

# Project Report

**Name of the Scheme: Raising of 89000 Budded Stump of Rubber Plant in Poly Bag Nursery for Plantation in 1200 Bighas of Land**

**Scheme Code: 30-1314-37-027**

**Amount: Rs. 25.20 Lakh**

**2013-14**

**Department of WPT&BC**

## **1. Rubber and the Rubber Tree:**

Rubber is obtained both naturally from rubber tree and synthetically from petroleum. Natural Rubber consists of polymers of the organic compound *isoprene* which is harvested in the form of latex from the Rubber Tree - *Hevea brasiliensis*. The latex is a sticky, milky colloid drawn off by making incisions into the bark of the tree and collecting the fluid in vessels in a process called "tapping". The latex then is refined into rubber ready for commercial processing.

The rubber tree was indigenous to the Amazon basin of South America from where it made its way in to other parts of the world for its commercial propagation and production. The British Government first introduced it in India, Sri Lanka, Indonesia, Singapore and Malaysia and there after it spread to other countries of the world.

## **2. International scenario:**

The major producer countries of natural rubber are – Indonesia, Thailand, Malaysia, India, China, Vietnam and some African countries which altogether cultivate rubber plants in more than 100 lakh hectare of land producing around 100 lakh MT of rubber per year, India's share being around 8%.

## **3. Rubber In India**

British planters brought rubber into India as early as in 1873. However, the first commercial rubber plantations in India were established in 1902 at Thattekadu, Kerala. Thereafter, it spread to all over Kerela and adjoining Kanyakumari district of Tamilnadu state. Thus Kerela and Kanyakumari became known as the traditional rubber growing zone of the country contributing to 83.64% share in area and 94.14% share in production of rubber.

However, rubber plantations gradually spread to some other states like Karnataka, Goa, Andhra Pradesh, Orissa, Madhya Pradesh, West Bengal and the North Eastern states including Assam. Both rubber plantation and production in India are steadily growing and so also the business volume. Export of Natural rubber rose from a low of 6,995 ton during 2001-02 to 75,905 ton during 2003-04 but declined to 60280 ton during 2007-08. The price of natural rubber has seen

a steady increase from Rs. 32.28 per kg during 2001-02 to Rs. 92.04 per kg during 2006-07 before falling marginally to Rs. 90.85 per kg during 2007-08. The price as on today is Rs. 00.04.

(Source: Rubber Board)

One unique feature of rubber plantations in India is that unlike tea plantations, majority of the plantations are of small holding size of less than 20 ha owned by individual entrepreneurs.

#### **4. Rubber in North East Region of India**

The agro-climatic conditions of NER are quite similar to that of south-west coastal region – the traditional rubber plantation area in terms of rainfall, humidity, temperature and suitable soil structure. It is for this reason the NER registered itself in the list of non-traditional region of rubber growers. The trial plantations in undivided Assam and Tripura in 1960 yielded very positive outcome and since then rubber plantations are growing in NER; the state of Tripura taking the lead role.

#### **5. Prospects of Rubber in MAC area:**

Rubber plantation in MAC area was first started in 1989 in Laimekuri area of Jonai sub division in Dhemaji district by a noted social worker Late Golap Chandra Doley. Following his footsteps, a small batch of young entrepreneurs around Laimekuri –Telam belt planted rubber trees in their fallow land. Some of these plantations failed mainly due to lack of proper management and adherence to prescribed package of practice. However, some survived which started giving yield since around 1997. The trees planted during 1990-92 have now attained full maturity and the farmers are presently reaping the benefit; and a large number of farmers and unemployed youths not only of Jonai sub division; but also from distant parts of the district and Subasiri basin in Lakhimpur district are getting attracted to rubber plantation.

**5.1 Availability of Land:** The Mising Autonomous Council covers the foothills of Arunachal Pradesh in Dhemaji and Lakhimpur districts and then the vast riverine areas along the courses of river Subansiri and the mighty Brahmaputra right up to the Kaziranga National Park. There are vast tracts of fallow land available for rubber plantation both in the foothills as well as in the plains which are not submerged during flood and therefore suitable for rubber plantation. The soil is mostly alluvial with high content of organic material and acidic in nature. Moreover, water table is lower than 1 meter in these areas.

**5.2 Availability of Technology:** Rubber Board, a Govt. of India organization with its HQ in Kerala provides all sorts of technical guidance, financial incentive and marketing assistance. The Board has a Field Office at Ruksin in Assam-Arunachal border which is about 100 Km from MAC HQ at Gogamukh. Therefore, the farmers are at ease in getting support from the Rubber Board. The Mising Autonomous Council has already conducted a series of grass root level workshops at Gogamukh, Laimekuri, Pub Dhakuakhana and Bokakhat which were attended by large numbers

of unemployed youths. Rubber Board Field Officers and successful rubber planters from Assam and Arunachal took part in these workshops.

**5.3 Availability of Market:** Rubber market is easy, stable and centrally controlled and there is no scope for involvement of any middleman as rubber prices – national and international, are updated on the Rubber Board website every day. Agents of buyers from Guwahati are stationed in every district and procure the products on cash payment.

**5.4 Availability of Fund:** The Executive Council of Mising Autonomous Council has already passed a resolution under its Livelihood Mission for giving incentives to farmers for scientific and organized rubber cultivation in MAC area and has earmarked an amount of Rs. 25.00 Lakhs in its Annual Operational Plan of 2013-14 another Rs. 50.00 lakh for 2014-15 out of the Grant-in-Aid received from the Govt. of Assam. The Council assures to increase the amount in subsequent years with an integrated plan.

## **6. Package of practice:**

**6.1 Planting Material:** Selection of the right kind of planting variety is the key to success of rubber plantations. The Rubber Research Institute of India (RRII) and Rubber Research Institute of Malaysia (RRIM) have developed a series of clones resistant to various adversities and to yield higher quantity of latex. Experience has shown that the RRIM 600 clone grows well in Dhemaji district with maximum production. Mother plants of this clone are locally available and therefore, it is decided to go for plantation of RRIM 600 variety in MAC area.

Various planting materials like seedling stumps, budded stumps, root trainer plants and poly bag plants are used for planting. In consultation with Rubber Board, it has been decided to use budded stump of RRIM 600 variety. The budded stumps are to be raised in poly bags till they are suitable for plantation.

**6.2 Plantation:** The area is cleared of all wild growths and pits of 75 x 75 x 75 cms are dug with a spacing of 15 ft. The recommended planting density is 64 plants per bigha or about 620-650 per ha. The pits are filled with top soil and approximately 12 kg of organic manure. Planting is done at the centre of the pit with shade and mulch provided. Plantation can be done from April to late September or even up to October depending upon the climatic condition.

**6.3 Manuring and Fertilization:** Any plant grows well when provided with optimum manure and fertilizer and a well grown plant yields best. This is true to rubber too. The long gestation period of rubber can be reduced at least by one year by well calculated doses of manure/fertilizer. The quantity of organic manure and chemical fertilizers should be calculated for each year after a proper soil test and as advised by experts or technical persons from Rubber Board.

**6.4 Inter cropping:** Inter cropping (and cover cropping where soil erosion is a problem) always helps growth of the rubber plants by controlling or smothering the weeds, preventing soil erosion and enhancing soil fertility. As the gestation period of rubber productivity is long and as the land area is not fully occupied by the plantation up to the fourth year, inter cropping in the inter spaces of plants is strongly recommended. This helps the farmer to gain income during the gestation period. The recommended inter crops in rubber plantations are banana, pineapple, tuber crops, ginger, turmeric, vegetables, leguminous crops, tapioca etc. Rubber should not be taken as a 'plant and forget' crop only to recall at the time when harvesting begins after 7 years. It requires everyday attention and that vital attention is ensured by inter-cropping.

**6.5 Plant protection:** Plants require full protection from – (1) Diseases & pests (2) cattle and (3) nature's fury like storm, land slide, flood etc. While we can do little for protection from natural calamities; we can fully protect our plants from the other two threats. The problem of stray or un-tethered cattle grazing or moving about in herds is a potential threat to rubber plantations; particularly in the first two years. Cattle even break in to such plantations through bamboo fences. It is therefore, strongly recommended to fully secure the plantation area with barbed wire fence with strong wooden posts. There should not be even any gate which are left open by irresponsible or absent minded caretakers and instead be replaced with stiles.

**6.6 Diseases and pests and their management:** Like all other plants, the rubber tree is also vulnerable to a host of diseases and attack by pests – some affecting their foliage, some affecting their stem, trunk or branches and some their roots. These diseases caused by many fungi, bacteria and virus; and damages caused by harmful insects can be easily managed by proper protective/preventive measures and then by curative or remedial treatment. Knowledge for early detection of these diseases is the key to their management which can lead a farmer to the technical persons of Rubber Board for the right kind of guidance. Therefore, this project puts emphasis on sensitizing the farmers about the potential threats of pests and diseases of their rubber plantations.

**6.7 Tapping:** During the sixth year of plantation when the girth of a plant attains the size of 50 cm, it is considered ready for tapping and the yield gradually increases till the 11<sup>th</sup> years when the tree attains its full maturity and continues to be productive till 25 year. A half spiral cut is made on the trunk of tree with expert hands. The latex exudes from the tree are collected in a cup shaped receptacle. The number of tapping days in a year varies from 200 to 330 days and there are different tapping practices including use of chemical stimulants used under proper technical guidance. The milk white latex thus collected in cups, the dried up latex on the tree panel(tree lace) and the cup (shell scrape) and the latex spilt on the ground together constitute the field coagulum which is processed in to crepe or block rubber ready for sell.

**7. Rubber price and rubber economics:** Rubber plants, on an average, yields from the 6<sup>th</sup> year onwards up to the 11th year at the rate of 900, 1300, 1500, 1800 and 2000 kilograms per hectare respectively and then it stabilizes at 2000 kilograms till 25<sup>th</sup> year. Considering Rs. 90/- per kilogram, gross income from one hectare of rubber plantation comes to around Rs.1,80,000.00 per hectare or Rs. 28436.00 per bigha. This is a conservative estimate. There are claims and even mention by Encyclopedia Britannica of production of 2500 kilogram of rubber per hectare of plantation which is translated in to Rs. 2,25,000.00 per hectare or Rs. 35,545.00 per bigha. Then there are added income from inter-cropping, seeds and nurseries.

**8. Raising Rubber Nursery of Budded stump in poly-bags:** Raising rubber nursery of budded stump in poly-bags is a long process involving several stages.

**8.1 Germination of Seeds:** Chosen seeds are placed in a germinator which is a bed of sand under a thatch shed constructed as directed by technical persons from the rubber board. Seeds are put in the germinator soon after their harvest and they should be bright and shining, lest they do not germinate. The seeds germinate after a week and when the rootlets are 2 cms long, they are taken out for putting in the seedling nursery.

**8.2 Raising Seedling Nursery:** The soil is first cleared of all trees and other vegetations and tilled well with a hoe up to a depth of 60 cms. Then the soil is leveled and harrowed to break up clods. The germinated seeds are placed in rows of four lines with spacing of - 40 centimeter between seedlings in a line; 30 centimeter between two lines and 60 centimeter between two rows. The bed is watered soon after putting the seedlings. The nursery is looked after carefully with keeping away weeds, watering to keep the soil moist and applying fertilizers as advised by technical persons of the Rubber Board. Normally, fertilizers are applied first after 2 months of planting and then after 5 months. The recommended dose is 150 kilograms of ammonium phosphate and 75 kilograms of potassium chloride per hectare of nursery. After 10 month, the weak plants are taken out keeping only the ones growing vigorously. From 12 months to 15 months the vigorously growing trees are suitable for bud grafting.

**8.3 Bud Grafting:** The young plant in the seedling nursery is taken as **the stock** and a tree of good quality is taken for the bud or **the scion** for grafting. This is a complicated process and utmost care is necessary. The simple steps are:

**8.3.1 Preparation of stock for grafting:** To prepare the stock, two vertical incisions of 4 cm long and 2 cm apart are made with a grafting knife on the bark of the stock tree few centimeters above the ground, taking care for not cutting into the wood. Then another horizontal cut is made joining the two lower ends of the vertical cuts so that the bark can be peeled back.

**8.3.2 Take a scion from a good tree:** Branch of a chosen tree of good quality is taken for the scion. The branch should be of same size as of the stock tree. There is a bud or eye below a leaf which is taken out as scion. The leaves of the selected branch should be taken of 10 days before cutting the branch and then the bud/eye should be taken off and grafted within 24 hours. To take the scion, first, two vertical incisions of 5 to 6 cm length are made on the bark on the two sides of the bud and then the entire patch is taken out along with a portion of the wood by a grafting knife as shown in the picture below:

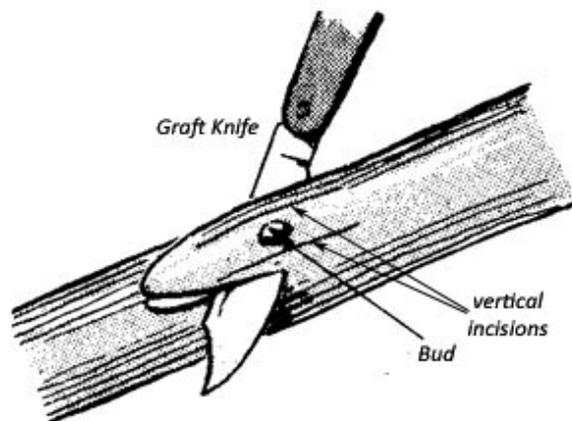


Fig-1

**8.3.3 Place the scion on the stock:** The strip of bark cut on the stock tree in the seedling nursery is peeled back as shown below:

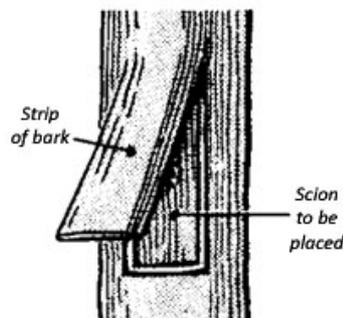


Fig-2

Next, two cuts are made joining the incisions already made on the strip of bark and wood taken from the mother plant for the scion. The scion with the bud or eye at the centre is removed as shown below.

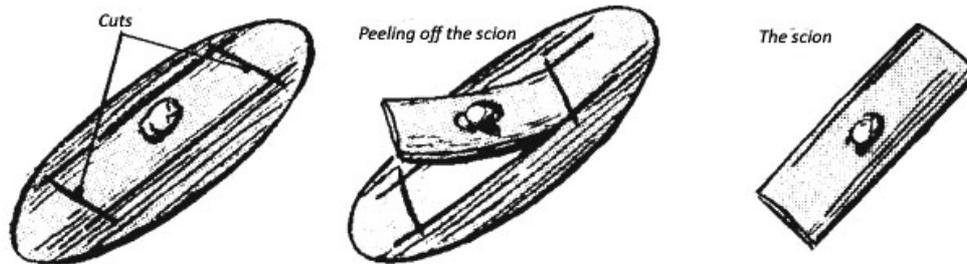


Fig-3

Now the scion is placed under the strip of bark peeled back on the stock plant as shown in Fig-2. Put back the strip of bark over the scion and bind to the trunk by grafting tape. The grafting is done.

***The inner side of the bark in either of the trees should never be touched by hand not to speak about soiling it.***

**8.3.4** After 20 days of grafting, the band or tape is removed and the strip of bark, now redundant is taken off by a cut at the top. The scion, if slightly scratched will appear green if the graft is successful. The grafted plants are now left in the nursery only to be pulled out as **budded stump** for further nursing in poly-bags.

**8.4 Planting budded stump in poly-bags:** Budded stumps are planted in poly-bags and the scion is allowed to develop till they are suitable for plantation in the field. Black polyethylene bags, 55 to 60 cm long and 25 to 30 cm wide, which can hold 8 to 10 kg of soil are used. The fertile top soil is cleaned of leaf litter, vegetations. Stones, roots and stubbles and the large clods are broken. Powdered rock phosphate at the rate of 25 grams per bag is mixed with the soil and bags are filled with it. Care is taken that the filling is compact. The filled bags are kept in the nursery either in trench or on the ground with support by bamboo or wood poles. The budded stumps are then planted in the bags. The roots of the budded stumps are dipped in cow-dung slurry before planting which stimulates rooting. NPK-Mg mixture at the proportion of 10-10-4-1.5 is applied – 10 gm per bag which is gradually increased to 30 gram per bag. Regular watering is done so that the required soil moisture is maintained; but excessive watering should be avoided.

The objective of using budded stump is to obtain the root system from the stock plant and the stem system from the scion. Therefore, any sprouts coming out from the stump other than the scion is removed and only the sprout from the scion is maintained to grow in to a plant for maximum yield. The nursery is maintained till the onset of monsoon when they are ready for planting in the field.

- 9. Organizational arrangement:** The Mising Autonomous Council has resolved to undertake Rubber cultivation in a Mission mode and therefore, have constituted an apex level committee with Members from the council, some progressive farmers and technical staff from the Rubber Board. The Committee has been empowered by a resolution of the Executive Council to plan, formulate schemes, select areas, select beneficiaries, conduct workshops and training of farmers, coordinate with Rubber Board, formulate policies and implement the schemes. The amount earmarked in annual plan of MAC for development of rubber cultivation shall be placed with the committee for judicious appropriation following Government norms and procedures.

#### **9.1 The Rubber Committee:**

1. Chairman: Sri Sukreswar Goyary, Dy. Chief Executive Councillor, MAC
2. Member Secretary: Sri Binit Kr. Saikia, Principal Secretary, MAC
3. Member: Sri Mulakanta Pegu, Executive Councillor, MAC.
4. Member: Sri Biju Pegu, Executive Councillor, MAC.
5. Member: Sri Sunil Pegu, Executive Councillor, MAC.
6. Member: Sri Anil Payeng, General Member, MAC
7. Member: Sri Ranjit Dutta, Field Officer, Rubber Board
8. Member: Sri Pranjit Pegu, Progressive Rubber Planter
9. Member: Sri Bhalok Chora, Progressive Rubber Planter
10. Member: Sri Nabin Kaman, Planning Officer, MAC

- 9.2 Project implementation Strategy:** The Mising Autonomous Council believes that development can't be imposed upon unwilling people and that a beneficiary oriented project can't be successful without total physical, mental and financial involvement of the beneficiary. And therefore, there is no scheme in MAC with 100% grant-in-aid or subsidy. The approach for selection of beneficiary and subsequent implementation of Rubber plantation with hand-holding support are as follows:

- 9.2.1** The prospective rubber farmers or beneficiaries must come forward voluntarily for rubber plantation and together with other farmers raise a small fund for conducting a day long workshop where personnel from Rubber Board imparts education on Rubber plantation and the farmers interact with progressive farmers. MAC plays the role of facilitator. It is made clear to the farmers that if they come forward and contribute their physical labour and invest about 30% of the probable cost of the plantation scheme, MAC will provide the rest of assistance with a hand-holding approach both in terms of financial and material support.
- 9.2.2** The farmers are then organized into clusters based on the jurisdiction of an MAC Constituency and after calculating their size of land and number of plants required, asked to raise a Nursery of budded stump in poly-bags. The cost of budded stumps, poly-bags, chemicals and other fertilizers are borne by MAC while the farmers provide labor and cost of farm yard manure (FYM), bamboo fencing etc. and look after the nursery till the plants are ready for planting. An in situ workshop is conducted at this stage on management of rubber nursery and package of practice for planting rubber.
- 9.2.3** After about six months, when the budded stumps in poly-bags are ready for planting, the farmers will have to prepare the field for plantation with full protection from cattle. The farmers will have to dig the pits, fill every pit with 12 Kg of FYM and collect as many wooden posts as required for fencing his or her plot of land at their own cost. After the farmer fulfills this, the MAC will provide the required barbed wire fence along with 'U' hooks. The farmer will have to fence his/her plot of land with the supplied barbed wire and after fencing is completed, the required number of plants will be issued from the nursery for planting in the prescribed manner. At this stage, a field level workshop will be held on management of plantation – application of fertilizer, watering, weed control, pest and disease control. Once, the plantation is established, another workshop with experts from the Agriculture department will be held on inter-cropping. The cost of chemical fertilizers, insecticides, medicines etc, shall be borne by MAC.
- 9.2.4** The farmers will be guided through different stages till the rubber plants start yielding latex and the farmer learn how to tap the milk, collect the field coagulum, process and preserve it and successfully sells his product at the price regulated by the rubber board.

**9.2.5 Selection of Clusters:** The following clusters have been selected based on willingness of beneficiaries and recommendation of the sites by Apex Level Livelihood Committee on Rubber Plantation, MAC. It is planned that 9 Nos. of collective nurseries will be raised close to the plantation sites. Workshops will be organized at all these clusters with the prospective beneficiaries and on hand training and guidance will be provided by Rubber Board farmers and progressive Rubber Planters on package of practice on raising rubber nurseries. There will proper care and monitoring of the nurseries till they are ready for planting.

<b>SI No</b>	<b>Name of the Cluster</b>	<b>No. of Plants</b>	<b>Target Area of Plantation (in Bigha)</b>
1.	20 No. Obonori Constituency	14000	219
2.	18 No. Bhimpora Constituency	8500	133
3.	17 No. Mingmang Constituency	7500	117
4.	16 No. Nalbari Constituency	12000	188
5.	14 No. Jiadhah Constituency	7000	109
6.	6 No. Sanjari Nwgwr Constituency	10000	156
7.	7 No. Somkong Constituency	8000	125
8.	5 No. Owang Jonai Constituency	14500	227
9.	1 No. No. Lali Constituency	8000	125
	<b>Total</b>	<b>89500</b>	<b>1398 Bigha</b>

**10. Unit cost of raising 10000 budded stump in poly-bag nursery:**

<b>Sl No</b>	<b>Particulars</b>	<b>Rate/Unit</b>	<b>Amount</b>
1	Site Preparation	LS	2000.00
2	Bamboo Fencing	LS	5000.00
3	Green Net shed	LS	5000.00
4	Cost of 135 Kg black poly-bags	Rs. 185/-	24975.00
5	Cost of budded stump	Rs. 20/-	200000.00
6	Cost of Rock Phosphate (250 Kg @ 25 gm per bag)	Rs. 7.50 per Kg	1875.00
7	Cost of NPK-Mg (400 Kg @ 40 gm per bag in four monthly doses)	Rs. 15.00	6000.00
8	Filling of poly-bags with soil	Rs. 1.00	10000.00
9	Installation of a HTW		5000.00
10	Cost of insecticide/fungicide		1000.00
11	Watch and ward for 6 months	@ Rs. 3000/- p.m.	18000.00
	<b>Total:</b>		<b>278850.00</b>

<b>Cost of Raising 1 (one) budded stump in poly bag:</b>	<b>Rs. 27.89</b>
<b>Cost of Raising 89500 budded stump in poly bag:</b>	<b>Rs. 2495707.50</b>
<b>Add 1% Contingency:</b>	<b>Rs. 24957.08</b>
<b>Total"</b>	<b>Rs. 2520664.58</b>
	<b>Say Rs. 2520000.00</b>

**Countersigned by**

**Prepared by**

**Binit Kr. Saikia**  
**Principal Secretary**  
**Mising Autonomous Council**

**Nabin Chandra Kaman, B.Sc.(Agri)**  
**Planning Officer**  
**Mising Autonomous Council**

### 11. Unit Cost of Rubber Plantation (2 Bigha):

SI No.	Particulars of Works	Rate/Unit	Cost (Rs) Per Year						Total
			1	2	3	4	5	6	
1	Site preparation, alignment and staking	LS	2000.00	0	0	0	0	0	2000.00
2	Digging of pits (75 cm x 75 cm x 75 cm) and refilling	Rs. 12/- per pit	1536.00	153.60	0	0	0	0	1689.60
3	Cost of Plant including transport and 10% replacement plants	Rs. 30/- per plant	3840.00	384.00	0	0	0	0	4224.00
4	Planting and replanting expenses @ Rs. 150/- per MD	1MD/1MD	150.00	150.00	0	0	0	0	300.00
5	Cost of Insecticide	LS	150.00	0	0	0	0	0	150.00
6	Cost of FYM @ 12 Kg/pit	Rs.2/kg	3072.00	0	0	0	0	0	3072.00
7	Cost of fertilizer @ 0.1 kg/plant/year	Rs. 12/- per Kg	120.00	120.00	120.00	1200.00	1200.00	1200.00	720.00
8	Weeding in First 2 Years	2 MD	300.00	300.00	0	0	0	0	600.00
9	90 Nos. of wooden post for fencing at a spacing of 8 ft	@ Rs. 25/-	1500.00	0	0	0	0	0	2250.00
10	Barbed Wire Fence 188 Kg (1 Kg = 6 Meter): 1125 meter in five rows	@ Rs. 70/- per Kg	13125.00	0	0	0	0	0	13125.00
13	Irrigation cost for first 2 years @ Rs. 500/- per years		500.00	500.00	0	0	0	0	1000.00
	Sub Total:		26294.00	1609.60	123.00	1204.00	125.00	126.0	29130.60
Total:									29130.60
Add 1 % contingency:									291.31
Grand Total:									29421.91
Say:									30000.00
<b>Contribution by MAC:</b>									<b>21000.00</b>
<b>Contribution by the beneficiary:</b>									<b>9000.00</b>