unit: 1000

Table 1: Cost of cultivation of Anthurium for one unit under Shade Net

Sl. No	Component/Item for each unit	Proposed cost for single unit (amt. in Rs)
1	Infrastructure	
	Shade house	12000
	Land development including coco pith	22500
	Irrigation system including pump	7000
2	Cost of Planting Materials	130000
3	<b>One year's capitalization Cost of Cultivation</b>	
i	Cost of fertilizer and manure	2000
ii	Cost of insecticide & Pesticide	2000
iii	Cost of Labor	25200
4	Other expenditure	5000
	Total investment cost	205700

Source: Zopar Export Pvt. Ltd, Chanmari, Aizawl, Mizoram.

**Table 2:** Expected return/income from the proposed project for single unit of 1000 plants project

Year	No. of plants Including suckers	Expected Gross Income	Expected expenditure on fixed asset excluding loan & interest	Expected working Expenditure (Amt in Rs)	Total Expenditure (Amt in Rs)	Estimated Net Income (Amt in Rs)
1 <sup>st</sup>	1000	10000	171500	34200	205700	-195700
2 <sup>nd</sup>	1200	72000		34200	34200	37800
3 <sup>rd</sup>	1400	84000		34200	34200	49800
4 <sup>th</sup>	1700	102000		34200	34200	67800
5 <sup>th</sup>	2000	120000		34200	34200	85800
6 <sup>th</sup>	2400	144000		34200	34200	109800
7 <sup>th</sup>	2900	174000		34200	34200	139800
8 <sup>th</sup>	3500	210000		34200	34200	175800
9 <sup>th</sup>	4200	252000		34200	34200	217800
10 <sup>th</sup>	5000	300000		34200	34200	265800

Internal rate of return for single unit: 38%

**Source:** Zopar Export Pvt. Ltd, Chanmari, Aizawl, Mizoram.

No. of units in the cluster: 1  
Area in sqm for each unit: 200  
No. of plants per unit: 2000

**Table 3:** Cost of cultivation of Anthurium for one unit under G.I Structure

Sl. No	Component/Item	Proposed cost for single unit (amt in Rs)
1	Land Development	
i)	Coco pith	25000
ii)	Bed making	6000
2	Poly House	
i)	Cost of G.I structure, GI wires etc	254000
3	Cost of Planting materials	260000
4	Irrigation	
i)	Misting system	30870
ii)	Fogging	30870
5	Cost of cultivation	
i)	Cost of fertilizer and manure	8500
ii)	Cost of insecticides and pesticides	5000
	Total	764240

**Source:** Zopar Export Pvt. Ltd, Chanmari, Aizawl, Mizoram.**Table 4:** Expected return/income from the proposed project for single unit of 2000 plants project

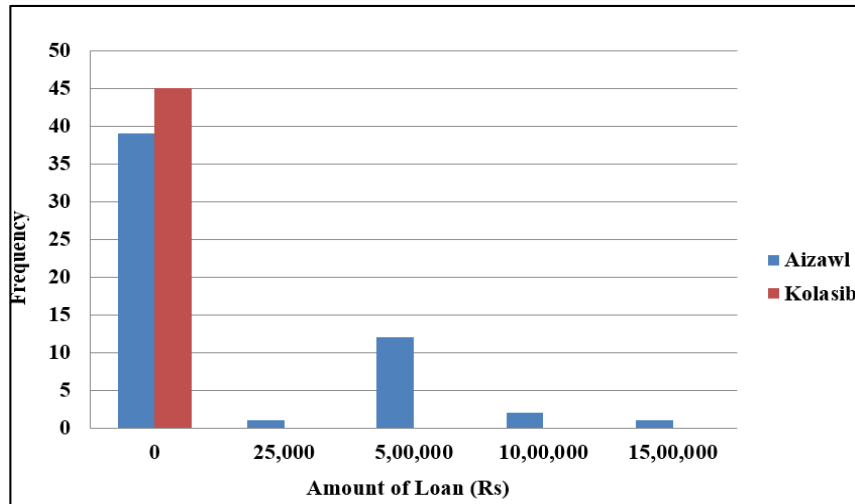
Year	No. of plants Including suckers	Expected Gross Income	Expected expenditure on fixed asset excluding loan & interest	Expected working Expenditure	Total expenditure	Estimated Net Income
1 <sup>st</sup>	2000	120000	660740	13500	674240	-554240
2 <sup>nd</sup>	2400	144000		13500	13500	130500
3 <sup>rd</sup>	2900	174000		13500	13500	160500
4 <sup>th</sup>	3500	210000		13500	13500	196500
5 <sup>th</sup>	4200	252000		13500	13500	238500
6 <sup>th</sup>	5000	300000		13500	13500	286500
7 <sup>th</sup>	6000	360000		13500	13500	346500
8 <sup>th</sup>	7200	432000		13500	13500	418500
9 <sup>th</sup>	8600	516000		13500	13500	502500
10 <sup>th</sup>	10300	618000		13500	13500	604500

Internal rate of return for single unit: 37%

**Source:** Zopar Export Pvt. Ltd, Chanmari, Aizawl, Mizoram.**Amount of Loan availed**

In Kolasib none of the growers have avail bank loan for the cultivation of Anthurium saying that loan gives additional burden whereas in Aizawl district 39 of the have not avail any bank loan, 1 have avail an amount of Rs. 25,000/-, 12

have avail bank loan of Rs.5, 00,000/- 2 avail Rs. 10,00,000/- and 1 have avail an amount of Rs. 15,00,000/-. Overall 16 Anthurium growers have avail Bank loan and all of them are from Aizawl district. The amount of loan avail by different growers is given at figure 4.



Source: Calculated on the basis of field work, 2011

Fig 4: Amount of Loan V/s Frequency

**Gross Annual Income**

The annual turnover from Anthurium in Aizawl district is Rs. 57, 36,000.00/- average income is Rs. 1, 04,290.9 whereas the annual turnover from Kolasib district is Rs. 1246000/-, the average income per household is Rs. 27,688.9/-. Overall the gross income from Anthurium from both the district is Rs. 6, 98, 2000/-.

In Aizawl district out of the 55 growers there is 1 household having gross annual income of Rs. 3000/-, 17 of them are having gross annual income ranging from Rs. 10,000-50,000/-, 24 of them have gross annual income ranging from Rs. 50,000-1,00,000/-, 11 of them have gross annual income ranging from Rs. 1,00,000-2,50,000/- and 2 of them gross annual income ranging from Rs. 10,00,000-12,00,000/-.

In Kolasib district out of the 45 growers, 3 of them are having gross annual income of Rs. 3000/-, 13 of them have gross annual income ranging from Rs.10,000-20,000/-, 21 of them have gross annual income of Rs. 20,000-50,000/- and 8 of them have gross annual income of Rs. 50,000-1,00,000/-

Overall the gross annual income of Growers in Aizawl district is higher, ranging from Rs. 3,000/- to Rs. 12,00,000/- whereas in Kolasib district the gross annual

income of the Growers ranges from Rs. 3000/- to Rs. 1,20,000/-. The gross annual income is presented in table 5.

Table 5: Gross Annual Income (Rs)

	Valid	Missing	Mean	Sum
Aizawl	55	0	104280.9091	5736000.0000
Kolasib	45	0	27688.8889	1246000.0000

Source: Calculated on the basis of field work, 2011

**Net Negative Income**

Though the Gross annual income is fairly high, there is a negligible case of Net Negative income. Overall there are 22 households having net negative income, 17 household’s growers of Aizawl and 5 growers from kolasib which is presented at table 6. The sum of net negative income from Aizawl district is Rs. 3, 08,857.91/- and the average net negative income annually from amongst them is Rs. 18168.1124/- whereas the sum of net negative income from Kolasib district is Rs. 46,068.42/- and the average net negative income annually from amongst them is Rs. 9213.6842/-. Overall the sum total of net negative income of both the district is Rs. 994926.39/- and the overall net negative income is Rs. 13690.898/-.

Table 6: Net negative Income

		Frequency	Percent	Valid Percent	Cumulative Percent
Aizawl	Valid	-93126.32	1	5.9	5.9
		-30842.11	1	5.9	5.9
		-29842.11	1	5.9	5.9
		-24342.11	1	5.9	5.9
		-23921.05	1	5.9	5.9
		-21263.16	1	5.9	5.9
		-19763.16	1	5.9	5.9
		-13684.21	1	5.9	5.9
		-12342.11	1	5.9	5.9
		-10684.21	1	5.9	5.9
		-10084.21	1	5.9	5.9
		-7105.26	1	5.9	5.9
		-6542.11	1	5.9	5.9
		-3584.21	1	5.9	5.9
		-1105.26	1	5.9	5.9
		-605.26	1	5.9	5.9
		-21.05	1	5.9	5.9
Total	17	100.0	100.0		

Kolasib	Valid	-21842.11	1	20.0	20.0	20.0
		-12042.11	1	20.0	20.0	40.0
		-5210.53	1	20.0	20.0	60.0
		-4763.16	1	20.0	20.0	80.0
		-2210.53	1	20.0	20.0	100.0
Total		5	100.0	100.0		

Source: Calculated on the basis of field work, 2011

### Net Negative Income Vs Age of Unit

To find out the reason of net negative income, the Net Income from anthurium was cross-tabulated with Age of units from both the district of Aizawl and Kolasib (Table 7). In Aizawl district there are 17 households having negative income from Anthurium, out of which 1 is having unit of 3 years of old, 4 are having 5 years old, 1 is having 6 years old, 6 are having 7 years old, 1 is having 8 years old, 2 are having 9 years old unit and 2 are having 10 years old unit. It is cross tabulated the net income with age to find out the

probable reason, the results shows that age of the unit is not the main factor for the net negative income particularly in Aizawl district whereas in Kolasib district out of the 5 growers with net negative income, 2 are having unit less than a year, 2 are having 3 years old, 1 is having 6 years old. It cannot be concluded that age of the unit is the reason for the net negative income because they are also having simultaneous problem of disease infection. So, age of the unit is not the reason for the net negative income from Anthurium.

**Table 7:** Net Negative income from Anthurium (Rs) V/s Age of units Cross tabulation

Count		.00	3.00	5.00	6.00	7.00	8.00	9.00	10.00	Total
Aizawl	Net income from Anthurium (Rs)	-93126.32	0	0	0	1	0	0	0	1
		-30842.11	0	0	0	0	0	0	1	1
		-29842.11	0	0	0	1	0	0	0	1
		-24342.11	0	0	0	0	0	1	0	1
		-23921.05	0	1	0	0	0	0	0	1
		-21263.16	0	1	0	0	0	0	0	1
		-19763.16	0	0	1	0	0	0	0	1
		-13684.21	0	1	0	0	0	0	0	1
		-12342.11	0	0	0	0	1	0	0	1
		-10684.21	1	0	0	0	0	0	0	1
		-10084.21	0	0	0	1	0	0	0	1
		-7105.26	0	0	0	1	0	0	0	1
		-6542.11	0	0	0	1	0	0	0	1
		-3584.21	0	0	0	0	0	0	1	1
		-1105.26	0	0	0	0	0	1	0	1
-605.26	0	1	0	0	0	0	0	1		
-21.05	0	0	0	1	0	0	0	1		
Total			1	4	1	6	1	2	2	17
Kolasib	Net income from Anthurium (Rs)	-21842.11	0	0	1					1
		-12042.11	0	1	0					1
		-5210.53	1	0	0					1
		-4763.16	0	1	0					1
		-2210.53	1	0	0					1
Total		2	2		1					5

Source: Calculated on the basis of field work, 2011

### Net Negative Income (Rs) V/s Disease Attack cross tabulation

The Net Income from Anthurium was cross-tabulated with the disease attack to find out the reason for the negative income from both the district of Aizawl and kolasib (Table 8). In Aizawl district there are 17 households having negative income from Anthurium, 16 of them reported that diseases is the main reason for their negative income i.e 94.1 per cent of the total growers with net negative income from Aizawl district and 1 reported negative income due to

natural calamity (storm) i. e 5.9 per cent of the growers with net negative income.

In Kolasib district there are 5 households having negative income from Anthurium. Out of the 5 household with net negative income, 4 of them reported to diseases is the main reason for their negative income which is 80 per cent of the among the growers having net negative income from Kolasib district, and 1 reported negative income due to unhealthy breed which is 20 per cent of the growers with net negative income.

**Table 8:** Net Negative Income from Anthurium (Rs) Vs disease attack Cross tabulation

District		Frequency	Percent	Valid Percent	Cumulative Percent
Aizawl	Valid	Disease	16	94.1	94.1
		Others	1	5.9	5.9
		Total	17	100.0	100.0
Kolasib	Valid	Disease	4	80.0	80.0

	Breed	1	20.0	20.0	100.0
	Total	5	100.0	100.0	

Source: Calculated on the basis of field work, 2011

**Utilization of Income derived from Anthurium:**

Different households have utilized income from Anthurium for different purpose. In Aizawl district one grower had purchase the land, 42 of them have utilized for daily consumption including recycling of their Anthurium cultivation and 12 of them have used for all purposes

whereas in Kolasib district out of the 45 growers, 44 of them have use it for daily consumption including recycling for their Anthurium cultivation.

In Kolasib district 44 growers have utilized income for daily consumption and 1 have utilized for all purpose which is presented at table 9.

**Table 9:** Utilization of Income derived from Anthurium district-wise

District		Frequency	Percent	Valid Percent	Cumulative Percent
Aizawl	Purchase of land	1	1.8	1.8	1.8
	Daily consumption	42	76.4	76.4	78.2
	All purposes	12	21.8	21.8	100.0
	Total	55	100.0	100.0	
Kolasib	Daily consumption	44	97.8	97.8	97.8
	All purposes	1	2.2	2.2	100.0
	Total	45	100.0	100.0	

Source: Calculated on the basis of field work, 2011

Overall 1per cent have purchase new land from the additional income derived from Anthurium, 86 per cent have utilized it for daily consumption including recycling of Anturium cultivation and 13 per cent have used it for all purposes. Table 6.19 shows the utilization of additional income from Anthurium.

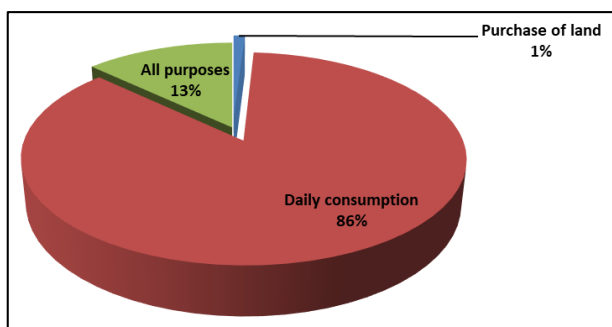


Fig 5: utilization of income derived from Anthurium

**Problems faced by the Growers**

Overall there are 100 number of household growing Anthurium, 9 per cent do not have any problem, 84 per cent are facing the problem of disease attack, 5 per cent are facing water scarcity problem and 2 per cent have the havoc of natural calamity (There are also few cases where storm have destroyed their entire shade net structure during the monsoon season, so natural calamity also cause a loss to some growers which is presented at table 6.

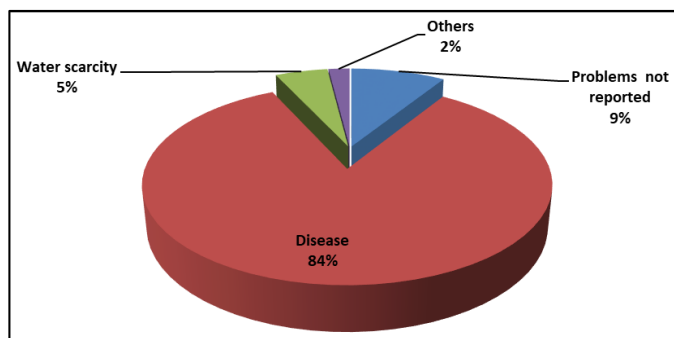


Fig 6: Problems faced by the growers

**Challenges (including Legal/Policy) Constraints faced by Zopar**

There are no major hurdles with regards to legal or policy matters. However logistics is one major setback for people dealing highly perishable items, more so in Mizoram as there is only one airline accepting cargo out of Aizawl, that too with such flight cancellations and high freight rates. The Manager of Zopar Export Pvt. Ltd reported that during the monsoon months they run with a loss which they recover it during the winter month.

**Conclusion and Recommendations:** Based on the results and discussion of the institutional arrangement for production of anthurium in Mizoram, the following suggestions are made by the researcher for securing improvement in the production practices of Anthurium in the area under study:

1. An atmosphere must be consciously built to exclude the faulty selection of the beneficiaries (of the individual who are not interested in the cultivation, seeking for inclusion by political recommendation for availing assistance under the Mission. There is a need on the part of the National Horticulture Board (NHB), Bankers and Department of Horticulture- to educate the growers on the loan component of the Technology Mission assistance for selecting right beneficiaries.
2. Basic principles involved in the assistance needs to be monitored closely.
3. Beneficiaries should be imparted more intensive training right from selection of the growers till post-harvest process.
4. Monitoring by the Department needs improvement.
5. Disease attack is the main problem faced by the growers. Hence, proper management needs to be incorporated to minimize the losses due to disease attack.
6. Reasons stated by the Department of Horticulture, Government of Mizoram of not following the proper practice of the production technology of Anthurium by the beneficiaries leads to the disease attack. Therefore proper care has to be taken on the production practices by the growers.



7. Anthurium has a good market potential including international market. It can also generate huge revenue for the state. It is also eco-friendly and will help to preserve environment of the state.

Since, Zopar have provided assured market for the growers, the planting materials are supplied to them, buy back the produced as per the agreement. 95 per cent of the produced is sold to Zopar. So the institutional intervention for production of anthurium has resulted into better income for the growers, thereby promoting their livelihoods. It is suggested that the Department of Horticulture examine the feasibility report of eight district of the state of Mizoram for replication in the entire state with proper arrangement.

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