

## Chapter 1 INTRODUCTION

### *Thoughts from the Blue Mountains*

Being in the hills is like experiencing an environmental film in real life. As the development around us - more areas growing tea, more chemical fertilizers and pesticides, more schemes/doles for the tribals, more health problems, more rivers of soil joining the Bhavani - surges to a high, our efforts in the hills seem even more important to continue.

Now here for one more year, some insights into the lives of indigenous people, the problems they face, their heightened sensitivities, their sudden migrations, the way they face the new economic order become a little more clear to us. In attitudes & ways of living, a couple of interesting things are:

1. The individual is more important than the community. The concern extends maximum upto the immediate family. This is specially true when there are projects which have an economic benefit.
2. Wage labour is a way of life - easy to get in tea growing areas and making the people more dependent on the "system". Money is absolutely important to continue day to day activities & erstwhile dependence on forests is reduced.
3. Today is more important than tomorrow.
4. A slow disintegration of a 'tribe' way of living, which is meant to be self governed, independent of other societies and community based. However, a few rituals and beliefs still bind them together.

Though these are important learnings from the field, the questions we have to continually ask are - what is our role, how closely can we be involved, is the proximity good or bad, are our projects making them self governed and independent, is the integration process with the “system” good or bad, etc.

These issues continually preyed on our minds - implementation pressures were high i.e. to do it in the right way - participation et al, but how much of the goals got transferred to the people, needs assessment. They are too used to working for somebody for a wage - part of the effects of plantation culture, so can we instill in them an ownership of the programmes?

At Keystone, work continued on the Basket Hive and beekeeping picked up in the whole valley of Semmanarai. It was a bad season for honeyhunting as few colonies settled in the hills this time - according to the tribals, availability of honey is good every alternate year. Renovation work around the Kurumba houses in Semmanarai started but was stopped because of the heavy rains this year. Silk cotton and pepper value addition, a drinking water-cum-micro irrigation project for Kilkoupe, millet cultivation and several other efforts kept us busy.

Subramani, the Kurumba field assistant could not remain with us. Visu had problems with money lending and borrowing for a few months and stabilized again. Jaya joined to work on accounts and sometimes with packaging of products. However, many times, we felt we are too few in number to handle the amount of work coming up.

A few assignments outside helped us learn about environment and development issues in other parts of the country & at a time the focus had shifted to the Koyta labour issues in Surat, Gujarat. The trip to Europe and Scandinavia was an eye opener and an interesting experience. Keystone did well by getting nominated again to the Standing Commission of Apimondia on Beekeeping for Rural Development. On attending this international meet, it was evident how little focus there is towards *Apis cerana* vis-a-vis *Apis mellifera*, the

European bee and how much needs to be done to keep this species alive and robust. *Apis dorsata*, as a species seems completely forgotten, beyond the Asian boundaries.

Extending beyond our work, the Shola Fellowship was held in Kotagiri once again and discussions on Kota pottery, Living Machines, Andaman tribes and hand pounded spices were engaging.

A critical look at all this and several new ideas has helped give direction to future work. Marketing of products has to do better - with more variety in the products and production systems being streamlined in the next few years. More emphasis on expanding the areas of honey procurement by crystallizing a honey hunter's network is necessary. Surveying the NTFPs of the region - both from the economic and environmental point of view, is important, to see the extent of value addition and the benefits that can accrue to the tribals in the future by setting up production systems at the local level. The AT work in beekeeping needs an extension and more emphasis has to be given to the *Apis cerana* bee to promote beekeeping in tribal/rural areas. For this, a place of scientific research and insights from indigenous knowledge need to be combined to get effective results.

The wish to remain small yet effective is dominant in all of us at Keystone, so all our work has to be significant and have multiplier effects. For the organization, it then becomes important to find its critical mass and have an efficient harmony in work.

## **Chapter 2 APICULTURE**

The Appropriate Technology (AT) project in apiculture has ended this year. It began three years back in the villages of Nilgiris. This section discusses the AT portion and the beekeeping efforts during 1997.

### ***Beekeeping for Rural Development***

Success or failure in a beekeeping project depends on the flora available (or termed as environment) to sustain the activity, the skill and interest levels of the beekeeper and the behaviour of *Apis cerana* bees (absconding, strain improvement). Combining these in a winning mix, is the challenge of the external agency.

Understanding of these parameters separately, would give us a better idea as to where the intervention is necessary to make this activity viable and sustainable without much external support. The Beekeeping project has been concentrated in three villages - Kilkoupe (KLK), Kolithurai (KLTH) and Semmanarai (SMN). All these villages are situated in a valley - a large watershed. Analysis of data in this region would also throw light on the ecology and development needs in this region vis-a-vis indigenous people, habitat and bees.

The following table gives the overall concept framework of this project :

**TABLE I**

<b>BEEKEEPER</b>	<b>ENVIRONMENT</b>	<b>BEES</b>
Skill, Participation, Potential, Income, Character, Development, Beekeeping extension: systems, approach, Role & limitations, Interest levels, innovation, honey & bees wax products	Habitat, Swarm, Micro-environment, Pollen, Nectar, Local material, Predators, Rain & wind, Plantations & pesticides, Pollination potential	Absconding behaviour, Efficiency, Nesting preferences, Honey output, Aggressive strain, TSBV, Hive management

**Aims**

- Enhance income levels of tribals in this valley
- Revive beekeeping through appropriate interventions
- Increase bee population in this region for greater pollination of wild and cultivated species

The data which is being discussed and presented in the following sections should lead us to:

1. New areas for action
2. Relevant studies required in this region
3. Strategies for village extension work
4. Potentials and limitations of the Basket hive

## I. The Beekeeper

Table II

<b>BEEKEEPERS' INCOMES</b> <b>(Apis cerana)</b>			
<i>Name</i>	<i>Village</i>	<i>Honey Prodn</i> <i>(kgs)</i>	<i>Income (Rs)</i>
Krishna	SMN	25.79	1805.00
C'Raman	SMN	16.42	1149.00
Dharmaraj	SMN	01.10	77.00
Chellan	KLK	15.50	1085.00
Rangan	KLK	07.76	543.00
Nilgiri	KLK	04.86	340.00
Chandran	KLK	04.57	319.00
Vellai	KLK	03.12	218.00
Masanan	KLK	00.85	59.00
Ayasamy	KLTH	04.08	295.00
	Total	84.05	5890.00

The beekeepers in this valley are all Irula or Kurumba tribals. A few of their significant characteristics with bees are:

1. Each beekeeper locates his own colony - he is not interested in maintenance of the bee colony. This duty, he feels is the project staff's responsibility.
2. When the colony is new, they open the box every morning to check if the bees are alright, try and locate the queen and observe whether the combs have been drawn. This behaviour is similar to checking if the hen have laid eggs, goats are alright in their penn or whether child is there. A physical verification is necessary to clear his doubt.
3. He "owns" and is possessive about his bee hive during the honey flow season. During this period, even if he does not get any assistance from the project staff, he does not mind and does not complain. He is eager to get as much honey as possible.
4. Eating honey combs during transfer of bee colony from wild to the box is considered normal. Sometimes, only bees are placed inside the box without any combs. This leads to absconding.
5. One of the best beekeepers in the valley - Krishna, has made a business arrangement with other beekeepers. He gets Rs.50 for every bee colony that he `stabilizes'. This way, the other beekeepers (mainly new) are sure that their bee colonies will be in safe hands and during the honey flow they can make back their money.
6. Though interest may be there for beekeeping, discipline seems to be lacking in most of them to continue through the period of maintenance, feeding and looking after the hives.

7. Postponing attitude: What can be done today can be done day after tomorrow
8. Fight to conquer: any amount of physical strain/risk will be undergone to get the bees/queen during hiving. It is quite another issue if bees do not stay - hunter pschye - taming the wild? However, if the hive absconds, there is no regret.
9. Simple innovations: Krishna is a man who sits outside the house watching every movement of the bees. He placed a wooden ladder on the flight path for the bees to land easily. He also placed an empty hive on top of a full Mulderry Hive (MH) -18 frame hive. He made a bamboo hive almost twice the size of the existing hive, to rear a bigger colony and get more honey. Vellai removed the comb-guide (sharp edge of the lower side of the top-bar frame) and made it flat. He felt that it obstructs the comb to sit properly while tying the brood combs from the feral nest.

Table III

<b>TOP TEN BEEKEEPERS</b>	
<b>Name of Beekeeper</b>	<b>Key Traits</b>
<b>1. Krishna</b>	Go for it, hunter skills, experimentator, helps others for a fee
<b>2. Ayasamy</b>	Follows procedures, good skills
<b>3. Chandran</b>	Modern beekeeper
<b>4. Chinnaraman</b>	Dependent beekeeper
<b>5. Chellan</b>	Good hiving, no sharing of know-how, individualistic
<b>6. Dharmaraj</b>	Dependent beekeeper
<b>7. Rangan</b>	Dependent beekeeper
<b>8. Masanan</b>	Following procedures, cooperative
<b>9. Vellai</b>	Will seldom listen, will do what he thinks best
<b>10. Nilgiri</b>	Poor eyesight but excellent hiving technique

### ***Honey Yield***

The yield of honey for the beekeeper can be understood from his bee colonies and his area in terms of nectar & pollen availability. For this, we examine two parameters:

- A Number of days from the 1<sup>st</sup> day of harvest to the final extraction. This would give us an idea of the honey flow period in this valley. and the most appropriate time to start a beekeeping project.
- B Number of days taken from the date of hiving to the first harvest. This would lead us to the average brood development and honey storage period. If this period is short, it reflects on the flora and on the management practices of the beekeeper.

### **Discussion**

Details of beekeepers and their hives are provided in Table IV (Pg 10). The honey flow period is for an average of 90 days. However, for a number of beekeepers, the first extraction was the only one. This happened in Mulderry hives, where due to the comb being crushed, it took a longtime for the bees to build & store honey. A second extraction was delayed. If we exclude these hives, the average is only 52 days. The longest honey flow season was at KLK (Chellan's hive), for 179 days.

It took almost 232 days - 7 months, with tribal beekeepers in this valley, to get the first harvest from the date of first hiving. The shortest period was 105 days at KLTH, for Ayasamy's hive.

**TABLE IV**

Zone, Name of Beekeeper & Hive Code	A	B	Honey Prodn (kgs)
SMN, Krishna, 108	128	151	7.62
SMN, Krishna, 107	129	124	13.34
SMN, Krishna, MH 07	0	205	4.29
SMN, C'Raman, 102	63	287	6.77
SMN, C'Raman, 104	51	433	5.99
SMN, C'Raman, 110	44	203	3.25
SMN, Dharmaraj, 103	0	216	1.10
KLK, Chellan, 207	179	133	13.08
KLK, Chellan, 206	118	170	2.42
KLK, Rangan, 204	61	397	6.70
KLK, Rangan, 216	0	178	0.96
KLK, Chandran, 212	132	106	4.04
KLK, Chandran, 217	0	157	0.53
KLK, Masanan, MH103	0	179	0.85
KLK, Vellai, 209	0	222	1.05
KLK, Vellai, 205*	30	433	2.065
KLK, Nilgiri, TBH wooden*	0	588	4.86
KLTH, Ayasamy, 201	63	105	3.57
KLTH, Ayasamy, MH 116	0	137	0.51
AVERAGE	90.73	232.84	4.37
	52.53		
Std deviation	58.26		

\* These hives have been functional since the last year

### ***Village Extension & Training***

The beekeeping team has observed a major development in the valley where there has an increase in the number of hives. Continuous motivation of beekeepers is a major role for the village coordinators. Many beekeepers become independent in hiving and extraction. The village coordinators are available for monitoring, technical support or when problems arise. Supplying comb foundation sheets & feeding syrup, carrying out minor repairs, colony divisions and taking seasonal precautions. Another responsibility has been to find the reasons for absconding and take preventive steps.

The following training programmes have been conducted:

- # Five village trainings (one day) in Semmanarai and one in Kilkoupe were organized on hiving, inspection of working and deserted hives, arrest of swarming, colony division and extraction.
- # Two beekeepers trainings were conducted at `The Hive` with audio visuals.
- # Two trainings for the village coordinators on melting wax, filtering and making plain wax sheets.
- # Two trainings were conducted in Tamil Nadu Agricultural University on making comb foundation sheets with a foundation roller mill.
- # Twice or thrice a month, the village coordinators spend time in `The Hive` sharing their day-to-day activities, looking at books and creating new tools.
- # Village visits to all apiaries with a resource person, Mr.Suresh Chengappa, an experienced beekeeper from Coorg to provide inputs to the beekeeping programme.

### ***Development & Potential***

The number of colonies, amount of honey collection from wild cerana and dorsata colonies indicate a major potential for further extension and larger returns to the beekeeper. Though the total turnover for one year from *Apis cerana* beekeeping has been only Rs.5840, there is enough reason to indicate that this activity is going to grow in the valley. A number of new beekeepers are taking up beekeeping. Old beekeepers are interested in keeping 25-30 hives each, creating small private apiaries in the villages. These apiaries are crucial to keep the activity and interest on. A common tribal man, prior to the beekeeping project has significantly developed and changed - not only has a new skill been improved under training, exposure and guidance but a new avenue to make a significant side income has opened up. Beekeepers in this region have come closer - sharing other problems in the community have become frequent through this project.

This project being flexible in its approach, has given an opportunity for the beekeepers to attempt to improvise, innovate and experiment with local materials to make new designs, find new ways to rear bees, to manufacture

low cost hives and to locate colonies - all these faculties have got an encouragement. They have carried through their own initiatives without the direct interference of the project. It has also given some enterprising tribals the opportunity to learn how to handle accounts and operate the comb foundation mill.

There is a significant potential for apiculture development in this region. The Thai Sac Brood Virus Disease (TSBVD) has not been a problem in this area. Only 9 cases of TSBVD symptoms were found in 146 bee colonies. A total of 96 colonies within the past one year have absconded.

Development of beekeepers has meant more confidence and has given rise to a lot more cash in everyone's hands. Apart from returns from beekeeping, the rapport established with the honey hunter community has given a chance for other projects such as silk cotton products and bees wax candles. Projects in basic needs with this community have been drinking water & micro-irrigation, renovation of their houses, medical support. Areas such as adult education and influencing them in their use of income have to be addressed (at present, it often goes to the illegal liquor shop adjacent to the village).

#### **FUTURE ACTION**

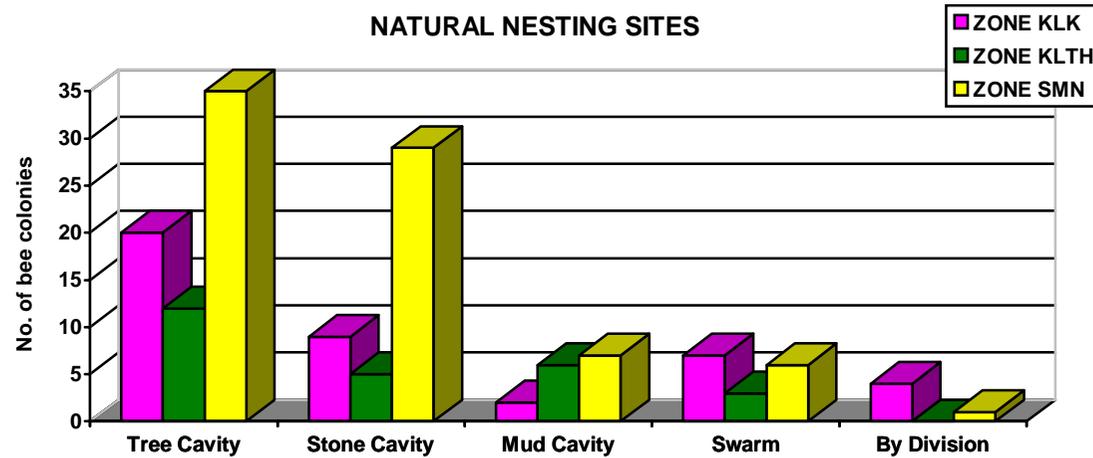
The past has given enough clues about potential beekeepers and their requirements. They have to be provided the required number of hives and tools for maximum economic gains, through which more colonies can be reared for better pollination.

- # Creating village apiaries which can multiply good strains of *Apis cerana*.
- # Creating a center, a Bee World for anybody to come and learn.
- # More local skills to be upgraded and utilized.

## **II. The Environment**

Bees without environment are incompatible - bees are indicators of better environments and good environments are home to bee species. The Nilgiris are a special environment - home to a number of endemic species, shola montane forests & tropical dry deciduous forests. These forests need to be conserved, protected and proper strategies need to be designed and implemented for forest-people. The Nilgiris house a number of tribal communities - some of these people are seen today as anti-forest, problematic and causing deforestation. There is an urgent need to understand their lifestyles, collection economy & ecology - a step which could bring them income at their pace and terms. Activities which are not alien to them will help in keeping a positive harmony between the forest and its people - none can be at the cost of the other. Though times have changed, the forest-people still remain inside. Though they come out to "civilization", they feel at home amidst their environment. Keystone has realized, that honey, bees and the environment is a relevant combination for forest-people.

*Bee Environment*



Total number of beekeepers in the three villages : 37  
Total number of hives in the three villages : 120  
(Newton type-88; Mulderry-32)

From the graph, it is clear that *Apis cerana* bee colonies prefer tree cavities for nesting. Being a Reserve Forest, this area is relatively undisturbed and therefore bee availability is high. If dead and fallen trees are left undisturbed in this valley, the probability of an increase in bee population is high. Bees generally prefer trees of

Vejai (*Anogeissus latifolia*), Nava (*Syzygium* spp.), Ichchi (*Ficus* spp.), Murungai (*Erythrina* spp.), Teak (*Tectona grandis*), Silk cotton (*Ceiba pentandra*), Soap and Kadalai trees, which have thick walls as insulation. Future design of basket or wall hives can take an idea from tree cavity specifications.

**Table IV**

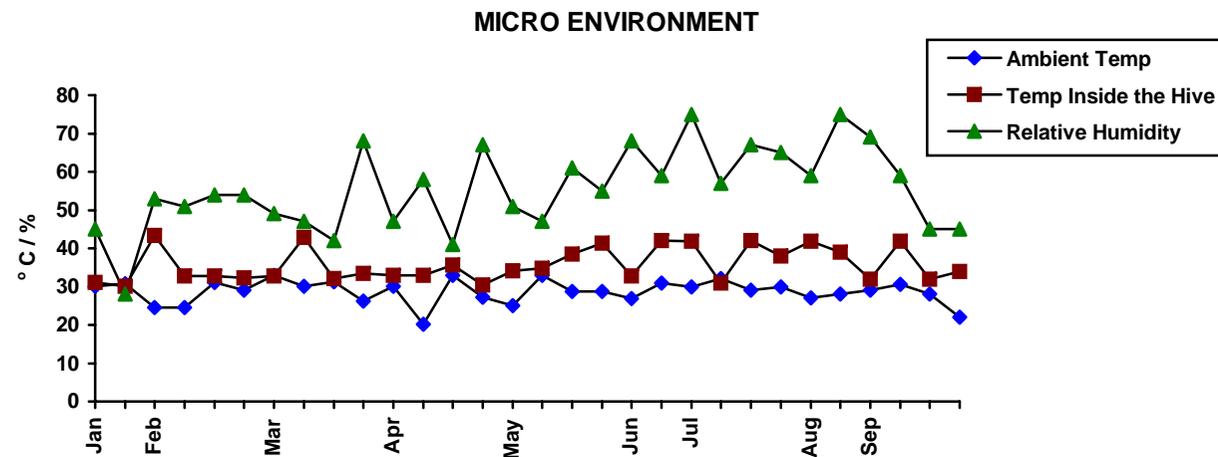
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Swarming period (single queen)			Swarms - high nectar flow (multiple queens)			Dearth Period					
Honey prodn (kgs)	0	0	1	8	43.7	22	22	17	7	4.4	0	0
	Col. avail. high			Col. avail med.			Col. avail low					

Change in landuse from forested areas to plantations, in the past, have had a negative impact on bee populations in the lower elevations. There could be a direct correlation between large estates (clearing operations) and the availability of bee colonies in the region. Old beekeepers mention that they used to see lot more swarms in the area. Honey availability per colony was also high. Wild colonies were captured for honey combs only.

Large estates require regular pesticide sprays, which kill bees. Areas below the estates, where good patches of forests are found, is also where the tribals reside. Chemical inputs are not so much of a problem here, though there is significant menace of predators such as bears & monkeys. Sufficiently large patches of forested areas should be kept undisturbed (without any logging operations or chemical inputs), as this would guarantee a healthy number of natural bee colonies which could be useful for pollination of forest species and plantation crops such as coffee.

**Study need**

1. Pesticide use and application in this region - how does it affect bee colonies? Can we estimate during a season how many bee colonies are lost due to pesticides - and what impact does it have on pollination.
2. If some tea estates are opting for organic tea, can bee populations in the vicinity help ?



The above graph is the climatic data collected in KLK village. Climatic information is important to understand the bee environment. Statistical tests show that there is no significant correlation between ambient temperature & temperature inside the hive. Bees maintain an average 35.8 C inside the box (from 30 readings from Jan-Sep 97). Relative Humidity (RH) is also an important parameter to be observed. Though xinside RH

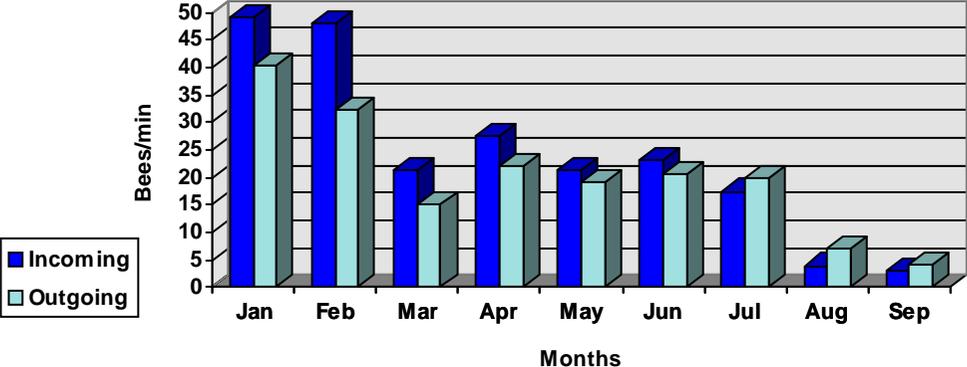
readings would have been appropriate to understand the micro-environment, due to lack of proper instrumentation, only outside RH could be measured.

### **III. The Bees (*Apis cerana*, *Apis florea* & *Apis dorsata*)**

The apiculture project deals with mainly *Apis cerana*, though other bees such as *Apis florea* and *Apis dorsata* are also a part of the tribal honey flow season. They collect significant amounts of honey from the Rock bee - *Apis dorsata*. New areas of honeyhunting was done this year. Padi varai & Suii varai was taken up for honey collection. More details on honey collection, method of harvesting & hygienic extraction have been discussed in the section on Marketing. *Apis florea* is also reared by some enterprising beekeepers - they transfer the branch from the forest and bring it close to their settlements for better observation and rearing. When honey is ready, they will cut the portion of the honey comb and let the bees build it again.

The following discussion is about *Apis cerana*.

### FORAGING SPEED



#### Discussion

Foraging speed is an indicator of how fast the bees work throughout the year. Pollen & nectar availability during the early part of the year allows a faster foraging speed. During Jan & Feb, the average foraging incoming speed is 49 & 48 bees per minute, respectively, outgoing during the same months being 40 & 32 bees per minute, respectively. The lowest foraging speed is in Aug & Sep, when the average incoming speed is 4 & 3 bees per minute and the outgoing speed is 7 & 4 bees per minute. This is also the onset of the monsoons. Due to lack of food being collected, the bee colony has to be well fed during this season.

### *Absconding*

	TSBV	Only Bees	Ants	Starvation	Queenless	Wind	Human Disturbance	Unknown
Zone KLK	6	5	0	0	6	0	2	6
Zone KLTH	0	4	0	2	4	0	1	3
Zone SMN	3	11	1	5	24	1	5	7

Absconding behaviour is intrinsic to *Apis cerana*. At any slight disturbance, it deserts the hive, even if there is sufficient honey storage. Most beekeepers get frustrated during this period and lose interest. Only some who keep on colonizing and find out why the bees have absconded, succeed in beekeeping. To understand the reasons for absconding is crucial. Readings from the three villages in the valley show that queenless colonies account for maximum abscondings. This means that during colony transfer, the queen is not recognized - new beekeepers think that they have the queen in the cluster, but results show a different picture. Another reason relates to the capturing technique - honey combs are often eaten and only bees are transferred. The shift to a new place without food forces the bees to abscond. The unknown factors were only 16% this year, unlike last year when the unknown factors were far more significant.

## *Appropriate Technology in Beekeeping*

### **Technical**

#	Number of Mountain Hive (MH) produced : 65	#	Total amount of honey produced 95-96 : 5.94 kgs
#	Number of bee colonies produced through multiplication 95-96 : 10 colonies 96-97 : 15 colonies	#	96-97 :10.51 kgs
#	Number of families involved Eighteen families (18)	#	Number of basket weavers trained to manufacture MH: Six weavers (6)

### **Social**

The Appropriate Technology project was the first project undertaken by Keystone in the Nilgiris with Kurumba & Irula tribal communities. The AT initiative was an entry point into the hamlets - to explore a long-term partnership on their habitat & livelihood strategies and possibilities of diversification into other basic needs. Being a project which dealt with forest vines, bamboo material, local skills and honey bees, made it local, relevant and relatively easy for them to grasp. The dialogue through this project enabled the villagers to be more vocal & specific about their needs and brought the village together around this activity. Erstwhile beekeepers who had lost interest in keeping bees mainly due to economic reasons were once again interested in taking it up due to the low cost and accessibility of materials and advice. Within the span of two and a half years, a number of other projects have evolved based primarily on the support, rapport and foundations laid by the AT Project. They include:

1. Drinking water & Micro Irrigation project for KLK village
2. Silk cotton project at SMN
3. Basket weaving training programme at SMN
4. Honey & bees wax marketing support in several villages
5. Beekeeping project with AT inputs at several villages
6. Revival of traditional landuse at SMN
7. Market support for organically grown coffee & pepper
8. Raising coffee nursery in the village
9. Planting of high value spices as diversified crops

### **Economical**

Prior to Keystone's entry into this area, the tribals mainly depended on daily wage labour for meeting their ends. During specific seasons, they would collect Non Timber Forest Produce from the forests and pass it to traders, receiving collection charges only. With income generation options such as beekeeping, marketing of

honey, bees wax and silk cotton, they are today in a better position. Honey prices are competitive - from Rs. 19-25 per kg that they used to get from local traders, we have raised the prices to Rs. 60-75 per kg, depending on quality. Better techniques for hygienic extraction and filtering are bringing better returns.

#### **Attitude towards beehives**

- (i) Earlier, tribals had seen Newton bee hives in big plantations/estates. When MH was introduced, many of them declined to believe that bees could be kept in MH. In the past two and half years, this myth has been broken and change is seen.
- (ii) Many hives were made with bamboo in different sizes, a plastic vegetable carrying basket coated with clay and an old iron trunk have also been used to keep bees. Bamboo strips were used many times as top-bars.
- (iii) In the beginning, everybody talked about 10 hives per family, otherwise, beekeeping could not be economical. However, practically, a single extraction of 4-6 combs could yield a crop of 4-5 kgs. This attracted them towards systematic beekeeping with a minimum number of hives.

#### **Training in beekeeping**

Primarily, most of them are honey hunters - eating brood & honey combs and transferring only bees into the hive were major reasons for desertions. The villagers realized the effect of such practices and now, except a few, most of them abstain from it.

- a) Some important aspects learnt by the beekeepers were:
  - Hiving of swarms with brood combs from a working hive, transferring of combs for weaker colonies, diagnosing queenless colonies, controlling swarming and reducing predator attacks.
- b) Visu, Chellan, Vellai and Subramani became adept in handling tough situations in beekeeping. When they explain to a co-villager in their own dialect, the exchange is effective.
- c) Many of them have learnt the technique to melt and filter beeswax.

- d) They realized that hygiene & cleanliness during honey extraction would ensure better quality and a good price.
- e) They have learnt to diagnose larval death disease and care is taken not to spread it anymore.
- f) The value and utility of comb foundations is understood in the village. Everybody wants to have their own stock.

**Future Plan: Phase II**

- Consolidation of efforts in AT, primarily in select villages with key beekeepers.
- Train up people capable of experimenting in AT and making the activity easy for others - in their terms and language.
- Testing and monitoring to know the strength and weakness of the technology
- Promote women beekeepers through the basket-weaving and bamboo hive interface.
- Bring out a simple, pictorial training manual on AT for beekeeping for interested beekeepers.
- Do a detailed costing of the Mountain Hive (MH) vis-a-vis conventional technology (Newton Hive) taking into account factors of pollination, skill development and acceptance.
- Work towards making the AT project a sustainable initiative after the second phase - with basket weavers, beekeepers and marketing personnel, working as a team.

## **Chapter 3 BUILDING MARKETS**

Efforts in the past year to provide an economic incentive at the village level has seen a consolidation of marketing of honey and bees wax while it has still been at an elementary stage for the other products like pepper, coffee and silk cotton. With `The Hive” fully operational all activities of production and packing have been taking place here. Certain systems have been set up to ensure efficiency in processing.

The balance portion of the Small Industries Development Bank of India (SIDBI) grant-cum-loan was received and all the necessary tools and equipment purchased to process honey and bees wax. Total turnover during this period was Rs.2.50 lakhs.

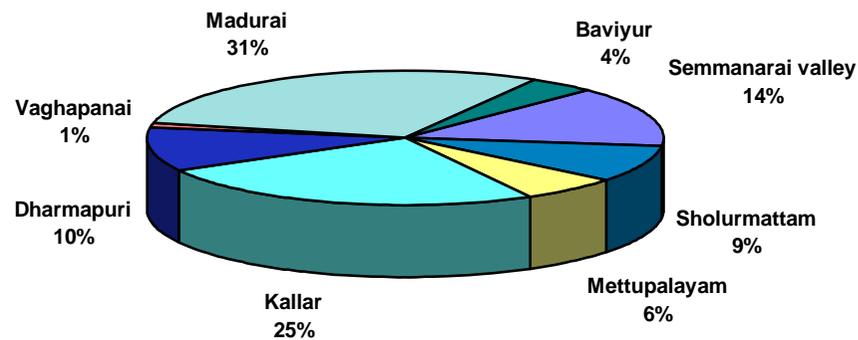
### ***Honey***

#### **Apis dorsata**

Collection during the past year has been much lower compared to the year before due to a number of reasons. One of the main factors was the high incidence of rains spread out over regular intervals. According to the tribals this did not allow much flowering and also restricted collection of nectar by the bees.

What was encouraging was that the number of places from where honey was procured has increased. People from surrounding villages have started bringing in their honey. At present, nearly 20 groups of honeyhunters are bringing in their honey to Keystone. There was even some honey brought in from Gudalur, the north-western portion of the district. Nearly, 1400 kgs of dorsata honey was received during this period from the following places

## HONEY PROCUREMENT



A small modification has been made with regard to the filtration system which was operational last year. The system was designed to have only one cloth filter - for filtering honey over 2-3 times, required that the honey be lifted from the bottom vessel and poured from the top. Now, a number of filters have been attached, so that one pouring takes care of many filterings at one time (see photograph).

Also, with the training on filtering honey with the honey hunters, the quality of honey received this year has been much better. During the year before, there were problems of high water content but this year the a large part of the honey has been in the range of 21-24% which has meant that related problems of fermentation have not been there.

### **Apis cerana**

This honey had two categories: honey which was collected from the beekeeping project from hives by a centrifugal extractor, while the other was the collection from the wild colonies. Approximately 50 kgs were collected from the wild and 85 kgs from the hives. Since the quantities have increased this year, a separate label was designed for marketing this honey. Most of the honey received had a moisture content between 19-22%.

Quality control for the honey received is crucial - one of the principal factors being moisture content. If the moisture content is high, then the honey is runny, and there are chances of fermentation. Though in the hives, a beekeeper can be trained to uncap the cells after a few days of sealing, but in the case of the wild collection, it is difficult. From our experience, it was seen that early extractions during the start of the season, have more moisture than later. Appendix II gives the moisture content throughout the season in AD & AC honey.

Experiments are being done to modify the traditional cerana extractors and design two new types: one to avoid wastage after extraction and another to extract from top-bar frames.

### ***Bees wax***

A substantial improvement has been made with regard to the value addition and marketing of bees wax. New designs of hand rolled candles and diyas were made. A large portion of the candles are being sold through Shola eco Ensemble, a marketing network of which Keystone is a part. A solar wax extractor has been designed and tested to melt and filter beeswax using solar energy.

### ***Pepper***

Pepper which is growing in the homesteads of the tribal families is now slowly finding a way to outside markets. The purchase of this pepper, free from chemical pesticide and fertilizer inputs, has been undertaken to encourage them to grow organically. However, the sales of pepper have not been as high as expected. This is due to the fact that we have not been able to develop an extensive market for it.

One of the problems that was initially faced was that the consumers would like a uniformity in the size and colour. This was overcome by designing a small tray with different sizes of holes drilled into it. For the coming season, it was decided that the pepper should be cleaned in the hamlets itself and a system of quality gradation introduced for the purchase.

There has been some discussion on being able to market white pepper. Markets are being explored for its potential and there has been some positive response.

### *Silk cotton*

There has been a complete turnaround in terms of the products made from silk cotton. Last year, the main product that was made were cushions. There were a few mattresses and pillows made for local sale. However, this year there has been a spurt in the local demand for mattresses and pillows from neighbouring villages and in Kotagiri town. Nearly 200 kgs of cotton was available after processing the pods. Due to the difficulty in ginning of cotton last year, a drum was designed with the hope that it would help solve the problem. However, due to the heaviness of the central rod, it was not found to be feasible. Improvements on this are underway.

### ***Pricing Policy***

A costing of all the products helped us to streamline the pricing. A policy of differential pricing allows us to market the products at nominal rates in the Nilgiris and earn a better margin when the goods are sent to other places. The maximum selling price for Kotagiri and the rest of the Nilgiris was fixed so as to provide the consumers a consistent rate. Most of the sales in Kotagiri took place from the office premises while those in the rest of the district were through shops.

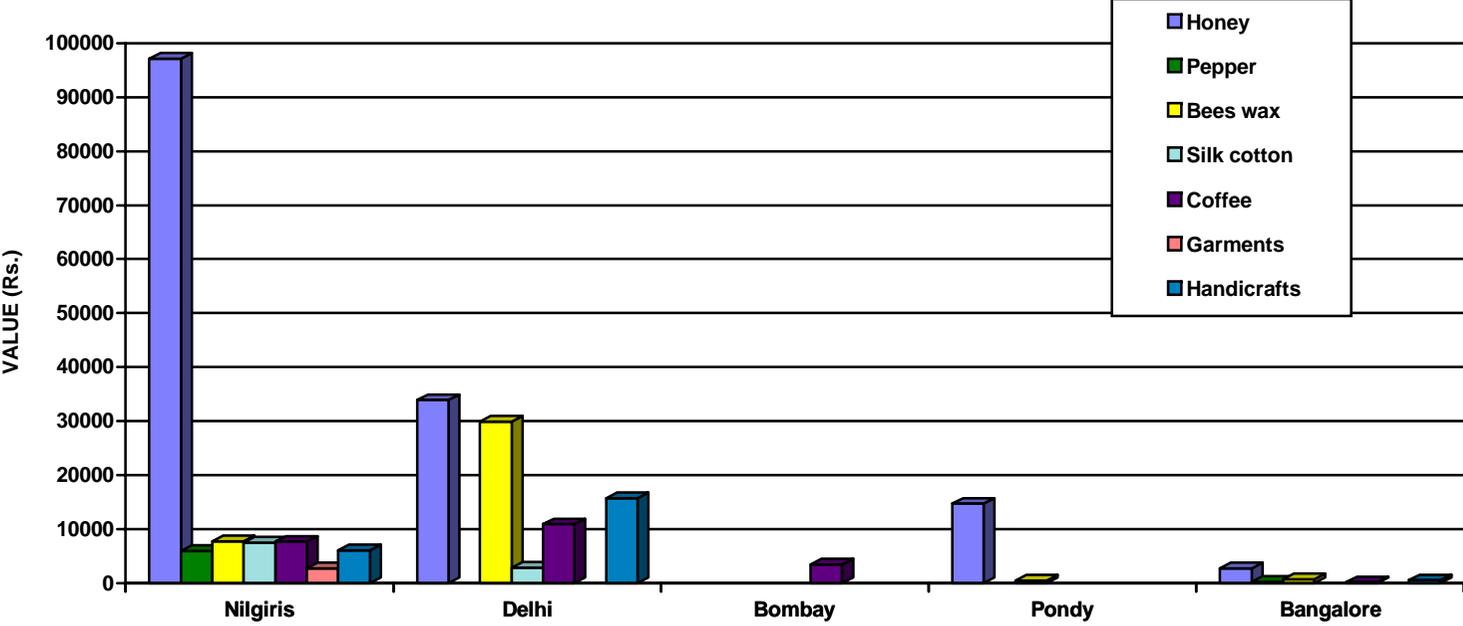
### ***Marketing***

Sales in the Nilgiri hills have formed more than half of the entire sales. Due to the natural consumption of honey in the hills, there has been a slow and steady growth in the number of people who have started buying the Keystone honey. There has been an increase in the number of shops that have been keeping the goods. Apart from these, the Taj group of hotels (Coonoor & Ooty) has been a regular buyer of honey to use in their cuisine. A major effort during the past year has been put into education of the consumers. This has included such diverse topics such as boiling of honey, crystallization, training of tribals in hygienic methods of filtration and remunerative prices to tribals.

To deal with the problem of crystallization, an incubator was designed and built with the help of John Clement, Kodaikanal. Before being sent to the market, the honey is put into the incubator for some time. An innovative scheme has been to encourage buyers by giving them a theme T-shirt if they purchase items for a certain value.

A consolidated picture of the sales vis-a-vis the places is shown below:

CONSOLIDATED SALES PICTURE



### ***Exhibitions***

During the past year, a few exhibitions helped not only in promoting the sales of the products but served as a chance to educate consumers about the effort behind the different kinds of products.

1. Dastakar exhibition, Delhi
2. Surgeon's conference, Ooty
3. Flower show, Ooty

The exhibitions helped us to understand the consumer's likes and dislikes, while making larger sales in a short time. In Delhi, the products sold under the banner of Shola eco Ensemble, a network marketing organisation of which Keystone is a part. Though, a good experience in selling, it was not profitable to take the products such a long distance from the Nilgiris.

#### Future Priority Areas

- # Develop proper systems for production of silk cotton items. These should take into consideration proper storage of raw and finished products, good working area and set systems for marketing locally. It is also essential to try and develop a product line and find different markets, so as to expand the production capacities.
- # Developing marketing avenues for coffee and pepper is essential in the coming years. Finding relevant bio-pesticides and fertilizers for these crops is important, especially to ward off borers in coffee. More efforts in both production and marketing are essential to make these products economically viable.
- # The South India Producer's Association (SIPA), Chennai has to be contacted for export markets.
- # The product range has to be diversified - both, to include value added items from the existing products and new products.
- # Production of items, now going on in The Hive, need to be transferred to the village. In the first phase - production of bees wax items, cleaning and grading of coffee and pepper need to be transferred. After this, a full fledged production centre can be envisaged.

## Chapter 4 COFFEE, KOYTAS & MORE....

### *Coffee Nursery*

Chinnaraman at SMN, who wanted to start a coffee nursery was supported through provision of seeds and plastic bags. He prepared the nursery bed, filled the earth in the bags, transplanted and took care of the saplings for 8 months. This was an individual venture, the success of which has interested other villagers in the valley.

### **Details**

2 kgs of seed after 8 months yielded 3000 saplings  
150 saplings used by Chinnaraman  
150 saplings given free to one of the Kurumbas  
2700 saplings sold @ Rs. 1.75 which gave him an income of Rs. 4725/-

### **Future**

- More people want to raise nurseries in the valley
- Individual support is not feasible in the long run
- Killkoupe will grow a nursery of 3 kgs of seeds to be distributed in the entire village and the balance sold.

### ***Tene kadu - Revival of Traditional Food***

As an initial experiment, 1 acre of land was cleared and planted with millets, which formed an essential part of their traditional diet. This was done by 7 Kurumba families at Semmanarai, who would share the yield.

Two crops of Ragi (*Elusine coracana*) and Tenai (*Setaria italica*) have already been harvested, dried and dehusked for use. Samai (*Panicum sumatrense*) has still to be harvested. Some of the Ragi harvested could not be dried properly due to bad weather and was destroyed.

Ragi is used to feed small children and newborns. Tene is used as a substitute to rice.

#### **Details**

- 20 man days labour used for clearing and sowing
- Seeds from Vagapanai and Palamalai were used
- Yield: Ragi - 12 Kgs; Tenai - 208 padi (2 padis = 1 Kg)

- The distribution of the millets was done as follows:
  - 1 share for each of the families
  - 1 share extra for Raju, who guarded the fields
  - 1 share for Keystone to use further as a seedbank for distribution

### ***Building up***

The housing project discussed last year with the Kurumbas of SMN, came through as a Government project - once again, poorly built and leaking. Unfinished houses were left for them to stay. It was then decided to use some resources to repair the houses, bring water to the settlement, make a drying yard, revetments wall and covered verandahs in front of the houses. This work started with a lot of enthusiasm but got delayed due to heavy rains. The work is now almost complete and has benefited 6 families.

### ***Water - Drinking & Irrigation Facility for Kilkoupe***

Discussions and meetings in the village identified the problem of drinking water and irrigation. The lack of rain in 1995 had destroyed large number of tea saplings. The people wanted a permanent system to get water from the main Kolkarai River. After getting permission from the Forest Department and funds from the Hill Area Development Programme - the people from KLK and Keystone team, together, with a mason undertook the work.

The design of the water system looked at a structure which would not have a negative impact on the river ecology. Therefore, the construction of a check dam was out of question in this perennial river as the flow and vegetation downstream would be affected by blocking or changing the course of water. The water needed was also not of a large amount - drinking water for 11 families and micro-irrigation for 18 acres.

The design was to make a waterway which would act as a speed breaker and a pipe would be fixed through the speed breaker so that water could be channeled. The location of this structure was important, so that the small structure did not get damaged in a flood during rainy seasons. The location also had to have a minimum head as to carry the water for over 2.5 kms to the village. With the help of an altimeter, a map was traced to show the exact line of the pipeline.

The whole system comprised of a structure "speed breaker" to slow down the flow, in which the pipe was inserted. This lead to a filtration cum aeration tank from where the pipe took the water to the village where one storage tank was made with several outlets for the land.

### *Consultancies*

1. Tribal Development Society, Kothimangalam, Thirukkalukundram, Chengalpattu district, Tamil Nadu Development Efforts amongst Irula Tribals: An Evaluation 1986-1997. This was done primarily to assess the economics of a Brick making project so as to bring in requisite funds from sale of bricks to run TDS. The evaluation also looked at the present activities and the future potential of TDS. This evaluation was done for the Swallows in Northern Finland, during Jan 1997.
2. Technical and financial evaluation of Gram Seva Samaj, a 20 year old organization, based on Gandhian ideals and philosophy and their network partners, in Surat and Valsad districts of Gujarat for Forum Syd, Sweden (1997): This study assessed the impact of their work among the migrant sugarcane cultivators from Maharashtra and different tribal groups in a neighbouring district in Gujarat, covering the last 5 years.
3. Workshop on Income Generating Activities with NGO Partners of EZE, Germany at Hyderabad: This workshop was primarily to initiate a discussion and identify new avenues for NGOs to look at income generating programmes in a professional manner keeping issues of social objectives and sustainability in mind.

### *Accreditations*

1. APIMONDIA Standing Commission on Beekeeping for Rural Development, Antwerp, Belgium
2. Institute for Market Ecology, Switzerland

## **Chapter 5 KEYSTONE EXPERIENCES**

*(the following extracts are written by some staff as their personal views and experiences)*

### **Robert Leo**

It is hard to believe that I have lived two and half years in Kotagiri, since we shifted from Pondicherry. The memories of the honeyhunters' survey and how Kotagiri was selected, are still fresh in me. I felt sad leaving Kodaikanal, my home town, on many occasions but the field of apiculture and working with the tribal communities are the vital interests have put other things far behind me. I did not care or think anything about the Kotagiri town initially, maybe the area and work were already conceived during early visits and soon after arrival also, but recently the attachment has started building.

Always there is a belief that the tribals are the harbingers of the forest, but due to recent developments through various interventions, according to many tribals, the civilization they want is entirely different from nature loving and sustainability. Some incidents like cutting an 80 year old tree to put across a stream as a bridge or cutting down a tree to collect fruits or a bee colony are still difficult to understand. The living style of a tribal community and their pace in work are major barriers to accept in developmental work. In these two and half years, I have learned lot and gained in personality developments, which is essential for a person like me. The work ahead for me in Apiculture and exploring new avenues are challenging. I have learnt that apart from hard work, the team spirit, backing up of initiatives, updating knowledge & technology, lineage with the tribal communities and no compromise or justification in work are the vital scale in successful organization structure.

I would give all credit to Keystone for granting me a an opportunity to grow to such a cadre and also, this field is a major interest in my life. The opportunities of interim trainings and visiting various NGOs are helping me, on the other hand.

The tribal life is based on routine activities, never mind the mechanical and physical burdens but diverting them to a scheduled activity is a challenge. The philosophy of Keystone may find difficult but has to have a constant role in monitoring and production.

The rural participation and appraisal, maybe new to the villager, as they have been basically fed by number of organization through a one way traffic, making the tribes always dependent. Our approach may require longer time to yield good fruits but it will be sweet.

- KS has to take initiatives to influence Govt's policies for sustainable income and environment.
- The facts of changes in tribal life, dying knowledge and culture of the tribal communities has to be exposed through local magazines.
- More emphasis has to be given for traditional medicine, diet and health care in the settlement itself rather than KMF, moreover their physiological conditions are not meant for chemical deposits, lead to become victim for disease.
- Attention is needed on basic needs like shelter.
- Income through new lines has to be in a right utilization rather the petty shop liquid.

#### **Jeya Rani**

I am a new member of this team. I am working as an Office Secretary. In these few months, I have gained a lot of experience about the work and also about the people (tribals). Keystone is working for tribals and with them. This helps to realize tribals and their habits. Keystone is not expecting anything from the people. Keystone follows "Don't say, do". If anyone has to develop, basic needs have to be given. Then only they can lead a normal life. This has been given by Keystone. Our wish is we should help them to develop their life. Their culture should not be changed. Luckily I have got this job. I must be thankful for this opportunity.

### **J. Miller Ashok**

Keystone Foundation is working for tribal communities for their improvement in income and training them in new skills. Our organization is working in villages like in Kilkoupe, Semmanarai, Kolithurai and Vaghapanai. Now their work is extended. Our organization is collecting tribals' products and giving them a fixed rate and we are marketing their products. The importance of this is, nowadays people came to know about tribals and also their produce. Keystone helps them to do the work throughout the year. Keystone also working with them. For example :

1. From Jan - Apr : Coffee
2. From May- Aug : Honey hunting ( Apis dorsata, cerana)
3. Silk cotton work making mattresses, cushions, pillows
4. Pepper
5. Ancient food items : ragi beans, tene
6. We train them to plant without chemicals
7. We have trained them in honey filtration

Keystone is working for their development. Keystone products is good for health. I am proud of saying, Keystone is working for people with people.

## THE KEYSTONE TEAM

### **Auxilia Jeya Rani**

Jeya is a new member in the Keystone team. She keeps track of the accounts and daily cash handling. She is beg adept in keeping all numbers and vouchers in the computer programme Tally. Apart from the office finance and accounts, she helps Miller in packaging products in the Hive during `heavy orders`. Jeya is learning rapidly to handle all administration at Keystone.

### **J Miller Ashok**

Ashok is an energetic man. He dreams about large orders and keeping deadlines. He is our marketing assistant going and meeting customers, shops and retailers in Nilgiris. Miller has learnt honey filtration, bottling and packaging quite well, apart from testing the goodness of honey. Miller has come a long way - learning to accept responsibilities and working hard.

### **R. Vishwanathan**

Visu is a modern Kurumba lad. He wants to learn new things and apply new methods in the field. Visu works in the Beekeeping project as a village coordinator. He is trying to pick up new skills of beekeeping, learning to keep accounts, writes reports about his field visits and is the link between village and office. Visu has just become a father and his wife Usha is also interested in joining Keystone activities after she becomes slightly free.

**P. Vellai**

Chellan's brother Vellai, is the village coordinator from Kilkoupe village. He has replaced Chellan who was the village coordinator for a year and now one of the good beekeepers of the valley. Vellai is an experienced Irula tribal leader - does not get excited over anything. He has his own way of doing things. He is instrumental in bringing together all the families of his village. Recently, they have completed a Training Centre at KLK village.

**Robert Leo**

Field Manager, Leo is a changed man today. He is more experienced, quiet and does not like to jump, he waits for situations to develop before giving his critical point of view. Angel, a teacher at St. Mary's in Kotagiri is his wife and they have a son called Gary (1997). Leo is learning to coordinate projects and build up a good cadre of field assistants. He is also interested in seeing more linkages with other projects and people - so that tribals on the whole can get a better all round future. Leo's high points this year - was his first visit to the Capital with an exhibition of Keystone products, doing an evaluation of TDS and learning to manage the office/project when MJ, SN & PR were out of the country.

**Snehlata Nath**

Sneh is obsessed with NTFPs (Non Timber Forest Produce). She dreams about them, sees them in the field, talks to tribals about their collection, systems, territories, meets the Forest Department officials regarding this. This will be her child in the next few years. Sneh, in her words has been a step-knee. Wherever there is work, be it how to make bees wax candles, designing a label, helping in accounts, project reviews, appraisals and field work she has given herself fully - so as to make it succeed. An economist by profession, her real interest lies in the interface of Biodiversity & Income generation for tribal communities. Sneh's challenge is to carry forward the production at the village level with the right combinations of (in)formal institutional arrangements.

**Mathew John**

Two things have changed Mathew's life: Annie Jacob is a Physics teacher at Stanes School at Coonoor, is his wife and partner in life. She hears him out every evening about all the development and environmental work in the Nilgiris - quietly supporting him in this activity. Secondly, Mathew has been able to organize his work better in the office and give his time more to the Marketing Project which has done impressively well. Mathew's cry of joy comes when a negotiation is successful or a large order through - his interest is in the field of enterprise development for forest people.

**Pratim Roy**

Having worked with White-headed babbler (winged birds), he babbles in Keystone. Pratim has been primarily working in the Appropriate Technology Project for Beekeeping. Bees, environment and people have been one of the triangles that have kept him busy, by looking at it from all aspects and taking the voice of the indigenous bees to international meets. He wants to set up in the Nilgiris a Mountain Apiculture Centre, which merges scientific research & traditional knowledge. His present interest lies in the Nilgiris Biosphere Reserve - where a significant population of indigenous communities and biodiversity coexist - albeit not so harmoniously as it did once upon a time. Working in the Nilgiris, practically, and with the best available information, network, advice and Science, he wishes to understand and implement the human - nature aspect into one.

## ***ANNEXURE I***

### **Reports/Documents available for more Information**

1. Tribal Development Society, Kothimangalam, Thirukkalukundrum, Tamil Nadu - Development efforts amongst Irula Tribals of Chengalpattu District, 1986-1997 - An Evaluation (Feb 1997)
2. Kilkoupe Water Project - Bringing Drinking Water & Micro-irrigation Facility for Irula Tribals, Kotagiri Taluk, Nilgiris District (May, 1997)
3. A Tree Fall Gap - The Keystone Document
4. Taking the Bypass Road - An Experience from Sweden and Denmark (October, 1997)
5. Honey Hunters of the Nilgiris - On a Road to Sustainability (August, 1997)
6. 5 minutes Video on "Honeyhunters of the Deep Forest"
7. Apicultural Abstracts, 1997 Vol. 48 No.4, International Bee Research Association, U.K, "Honeyhunters and Beekeepers of Tamil Nadu : A Survey Document"

*On Jenu...*

“The gathering of honey (Jenu) has been a regular occupation of the indigenous people of the Nilgiris for thousands of years. Those tribes in whose economy it has played a major role have elaborate folklore about bees and about honey-gathering in general; honey and bees appear even in origin and ancestor myths. “

“The Uralis have the following little tale about honey. There was a great famine for twelve years, and all Uralis were starving. The *mucuru*-honey said to the prickly pear, “We must do something to relieve the suffering of these hungry people. If you’ll manage to feed them every six months, I’ll take care of the next six months. Somehow we’ll manage together to save them. “ The prickly pear agreed, demanding in turn that the *mucuru*-honey would send its bees to collect its pollen. Then it flowered, and after developing fruit, it fed the hungry people for six months; the bees collected pollen and nectar and made honey, which fed the people for another six months. Thus, twelve years passed, the rains came, and prosperity returned.”

*The Irulas of the Blue Mountains by Kamil V. Zvelebil*

The Irulas differentiate among four kinds of honey: *peruntenu* [large honey], found in big, heavy combs in the fissures of steep, rocky slopes; *kolantenu* [pole honey], a very sweet honey produced by small bees and found on trees and bushes (.....); *todudi*, honey from combs hidden in many layers in the hollows of old, dead trees and tree stumps; and *mucurutenu*, a honey considered to be of the best quality, produced by *mucuru kunni*, a small bee with a long proboscis.

**Table V**

**HONEY FLOW**

<b>Months</b>	<b>Apis cerana (Hive+Wild) kgs</b>	<b>Apis dorsata kgs</b>
Jan	0	0
Feb	0	0
Mar	1	0
Apr	8	0
May	43.7	22.6
Jun	22	219
Jul	22	317
Aug	17	134
Sep	7	0

Oct	4.4	20
Nov	0	0

