

## **Schemes of the Directorate:**

### **(1) CULTIVATION OF CINCHONA**

The chief *Cinchona* producing countries of the world are Indonesia and Zaire. Other producing countries are India, Kenya, Rwanda, Sri Lanka, Bolivia, Colombia, Costa Rica, Ecuador and Guatemala. In India, *Cinchona* cultivation is being done only in West Bengal. The total world production of *Cinchona* bark is estimated to about 8,000 to 10,000 tonnes which can produce about 400 to 500 tonnes *Cinchona* alkaloids annually.

Following decline in demand for quinine during 1950, *Cinchona* plantations appear to have been abandoned by many countries particularly Indonesia and India, but interest in the product revived during the following decade presumably due to reappearance of malaria in many parts of the world and also owing to increase in demands from soft-drink sector and a number of countries including India are reported to have rehabilitated old plantations or initiated new ones.

The *Cinchona* plants, the only source of natural Quinine, having being cultivated since 1862 by Britisher in the hills of Darjeeling has become a largest industry providing an ample scope of employment is still continued. It has been successful to protect the interest of the people of hills and maintain economic condition. At present, area under *Cinchona* is 7425.14 acres. Quinine is used for curing malaria and other diseases like haemorrhoid, varicose vein, influenza, mouth and throat diseases etc.

### **(2) CULTIVATION OF IPECAC**

#### **INTRODUCTION :**

Ipecac (*Cephaelis ipecacuanha*) plants, from the annulated radix (root) of which the active alkaloid emetine is obtained which is the wonder drug for treatment of amoebic dysentery, was introduced in Mungpoo in the district of Darjeeling by the Britishers. The commercial cultivation of the plant was taken up since sometime mid of 1950's. Ever since then, the cultivation went on expanding with encouraging results till the mid 80's, when its demand started declining. Since then the cultivation has been confined to just preserving the germplasma.

But of the demand for Ipecac radix has started showing encouraging signs. So it has been contemplated to expand its cultivation once again in a slightly modified cultivation practice mainly regarding the roofing material. Doing away with the conventional bitumen felt (tar felt) roofs, excepting for plants kept for seed stand purpose. It is contemplated to cultivate it under natural shades of *Tephrosin candida* and *Crotolaria anagroids* leguminous shrubs. In fact, some experimental cultivation had already been done under such shade by the Directorate with encouraging results.

This Directorate is one of the major cultivators of Ipecac. Emetine is the bi-product of Ipecac, which is also produced by the Directorate. The demand of Ipecac radix is increasing day by day. This encouraging demand of *Ipecac radix* compels the Directorate to further extend the Ipecac Cultivation.

### **(3) CULTIVATION OF MANDARIN ORANGE**

At present the area under Mandarin Orange in the Directorate is 263.57 acres. The Directorate has taken up the cultivation as per its diversification activities since 2007. It is one of the major cash crops in the hills of Darjeeling. The plants have started to yield fruits since last year. The trend is likely to continue and increase in years to come.

#### **Objectives:**

- (i) The Orange Orchard will serve as a demonstration purpose for the interested farmer all over the district of Darjeeling.
- (ii) Generate revenue for the Govt. exchequer.
- (iii) Help the socio-economic upliftment of the hills of Darjeeling.
- (iv) To cover the greeneries blanket of the hills, for eco-tourism as well as sanitation.

### **(4) CULTIVATION OF RUBBER**

The Rubber plantation was first introduced in the Directorate during 1993-94 on experimental basis. Encouraged by the success, the Directorate decided to take up the eco-friendly rubber plantation in a big way in consultation and supervision of Rubber Board of India. The total acreage under Rubber Plantation in Directorate till date is 280.90 acres. India is one of the highest users of natural rubber to the level that 80 percent of its need is met with natural rubber. The demand will surely increase looking towards to the country's rapid industrialization. Therefore, the scope for stepping up of the production of latex is vast. The annual production of latex in the Directorate is around 40 MT. Extension of Rubber plantation in the Directorate will surely reduce the demand-supply gap of Rubber in the country.

#### **Objectives:**

- (i) Natural Rubber is never ending demands of universe, to cope up this supply-demand gap.
- (ii) Natural Rubber is a hidden treasury and will generate employment and revenue of the Directorate.

### **(5) CULTIVATION OF TAXUS BACCATA WALLICHANA:**

Texol, a complex diterpene, is currently considered the most exciting lead in cancer chemotherapy. Texol possesses high cytotoxicity and strong antitumor activity against different cancers which have not been effectively treated by existing antitumor drugs. It may be mentioned here that Texol has been accepted as a drug for treatment of breast cancer since December 1992. Other areas of possible uses are of in the treatment of ovarian cancer, lung cancer, colon cancer and acute leukemia. At present the supply of texol is solely dependent on the extraction from the bark of *Taxus brevifolia* (Pacific yew), which is a very slow growing tree in old growth forest of the North-East of the United States and the total number is estimated to one million. For the set of clinical trials only, more than 25000 trees are required because of the low concentration of texol in the bark. The harvest of those trees endangers not only the very existence of the trees in the forest but also the future supply of texol.

However, it has recently been found that the most complicated tetra cyclic diterpene mostly of taxol 10 doscityl baccatin III, which is the most demanding in total synthesis, is more readily available from the leaves of *Taxus wallichiana* (Himalayan yew). The species is available in the upper areas of Darjeeling Hills. The extraction of the fresh leaves yields 10 doscityl baccatin III in good yield. The leaves are reproduced quickly.

A pilot scale cultivation of *Taxus baccata* was stated by the Directorate to during 1995. By now 64 acres of plantation has been established by using the agro technology developed in-house in the plantation pending approved of the government. The Directorate can easily maintain 500 acres of *Taxus* plantation. It is estimated that the market for taxol and its analogues could be \$ 5 billion per year.

*TAXUS*: The demand of *Taxus* leaves is increasing day-by-day as evident from the enquiries received by this Directorate from potential buyers. Dr. Reddy's Lab, Dabur Himachal pharmaceuticals. M/s. Export Agencies etc are few to mention here. Hence it can be confidently stated that the produce has high degree of market ability in future too.

#### **(6) ASSESSMENT ON CULTIVATION OF NEW MEDICINAL PLANTS:**

The forest of Darjeeling hills is enriched with high valued medicinal plants. But some of these plants are in a verge of extinction due to lack of proper conservation and work towards its sustenance. To preserve this high value plants, the Directorate has set up its own nurseries where these plants are being maintained and grown. This is an ongoing activities of the Directorate. Now, it is planned to further increase the activities in this area and commercially exploit these plants.

##### **Objectives:**

- (i) To exploit the natural resources of Darjeeling Hill Forest.
- (ii) Darjeeling hill forest is highly rich in bio-diversity in the North Eastern Himalayan Region, which is yet to be discovered fully. Therefore, to discover this plants.
- (iii) Botanical identification of medicinal plants grown in Darjeeling yet to be investigated scientifically in the wild. To materialize this for the purpose of medicinal use in the world market.

#### **(7) OTHER IMPORTANT ACITIVITES OF THE DIRECTORATE:**

- (a) Cultivation of Dioscorea and conservation of germplasm.
- (b) Collection of Wild Plants that could be beneficial to maintained.
- (c) Development of Horticulture crops (cultivation of Kiwi, pear, peach, plum, strawberry).
- (d) Development of Floriculture activities (Cymbidium Orchids).
- (e) Cultivation and Production of essential oil bearing plants.
- (f) Commercial cultivation of Button, Oyster and Medicinal Mushroom.

## LABOUR WELFARE WORKS–

Directorate having 5350 Daily Wage Worker under its control is governed by the Plantation Labour Act, 1951. As stated in the Act the Directorate annually take up the following Labour Welfare schemes:

- (i) Housing (Construction of Model House for Plantation Labourers).
- (ii) Supply of Piped Drinking water to the labour colonies.
- (iii) Roads and Paths.
- (iv) Health Care (4 Hospitals) and 14 Dispensaries.
- (v) Electricity.
- (vi) Welfare Centre.

## PROPOSED WORK PLAN:

- (i) Expansion of Cinchona Cultivation.
- (ii) Expansion of Ipecac Cultivation.
- (iii) Extension of Orange and Rubber Plantation.
- (iv) Revitalization of Govt. Quinine Factory, Mungpoo as per the GMP standard.
- (v) Revitalization of other factories of the Directorate viz. (i) Govt. Emetine Factory, Mungpoo, (ii) Govt. Diosgenin & Downstream Factory, Gairibas.
- (vi) Development of Horticulture crops viz. Peach, Pear, Plum, Kiwi and strawberry.
- (vii) Development of Floriculture activities.
- (viii) Afforestation programme.
- (ix) Eco-Tourism.
- (x) Cultivation of Mushroom.

## Physical and Financial Achievement:

### (a) Financial Performance during 2014-15:

Sl. No.	Name of Scheme	Amount (Rs.)
1	Expansion of Ipecac Cultivation, Phase I & II	99.9192
2	Cultivation of Dioscorea	0.5625
3	Construction of Model House for Plantation Labourers	144.73096
4	Supply of Piped Drinking Water and Providing Sanitary Condition to Labourers of Cinchona Plantation	37.50
5	Project for Development of Plantation Road	18.75
6	Project for Utilization of Raw materials from Wild Plant Resources	3.3636

7	Schemes for construction of Houses for Office staff	6.57868
8	Scheme for Afforestation of Plantation Area	1.50
9	Diversification of Activities of the Directorate of Cinchona & Other Medicinal Plants	59.9635
10	Cultivation of Ginger	24.785
<b>TOTAL (2014-15)</b>		<b>397.65344</b>

**(b) Physical Performance made during the year 2014-15:**

Sl. No.	Name of Scheme	Target	Actual Achievement
01	Expansion of Ipecac Cultivation, Phase I & II	17 acres	Expansion in 15 acres.
02	Cultivation of Dioscorea		Maintenance of existing Dioscorea block
03	Construction of Model House for Plantation Labourers	22 model houses	22 (twenty two) Model House constructed
04	Supply of Piped Drinking Water and Providing Sanitary Condition to Labourers of Cinchona Plantation	three new schemes	2 (two) Schemes initiated at Mungpoo for providing Supply of Piped Drinking water to the labourers of Cinchona Plantation.
05	Project for Development of Plantation Road	800 mtr.	800 mtr. Jeepable road at Rungbee Division, Mungpoo was constructed.
06	Project for Utilization of Raw materials from Wild Plant Resources	Collection of wild species and maintain it in Nursery	Several wild plants collected and maintained in the Research Nursery of the Directorate at Mungpoo
07	Schemes for construction of Houses for Office staff	2 staff quarter	One staff quarter renovated.
08	Scheme for Afforestation of Plantation Area	10 acres	Afforestation was done in 10 acres.
09	Diversification of Activities of the Directorate of Cinchona & Other Medicinal Plants	Maintenance of Orange Plantation. Extension of Rubber Plantation by 60 acres and Production of Crude Rubber sheet from the existing matured Rubber Plant. Pilot Scale Cultivation of Button and Oyster Mushroom.	Extension of Rubber Plantation by 35 acres and maintenance of existing block of Mandarin Orange at Mungpoo and Latpanchor.
10	Cultivation of Ginger	40 acres	Ginger was cultivated in 30 acres at Gairibas and 10 acres at Rongo. Total production of Ginger during 2014-15 was 16105 kg.

**(c) Physical Performance 2015-16 :**

- Trail cultivation of Sitakey Mushroom was successfully achieved and it was first of its kind in the District of Darjeeling.
- Commercial Cultivation of Button Mushroom and Oyster Mushroom initiated.
- Optimum priority was given in expansion programme of Medicinal herb like Cinchona, Ipecac, *Taxus baccata*, Chirata, some high valued medicinal plants and essential oil bearing plants like Citronella, Vetiver, Patchouli, Lemon Grass.
- Conservation of high valued medicinal plants in the Research Nursery of the Directorate.
- Imparted training to the farmers of Darjeeling district on the viable cultivation practice of Large Cardamom and Mandarin Orange as part of awareness programme on the importance of growing horticulture crops for the socio-economic upliftment.
- Increased the area under Rubber cultivation by 40 acres. The total acreage under Rubber Cultivation as on 01/04/2015 is 280.90 acres.
- Convergence with MGNREGA on cultivation of various horticulture, medicinal and Aromatic plants.
- *Taxus baccata* is introduced for the first time in Munsong and Rongo unit in 5 acres each.
- Chirata is introduced in Munsong and Rongo units in 2 acres each for the first time.
- 5 (five) farmers are given – *Taxus baccata* in Kurseong, 5 (five) farmers are given *Rauvolfia serpentina* in Gorubathan; 5 farmers are given Chirata seeds in Rimbick (below Sandhakphu area); 5 (five) farmers are given Jatamansi in Gitdabling area
- Directorate requiring earthen pots and we buy every year. Considering this we have trained 12 (twelve) number of our staff in earthen pot making.
- One day Football tournament was organised on 2<sup>nd</sup> October, 2015 for the staff member of Mungpoo unit.
- All 4 (four) units together organised Football tournament for the Plantation Labourers for the first time.
- 131 acres of Cinchona is cultivated compared to 220 acres of area expansion in the past 5 (five) years.
- 14 acres of Ipecac is cultivated compared to 55 acre of area expansion in the past 5 (five) years.
- Ginger cultivation has been introduced in all the units with seed from Rongo unit this year.
- Large Cardamom seedling production started in Gairibas Division of Rongo unit where production of 5 (five) Lakh seedling is our target.

- Darjeeling Orange seedling production started in Mungpoo unit where production of 1 (one) Lakh seedling is our target
- Cultivation of Gladiolus under Research and Development Section has been initiated in Mungpoo this year. Similarly, commercial cultivation of Gladiolus initiated in Gairibas Division of Rongo.