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ÉTUDE PRÉALABLE AU PROGRAMME D'APPUI AU DÉVELOPPEMENT ÉCONOMIQUE RURAL DES ZONES DE MONTAGNE DU KUMAON ET DU SIKKIM - INDE

ANNEXES AU RAPPORT D'ETUDE PRESENTE AU F3E

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LISTE DES ANNEXES

ANNEXE I

ÉTUDE PREALABLE AU PROGRAMME D'APPUI AU DEVELOPPEMENT ECONOMIQUE RURAL DES ZONES DE MONTAGNE DU KUMAON ET DU SIKKIM (INDE)

DEMANDE PRESENTEE AU F3E

Responsable de l'étude	- GERES - F. THUILLIER et V. STAUFFER
Partenaires français :	- ASVIN - M. CAMPS
Partenaires indiens :	- SWRC - Rajnish K JAIN et Laxman SINGH - Pranab CHAUDHURY

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Nos réf. RAG.732.HIM.DAE
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S O M M A I R E

I. LE CONTEXTE MOTIVANT LA DEMANDE

A. REPERAGE GENERAL

1. LA SITUATION DE L'ECONOMIE RURALE DE MONTAGNE AU KUMAON ET SIKKIM

La région du **Kumâon** est située dans la zone himalayenne de l'Etat de l'Uttar Pradesh (Nord-Ouest), elle possède deux frontières internationales, au Nord avec la Chine (Tibet) et à l'Est avec le Népal. Généralement, le relief varie du Sud (collines) vers le Nord (hauts sommets et zone trans-himalayenne).
Peuplée d'environ 2 950 000 habitants, la région dépend essentiellement de l'agriculture (80 %), les populations du Nord pratiquant encore l'élevage et la transhumance. Des travaux saisonniers rémunérés par de bas salaires, complètent les revenus des zones rurales, en général assez pauvres. Une source de revenu importante est constituée par les salaires reversés par des migrants (de nombreux Kumaonis sont par exemple engagés dans l'armée) facteur de relative richesse pour les familles concernées, mais aussi de dur labeur pour les femmes concernées qui doivent alors s'occuper de la maison, de l'agriculture et de la collecte de bois de feu.
La grande majorité des habitants sont des Kumaonis d'origine, de religion hindoue. Quelques tribus nomades dans le Nord ont quant à elles des pratiques animistes. La zone dans laquelle le projet doit se dérouler est essentiellement habitée par des hindous qui suivent des règles strictes liées au système des castes. La structure sociale est gouvernée par la hiérarchie sociale qui peut même influencer le système officiel du Panchayati Raj selon lequel un comité élu (Panchayat), avec à sa tête un Pradhan, reconnu par le gouvernement local, est responsable du développement local (attribution de fonds, etc.…).

Le **Sikkim** est devenu le 22^{e} état indien en 1975. Il a pour frontières : à l'Ouest le Népal, au Nord la Chine (Tibet) et à l'Est le Boutan. La partie Sud (collines) bénéficie d'une végétation luxuriante et la mousson est très forte. À l'Ouest se trouvent les hauts sommets (Kangchenjunga, le plus haut de l'Inde, 8598 m), et au Nord une zone de haut plateaux, très aride car protégée de la mousson.
Divisé en 4 zones administratives (districts du Sud, Ouest, Est et Nord), le Sikkim est peuplé de seulement 463 000 habitants parmi lesquels deux ethnies prédominent : les Népalais (de religion hindoue) -qui forment 75 % de la population- et les différentes tribus originaires du Sikkim comme les Lepchas –aujourd'hui 18 % de la population- qui durent se retrancher dans les régions les plus isolées aux cours des différentes périodes d'immigration des Tibétains (bouddhistes). Alors que le système tribal est assez égalitaire, les moines bouddhistes bénéficient d'un statut privilégié et les Népalais suivent le système des castes.
Les villages du Nord sont restreints (15-20 familles) et encore aujourd'hui organisés de façon traditionnelle et autonome autour d'un chef de village. Les villages du Sud, plus densément

peuplés et étendus, disposent en revanche d'un mode d'organisation qui se rapproche du Panchayat.
L'agriculture pratiquée par les Lepchas (système de rotation dans les forêts, complétée par la chasse) est, au fil du temps, devenue impossible du fait de l'utilisation de la forêt par les immigrants Népalais. Le développement des terrasses, et le climat humide a permis d'accroître la production agricole (riz, maïs) et apporter une relative prospérité, même si les revenus restent, pour la plupart, faibles à cause des faibles surfaces possédées. Il existe également des produits d'exportation : la cardamome, le thé, les oranges (quelques unités semi-industrielles produisent des jus de fruit). Au Nord, la culture du blé, de l'orge et de la pomme de terre prédomine.

Les **enjeux et problèmes environnementaux** des deux régions sont ceux de la zone himalayenne en général. Ses habitants dépendent des ressources naturelles, notamment des forêts avec une consommation de bois de feu représentant 80 à 90 % de l'énergie consommée en zone rurale. Depuis une vingtaine d'année, les intérêts commerciaux accrus, l'augmentation de la population sont sources de déforestation et d'érosion du sol, ou encore surpâturage par le bétail. Mis à part les conséquences sur le développement local, l'équilibre écologique est gravement menacé.

Parvenir à contrôler ce processus de dégradation écologique dans l'Himalaya est indispensable : répondre aux besoins énergétiques, avec des solutions décentralisées, non polluantes comme l'énergie solaire représente une des solutions.

2. LES ENJEUX DE L'UTILISATION DE L'ENERGIE SOLAIRE POUR LE DEVELOPPEMENT ECONOMIQUE RURAL EN MONTAGNE

En Inde, seul le Ladakh (Etat du Jammu & Cachemire) a connu des innovations pour améliorer la situation des populations rurales par l'introduction, notamment de serres solaires maraîchères familiales permettant :

- La consommation régulière de légumes, habituellement une fois par jour à l'exception des mois de janvier et février dans les régions les plus froides.
- Un espace chaud permettant de faire mûrir les fruits ou certains légumes (comme les tomates)
- Un lieu pour le travail dans des conditions agréables pendant les journées d'hiver.
- Un lieu confortable pour que les enfants, les malades ou les personnes âgées puissent s'asseoir et se reposer.
- Servant de salle de bain d'hiver elle permet en plus de chauffer l'eau pour se laver.
- Un lieu où l'on peut faire chauffer l'eau pour la lessive, puis sécher le linge.
- Une joie réelle de « voir quelque chose de vert pendant les longs mois d'hiver où pas même un brin d'herbe ne se risque à pousser ». Cet impact psychologique n'est pas négligeable.

Les serres solaires ont également un impact économique non négligeable qui dépend de plusieurs facteurs :

- La proximité des marchés des petites villes.

- La production de plants sous serre, qui permet d'éviter de les acheter, et permet d'avancer la mise sur le marché des produits maraîchers.
- La capacité de diversifier les productions sous serres, au-delà des légumes traditionnellement cultivés. Au Ladakh le GERES qui a participé à l'introduction des serres, favorise la diversification : production de thé, de raisins, de champignons, tomates, fraises…

10.000 serres existent aujourd'hui au Ladakh.

D'autres applications ont un impact sur le développement et sont utilisées au Ladakh :

- L'élevage de poules et poulets dans des bâtiments solaires ; autonomes sur le plan énergétique, ces bâtiments sont plus rentables que des bâtiments conventionnels, beaucoup moins dépendants des approvisionnements aléatoires en combustibles ; ils se déclinent en unités de taille variable : de l'unité familiale (10-20 bêtes) à l'unité artisanale (100 à 500 bêtes).
- Le séchage de qualité des fruits ; abricots et pommes à destination des marchés émergents : tourisme, grandes villes indiennes.

ASVIN intervient au Népal et dans trois états de L'Himalaya indien (Sikkim, Kumâon et Ladakh) en matière d'électrification rurale décentralisée et d'intervention sur la filière lait (conservation du lait).

3. LA VALORISATION DES PRODUITS FORESTIERS

Au Nord Sikkim, les populations rurales font traditionnellement la cueillette des produits bruts (feuilles, écorces, racines d'arbres) nécessaires à la production d'encens. Des collecteurs venus des grandes régions de transformation achètent les produits sur place. Aucune transformation n'est réalisée au Sikkim.
Il en va de même pour les plantes aromatiques et médicinales, abondantes au Nord Sikkim ou l'on trouve plus de 400 variétés. Toutefois, environ 40 variétés, en l'absence en mesure de gestion de la biodiversité sont en voie d'extinction.
Au Kumâon, la majorité de la population a recours au bois de feu pour couvrir les besoins domestiques malgré l'interdiction par la Cour Suprême de couper les arbres.Les pins, a vocation commerciale (récolte de la résine) constituent, grâce au briquetage des aiguilles et autres déchets, une solution de substitution au bois de feu.

B. LES ACTEURS IMPLIQUES DANS L'ETUDE

1. L'ONG DEMANDEUSE : GERES

Crée en 1976, le GERES est une association de développement qui travaille depuis une quinzaine d'années sur le thème du développement des zones de montagne. Ses interventions sur ce thème se sont concentrées essentiellement au Ladakh sur le développement de technologies solaires pour l'habitat et l'agriculture ainsi que sur la valorisation de la laine pashmina et des abricots. Le GERES n'intervient pas encore au Kumâon et au Sikkim, contrairement à ASVIN, opérateur de développement associé à cette étude préalable. ASVIN conduit avec SWRC (cf. B.2.) depuis fin 97 un programme d'électrification décentralisée

dans ces deux régions basées sur une forte participation locale (Comité villageois de l'environnement pour la gestion et l'animation, réseau de « Barefoot engineers » - « ingénieurs aux pieds nus », techniciens issus et basés dans les villages - pour la maintenance).

Partenaire du Nord : ASVIN

ASVIN est un programme de recherche / développement, issu du CNRS dont le but est de promouvoir les énergies renouvelables, en particulier solaire, comme un outil de développement s'intégrant dans un processus plus large de développement rural. L'introduction d'une innovation technologique, dans des villages isolés de l'Inde et du Népal, requiert la mise en place d'organisations ou réseaux d'ordre social, financier, technique ou institutionnel qui sachent tenir compte des systèmes de productions et structures sociales existantes. L'analyse des conséquences de ces innovations technologiques sur ces mêmes structures est également un des objectif du programme ASVIN.

Une évaluation en 1997 des activités du GERES au Ladakh avec le soutien du F3E avait recommandé de mieux inscrire les activités futures dans une démarche d'implication des populations locales. La collaboration avec ASVIN et SWRC va dans ce sens.

ASVIN et GERES collaborent depuis 1998 sur les questions de développement des régions Himalayennes :

- en élaborant ensemble un programme de développement du Mustang (Népal) avec un Parc Régional Népalais (Anapurna Conservation Area Project). La collaboration repose sur des complémentarités de domaines d'intervention ; ASVIN étant essentiellement actif dans les applications de l'électricité solaire alors que GERES intervient plus dans l'utilisation de l'énergie solaire thermique ;

- en réfléchissant ensemble depuis une année sur une collaboration ASVIN – SWRC – GERES en matière de développement des régions Himalayennes de l'Inde ;

- en mutualisant les ressources humaines : le chef de projet de ASVIN en Inde (M. CAMPS) coopère régulièrement avec le GERES dans le suivi de nos activités en Inde.

Pour le projet futur, les complémentarités seront celles décrites ci-dessus avec, un coordinateur de terrain conjoint pour les deux structures, en charge de la coordination avec SWRC.

ASVIN collabore avec SWRC depuis de nombreuses années dans d'autres régions indiennes, sur le thème de l'insertion des systèmes énergétiques (pompage solaire, électrification rurale) dans les zones isolées. L'étude d'identification conduisant à la présente demande d'étude préalable a été menée en trois étapes :

1. Lors d'un atelier de bilan réalisé début 99 par ASVIN et SWRC, concernant le programme d'électrification décentralisée, les communautés villageoises ont fortement demandé une implication de SWRC dans des actions de développement économique.

2. L'identification a été précisée ensuite dans les deux région du Kumaon et du Sikkim sont par les représentants de SWRC en lien avec les comités villageois de l'environnement. Les thèmes mis en avant les suivants :

Au Sikkim :

- séchage de la Cardamome
- éjarrage de la laine de pashmina
- petites unités rurales d'accueil pour touristes en lien avec le département du tourisme du Sikkim
- stockage / conservation des légumes / fruits
- transformation de divers produits forestiers (pour la fabrication d'encens et l'extraction d'huiles essentielles)
- serres pour la culture de légumes
- élevage de poulets, production d'œufs.

Au Kumâon :

- transformation de la laine de mouton (mécanisation du filage et du cardage, chauffage solaire de l'eau pour le lavage et la teinture, séchage de la laine)
- serres pour la culture de légumes
- production de briquettes à base d'aiguilles de pins en substitution du bois de feu
- petites unités rurales d'accueil pour touristes dans les hautes vallées du Johar et Darma.

3. Une analyse des solutions existantes a été menée pour les thèmes suivants :transformation des produits forestiers et production de briquettes combustibles, non maîtrisés jusqu'à présent par le GERES et ses partenaires. Les autres thématiques sont maîtrisées en Inde ou au Népal par les partenaires de l'étude. Les résultats des investigations menées sur la transformation des produits forestiers adaptables au Nord Sikkim sont les suivants (cf annexe 6 : « valorisation des produits forestiers au Sikkim »)

- **Production de bâtons d'encens**.

  (+) Abondance des produits bruts (mélange de trois types de feuilles d'arbres / plantes), faible niveau technique requis, investissement modeste, production possible à petite échelle au départ, marge importante.

  (-) Mauvaise interprétation d'une loi limitant la collecte des produits forestiers par l'administration locale, rôle des intermédiaires, inexpérience en termes de mise en place de petite industrie artisanale.

- **Plantes médicinales et aromatiques** (culture et transformation intermédiaire -séchage, pulvérisation, extraction d'huile essentielle ou de teinture végétale-)

  (+) Abondance de ces plantes, dont la plupart se trouvent au Sikkim nord (400 variétés), connaissances locales par les lamas (médecine tibétaine), investissement modeste, niveau technique accessible.

  (-) Les réseaux existants privilégient une exportation des produits bruts, 40 espèces sont déjà en voie d'extinction, absence de mesure de protection de la bio-diversité, recherche et expérimentation nécessaire avant d'envisager une phase commerciale (pour l'extraction d'huile, teinture…).

Les résultats des investigations menées au Népal et en Inde sur la production de briquettes à partir d'aiguilles de pins en substitution du bois de feu, adaptables au Kumâon, sont les suivants :

En Inde les travaux de recherche de IIT Delhi sont avancés mais la phase de diffusion est à ses débuts (références à l'ONG HIMCON dans la zone du Garwal, voir annexe 7 « Production de briquettes d'aiguille de pins (Kumâon) »).

Au Népal, basé sur la technologie de IIT Delhi, un micro projet de substitution est opérationnel dans la région de Lukla mené par une ONG népalaise (Centre for Energy and Environment, CEE) ; il est économiquement viable et maîtrisé techniquement. Le CEE met en place de petite unités de production de briquettes à partir de résidus agricoles et forestiers.

Certaines activités telles que : le séchage de la cardamome, la valorisation de la laine de mouton, le développement de petites unités touristiques, font l'objet d'une phase de recherche action soutenue par le MAE/DGCID-energie (décision en cours de notification, cf. annexe 6 : « valorisation des produits forestiers au Sikkim »).

L'étude préalable définira le contenu du dispositif nécessaire à mettre en œuvre pour l'introduction des outils les plus pertinents, sur la base de mécanismes opérationnels aujourd'hui et mis en œuvre par SWRC.

2. LE PARTENAIRE LOCAL

SWRC a été créé en 1972, et collabore depuis 1976 avec des ONG étrangères dans les domaines suivants : agriculture, éducation, santé, systèmes d'information et conscientisation (défense des droits, lutte contre l'exploitation), science et technologie (mise à la portée des villageois), énergies renouvelables, artisanat et industrie en zone rurale…
Dans la région du Kumâon, SWRC a lancé ses activités en 1996 essentiellement dans le domaine de l'électrification solaire, de la transformation de la laine à la commercialisation de produits finis, de l'éducation à la protection de l'environnement.
Au Sikkim, SWRC a monté son premier centre de formation / atelier solaire, dans le Sud en 1995. Un second vient d'être mis en route au Nord Sikkim. L'électrification solaire, l'organisation de groupes de femmes, la construction de réservoirs pour l'eau potable à l'échelle de village constituent l'essentiel des activités.

SWRC est l'ONG la mieux implantée dans ces deux régions pour la mise en place d'un tel projet grâce à son approche de forte participation des populations (comités villageois pour l'énergie et l'environnement) et de structuration de services (réseau de techniciens « barefoot engineers », présence d'un atelier solaire de fabrication et de réparation).

SWRC compte une centaine de collaborateurs au siège et dans 15 centres régionaux répartis dans toute l'Inde.

C. LE PROJET ENVISAGE A L'ISSUE DE L'ETUDE PREALABLE

Le but du projet issu de l'étude préalable consiste à développer les activités génératrices de revenus au Kumaon et au Sikkim. Il repose sur l'opérationnalité d'un dispositif d'appui aux communautés rurales et aux petits entrepreneurs capable de les aider dans leurs besoins techniques et organisationnels et financiers avec la mise à disposition :

- d'outils techniques fiables,
- d'outils méthodologiques,
- de mécanismes de financement des investissements.

Un tel dispositif d'appui existe déjà (cf. ci-dessus), coordonné par SWRC dans le domaine de l'électrification rurale décentralisée ; l'évaluation du projet ASVIN – SWRC faite par la Commission Européenne a validé la pertinence du dispositif ; le projet issu de l'étude préalable reposera nécessairement sur ces acquis. Le détail du mécanisme de mise en œuvre sera étudié durant l'étude préalable (cf. II.B.2).

Ce dispositif n'aura d'impact que s'il est porté par une structure nationale, capable de fédérer les acteurs en capitalisant les acquis.

Les moyens pré-identifiés pour la prise en charge du financement du projet sont les suivants :

- Le projet « énergie rurale » PNUD/Gouvernement Indien/SWRC approuvé fin 99 qui reprend les thèmes du développement économique, objet de la présente proposition (cf. annexe 4)

- Le MAE (DGCID / Energie) est intéressé par la démarche et pourrait soutenir un projet d' accompagnement au projet ci dessus.

- Le Gouvernement Indien avec qui SWRC coopère régulièrement.

- La Commission Européenne dans le cadre de projet de développement ONG.Une évaluation menée par la CE du programme ASVIN/SWRC recommande de traiter du développement économique comme moyen de viabilisation à terme des projets sociaux d' électrification.

S'agissant de la viabilité à terme, le projet sera conçu dans un premier temps sur des zones restreintes, autour de Tripura Devi (Kumâon) avec une dizaine de villages (environ 400 familles), Sadam et Mangan (Sud et Nord Sikkim) avec une quinzaine de villages (environ 300 familles). Cela devrait permettre de travailler sur le caractère démonstratif, mettre en œuvre l'organisation de l'appui technique et méthodologique, mettre en place des stratégies de commercialisation, de promotion des produits et faciliter l'intégration des nouvelles activités dans les systèmes sociaux et économiques existants. La viabilité à terme se base sur plusieurs critères :

- Des techniques maîtrisables au plus près des populations. La pérennisation des barefoot engineers sera facilitée par l'extension de leur domaine de compétence

(entretien/maintenance des équipements d'électrification, suivi et entretien / maintenance de la mise en œuvre des équipements productifs, l'identification de nouvelles activités…).

- La disponibilité d'un responsable technique maîtrisant les différents outils dans chaque région (Kumaon, Sikkim).

- La pérennisation de cette fonction pourrait reposer sur l'extension ultérieure du projet dans chaque région.

- La mise en place d'outils financiers sélectifs selon les activités envisagées pour éviter des effets de subventionnements massifs comme c'est souvent le cas dans ces régions ; ceci risquerait de limiter fortement l'intérêt économique des unités de production comme on a pu le constater au Ladakh pour les serres. Cet aspect nécessite une bonne coordination entre les porteurs non gouvernementaux de projets de développement et les autorités locales. Le projet tirera partie des dispositifs de crédit mis en place par l'IREDA (Agence Indienne pour le Développement des Energies Renouvelables) -fonds de roulement de la Banque Mondiale, de l'Asian Development Bank…-)

On notera l'intérêt du FFEM (Fonds Français de l'Environnement Mondial) pour le soutien à un projet d'envergure, une fois une phase pilote validée (réunion MAE/AFD-FFEM/SWRC/ASVIN/GERES de Mars 2000).

Les risques estimés pour le projet envisagé sont de deux sortes :
- La difficulté d'élaborer des stratégies cohérentes avec les interventions de autorités locales ; les liens que SWRC a pu rétablir avec les autorités locales pour l'électrification rurale constituent toutefois un point d'ancrage favorable.
- Certaines activités (stockage des fruits et légumes, valorisation des produits forestiers) mettent en jeu des acteurs intermédiaires (collecteurs…) pour approvisionner des unités de transformation extérieures aux zones de production. La maîtrise locale de la transformation devra s'avérer plus attractive que la situation actuelle.

II. L'ETUDE PREALABLE

A. OBJECTIFS

L'étude préalable proposée comporte deux objectifs :

1. Valider la pertinence des activités identifiées par SWRC et les Comités villageois d'environnement, dans le contexte des deux régions.

2. Etudier le dispositif d'accompagnement à mettre en œuvre au niveau de SWRC (formation, mise en réseaux, outils financiers…).

B. TERMES DE REFERENCE DE L'ETUDE

Les points suivants seront étudiés :

a- L'étude des aspects socio-économiques relatifs aux 5 activités retenues pour l'étude :
- conservation des fruits et légumes au Kumaon et au Sikkim
- culture maraîchère sous serre au Kumaon et au Sikkim
- élevage de poulets et production d'œufs au Sikkim
- valorisation des sous-produits forestiers au Sikkim
- production de briquettes d'aiguilles de pin au Kumaon

b- L'étude des dispositifs d'appui à mettre en œuvre pour la réalisation du projet dans les zones choisies.

a - Les aspects socio-économiques

L'étude doit permettre de répondre aux questions suivantes :

1. Quels sont les marchés pour chacune des activités envoyées et quels sont les conditions d'accès à ces marchés. Les produits issus des activités prévues sont-ils compétitifs par rapport aux produits existants ?

2. Les marchés ciblés permettent-ils d'envisager une activité rentable sur le plan économique?
   Quels sont, éventuellement, les conditions pour attendre la rentabilité des attentes (sur le plan financier, gestion, technique...).

3. Les populations partenaires du projet ont-elles la capacité de s'approprier les outils nécessaires à la conduite des activités prévues ?

b-Etude du dispositif d'appui et de sa mise en oeuvre

A partir des résultats de l'étude des aspects socio-économiques, un dispositif d'appui sera étudié pour les aspects suivants :

1. Quels sont les mécanismes financiers adaptés aux micro activités économiques en lien éventuellement avec les institutions en place ?

2. Quels outils de promotion des produits, de suivi des marchés sont nécessaires, autant pour les produits finis que pour l'approvisionnement en matières premières ?

3. Quelles formations sur les aspects économiques et de gestion des activités faut-il prévoir pour les intervenants de SWRC ? Dans quelles mesures SWRC aura la capacité de s'approprier les outils de formation pour les diffuser auprès des promoteurs et des « barefoot engeneers » ?

4. Comment capitaliser les savoirs sur les différentes activités économiques spécifiques aux régions de montagnes afin de faciliter les extensions géographiques ?.

5. Quels sont les moyens humain et matériel à mettre en place en particulier au sein de SWRC en rapport avec ses capacités actuelles et sa stratégie ?

C. METHODOLOGIE ET ETAPES DE L'ETUDE PREALABLE

1. LES ASPECTS SOCIO ECONOMIQUES DES ACTIVITES

a. Réalisation d'analyse des marchés pour les produits envisagés (œufs, légumes…),
- Enquêtes sur la situation actuelle
- Enquêtes prospectives
- En cas de substitution possible des importations (d'autres régions de l'Inde) : filière à construire, analyse économique.
- Potentialités de croissance du marché.

Les enquêtes sont réalisées par les équipes de SWRC encadrées par le coordinateur d'ASVIN, la base d'outils fournis par le GERES.

b. Etablissement de la situation agro-économique / organisation de la production / commercialisation.
- Rencontres producteurs, services de l'agriculture du Gouvernement, comité villageois de l'énergie et de l'environnement (VEEC).

2. ETUDE DU DISPOSITIF D'APPUI

- Réalisation d'un rapport d'étape à présenter / débattre avec les acteurs potentiels des filières.
- Elaboration d'un dispositif d'appui en fonction des acteurs mobilisés.
- Présentation / finalisation du dispositif lors d'un atelier avec les acteurs et SWRC – ASVIN – GERES.

V D. MOYENS A METTRE EN OEUVRE

Le GERES : le pilotage de l'étude et expertise technique et agro-économique

Le GERES mettra à disposition deux ingénieurs pour les études techniques et économiques des différentes activités identifiées (réalisation d'une mission). Ils seront notamment chargés de rassembler les informations concernant les solutions techniques, participera à la formulation des enquêtes de terrain et à l'analyse des données récoltées. Le GERES participera également à l'atelier prévu à la fin de l'étude.
Le pilotage sera assuré conjointement par le représentant d'ASVIN en Inde. (Matthieu CAMPS).
L'un des ingénieurs (V. STAUFFER) est en charge des activités du GERES au Ladakh et a une bonne connaissance des outils développés. L'autre ingénieur (F. THUILLIER) est agro économiste ; il a développé au GERES des outils d'analyse éco-financière des petites activités artisanales et encadre plusieurs projets de développement économique : filières plantes médicinales au Burkina Faso, plan de relance des activités agroalimentaires au Burundi, appui à une unité de séchage en Inde…

ASVIN : co-pilotage de l'étude et expertise socio-organisationnel

L'expert d'ASVIN, représentant permanent en Inde d'ASVIN depuis 6 ans, assurera le co-pilotage, en particulier l'articulation des interventions de terrain des personnes ressources de SWRC ou mandatées par SWRC (enquêtes, études de marché…).
Il sera en charge du volet « conditions de mise en œuvre des activités sur le terrain », participera à la formulation des enquêtes de terrain, à leur organisation et analyse ainsi qu'aux aspects liés à la commercialisation. - ASVIN participera à l'atelier prévu à la fin de l'étude.
Il a une très bonne connaissance des mécanismes d'appropriation des innovations dans le milieu rural himalayen. Son rôle principal actuel consiste à faciliter, à ordonnancer la médiation entre les acteurs de l'électrification rurale (communautés, fournisseurs d'équipement….).

SWRC. Réalisation d'enquêtes, étude, dispositif d'appui.

Chaque centre régional sera chargé de mener les études sur sa zone. Une personne de chaque centre travaillant au sein de SWRC depuis des années sera chargée de ce travail, et, en préalable, participera à la formulation des enquêtes, puis à leur analyse et aux études des marchés.
SWRC aura la responsabilité de mettre en forme toutes les informations récupérées, les résultats des études, avec le soutien technique du GERES et d'ASVIN, et présentera le tout lors de l'atelier final.
SWRC (Tilonia) participera à l'élaboration du dispositif d'appui, en collaboration avec les deux centres régionaux.

Le coordinateur du SIKKIM se chargera de l'intervention au Sud et au Nord SIKKIM.

Un expert indien, Mr Chaudhury, ayant collaboré avec le GERES à une première analyse des possibilités de transformation des produits forestiers au Sikkim sera en charge de la composante « valorisation des produits forestiers ».

Les intervenants indiens ont généralement suivi un cursus universitaire important complété pour tous par une expérience de plusieurs années dans la mise en œuvre de projets de développement.

E. CALENDRIER

Activités	Mois 1	Mois 2	Mois 3	Mois 4	Mois 5	Mois 6	Mois 7	Mois 8
Étude des activités								
Étude dispositif d'appui								
Rapport final								

F. BUDGET PREVISIONNEL

		Coût unitaire	TOTAL en FF
Intervention SWRC			
- prestations pour étude des activités	2,5 mois x 2 p	4.400 FF	22.000
- prestations pour étude du dispositif	1 mois	14.700 FF	4.400
- frais de voyage / séjour	7 pers.mois	2.200 FF	15.400
- logistique atelier final	forfait		10.000
			51.800
Expert produits forestiers			
-prestation	13 j	650 FF	8.450
-frais de voyage / sejour	forfait	1550 FF	1550
			10.000
Intervention ASVIN			
- prestations pour étude des activités	1,75 mois	30.000 FF	52.500
- prestations pour étude du dispositif	0,5 h-mois	30.000 FF	15.000
- frais de déplacement / séjour Inde	forfait	≈ 5.000 FF	5.000
			72.500
Intervention GERES			
- prestations pour étude des activités (F. Thuillier 11j, V.Stauffer 11j)	22 j	2.800 F	61.600
- prestations pour étude du dispositif (F. Thuillier 5j, V.Stauffer 3j)	8 j.	2.800 F	22.400
- 3 A/R France – Inde	3	4.500 F	13.500
- Déplacement en Inde	forfait	4.000 F	4.000
- Per diem	30 j	500 F	15.000
- Déplacement en France	forfait	1.500 F	1.500
			118.000
Frais administratifs 10 %			**25.230**
Budget Total			**277.530**

PLAN DE FINANCEMENT

GERES : 83 870 FF

ASVIN : 33 750 FF

SWRC : 9 910 FF

F3E : 150.000 FF

L'autofinancement de SWRC et ASVIN se décompose comme suit :

SWRC

- Honoraires 6 hommes mois x 4.400 FF = 26 400 FF
  Prise en charge SWRC = 9.910 FF

ASVIN

- 2,25 hommes mois d'intervention de Mathieu CAMPS x 30.000 FF soit 67 500 FF
  Prise en charge ASVIN = 50 % de l'intervention soit 33.750 FF

A N N E X E S

1. Présentation SWRC

2. Présentation ASVIN

3. Présentation GERES

4. Extrait du document d'accord PNUD / SWRC / Gouvernement Indien sur énergie rurale (déc. 99).

5. CV de
- Matthieu CAMPS
- Fabrice Thuillier
- Vincent STAUFFER
- Rajnist KJAIN
- Laxman SINGH.

6. Note « Valorisation des produits forestiers au Sikkim »'

7. Note « Production de briquettes d'aiguilles de pins (Kumaon) ».

ANNEXE II

ANNEXE II.1

CONSULTATION SWRC-VILLAGERS FOR THE DEVELOPMENT OF ECONOMIC ACTIVITIES IN SIKKIM

(Initial information that will be shared with the villagers)

This document has been prepared by a group of Voluntary Agencies, French and Indian in order to present its present and future action in Sikkim, and the way it plans to contribute to local development.
Several presentation papers / cards have been prepared regarding the activities that could be developed in the area and for which the group could bring some support. They will be displayed and discussed once the approach has been presented.
SWRC Sikkim will organise a regional workshop with the village representatives from various places where some scope / interest has been or is being identified. *(Here add the date and venue).*
Here are some elements that can be taken into account by the interested parties / village committees, describing the approach that is being elaborated.
Presentation of the Voluntary Agencies
ASVIN and GERES are two French Voluntary Agencies that co-operate in Indian Himalayas for several years. ASVIN is presently involved in the European Commission funded project *"Development & Dissemination of Solar Energy Systems for Villages in the Himalayan Region - India"*, with SWRC Sikkim being the organisation in charge of the project in Sikkim. GERES works in Ladakh for the development of economic activities (pashmina wool, green houses, crop conservation & processing).
SWRC works in Sikkim since… - *brief description here* -
An economic development programme for Sikkim
The Voluntary Agencies aim at bringing a technical support to the local populations so that they can improve their living conditions. The approach proposed puts the emphasis on the participation of the villagers concerned by the project. This is a very important aspect as far as planning and selection of relevant activities are concerned, but also for building proper competence locally. Ultimately, the objective is that a network of local resource persons, experienced villagers' group & committees can promote and disseminate the initiatives launched in a few places.
The technical support comprises of technical study & support in survey work; training on various innovative techniques, advice & assistance in terms of investment and foreign funding.
Today, sustainable rural development requires the emergence, or the improvement of economic activities that generate adequate income to the people involved in it. The Voluntary Agencies are in favour of a sustainable development that is based on the proper use of the resources available locally while encouraging the development and strengthening of know-how. Resources and know-how are a source of wealth for a region.
Several activities have already been identified by the local partners.
Today, it is proposed that the Voluntary Agencies, with the villagers concerned, think together about the activities that should be developed in priority in the

area. Then only a development programme can be defined, a programme where the villagers, future users / producers will be the main actors and beneficiaries.

Role of the Voluntary Agencies

At present, the project is just being defined (content, subjects, action, framework…). The partners involved fully agree on the central role to be played by the local population. That is why it is expected that villagers will give their opinion on the pre-selected activities: the present situation, how do they see their evolution…

The Voluntary Agencies have a role of support, with resource persons that can be contacted locally. They will help the villagers to formulate their needs and will propose a consultation framework, which will lead to a regional workshop.

Regional workshop

It will be held on …… at ……. It is seen as an open forum between the various partners and villagers' representatives. It will be a major step towards the elaboration of the development programme.

After the workshop

In order to finalise the future development programme (areas, type of actions and activities), the study team (representatives of the Voluntary Agencies) will continue its field work with a detailed diagnosis activity wise, involving the most motivated groups.

ANNEXE II.2

FIELD VISIT REPORT FROM 11 TO 21st MAY 2001

Have participated to the discussions: Moti Lal (SWRC Tilonia), Shiva Prakash Rai (SWRC Sadam), Amrit (SWRC Sadam), Namgyal (SWRC Mangan), Denis Blamont (DB) and Matthieu Camps (MC) from ASVIN.
Part of the discussions took place in Gangtok, and then most of the time was spent in North Sikkim (Dzongu area). Two days / one night were spent in Leek. Other VEEC representatives came to Mangan workshop where the meetings took place.
Strategy
The strategy behind the studies GERES/ASVIN/SWRC and the future perspectives were discussed. The various papers prepared by GERES *&* ASVIN were reviewed and discussed in details. The participants agreed on the strategy, which is to involve the villagers in the identification, planning and survey work; as well as on the future perspectives: such preparatory work, at the village level and SWRC level is meant to lead to a wider project (implementation and dissemination). Another dimension was added here as SWRC Sikkim is a sub-centre of SWRC Tilonia: the fact of having 9-10 months of field work to prepare a programme for the area is quite unique so far in the experience of SWRC Sikkim team. It is a very good opportunity for them to take advantage of their experience of previous projects (as EU or UNDP sponsored ones) which were planned by outsiders, reviewed and modified by external experts before they were launched. They should try to see what needs to be rectified in the set-up, strategy or mode of management of such projects and propose, accordingly, a new approach.
So it was agreed the strategy here does not only apply for the villages and the Village Energy and Environment Committees (VEECs), but also for the SWRC Sikkim team itself. It is an exercise of self-planning. Besides this, SWRC Sikkim's role will be to initiate discussions, facilitate exchanges, and provide information and technical support in the course of the study. For that they will get support from GERES and ASVIN, but also from resource persons like Pranab Chaudhury (minor forest produces, agriculture) or Yogeshwar Kumar (micro-hydropower).
The importance of the role of the community workers in the process was underlined: they have to initiate and lead the discussions with the VEECs, and at the same time, leave them enough room for expressing their own ideas. Since the number of activities is quite important, and their own knowledge on some subjects sometimes limited, it was decided that a good way to launch the interaction on the income generating activities was to organise an "exposure trip" for representatives of the VEECs and SWRC community workers involved. Several places were identified where economic activities have taken place (villages) or improved techniques demonstrated (resource centres). A direct dialogue with experienced village groups or resource persons can be very instructive for the village representatives. The tour is less ambitious in distance covered or number of places visited than the one in Kumaon because of budget constraints (where F.Y.F project will co-finance). Nevertheless it is worthwhile doing it thanks to a high concentration of projects and various initiatives in north West Bengal (around Kalimpong / Darjeeling). It is a good illustration for the people of Sikkim (especially north) to see how and where their own raw material, sold at low prices, are exported, transformed, fetching higher prices.
The other advantage of such exposure trip is that it gives a good opportunity to the CWs to start the interaction during the trip itself. It is a good way to initiate the dialogue on these subjects with each VEEC once back, rather than merely expose ideas through documents or posters. Then, up-to the regional workshop is organised the CWs can help the VEECs formalising their ideas and priorities as far as economic activities are concerned.
As in Kumaon, the season is not the best one to mobilise people in the villages because of agriculture work. It was found possible to find about a week at the end of June for such tour.
Exposure trip: starting from 25th June. For 6 days approximately. Places to be visited:

- Gangtok: cottage industries (handicraft, hand made paper…), Indo Swiss Project Sikkim (cardamom)
- Lingdam (East Sikkim) water flour mill

- Kalimpong (WB) hand made paper, fabrication of incense sticks, green houses, floriculture, poultry farm (small scale), vegetable cultivation
- Darjeeling (WB) cultivation of medicinal plants, fabrication of incense sticks

Workshop: will take place at Mangan (North Sikkim) mid-August.

Preparation of the field work

This was done following the document "Launching the studies in Sikkim *&* Kumaon, some guidelines up to May 2001".

- The list of villages and map were prepared. 9 villages have been selected: 2 neighbouring villages in South District: Vok and Omchu at about 25 km from SWRC Sadam; and 7 villages in North District, 6 in a cluster in Dzongu (Lepcha inhabited tribal area): Sakyong, Penthong, Passintang, Leek, Safo, Salim Pakel in a radius of 15 km from SWRC Mangan and 1 in extreme North (Tibetan plateau) at about 4,800 m altitude, Donkong.
- The villages of Leek and Safo have already made a proposal for cultivation of medicinal plants. Sakyong is a village of cardamom growers, Penthong also but at a lower scale. Sakyong village also used to have a tradition of paper and ink fabrication. In Passintang, villagers have proposed to set-up a water mill for grinding their cereals. The other activities remain "open" to the other villages. Eco-tourism came frequently during the discussions in Dzongu. Although part of the area is still "prohibited" or requires, for Foreign Nationals, special permissions, the Government plans to open it to tourism. The area, is covered by dense forests, with paths leading to one of the oldest monastery of Sikkim, and, further up, to the high altitude plateau (Green Lake) and Tibetan settlements: in a few days, it is possible to experience very diverse and impressive landscapes. It has certainly an important potential, which requires adequate planning, now, to develop a respectful and meaningful eco-tourism rather than promote a mass destructive tourism…
- Criteria for selection of target villages were discussed. The selection was made by SWRC team mainly based on their existing knowledge of the area and interaction with village groups. Positive involvement of existing VEECs was the main criteria. The team underlined that a very interesting phenomena is now taking place in the villages where the EU project is going on. The people are receiving or about to receive the solar lights, they have started to contribute financially and a strong feeling of need for more income generating activities is developing. They have made their own calculations and realised they need to earn more than they do now in order to be able to maintain, on the long run, their solar equipment. They have also started to think and elaborate plans (as in Leek-Safo) and such initiatives are quite impressive, not seen very often in remote areas like this one, and quite unique for Sikkim where the subsidy culture is prevalent.
- The exposure trip, as mentioned above, is meant to help launching the process at village level. This is expected thanks to the feed back to be given by 2 or 3 VEEC representatives who will join the travel group. They will act as a relay in the villages. This is a dynamic process. And a "direct experience" which totally fits the strategy elaborated and should give more results than only village meetings. The role of the community workers will be to build up the process of exchange starting from this practical experience, leading to clear statements / priorities during the workshop.
- Presentation cards / data sheets proposed by M.C. were discussed at length with SWRC team. They were modified accordingly. There are 9 activity cards:
    - Cardamom drying
    - Processing of minor forest products
    - Poultry farming
    - Paper *&* ink making
    - Storage and conservation of crops
    - Green houses
    - Micro-hydropower
    - SPV multi purpose units
    - Eco-tourism

  And 1 explanatory card:
    - Consultation SWRC - villages for the development of economic activities in Sikkim

  It was agreed that these cards will be used only as one tool (a kind of check-list), to help the community workers during the meetings. The most important aspect is that the villagers should be encouraged to participate actively to the process, even while the

community worker is not present in the village. The translation of these cards into Nepali might be required for the community workers of South Sikkim, but not for North Sikkim.

- Diagnosis of activities "post-workshop": it was too early to develop this and it was agreed that the experience of Kumaon, which is about 1 month ahead in the process, will be taken into account. Shiva Prakash Rai will come to Kumaon mid-July for the workshop. It will be a good exposure trip for him; he will be able to exchange with Kumaon team and take advantage of this experience to organise the workshop in Mangan.
- Collaboration with Sikkim administration continues to be very positive. This is true at Gangtok level, thanks to the support given by the Chief Secretary, M. Sonam Tenzing, as well as at the District level (Mangan) with various project officers who seem genuinely interested by the project, and ready to extend their collaboration. It was then decided in Mangan that the workshop will take places in two stages. The first day will be a gathering between the VEECs, SWRC and ASVIN / GERES representative, and possibly Pranab Chaudhury where the plan of the VEECs will be exposed and discussed. Then, the second day will be devoted to an interaction with local administration representatives: the VEECs will explained their work and future plans, the Govt. officers will get an opportunity to describe their own programmes and scheme. Possible collaborations will also be studied.

ANNEXE II.3

FIELD VISIT REPORT FROM 3 TO 8th MAY 2001

Have participated to the discussions: Rajnish Jain (RJ) AVANI, Hansi, Jagdish, Deepa and Chanchal (four Community Workers [CWs] of AVANI who will spend part of their time on this study), Yogeshwar Kumar (YK) resource person involved in different fields for the studies (micro-hydropower, wool processing, solar water heaters…), Denis Blamont (DB) and Matthieu Camps (MC) from ASVIN.
A one-day visit to Mana was organised with RJ and Jagdish. This was considered partly as a follow up of the EU sponsored programme and partly as a first contact under the present study. It was decided that no formal meeting would be held in the village as intensive agriculture work was going on. It was more meant to have informal talks with villagers available.
Strategy
The strategy behind the studies GERES/ASVIN/AVANI and the future perspectives were discussed. The various papers prepared by GERES *&* ASVIN were reviewed and discussed in details. The participants agreed on the strategy, which is to involve the villagers in the identification, planning and survey work; as well as on the future perspectives: such preparatory work, at the village level and AVANI level is meant to lead to a wider project (implementation and dissemination).
The Village Energy and Environment Committees (VEEC) are the village-based groups that are expected to take advantage of this process. The role of AVANI will be to initiate discussions, facilitate exchanges, and provide information and technical support in the course of the study.
The importance of the role of the community workers in the process was underlined: they have to initiate and lead the discussions with the VEECs, and at the same time, leave them enough room for expressing their own ideas. Since the number of activities is quite important, and their own knowledge on some subjects sometimes limited, it was decided that a good way to launch the interaction on the income generating activities was to organise an "exposure trip" for representatives of the VEECs and AVANI. Several places were identified where economic activities have taken place (villages) or improved techniques demonstrated (resource centres). A direct dialogue with experienced village groups or resource persons can be very instructive for the village representatives.
The other advantage of such exposure trip is that it gives a good opportunity to the CWs to start the interaction during the trip itself. It is a good way to initiate the dialogue on these subjects with each VEEC once back, rather than merely expose ideas through documents or posters. Then, up-to the regional workshop is organised the CWs can help the VEECs formalising their ideas and priorities as far as economic activities are concerned.
As the calendar is quite tight, it was important to decide on the dates for the trip and the workshop.
Exposure trip: starting from 23rd May. For 10 days approximately. Since AVANI was planning a trip for VEEC members and staff to Himachal Pradesh for its wool project (F.Y.F. funds), and that the objectives match, it was decided to merge the two trips into one, part of GERES contribution (travel) will be also used. Places to be visited (first selection, to be finalised later on):

- Bodakadar (Tehri, Garwal): community owned micro-hydel (meeting with community)
- HIMCON (Garwal): pine needle briquetting, cultivation of medicinal plants
- HESCO (Garwal): micro-hydropower
- Srinagar Agriculture University (Garwal): medicinal plants
- Cultivation of vegetables (Chamba road, Garwal)
- Drip irrigation (Solan Dist., H.P.)
- Wool processing co-operative, wool bank (H.P.)
- I.I.T. (Delhi): pine needle briquetting
- Plantiss (Ramgarh, Kumaon): green houses

Workshop: will take place at Tripura Devi on 10th July. Since it will be the monsoon, it will depend upon the weather and might be postponed to 11 or 12 in case of bad weather.
Preparation of the field work
This was done following the document "Launching the studies in Sikkim *&* Kumaon, some guidelines up to May 2001".

- The list of villages and map were prepared. 9 villages have been selected: Mana, Dewalbisral, Chantola, Simail, Mehroli, Simgarhi and 3 villages in Boran area. All the villages are within a radius of 15 km of AVANI's centre.
- The villages of Simgarhi and Boran cluster are, for the first one, already involved in wool processing with AVANI, and for the cluster, about to join the wool programme. The other activities remain "open" to the other villages.
- Criteria for selection of target villages were discussed. The selection was made by AVANI team mainly based on their existing knowledge of the area and interaction with village groups. Positive involvement of existing VEECs was the main criteria. Then came the fact that the community workers already work and visit regularly these places.
- The exposure trip, as mentioned above, is meant to help launching the process at village level. This is expected thanks to the feed back to be given by 2 or 3 VEEC representatives who will join the travel group. They will act as a relay in the villages. This is a dynamic process. And a "direct experience" which totally fits the strategy elaborated and should give more results than only village meetings. The role of the community workers will be to build up the process of exchange starting from this practical experience, leading to clear statements / priorities during the workshop.
- Presentation cards / data sheets proposed by M.C. were discussed at length with AVANI team. They were modified accordingly. There are 8 activity cards:
    - Wool processing
    - Poultry farming
    - Pine needle briquetting
    - Storage and conservation of crops
    - Green houses
    - Micro-hydropower
    - SPV multi purpose units
    - Eco-tourism

  And 1 explanatory card:
    - Consultation AVANI - villages for the development of economic activities in Kumaon

  It was agreed that these cards will be used only as one tool (a kind of check list), to help the community workers during the meeting. The most important aspect is that the villagers should be encouraged to participate actively to the process, even while the community worker is not present in the village. The translation of these cards into Hindi was started after this field visit.
- Diagnosis of activities "post-workshop": R.J. proposed to start developing this part, which has to be completed before the workshop so that the diagnosis can start soon after.
- The involvement of Y.K. (consultant) was also discussed with reference to the ToR dated 2/03/01. He is presently working on 3 of the points defined. (1) The development and improvement of an electric charka. (2) Assisting AVANI in setting up a solar water heaters fabrication workshop: a market survey for the equipment has been done. (3) Organisation of a training in a mechanical workshop in Delhi for 2 barefoot engineers of AVANI plus one trained technician from the area / identification work in Delhi (iron work). The setting up of such a multi-purpose workshop in AVANI (funded under EU and FYF projects) will facilitate further work on the development of economic activities in the area.

ANNEXE III

ANNEXE III.1

GREEN HOUSES

SITUATION

Kumaon is a region relatively remote because of its distance with the plains and main development centres. The lack of income generating opportunities leads to an important out-migration phenomena whereby men look for employment outside the region (cities, army, Government service…).
The main activity in this rural area is agriculture, and crops are mainly dals and cereals, with no emphasis on vegetable up to now, which, mainly, come from the plains.
The present limitations to the vegetable cultivation are:

1) a severe water scarcity during the summer months
- the composting techniques are not elaborated and not very effective
- limited knowledge about vegetable cultivation
- lack of availability of quality seeds and seedlings

SCOPE

Usage of green houses could enhance the production of vegetables for both self-consumption and sales on the markets (vegetables & seedlings). Improved diet and cash earnings would be the expected results at the household level. Off-season vegetables can be produced and promoted locally. Women groups could take a responsibility in these activities, being more careful and able than men about cash handling…
If the water is scarce in summer, there is a good annual rainfall over the region, which can be harvested and stored. Moreover, with the green house, the water evaporated is trapped in the plastic sheet, and after condensation, returns to the bed. Watering can be managed economically.
With improved composting techniques (for example vermi-compost), the users can promote organically grown vegetables.
So, a package should be promoted in order to tackle the problems identified, this could be one of the objectives of the future project on the development of economic activities in Kumaon:

- green house for vegetable cultivation
- training on vegetable cultivation for improving the present skills
- polylined water tank for harvesting rainwater
- promotion of improved compost pits

In order to see if such objective is relevant, it is required that the producers, farmers, existing women groups give their opinion on these subjects. These are few questions that need to be addressed:

DISCUSSION

- What types of vegetables are presently grown, in which season, on which land? Do they have enough? If not why don't they grow more?
- What is the main purpose of growing vegetables, sales or self-consumption? What is their interest to develop this sector? What has been tried so far? Are green houses already used? Limitations and problems faced?
- Keeping in mind the agricultural calendar, workload, land use, manure and water availability, when and how vegetable cultivation can be promoted?
- Inputs required as far as skill is concerned (green house cultivation, composting, water management, pest control, seeds/seedlings…)?

- Possibilities to harvest rainwater near the fields (building, structure, and landscape…)?
- Who can be involved, and why (individual, groups, formal organisations)? What is their respective capacity of investment?
- Marketing issues: present local demand on the markets, origin of the vegetables sold? The possibilities to access these markets? The existing rates?
- Is the question of theft an issue in the area? If yes, how can it be tackled?
- In case vegetable cultivation can be promoted for commercial purpose, what is the perspective of co-ordination between the various groups or villages that will be involved in the same area to avoid a rapid saturation of the market and fall of the prices? (diversity of the products, "export"…)
- Is there a scope to develop a market channel for a very good local product that could be identified for its quality and labelled for the export (example of the local tomato fetching a higher price on the market than the one from the plain, because of its quality and taste)?

ANNEXE III.2

STORAGE & CONSERVATION OF CROPS

SITUATION

Kumaon is a rural area, and its main economic activity is agriculture. Generally, crops (cereals, dals, vegetables, and fruits), once harvested, need to be stored before they are sold or used for self-consumption. In the area concerned by the project, the capacity to store dals and fruits is very limited.

A proper conservation also requires an adequate processing, which can, depending upon the farmers' competence and market requirement, be of different types and levels (simple post harvest treatment up to special preparations -for example fruit juice, pickles…-).

Beyond the problem of storage and conservation, farmers are often forced to sell their crops (especially fruits) as soon as harvested because of cash requirement at this season. Buyers, in a position of strength, offer very low prices.

SCOPE

Improving storage and conservation techniques at village level can reduce the risks of losses, or give the opportunity of selling at higher prices during off-season. A properly processed product can be more attractive and fetch higher prices on the market.

New techniques of storage and conservation are required in the case of new crops being introduced in an area. This measure should then be studied where the introduction of green houses / vegetable cultivation is proposed.

Credit facilities have to be introduced as an accompanying measure that will give the real capacity to the farmers to sell their products at the most beneficial period for them. Issue of borrowing (for seeds for example) can be addressed as a whole (seeds bank, micro-credit facilities) so that borrowing cash does lead to a situation of dependence.

In order to see if such objective is relevant, it is required that the producers, farmers, existing women groups give their opinion on these subjects. These are few questions that need to be addressed:

DISCUSSION

- What are the problems related to the storage and conservation of crops? (for example rodents, important losses after a certain time, seasonal problems, lack of knowledge on the subject…). Is it felt as an important problem, as an issue to be addressed?
- What are the present storage / processing techniques used in the villages for cereals, dals, vegetables and fruits?
- Have any innovative techniques been tried? For which results? If there was a failure, why? (technical problem, solution not adapted, social problem…) *It is important to analyse any trial made: has the problem been identified? What could be the solution? As a policy, one should always analyse, with the villagers, the previous trials, their results, before starting any new activity or innovation is proposed. Moreover, an innovation must be accompanied by follow-up measures, and a complete freedom, for the users, to adapt the technique to their needs.*
- Can the villagers list and compare old and new systems of storage and conservation?
- Is there a specific crop for which this question is particularly important (either because of losses at present, or scope for income generation if properly processed and conserved)?
- What are the expectancies of farmers as far as storage and conservation of crops are concerned? What could be the interest of farmers to improve their storage capacity? And to start new processing method for better conservation?

- What are the present marketing channels for the crops? Is there a commercial opportunity (market) for new products (processed), or a demand during off-season?
- Are they ready to invest, and up to which extent, for improving their capacity at this level (equipment, infrastructure…)?
- Should it be an individual or a community level effort / investment? What should be the property of the community? What should be the property of individuals? Why?

ANNEXE III.3

PINE NEEDLE BRIQUETTING

Important comment: this activity, before being discussed in details in the villages, requires more enquiries as the technique does not seem to have reach a mature stage for dissemination. It is proposed that the team which will undertake the travel in the second half of May meets the organisation & villagers who have already tried pine needle bricketting, and stop, on their way back in Delhi at the I.I.T. for further demonstration, explanations.

The topic could be broaden, during the discussions with the villagers, to the issue of fuel wood saving, and other alternatives could be studied (gober gas plant, solar cooker, water heater…)

SITUATION

A large majority of Kumaon inhabitants depends upon non-commercial energy, mostly fuel wood for their domestic needs (cooking, heating). Although cutting trees is forbidden, the rural population is left with no other alternative than exploiting the forest resource to meet its constantly increasing needs. This has led to a situation of alarming deforestation.
Women are involved in the fuel wood collection, and the time needed for this task keeps increasing, as the wood has to be collected always further.
Many parts of Kumaon is covered by pine forest planted for the commercial exploitation of the pine resin. Every year the trees shed a large quantity of pine needles that cover the soil in thick layers of sometimes 10 cm or more. Acidic and easily inflammable, these pine needles represent a real environmental hazard, preventing other species from growing, damaging the soil quality and causing forest fires.

SCOPE

There have been research and experiments done in I.I.T. Delhi, as well as some trials on the field (neighbouring Garwal), to convert pine needles into briquettes *("beehive smokeless gas briquettes")*. The technology is designed to be used in rural areas, and is relatively simple and low cost. The principle is to partially carbonise the pine needles to obtain char, which is then mixed with clay and water to form a solid mixture. Compressed and moulded it then takes the shape of a cylinder with vertical holes. After being dried the briquettes can be consumed in a stove, each hole acting as a gasifier, giving a clean flame.
Rural entrepreneurs could start manufacturing such briquettes and sell them on local markets, as an alternative to fuel wood, where LPG is hardly or not available.
Another possibility is that, at the household level, the users could manufacture such briquettes for their own need.
Resource persons / teams have been working on the subject for some time now. In Garwal, HIMCON has implemented a first project, and is trying to extend it. Visiting their project area (AVANI team with representatives of the villages) could help gathering appropriate information and exposure. I.I.T. team could also make a demonstration at AVANI campus.

In order to see if such objective could be included in the future project, it is required that the villagers who could be involved in it give their opinion on this subject. These are few questions that need to be addressed:

DISCUSSION

1) How is the situation related to fuel wood collection and consumption perceived by the villagers? Problems faced? Time spent, and by whom in the family? If a real problem is faced, is it a priority for them to find a solution? How long the present situation can last? (try to make a comparison between now and 20 - 30 - 40 years back talking to elderly people - introduce the idea of what will be the situation of their children).
2) What are the alternatives they know presently? The availability and access for this (these) alternative(s) on the market? Their cost?

Comment: the last two questions should be raised only if the visits to HIMCON / I.I.T. showed that the scope for dissemination and the existing equipment are satisfactory.

3) In case such a project of producing briquettes from pine needles can be set-up, up to which extend would they be interested? What kind of investment are they ready to make (money, time & labour…) to get such a product?
4) Can they foresee a particular form of production (centralised - small scale factory type - or more decentralised - family / self-consumption level -)? Do they feel there could be a market for such a product?

ANNEXE III.4

PAPER AND INK MAKING

SITUATION

Sikkim had a tradition of paper making out of *daphne cannabina*. Ink was also prepared locally from a mushroom and black mud from Namchi (South Sikkim District head quarters). The know how has not completely vanished and these techniques could be easily reintroduced on a larger commercial scale.

SCOPE

There is a large demand for such products as is clearly seen in Nepal or Kalimpong. The combination of local paper and ink would make the products even more attractive. Such an activity could be promoted provided the resources are managed properly (*daphne cannabina* plantation, introduction of fuel wood saving techniques such as solar passive heaters, gassifiers…). Markets and commercial circuits have to be thorougly investigated and dealers identified.

In order to see if such objective is relevant, it is required that the producers, farmers, existing women groups give their opinion on these subjects. These are few questions that need to be addressed:

DISCUSSION

- Have paper and/or ink ever been produced in the village? When? Is anybody still knowing the technique, in the village or in other places?
- Was (is) the paper (and/or ink) sold outside or consumed locally?
- Is *daphne cannabina* (Kagatey) present in the forest? In which quantity?
- Are they ready to invest, and up to which extent, for practicing this activity?
- Should it be an individual or a community level effort / investment? What should be the property of the community? What should be the property of individuals? Why?

ANNEXE III.5

POULTRY FARMING

SITUATION

In Kumaon in general, there is little production of eggs and chicken. Supply comes from the lower parts of the State, or even from outside.

SCOPE

Setting up poultry farms in these remote areas, considering the potential of sales on the local markets can be really profitable for the local producers.

Solar technology, for poultry farming, derived from the ones already experimented in Ladakh, can be effective for maintaining a sufficient temperature in winter in the henhouse, where small chicks can be kept, ensuring a poultry farming activity round the year.

Various interlocutors have to be identified (local authorities, villages in a potential area…) and the following questions should be raised:

DISCUSSION

- Why is the production of eggs and chickens so scanty? Would there be a reason for them not to produce them? Would local people be interested in producing? Consuming?
- Is poultry farming existing in Kumaon, and up to which altitude?
- What is the demand on the market for eggs / chickens throughout the year?
- How is the demand met? Where are the products coming from? At which price?
- Who could be locally interested in poultry farming? What is their present skill, do they have some experience in this field? Do they have some kind of infrastructure ready? Are they ready to invest in a new building?
- What could be the form of farming (individual, community)?

ANNEXE IV

ANNEXE IV.1

Workshop on development of Economic activities in the villages of Himalayan Region

Date : 10th July 2001
Venue : Avani Campus

Avani
P O Tripuradevi
via Berinag
District Pithoragarh
Uttaranchal- 262531
Telephone 91 5964
44943

Avani organised a one-day workshop with help of GERES, on the 10th of July 2001 at the Avani campus. The main subject of the workshop was **'The Development of Economic Activities in the Villages of Himalayan Region'**.

Ms. Rashmi Bharti, Secretary, AVANI introduced the partner organisations and gave a short summary on the purpose of the workshop. Thereafter, members from the various villages attending the workshop formally introduced themselves. The other participants in the workshop were the Solar Energy Committees, the members of Women's Groups, men and women from the villages newly selected by Avani and the team of Avani.

In the first phase of the workshop Shri Rajneesh Kumar Jain informed those present that the Social Work and Research Centre, Tilonia had organised a national workshop on solar energy in which the possibilities of developing economic activities were discussed. This workshop was attended by the member from the village solar committees as well as the AVANI team. He also referred to the support provided by the partner organisations of Avani especially GERES and FORRAD, in developing appropriate technology for villages. He said that GERES is a French organisation working with the development and dissemination of appropriate technology in rural areas for promotion of economic activities. Referring to Forrad, he said that it is a Delhi based group, that helps the community based organisations working in the remote rural areas, technically and financially. Ms. Rashmi Bharti said that it was due to Forrad that the first solar systems were made available in the villages of this area.

In the next phase with reference to the economic development in the villages, the natural and human resources available at village level and the reality of the villages was presented through resource map of each village. Thereafter the participants exchanged views on the possibilities of development of economic activities in the villages. Introduction and presentation by the selected villages during the course of the workshop is presented below.

VILLAGE – CHAKH

Presented By: Shri Sher Singh (Gram Pradhan)

The gram pradhan of Chakh, Shri Sher Singh, presented the resource map of his village with the locally available resources. He mentioned that earlier woolen handicrafts existed on a fairly large scale in his village as a cottage industry. This comprised mainly of spinning and weaving of wool, which at present has come to a total stop. The spinning wheel and loom used for this purpose are now lying totally idle.

Shri Rajneesh Kumar Jain questioned as to why this condition had arisen?

In this context Shri Sher Singh said that previously the Khadi Board kept the village supplied with raw material but later on the supply decreased and became very irregular. On the other hand, the rural community is very interested in this work because it does not affect their other household chores. They take out time from their daily routine and do the spinning and weaving of wool.

Shri Rajneesh Kumar Jain then asked the villagers if they had tried to analyse the reasons behind the fact that the Khadi Board had decreased the supply of raw wool in their village?

In this context Shri Sher Singh expressed his ignorance. Shri Rajneesh Kumar Jain then asked about the business aspect, to which it was said that previously the Khadi Board paid keen attention to the quality by which the spinning of the wool was very good. The products made out of this would sell hand to hand in the market. But slowly slowly the Khadi Board did not pay attention to the quality, which later on made the rural community also indifferent to quality of products. As a result of this low quality products

started filling the godowns of Khadi Board. As these low quality products could not be sold, the stock piled up and the production had to be toned down, resulting in reduced employment opportunities. So, it was suggested that woolen products with good quality finish and contemporary designs should be produced to provide sustainable employment in the villages..

Shri Chandra Shekhar Pant (Retd. Block Development Officer) told the people that the Government has always had a positive policy towards small and cottage industries. So if the village people have interest in such works they should put up their aims in front of the Government. Under the available plans at the block level wool distribution arrangement and training for quality control could also be arranged. Shri Pant also said that this is a problem of not only village Chakh but of the whole development block.

In this reference Shri Yogeshwar Kumar suggested that for the proper functioning of the village people they should take steps to self dependency. It was his idea that such an arrangement should be set up at the village level by which the people that the people should not be dependent on any outside agency for their raw material. He expressed his view that in the beginning work can be done by raw material supplied by an outside agency but slowly slowly such a group should be established which should function as a cooperative. Citing an example he mentioned Bhutiko Cooperative.

Talking about the resources available at the rural level Shri Sher Singh that their village has seven water wheels out of which five are dependent on the rainwater and two of them work through out the year. In the form of a cottage industry the manufacture of watermills, grinding stones, hand grinders, manual wheel exists. At rural level solar systems have been installed by NEDA for lighting. At present there are 143 houses that have solar systems installed.

Ms. Rashmi Bharti asked that if the solar equipments stop functioning, where do they get it repaired?

The village community answered that since the installation of the equipment very few instruments have gone out of order. Incase some defect occurs in any of the instruments then it is repaired in the local market in Berinag. The people of the village of Chakh said that their village has an electric line going through their village, but they do not want to take an electric connection.

Shri Yogeshwar Kumar wanted to know that when electricity is available then why do the people not want to take a connection?

To this question Shri Durga Singh Panchpal replied that electricity is quite expensive and unreliable whereas solar energy falls cheaper and is more reliable.

Shri Rajneesh Kumar Jain then wanted to know what are the other economic possibilities in the Chakh village?

Answering the above question Shri Sher Singh said that in their village there is a large scope for natural dying, sericulture and fruit processing. Due to it's location at high altitude there are various kinds of herbs and roots, Oak forest, and in fruit there are walnut, Malta(Tangerine), Oranges, Peaches, Apricot etc. are the main ones.

Shri Rajneesh Kumar Jain suggested the possibility of production of peach and apricot oil on a small scale?

Shri Sher Singh said the area has a great potential for tourism. The Lamkeshwar Temple is situated at a great height and would be an ideal pilgrimage on foot. It is also a panoramic spot.

Shri Yogeshwar wanted to know the situation of handicraft and technology in the villages?

Shri Sher Singh said that previously high quality woodwork was carried out. Workers at the village level made beautiful designs on doors and windows, but this has now disappeared.

With this concluding information, Shri Sher Singh concluded his presentation.

VILLAGE – GHANGAL

Presented BY: Shri Jagat Singh

Shri Jagat Singh presented the geographical location of the village Ghangal through the medium of visual aids. Village Ghangal is deprived of the basic necessities like electricity, water and road. There is one water mill in the village, which is dependent on the rainwater. The rural community is generally dependent on the diesel mill.

Shri Jagat Singh informed the participants of the workshop that the work of the Khadi Board was closed since the last two years but at present it has started again. However the wool supplied is totally insufficient. Shri Singh requested that his village should get enough raw wool and a Ram Temple Knitting centre should be established.

Shri Rajneesh Kumar Jain inquired that if in the near future the Khadi Board is once again unable to provide a regular and sufficient supply then do the people of the village have any alternative?

In this context Shri Sher Singh said that previously the people used to traditionally work with Indian Hemp fibre. He further stated that it had various uses. It's seeds are used to make spices and chutney and it's fibre is used to make *kuthla, budla* (hemp sackcloth) and rope etc. The village people grew Hemp plant locally. So there was no problem for raw material, but at present the Government has put a ban on it's cultivation and production. This has adversely affected this industry or rather it has totally disappeared. He said that the work of the Hemp fiber was integrated in their culture and had multi uses, but hey are helpless in front of the Government. Although to put a ban on this is beyond their understanding.
He further clarified that because of the intoxicant *charas* that is derived from it's leaves, the Government has put a ban on this, but this is also true that the people do not cultivate Hemp only for *charas*.

Shri Rajneesh Kumar Jain then informed all the people that he has heard of such a variety of Hemp which does not have the narcotic qualities. This species of Hemp could be used for production of fiber only. However, at present full information is not available and if such a variety is there then it can be publicised and information can be given to the other villages.

Shri Jagdish Singh Dhapola told all present there that there are some rumours spread according to which the Khadi Board has said that if the production of Hemp is stopped only then will they continue the wool supply.

Shri Jagat Singh then clarified that if the people get together then such questions can be raised. Speaking of the natural resources of his village Shri Singh said that there are large forests of *Chyura*, Pear, Apricot, Peach, Orange, Oak, Rhododendron and bamboo.

Shri Jagdish Singh Dhapola speaking of the possibilities of economic development activities suggested natural *dyeing*, juice from Rhododendron, Oak tussar, oil and fruit processing from ***Chyura*** and Pear.

Shri Rajendra Kumar Joshi said that the grinding of wheat by the women in Barod area was done by hand or manually.

Shri Yogeshwar wanted to know whether the watermill wheels have iron bearings or not?

Shri Jagat Singh told that the watermill wheels do not have iron bearings in them.

In this context Shir Yogeshwar suggested that iron bearings should be put in them, by which it would become easier to work with and more grinding could be done in less time.

So, there is a possibility of technical upgradation of the existing water mills

VILLAGE – MANA

Presented BY: Shri Bhupal Singh Karki

In the next phase of the program Shri Bhupal Singh Karki visually explained to all, the geographical location of their village. It is 4000 ft. above sea level and it takes three hours from the main motor road to reach it. The major forest plantations are of Oak, Rhododendron, Pine and ***Bhimal***. The majority of the population do farming as it's livelihood. The main crops are Rice, Whea, pulses etc.

Shri Singh said that the alternative work is wool hand spinning and making Hemp fibre. The wool work was dependent on the supply of wool by the Khadi Board. Later on this supply stopped and this work came to a stand still. On the other hand the Hemp fibre work which was used by the people to make ***kuthla, budla*** and rope etc. is slowly coming to the point of closing down.

Ms. Hansee Bhatt wanted to know as to why did the traditional handicraft work stop?

Answering the above question Shri Bhupal Singh said that the wool work had been coming regularly since 1947, but in 1962 after the invasion of Tibet by the Chineese due to the scarcity of raw wool, slowly slowly the work decreased which finally came to an end. Shri Singh also said that in the past the people of Mara used to go to the fare of Jauljivi where they would sell their Hemp fibre products and on their return buy wool, which was the basis of their work. On the other hand the fall in production of Hemp products was a result of Government policies by which cultivation of Hemp is illegal.

Shri Rajendra Kumar Joshi asked that after the stopping of this traditional work what is the means of the livelihood of the people?

In this context Shri Bhupal Singh said that majority of the people do farming, some people have gone down to the plains and have taken employment in private firms and some are government employees. The people involved in farming at present are accepting the work of spinning wool and knitting provided by Avani as their alternative source of employment. Shri Singh said that wool work is their cultural heritage and said that the whole community and he himself has a great liking for this work. He also said that along with his studies till class eight he got training in spinning and knitting.

Shri Rajendra Kumar Joshi asked that whether the inhabitants if Mana have again made an effort to continue with this work and self-dependency?

With reference to this Shri Singh said that efforts have been made and even a Women's Group organisation has been made in the village. In which monthly collections of contributions are made by the women during the meetings and deposited in their bank. Through this medium the wool bank work in Mara has started. Mentioning ***Bhimal*** Shri

Singh said that the ***Bhimal*** tree is in plenty in that area. This can alternatively be used in making ***Hemp*** fibre. In this area the other economic development possibilities were mentioned as follows: -

- Natural colouring - Rhododendron and other herbs and roots are available.
- Oak tussar farming - Oak forests are available.
- Natural fibre - Hemp, Bhimal are commonly used.
- Vegetable production - land is available.
- Bee keeping(honey) - fruits and vegetables are available.
- Poultry farming - means are available.

Shri Bhupal Singh pointed out that the "waist loom" which was previously used for the Hemp fibre could be used for wool and other fibres. He spoke highly of the efforts made by Avani in this area.

VILLAGE – SIMAYAL

Presented BY: Shri Kripal Dutt Pant

Shri Kripal Dutt Pant visually explaining to all the geographical location of their village, informing them about the natural and human resources there went on to tell that Simayal is situated 4000 ft. above sea level. River Kulur flows near the village. There is a water wheel on its bank, which works through the year. Previously there were fertile fields here, but due to the flood in 1957 these fields were washed away. As a result the people settled at greater heights and started farming there and continue to do so till today.

Talking about the economic possibilities Shri Pant said that Mangoes, Peaches and Pear are present in a large quantity in the village. But due to no proper marketing arrangement and no fruit processing arrangement most of the fruits go waste. He further stated that he expected Avani to provide technical training for fruit processing.

In this context Shri Rajneesh Kumar Jain said that for this a study in the eco feasibility will have to be done because after the processing process the marketing is necessary. At present there are many multinational companies are working in the field of fruit processing and they work on a fairly large scale. As a result their investment is not too much and to compete with these companies becomes quite difficult. Shri Jain also cited various efforts made in this area, which could not be successful, but he further said the work that can be successful should certainly be promoted. In this connection he cited some good varieties of fruit that could be stored, directly sold and income obtained.

Shri Yogeshwar Kumar said fruits with a longer shelf life could also be grown in this area. He gave Walnut as an example. The rural community expressed their approval for this suggestion.

Shri Kripal Dutt Pant suggested the possibility of selling juice at rural level by the fruits produced in the area since the people buy such products from the market.

Shri Rajneesh Kumar Jain seconded the suggestion and also suggested a survey of the village was necessary whether the people would buy products produced in their own village for daily use? All approved this.

The second possibility suggested by Shri Kripal Dutt Pant was vegetable production in the area. He said that Onion, Potato and Garlic are cultivated in a large quantity in the village, but due to no proper marketing and storage most of the vegetables rot. In this regard he expressed his desire for help from Avani.

Shri Rajneesh Kumar Jain approved of the suggestion and said that they would help with full cooperation. He also wanted to know how the people maintain the fertility of the fields? What fertilitizers do they use?

Shri Kripal Dutt said that initially their ancestors used cow dung as manure but for sometime they had been using chemical fertilizers. However they are now aware of ill effects of the chemical fertilizers and at present they are again using cow dung as the fertilizer.

In the end Shri Pant pointed out that the initiative taken by Avani to for a Women's Group for women's independence is commendable. He also informed the people there that by the collective efforts of the Women's Group the women learnt quite a bit from the stitching training arranged by Avani. However they are still not fully independent. He stressed on the need for further training.

In this context Ms. Hansi Bhatt a member of the Avani team gave the people the assurance that another stitching training programme would be arranged. On the basis of the presentation of village Simayal Ms. Bhatt cited the possibilities of economic development as below: -

- On the basis of Oak tree silk production.
- With the help of herbs and roots and Rhododendron trees primary medication and dyeing
- Polyhouse use for producing out of season vegetables
- With the help of Pine needles manufacturing coal for fuel etc.

Shri Kastuba Nand from Simayal suggested the possibility of Burmese compost.

VILLAGE – MAHRURI

Presented BY: Shri Jeet Singh Mehra

Before the presentation of his village Shri Jeet Singh Mehra of Mahruri told about the experience of the fifteen-day exposure tour organised by Avani. Stating that the exposure tour was extremely beneficial Shri Singh said that the people of Himanchal Pradesh and Garhwal utilise the available resources in a better-planned way and are actively moving forward towards economic development. He told about the important works being carried about by the Himanchal Bhutiko Cooperative, Hesco, Sahra and Smridhi organisations relating to cooperatives, natural fibre, women empowerment and fruit processing. He also told all the participants of the other villages who went with him to inspire the people of their villages to carry out such works as above.

Thereafter Shri Singh gave the geographical location of his village and said that Mahruri is situated approximately 5000 to 7500 ft above sea level. Primarily it has Oak and Pine forests. The population of the village is approximately 3000 people. There is an electricity line in the village, which has been lying useless since many years. The people of the village have given priority to solar energy for electricity. At present there are 26 solar panels working in the village.

Shri Yogeshwar Kumar wanted to know that how many WATERMILLS are there in their village?

Shri Singh said that there are watermills, but due to the availability of the diesel wheels the rural community is disinterested in them. Further discussing the matter he said if the technical help is provided then there is a greater possibility for small hydroelectric project.

Coming to development of economic activities Shri Singh suggested the possibilities of fruit processing. Malta, Orange and Pear grow in ample quantity in the village. He even said that with reference to this matter that he had contacted the Development Department Office, but each time except baseless assurances he got no positive response.

Shri Madhvanand Joshi suggested that along with weaving and knitting, a knitting training should also be organised and he emphasised the necessity of installing the solar equipment .

Keeping the problem of electricity in mind Shri Rajneesh Kumar Jain proposed that at the rural level through the medium of water wheels production of electricity should be given priority.

Shri Jeet Singh wanted to know whether the flour mills can work with solar energy ?

Answering the question Yogeshwar Kumar told that it is possible for the flour mills to work with solar energy, but from economic point if view it is not appropriate for this area. He further told that there is a possibility of such flour mills in Laddakh since the temperture there falls to 0-25 degree centigrade due to which the water freezes. Therefore water flour mills cannot work there in winters.

Thus he gave the priority to waterwheels for minor electric projects in the area, he emphasised to train the local people for such work because to call a mechanic from outside is costly. On the other hand, repairing work is also affected.

For the development of economic activities the rural community suggested to promote ecotourism. Shri Jeet Singh told all present that in this area Kasturi farm, Shikhar and Sangad temple are scenic places. Shikhar is an excellent place to trek for pilgrimage.

Shri Durga Singh Panchpal expressed his concern over the mining of soapstone in this region, because mining is the cause of the landslides and earthquakes in this region. All the participants expressed their approval.

Coming to economic development possibilities in Mahruri and considering the available resources there Shri Jeet Singh suggested the following :-

- Herbs and roots used for dyeing and treatment.
- Oak forests for manufacturing Silk.
- Pisciculture
- Development of tourism
- Use the grass ***Smayo*** to produce ***dhoop***

VILLAGE – BHYUN

Presented BY: Shri Jashod Singh

Shri Jashod Singh visually explaining to all the geographical location of their village, informing them about the natural and human resources there went on to tell that Bhyun is situated 3500 ft. above sea level. The main crops and fruits of Bhyun are Paddy, Wheat, Millet Madwa, Mango, Peach and the vegetables grown are Gourd, Pumpkin, Potato, and Onion and among herbs and roots Ritha and Peppermint are common. For electricity 24 families have established the solar panels.

Shri Singh said that there is a river flowing right through the centre of the village, which divides the village into two parts. Due to floods in the rainy season often the fields are damaged.

Shri Rajendra Kumar Joshi wanted to know that when their village has ample water, why do they not propagate vegetable production through which the income of the rural people may increase?

Answering the above question Shri Singh said, that usually the people have their fields near their houses, which are at a considerable height. There are no means to get the water there. He requested for a pumping set for the same.

Shri Yogeshwar Kumar told benefites of using hydram over the electric pumping set to the people.

Discussing further Shri Singh emphasised on the necessity of a trained rural community for the eradication of unemployment.

Shri Yoeshwar Kumar wanted to know which type of training does the community need?

In reference to this Shri Singh said that the training of processing of natural resources, especially Rambass (Agave species) and Ritha is required. Since both the things are available in abundance. But due to the lack of appropriate technical knowledge it's full utilisation cannot be made.

Everyone agreed to Shri Singh's suggestion and Shri Jagdish Dhapola expressed the idea that work in the village would only be done after a survey.

Discussing about the solar energy Shri Jasod Singh told the present people that with the establishment of solar instruments in the village they have benefited to quite an extent and he also sated that solar technology is appropriate for the area. Shri Singh also said that there is an electric line going through his village but because of a burnt transformer there has not been electricity there since the past few years. Till today there have been no arrangements made by the Government to replace the transformer and repair the existing line. At present there are 24 solar instruments in the village.

On the basis of the presentation of village Bhyun by Shri Singh, Shri Jagdish Singh Dhapola suggested the following economic development possibilities:-

- Keeping in mind the availability of water, herbs and roots production.
- Pisciculture
- Vegetable production.
- With the help of Pine needles manufacturing coal for fuel etc.

VILLAGE – SIMGARHI

Presented BY: Shri Amar Singh Rathore

Shri Amar Singh Rathore visually explained to all the geographical location of Simgarhi, and said that Simgarhi is situated 7000 ft. above sea level and 95 hectare of the jungle is under the Forest Panchayat. Where mainly Oak and ***Uttees*** trees grow. The people of the village are dependent on farming for their livelihood. The main crops are wheat, paddy, soyabean. The vegetables produced include ***lai***, Spinach, Fenugreek etc. The village land is partitioned into two parts the irrigated and unirrigated.

Shri Yogeshwar ji wanted to know whether there is enough water for drinking and irrigation in the village or not?

Shri Singh answered that there is water in plenty but the all water springs are far from the village and scattered. Since there is no appropriate arrangement to collect and utilise the water, it cannot be used for good. Shri Singh said that in the year 1986 Government

made a plan of 22 lakh rupees, but due to the neutrality of the Government and the unawareness of the people the plan could not be materialised.

Shri Yogeshwar ji asked if there is a Watermill in the village?

The rural community said that there is a Watermill but it is entirely dependent on the rainwater, as a result it works only four months a year.

Discussing about the economic development activities Shri Singh said that the village has a lot of potential for farming and tourism. There are certain families in Simgarhi, which produce vegetables at rural level and sell in the local market Dharamghar. This is a good source of income for them. In the field of tourism the market of Simgarhi, Dharamghar, situated at high altitude attracts people, since from here people get to see the panoramic view of the snow capped mountains. In addition to this, the area is suitable for the production of Walnut and Chestnut. Therefore by growing such fruit trees in a barren land, it can be utilised commercially.

Shri Rajendra Kumar Joshi wanted to know that whether the people can earn more money by producing vegetables than food grain? If yes, then have the people tried to develop as an alternative source of income.

In this context Shri Singh said that no proper attempt has actually been made, but generally it is seen that the rural community is increasing their fields for the production of vegetables. Which indicates that the people are profiting by it.

Discussing about the problems of the farming areas Shri Singh said that the main problem faced by these areas is the monkeys and pigs. They cause a lot of damage to the crops. On the other hand due to the growing population the farming is also being affected, since the fields have become smaller is size. Also the farming land is reduced due to land being used for making houses.

Ms. Hansi Bhatt asked that is the problem of monkeys and other wild animals coming to the fields due to the vast deforestation?

Shri Singh expressed his approval on this and informed that with the help of Government plan they have done plantation and with the help of the Forest Panchayat they have done the same.

Shri Yogehswar wanted to know that for the collection of water and it's appropriate utilisation what do they want to do and what help do they require?
The rural community answered that they need a technology to collect the water and help to make a canal. They also said that the women have formed a group to overcome the problem of the monkeys, who in turn chase the monkeys. Shri Amar Singh clearly stated that the women's groups' work at present is limited only to chase the monkey, and the future plan not yet decided.

The other problems of the farming area were extinction of traditional seeds and discussed the adverse effects of the chemical fertilizers on the soil. Stating the problem of extinction of traditional seeds Shri Singh said that previously they used to sell Soyabean but now at present they do not even have enough to make seeds. He emphasised the need for testing the soil.

On the basis of the presentation by Shri Amar Singh, the following possibilities on the economic development were suggested:-
- On the basis of Oak tree silk production.
- Vegetable production
- Development of tourism

Shri Rajendra Kumar Joshi cited the example of vegetable production of Simgarhi village before the rural community of the other villages. Thereby appealing to the other villages to promote vegetable production in their villages likewise.

In the last phase of the workshop Shri Rajneesh Kumar Jain summarised the views of all the participants. Laying emphasis on the issue of self-dependence Rajnish Jain about the necessity to form production groups so that in future the people themselves can deal with the issues production and sales. In addition to this he said that in the next phase, Avani team will make an exhaustive survey of all activities of the market and village 'Techno-Economic-Feasibility'. For it's success not only the cooperation but also the active participation of the rural community is necessary.

The village survey and the market survey will be designed to look at the following aspects

- The resources (natural, human, and financial) available in the village
- The need for economic activities
- Possibilities of economic activities in the village
- Marketability of the products and services
- Economic benefits to people
- State of technology existing
- Skill levels
- Upgradability of technology and skill levels

In the end Ms. Rashmi Bharti thanked all the participants of the workshop for attending the workshop and announced the close of the workshop.

Participants

Serial Number	Name of the Member	Name of the Village
1	Shri Amar Singh Rathore	Simgarhi
2	Shri Kalyan Singh, President Solar Energy Committee	Simgarhi
3	Shri Ranjeet Singh	Simgarhi
4	Shri Pushkar Singh	Simgarhi
5	Shri Bhawan Singh	Simgarhi
6	Shri Jagat Singh	Ram Mandir
7	Shri Keshar Singh	Dutkholi
8	Shri Pan Singh, President Solar Energy Committee	Lamjigra
9	Shri Thakur Singh	Lamjigra
10	Shri Madhvanand	Lamjigra
11	Shri Deewan Ram	Simayal
12	Shri Jashod Singh, President Solar Energy Committee	Bhyun
13	Shri Bhim Singh	Dasila
14	Shri Basant Ballabh Pant	Simayal
15	Shri Bhupal Singh	Bhyun

16	Shri K.D. Pant	Simayal
17	Shri Narayan Singh, Treasurer Solar Energy Committee	Tusrera
18	Shri Himmat Singh	Bhyun
19	Shri Devendra Singh	Bhyun
20	Shri Deewan Singh Mehra, President Solar Energy Committee	Udiyari
21	Shri Kabindra Pant	Simayal
22	Shri Balram Singh	Bhyun
23	Shri Jeet Singh Mehra, Treasurer Solar Energy Committee	Lamjigra
24	Shri Harish Singh	Dhamoli
25	Shri Deewan Singh	Simgarhi
26	Shri Durga Singh Panchpal	Sokyura
27	Shri Anand Singh Dasila	Bhyun
28	Shri Dhan Singh Khati	Tripuradevi
29	Kesang Namgyal	Sikkim
30	Kethup Lepcha	Sikkim
31	Shri Sarita Pant	Simayal
32	Shri Pushpa Pant	Simayal
33	Shri Mohan Singh	Chakh
34	Shri Bhupal Singh	Chakh
35	Shri Sher Singh Bora, Pradhan Gram Sabha	Chakh
36	Shri Rajendra Singh	Chakh
37	Shri Mehar Singh	Chakh
38	Shri Kundan Singh	Chakh
39	Shri Joga Singh	Chakh
40	Shri Gokulanand Joshi	Deval Bichral
41	Shri Nandan Lal	Chakh
42	Shri Harish Singh	Simgarhi
43	Shri Santosh Singh	Mahruri
44	Shri Harish Kumar	Banri
45	Shri Gusai Ram	Mara
46	Shri Phakir Ram, Pradhan	Bana
47	Shri Ganga Ram	Nargoli
48	Shri Joga Ram	Nargoli
49	Shri Chinta Ram	Chantola
50	Shri Nar Singh Mehra, Area Panchayat Member	Mahruri

51	Shrimati Bhagirathi Devi, President Women's Group	Mahruri
52	Shrimati Kaushalya Devi, Vice – President Solar Energy Committee	Simgarhi
53	Shrimati Shanti Devi	Lamjigra
54	Shrimati Ganga Devi	Lamjigra
55	Shrimati Dhanuli Devi	Lamjigra
56	Devki Devi	Lamjigra
57	Km. Rupa	Chantola
58	Km. Kamla	Chantola
59	Km. Manju	Chantola
60	Shrimati Kaushalya Devi	Chantola
61	Shrimati Heera Devi	Chantola
62	Shrimati Kamla Devi	Chantola
63	Shrimati Chandra Devi	Chantola
64	Dr. Lalit Nayal, Kasturi Farm	Dharamghar
65	Shri Ramesh Chandra	
66	Shri Madhvanand	Chantola
67	Shri Anand Singh Mehta	Silginya
68	Shri Rajneesh Kumar Jain	Avani
69	Ms. Rashmi Bharti	Avani
70	Shri Yogeshwar Kumar	Avani
➢ Matthew Camps		ASVIN
➢ Vincent Stauffers		GERES
72	Shrikant Tiwari	Avani
73	Shri Tejnarayan Singh	Avani
74	Shri Balwant Singh	Avani
75	Shri Jagdish Singh Dhapola	Avani
76	Shri Deep Chandra Pant	Avani
77	Ms. Deepa Mehta	Avani
78	Ms. Hansi Bhatt	Avani
79	Ms. Deepa Pant	Avani
80	Shri Rajendra Kumar Joshi	Avani
81	Shri Bikram Singh Mehta	Avani
82	Shri Kedar Singh	Avani
83	Shri Chanchal Singh	Avani
84	Shri Puran Singh Bisht	Avani
85	Ms. Kamla Rawat	Avani
86	Ms. Leela Joshi	Avani

87	Ms. Geeta Rathore	Avani
88	Shri Jagdish Singh Mehta	Avani
89	Shri Rajneesh Kumar Pant	Avani
90	Shri Umesh Chandra Pant	Avani
91	Shri Mahendra Singh	Avani
92	Shri Kripal Dutt Pant, President Solar Energy Committee	Simayal

ANNEXE IV.2

TWO DAYS WORKSHOP AT THE SOCIAL WORK AND RESEARCH CENTER, CHANDAY, NORTH SIKKIM

17th & 18th August2001

A workshop of two days held at the Social Work and Research Center (SWRC) Chanday, Mangan. The members of Village Enviroment and Energy Committee from Sakyong, Pantong, Leek, Safo, Muguthang of north Sikkim including the members from Lower vok and Upper Vok and Upper Omchu of South Sikkim, Sri Pranav Choudhurai (Development Consultant) Jamshedpur Tata Nager, Mathew Camps (Technical Adviser) ASVIN.the members of SLYA and the workers or SWRC all attended the workshop.
The first day after the introduction, Sri Pranav gave his report of his earlier visit and his interaction with the villagers of Sakyong, Lhachen about the local resources to generate income. And inquired the villagers about the impact of his visit.

Leek
Shri Nimho Lepcha from Leek Upper Dzongu a VEEC worker with his prepared map by the committee gave his income generation schemes in village. In his report he informed us about the medicinal herbs in his village. The villagers should be taught to cultivate medicinal herbs in the barren land of the village.
Due to availability of Argeli plants in his village along with traditional ink making raw materials one should encourage the villages to manufacture the traditional papers and ink. In his village the Nakima can be encouraged to grow and can be source of income. In his report Shri Nimchu Lepcha elaborated that villages like Leek including Safo, Salim and up to Lachen an Eco-Tourism trek route can be made. The tourist in this alternative trek route can enjoy the river rafting, rock climbing at the same time enjoy the scenic views of seven falls and five lakes at the time a watch tower made by KNP can be used for wild animal watching. In his concluding report he informed the gatherings about the year by year decreasing out put of cardamom. Instead we should look for alternate income generation like Herbal Plantation.
Sri. Pranab encouraged the gathering about the Poultry and Dairy ect. According to Shri. Nimtsho's version every villages need 7 to 10 hecters land where herbal plantation along with traditional crops can be done for this purpose Rs.15000 to Rs.20000 can be invested by the villagers.

Mom / Safo
A worker from Mom informed the gathering about the loss of 1/4th part of cardamom fields of the village and at the same time the decreasing rate of yearly crop of cardamom due to decrease of plants. A nursery should be developed for this purpose. Although herbal plantation is there in the village but due to prevention by government in the sale of medicinal plants and herbal plants there is no scope of marketing of this items. There is also talk of marketing in regard to milk product. They are thinking about Eco-Tourism and Poultry

farming as well as Floricultural should be encouraged. Another worker of VEEL from Salim-Pakel requested the SWRC to open a training center for herbal medicine as there are ample production of these plants at his village.
There is no marketing of this medicinal plants so far. A person named Sonam Palden is manufacturing the medicines but the marketing facilities are almost nill. He also told that alternative plants like Katus and Khasre Khaniu can produce tea. The major crop of the village is cardamom but the disease in its plants are headache for the farmers. The villagers are aware of medicinal herbal plants can be income generating alternative.

Muguthang
Another work of VEEC from Muguthang informed that a 16 unit solar light unit installed by SWRC during 1996 is still smoothly working. He suggested a Solar Passive house to be constructed for the tourists who visits village regularly. He also informed us that in his village there is facility to manufacture yak skin quilts a quilt sized 6*6 costing around Rs.2000 but there is a lack of marketing facility. He demanded a marketing facility for his villages product. Another of his demand was the marketing facility for his village produce such as butter and cheese incase of availability of marketing facility from yak skin quilts 3000 can be made only in a year. His report also includes plenty of herbal medicinal plants in their village but the government has prevented selling them. About the yaks skin quilt too the government is the only buyer and pays very low price. Concluding his report he demanded a water heater for the village.

Pentong
Due to shortage of water, rain water harvesting tanks is much needed was the demand of SWRC worker of Penttong. At the same time the villagers are demanding a nursery for the cardamom seedlings as due to disease in the cardamom the crop production is going down each year. He also stressed his point about the poor condition of P.H.C of the village where nurses and compounders are much in demands. Due to this factor the villagers are facing a lot of difficulties.
There is also unavailability of marketing facility due to which vegetables the villagers produce and bamboo craft they manufacture are useless. At the same time he demanded a training center for the manufacture of bamboo goods. He requested all these in the same VEEC meeting.

Sakyong
According to the VEEC member of the locality SWRC has to do something about the disease in the cardamom plants. Due to lack of facilities of transportation and marketing there is no income source for villagers even if they produce vegetables and various fruits. And Eco-Tourism facility should be provided to the villages. The older generation of the village are artisans who can manufacture the bronze and copper utensils. For this facility of marketing should be provided so that the income source of the villagers can be increased. A night school should also be opened in the village. A gas cardamom dryer should be provided for the villagers so that one can save the forest and at the same time the quality of cardamom can be improved. A water flour mill is much needed so that villagers instead of going to town can bring their maize, millet and wheat in the village itself. Another source of income of the villager can be increased if a small paper factory is installed in view of availability of ample ‘Argeli’ (raw material) in the village.

Tholung Chana

A member of this particular region came with the map of his village and ideas to raise the income of his people. He had no marketing facility for his vegetables. Among the fruits he informed that there is some apple orchards too. His village is in need of solar water heater. There is a scope of Eco-tourism as the scenic views of his village is breath taking. A guest house for the tourist also needed. In his concluding remarks he informed the gatherings a need of Solar Passive House for the guest as well as people who visit the gumpa.

Upper Vok

Amrita Thapa, group leader of the region with her resource map commented about income generation of the village. She informed us that one voluntary women group is formed and monthly Rs.20 is collected from them. But till now the same amount is not deposited in the bank. The main income ways of the village they produce cardamom, maize, vegetables, pickles and ginger etc. But the ginger is the most important crop of the village. Every household cultivates the ginger up to 50 munds. Along with ginger they produce pickle and amla. They requested through SWRC a training for pickle manufacturing can be arranged in the village. There is a wasteland in the village a haven for wild beasts where a Dairy farm can be installed but the lack of knowledge about this subject is the main hindrance. At the same time they requested about a disease is spreading in there ginger crop and any knowledge about this can be valuable to the villagers.

Lower Vok

The member of Lower Vok (South Sikkim) also confided the same problems of his village. Shri. Rabindra Rai the member of the above village gave his report of his village. The people are not in a position to finance on their own on Solar Light. All the other problems of his village is same as Upper Vok. He placed his demand of a water flour mill as the traditional method of grinding is time consuming. He enquired about solar light can be arranged by SWRC.

Upper Omchu

Village Energy and Environment Committee's members Birtha Ram Rai with his village resource map he formed the gathering. That 17 houses are in his village. There is poor source of income of the villagers. A need of gas fire cardamom Dryer as the people are using traditional method due to which the deforestration is taking palce. He expressed his views on his recent exposure tour to Kurseong Saint Alphans Social Agricultural Center (SASAC) he revealed his wishes about the Dairy farm and Poultry farm. In addition, due to lack of drinking water if a rain water harvesting tank can be arranged in his village.

Sadam Gupti

Pravin Rai of that village representing the village informed the gathering about SWRC has constructed a Rain Water Harvesting Tank. 18 houses of his village are benefited by this tank. To upkeeping of this tank monthly Rs.5 is collected from each house hold.He informed the gathering that the village produces various types of vegetables and especially Gladiolous flower. But there is a lack of marketing facility. He also informed about the poultry farming.

2nd day the 18th august 20

Today the DC, North, DDO, Joint Director of Education Department, Manager NABARD Gangtok including members of VEECs, women group staff SWRC, Matthew Camp, Technical Advisor (ASVIN), Pranab Chowdhury, Development Consultant Jamshed Pur, Gharkhand and members of SLYA (North) attended the meting.

The meting started with display of vedio slide show of SWRC's workshop. The Organisation's member Shri. Shiva explained the activities of organisation. A member like villager Shri Nimcho Tshering confided the available resources of his village and how these resources can generate the income of the village. DC, North and Manager (NABARD) informed the gathering about the smooth running of the solar light already fitted in the villages.

The smooth running of the solar light there is a monthly collection of Rs.51 and Rs.25 for the maintenance and replacement of Battery's as well as salary for BSE cannot be maintained. So an income generation of the village through other schemes should be looked for. The VEEC member Shri Nimcho Tshering again placed his demand of a community guest house as well there is a lack of medicine in his village P.H.C. The DC, North explained that all these things happen due to their lake of complains from the villages.

The DC, North also suggested a memorandum from the villagers explaining the condition of the village about the health, sanitation and other developmental works which will be fulfilled.

The other schemes for the developmental works in the village SRDA can provide loans subject to repayment of the loans taken earlier. The DC North also explained that instead of using middle man the villagers should open of a co-operative society. So that their produce mainly cardamom can be marketined by the villagers themselves so that the villagers can obtain the right prices.

The President of Sikkim Lepcha Youth Association (North) Sri Loden Lepcha said that all the developmental works and health awareness camps should be organised with the help of local NGOs. The DC North wanted a public helping hand in the developmental works.

The VEEC members Shri Mika Lepcha demanded with the DC, North that all developmental works in the villages should be done with due consultation with the NGOs as well as panchayat members. He also demanded a road leading to SWRS, center should be rebuilt by the government itself. The DC, North Gave his assurance on the subjects.

ANNEXE V

ANNEXE V.1

Discussions held in Tripura Devi on 11 & 12.07.2001 on the diagnosis work.

Participated to the discussions: Rashmi Bharti (AVANI), Rajnish Jain (AVANI), Vincent Stauffer (GERES), Matthieu Camps (ASVIN).
Three tools are designed for the diagnosis work.

- **Village resource map**. Elaborated by the community workers with VEEC members. This will be constantly upgraded. More information can be recorded on these, linked to the various activities proposed.
- **Household survey**. Gives information at the family level. To be collected by the community workers. Format proposed by AVANI. EU project villages data are already available.
- **Activity appraisal**. Economic, technical, socio-environmental issues to be investigated. Specific formats will be developed when required, and kept in annexure.

Based on the workshop presentations held on 10.07.2001, the VEECs have listed the resources and possibilities identified in each village, they have indicated this on the village resource maps. On the next page is a brief summary of the resources / possibilities.

Starting on page 3, are the issues related to each activity and the information or data expected to be collected by the local team. Some of the initial activities proposed which have not been underlined by the VEECs have been kept below, the team can still collect information and keep it in view of any shift in the activities in the coming months.

Time frame and team involved. The community workers and team leader (cf. document Study on development of economic activities in Kumaon region of Uttaranchal – Report upto June) will be involved in this work. This should last throughout July, August and September. Follow up and discussions with M.C. will be held regularly in between. Feed back will sent to GERES through the monthly progress report.

	Boran[1]	Boran[2]	Simayal	Mana	Lamgingra (Mehrodi)	Simgari	Bhayou
(i) Situation and resources:							
	Alt. 7,500' ➢ Forest: oak, pine & buransh ➢ Natural fibres: hemp and bhimal ➢ Fruit trees: kafal, walnut, citrus, orange, pears and apricot trees ➢ Medicinal plants ➢ Traditional handicraft (ringal + hemp) ➢ Water flour mills ➢ Youth organisation (Nav Youwak Mangal Dal) ➢ Agriculture fields	**Alt. 6,500'** 1. Forest: oak, pine, kafal & buransh 2. Natural fibres: hemp ringal and bhimal 3. Fruit trees: kafal, walnut, citrus, orange and pears trees 4. Traditional handicraft 5. Water flour mills 6. Youth organisation (Nav Youwak Mangal Dal) 7. Agriculture fields	**Alt. 4,500'** 1. Forest: oak buransh, & pine 2. Fruit trees: kafal, mango peach and pears trees 3. Medicinal plant (samyo) 4. Water flour mills 5. Agriculture fields	**Alt. 5,000'** 1. Forest: pine, buransh & oak 2. Natural fibres: hemp and bhimal 3. Fruit trees: citrus 4. Women's group, spinners and weavers Water flour mills	**Alt. 7,000'** 1. Forest: pine, buransh, oak and utis 2. Fruit trees: pears, walnut, peach trees and chesnuts 3. Medicinal plants 4. Women's group 5. Water flour mills 6. Agriculture fields	**Alt. 7,000'** 1. Forest: oak buransh, & pine 2. Water sources and water mills 3. Women group 4. Agriculture fields	**Alt. 3,500'** 1. Forest: pine, and rithas trees 2. Medicinal plants in the bank of the river 3. River 4. Agricultue fields 5. Natural fibres: rambans and bhimal 6. Water flour mills
(ii) Identified possibilities:							
Oak tussar	√	√	√	√	√	√	
Pine needle briquetting	√	√	√	√	√	√	√
Fruit conservation / processing	√	√	√	√			
Medicinal and aromatic plants	√		√				√
Eco-tourism	√					√	
Vegetable growing / green houses	√	√	√		√	√	√

[1] Chalk, Mer, Kanaura, Okhaldhar, Chauna, Dotari

[2] Thyantoli, Siradi, Ghangal, Sukna, Chakhdhar, Dharmoli, Pyantoli

Wool and natural fibers processing	√			√			√
Fisheries						√	

1) Green houses for vegetable cultivation

a) Outside

i) **Market** of Berinag and Gangolihat: vegetable vendors' survey (what, when –3 seasons-, how much they buy and sell, supply / origin of the products, is there a period of total non-availability, broadly describe the area they cater to –number of villages, etc.-?). Try to analyse the latent demand (= if local vegetables are available, the situation changes, does the demand increase?).

ii) **Finance** mechanism. Describe the existing schemes (rural banks, Govt. agencies –meet BDO, etc.-).

iii) **Technology**. Explore the compost technology (vermicompost, trench, etc.), the irrigation technology (drip, etc.), greenhouses technology (polyhouse, trench, mulching, etc.), pest and pathogen control (and availability of organic pest repellent, knowledge about it, link this with the cultivation of medicinal plants in the area), crop rotation technique, availability and cost of quality seeds and seedlings. This should be a list and description of existing technique (resource centres, suppliers, etc.)

iv) Based on the market demand / supply situation, explore possible **crop management strategy**. Backward and forward integration of vegetable cultivation = seedlings at the beginning of the season / harvest of vegetables / harvest of seeds at the end of the season). (In order to determine the crop management strategy).

b) Inside, village / household level

i) Household level: water availability, human resource (seasonal availability, skill, tools and implements, division of labour in the familly), biomass, frequency of going to the bazar and buying fresh vegetables, availability of finance for investment.

ii) Village level: sale of vegetables (if any) in the village, rates to be compared with main markets, communication facilities, distances to markets, mode of transport, transportation cost.

2) Poultry farming

a) Outside

i) **Market** of Berinag and Gangolihat: list the places (kind of shops) from where eggs and chickens can be purchased. Quantity sold, seasons, prices. See the latent demand (= if local eggs / chicken are available, the situation changes will the demand increases?). Origin of the eggs / chicken? Is there a price difference between imported and local products, breeds.

ii) **Procurement & supply**. Where is the **feed** available? Type, quality and price? How can it be delivered to the villages? AVANI's position at this level is: *this should be a limited input in the villages, local varieties from the hills with local feed should be promoted (household waste), only necessary components (minerals, calcium) should be purchased from outside. Non industrial practices have to be investigated.* Where is the nearest chick supply centre? Where are medicine, and veterinary available?

iii) **Networking required technology input**, see the work done by other NGOs (alternative rearing practices, etc.), identify resource centers for future training. Possibilities of having an incubator / hatching facility locally.

iv) **Finance** mechanism. Describe the existing schemes (rural banks, Govt. agencies –meet BDO, etc.-).

v) Based on above information, explore possible **strategies**. Feasibility of extending the Barefoot concept (training of a local technician). See the possibilities of integrating this activity with farming (collecting the birds' manure for composting).

b) Inside, village / household level

i) Household level:

(1) **Present consumption habits** (eggs / chicken) frequencies, occasions.

(2) **Identification** of families already keeping hens / chicken. See their **skill**: what are the rearing practices (chick supply, breeding, feeding, disease control), and economic results (self-consumption or sale, production, income, difficulties). Analyse *the needs for improvement*. Discuss their interest for continuing and broadening this activity, level of investment acceptable from their side.

(3) **Future perspectives**: what are the possibilities and potential for keeping hen / chicken in a wider way? Products for local feed? Investment at every level (birds, chicken coop, medicine, feed, etc.). Scope for networking the producers (supply of chicks, medecine, feed, transport and sales).

ii) Village level: rates to be compared with main markets, communication facilities, distances to markets, mode of transport, transportation cost What type of product is available in the villages which can be used for feeding the birds. (Use of GERES software for defining the optimum feed contents based on available products).

3) Wool and fibre processing, oak tussar

Fibers available in the area. *Wool, Silk, Nettle, Hemp, Bhimal (fodder tree, new shoots are used), Agave (cactus plant). All of these will be described, then studied, the objective at the end of the study is to see which are offering the best potential. For each fiber, information to be gathered:*

a) **Raw material availability**. Quantum available, procurement strategy for some (wool) or harvest from forest. Broad assessment in the selected villages, based on the size of the forest, present resources. Explore the possibilities of cultivating some species.

b) Present **local consumption** and **local skill.** See the ratio quantity required of raw material / finished products. Scope for increasing the production with the present resources? Collect data such as quantity processed at the family level, time spent on collection and processing, finished product value, sales on the market. See the present link wages ←→ quality. Compare the rate of finished products and processed fibers. Assess the present difficulties for the people involved in these activities. Possibility of upgrading the skills and look at labour availability (seasonal factor). Look at the impact on the environment.

c) **Local market demand** (finished products). See the products available, prices, how much do the families producing these are able to sell at present? Trends on the market and factors leading to acceptance or not of the products (price, quality, fashion, etc). *N.B. Present marketing channels of AVANI can be used for such products later, notably in South India where the sale of products derived from fibers (other than woolens) have a very good market potential. Existing contacts, sale outlets can be used in the future.*

d) **Technology, process**. Possibilities of mechanisation of extraction of the fibers. Describe briefly the present process for each fiber (manual, long and physically painful for some of them). GERES can explore in Europe if any machine has been designed (see the present hemp fashion). Spinning technique will be assessed as well as scope for improvement. Explore the possibility of dyeing these fibers. Generally see the tools and implements used, possibilities of up-gradation. Energy inputs required, match this with the existing resources in the villages, alternative sources of energy. Water resources required, match also this with the existing resources.

4) **Eco-tourism**

a) Outside

i) Meet **travel agents in Kumaon** (Almora for example): what is the present situation, any "tour" in villages? Main tourist season? What is the origin of the tourists? Trend in the area. Demand for eco-tourism, for linkages with development projects in rural areas? Acceptability of the concept (like stay in village houses, eat local food, etc) and interest of having a kind of "label".

ii) GERES can see with **foreign travel agencies** (in France for example) already associated with this concept the scope for supporting such initiative in Kumaon. Role of appropriate travel agents to advertise, and get appropriate.

iii) See the **Uttaranchal Govt**. policy? Any plan to develop eco-tourism?

b) Inside

i) **Infrastructure and facilities**: (household level)

(1) **Strategy**. Initial discussion on boarding, lodging, medical facilities.

(a) Whether villagers are ready to accommodate tourists, which also means upgrade their facilities (toilet, running water, hot water etc.), introduce new means (alternative energy sources) and investment aspects.

(b) Or do they rather foresee a community house (existing, to be built?).

(c) Task distribution within the family (private guest house) or within the community (in case of joint management of the infrastructure).

(d) Cultural aspects to be discussed.

(e) See the architecture: how to revive traditional skill, restore old houses, avoid use of concrete house (idea of "label" to promote such tourism, guaranty for the quality (stay, food, etc.).

(f) Based on above, need and possibility of training villagers (look for resource centres).

(2) Broadly **estimate**:

(a) quantify the number and respective capacity of the villages (number of houses or rooms available for accommodating tourists), possible facilities to be listed (guides speaking English, transport -mules, etc-).

(b) describe the potential, village wise (scenic beauty, historical / cultural interest, wildlife, linkages with AVANI or other projects – sale of handicraft-, promotion of the development activities,).

(c) look at the access to these villages, possibilities of "treks" from one to the other (see the footpaths, access of the villages, time required to go from one place to the other –tourist speed!-, distances to tourist spots, etc.). prepare a detailed regional map (Berinag, project area)

(d) see the seasonability associated with the villages proposed (different altitudes, see climatic conditions, etc.).

ii) **Environment aspects** to be taken care of:

(1) Energy source (cooking, heating of water), and possibilities to use eco-friendly ones. Prepare list of equipment, manufacturers, prices, cross check with the other study's subject "*Solar equipment, manufacturing and repair"*

(2) Issue of solid waste management (easier with local products being used).

iii) **Networking**. How to coordinate and communicate from one place to the other (information, booking, some places for night halt, some other for lunch etc.). Feasibility of setting up a label: whose responsibility can it be (villagers, AVANI, travel agents, Govt.?)

5) Conservation and storage of seeds and grains and fruits

This activity will be studied following a two step process

a) **Production and local strategies**.

i) Outside.

(1) **Market survey** of fresh fruits (Berinag, Gangolihat) Season, types, prices, quantity, origin of fruits and nuts. See also the situation of Almora. As a second step, information can also be collected in Delhi markets. Try to analyse the latent demand (= if local fruits are available, the situation changes, does the demand increase?).

(2) **Networks** for supply (any producers' groups?)

ii) Inside

(1) **Quantum** available (household survey) numbers of trees, quantity of fruits and grain. Losses & unsold products for the grain and the fruits. Also record the production of nuts (in this cased storage issue does not arise)

(2) **Time & labour input** required in this activity as practiced now (season wise). Compare with other activities and discuss villagers' priorities.

(3) What is the present **strategy**: self-consumption, or sale? For the fruits, distinguish between citrus family and temperate fruits. At the village scale, is there a group of producers?

(4) Describe the present **storage facilities** (fruits and grains) and their limitations.

b) **Perspectives**. *A priori*, according to AVANI's description of the situation, focus will be rather on storing aspects than processing as sale of fresh fruits is in high demand

i) Taking into account the time component required. Analyse the time / seasonal availability of farmers.

ii) Look at possibilities of accessing **appropriate technology** (cold storage for fruits and safe storage of grains –storage in inert gases- and if necessary for processing). Where and how to design such technology. Price and investment, compare with present losses.

iii) **Producers' organisation** issue. How to face contractors (at present 1 quintal of citrus is sold 80 Rs to contractors coming from Haldwani)? Can they get together? Hire trucks and sell their products? Coordination to be stronger in the market. Is the use of new technology to be designed for private or community use?

iv) If required, investigate the **possible marketing channel** for Almora and Delhi.

6) **Extraction of oil**

Another organisation in Kumaon (AROHI, Mukteshwar) presently producing apricot oil and looking for expansion has offered to buy kernels from this area. In case the production capacity is very important here, they have also proposed to help AVANI get the technology and start a producing centre. Such arrangements, depending on the production capacity will have to be discussed and formulated between AVANI and AROHI.

a) Inside. This subject is linked with the previous one. Apricot and peach kernel is presently in demand in the market. From the above survey the possible **production** in the selected villages will be estimated.

b) Outside. List the processed products on the market (oil, scrub, etc.), brands, prices, amount of sales, type shops offering this product. Production units in Kumaon (location, capacity, form of organisation – private company, cooperative, NGO, etc-. Explore the existing technology (oil press suppliers, power required, capacity, etc.).

7) Solar equipment, manufacturing and repair

This is a service, that can be provided through AVANI, and facilitate local employment.

a) SPV lighting

i) A **survey** in the concerned villages should first assess the number of solar home lighting systems and lanterns have been installed. Functional and dysfunctional. Demand for new systems in view of future procurement.

ii) Compare this with the resources at AVANI level (staff, size of the workshop), does it match, how to bridge the gap if any? This is considering the need for the barefoot engineers to develop as a sustainable group, generating their own income through these activities.

b) **Solar water heaters** and other thermal applications
The demand can not be expressed yet in the market, as this will be a totally new product. This is linked to eco-tourism, as well as wool processing for which this seems feasible. The same way the demand was created for solar lighting systems, the demand can be created for solar water heaters.

i) For solar water heaters, some institutions in the area (hospitals) or private structures (hotels, restaurants) or Govt. ones (KMVN) could be approached (network of Govt. owned hotels in Kumaon).

ii) Parabolic solar cookers with concentrator allow to keep the stove inside the house. It could be manufactured at AVANI workshop.

(1) Enquire about the existing technology (manufacturer in Ghaziabad, experience led in Auroville).

(2) Record the food and cooking habits (timings, type of food)

(3) Record the wood consumption for cooking showing seasonal variations

(4) Survey, in the villages selected (interested in eco-tourism), a sample of houses. Look at the structure of the house (location of the kitchen, shading), calculate the percentage of houses presenting favourable conditions? For the others, what are the alternatives?

8) Pine needle briquetting

a) Mainly, investigation will revolve around the **technology for making the briquettes** and technology for **burning briquette**, as well as the cost effectiveness.

i) Keep contact and continue exchanges with HIMCON, which is at the experimentation stage. Enter into contact with Nepal project led by CEE

(Center for Environment and Energy) in Lukla, Namche Bazar where two production centres (capacity of 1,000 briquettes per day).

ii) Issue of size of production (household, village or larger scale) to be addressed keeping in mind the economics and availability of raw material (pine needles, mud) and possibly power.

iii) Practical trials can be envisaged at AVANI with the purchase of one system from I.I.T. It will also serve a s a demonstration for surrounding villages.

b) **Compare** this technology **with other existing means** (LPG, wood, kerosene)

i) Cost effectiveness

(1) To be compared with commercial energy sources (LPG, kerosene). For example, for winter and summer, cost of cooking (boiling a certain amount of water, or, to have a more "user's approach", one day cooking for a family).

ii) Time factor

(1) Fabrication time to be compared with wood collection time (keeping the above reference, for boiling a certain amount of water, or one day cooking for a family).

(2) Risk in term of supply (seasonal, transport, unavailability on the market, etc.)

iii) Environment impact

(1) Compare the carbon dioxide emissions between briquette (including processing), LPG, wood, kerosene.

(2) Compare advantages of each source (for example, briquetting: lowered fire risks, regeneration of forest, etc).

9) Medicinal and aromatic plants

*The two main issues are the **production** (two possibilities: harvest from the forest or cultivation) and later on **marketing**. At present, focus will be on the collection practices in forest, local knowledge about their use and self-consumption. As it is not established that this activity can lead to income generation in the villages the work is at present understood as a way to apprehend the situation. In case, after few weeks, AVANI gets indications that it can become an economic activity, the following questions will be detailed and more precise formats elaborated.*

a) What is the trend? Is the knowledge being kept and transmitted, any action required at this level?

b) Collect documentation on medicinal and aromatic plants in the area (publications might have been done, research work, etc.).

i) One of the first actions is to identify local resource persons in this field. The local team can then start documenting.

ii) The objective is to get a list of the local medicinal / aromatic plants, the quantity available, the time required for collection, the season, the market rate.

c) Supporting agencies: *Bheshaj Sangah* (Govt. promoted agency / collectors' cooperative) is the official and legal way to sell plants harvested: contact to be established. *Uttaranchal Govt*. has started to promote the cultivation of medicinal herbs. This has to be investigated to assess the type of support they propose, what is their strategy, etc.

d) One production unit of incense sticks closed in Gangolihat, which can be investigated: reasons, production level before closing, marketing etc.

ANNEXE V.2

Discussions held in Mangan on 18 & 19.08.2001 on the diagnosis work.

Have participated to the discussions: Shiva P. Rai (SWRC), Namgyal / Kathup (SWRC), Pranab Chaudhury (Resource person), Matthieu Camps (ASVIN).

Definition of the diagnosis work

It was firstly agreed that there are three tools designed for the diagnosis work.

- **Village resource map**. Elaborated by the community workers with VEEC members. This will be constantly upgraded. More information can be recorded on these, linked to the various activities proposed.

- **Household survey**. Gives information at the family level. To be collected by the community workers. EU project villages data are already available.

- **Activity appraisal**. Economic, technical, socio-environmental issues to be investigated. Specific formats will be developed when required, and kept in annexe.

Based on the workshop presentations held on 17.08.2001, the VEECs have listed the resources and possibilities identified in each village, they have indicated this on the village resource maps. The chart ***"Village planning - outcome of Mangan workshop with Village Energy and Environment Committees VEECs) -August 2001"*** summarises the resources / possibilities for South then North Sikkim, it can be used as the first tool.

It should be noted that Donkong VEEC representatives could not attend the meeting. On the other hand, Muguthang, Tholong Gompa and Sadam-Gupti villages have requested SWRC to join the process. They already have a village committee and development activities initiated by SWRC.

Before going into details regarding the design of the second and third tools, it was agreed that an initial assessment of SWRC competence and knowledge about the various activities selected should be made. This exercise was done and one can refer, in this regard, to the second chart ***"Village plan - interface with other agencies - August 2001"***. It gives the issues related to each activity and presents what SWRC knows or can handle at present (in blue font), or what has been identified as a gap (in red font).

Keeping in mind the information available and the present gaps, specific questions for each activity proposed by the villagers were listed (NB some of the activities which have common features have been grouped). Some are given in blue font that can be collected shortly by SWRC, some in red font, that may be collected later by SWRC or resource persons. These questions are given from the next page onwards.

1) Fodder & feed development

a) Inside information

i) From the VEEC, farmers

- ✓ Kind of fodder used by villages at present, in three languages (Nepali, Bhutia, Lepcha)
- ✓ Type of fodder collected season wise
- ✓ Field grazing, stall feeding, season wise

b) Outside information

i) From Govt. dairy, private dairy, other NGO -preferably in rural area-

- ✓ Quantitative information (green fodder, feed) per day, etc. If possible contents of feed, otherwise, company name

ii) From dairy experts

- ✓ Feed contents / ingredients, quantity, rate, availability & from where to procure

2) Dairy

a) Outside information

i) From experts, Govt. dairy dept.

- ✓ Training facilities, existing schemes
- ✓ Investment, running costs (economics)

3) Processing of ginger, chilli, amla, herbs, dhup, dyes…

a) Inside information

i) From the VEEC, farmers

- ✓ Based on farming seasons (1) June-July-August (2) September-October-November (3) December-January-February (4) March-April-May, collection of data, for each item (1 page per item), will be done: quantity available, rate, to whom is it sold?
- ✓ For the medicinal herbs, dhup (which is made out of 3 items) and dyes, a list of all of them has to be made on separate charts, answering to the same questions. But instead of collecting at household level, the information will be recorded at village level (individuals will be reluctant to answer the questions since these forest products are banned for collection).

4) Cardamom re-plantation, disease control and processing

a) Inside information

i) From the VEEC, farmers

- ✓ Present cardamom production and rate village wise
- ✓ Disease pattern (symptoms) seasons wise. Action taken by farmers to control the disease?
- ✓ Re-plantation already undertaken? If yes, what is the variety used, and from where is it procured?
- ✓ What are the trees or plants presents in the cardamom fields? Why?
- ✓ Farmers suggestions on the above points (2), (3), (4)

b) Outside information

i) From Govt. Horticulture Dept, ISPS, Spices Board

- ✓ Discussion, suggestions on disease control issue, re-plantation strategy, mixed cropping systems.

5) Green houses for vegetable cultivation / Mushroom cultivation

a) Inside information

i) From the VEEC, farmers (here household wise):

- ✓ Season wise vegetable production and intake / surplus sales (in that case, rate)

b) Outside information

i) From Gangtok, Mangan and Jorethang markets:

- ✓ Market survey. To be undertaken later by a specialised agency, after initial pre-selection of suitable products has been done (difficult for SWRC Sikkim to take up a detailed market survey).

ii) From Gangtok

- ✓ Assess the mushroom demand in Sikkim (cities) and from where the products are coming from, market rates?

iii) From Melli and Rangpo (entry points of Sikkim)

- ✓ Collect information in these two places from the auction centres: what kind of vegetables and fruits are imported into Sikkim season? Quantities? (Establish first friendly relationship with president / owner of the auction centre!)

iv) From ISPS, Horticulture Dept.

- ✓ Check previous market survey reports
- ✓ Availability of green houses technology in Sikkim itself. Then ascertain the need for outside help

6) Water mill

a) Inside information

i) From the VEEC, farmers

- ✓ Present processing practices used by the villagers
- ✓ If they go outside, where are the centres, distance to the villages?
- ✓ Rate per kilo + cost of transport

7) Floriculture

a) Outside information

i) From Govt. Horticulture Dept, ISPS, Spices Board

- ✓ Present strategy and planning for development of floriculture in Sikkim
- ✓ Market survey (supply to buyers outside Sikkim)

8) Eco-tourism

a) Inside information

i) From the VEEC

- ✓ Any trekking route designed?
- ✓ Plans for staying arrangements for tourists at village level (place selected, mode of management…)?
- ✓ Availability of local craftsmen (architecture, etc.)

b) Outside information

i) From Gangtok: Tourism Dept., ECOSS, and private travel agents…

- ✓ Tourist flow, origin, pattern (season, interests, requirements…)
- ✓ Future plans and strategy

9) Yak products (meat, wool, skin, milk, butter, cheese, bone marrow)

a) Inside information

i) From the VEEC

- ✓ Present production, and rate at the village level season wise
- ✓ Marketing channel
- ✓ Present skill for processing

b) Outside information

i) From Lachen, Mangan

- ✓ Enquire about the marketing channels, what is the present demand, and for what?

ii) From Gangtok, Cottage Industry Dept., Khadi commission

- ✓ Enquire about leather technology, handicraft (wool, vegetable dyes…)

10) Hand made paper and ink

a) Inside information

i) From the VEEC

- ✓ Availability of raw material village wise (trees, black soil, bamboo)

b) Outside information

i) From Gangtok

- ✓ Assessment of range of such products available in the market. Type, rate, buy and keep some samples

Then, the household survey format was designed and some of the above questions were incorporated into it.

Time frame and team involved for the diagnosis work

The community workers and team leader will be involved in this data collection work. This should last throughout August and September. Follow up and discussions with M.C. will be held regularly in between. Feed back will sent to GERES through the monthly progress report. Pranab Chaudhury will plan at least one more visit, in order to follow up the data collection, and help in compilation & analysis work.

The involvement of VEEC members in data collection was discussed with them after the workshop. It was agreed that they will support the community workers in the villages: teams will be formed and SWRC workers, accompanied by members from VEECs in the various clusters (South, Dzongu, High altitude), will spend several days in a village, collect data, cross-check information. The idea is to get as accurate information as possible (especially on raw material quantities, workforce, etc.) so that feasibility assessment of the activities is relevant. SWRC being now well known from the villagers, and the solar lighting project having already been implemented, the contact with people and trust from them will be better than for the EU survey in 1998-99.

Ultimately, the objective of the diagnosis work is to give the possibility to SWRC to

plan the integration of these new activities in the village context:

6. timeframe of the activity, resource -human, financial, raw material, etc.- (in the year, seasonally…)
7. inter-connection of the activities (compatibility, complementarity…)
8. type of involvement (individual, community) - infrastructure, investment, management…-
9. capacity of investment

prepare, while combination the above factors, the village wise activity chart. (activities / months of the year with proper human resource planning).

ANNEXE VI

ANNEXE VI.1

Vegetable and fruit cultivation

Situation

Sikkim diverse ecological conditions ranging from tropical to alpine support the cultivation of varieties of fruits, vegetables, in and out of season and are also excellent for commercial crops like cardamom, ginger, oranges… The varied climate also ideally allows Sikkim to supply neighbouring areas "winter" vegetables grown at higher altitudes during summer.

Productivity and yields, however, have remained low because horticulture, like other land-based activities in the state, is practised in a largely traditional fashion. Most of the area is still under mono-cropping (one estimate put it at 93% of the non-irrigated area); farmers use traditional tools and follow traditional practices; crop cultivation is mainly manual or animal-based; and the use of chemical fertilisers and pesticides is low.

Various marketing functions, such as collection, storage, grading, handling and forwarding, transportation, financing and selling of horticultural produces of farmers are presently handled by middlemen. Very often, the high number of middlemen multiplies the charges, that become out of proportion as compare to "services" they propose to commercialise the farmers' produces. Lack of access to market information on crops, hampers the cultivators in making informed decisions about what to cultivate, when and where to sell, and middlemen take full advantage of this situation keeping farmers' margins very low.

Fruit and vegetable production has been declining during the past decade. Main problems assessed by the Government and other agencies concerns the supply of seeds and nursery plants, as well as the lack of marketing infrastructure (until recently, there was no wholesale market in Sikkim, middlemen controlling the whole system).

Poor transportation infrastructure with high transportation cost (hilly terrain) is also an important issue.

These difficulties have a definite impact on the production cost (seeds have to be purchased outside as Government farm can not supply sufficient indigenous seeds to every farmer, involving higher cost and often delays) and lead to inadequate profit for the farmers.

One more point that is important is the small percentage of irrigated cultivated land, and cultivators time their crop cultivation to coincide with monsoon. This has contributed in keeping the yields low and limited the range of crops that can be grown. Most of the streams flow through deep gorges, making them impossible to tap for irrigation purposes. Diverting water from these streams through field channels has resulted in poor water use efficiency, and has had a disastrous effect on the fragile landscape, causing landslides.

Nevertheless, the GoS expects that a real "take off" could take place in this sector once farmers have access to improved marketing channels (both for getting inputs and to sell their crops). The increased profitability will induce the farmers to go for improved farming technique, which should be provided through adequate training programmes.

In recent publications, the GoS also links the development of horticulture sector with tourism. Tourism can certainly sustain part of the local horticulture production.

Figures and data collected - Observations

Sikkim is a net importer of all essential agricultural goods. A survey for the definition of a wholesale market[3] (1996) shows that the total fruit and vegetable **import was 9,374 tonnes** while the **export was 2,206 tonnes** (figures from the two check posts of Melli and Rangpo).
If we distinguish vegetables and fruits, the main items are summarised in the table below:

Table 1 - Import / export of vegetables and fruits

Main products	Imports (tonnes)	Exports (tonnes)
Potatoes	2,756	431
Onions	1,173	-
Tomatoes	1,102	73
Cabbages	624	93
Cauliflower	613	-
Chillies	300	2
Brinjals	299	-
French beans	60	97
Green peas	26	160
Oranges	31	1137
Pears	2	86
Bananas	292	5
Mangoes	214	1
Apples	168	-
Lemons	60	1

Table 2 - Totals for vegetables and fruits:

Products	Imports (tonnes)	Exports (tonnes)
Vegetables	8,501	956
Fruits	873	1,250
Total	**9,374**	**2,206**

The only items for which export exceeds import are French beans and green peas for the vegetables and oranges (major item for export) and pears for the fruits.
Overall vegetable production in Sikkim has fallen, from 35,000 tonnes in 1990-91 to 30,000 tonnes in 1996-97, and potatoes production from 34,970 tonnes in 1990-91 to 26,000 tonnes in 1997-98. It is a **net decrease of 14% for vegetables** and **25% for potatoes**. No more recent figures are available, but it is interesting to underline that, in the meantime, the Sikkim population, that was 405,000 in 1991 is estimated in 2001 at approximately 550,000. On the considered period, the **population growth could be estimated at 18%**.
These figures show clearly the insufficient production to meet the population requirement, there is a definite gap of demand / supply on Sikkim markets.

[3] Cf. Bibliography - horticulture, Simon Young

These are for the State level data, considering the villages studied, the following information could be extracted for the surveys:

Answers to the questions raised in the ToR

The cultivation of vegetables in the villages studied could be strengthened keeping in mind the market issues. The overall short supply scenario in Sikkim is favourable, but market access has to be considered. More focus was given to North Sikkim as in the course of the study it appeared that it was the most probable location for future projects (more villages, scope, and community participation).

Linkages with eco-tourism activities in Upper Dzongu could give a basis to this activity with a seasonal immediate market and good value addition potential as tourists would require ready made meals.

Local markets (like Mangan) can also be targeted in priority as a lot of fresh vegetables come from the plains. Later on, one should also consider the possibility of competing in Gangtok markets.

Another interesting possibility is to target, on the long run, the army market, very important in North Sikkim. At present, their consumption does not enter into the figures given above for State level production and imports. They have their own channels and mostly rely on imports.

In case the VEECs, with the help of organisations like SWRC, can set-up strong marketing linkages (through their future Upper Dzongu committee as far as supply of eco-lodges is concerned), avoid middlemen and manage a good access to inputs (seeds, seedlings - even by producing them), the scope for vegetable cultivation as a profitable activity can soon emerge.

Appropriate linkages have been identified with G.B. Pant Institute for technical inputs, thanks to its facility located at Pangthang (South Sikkim) where villagers can get trained in bio-composting, water harvesting tank (for which SWRC has also a very good experience and competence) and polyhouses, polybeds, polypits and sloping agriculture land technology.

So, to conclude, in the present context, one should favour the popularisation of home vegetable gardens with introduction of simple poly-houses & poly-pits. With, in addition, two option:

- Opening a seed bank managed by VEECs / SWRC at a central place like Passingtang or Mangan
- Or, by opening a permanent nursery

As far as appropriation of new production and management tools is concerned, there is a definite need for orientation and training. For example, the introduction of bio-compost and vermiculture is required.

ANNEXE VI.2

Poultry farming

Situation

As described in **Erreur ! Source du renvoi introuvable.**, almost every family in Sikkim rural areas rears some livestock. It may be for selling locally as well as for self-consumption. Rearing chicken for eggs and meat is also common in villages, but the production is never on a significant scale.

Since 1995, the importance of poultry farming is increasing day by day. The population increase has raised the demand level for eggs and chickens. Tourism development has also had an impact on this demand.

As there is no big farm in and around Gangtok, there are heavy demands for these products. Poultry farmers are willing to increase the quality and quantity of their products, but are facing great difficulties (diseases, chick supply).

The GoS is conscious of this situation, and is trying to improve the awareness level of farmers and villagers about this economic sector. Under *Jawahar Rojger Yojana* scheme, the Industry department is disbursing loans amounting upto Rs. one lakh (1,00,000/-) per farmer under Government norms and condition. GoS is also giving subsidy of Rs.7,500/- per farmer. The department of Animal Husbandry is giving necessary guidelines and training.

It is now proven (experience of a project like "***Development of small scale livestock activities in Sikkim, India***" implemented by the GoS [Department of Animal Husbandry and Veterinary Services] and funded by the FAO) that improved poultry farming (better breeds and management practices) can **increase by 200% the egg production**. Over and above the self-consumption, the sale of eggs can bring cash and have a significant impact on poverty alleviation. It has been observed there is a reduction in dependence on moneylenders, and the gender issue, as women generally handle the activity, benefit from it. Their expenses are firstly dedicated to food and medicine for their children.

Figures and data collected - Observations

Table 3 - Main poultry farms in Sikkim (industrial):

Location	Farm characteristics
Mangan	One Govt. farm - 600 birds One private / broiler - 15,000 birds One private / layers - 4,000 birds
Namchi	One Govt. farm - 600 birds
Gyalshing	One Govt. farm - 600 birds
Karfectar	One Govt. farm - 600 birds
Rhenock	One Govt. farm - 600 birds

Poultry farmers of the state are not willing to rear layer birds due to transportation problems especially during the month of May, June and July leading to heavy losses. Arrangement for marketing of eggs is by jeep, bus or van in the private sectors. In the government farms as there is a heavy demand for eggs and chicken the consumer itself often drops in the farm to collect the products.

Two methods for keeping poultry are used: deep litter and cage system.

According to the last available report from Animal Husbandry and Veterinary Services department, there is no private hatchery in Sikkim.

As far as government hatchery is concerned, there was an incubator with a capacity of 13,000 eggs till 1992, but it closed due to the construction on its land of the referral Hospital at Tadong near Gangtok. At present, the Sikkim Poultry Development Corporation (government undertaking) which includes the Sikkim Hatchery is installed at Tokal Bermoick (20 km from Gangtok). This poultry farm disburses day old chicks to the poultry farmers.

Some other reports show that there is no functional hatchery centre in Sikkim, and chicks have to be imported.
There is no firm manufacturing poultry farming related equipment in Sikkim and as far as feed production is concerned, there used to be a feed mill in Ranipool (Sikkim Ani Feed) which closed in 1993. All equipment and feed must be imported from Siliguri.
To render the veterinary services at village level, the Animal Husbandry and Veterinary Services department has established a network of "Veterinary Stockman Centre" in each block. In reality, as for many Government schemes, unfortunately, the contact and actual work on the ground lacks (problems of means, funds, willingness, communication with farmers…) and the final delivery and output is not satisfactory.
The latest figures, from the Animal Husbandry and Veterinary Services department show that:
Production of eggs from exotic breeds such as Key Stone Golden, Hisex-white and Hisex-brown amounts to 70%. At the same time their Census reveals that all over Sikkim the ratio local / improved breed is around **3.3 / 1** and, for layers, is **3.9 / 1**. The difference could be explained if the figure of 70% comes from Government and private industrial farms, whereas the second figures (ratio) come from village level surveys (census). Ref. to:

"Dept. of Animal Husbandry & Veterinary Services, Poultry Census, District level and Sub-division level "

- The percentage of eggs consumed internally is 60-65% (by the producers).
- Average number of eggs laid per hen: 230 eggs/annum.
- Average price of egg: Rs.2/- each
- Feed consumption of chickens and adults birds: 500 tons/annum
- **Egg production in Mangan sub-division**: From the Census, one can also underline that the present number of layers in Mangan sub division is 3,140 (local 2,215 and improved 925), which can give an approximate figure of 7,22,200 eggs produced per year. Compared to the population of approximately 30,000 ? it gives an average 24 eggs per year per capita. That is less than the all India average of 36 eggs/year.capita (100 in urban centres, and 15 in rural areas) and may not be sufficient for self-consumption.
- **All over Sikkim the total egg production** is, with around 47,000 layers (census + private + government farms), 10.8 millions eggs per year. With a population of 5,50,000, it makes only 20 eggs/year.capita. Considering Sikkim is a mountainous State, with mainly non-vegetarian food habits and a probable average consumption of eggs at least equal to the Indian average of 36 eggs/year.capita, this figure shows there is a deficit in eggs production. If one add the tourist inflow of more than 1,50,000 per year, this deficit is further increased (with a consumption assumed at 100 eggs/year.capita, and an average duration stay of 5 days, the expected annual consumption of eggs by tourists is an additional 200,000 eggs).
- **Meat production / consumption at Sikkim level**, the total chicken production for meat is around 43,500 birds per year (census) with an additional 15,000 from private broilers (Mangan) so about 58,500 birds are produced in a year, whereas the consumption, according to a private report is 8,50,000 birds per year. It gives a net import of **7,91,500 birds** per year. In other words**, the production only covers 7% of the needs**.

Answers to the questions raised in the ToR

Considering the costs of inputs (feed, chicks that have to be imported), as well as the present marketing difficulties, one should consider poultry farming as a side activity, on a small scale (backyard poultry), meant for self-consumption and local sales of surplus (eggs and meat). Unless it is a very big unit, the economics of the activity are very risky (even in plains, poultry farmers find difficult to maintain their profit margin).
Even though there is a great demand for meat, it does not seem, at this stage, possible to set-up appropriate networks to produce and commercialise chicken on a larger scale. And, as mentioned above, the commercialisation of eggs is problematic due to transportation. So, from the project area, targeting big centres like Gangtok is not recommended.
Keeping in mind the possible development of an eco-tourism project in Upper Dzongu, the linkages between production of eggs and chicken could make sense, as the local demand would increase.

At present, one can recommend, in the present context of backyard poultry:

- To go for improved breeds
- To prepare the feed with local material: corn, millets, cereals, papaya (when available in low altitude villages, otherwise other type of fruit) & vegetables. As far as possible, to add some nutrients supplements (at the scale of several villages, BSEs/VEECs network with back-up from SWRC, can play of role to ensure proper supply).
- To improve the vaccination service (same remark)
- To see the feasibility to design small heat chambers for winter
- To introduce small incubators

ANNEXE VI.3

Non Timber Forest Produces - NTFP - (cultivation of medicinal plants and minor forest produces processing for incense stick production)

Under this paragraph that starts with a common presentation of the situation, we aim at looking at two kinds of concrete activities, the cultivation, processing and marketing of medicinal plants as well as aromatic plants required for producing incense sticks. The idea being to promote low volume-high value products for the benefit of local people, while offering an alternative to banned - therefore illegal and unruly - collection from the wild and direct export through networks of middlemen.

Situation

44% of the total geographical area of the State is under forest cover. The forests are repository of wild flowers, medicinal herbs, bamboo, ferns and numerous varieties of flowering plants.

The Indian forestry sector is currently undergoing a significant transition. There is an increased focus on conservation and subsistence needs of forest-dependent communities, reflected in the latest forest policy; and there is an ongoing debate regarding the role of the corporate private sector and of individual farmers.

Although positive policy changes are under way, significant policy bottlenecks still remain in place. These include a number of policies, laws and procedures that inhibit or restrict private sector participation in sustainable forest management; they range from land ceiling laws to tree felling and transit rules. These were generally made with good reasons in the past but need to be reviewed in the present context. Many of these issues are now the subjects of lively debate in India.

Apart from the government and the private sector, other significant players influencing forestry sector policies, at national level include NGOs, the judiciary and donor agencies. A strong NGO lobby has emerged over the past few years. The judiciary has also started taking keen interest in environmental issues. Several Supreme Court judgements, often in response to "Public Interest Litigation" cases filed by environmentalists or concerned citizens, have had a profound impact on the forestry sector, and, in the case that interests us, the ban on collection of any product from the reserve forest (NTFP).

This can be considered as an extreme answer to an emergency situation, in order to curb the over exploitation of resources in many forests of India. In Sikkim too, the pressure of population explosion as well as commercial exploitation and indiscriminate and non-systematic collection of medicinal and aromatic plants (90% being harvested from the wild) has led to severe pressure on the availability of these plants, many of which are now rare, threatened or endangered.

But, at the same time such judgement made very far away from the real stakeholders, has a very important impact on the local forest people livelihood, as seen in North Sikkim (Lachen area, and further North). There are simply and suddenly deprived of one important source of income, without any alternative offered. The enforcement of the judgement has come during 2000-01, so we could see on the field the impact through all the discussions that were led with the communities.

The officials, dealing with forest issues are aware of the situation, and we organised several meetings in Gangtok and Mangan to raise this issue, but as far as reserve forest is concerned, they have to abide by the Supreme Court judgement.

Nevertheless, it seems policies, at least what is under Forest Planners' power, are changing and the transition that the Indian forestry sector is currently undergoing presents both threats to the 'old order' and a number of opportunities for change. Many of those opportunities concern the conditions under which the private sector can play a part in sustainable forest management. A proper integrated approach of cultivation and processing, could provide income to local people as well as help conserving the wild species.
In Sikkim, the forest department has an NTFP branch, actively working to assess the actual status and availability of various raw material They have also been running field trials programmes in 20 plots that are operated at different altitudes, and nurseries are being set-up in order to produce planting material.

Cultivation of medicinal plants

Sikkim is endowed with a long and old traditional medicine heritage, which is plant based. There are more than 100 species reported to be of medicinal use, and more than a dozen are used in Sikkim providing remedies for a wide range of health conditions[4]. Other estimates give records of 400 plants of therapeutic value in the Sikkim Himalayas[5].
The indigenous system of medicine practised in the Himalayas depends on the variation of medicinal herbs found there. The Amchi system is especially known for relying upon the flora of higher altitudes of the Himalayas.
As underlined in the introduction above, the plant extraction from forests was an important source of supplementary income for the people living around forest areas in North and West Sikkim in the past, and the ban imposed for extraction has adversely affected their earning. The NTFP branch of the department of Forest is convinced that *"…traditional medicine industry can create income and employment, wealth not only for industry but also for the farmers, tribals and women*"[6]. It further states that "*But this can only happen if the current policy makers broaden their outlook and stop unsustainable exploitation of nature and see their future progress as a parallel to the progress of thousands of small farmers all over the State*".
Thus, if there is a deadlock as far as continuation of earlier collection practices, one can say that the understanding shown by the GoS to find alternatives is very positive.

Figures and data collected - Observations

Different sources were used for information collection: discussion with the Government officials, a visit to a voluntary agency located in Darjeeling and implementing a medicinal cultivation programme, articles published on this topic, as well as household and village surveys.

The **Forest Department** has a tissue culture laboratory and has established nurseries in various places. The main species planted by them are:
Picrorhiza kurrooa, Nardostachys jatamansi, Orchis latifolia, species of *Aconitum, Panex pseudogingseng, Taxus baccata, Bergenia cilita, Swertia chirata, Rubia cordifolia, Sapindus detergens, Zanthoxylum aromatum, Evodia franxinifollia, Podophyllum*.

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[4] According to the department of Forest, Environment & Wildlife ***"Prosperity through integrated development of medicinal plants in Sikkim"***
[5] L.K Rai, G.B. Pant Institute ***"Conservation threats to some important medicinal plants of the Sikkim Himalayas"***
[6] Same reference as [4]

Table 4 - Survival rate of main medicinal plants species planted by the Forest department

These species seem to have shown very good results after series of trials:		
Method I	- Pit planting -	success of 60%
Method II	- Line sowing -	success of 75%
Method III	- Conceal plantation -	success of 90%

The department has also standardised propagation technique for some of the species. For example:

Table 5 - Propagation techniques for some medicinal plant species

Species	**Propagation technique**
Taxus baccata (stem) *Tupistra* (Nakuma)	rhizomes are given mist chamber treatment and raised in polybags
Aconitum *Nardostachys jatamansi* *Podophyllum* *Allium wallichhii*	seeds collected and sown in mother beds, seedlings pricked and planted in polybags
Picrorhiza kurooa (Kukti)	rhizome is used as planting material

In total, the Department has selected 13 species for high hills and 25 for middle hills[7].
Access to information, visit of nurseries, and supply of planting material, for initial trials have been discussed with some officers of the NTFP, GoS. They have also proposed their guidance in selection of plants to grow, taking into account the micro-climatic conditions and the plants already growing there, in the wild. They insisted that the formal authorisation should first come from the head of the Department (The Principal Chief Conservator of Forest, and Secretary of Forest, Environment and Wildlife, GoS), which should not be a problem.
Last point discussed with them was the need to have a "certification" systems in order to properly label the products (origin, quality, even for the processing technique) so that it can be recognised as genuine on the market. With the current ban on collection of NTFP, there is suspicion on the market that a lot of products are adulterated. On that level, too, the GoS could extend its co-operation and set-up a certification / labelling procedure.

Another source of information has been the NGO **Panchavati Greentech**, located in Darjeeling (North Bengal). SWRC Sikkim co-ordinator, accompanied by Pranab Chaudhury went there and had extensive discussions on this subject with Prof. D.C. Lama, Secretary.
Panchavati Greentech has started tissue culture of medicinal herbs like **chirata** (*swetia chirata*) with financial support of the Department of biotechnologies, GoI. So far, tissue culture is successful but hardening has still not been standardised. Chirata is a plant growing on upper hill forest, from an altitude of 1,600 to 2,600 m, the water extract from the plant is generally used during fever (and malaria), other uses are in bronchial asthma, dyspepsia and debility.

[7] List available in Table 7, page 54 of the document "A project design workshop on medicinal plants and orchids".

The propagation technique this organisation uses is through seeds. It is easy and they are cultivating it in 10 acres of land through one self-help group. Their experience could be relevant to us, as discussions with VEECs in Upper Dzongu shown that some of them already think of going for chirata cultivation, having heard of some successful projects in Eastern Nepal. So far, they did not know about Panchavati Greentech, whose contact was given by GoS, NTFP team. Based on the practical experience of this organisation, the following information could be collected:

Table 6 - Chirata cultivation by Panchavati Greentech

Chirata cultivation:	
Cultivation cost (per acre)	Rs 3,000/-
Yield per acre	60 kg of dry material (about 3,000 plants)
Selling price (per kg)	Rs 100/- to Rs 150/- (see the foot note [8] as this price is controversial)
NB. According to Prof. Lama, no manure and no weeding required	

According to these discussions, these figures show the profit is not high[8] (around Rs 4,500/- per acre, which is less than cardamom with Rs 7,000/- to Rs 8,000/-). In order to encourage farmers, the return should be raised up to Rs.10,000/- per acre, which is possible with proper agro-technological intervention.
However, Panchavati Greentech experience is useful and people of Sikkim can start from there. Prof. Lama was very cordial, helpful and he has agreed to provide their expertise as and when required for cultivation of medicinal plants and procurement of planting materials.
Moreover, they have the plan, as a second stage, to go for tissue culture of following plants:
Aconitum ferox, Nardostachys Jatamansi, Picrorhiza kurrooa, Piper longum, Acorus calamus, Podophyllum hexandrum, *Panax* pseudo-ginseng, *Taxus baccata, Orchidis latifolia*

From the **articles collected**, a lot more information can be used for establishing future project strategies by taking advantages of the research and development already done in this field. See the summary table below.

[8] This figure of Rs 100 to 150/- per kilo was given by Prof. Lama during the visit. Pranab Chaudhury, who placed an order during his visit, was told the rate would be Rs 200/- per kg. Later on, when the quotation was received from Panchavati Greentech, the rate given was **Rs 700/- per kilo**. After that field visit, P. Chaudhury also made a market review in Siliguri and found the price there is Rs 600 to 700/-. This also possibly means the farmers are not given a fair price, and with even Rs 500/- per kg, in the situation where the group gets 60 kg of dry material per acre, **Rs 30,000/- could be earned in one acre, which is then very high**.

Table 7 - Specific bibliography collected on medicinal plants in Sikkim

Document title[9]	Information contents
Prosperity through integrated development of medicinal plants in Sikkim → Strategy → Lists	• This recent report (2000) prepared by the NTFP division of GoS proposes a list of recommendations to the planners of GoS as far as medicinal plant cultivation is concerned. • It lists 120 plant available in Sikkim (botanical name, local name, distribution - altitude, part used, medicinal and other use). • It lists the medicinal plants prohibited for export. • It lists the plants used by Vaidya Nagaraj (Tamil Nadu - Ayurvedic centre) for treating various ailments.
Use of medicinal plants of Sikkim in Ayurvedic medicine → List	• It presents the 20 most common medicinal plants that are used by tribal population of Sikkim, and gives the local and botanical name, the uses, the drugs prepared out of it and their occurrence.
Ethno-botanical studies on Lepchas of Dzongu, North Sikkim, India → Research results, nomenclature.	• It reveals that Lepcha tribe of Sikkim uses 141 plant species in their daily life (wild edibles, dye, fibre, fish poisoning, aromatic, fodder, timber and traditional medicine, etc). • A nomenclature is given (local name, botanical name, part used) for each of the following usage: edible plants ; dye making ; fibre processing ; aromatic / incense ; fodder ; furniture / construction ; traditional medicine). • It concludes by recommending small botanical gardens to be raised by Lepcha to serve their interest (preserve the culture), but also reduce the pressure on the forest.
Conditions for replanting and conserving high valued Tibetan medicinal herbs → History of Tibetan medicine. → Planning and strategy issues for Sikkim.	• It first traces the history of Tibetan medicine, and the long-standing tradition in the use, the proper time of collection and medicine preparation. • But due to increase in population and its needs, the availability of plants has suffered, therefore it proposes conditions for replanting, highlighting the importance of the quality over the quantity factor, if Tibetan principles are to be respected. • Environmental and socio-economic aspects are considered, and questions raised to the planners in the conclusion.
Tibetan medicinal plants: an agenda for cultivation → Line of arguments for cultivation of medicinal plants in Sikkim.	• It elaborates on the reasons for launching projects on medicinal plants cultivation in Sikkim. (1) Ideal location, (2) economic benefits, (3) cultural affinity, (4) concrete and specific proposal [value of the plants already known - no ethno-botanical research further required], (5) valuable contribution to Mankind's medical heritage, (6) contribution to national health care system, (7) contribution to bio-diversity and conservation of nature. • It short lists 24 medicinal plants suitable for Sikkim (botanical and Tibetan name)

[9] Cf. complete reference in List of references and contacts established in Sikkim

Conservation threats to some important medicinal plants of the Sikkim Himalayas → Detailed study, information on plant-wise collection patterns.	• It is a detailed study of 6 medicinal plants: *Aconitum heterophyllum, Podophyllum hexandrum, Nardostachys jatamansi, Picrorhiza kurroo*a, *Swertia chirata* and *Bergenia ciliata,* with a view to promote successful conservation of these threatened species, as well as others. • It studies the plants characteristics; their distribution over Sikkim (map); their seasonal extraction (quantities, month-wise and site-wise); their prices (1993) on Sikkim market. • It gives a calendar year collection in kg, and compares the collection pressure with Nepal figures ; the plant numbers required to reach 1 kg and numbers harvested annually in Sikkim ; and some Indian Institutions involved in R&D on medicinal plants. • It focuses on propagation and cultivation as accompanying measure to conservation.
Status of medicinal plants and their cultivation potential in Sikkim → Technical guidelines based on field research (carried out in Sikkim). → Strategy.	• From a status survey of 40 medicinal plants of Sikkim, it proposes a grouping into five groups, in terms of potency and market value, and giving strategies and recommendations for their cultivation. • It summarises the results obtained by the GoS, NTFP division on its 20 plots of land • It then broadly outlines perspectives for future programmes in Sikkim (N.B. article published in 1994)
Agro-techniques of some high altitude medicinal herbs → Technical guidelines based on field research (carried out in Garhwal). → Economics.	• It is a detailed study of four important high altitude medicinal herbs: *Aconitum balfouni, Aconitum heterophyllum, Picrorhiza kurroo*a and *Podophyllum hexandrum*, with a view to develop techniques for their cultivation. • Gives tables on their characteristics; their seed production potential; their germination rate under field conditions their stem cutting rooted rate after 50 days (for *Aconitum* species); their yield potential and economics under different conditions.
Approach to project design on medicinal and aromatic plants → Planning and strategy issues.	• It focuses on important conditions to be met before going for large-scale cultivation of medicinal plants in Sikkim. Then, it proposes two independent strategies: (1) Promoting the cultivation of economically important medicinal and aromatic plants where the market and the technology package is established and needs to be adapted to suit local conditions. (2) Conservation, domestication and sustainable utilisation of over-exploited, threatened and endangered plant species that are being indiscriminately harvested from natural habitat. • Under the first strategy, a list of 11 plants is given and important issues for successful implementation. • Under the second one, it proposes immediate and long-term measures for a list of 13 plants, with clear guidelines ranging from NGO involvement to utilisation of modern techniques.

Answers to the questions raised in the ToR

There is no doubt that cultivation of medicinal plants is a viable and profitable venture. The problem right now is that lack of practical example in Sikkim.
The demand on the market, the prices are very high. Ban observed by the Government is on wild plants, but commercial activity is feasible on private or village land, the GoS can authenticate the origin and quality of the products.
Gangtok and Siliguri are two markets that are easily accessible considering the high value-low volume of the product, once dried.
Drying aspects will require some research and development, at the beginning simple technology can be suggested and developed by GERES.
At present two options can be seen (that can be combined):

- To go for cultivation of some species, that can be undertaken at two altitude levels:
  - **High altitude**: *Juniperus*, *Nardostachys grandiflora* (Jatamansi), *Aconitum*, *Picrorhiza kurooa* (Kutki), *Orchis latifolia*, *Rheum emodi*, *Heraccleum wallichii*, *Bergenia ciliata*, *Allium wallichi*, *Panax pseudoginseng*…
  - **Middle hills**: *Swertia chriayita* (chirata), *Piper longum*, *Zanthoxylum allatum* and *Sapindus detergens*

  These plants have already been tried (GoS, researchers…) and initial know-how on their cultivation is available. Inter-cropping with vegetables, cereals can also start so that farmers get regular income from their fields. As many of the above species are long duration plants (1.5 to 8 years cycle), an alternative strategy should be to partly consider short duration plants (like peppermint, bergamot mint, scotch mint, kuth, valeriana). In the list of middle hills plants, chirata and *Piper* have rather short cycles.
  According to the researchers of NFTP, GoS, cultivators can earn from Rs 71,500/- to Rs 5,50,000/- in 7 years per hectare.
- To start as soon as possible raising nurseries of the above plants. There is a great demand for planting materials, but nobody, so far as really set-up a convincing system of supply. If the villages in Upper Dzongu can supply seedlings, the profit will be very consequent. Considering a profit margin of Rs 0.50/- per plant is made, one hectare plantation 1,10,000 seedlings / plant cutting can be managed and Rs 55,000/- profit is possible.

While the preparation of nurseries, and plantations is being undertaken by the villagers, preservation, processing of the plants, including oil extraction can be assessed more in details. For that, CIMAP, Lucknow is the right resource centre to visit (cf. footnotes [14] and [**Erreur ! Signet non défini.**]).
It should be underlined here that the villages that came up with idea of medicinal plant cultivation (Leek-Salim-Safo) have already identified land, on middle hills, private adjacent plots that can be combined and managed together (8 ha of land in Salim) as well as at higher altitude, in a place that seems common to these villages. They are now speaking of a common venture for this particular cultivation, and could share a common system for future processing, marketing, etc.
Linkages with eco-tourism are described in the next section (incense sticks production).

Incense sticks production (aromatic plants)

Processing of Sikkim forest resources needed for incense sticks production mostly takes place outside Sikkim, local people are only involved in low-level / lowly paid tasks such as collection, with middlemen controlling the supply networks. This means that Sikkim is loosing a lot of potential revenue by leaving industries located in other States adding value to the raw material and getting most of the profits.
Being also under NTFP, the same ban applies for the raw materials needed for this activity, and for the last two years, very limited collection is authorised (on non reserve forest land) by the local authorities, and it seems that a lot of collection still occurs in an illegal way.

Here also, it can be explained by the fact that the Supreme Court judgement has not provided any alternative livelihood for the collectors, and they can not, from one day to the other, drop this source of income.

Figures and data collected - Observations

Raw material that can be used for producing **dhup** or **aggarbatti** (Indian common names for joss-sticks). They are used in most Indian households, and in substantial quantities in temples. The sticks are available in different fragrance, depending on the plant-base, or chemical used.

About 75% of dhup manufactured are of cheap quality containing only charcoal powder or low quality sandalwood powder with a mixture of 50% of wood gum powder. Cheap perfumes are used to give them a top note. In superior variety, essential oils, purified resins, natural fixative like Amber, musk and civet are used along with synthetic aromatics. Absolutes are used in the costlier types.

The production of incense sticks is a labour intensive process, and does not require high skill level. One has to prepare the powder, mixing the right proportion of various ingredients like charcoal, different herbs or plants, sandalwood and making a powder. To this powder, camphor, perfume and diethylphalate are added to enhance the fragrance (often because the quality or quantity of herbs or plants is not adequate, because of price or availability). Some bidding agents are also used and it becomes a paste that is applied on bamboo sticks and rolled manually on wooden planks. In another process, a hand-operated extrusion piston is used to produce a coil that is cut into 7 to 10" sticks. The next step is to dry the sticks and pack by bundles. Often, around cities, large production centres prepare the paste and decentralised stick production is made (at household level, payment according to the production).

The machinery equipment is very limited: grinding machine, wooden planks, balance, hand sleeves, wooden racks, plastic buckets and mugs, dipping trays and simple hand-operated extrusion piston (cycle air pump size) for the bamboo stick free process.

A complete study meant for the setting up of a dhup production cottage industry, with detailed economic analysis has been obtained. Although the raw material used does not apply to Sikkim (where there would be no import of chips / powder, etc.), the study is interesting to look at. Ref. to[10]:

"Dhup / Aggarbati production unit"

The dhup factory visited in Kalimpong was also another source of information, even if the owner refused to give any precise information on the business aspects of his activity. They employ between 10 and 20 people (depending on the activity volume), and their initial capital was Rs 1,00,000/-, with a working capital of about Rs 20,000/- per month. The workers are paid according to the volume, they get around Rs 2,000/- per month. The owner said he would agree to give technical guidance and training if a project is started in North Sikkim.

So, that is the information for the general process, industrial, or city-based process.

In case of Sikkim, Upper Dzongu, the idea is to rely on local material and manufacture dhup according to the traditional "recipe". Because the plants are available locally, and are of superior quality, there will be no need to add chemical or perfume. It can then be marketed as "pure and traditional" product from Himalaya.

The possible raw materials for that are:

Dhup jadi (***Selinium tenuifolium***), Samaya (***Valleriana wallichii***), Jatamansi (***Nardostachys grandiflora***), Sunpati (***Rhododendron anthopogon***), Dhupi (***Juniperus*** spp.) (the last two growing at high altitude)

[10] Information found at: :
http://www.smallindustryindia.com/publications/pmryprof/chemical1.html (third item)

That can be used single or in combination: Dhup jadi + Samaya; Samaya + Jatamansi; Dhup jadi + Jatamansi; Dhup jadi + Samaya + Jatamansi; Dhup jadi + Samayo + Jatamanshi + *Pyrethrum*
Ingredients like insecticide plant materials from *Pyrethrum* (for sanitary improvement) and other by-products like rice barn, saw dust, etc. can be also added.
The manufacturing process (grinding into powder, adding biding agents to make a paste, drying and rolling) would be the same, but based in North Sikkim itself.
Regarding the present collection practices, quantum of raw material available, one should underline that it has been very difficult, almost impossible to collect data on the field. This can be explained by the present ban and illegal practices that have emerged, and reluctance of villagers to give any information on this.
Two years back, it was roughly estimated by SWRC that, altogether, 60 tons of raw material is available at high altitude (above Lachen) (this was calculated considering one truck carries 120 sacs of 20 kg each). Exact proportion of products harvested was not given, but it includes Sunpati, Bhairnagpati, Gathapati. The harvesting time is May to September. The villagers proposed to process 30 tons per year. They used to sell at Rs 5/- per kg, while the finish incense sticks cost around Rs 70 to 125/- per kg.
Not explored on the field, but to be kept in mind if a project of cultivation of *Nardostachys Jatamansi* is to be launched, is the Nepal experience. An enterprise at Humla in Nepal has a success story for conserving *N. Jatamansi* and its habitat. Local people harvest the roots of this specie from nearby alpine meadows using minimum disturbance and taking only the largest plants, process them on-site and export the oil through the Humla Conservation and Development Association (ref. Biodiversity Conservation Network, 1997[11]).
An interesting feasibility study was also carried out in Nepal, Bajura District, where a Dhup processing unit was proposed to be set-up. The description of the situation in the area, its resources and problems faced in term of collection, middlemen influence is quite comparable to Sikkim situation[12].
Not directly related to dhup making, but to other aromatic plants and their oil extraction (which is also relevant to the "medicinal plants" section) is a programme led in Arunachal Pradesh[13], implemented by the Itanagar branch of RRL, Jorhat, that could, later on be a source for further technical information. A brief summary is given below:

Table 8 - Brief description of a project of aromatic plants in Arunachal Pradesh.

"Promotion and cultivation of aromatic plants and production of essential oils for the benefit of tribal population of Arunachal Pradesh"
Its main objective is to motivate local people through training and demonstration to take up organised cultivation of potential aromatic plants in Arunachal Pradesh.
224 local tribal people were trained on cultivation and processing of Citronella, Lemongrass and Patchouli. The planting material of citronella has been grown in 9 ha area and about 1.7 lakhs Citronella seedlings have been distributed to beneficiaries belonging to villages of Arunachal Pradesh.

[11] http://www.bcnet.org/learning/ar96/humla1.htm

[12] **"A study on Non Timber Forest Products in Bajura district, NEPAL volume I & II"** available at: http://www.carenepal.org/publications/ntfp/ntfp.pdf

[13] Information found at:
http://www.cosidici.com/cosidici/INSTITUTES/biotech%20product.htm

In addition, a nursery of 4,000 seedlings of Patchouli was raised for distributing planting material free of cost to the tribals. These efforts have resulted in cultivation of aromatic plants in more than 50 ha area at 5 different locations.

The institute is also setting up 4 processing units for essential oil extraction at 4 locations.

In an another project at Krishi Vigyan Kendra (KVK), Pal, dist. Jalgaon (MS), nurseries of Citronella, Lemongrass, Palmrosa, Ashwagandha, Isabgol, Safed Musali and Costus have an area of 5 ha and planting material/seeds have been distributed to 270 farmers who raised crops of medicinal and aromatic plants at their 32 ha land. The project has helped the farmers to increase their farm income 2-4 times. More than 1,000 people have benefited through training, field demonstrations and cultivation of aromatic/medicinal plants. A distillation unit has also been established for Citronella and Lemongrass.

Answers to the questions raised in the ToR

The following description of the Indian situation, and the present market and scope applies to both medicinal and aromatic plants (MAP). The ToR required a separate study of medicinal plants and dhup production, but the basic issues are one.

Cultivation and processing of materials harvested from medicinal and aromatic plants are providing the much-needed avenues of self-employment. Business opportunities in MAPs and their products are visibly on the rise, due to the uses that plant derived compounds are finding in pharmaceutical, cosmetic, and other agri-chemical industries.

Significant progress has taken place in the area of research and development in MAPs in the last 50 years. In spite of this, India's share in the world trade of market of over US$ 70 billion of aromatic and medicinal plant products is in the range of 3-5%. Out of about 100 million farming families, over 75% are marginal, operating on holdings of size below 1 hectare. As a result, agriculture has been gradually proving itself uneconomical option leading to the growers' inclination towards urbanisation.

Under these circumstances, India needs to develop sustainable agri-economic growth strategy based on pro-nature and pro-poor orientation towards viable technology development. High valued crops and their cultivation practices need to be introduced and optimised for this. In this respect, cultivation of MAPs (mediculture) is emerging as the most acceptable approach to generate additional income for the farmer. While an exponential growth in trade is envisaged in this area in the near future, a value chain is yet to be established through linkage among the three essential groups – the growers, the industry and research. Domestic market of MAPs based products has thus become volatile in the absence of the proper bondage between research and business (R&B). The global competitive ambience has therefore necessitated the need of a paradigm shift from R&D to R&B mode. A common platform to bring these three forces together has become almost inevitable to register growth in this niche area[14].

[14] This is extracted from: http://www.cimap.org/NIM_index.htm CIMAP organises a two day National Interactive Meet 2002 (NIM-2002) from 15 to 16 February 2002 at Lucknow on **"Scope and Opportunities in Research and Business of Medicinal and Aromatic Plants"**. Brief presentation of the seminar:

With its research background spanning over four decades and a commitment to develop R&D in medicinal and aromatic plant (MAPs), Central Institute of Medicinal and Aromatic Plants (**CIMAP**) intends to bring farmers, entrepreneurs and researchers to a common platform with a view to forge linkages, discuss present prospects and workout strategies for the future. Such a proactive step to provide the common platform will not only help in identifying gaps in the lab-to-land-to-market system, but also will come up with symbiotic/synergistic solutions to the existing problems in the business. It is expected

In case of Upper Dzongu project, the same guidelines given for medicinal plants apply. Because of the ban on collection, the only legal way is to take up cultivation / nurseries. The investment level required for the equipment is not high.
Some of the steps will have to be managed by the community (nursery, grinding) since it requires higher labour / care or investment, while the final product can be prepared at the household level.
Energy aspect is relevant to the grinding step (and can be assessed in the area level strategy, with Passingtang possible mircro-hydro unit being a good location), and to the drying one (although in the unit visited there is no specific drying system. The sticks are left several days, inside one room, onto trays, until dried).
Market can be local in Mangan, as well as Gangtok since there is no important transportation constraint (the product is low volume-high value, easily transportable and can be stored). Promotion and labelling are two important aspects, and SWRC, with the help of professional organisation (like Sikkim Industrial Development & Investment Corporation), and possibly GoS can help setting up a label ("*pure Sikkim Himalayan dhup*"), that can facilitate the sales within, and later, if the production capacity is sufficient, outside the State.
Linkages with eco-tourism should also be envisaged. Tourists can be encouraged to visit the fields, nurseries, special tours to identify plants, even in the wild, could be proposed. Then, visit of the facilities, exposure to the processing methods. This can favour exchanges with the cultivators; village level entrepreneurs, and encourage tourists to buy some products. The strategy here can be merged, whether one speaks of medicinal or aromatic plants.

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that there will be participation of those who are involved in the cultivation and processing of MAPs, aromatic and pharmaceutical industry engaged in business through value addition and active research, apart from the middle links in business

ANNEXE VI.4

Handicraft from North Sikkim

Handmade paper

Situation

Upper Dzongu is covered with a dense forest, and inhabited with Lepchas who have deep knowledge of the forest produces[15]. It was found during the course of the study that in the remote village of Sakyong still lives an old man who has the traditional skill to produce handmade paper, as well as black ink (cf. next § 3.6.2.).
Sakyong and other surrounding villages used to produce paper and ink and supply to Tibet Monasteries. That was prior to the Indo-Chinese war of 1962, when the border was closed. Without any market, or any idea how to find new opportunities, the Lepcha dropped that activity. Cheap industrial paper, by then, was easily available on the markets and nobody saw any use in keeping this skill, and production stopped.
So, unlike Nepal, where papermaking has always been an important activity in rural areas. and represents a great source of revenue for the hill tribes, North Sikkim villages were not able to keep that activity alive.
Fortunately, the know how has not completely vanished and these traditional techniques could be reintroduced on a cottage industry scale.

Figures and data collected - Observations

Paper is made from the locally available plant *Daphne cannabina*, locally called "argeli" or "kagatey" (this second name seems to qualify a slightly different specie that grows on higher hills, and that has better properties for papermaking).

The argeli or kagatey bush is mostly found amongst conifers or deciduous trees. In ideal climatic conditions, the plant can reach a height of 15 feet. The stalk's diameter caries between 2 1/2 and 4 inches, and its green leaves have a length of 2 to 4 inches with a width of 1/3 to 1 inch. A white flower blossoms from the plant that produces a very subtle fragrance. The plant also has the advantage of being a natural insect repellent.

Various sources of information were identified: a factory in Kalimpong, producing paper from the same plant, a survey in the villages concerned was conducted and other information from Internet was also collected.

Handmade paper factory in Kalimpong

The factory (Gangjong Paper Industry) uses, as raw material, plants from two origins: they are presently successfully cultivating the plant in high altitude areas of West Bengal (Lava village, 30 km from Kalimpong), as well as importing from Sikkim.
The quality they get in North Bengal is not as good as the North Sikkim supply, but due to the ban on collection of forest produces, their supply has almost stopped. This ban has an adverse effect as a lot of plants are anyway cut and illegally exported outside Sikkim. Moreover, recent articles have also shown that there is an important smuggling problem from Sikkim to Nepal[16].

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[15] Cf. 0, the reference about the article ***Ethno-botanical studies on Lepchas of Dzongu, North Sikkim, India***

[16] "Forest Plunder By Indo-Nepal Border Bandits", 18/04/2000,
ref. http://www.igc.org/igc/gateway/en/hl/10004204076/hl4.html

Supply is a very big limitation for them, having insufficient plantation and no other regular supply. And the factory is unable to use its full production capacity i.e. 1,000 pieces of paper per day.
The basic economics are as follow:
The production cost of per paper is around Rs 5/- per piece and each piece is sold Rs 10/-, in bulk (in private shops of Darjeeling, the price per piece sold to tourist can reach Rs 40/- to Rs 50/- per piece). They have also diversified their products (diary, envelopes, writing pads, bags, lampshades, etc; - made on special orders).
70 kg of raw materials are needed to produce 1000 paper sheets.
Due to the absence of technical person and reluctance of the owner of the factory to divulge information, we could not ascertain the plantation cost and production per acre.
Nevertheless to push forward the discussions, during the second visit we proposed a possible "deal" to him: he would be given the work to establish a new factory in Upper Dzongu, North Sikkim. Under these circumstances, with the perspective of consultancy work, or even investment opportunity in Sikkim, the owner has agreed to help establishing such unit. He underlined he had already contributes to establish a factory in Bhutan recently, for the Government.
He has also agreed to buyback the production, if necessary. From the discussions that followed, it appeared that marketing of the product will not be a problem, the demand exceeding largely the supply.
The total built up area should be around 3,000 sq.ft., and cost of the machinery, working capital would be around Rs 5,00,000/- (five lacs).
Upper Dzongu assessment

Project in Nepal
Information below is extracted from the website:
http://www.overpeck.com/photo.htm#Lama%20Li it describes the step by step technique of making paper by hand from "lokta" *(Daphne cannabina* or *Daphne papyraces).* On the website, photographs illustrate the process.
Lama Li is a Nepalese lokta paper produced by a local paper collective in Nepal. Each of the families involved in the papermaking process owns a part of the company, helping improve the economic welfare of the people of rural Nepal. The plant flourishes at an altitude of 6,000 to 9,000 feet. The bark's fibrous nature makes it an ideal raw material for papermaking. The cultivation of the lokta plant provides an environmentally sound, self-sustaining natural resource for the hill people. If cut 8 inches above its base, the lokta bush grows back and can be harvested again four years later. The lokta fibre is very long and textured, making the paper extremely resistant and durable.

Table 9 - Step-by-step process of handmade paper production

Step	Description
Step 1	Local people first collect the branches of lokta from the forest.
Step 2	They skin off the bark from the branches and the inner white layer is dried.
Step 3	The dried bark is first cooked in an ash solution in order to soften the fibres.
Step 4	After being washed in pure Himalayan water, the bark is cut into small pieces. The bark is then cooked and rinsed a second time.

Step 5	When the process of cooking, cutting, and rinsing the lokta bark is finished, the fibres are crushed on a large flat rock.
Step 6	The mixture is poured onto the surface of a screen that is half immersed in water. That screen is called a mould; its size determines the size of the finished sheet of paper. The mould is gently shaken in order to even out the pulp, and is then removed from the water.
Step 7	The mould is lain in the sun to dry slowly and naturally. When the water has completely evaporated, the sheet of paper is complete.

Answers to the questions raised in the ToR

We know there is a wide gap between demand and supply, so the market is not a problem. The difficulties assessed, for a project in Upper Dzongu will be to ensure a proper supply of raw material to reach the profitability scale if a centralised unit (fully equipped) is to be set up - i.e. 1,000 sheet per day production capacity, and to produce a good quality finished product.

The initial starting point would be to strengthen the level of knowledge and awareness of interested villagers (especially the younger generation) for the various existing products (type, price, quality of the finishing…).

In the meantime a proper project could be elaborated, and based on the various information collected, a two phase approach is proposed in order to start papermaking in Upper Dzongu, using *Daphne*.

Phase I

- Initially thick traditional paper should be produced, with the help of elder(s) still having the knowledge. This would be a "revival" of the scale, based on the existing resources, so not at a large scale, but with few motivated persons, on a family seasonal job level.
- This would also lower the risks in terms of investment, very limited. It is assume a group of 10 persons can start with an investment of around Rs. 20,000/- per beneficiary (for complete small scale equipment - pulp making unit, vat, trays). The drying part being sun based (so subject to weather). This set-up will be easier to manage than a centralised unit, with workers that have to be paid daily wages.
- At the same time, to initiate a 10 hectares of plantation (plantation cost of around Rs. 5,000/- per acre) that will be enough for 1,000 pieces of paper per day x 365 days, with a proper rotation / re-plantation sustainable system. This would lead after, 3 to 4 years, to an uninterrupted raw material supply.
- In case the project can not go, for one reason or the other to phase II, then the plantation is no lost. Since it will be cultivated on private or village land, the GoS can authorise the export of the product, and since the market demand for *Daphne* dried inner bark is really high, this would anyway generate income.

Phase II

- Once the community (specific group), additional surveys and raw material supply are ready to undertake a more elaborated project, then a full-scale factory, the size of the one in Kalimpong, with proper equipment (boiler, bigger pulp machine, etc…) could be set-up.
- Govt. should provide the built up area.
- At this stage, the community should be well organised to control the production and management system, the investment and energy aspects should have been looked into carefully (for energy cf. **Erreur ! Source du renvoi introuvable.**). The community should also consider that it requires a lot of effort and planning process to handle a business activity of this scale, and unless they are ready for it, there are chances that ultimately an outsider take control over it.

As for other activities mentioned before, and on the same mode as dhup processing, there could be interesting linkages to create with eco-tourism, tourist being able to have access to the life and work of the villagers involved. A variety of different handmade paper products should be made available locally in the eco-lodge, that tourist could purchase during their stay.

Traditional ink production

Situation

As mentioned in the previous section, black ink used to be produced from Sakyong village along with paper.
When this was discovered, we thought that it could combine very well with handmade paper and could be sold on tourist outlet as a traditional and exclusive Sikkim gift. Bamboo or cane quills are also made in traditional fashion, and can be added to the set.

Figures and data collected - Observations

Several samples have been collected from SWRC community worker coming from Sakyong village. So far, it has not been possible to list the exact contents of that ink. Black soil is the main content. It comes either from Namchi, South Sikkim, or high altitude land, that seems to fall under the Kanchedzonga National Park - so where no human or industrial activity [collecting soil will be defined as a mining activity] will ever be allowed to take place). It seems various bidding agents are used: one mushroom extract from the forest, millet or rice extracts.
Several samples have been collected, of various quality (colour ranging from dark grey to black) because, according to SWRC staff not all the component were available when the samples were made. So, in the very initial trials, it seems there are supply constraints.
Polyinks, Hyderabad, which is the second largest liquid ink manufacturers in India was approached for guidance, through a contact in Sikkim and the following initial reply was received as a pre-test, while more detailed research and development is being carried out. Polyinks produces about 3,000 tons of ink per year, and the director, who accepted to help us has over forty-five years experience in formulation of inks. They have their own factory and research laboratory in Bangalore. Extracts from their letter:

Table 10 - First assessment of Upper Dzongu traditional ink

Item	Comments
Colour	It is a fairly weak black ink. It is not strong and dense as normal inks are. It looks as if it has been made with – what we call as Iron Oxide Black, which is naturally available, but has very low colour value.
Viscosity	It is not suitable for an ink pen. It is slightly thicker than what is required for an ink pen. However, we will test it.
Pigment	– i.e.- the iron oxide looks, at the first instance, as held together with natural proteins or glue. We do have to test the light fastness of the ink.
Fastness	It is water soluble
Drying time	Drying time is more than 20 seconds and it has no tack. Thus, it is ideal for brushing or Kalam.
Additional tests proposed	We will have to test it at 25°C and then also at much lower temperatures to say 10°C to see whether the viscosity boosts up and make a sine curve.

Initial proposal from Polyinks	There are two ways in which – my initial thought process – we can make this ink: 5. We send you a kilo of concentrate (as we call it) and you dilute it with water to the consistency required. This is because, the pigment must be well ground – to less than 5 microns and it can be done in modern grinding machine. Or 6. We send the finished ink to you in One Litre bottle and you can then pot it off in smaller containers.

Answers to the questions raised in the ToR

As far as ink is concerned, it is too early to give clear recommendations, or market orientation, the activity being without any comparison elsewhere.
What can be said, nevertheless is that it is not an activity that can stand alone, but can be a complement to handmade paper production, to add value to the whole product, provided access to raw material is easy in case of large production.

ANNEXE VI.5

TOURISM & ECO-TOURISM IN SIKKIM: SYNTHESIS OF INFORMATION AND DATA COLLECTED

CONTENTS

N.B. The information has been collected and compiled taking into account GERES document FT/EA/0110.noteSikkim-ESK.DAE

A - EXECUTIVE SUMMARY

- Situation and prospect for tourism in Sikkim is assessed: a lot of potential resources but rules and regulations (either Government of India or Government of Sikkim) seem to be the bottleneck.
- Protection of the environment and local culture will be as important as providing sustainable livelihood options to the people. This is true for the long-term impact of the project, but also for the immediate persuasion of Government officials.
- Eco-tourism can be an answer to the above issue and there is a growing awareness among the administration and the village people.
- Resource persons and organisations, having already worked on eco-tourism in Sikkim have been identified and met. There is an interesting possibility of collaborating or networking with them in future.
- Given the lack of economic information for eco-tourism (profit percolation at village level), it is an apprehension that such activity will not be sustainable on its own at the very beginning (trekking route, ect. to be promoted, tourist flow to be strengthened in North, etc.). Therefore, there should be an external support for sometime, and under some form.
- There is a need of skill development in relation to eco-tourism as well as diversified income generating activities. The inter-relation between the various activities is obvious, eco-tourism, in the proposed area could be the leading activity and the eco-lodge, a local village hub-centre.
- But, for Upper-Dzongu (Leek area) the area we are looking to**, the immediate issue is to address is the permit situation**. There are conflicting information, from various sources, about the possibilities offered to Indian as well as foreign tourists to enter and visit this area.
- Since villagers have already started to plan on their own, this issue of the area being possibly open, or not, has to be discussed openly on 8/12/2001 meeting in Mangan, and immediate orientation of the planning done accordingly.
- Nevertheless, in case the GoS has no power to grant permission to tourists for Upper Dzongu, the other income generating activities identified would still remain feasible, the marketing aspect would then totally be turned towards the outside, and the production planning will be reviewed according to that market requirement. Perhaps even the "eco-lodges" could be "community-centres" (meeting place, collection-processing centre, etc.).
- Discussions have been initiated on future management systems at village / area level, possibly, an inter-village committee, approved by the Panchayat, could play an important role in management and regulation.

B - GENERAL INFORMATION ON TOURISM IN SIKKIM

B.1 A BRIEF INTRODUCTION

The saying 'Small is beautiful', is amply demonstrated by the tiny mountain state of Sikkim. With the grandeur of her mountain peaks, verdant valleys, fast flowing rivers, terraced hills and floral wealth, a visit to Sikkim is a rare and unique experience. Situated on the eastern Himalayas, in the shadow of the towering Mount Kanchenjunga, which is worshipped as the principal deity, Sikkim measures approximately 100 kms from north to south, and 60 kms from east to west.
The inhabitants of Sikkim are beautiful people who radiate with life, and a simplicity which is truly endearing. The population of Sikkim comprises of three main groups of people, the Lepchas, Bhutias and the Nepalese. The Sikkimese, are by nature, polite

*and non - aggressive people. Being devout Buddhists, they celebrate their festivals, with a distinct mixture of abandon and reserve. One of the most colourful performances in the world, are Sikkim's mask dances performed by Lamas in the 'gompa' (monastery) courtyards. The colourful dances of Kagyat, and the masked Rumtek and Enchey 'Chaams' (ritual dance of the lamas), are the popular dances, that recreate legends and myths connected with Buddhism, and the eternal triumph of good over evil.
Sikkim has an estimated 4,000 varieties of flowering plants and shrubs, that include Orchids and the rare Rhododendrons, that cover the slopes and mountains. Ornithologists have catalogued 550 species and sub species of birds, along with 600 varieties of butterflies. Its dense forests abound with endangered species of Himalayan Bear, Musk and Barking Deer, Red Panda and Blue Sheep, among other fauna. The capital city of Gangtok, monastries of Sikkim, the trekker's paradise at Dzongri, and the overall raw natural magnificence, leave a visitor to this mountain state with memories to last a lifetime. Other places of tourist interest include the Deer Park, Enchey Monastery, Orchidarium Tashi View Point, Rumtek Monastery and Phodong Monastery.
(Source: http://meadev.nic.in/tourism/states/sik/overview.htm)

B.2 A MORE DETAILED INTRODUCTION

Though small (7000 km^2), the mountain state of Sikkim occupies an important niche of its own, in the Indian Union. The grandeur of its mountain peaks, lush valleys, fast flowing rivers, terraced hills and incredible floral wealth, make a visit to Sikkim a truly unique and unforgettable experience.
Situated on the eastern Himalayas, in the shadow of the towering Mount Kanchenjunga, which is worshipped as the principal deity, Sikkim measures approximately 100 kms from north to south and 60 kms from east to west.
Surrounded by Tibet, Nepal and Bhutan on three sides and with West Bengal on the fourth, Sikkim is a strategically significant state. It is entirely mountainous, with one - third of the land covered with dense forests of sal, sambal and bamboo, which are mostly inaccessible and unexploited. Sikkim receives heavy rainfall. It is watered by the perennial river Tista, and its tributaries, which are fed by both snow and rain.
Sikkim is, today, a state of the Indian Union, due to a combination of politically significant events. Ruled by the Gyalpo rulers as a political entity till the 18th century, Sikkim appealed to the British for help to overthrow the emigrant Bhutanese and Nepali Gorkhas, who threatened to outnumber the natives. It gradually became a protectorate of the British, and this status was transferred to India on Independence, with the Chogyal as the Maharaja. Sikkim was made the 22nd full fledged Indian state, after the Indian Parliament passed the 38th amendment to the Indian Constitution on April 26, 1975.
The inhabitants of Sikkim are beautiful people, who radiate a lot of charm, life and colour. The population of Sikkim comprises three main groups of people, the Lepchas, Bhutias and the Nepalese. The Sikkimese, are by nature, a simple, polite and non-aggressive people. Being devout Buddhists, they celebrate their festivals with a characteristic mixture of abandon and reserve.

The two hundred year old Pemayangtse Monastery

Life in Sikkim is according to some, a never-ending festival, for there are vibrant festivities throughout the year. They are the reflection of the rich cultural heritage of the state, which combines Buddhism and Hinduism, with the original traditions of the Lepchas. The major monastries like Pemayangtse, Tsuklakhang, Enchey and Rumtek are important venues for Buddhist festivals. Pang Lhabsol, Drukpa Tseshi, Losoong, Saga Dawa and Dasain are the most popular festivals. A favourite form of celebration

is drinking of 'Chang', the millet beer of the Himalayas. Packed into tall bamboo containers, the drink is sipped through a bamboo pipe.

The Department of Tourism, Government of Sikkim, has been organising an annual, month-long Tourist Festival in May, at the White Hall premises in Gangtok, since 1981. Flower shows, cultural programmes, film shows and exhibitions are the highlights of the festival.
One of the most colourful performances in the world are Sikkim's mask dances, performed by Lamas in the 'gompa' (monastery) courtyards. The fascinating dances of Kagyat and the masked Rumtek, and Enchey 'Chaams' (ritual dance of the lamas), are the popular dances, which recreate legends and myths, connected with Buddhism, and the eternal triumph of good over evil.
Knotted woollen carpets with the dominating dragon emblem, and eight auspicious signs; wood carvings, Lepcha handlooms in traditional designs and rich colours for clothes, bags, linen and accessories; leather jackets and handbags, articles of homemade paper, Thanka (religious scroll paintings) and Sikkimese Dragon Jewellery make a fascinating collection of handicrafts, inspired by an age old culture.
Sikkim has an estimated 4,000 varieties of flowering plants and shrubs, that include orchids and the rare rhododendrons that cover the slopes and mountains. Ornithologists have catalogued 550 species and sub species of birds, along with 600 varieties of butterflies. Its dense forests abound with endangered species of Himalayan Bear, Musk and Barking Deer, Red Panda and Blue Sheep among other fauna.
The capital city of **Gangtok**, the impressive monasteries of Sikkim, the trekker's paradise at **Dzongri** and the overall raw beauty and grandeur leave a visitor to this mountain state, with memories to last a lifetime. Other places of tourist interest include the **Deer Park**, **Enchey Monastery**, **Orchidarium Tashi View Point**, **Rumtek Monastery** and **Phodong Monastery**.
The economy of Sikkim is basically agrarian. Maize, rice, wheat, potato, large cardamom, ginger and orange are the principal crops. Ginger, potato, orange and off season vegetables are the other cash crops. Sikkim is not industrially developed, but the government has launched a number of promotional schemes to help the industry. Temi Tea Estate, the only tea estate in Sikkim with an area of around 400 acres, has earned a reputation both in domestic and foreign markets, for its superior quality tea. A number of industrial units have also come up in the state in the area of fruit jams and juices, bakery products, beer, plastic goods, wrist watches and leather goods. At the same time, consistent efforts have been made to promote and preserve traditional arts and crafts, such as wood carving, carpet weaving, *thanka* painting, and traditional handlooms.

State Resident Commissioner in Delhi

Sikkim House, 12 Panchsheel Marg, Chanakya Puri, New Delhi. Tel: +91-11-3010747/3013026

The duties of the Foreigners Regional Registration Officer are performed by the Superintendent of Police of the respective districts in the state.

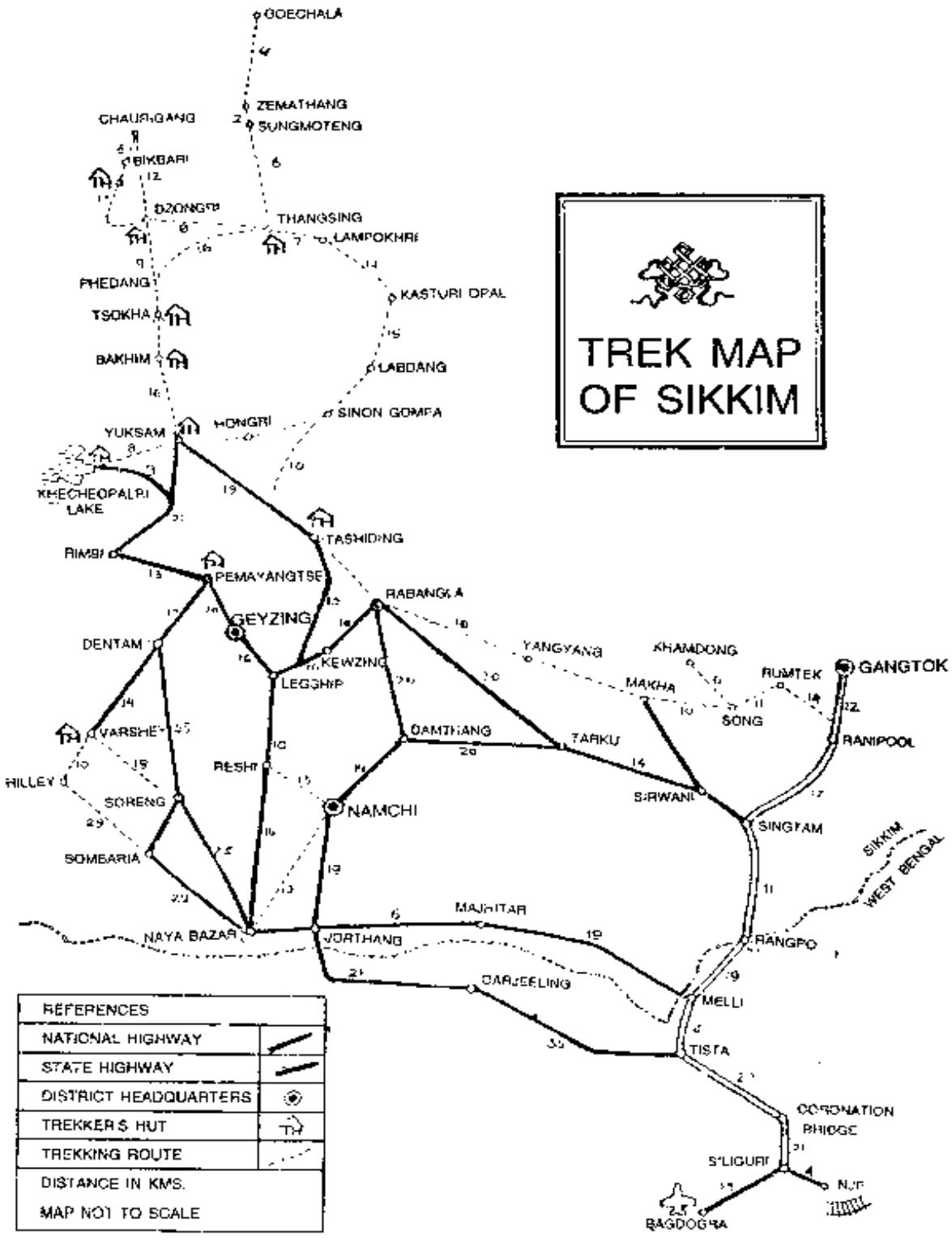
(Source: http://meadev.nic.in/states/sik/sik.htm)

B.3 TOURIST PLACES

One can refer to the official web site http://sikkim.nic.in/sws/sikk_tour.htm for detailed information:

About North Sikkim District: http://sikkim.nic.in/sws/poi_nor.htm
About East Sikkim District: http://sikkim.nic.in/sws/poi_eas.htm
About West Sikkim District: http://sikkim.nic.in/sws/poi_wes.htm
About South Sikkim District: http://sikkim.nic.in/sws/poi_sou.htm

B.4 TREKKING ROUTES OF SIKKIM



(official map of GoS for trekking routes)

B.5 ACTIVITIES PROPOSED

The tourism is promoted by the GoS as being multi-form. It claims Sikkim is the perfect destination for vacationers in quest of **enchantment**, **tranquility** or **adventure**.
Tourists can come for sightseeing, culture, religion, or activities close to nature and adventure.
"You can wander up lush green mountain trails, in the very footsteps of those early travellers . Marvel at the stupas, monasteries and temples. Acquaint yourself with a culture that is at once bizarre and fascinating. With its endless intriguing rituals and festivals and festivities. Sikkim offers you a holiday that is more than a dream - a voyage of adventure and discovery".
As far as adventure & sports are concerned tourist can enjoy:
Mountaineering, Trekking, River rafting, Yak safari, Mountain biking, Hang gliding
(More details on each of these activities on the web page: http://sikkim.nic.in/sws/tour_asp.htm*)*

B.6 REGULATIONS FOR FOREIGN TOURISTS

What are Inner Line Permits?
The entire State of Sikkim is under the restricted/protected area regime under the Foreigners (Restricted Areas) Order, 1963 and Foreigners (Protected Areas) Order, 1958. Under these two Orders issued under tha Foreigners Act, 1946 no foreigner can enter or stay in the State of Sikkim without obtaining permits from the designated authorities. These permits, officially termed Restricted Area permits/Protected Area Permits, are popularly known as Inner Line Permits.

Who can issue ILPs?
The following competent authorities have been designated to issue inner line permits :

* All Indian Missions abroad
* Ministry of Home Affairs
* All Foreigners Registration Officers
* Immigration Officers at Airports at Mumbai, Calcutta, Chennai and New Delhi
* Deputy Commissioner, Darjeeling
* Deputy Secretary/Under Secretary, Home Department, Govt. of West Bengal, Calcutta
* Government of Sikkim
* Chief Secretary, Gangtok
* Home Secretary, Gangtok
* Secretary, Tourism, Gangtok
* I.G.P. of Police, Gangtok
* Resident Commissioner, Sikkim House, New Delhi
* Deputy Secretary, Tourism, Siliguri
* Resident Commissioner, STCS, Calcutta
* Tourism Officer, Rangpo

Clearly, there are numerous authorities from which to obtain inner line permits. If one plans in advance it is best to take an endorsement on the visa itself for permission to visit Sikkim from Indian Missions when applying for Visa to visit India. Once in India, it could be most convenient to approach Government of Sikkim authorities at Delhi, Calcutta and Siliguri.

How much time does it take a get an ILP?
Normally the Inner Line Permits are issued off-the-counter without any delay. The permits would however be available only on government working days. One requires to produce the passport and visa in original to the competent authority.

Are there exceptions to the ILP regime?
Existing guidelines require that nationals of Pakistan, Bangladesh, China and Myanmar can be given Inner Line Permits only after approval from the Ministry of Home Affairs in New Delhi. Further all Bhutan nationals are exempt from the requirement of obtaining ILPs. They do not require to obtain permits to enter Sikkim. Permits to foreign diplomats and members of United Nations and International Organisations holding diplomatic/official passports are issued only at Delhi by the Ministry of External Affairs.

What is the duration of these inner line permits?
Normally the permits are issued for a duration of fifteen days for the specific purpose of tourism only. Once in Sikkim these permits can be further extended for 30 more days in two spells of 15 days each. These extensions are granted only at Gangtok by State Home Department. Extensions beyond the period of forty-five days are vary rarely given. Foreigners who wish to stay in Sikkim for purposes other than tourism for longer period of time are required to apply directly to the to Ministry of Home Affairs, New Delhi.

Once in Sikkim, what all places are 'open' for foreign tourists? What restrictions should be observed by foreigners?
Individual foreign visitors may visit/stay at any of the following towns in Sikkim
* **EAST** - Gangtok-Rumtek-Pakyong,Barapathing-Rongli-Renak-Aritar-Rorathang
* **WEST** - Geyzing . Pemayangtse . Khechepheri, Tashiding . Yuksom . Soreng
* **NORTH** - Phodong . Mangan . Singhik
* **SOUTH** - Namchi . Ravangla

Groups of foreigners (4 or more persons in a group) are allowed to visit following additional places/circuits. Permissions are granted for specific tour circuits as identified with definite entry and exit points and a specified mode of transport. Local tour operators only organize these trips and also provide a local Liaison Officer who accompanies the group.

I. East District
i. Gangtok-Penlong-Tinjure-Rumtek/Martam

II. North District
i. Gangtok-Chungthang-Lachen-Thangu
ii. Mangan-Lingzia-Shabrung-TholungMonastery-Kisong (except Yabok)
iii. Mangan-Lingzia-Sakyong-Royot Patam (except Gochala)-Dzongri-Yoksum
iv. Yumthang-Phuni-Phunichoka-Tarum Chachu-Chunbgthang
v. Dikchu-Phodong-Labrang-Namptam-Mangan-Maling-Singhik-Samartek-Chungthang
vi. Lachung-Yumthang-Yume-Samdong

III. South District
i. Sirwani-Temi-Damthang-Tendong-Namchi
ii. Damthang-Tendong-Damthong-Rabangla-Maenam-Yangaang-Singchuthang-Sirwani
iii. Rabangla-Maenam-Borong/Polout-Tashiding
iv. Kewzing-Rayong-Tinkitam-Legship

IV. West District
i. Yuksom-Dzongri (except Gochala)
ii. Yuksom-Dzongri-Thangsing-Lampokhri
iii. Utterey-Chewa Bhanjang-Dhond-Garakhet-Oktak-Dzongri
iv. Hilley-Versay-Singalila-Chewabhanjang
v. Hilley-via-Sombarey-Versay-Soreng
vi. Hilley-Versay-Dentam
vii. Pelling-Sangcholing-Khecheperi-Yuksom-Dubdi-Sinon-Tashiding.

viii. Tsomgo Lake in East Sikkim (day visit only)
ix. Mangan, Singhik, Toong, Chungthang, Lachung and Yumthang (for 5 days only)

It must be remembered that foreigners cannot stay at any place, which is not mentioned above. Violation of above instructions and conditions specified on permits are treated as an offence under the Foreigners Act and are punishable under law.

How to extend ILPs?
Foreign Visitors will have to apply for extension of ILPs to the Home Department, Government of Sikkim.

B.7 SIKKIM TOURISM OFFICES

- Sikkim tourist information centre,
  Mahatma gandhi marg, gangtok.
  Phone: 22064, 23425, 25277
  Fax: 25647.
- Sikkim tourist information centre,
  New sikkim house.
  14, panchsheel marg, chanakyapuri,
  New delhi - 110021.
  Phone: 3015346.
- Sikkim tourist information centre,
  Snt colony, hill cart road.
  Siliguri.
  Phone: 43646.
- Sikkim tourist information centre,
  Bagdogra airport, bagdogra.
- Sikkim tourist information centre,
  4c poonam building, 5/2 russell street
  Calcutta - 700017
  Phone: 297516, 298983
  Fax: 2458479.

B.8 ECO-TOURISM - GOS PERSPECTIVE

The recommendation (number 7) of the **First Round Table on the Vistas of Partnership between the Sikkim Government and the Non-Governmental Organisations** (Dec. 2000) is the following:
*"The immediate priorities for the partnership programmes are rural management, **eco-tourism**, environment, governance, health, education, mini and micro hydels, technology transfer and other income and employment generating activities and programmes."*
Address by Shri Pawan Chamling, Chief Minister, Sikkim to the National Development Council (Central Govt.). *1st September 2001, Vigyan Bhavan, New Delhi.* The four items below are of direct interest:
(20) But the most critical question is, how to transmit this high growth to the poorest of the poor living in our villages. We have to translate it into people's welfare and more equitable distribution of income. Then, what is the transmission mechanism?
(21) We have two clear options. Do we follow the same route that we followed for the last 50 years, when the entire delivery mechanism remained dependent on bureaucracy? Or, do we set up a new range of delivery mechanisms? My government feels that the challenges brought forward by globalisation are (22) This is where we see a major role for the non-governmental organisations. The NGOs can increasingly supplement and to a large extent even replace the governmental machinery. This will make the delivery of goods and services to the poverty stricken and deprived

communities a lot more effective and sustainable. We want NGOs to bring the entire spectrum of development resources including technology, management skills and finance. You will be happy to know that even as I speak here there are those who are working quietly toward this end.
(23) In order to convey our strong urge to involve the NGOs in the development process, particularly, at the grass root level, we organised a very comprehensive Round Table meeting with the national and international NGOs in Delhi. We are overwhelmed by significant and prompt response from various well-known NGOs. Many of them have already begun activities in areas, such as, **eco-tourism**, drinking water, health, education, human resource development, agriculture, horticulture, dairy development and natural heritage management.
(Source: http://planningcommission.nic.in/cmstat49/sikkim.htm)

Annual Plan 2001-02 - SIKKIM
(§ 27) TOURISM
While there been steady growth of tourism in Sikkim, this is an area which has not been fully exploited. Full exploitation of the potential of this sector is desirable as the sector has a large multiplier effect (both direct and indirect) on other sectors of the economy. Being labour intensive, it may generate large employment opportunities to the unemployed. The State has accorded priority for the development of tourism and has prepared a Master Plan . Rs.40 crore has been approved for the Ninth Plan. The Tourism Department has taken the initiative to provide infrastructure facilities in each areas as hotels, lodges, wayside amenities, trekkers' huts, etc.
The limited growth of tourism is a reflection of awareness of Sikkim as a tourist destination, inadequate tourism infrastructure and the poor connectivity of the State. Steps needed for realizing the full potential of the State, include promotion of environmentally sustainable tourism anddevelopment and promotion of special interest tourism such as adventure tourism, heritage tourism, etc.
In the promotional effort, the involvement of the private sector need to be encouraged. There is a need to explore ways of improving and standardizing the services rendered by various operators in this sector.

Comments based on discussions held in Gangtok
Behind this claim of high or even top priority to tourism, and sepcifically eco-tourism (also underlined in various press reports, articles, etc.), one has to see the realities. The GoS at present has a really limited team working on the subject (four or five members only). This team jointly under the Forest Department and the Tourism Department.
A plan has been prepared and submitted to Central Govt. for financing (5 crores), but there is no response so far. The plan was prepared by B. P. Pradhan (IFS) and different new zones were proposed (new trekking route, including one going through Dzongu, North Sikkim, and meeting West Sikkim trails (Yoksum). Another one from the same area (Dzongu) going northwise, towards Green Lake, Muguthang, and then going back to Lachen. This high altitude trek is the one proposed by the villagers of Leek and surroundings. Unfortunately, it was impossible to get a copy of than plan as the only copy on a computer was lost, and all the paper copies were submitted to the central Govt. or the Minister for Tourism. The office visited does not have a copy of the plan (!)
The officials met explained that their workforce is extremely limited, being a small team. They welcomed our proposition of working based on village participation, having local committees that could draw their own plans and co-ordinate between them for maximum benefits for the locals.
At present their, emphasis in their work is eco-tourism = natural means (no concrete foot paths, or concrete house, etc.). They acknowledged the definition is somehow

limited, but explained it is also due to their lack of resources to be more ambitious and efficient in implementing projects. That could change if the above mentioned project comes through.

On the official web site of the Govt. one can read some recommendations on eco-tourism.

A CODE OF CONDUCT FOR ECOTOURISM IN SIKKIM

We request all the Visitors to follow the following Principles of Ecotourism:

- **Conserve Sikkim's natural and cultural heritage**
- Do not trample high altitude vegetation, do not pick any flowers or medical plants.
- Do not disturb wildlife or its habitats.
- Do not allow clients to purchase endangered animal parts or antique cultural artifacts.
- Support local conservation efforts and income generation activities.
- **Avoid use of fuelwood. Use alternative fuels**
- Use kerosene, L.P.G. (or other non–wood fuel) for all cooking, heating, lighting including that by staff and porters.
- Discourage campfires, encourage camp fun.
- Follow safely rules when carrying, storing and using kerosene and gas.
- **Leave all camps and trails clean**
- Separate and properly dispose of litter, burn burnable, bury biodegradable, and carry out all other non-biodegradable materials for deposit at designated trash site or for recycling .
- Use toilet tents on all treks, set up and use toilets tents in an environmentally sound manner so as to avoid pollution of water sources (at least 100m away).
- Use established campsites and kitchen sites, avoid trenching around tents.
- **Practice Conservation**
- Avoid fuel-consumptive menu items, e.g. baked foods and large menu selections.
- Re-package food into reusable plastic containers to reduce waste.
- Reduce waste by de-and replacing also.
- **Practice proper hygiene and sanitation**
- Teach all staff about personal hygiene, sanitary, kitchen and camp routines.
- Properly treat the drinking water and uncooked vegetables for clients.
- Dispose of washing and bathing water well away from streams, use biodegradable soaps.
- **Take Responsibility for staff and porter welfare**
- Provide adequate warm clothing, sleeping cover, shoes, snow gear, food for cooking, stoves and fuel, and take care of hired staff.
- Periodically train staff in first aid, guide responsibilities, sanitation etc.
- **Properly brief clients before leaving on a trek**
- Address cultural "do's" and "don'ts", environmentally friendly behaviour, safety precautions, proper dress and respect for local beliefs, peoples and religious sites.
- Plan days for proper altitude acclimatisation when ascending, know how to identify and treat high altitude illness and how to provide emergency rescue.

(Source: http://sikkim.nic.in/sws/tour_travel.html*)*

B.9 NGO PERSPECTIVE OF ECO-TOURISM

ECOTOURISM & CONSERVATION SOCIETY OF SIKKIM

Background

ECOSS, Ecotourism Conservation Society of Sikkim is the result of a group of like-minded people getting together to accomplish a mission. A mission that seeks to

see that there is a thorough and correct understanding of the concept of '**ECOTOURISM**' and that this cannot be viewed without realizing the very nature of '**CONSERVATION'**. These go hand in hand. This is our shared vision. This is truly a Sikkimese initiative.

The need for doing this is that in today's complex world where there are economic considerations, which are far more complex and impinging on sustainability. Hence this has created space for organisations like ECOSS to work. Our mission spelt out in our objectives is proof enough of that space creation. The work cut out is fundamental in nature. So this is a Sikkimese effort for Sikkim. Enough of others coming in and telling us what to do! We have to think through all this ourselves as it involves our destiny and the future of our children. We need to rely on ourselves for our own future as no one else has a greater stake in this.

The economic drivers that are being talked about come in the shape of 'competitive advantage'. What is the global competitive advantage of Sikkim? I have given a lot of thought to this and have one answer. That is SIKKIM itself. This is unique in that we cannot have any other place in the world like Sikkim. So our recognition of this is fundamental. When we look further this translates into our natural capital. Natural Capital as defined by Paul Hawkins is all about our biodiversity, our people and our customs and our well-honed traditions. Natural Capital is about our living systems and us. It gives us much more leverage than just viewing everything in the context of financial capital and assets. We are what we are today - and that is what makes us unique. However, we are faced with the challenge of not only losing our identity but also our very soul. We are actually losing it all in the name of development. That is the irony. We could be selling our very competitive advantage to globalisation - one shoe does not fit all. We have to, therefore, preserve this advantage and that is where there is a need to have a fundamental shift in the way we think.

Ideas are powerful. Ideas can move mountains and create just about anything. Ideas also just die. Millions of ideas just evaporate daily. An idea is about thinking. So in today's session we want ideas to flow like never before. Let us today understand and debate these very ideas that are being sown - not just as a fad but something that needs institutionalizing - something that would be at the heart of our work.

If we are able to do this then perhaps sustainability is not too far off. This is what really would constitute that 'paradigm shift'.

ECOSS is born because we cannot leave development of our state to chance or to 'development by default'. We have an opportunity to actually shape it and we think that this is fundamental to our mission. Stakeholders and our partners are all around us. We need to jointly work and make this into a people's program and then and then only can it fructify into something which can be called a work of art.

When one talks of tourism the conditioning is that of Darjeeling. Darjeeling has been the role model so far. We have to change this picture. Darjeeling has been robbed of its splendour in recent times.

The hills were used for planting tea - it fetches so much yet no cream of that development process ever went into building more assets and resources for Darjeeling. Their natural capital was never used. Further the kind of tourist that it started attracting ended up in low margins for the local people. This resulted in the building up of slums - low cost tourism - just for the fun of a section of the population of Bengal - effectively building a cycle of downturn. The recent events in that area are manifestation of this malaise. They have to do a lot of hard work to change their paradigms if they are to break out of that down turn cycle. We have to also see how we can help them as this affects us all as a region.

I would ask all of you here: Are we not emulating the same paradigm? If we enter that same process will we not end up the same way? Are not so many of the signs around us screaming to us to have a relook; a rethink; perhaps a reassessment?

There is never a doubt in my mind that we need to test many other aspects. The resilience and the capacities of our people and business need to be put to the test. The end of the year International meet will do just that. We have many strengths in our community which we will harness - those of voluntarism already so amply demonstrated; simplicity, hard work and fun-lovingness. We have other attributes like cohesiveness and sheer creativity. These are to be used to come up with unique solutions to some of the challenges that would be brought to bear when we go about planning and executing this project.
I cannot over emphasize the need to have a worldview even as we seek to make paradigm shifts in our thinking of development. We need to learn of new state of the art thinking. We need to align ourselves with groups with similar views and it always helps to help save this planet! Apart from this, new technology and new markets can be explored.
This conference will give us the much-required boost. Pre conference it is going to trigger a host of Governmental interventions that are needed and in the right direction. Post conference there is going to be much more understanding of our own strengths. It will bring this newfound confidence to excite us to enhance our conservation efforts. This would indeed be the turning point of our journey into sustainability. A journey which seeks to help the present generation even as we work toward leaving enough, perhaps more, for our future.

The Aims and Objects of the Society shall be:

a) To work towards developing and promoting Sikkim as an ecotourism destination in the national and international ecotourism map.
b) To ensure that the development of ecotourism and tourism in general has positive and beneficial linkages for the marginalized communities living in the rural and mountain areas. And to protect and enhance their economic interests and their social and cultural integrity by promoting self-reliant community development initiatives that are economically and environmentally sustainable.
c) To conceive and execute projects that are aligned to the goals and objects of the Society.
d) To promote research in the areas of ecotourism, conservation and impact of development on environment with a view to enabling policy formulation and implementation that will lead to economically and environmentally sustainable development.
e) Through a process of education, dissemination of information and awareness building make the people of Sikkim aware of the value of their heritage in the state's biodiversity and to encourage them to actively engage in its conservation.
f) To encourage and facilitate the adoption of environmental studies in schools so that students at an early age understand what biodiversity means and why it should be protected.
g) To advocate a development process that is growth oriented, equitable, founded on good governance and environmentally sustainable.
h) To serve as the apex body for individuals and institutions in the region involved in the areas of ecotourism, conservation and development. As the apex body promote open and unfettered discussions on development activities that have social and environmental impact by organizing, facilitating and holding conferences and workshops. And to make available the results of all such activities in the public domain.
i) Establish and forge ties with ecotourism and conservation oriented national and international organizations with a view to furthering the goals and objects of ECOSS.
j) Cooperate and collaborate with State and Central Governments, their agencies and other NGOs with a view to furthering the goals and objects of ECOSS.

k) To proactively engage with state and national bodies in policy formulation that lead to environmentally and economically sustainable development.
l) To undertake or contribute towards the publication of research works and articles on ecotourism, conservation, environment and social and economic development that will enhance and enrich the pool of knowledge in these subjects.

Executive committee members

The Executive Committee Members shall consist of Nine Members and would ordinarily be residents of Sikkim. The First Term Office bearers and Executive Committee Members shall consist of the following:

1. Mr. P D Rai Chairperson
2. Mr. K N Bhutia Vice Chairperson
3. Mr. Rinzino Lepcha Executive Secretary
4. Mr. Ganden Lachungpa Joint Secretary
5. S B S Bhaduria Treasurer
6. Dr. Eklabia Sharma Executive Member
7. Mr. R P Gurung Executive Member
8. Mr. Loday Chungyalpa Executive Member
9. A Nominee of TAAS Executive Member

Rationale for Ecotourism Conference for the Region in Sikkim

South Asian Association for Regional Cooperation countries comprises of India, Nepal, Pakistan, Bhutan, Bangladesh and Maldives. Tourism has been one of the major areas of growth in these countries in recent years. These countries offer a great range of destinations from marine to freshwater systems, hot desert to cool desert, and from tropical to alpine climates. All forms of adventure and nature tourism are promoted in these countries. The region is developing fast, and development is expected to be linked with nature conservation for sustained growth. Therefore, it is most appropriate to organize an international conference on ecotourism with a regional focus, as a preparatory effort for the ensuing IYT in 2002.
Sikkim is a recognized global tourism destination for its richness in culture, traditions, monasteries, lakes and biodiversity. Tourism growth in Sikkim has been tremendous from fifteen thousand in early 1980s to around one hundred fifty thousand in 2000. The region harbors more than 26% of the flowering plants of India and is an important phytogeographic reserve of the country. This region is listed among the world's ten most critical centers for biodiversity and endemism. The spiritual and physical focus of the region is Khangchendzonga, the world's third highest mountain peak (8598 m) and revered as the abode of the protective deity of Sikkim.
Sikkim is new to many modern development facets and strong in environmental backdrop. Recently in Sikkim, ecotourism concepts have become an integral part of development cutting through community activities, private sector travel management to policy decisions. There have been several initiatives from the private sectors and non-governmental organizations in tourism product development, marketing, skill development and conservation. Sikkim has already sensed the ecotourism nerve and is the most appropriate place for hosting the conference. The venue of the conference, Gangtok and other Sub-Urban Centers, will permit joint examination of sites in Sikkim, and facilitate creation of interfaces between representatives from local communities, tourism sectors, NGOs/CBOs, science and technology, and policymakers at various levels of intervention. It will also allow exchanges for regional policies and cooperation.

Conference Context

In view of the expected activities leading up to the International Year of Tourism (IYT) 2002, Ecotourism and Conservation Society of Sikkim (ECOSS) decided to organize an international conference in Sikkim, India with a focus on SAARC countries in preparation for, IYT 2002. Sikkim is a mountainous state of India and by organizing this conference it corroborates for contribution also to the International Year of Mountains (IYM) in 2002. The Conference will take place during 17th to 25th January 2002, and provide an opportunity for SAARC member countries to exchange experiences on ecotourism development and conservation. The International Ecotourism Society (TIES) has been commissioned by United Nations Environment Program (UNEP) to hold six to eight regional conferences before and during the IYT 2002, and this conference is being planned to be one for the South Asian Countries. TIES has extended support to ECOSS for organizing this international conference. These regional conferences will be preparatory events for the World Ecotourism Summit to be hosted by WTO and UNEP in Quebec, Canada in May 2002. Regional representatives from the regional meetings will be given time during the summit to present their conclusions to the global tourism and environment leaders represented there.

SAAR Regional Conference & International Eco-tourism Conference

Venue: Sikkim

Date: 17th - 25th January 2002

The **United Nations Environment Programs** (UNEP) has declared the Year 2002 as the **International year of Ecotourism**. Together with **World Tourism Organization** (WTO) they are organizing a Summit in Quebec in May 2002. Leading up to this The **International Ecotourism Society** (TIES) based in Vermont, USA has been given the mandate to organize six regional conferences around the world. One of these conferences is being scheduled for South Asia Region and will be held in Sikkim in January 2002.

The dates are now final:

Jan 17th - 19th Workshop on Ecotourism - Co hosted by TIES
Jan 21st - 24th South Asia Regional Conference on Eco Tourism
Jan 25th One-day certification program

This program will seek to bring in diverse groups of people from the SAARC countries as well as Myanmar and the rest of the world interested in the Natural Capital of the Himalayas and diversity of India.

The organizers are the "Ecotourism and Conservation Society of Sikkim" (ECOSS) in collaboration with The International Ecotourism Society, Burlington, Vermont USA and The Mountain Institute (TMI).

The State Government is supporting conference and will do all within its power to make this all-important meet a success. It is indeed being seen as a very significant opportunity to place Sikkim on the world Ecotourism Map.

This program will seek to bring in diverse groups of people from the SAARC countries as well as Myanmar and the rest of the world interested in the Natural Capital of the Himalayas and diversity of India.

Wen site: http:/www.sikkiminfo.com/ecoss

(Source: Compilation from Ecoss Web site, discussions held and other leaflet given)

GREEN CIRCLE (Awareness campaigns, work with schools, participates in Govt. workshops, etc. Consist of a team of professionals of various background, working in a benevolant manner for the cause of environment in Sikkim. Eco-tourism is also covered, but no major action so far).

KHANGCHENDZONGA CONSERVATION COMMITTEE (KCC is the grass root organisation based in Yuksom that has emerged of the work done under the Sikkim Biodiversity and Ecotourism project described below).

SIKKIM BIODIVERSITY AND ECOTOURISM PROJECT

The goal of the Sikkim Biodiversity and Ecotourism project (SBE) was biodiversity conservation through increased capacity and actions of stakeholders to conserve the natural resources on which tourism incomes depend. Primary threats to biodiversity from tourism were fuelwood use and grazing by pack animals. Additional environmental threats from trekking tourism included poor garbage management. The project was part of a larger effort supported by the Biodiversity Conservation Network to test the hypothesis that enterprises based on the continued availability of biodiversity can generate economic incentives to conserve those resources on which incomes depend.

The project was a joint effort of The Mountain Institute and the G.B. Pant Institute of Himalayan Environment and Development. Project collaborators included the Travel Agents Association of Sikkim and local organisations and communities at the sites.

Sikkim Biodiversity and Ecotourism (SBE), was designed to generate incentives to conserve at more than one operational scale. Communities at the sites were not the primary focus, since there were other stakeholders, such as the commercial private sector and government, who played a key role in tourism revenue generation and use of natural resources in the state. The approach acknowledged the role of the market, tried to generate incentives based on value-addition to existing tourism services and products, and attempted to address government actions that either encouraged private enterprise or retained control within the state apparatus. Working with local communities, the private sector and government SBE used participatory strategies to:

1. Increase community and private sector conservation
2. Increase economic returns from ecotourism services and enterprises
3. Contribute to policies that meet conservation and ecotourism goals

Key achievements during the first three years of operation include:

An overall reduction in fuelwood consumption of 60% by tourism service providers and entrepreneurs since 1996 due to increased use of alternatives promoted by the project. Communities and trek operators have improved site appearance by reducing and managing levels of garbage. Grazing impacts at the key trekking sites have been studied and participatory monitoring is underway, prior to developing grazing plans. Community-based institutions have emerged (Khangchendzonga Conservation Committee) and been strengthened (Khecheopalri Holy Lake Welfare Committee) to plan and continue conservation activities at the sites.

Since the start of the project there has been an increase of between 40% to 50% in the number of households at the project sites participating in tourism-related activities. Of this increase, approximately 25% can indeed be attributed to the impact of project activities, primarily through training courses and enterprise support (porters, guides, vegetable growers). Overall revenue to TAAS operators operating along the Yuksam-Dzongri trail has increased by 17% since 1996, and to target stakeholders at Yuksam, Tshoka and Khecheopalri from tourism-related activities by 50%. Notable achievements include a base daily rate increase of 30% for porters and pack-animal operators primarily as a result of training given by the project.

Participation by the private sector and local communities in policy discussions has increased, as the Government of Sikkim adopts project models of consultation and decision-making. The Government of Sikkim has also actively sought and acted upon technical assistance given by project staff, e.g. refining tourism development proposals.

Since there had been little prior study of biodiversity in the project sites, there was considerable investment of staff and project resources in collecting and establishing base-line data. Staff and collaborators have made great strides in establishing baseline data for this "hot-spot" that provide the foundation for assessing the impact of current and future activities, and guiding policy development.

Our findings indicate that the hypothesis is a useful basis for planning conservation actions at a variety of scales. Stakeholders can and do take conservation actions because their incomes depend on the continued availability of the resource. However, as this and other projects have shown, key factors that strengthen this approach and which need to be addressed in future programs include:

* Stakeholder decision-making power over resource management
* Availability of alternatives to the resources under threat
* Stakeholder capacity and interest to monitor resource status
* Lobbying for enabling policies

(Source: http://www.mtnforum.org/resources/library/tmias99a.htm)

B.10 TOURIST FLOW

Indian tourists during 1995-2000

Months	1995	1996	1997	1998	1999	2000
January	2291	4120	4848	5983	6881	7239
February	2376	6978	4472	5478	6025	6627
March	4827	10903	8246	9708	10678	10784
April	12981	21306	15946	16406	16570	16735
May	20185	33642	24458	31307	31620	31936
June	13227	20102	9723	10807	10915	10861
July	3866	3448	4094	5087	5595	5291
August	3991	2649	4723	5028	5530	5279
September	5672	5602	5500	6847	7531	7531
October	16065	16678	13490	14508	14653	14653
November	5836	12243	12224	12346	12469	13540
December	7233	7585	8776	9653	10618	12630
TOTAL	**98 550**	**145 256**	**116 500**	**133 158**	**139 085**	**143 106**
Forecast TECS made in 1995	**-**	**105 000 to 111 000**	**114 000 to 130 000**	**122 000 to 147 000**	**131 000 to 167 000**	**139 000 to 190 000**

Domestic tourists profile:

West Bengal	60%
North India	10%
West India	10%
South India	10%
Others	10%

Foreign tourists during 1995-2000

Months	1995	1996	1997	1998	1999	2000
January	490	466	356	192	487	417
February	232	573	512	433	723	596
March	606	996	1337	590	919	1186
April	1272	1412	1294	1502	1192	1325
May	368	766	954	500	624	624
June	450	245	183	112	247	232
July	115	234	226	113	235	284
August	250	340	261	349	299	299
September	299	696	307	302	551	551
October	938	1309	1495	843	1458	1520
November	419	956	871	900	1054	1158
December	427	649	271	355	725	602
TOTAL	**5 866**	**8 642**	**8 067**	**6 191**	**8 514**	**8 794**
Forecast TECS made in 1995	**-**	**7 500**	**-**	**-**	**-**	**13700**

Foreign tourists profile (*NB doubtful*):

American
British
Germany
Italian
Japaneese

(Source Tourism Dept., GoS, Statistics 1995-2000, based on Foreign Registration Office)

It seems the forecasts made by TECS are rather on the lower side for domestic tourists and over evaluated for foreign tourist. The growth expected from foreign tourists has not taken place it is rather constant. Since the type of tourism promoted in Dzongu would rather match the foreign segment (see below, tourists' profiles) that has to be taken into account.

B.11 TOURISTS' PROFILES

Domestic (Indian) Vs. Foreign tourists, different needs and habits:

The Indian tourist is generally travelling with his family, which often includes children. This limits the choice of activities so that strenuous trekking would normally be ruled out for this tourist segment. Limited walking, picnics, pleasant surroundings and some curiosity regarding local culture and traditions is what most Indian tourists are looking for. Traditionally, Indians or people from South-East Asia are not great trekkers. The total change in global communications, television and impact on lifestyle has meant that Indian lifestyles are undergoing a change, and indian tourist have started to show an interest in trekking.

Sikkim's appeal for the foreign tourist lies in its natural setting and cultural uniqueness, but it is an ideal locale for the trekking tourists because of the pristine unspoilt environment, and the diversity of flora and fauna.

Identified tourist activity segment for Sikkim (1994):

	Domestic	**Foreign**
Current		
	Sightseeing & culture	Nature & culture
Potential		
	Dominant	
	Sightseeing & culture	Nature & culture Trekking (both backpackers and agency trekkers)
	Growing	
	Nature & culture Trekking Honeymooners Conference Resorts	

World Trade Organisation tourism forecasts for South Asia (1994):

Major generating market	**Rate of growth per annum (%)**	
	1990-2000	*2000-2010*
France	7.25	6.5
Germany	7.25	6.5
Japan	10	9
UK	5	4.5
USA	4	4

Taking WTO forecast and local assessment of tourist profiles and trends, the master plan of Sikkim defined in 1998 **the major source markets as follow**:

	Domestic	Foreign
Current		
	West Bengal	Germany
	Delhi	France
	Maharashtra	UK
		USA
Potential		
	Gujarat	South & east Asia
	Andhra Pradesh	Japan

(Source Tourism Master Plan of Sikkim, TECS - 1998)

Average seasonality index:

Relative to an annual index of 100, months of March-April and October-November are the main tourist seasons for foreigners (the rhododendrons and orchids bloom in March-April, and the climate is pleasant and dry and this is in line with the tourist season in other parts of India that extends from october to March).

Months of April, May, June and October are the tourist months for domestic tourists (in line with school hollidays, and very hot weather in the plains -summers-).

Seasonality indexes are computed (independent domestic/foreign), with an annual average of 100 (1987 to 1995):

Month	Foreign Tourist	Domestic tourist
January	43	53
February	89	59
March	128	75
April	167	115
May	93	192
June	44	119
July	37	65
August	62	62
September	83	84
October	228	196
November	150	93
December	76	87

(Source: Tourism Dept. of Sikkim, in Tourism Master Plan of Sikkim TECS - 1998)

B.12 CLIMATE

The chart below gives the average maximum-minimum temperature and the average rainfall over the last ten years at Gangtok, and the possibility of seeing a clear sky.

Although the figures pertain to Gangtok, which is at an altitude of 6,000 feet, it could be representative of the whole area, after corrections are applied for the altitude: the rainfall would decrease at higher altitudes and so would the maximum-minimum temperatures. Because of high humidity in this region, even a temperature of 30°C is considered to be uncomfortably hot.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max. °C	13.5	11.9	16.6	20.7	22.3	21.5	22.5	22.5	21.8	19.9	16.1	13
Min. °C	2	3.6	10	12.1	15	17.4	17.7	17.7	16.9	13	9.4	6.7
Rain cm	2.7	6.5	10.3	30.4	54	57	66	57	49.8	13.7	4.7	2.7
Clear sky	90%	90%	75%	40%	30%	10%	1%	2%	5%	50%	98%	98%

Sunrise and sunset
Sikkim being situated towards the east-end of India, the sun rises very early. During mid-summer the days dawns as early as 4 am and at about 6 am during the winter. It correspondingly gets dark early, 6 pm in the summer and 4.30 pm in the winter.

TOURISM INFRASTRUCTURE, SERVICES IN NORTH SIKKIM

C.1 PRESENT STATE (STATISTICS…)

Tourist flow district-wise in 1996

District	Domestic tourists	Foreign tourists
East	100 %	> 85 %
West	> 30 %	> 40 %
South	< 1 %	< 20 %
North	< 1 %	< 2.5 %

Average stay (in days) of tourists in 1996

District	Domestic tourists	Foreign tourists
East	2.5	3
West	1.5	2
South	0.5	0.5
North	1	1

(Source Tourism Master Plan of Sikkim, TECS - 1998)

C.2 TYPE OF TOURISM & RULES SET UP BY THE GOVT.

As mentioned in § A.6, these are the official rules as far as North District is concerned:
Individual foreign visitors may visit/stay at any of the following towns in North Sikkim, without special permission: Phodong, Mangan, Singhik.
Group of 4 tourists minimum, through a travel agency, and accompanied by a liason officer with definite entry and exit point can go to:
i. Gangtok-Chungthang-Lachen-Thangu
ii. Mangan-Lingzia-Shabrung-Tholung Monastery-Kisong (except Yabok)
iii. Mangan-Lingzia-Sakyong-Royot Patam (except Gochala)-Dzongri-Yoksum
iv. Yumthang-Phuni-Phunichoka-Tarum Chachu-Chunbgthang
v. Dikchu-Phodong-Labrang-Namptam-Mangan-Maling-Singhik-Samartek-Chungthang
vi. Lachung-Yumthang-Yume-Samdong

The items ii and iii in red are the treks that are presently possibly done in Dzongu (starting from Mangan).
But, after enquiring in the market among Travel Agencies, it seems that the travel agents are not in a position to get permits for neither foreigners nor Indians for that area. They say Dzongu is a protected area, therefore they are not granted any permit.
They only promote, for North Sikkim, the following packages:
For two people minimun, with one liaison officer (a guide recognised by both the Tourism Dept. and TAAS [Travel Agents Association of Sikkim):
If foreigners:
Mangan, Latchung, Yumthang (all by road) - 2 nights, 3 days
With one day extra, they cover the other valley, to Lachen and up to Thangu.
If Indians:
Mangan, Latchung, Yumthang up to Yumesamedong (all by road) - 2 nights, 3 days
With one day extra, they cover the other valley, to Lachen, Thangu, up to Gurudongmar lake (tista river source).
The above package is considered as "sightseeing", there is no walk or trek involved. And a lot of time spent in the jeep.
According to Blue Sky Tours and Travels, one of the leading travel agency in Sikkim, they have identified and prepared, in collaboration with the Dept. of Tourism a new "product" for north Sikkim. It is a trek of 5-6 days from the valley of Latchung, accross Lha Bha Pass to the valley of Lachen. The GoS (Tourism dept) is about to open that trek and will deliver permissions to both Indian and foreigners.

Other than this sightseeing tourism or this potentially new trek, there is possibility of mountaineering, with specially designed treks to reach some glaciers or few peaks, but that remains of course marginal and the process for getting the permit goes through the Central Govt., Delhi.

C.3 TYPE OF ACCOMMODATION

In Mangan, there are some lodges (cheap, concrete structure, un-confortable, and of very low standard). In the area we are concerned with (from Mangan) there are no proper accommodation, the tourist being low and not organised yet.
Yumthang being a "famous" destination, it has some better accommodations and more choice (hotel and "resort" standard and deluxe type, as well as budget accommodation).
Lachen and Lachung have also some hotels and guest houses with basic facilities.

C.4 MEDICAL FACILITIES

Hospital (Mangan)	1
Primary Health Centres	3
Beds	80
Doctors	10
Nurses	51
Population/doctor	3,504

(Source: Dept. of Health and family Welfare (1995)

RELATED ECONOMIC ACTIVITIES

List of all existing economic activities in the proposed area:

	At present linked to tourism? Yes/No	Possibility to link it in future? Yes/No	How, benefit expected?
Production systems			
Vegetables and fruits.	No	Yes	Products used for fooding requirement in eco-lodges. Benefits the producer + eco-lodge
Meat, eggs and milk	No	Yes	Products used for fooding requirement in eco-lodges. Benefits the producer + eco-lodge
Handicraft			
Traditional paper and ink making	No	Yes	Sets for sale in the eco-lodges + marketed outside. Benefits the producer + eco-lodges.
Traditional cane hats and other handicrafts	No	Yes	Sale in the eco-lodges + marketed outside. Benefits the producer + eco-lodge
Angora wool production and processing, yak wool and leather processing.	No	Yes	Sale in the eco-lodges + marketed outside. Benefits the producer + eco-lodge
Visit, exposure to local culture, general services			
Lepcha house cum information cum sale centre (Nampringtang main + products in every lodge)	No	Yes	Orientation of eco-tourists, can be a land mark for preservation and sharing of culture. Exchange of culture that builds tolerance. Self confidence and awareness of positive aspects of traditions.
Services related to handicraft (delivery system of products purchased during the trek to Gangtok)	No	Yes	Benefits the producer + service provider
Visit of some workshops or small cottage industry (fabrication of paper and ink, dhup processing…)	No	Yes	Sales or promotion of some products
Visit of medicinal plantations and processing centres	No	Yes	Exposure for the eco-tourist to the traditional healing system (cf. Kerala Ayurvedic / Siddha centres for foreigners)
Guides, porters, translators, pack-animals	No	Yes	Give employment to some youth
General supply systems strengthened (diversification of local village market, new provisions and goods suitable for trekkers, fuel, minor repairs…)	No	Yes	The fact of having a influx of eco-tourists in the area will benefit indirectly many families involved in intermediary activities and services.

REFERENCES

Persons met / Government:

- S. W. Tenzing, Chief Secretary, GoS
- P.K. Dong, Executive Director, Sikkim Tourism Development Corporation
- F. R. Sharma, Principal Chief Conservator of Forest cum Secretary Forest, Envt., Wildlife
- S. Z. Luksom, Joint Director, Environment & Eco-tourism
- B. P. Pradhan, District Forest Officer, Envt. Protection Conservation and Eco-tourism
- Usha Lachungpa, Senior Research Officer, Wildlife
- K. Gyaltsen, Dept. of Tourism (also member of Green Circle, NGO)
- Akhouri Pramod Khrisna (Scientist in-charge, G.B. Pant Institute of himalayan Envt. & Devt.
- Nim Tshering Lepcha (Chairman, Land use & Environment Board, Forest Secretariat)
- N. K. Gurung (Principal Chief Engineer & Scy Building & Housing Dept.)
- Beena Kanti Pradhan (Deputy Scy II, Directorate of Handicraft and Handlooms)
- Karma Samten Bhutia (Assistant Director -Production-, Directorate of Handicraft and Handlooms)

Persons met private / NGO

- P.D. Rai, Chairman ECOSS, also Chairman, SIDICO (Sikkim Industrial Devt. & Investment Corporation Ltd)
- Dr. Eklabya Sharma, Head Mountain Farming Systems, ICIMOD Kathmandu, former Scientist in charge G.B. Pant Institute, Gangtok, and executive member of ECOSS
- Pema Gyaltsen Bhutia, General Secretary, Khangchendzonga Conservation Committee
- Loday Chungyalpa, Secretary, Sikkim Development Foundation
- Tsten Lepcha, resource person based in Chungtang
- Karma Loday Lepcha (Gal Scy, Renjyong Mutanchi Rong Tarjun -Sikkim Lepcha Association)
- Palzor Lachungpa (Blue Skies Tours & Travels and President of the Travel Agents Association of Sikkim) N.B. assistant (Binod Mukhia) met.

Persons met / International

- Yesim Elhan (Programmes Officer -West-, Asian Devt. Bank - Manila)

Websites

- http://sikkim.nic.in/sws/sikk_tour.htm
- http://planningcommission.nic.in/st_skm.htm
- http://www.icimod.org.sg/publications/newsletter/News28/news28.htm
- http://www.sikkiminfo.com/ecoss
- http://www.mtnforum.org/resources/library/tmias99a.htm and http://www.bcnet.org/learning/ar96/sikkim4.htm (about Sikkim Biodiversity & Ecotourism proj.)

Bibliography

- Sikkim, a guide and handbook, Rajesh Verma
- Community Development and Tourism: The Sikkim Experience in the Eastern Himalayas (Maitreyee Choudhury, University of North Bengal)
- "First Round Table on the Vistas of Partnership between the Sikkim Government and the Non-Governmental Organisations" held on Dec. 27, 2000, India International Centre, New Delhi
- Annual Plan 2000-01 - SIKKIM, Opening Remarks by the Deputy Chairman, Planning Commission
- Annual Plan 2001-02 - SIKKIM. Summary Record of Discussions between the Deputy Chairman, Planning Commission and Chief Minister of Sikkim, held on February 23, 2001, to finalise the Annual Plan 2001-02 for Sikkim
- Address by Shri Pawan Chamling**,** Chief Minister, Sikkim. 1st September 2001, Vigyan Bhavan, New Delhi
- "Mountain Tourism: Constraints and Opportunities" in ICIMOD Newsletter No. 28 (http://www.icimod.org.sg/publications/newsletter/News28/news28.htm)
- Tourism master Plan of Sikkim 1997-2011, Tata Economic Consultancy Services, N. Delhi (consulted, but no copy obtained)

ANNEXE VII

ANNEXE VII.1

VEGETABLE CULTIVATION

Physical Description

The project area is located in the middle ranges of Central Himalayas, geologically known as the lesser Kumaon Himalayas. These hills have very steep slopes, forming long and deep valleys. Plain land is scarce and the farmers have made terraces for cultivation. Most of the wastelands are covered by perennial fodder grasses. About 70% of the total precipitation takes place from June to September. Sufficient discharge of water is available in streams and channels during these months (peak season discharge is 40 times of the lean season discharge. During the month May and June, there is a great scarcity of water and farmers have to make special arrangements to cultivate vegetables and raise nurseries of Paddy. Household survey shows that about 33% of cultivated land is irrigated.

Access to the area is by mountain roads, about 200 Km from Haldwani (in the plains) making the area quite remote.

Table 1: Villages in the project zone:

Village name	Altitude (m)	Stream	>5km from road	1 – 5 Km	<1km
Mana	1500	Y Monsoon	Y		
Digoli	1600	N	Y		
Chantola	1300	Y perennial	Y		
Simayal	1450	Y perennial	Y		
Matkoli	1800	N	Y		
Simgarhi	1800	Y Monsoon			Y
Saukara	1900	N			Y
Lamgingara	1800	Y Monsoon			Y
Chhipsiya	2000	N		Y	
Ghangal	2200	N	Y		
Dauhlani	1950	Y perennial	Y		
Sirari	1600	Y Monsoon	Y		

Most of the villages are located at a distance of more than 5 kms from the nearest road head. This makes transportation of goods a tedious and expensive affair.

Meteorological data

Climate can be characterised by the seasons: summer (mid April to mid June), monsoon (mid-June to September), autumn (October to November)

winter (November to February) and spring from March to mid April. Total rain is about 2000 mm, mainly during monsoon season.
There are important climatic variations depending on altitude inside the project zone. Approximate data shown in the next table was collected through interviews.
Table 2: Approximate meteorological data Tripuradevi (1550 mts. altitude) Probably Jan, Feb, average minimum is less than that, average maximum should also be less than that in winter, January being colder than Feb.)

Month	J	F	M	A	M	J	J	A	S	O	N	D
T°min	2	4	12	15	20	22	22	20	18	12	8	4
T° max	15	18	20	22	25	30	30	30	27	22	20	18
Rain	Y	Y	N	N	Y	Y	Y	Y	Y	N	N	Y
Heavy rains[17]	N	N	N	N	N	Y	Y	Y	N	N	N	N

June to September receive heavy rain and December to February receive good winter rains, the remaining relatively dry months also tend to receive showers.

Tables 8 and 9 in the analysis of the survey show that for every hundred Rupees earned from various sources including the value of agriculture produce, Rs. 70.32 comes as remittance from outside, Rs. 13.20 from agriculture, Rs. 10.98 from labour and Rs. 5.5 from cottage industry.

14.1% (migrated population table 2) of the total population earns 70.32 of the income in the area. This points to a very severe lack of opportunities for making livelihood in this area. Income opportunities (already discussed in the workshop) need to be developed to increase the contribution of the people living at home in the economy of this region.

Value of Agricultural produce is about Rs. 14000per hectare (Table 6, 6.1, 6.2 and 7). With more than 90% of the families owning less than 1 Hectare of land, farming of traditional crops of cereals and pulses is becoming unsustainable. Farmers are being forced to look at the more productive agriculture options to optimise the land use. Vegetable production is one such area with tremendous potential.

According to Plantiss Agrotech, a leading state Government supported company, the promotion of green houses can give an earning of Rs. 20000 per annum through vegetable cultivation from an area of 55 sqm. Shifting a small patch of land from cereal production to vegetable farming can give a handsome supplementary income, thus making land use a profitable business.

Market survey conducted by Avani team (table B.2.3) shows that vegetables, chicken and eggs worth about Rs. 86 lakhs are imported from the plains and

[17] Definition : rain inducing streaming

sold in this area by various vendors annually. This shows a ready market for vegetable produce within our project area. This market could expand to nearby areas and urban centers like Almora and Pithoragarh, where locally grown vegetables are sold at a premium because of their taste and freshness.
Vegetables are consumed daily by all families in low quantity (bought quantity: 8,6 kg/person/year in project area).
Some of these are bought from the market (potato, tomato, cabbage, and cauliflower) and others are grown (leaf vegetable, radish). There are no quantitative data for home-grown vegetables because they are harvested when needed and it is impossible to get estimated quantity.
The consumption of vegetables is severely limited by low availability and high costs, which are linked.

Strategy
In remote villages, one shop usually brings vegetables from the market. People buy whatever is available from this shop not having much choice.
In remote places vegetable production should be developed for local consumption within the family and sale at village level. This will bring down the cost of vegetable by eliminating the transportation costs and losses. This will increase the quantum of vegetable consumption in the area leading to better health, nutrition and earnings for the farmers.

In places where access to the road is easy, vegetable can be grown in a more commercial manner, demand being very high in the neighbouring semi-urban centers.

For example:
One farmer, graduated in agriculture, settled recently next to the road, few kilometres from Berinag market. A permanent stream provides him easy irrigation. He has invested in three small polyethylene greenhouses, producing vegetable and seedlings. His experience (<1year) is too short for providing any conclusion, but he doesn't show any production or marketing difficulty.

- Technical aspects

Apart from the example cited above and a few seasonal kitchen gardens that are maintained by the farmers for their own consumption, vegetables are not grown commercially in the project area. Trying to understand the reasons can only raise unanswered questions. Is the demand for vegetables with changes in food habits increasing faster than local production? Are lack of technical knowledge or lack of initiatives responsible for this situation?
Irrigation: Farmers have irrigated land and are familiar with the practice of irrigation. This technical aspect should not be a problem in case of vegetable growing. However irrigated land is scarce and special attention should be given to water saving practices. Mulching is one of the most efficient and easy ways to save water. Polyethylene sheets can be used to cover the soil, but use of pine bark (which is easily available in the region) would be more

ecological and also very efficient. In the case of intensive cultivation with high investment level, for commercial purposes low cost drip irrigation could be envisaged, especially in the greenhouses. High-density polyethylene (HDPE)/ low-density polyethylene pipes could be used for harvesting (waste + rain water) as well conveyance of water to the fields.

Compost: Scientific composting methods are not practised in this area. In best cases manure is left in a heap for a few months. Material for composting is not scarce, tree leaves, hay, straw, agriculture wastes are easily available and all families have few animals to provide dung. Table 10 and 11 in the house hold survey analysis indicate that leaf litter to the tune of 2600 Kg per hectare and 1570 Kg of dung per hectare is applied to cultivated lands. Climate being very moderate, introduction of vermicomposting and Nadep composting techniques could lead to improved crop management with low incidence of pest and pathogens attacks, especially in the case of organic farming. This would result in high crop productivity. Introduction of BioGas could also lead to production of rich slurry which is a very good manure (10% more efficient than normal compost) while providing free fuel gas to improve the energy scenario.

Season and Greenhouses: Even during cold winter months, vegetables can be grown in the greenhouses. Greenhouses can be used to improve yields during this cold and dry period where ideal temperature and humidity can be maintained for rapid growth of vegetables. Temperate climate vegetables, grown in the plain during winter could be grown in higher altitudes during summer. Growing hot climate vegetable under sheds during end of summer could be interesting to produce off-season vegetables. Tomato, cucurbits and brinjal for example could be produced in greenhouses at the end of summer and in the beginning of winter. Greenhouses would be used for protecting solanaceous crops from heavy rains during monsoon season, when they tend to start rotting due to excessive moisture in the soil. Greenhouses could also be used for seedling production towards end of winter, for advance planting of summer vegetables. These vegetables grown a few months ahead of the normal season can fetch very good prices even in the local market, apart from semi-urban centers.
Greenhouses in the region are metallic structures covered with transparent polyethylene sheet. It looks adapted to this purpose. Small low cost tunnel shed could also be used.

Seeds: Good quality seeds are available on the market at affordable prices. Local varieties of seeds are also easily available.

Farming tools (implements) used by farmers are primitive and better / efficient tools need to be introduced.

Technical resources: Any action concerning vegetable production development can be led in collaboration with resources centres:

Name	Place	Distance from Berinag	Activities
G B Pant University of Agriculture	Pantnagar	230 Km	Formation Technical information Seed production Compost Pesticides Seed supply Micro irrigation Pest control Biogas
Vivikananda Parvatiya Krishi Anusandhan Sansthan	Almora	100 Km	Agriculture Research center Seed supply Poultry farming Agro- development
National Seeds Corporation	Solan, Himachal Pradesh	300 Kms from Delhi	Certified seeds
Plantiss Agrotec	Kainchi	130 Km	Greenhouse building Irrigation technology Seed supply

NB. The reliability of seeds being a very important issue, an important aspect of the project should be on quality seed production.

Integrated approach: In any action regarding vegetable cultivation, all technical aspects should be promoted at the same time: Green houses, water harvesting, Composting, Mulching, seed production, irrigation techniques, crop management, should be provided as a package to the beneficiaries.
As a first step AVANI campus could serve as a demonstrative and experimental farm as well as a training center. A greenhouse has already been built here, and vermicompost activity is ongoing.
Activity could then be extended to progressive farmers selected in each village, by providing them training in vegetable cultivation, technical help and a kind of technological package. These farmers could then help catalyse others in their own village.

- Organisation of farmers

As vegetable farming is currently not being practiced as a commercial activity, the organisation of the farmers as producers would have to evolve based on Avani's experience in other areas such as solar technology and handicraft development. Targeted population should be at first individuals

ready to invest time and land in vegetable growing. With development of activity, groups could evolve for organising various aspects of vegetable farming. For example a women's group is already interested in producing vermicompost to sell to the vegetable producers.

There is an existing team of technicians, which could take on the responsibility of providing technical assistance in fabrication of green houses and micro irrigation systems with additional training.

The farmers could divide the responsibilities of seed provision, seedling production, composting, production of vegetables and marketing of the vegetables while benefitting jointly from the shared enterprise. This would result in developing interdependent specialised functions and provide employment.

Gender issues: Use of improved technologies such as green houses and micro-irrigation would lead to alleviation of drudgery in day to day work of women. This would also provide better nutrition for women and children. Cash income would provide financial independence to women. Higher cash income from a smaller plot near the house would lead to concentrated activity without dissipating women's energy (who by and large are main farmers in this area) in tending to numerous scattered parcels of low productive fields. New technologies of agriculture would attract men to find employment by vegetable farming, thus increasing their participation in agriculture.

ANNEXE VII.2

FOOD PRESERVATION AND PROCESSING

- Grain preservation

Families grow grains (cereals and legumes) for their own consumption. These are stored in various containers like metal barrels. Losses during storage are very important and are reported to be up to 25%.
Improving grain preservation would not be income generating but would help to reduce food expenditures that is the main expenditure in most of the families (Graph 3).

Technical aspect: Grain should be stored in airtight containers. To kill insect's larvae oxygen can be burned inside after sealing the container. For example a little oil lamp can be left burning inside.
This could be an additional technical activity / service that the BSEs could provide in the villages.

- Citrus Preservation

Citrus fruits are not an important crop in the project area (table 5) but are much more important in neighbouring valleys. They are usually consumed and sold at the family and village level. As all fruits ripen at the same time, there are big losses (no data available). These losses could be reduced by 3 to 6 months preservation in the villages.
This would neither generate substantial income nor reduce any expenditure but would improve food balance of concerned population by providing fresh fruits during a few months.
Interest in this activity depends on technical and economical feasibility. If this is confirmed, activity could be extended to more citrus productive areas.

Fruit and vegetable processing

Main fruits grown in the project area are citrus. They are not processed into jam, juice, or other products. Demand for processed agricultural products is very low on surveyed markets.

Table 7: annual sold quantity for processed products in all surveyed markets

Jam	240	Bottles 500g
Orange Juice	480	Bottles 750 ml
Pickles	490	Pots 500g
Tomato sauce	360	Bottle 200g

These very low figures lead to conclude that development of agriculture product processing in the project area have nearly no commercial interest. Moreover, it seems very difficult to envisage any kind of competition in the urban markets.

- Poultry Farming

Poultry farming is not practised in the region even at small scale. The reasons for this are not very clear, but it could be a potential activity to be taken up.

- Market data

Chicken and eggs are imported from Haldwani.
Egg price is Rs2/piece; Chicken price is Rs. 100/ Kg
Total egg consumption on surveyed markets: 219840 eggs/year
Total chicken consumption on surveyed markets: 21140 Kg/year
It would be certainly profitable for local development to produce these quantities locally instead of importing them from Haldwani.

- Technical aspect

Food: Ready made food and food complements can be easily imported from Haldwani. Locally produced grains and cereals can also be used for chicken food.
Chickens: Layer and broiler 1day chicks are easily available from Haldwani.
Veterinary service: Doctor in Berinag can provide this service. Common antibiotics, anti parasitic and vaccines are available in Berinag.
Technical assistance is available from:

Vivikananda Parvatiya Krishi Anusandhan Sansthan	Almora	100 Km from Berinag	Agriculture Research centre Seeds Poultry farming Agro- development

- Targeted population

Individuals ready to invest and strongly motivated. In a place on road border for supply and market access. Good water quality should be available in quantity.

Contact was established with Maple Organics in Dehradun. This company supplies EME solution for faster composting with use of organic processes. This will be a crucial technical input for composting, which is so important to vegetable cultivation.

Plantiss Agrotech is a major company working with propagation of greenhouses in Uttaranchal. They work in collaboration with Kumaon Mandal Vikas Nigam, a Govt. of Uttaranchal undertaking. They provide subsidised greenhouses to farmers, which are of considerably large sizes, and are difficult to afford by small farmers. A meeting with the Managing Director assured us that they could be a useful resource for training and equipment.

ANNEXE VII.3

MEDICINAL AND AROMATIC PLANTS CULTIVATION

With almost 95% of the families owning less than 1 hectare of land (table 6, 6.1, 6.2 and 7), the average earnings from the farm are around Rs 14,000. This means a change in the cropping patterns and the use of small land holdings for higher value crops like medicinal and aromatic plants could be an alternative land use.

- Aromatic Plants.

1. Chamomile

Matriacaria chamomilla Linn, commonly known as German and Roman Chamomile is of great importance. It is extensively cultivated in Belgium, France and England. Belgium is the primary producer.

The estimated world production of Chamomile is about 15000 tons of dried flowers and 8 tons of oil. In India, the plant has been cultivated for the production of dried herb known as 'Babuna'. The oil is used in face creams as a protection against sun burn and flavouring fine liquor. As a medicine the plant extract us useful in stomach disorders, cure of ulcer and healing of wounds. Flowers are used as herbal tea.

Chamomile can be cultivated in wide range of soils except those are light textured and have low water holding capacity. Its cultivation has been successfully on medium and heavy textured soil, including those traditional rice growing soils. High water table in injurious to the plant. Chamomile is basically a temperate plant and grows very well in moderately cool weather. It can be cultivated as summer crop in the hills of Uttaranchal. The best growing conditions for the plant are 30 deg C. the growth and flower bud formation is severely affected when the temperatures reaches 38 deg C.

The field for preparation for raising Chamomile is prepared by 3-4 harrowings. Since the crop can be planted in rotation with rice and maize or any rainy season crop. No special care is required in the preparation of the field. Beds and channel are laid out to facilitate the irrigation. Propagation of the plant is generally done through seeds for commercial production although in European countries root cuttings are also used. First a nursery is prepared in the month of March in hilly areas. Seeds take about 4 days to germinate and seedlings are ready in 6-7 weeks. After planting seedlings the flowering starts at the end of third month when the flower can be picked at regular

interval. The plant requires adequate care and it is labour intensive. Proper weeding and soil moisture is maintained. Labour has to be engaged in harvesting flowers at regular intervals.

Scientific cultivation and distillation technologies of Chamomile have been developed by:

1. Central Institute of Medicinal and Aromatic Plants. Lucknow
2. National Botanical Research Institute, Lucknow
3. Regional Research Laboratory, Jammu

- Oil Contents and Yield

An average plantation may yield 40-50 quintals fresh flowers per hectare, which on drying give 8-10 quintals of dry flowers, the best however is 15-20 quintals of dry flowers. The essential oil content in flowers varies from 0.3-1.2% and largely depends on the germ plasm and conditions of drying flowers.

- Economics of Cultivation

a. Expenditure

Operations	Amount (Rs)
Land preparation	850.00
Nursery raising	500.00
Manures	2000.00
Planting	1000.00
Weeding	750.00
Irrigation	1500.00
Plant Protection	250.00
Picking of flower and drying	12500.00
Unforeseen	500.00
Total	19850.00

- Gross Return

850 kg dried flowers @ Rs 40/kg 34000.00
if flowers are processed

Expenditure:
Cost of production of dried flowers 19850.00
Distillation Charges 9000.00
Total 28850.00

Gross Return/ha 4.25 Kg oil
From 850 kg oil at 0.5% oil recovery
Selling price Rs 25000/kg (1994 prices) 1,06,250.00

- Net Return

From Flowers
(Rs 34000-Rs 19850.000 14150.00
From oil
(Rs 106250.00-Rs 28850) 77400.00

Since people in Uttaranchal contribute to field labour extensively, growing Chamomile could highly advantageous. This can be taken up as summer crop and no special land preparation is required.

- Rose

Popular High yielding species are:
- Rosa damascena Mill
- Rosa centilifolia Linn
- Rosa Gallicia Inn

Rose oil is one of the oldest and most valuable perfumery material available in the world. No high grade perfume can be thought of unless it contains small amounts of rose oil. It imparts characteristic flowery top note to the perfumes and lends depth to blended material. It is a necessary constituent of high grade perfume, cosmetics and flowering material of tobacco, foods, soft drinks and beverages.

Rose is basically a temperate plant and requires mild temperature for optimum growth. Considering the above facts, hilly areas and mild hills are most suitable for cultivation. The yield of rose in temperate climate is much better than in the plains. Recently rose cultivation has been introduced in temperate climate of J&K and Himachal Pradesh from where the level of yield reported is much higher than the plains. Bright sunny days, high humidity and mild temperature(20-25 deg C0 are most conducive for enhancing the flower production, as these conditions prolong the duration of flowering and give synchronised flowering.

Propagation of rose is done through cuttings. It grows in soil rich in organic material and have high nutrient status. The optimum time for planting rose in temperate region are October-November and February-March. Rose is susceptible to weed interference mainly in the planting year. Therefore special care is taken to suppress the weed growth for about 6-7 months after planting. In second and subsequent years the plant develops sufficient canopy and can take care of the weeds. In established plantations, one hoeing, after pruning in December and weeding in Jan-Feb may be sufficient for plantations without weeds.

Flowering in rose plantations commences after two years planting. However, the full flower production can be expected in third year onward. The flowers

are picked daily early in the morning. In temperate climate flower yield ranges from 4000-5000 Kg/ha/year. Flowering in temperate region starts in May and continues for about 50 days.

Institutions engaged in research on Rose:

1. Central Institute of Medicinal and Aromatic Plants. Lucknow
2. National Botanical Research Institute, Lucknow
3. Regional Research Laboratory, Jammu
4. Indian Agriculture Research Institute, Pusa, Delhi (Dr Paul's centre)

- Economics of Cultivation

	Amount Rs/Ha/Year		
Operations	**1St year**	**2nd year**	**3rd year**
Land Preparations	1500		
Digging pits etc	2000		
Nursery raising	3500		
Manure	5000	5000	5000
Planting	1250		
Weeding and hoeing	3500	1500	1500
Irrigation	2000	2000	2000
Pruning	500	1500	1500
Plant protection	500	500	500
Picking of flowers	100	500	2500
Distillation	500	1200	6250
Unforeseen expenses	1000	1000	1000
Total	**21350**	**13200**	**20250**

- Total Expenditure for 10 years

Year I	**Rs 21,350**
Year II	**Rs 13,200**
Year III to Year X	**Rs 1,62,000**
Total	Rs 1,96,550

- Return

	Oil yield Kg/ha/year
Year I(250 kg flowers) at 0.2% oil recovery	**0.05**
Year II(600 Kg flowers) at 0.2% oil recovery	**0.12**
Year III to Year X(2500 kg/year) at 0.2% oil recovery	**4.00**
Total(for plain areas)	**4.17**

Total return for 10 years
4.17 kg oil@ 1.8 lacs/kg Rs 7.50 lacs

- Net Return Rs 5.50 lacs

- Net Return per year/hectare Rs 55,405.00

These figures are for plain and tropical areas. The production is much higher in temperate and warm temperate areas. The oil contents are almost 2.5 to 3 times as compared to the plain areas.

- Distillation Plants

Extensive distillation of aromatic plants is carried in Kannauj district in Uttar Pradesh. The farmers distill various essential oils derived from mentha, rose, clove , eucalyptus, geranium, Basil, turmeric etc. Most of these plants are made of mild steel. There are often complaints in the essential oil contents extracted using mild steel plants. It is due to a chemical reaction that takes place with mild steel. It is therefore highly recommended that stainless steel distillation plants should be used.

The fuel for distillation plants is normally the waste obtained from plants. But sometimes there is not adequate waste such as in rose, geranium etc. In such cases agriculture waste is used. In hills firewood is available at cheaper cost. Despite easy availability, there is need to undertake the following:

1. To improve the fore box of distillation plants to improve efficiency of heat utilisation.
2. To use solar concentrators to heat water to almost boiling point if required or using solar heaters for heating water. It would depend on the boiling temperature of essential oil.

- Approximate cost of Distillation Plant

- Stainless Steel Distillation Vessel:

Capacity: 50 litres
Type Cylindrical, Field Type

Completed with:
Live steam injector cross type
With top opening lid
Vapor duct SS pipe that leads to heat exchanger

Construction Features:
The steel body provided with grid perforated plate with 6mm holes, set of tirod grid and hoisting shaft of Stainless steel. The vessel is insulated with claded mild steel sheet.

Condenser:
The capacity of condenser is 1 sq m surface area with ss tubes with inlet/outlet SS flanges along with MS flanged header.

Stainless Steel Oil Separator:
Stainless Steel Body with nozzle connections along with ss valves.
Boiler:
For Steam generation for above.
Cost: Rs 65000 (Rates 1999) plus taxes

- Medicinal Plants
  Agriculture in the hills is a highly labour intensive activity. It is dependent upon forests and domestic animals and high labour inputs from the family. The returns are meagre. In some cases such as paddy it is estimated that Rs 32 of inputs in terms of labour lead to production of 1 kg of rice which is valued at Rs 9 in the market. In addition to it one kg of cereal requires almost 30 kg of fresh leaves which are partially consumed by domestic animal and rest mixed with the compost to provide manure to about 8 square meters of agriculture land (as indicated by analysis of survey conducted in the villages associated with AVANI). Moreover the agriculture land is fragmented and highly scattered. It becomes difficult to cultivate and take care of all the parcels.

- Agriculture still remains the most time consuming activity because villagers are not aware of other alternatives. While aromatic plants could be one alternative because it will not be affected by wild animals and may not require high labour inputs as agriculture plants do. Medicinal plants could be other alternative. These plants are required by a number manufactures of Homeopathic, Ayurvedic and Unani medicines. A number of medicinal plants grow at this altitudinal range and many can be cultivated. Most of these plants are growing in the hill campus of G.B.Pant University at Ranichauri and Kadukhal.

- Growing of medicinal plants would help in reviving the traditional practice of using local herbs for medical treatment and it will also help in preserving bio-diversity of the area. The plants can be grown on individual plots as well as in the community plots and barren areas of the village land

List of Medicinal plants occurring in the area:

S No.	Botanical Name	Parts used
1.	*Achyranthues aspera*	Plant, infusion of roots, seeds
2.	*Acorus calamus*	rhizome
3.	*Asparagus adscendens*	Roots
4.	*Atropa belladona*	Roots and leaves, berries
5.	*Berberis Species*	Root
6.	*Canabis sativa*	Plant

7.	*Centella asiatica*	Plant, leaves
8.	*Chenopodium ambrosoides*	Plant
9.	*Curculigo orchioides*	Rhizome
10.	*Digitalis lantana*	Leaves
11.	*Dioscorea deltodia*	Tubers
12.	*Fagopyrum esculentum*	Grains
13.	*Hebenaria intremedia*	Tubers
14.	*Hebenaria edgewrothi*	Tubers
15.	*Matricaria chamomila*	Flowers
16.	*Mentha species*	Essential oil
17.	*Potentilla nepalensis*	Root
18.	*Prunus cerasoides*	Smaller branches
19.	*Prisepia utilis*	oils from seeds
20.	*Pueraria tuberosa*	Roots
21.	*Punica granatum*	Root bark, Stem bark, seeds
22.	*Hedychium spictum*	Root stock
23.	*Raulfia serpentina*	Root
24.	*Rosa damascena*	Petals
25.	*Rumex nepalensis*	Roots
26.	*Solanum lacinitum*	Plant
27.	*Swertia angustifolia*	Plant
28.	*Taraxacum officinale*	Root
29.	*Thaliactrum foliosum*	Root
30.	*Viola serpens*	Plant

Several Institutions are involved in the propagation of medicinal plants. These are:

- Jadi Buti Shod Sansthan, Govt. of Uttaranchal, Ranikhet and Gopeshwar
- G.B.Pant University, hill campus, Ranichauri, Tehri
- Central Medicinal and Aromatic Plant Research Institute, Lucknow
- Regional Research Laboratory, CSIR, Jammu
- High Altitude Plant Physiology Lab, H.N.Bahuguna University, Srinagar, Pauri Garhwal.

➢ Marketing

There is a large demand of essential oils in perfume industry in Kannauj, Bangalore, Mumbai, Calcutta.

Medicinal plants can be sold through Bheshaj Sangh, a cooperative marketing federation or directly to pharmaceutical companies manufacturing Ayurvedic medicines.

ANNEXE VII.4

WOOL AND TUSSAR PROCESSING

- **Introduction**

Woollen handloom was once an important source of income in the northern Kumaon region of Uttaranchal. Besides trade of fleece and woollen materials to far off places, it was the second largest economic activity after agriculture, and provided income to a number of skilled spinners and weavers. The woollen industry suffered a serious set back after closure of trade with Tibet in the year 1962. The wool and Pashmina from Tibet once obtained easily, were not available any more. The local wool on the other hand was rough and not suited to making apparel material. Soon after the closure of trade, various agencies of the Government initiated wool programmes such as making wool available, setting up carding plants, introducing multi-spindle spinning wheels and imparting training to local people. But most of these efforts were directed towards the use of Merino wool. A program was also launched for crossbreeding local sheep with fine haired breed. Of various breeds experimented, Rambouillet breed of Merino was found to be the most successful. Even after many years of breeding program the wool is not yet found to be the same as sheep in flocks are in different generations after the cross breeding. Hence, there are numerous difficulties in sorting, carding, sliver making and spinning on multi-spindle wheels. Besides these difficulties the wool also shrinks, and hence found not highly suited to apparel material.

The facilities created by the Government no longer provide required services due to shortage of funds. The development as well as introduction of technology at Government centres for processing different kind of fibers such as cross-bred fibers, angora and pashmina has also not taken place. Carding and spinning of these fibers is still very time consuming and laborious, and the worker is seldom paid for the entire time used. With their livelihood curtailed and already marginalised, professional spinners, weavers and other part time wool workers are left with little options of earning supplementary income.

Avani has initiated a comprehensive program to revive the craft of handloom and supported spinners and weavers in Pithoragarh and Bageshwar districts. The efforts have been aimed at improving quality as well as production of woollen handloom textiles for high value market. New fibers, attractive designs, environment friendly dyes and energy efficient processing methods are being experimented and propagated for making woollen handloom a self sustained economic activity.

As a part of this exercise, numerous studies and visits to carding and wool finishing plants were undertaken and various people experienced in woollen handloom were contacted to identify problems associated with this sector. These are:

a. Locally carded and spun yarn is not competitive with the mill yarn. The processes of carding and spinning are very labour intensive and time consuming at community level. The required fine yarn for extra high value textile cannot be made at village with the existing technology unless woolen garments are aesthetically designed.
b. Most of the carding plants in the region are not in proper working condition. A majority of these plants are not equipped with condensers and gillboxes. Therefore, sliver cannot be made in these plants for multi-spindle spinning wheels.
c. Multi-spindle spinning wheel are not designed to spin Tibetan wool, local wool, pashmina or angora
d. Wool workers are neither fully conversant nor experienced in the use of vegetable dyes.
e. In the absence of 'scaled down' technology, it is expensive to finish textiles at village level. The energy requirement for processing textiles is also high.
f. Wool and other fibers/yarns are not available on continuous basis.
g. Market for high value product does not exist in the region. A collective effort is needed to explore market.
h. At the same time, low cost products for consumption in local market need to be developed so that people of this area may buy locally produced woolens. Due to long and severe winters, there is a huge demand for woolens in this area.

- Shearing of wool

Wool is sheared in the Himalayan region at least twice a year. Once during Aug-Sep when the sheep graze in high altitude pastureland, and second time during Feb-March while wintering in Himalayan foothills. The summer wool is usually longer stappled and sold in the hills where as the winter fleece is smaller and normally bought by wool suppliers in the plains. Many shepherds also shear wool three times a year. Shearing more than twice affects the length of the fiber.

Shearing of wool in the Himalayan region is still done by primitive methods. A set of sharpened clippers is used to shear wool. Most of the shepherds are unaware of the scientific way of shearing such as following the hair and shape of sheep. As a result, best fleece is not obtained. They are also not careful in sorting the wool at this stage. The first step after shearing should be wool sorting, which entails separation by hand of long fibers from short. It also involves the grading of different qualities ('sorts') of wool from different parts of the animal. For example, wool from the belly, legs or other parts of the sheep contaminated by excreta, and other impurities should be kept separate. Unsorted wool is difficult to process to desired results especially when good carding facilities are not available.

It takes on average 25 minutes to shear one sheep. Therefore for a large flock many people have to shear wool simultaneously. One sheep normally yields 600 to 900 grams of fleece per season. Normally two men shear one sheep, while one holds the sheep the other shears. Shearing by clippers does not ensure consistent shearing of fleece. Therefore, in the subsequent shearing season one is likely to get uneven size of fleece from the same part of body of sheep. *Mechanical shearing machines, whether hand operated or power operated, are practically non existent in the hills. Powered shearing machine, according to an estimate use 20 –35 watts of power.*

Wool Skirting

Immediately after shearing, the coarser, dirtier wool from the head, belly and hind end is separated or "skirted" from the higher quality wool on the back and side of sheep. This simplifies cleaning, and ensures that only the best fiber is used to produce yarn.

Scouring of wool

Wool scouring is the process of washing wool in hot water and detergent to remove the non-wool contaminants and then drying it. It has always been an important step in the wool processing train

The first step in washing wool is to prepare it for washing by skirting. This is the process of removing sections of wool which are damaged, too dirty, too coarse, or too contaminated with vegetable matter to bother using. The fleece is spread over a flat surface, looked over carefully, and the following are discarded:

Manure tags	**wool that is coated with manure**
Vegetable matter	**bits of hay, leaves, straw, etc**
Britch wool	**wool that is especially coarse, usually around the back end and legs of the sheep**
Belly wool	**wool that is particularly dirty and short, from the belly of the sheep**
Sun damaged wool	**wool that is dry and harsh due to sun damage, usually found along the backbone of the sheep**
Stained wool	**wool which is yellowed or otherwise permanently stained**

The easiest method commonly used in the village is wash wool in cold water from the stream. A locally available detergent is poured and stirred till it dissolves. Fleece is then added to it and the water is mildly stirred from time to time for about 30 minutes. The dirty water is then drained out and fresh water sometimes cold water is used for rinsing. Wool is rinsed 3 to 4 times till most of the dirt has drained out. One by one wool pieces are then taken out with hand and spread on cloth in sun. Depending on the season it may take about 12 hrs to 36 hrs to dry. This method sometimes lead to undesirable changes in wool due to sudden change in the temperature and by the type of detergent used. Sometimes there is a danger of felting because of agitation and use of alkaline water.

A better method recommended for washing fleece is by holding wool in basket and dipping in a trough or a large utensil. Plastic baskets of smaller size then the bucket or utensil is used to hold wool. The wool is pulled into staples and layer of wool is put on the bottom of the basket. A sheet of mesh is placed over this, then a layer of wool, mesh etc until the basket is full. The utensil or bucket is then filled with hot (nearly at 75 deg C) water and the detergent to the depth of the basket. The whole basket is immersed into this hot water and allowed to soak for 10 to 60 minutes. This not only removes dirt but also most grease. It is not advised to agitate as this causes felting. The basket is then taken out of the dirty water. The trough is filled with hand hot water and basket is immersed into this to rinse. Rinsing is repeated once or twice. And then wool is spread either on cloth or enclosed in plastic mesh and stretched in shade.

Water requirement for washing operation is 45 –60 litres for 300 grams of wool. The water should be at 75 deg C for the first 15 litres and 30 litres at 55 deg C. The temperature of water is 5 deg C in winters and 22 deg C in summers. Water is heated in village in open hearths. *Cook stoves can be modified for efficiency upto 22 percent. Also solar energy can be used for heating water to the required temperature or at least to 50 –60 deg C depending on the weather conditions of the day.*

- Drying of wool

Drying of wool could be extremely slow during monsoon and winter months due to cold weather or high humidity and cloudiness. Wool is dried in open and when it is snowing or raining the entire lot is shifted inside the house or shed. During hot summer day wool dries in about 6 hours time while in monsoon or winter season it could almost take 3 days. Most of the drying of wool is done during September-October. This is shortly after summer shearing and a few days before the harvesting of paddy. Washing of wool is also undertaken from late November to March.

Drying of wool in large quantities can pose problems in hills. Firstly there is a shortage of space and weather conditions are uncertain. Instead of drying wool completely in shade for retaining its good properties, wool can also lightly spin dried so that most of its water is removed. *A spin drier can be hand operated or powered. The requirement of power for spinning varies from 100 watts to 250 watts. The type of machine will be dependent on the source of power--hydro, grid electricity or solar power.*
Partially spun dried wool can then be hung in a room where air heated by solar panels is circulated either by convection currents or a solar powered fan of about 20 Watts. We at Avani are in the process of developing and setting up such a drying system.

- Sorting

When dry, the wool is beaten with rods to free it from dust - an operation known as willeying. It is then picked to remove any contaminant that had escaped the rods.

Carding and Combing Operations for making sliver and roving

Next follows the carding or combing operations, depending on the length of the fibers concerned. Thus, short fibers are carded to produce (after spinning) woolen yarns, and long fibers are combed to produce (after spinning) worsted yarns. Nowadays, because of improvements in combing, short fibers are also used in mixture with long fibers to produce worsted yarns. The principal difference between the two types of yarns lies in the alignment of the fibers: in woolen yarns, the fibers are arranged almost haphazardly, and in worsted yarns, they are almost parallel to the yarn axis.

Economics of woolen handloom depends primarily on the technology of making yarn from wool. Major handicap at village level is lack of carding and combing equipment for making appropriate roving that can be used in multi spindle spinning wheels for bulk production of even yarn. The villagers also find it difficult to access centralised wool processing centers for carding. Most of the

centers do not even have the required facilities to make tops i.e. fine quality roving. Therefore fine yarn cannot be made at village in absence of combing technology. For high value handloom textile high count yarn (say 40 for Merino or Ramb, 100 or even 140 for Pashmina) is needed. Without combing , gill box and bobner it is not possible to make high count thread. Due to this problem wool spinning at village level is restricted to making woollen or semi-worsted yarn of thicker diameter less than 25 or 30count. The count here represents length of the thread in one gram weight. *A scaled down technology is needed for carding and combing operation so that villagers are able to make fine yarn at community level.*

- Carding

At the village level, carding is done by using a set of hand carders. These are a pair of wooden paddles with wire faces. The wire teeth are either course or fine. The coarse teeth are for carding wool, mohair and coarse fibers. The fine teeth are for carding Pashmina, cotton and softer fibers like angora.

One of the carders is taken in left hand and with right hand staples of wool is laid cross the teeth of the carder. The wool is evenly distributed across the entire card until the teeth are barely showing through. The second carder is taken in the right hand and it is positioned directly over the left card. The right carder is gently brushed across the teeth of the left. It is done five to ten times until the fiber is evenly distributed on both cards. When the fiber is well separated and airy, the fiber from the left carder are scooped. The fiber are rolled toward the handle of the carder to form a rolag for spinning using drop spindles and single spindle spinning wheels. The rolag or batt of lofty wool makes spinning easier.

Carding at village level can also be done by hand operated drum carders or small carders powered by electricity. Drum carders have an advantage over hand carders because these can be useful in wool blends. Though the drumcarders are more efficient than handcarders, but they are not available in the country at present. It is mainly because the felt needed for the drum is not manufactured in India.

A dehairing machine introduced by GERES in Ladakh region has a potential of being used as a carding machine at community level for producing rolag. The machines have good potential for being used as carding machines at community level. The machine can also be modified for larger amount (more than 5 grams per feed) of Pashmina/wool for processing which would also yield longer and better Rolex than handcarders or drum carders. During trials the power requirements of the machines was estimated to be 250 watts. The existing machine has a capacity to card 1-2 grams of wool per minute. The bigger machine would require 500 watts of power for processing 3 grams of wool per minute.

2) Combing

A method of treating already straightened fibers in the comber machine. The process removes all fibers below a certain staple length; it combs those that are to be retained and set them in a uniform, parallel order ready. Combing takes out practically all foreign matter such as dirt, neps, shives and other minute particles. In the absence of combing facilities, gill box attachments and bobner, it

is difficult to get tops and fine sliver for uniform spinning of thread. The yarn produced without these operations can mostly be used for rugs and carpets and also for tweed, but not for light shawls and fine apparel material. At present community level technology is non-existent.

- Spinning

Spinning is the backbone of handloom industry. It is availability of spun yarn that defines production of handloom textiles. In the mills spinning is done by three methods depending on the rovings and slivers. When rovings are available, self action mule or ring spinning frame is used for spinning. However , when slivers are available then flyer spinning frames are used.

Spinning at village level is done by three methods depending on the type of wool, carding and combing facilities, availability of sliver and rovings. Drop spindle is the commonest tool for spinning wool . Since it does not affect mobility, it is the easiest method of spinning . All kinds of wool can be spun on drop spindle. including blend. However production of spun yarn from these drop spindle is very low. It is almost 1/3rd to that of spinning wheels. Very thin yarn can also be spun using these drop spindles. In Kashmir pashmina yarn of 120 – 140 count is spun on drop spindles. This method of spinning engages a large number of people throughout the Himalayan region.

When rovings are available many spinners use an indigenous foot operated spinning wheel, Bageshwari Charkha. These charkhas have been in use for almost four decades. It is a side feeding spinning wheel and uses flyer for twisting fibers as all other treadle wheels do. The production of spinning a 25 count yarn is 12.5 grams an hour. Therefore for making a shawl of 400 grams it requires about 4 days at the rate of 8 hours a day. The material used in the wheel does not allow motorisation of the wheel. Moreover, the bearings of wheel are exposed and prone to damage with dirt and high humidity. Since it is a side feeding wheel it involves a bit of twisting of body.

As a part of GERES program on Local Intervention in Wool and Pashmina Program a front feeding spinning wheel has also been developed. The wheel has numerous power options. It can be operated by foot, solar power or grid power depending on availability of power. The consumption of power is 80-100 watts. It has all other features of single drive wheel having numerous ratios for spinning various types of fibers and blends. The rate of spinning is dependent on release of twisted fibers by the spinner. Therefore for the first one hour the rate of spinning is almost the same as that of Bageshwari Charkha, but for longer duration the production is comparatively higher. For solar power there is requirement of 150watt panel for operating the spinning wheel taking into account the cloudy days etc.

Khadi and village Industry Commission, an autonomous body under the Ministry of Rural Development also introduced multi-spindle wheels. But these spinning wheels are suited to cotton spinning or Merino wool. They are hand operated spinning wheel and cannot be motorised without making necessary changes. Since Merino tops are not easily available in hill areas most of the spinning wheels distributed as grants are not in use anymore. Moreover, spares of Multi-spindle wheels are not available locally. Recently trials were conducted on multi-

spindle spinning wheels for spinning local wool tops. It was found that there are frequent breakages of tops while spinning. Multi-spindle spinning wheel has lot of scope for improvement at the sliver drawing compartment depending on the use of fiber. Normally sliver of local wool breaks when it is drawn by the rollers of spinning wheel, because local wool contains assorted fibers of various thickness. The power requirement of multi-spindle spinning wheel is 250 watts. The production of 20-25 count thread on hand operated 4 spindle wheel is 1000 grams/ 8 hours.

The problem with the multi spindle wheel is it can produce yarn only when tops are available. Currently it is only designed for merino wool and not for local wool, Tibetan wool, angora or Pashmina.

- Dyeing

Much of the technology by which natural dyes acquired luster and virtuosity, have been lost. An inherited skill passed from generation to generation, the art of natural dyeing fell into almost disuse. Synthetic dyes have become popular over a period of time. The weavers are keen to revive the art of natural dyeing because of its least impact on environment and non –allergic effects.

Avani has initiated a program on natural dyeing. New dyes are explored and experience is gained in dyeing colours from some of the non vegetable dyes.

Dyeing is energy consuming activity and it needs a lot of water for preparation of dyes and mordents and washing wool. Immediately after dyeing there is a need to dry wool. The wool is slightly hygroscopic in nature and absorbs up to 20 percent of water when humidity is of the order of 80-90 percent. Therefore drying of dyed wool needs proper arrangement in case the quantities are large. An experiment at Avani has the following results

Weight of 2.080 kg of spun Tibetan wool dyed during December 2001

Total gas used= 1.370 kg equivalent to 0.067 G Joules costs Rs 25

Total water used = 300 litres

Weight of dyed but un-dried and squeezed wet wool = 5.90 kg

Weight of dyed wool after drying = 2.060 kg

Time taken for drying = 2.5 days in sun

It clearly shows that solar energy has to play a key role in dyeing for heating water to boiling point. Approximately 50 kg batches of wool is planned to be dried per day at AVANI centre. Similarly there is also a need of spinner for drying which can be operated by solar power. In order to dry it to critical moisture level, solar heated hot air is also necessary.

- Weaving

There are a large number of weavers in Kumaon region and many of them are well versed with different kinds of looms. There are also people of younger age group who are keen on taking up weaving as a source of supplementary income.

AVANI initiated a program on providing training to weavers on basic weaving, use of yarn made of blends, silk, tussar, pashmina, new designs etc.

Since a large number of weavers are in need of looms at a reasonable price, lighter and sturdy looms are needed. The looms could be made of metal frames or wooden frames. A training in fabrication of highly efficient designs of loom is required.

- Milling and Washing

After weaving, the woolen products need to be milled for compacting the fabric so that the shrinkages are allowed before the fabric is put to use. Traditionally, the milling is done by putting the cloth in light soap solution and milling the cloth by feet. This is a very laborious process in which person doing the milling has to stand in cold water for long hours even during the winter months. Some large-scale motorised milling units exist for large-scale industrial use, which can not be used in our scenario of cottage industry. We need to develop a small scale motorised or mechanised milling machine so that human drudgery in milling can be eliminated.

- Calendering

One of the most important common finishes used on woolen textile, it gives the material a clean, smooth, even, regular, appealing-to-the-eye appearance. There are times, however, when a superficial glaze is observed in calender-finished cloth. Calendering, is an improved method of ironing in the home. Cloth is passed between the rollers of the calender frame; the number of rollers may vary from two to seven, depending on the finish and the cloth. The goods may be passed over the rollers three or four times, depending on the particular finish sought. The finish may be dull, flat, glazed, watered or moire, smooth. The frame flattens and imparts luster to the goods, as it passes between the roller sets, because of the great pressure exerted on the cloth. The heat of the rollers is also an important factor in obtaining the desired finish. By passing the folds of the cloth through the machine, the threads of the one fold will make an impression on the threads of the other fold. This will tend to give a wiry or marked appearance to the material. Calender rollers are heavy, but hollow in order that the infusion of steam and heat may be applied to the interior of the rollers. Heat does much in developing the final appearance of the cloth. Rollers used in calendering may be copper, nickel- chromated, iron, or crushed parchment.

Calendering is essential for finishing textiles prepared by the weavers associated with AVANI. As the program on handloom develops further it is expected that 20 –30 square metre of textile per day would require calendering. The steam could be prepared by a solar concentrator or water can be partially heated by solar energy and further heated to generate steam by LPG.

In addition to calendering at a large scale a simple technology is needed for a small group of workers involved in handloom. In many cases weavers send textile material to mills outside the state for finishing and calendering.

- Production and its Organisation

Although 28.2% (refer to table 4 of the household survey analysis) of the families are engaged in cottage industries such as wool and other natural fiber processing, black smithy, bamboo craft etc., the average income in the highest earning villages is less than Rs. 20,000 per annum. The area average being only Rs. 6580, there is a strong case for investing in wool and tussar processing cottage industry in this area. This would include, natural resource optimisation, skill up gradation, introduction of appropriate technologies and marketing. This would lead to the inclusion of unemployed men and women in this sector as well as enhancing the earnings of existing artisans.
Avani is already involved with about 150 families of spinners and weavers and is training more artisans in various processes of this craft.
Avani is also involved in developing appropriate technology as described earlier in this section, for wool and tussar processing at the community level.
We would need some more experience with production in the decentralized rural scenario to work out optimum levels of production and sales.

- Work Organisation

Avani level:

A team of technical and community supervisors manages the entire production. This team is also responsible for the capacity building of the groups at village level. The transfer of skill for financial record keeping, stocks and production is ongoing and we hope to soon be able to transfer the responsibility for some stages of production to village level.

Village Level:
It is envisaged that there will be producer groups working in every village who would manage the entire production schedule there. These village groups will keep the records and bring out a finished product.
The management of raw material, the processing of raw material into yarn and then the dyeing and weaving of this yarn in cloth will be slowly managed by the producer groups.
The requisite trainings to empower the groups will continue until the group is independent.

- Summary of interventions needed for improvement of woolen handicrafts in Kumaon

PROCESS	TRAINING	TECHNOLOGY INTERVENTIONS	
		Short Term	**Long Term**
Shearing of Wool	Shearing	Introduction of mechanical shearing machines	
Sorting of wool	Sorting		
Washing, scouring and drying	Washing to retain good properties	Spinner for drying Solar Water Heaters Improved Cook Stoves	
Dehairing Removal of thick hair		Further improvements in GERES dehairing machines	
Carding	Use of GERES machine	Use of GERES machine Improvement in the GERES machine	Further improvement in GERES machine Design of Community level units
Combing		Hand operated combing	Design of community level units
Spinning	New Spinning Wheel	Further improvement on new wheel	Improvements in multi-spindle wheel
Wool Dyeing	Natural Dyeing	Use of solar heaters and concentrators for water Spin drying Solar drying	Trials on other plants as dyeing materials
Weaving	New Weaves & Designs		Design Unit at AVANI
Washing and Finishing	Finishing	Small Scale Milling Small Scale Washing Spin Drying Solar energy for drying	
Calendering	Calendering	Steam Press Small Calendering Machine Solar Concentrators for steam	
Testing of Wool	Testing	Testing Equipment	
Looms	Local loom Fabrication	Lighter Looms	

- Marketing

So far, Avani has been involved in production of high value hand crafted products made with these fibers. Due to the high price of such material, it is currently being sold in the urban markets. During various exhibitions held in Delhi, Bangalore and contact established with some exclusive shop in almost all the major cities of India, the response to such hand crafted products has been very good. Almost all the products made during this year have already been sold in these exhibitions and a lot of trade inquiries indicate towards a good market potential for such products. Avani has already achieved a sale of more than Rs. 3 lakh. The fact that we sold out all our new products shows that more people can be involved in producing more material that has a ready market.

- Need for a pilot program

Despite potential for good production and marketing of the fabrics a lot needs to be done on developing appropriate technology for processing at community level. The technology existing as of now is either very primitive, making it expensive to compete with machine made products, or available for large-scale operation which can not be applied at community level. We need to develop scaled down systems for efficient and cost effective processing of fibers at village level.

We are proposing a pilot project for developing a small scale calendering machine for installation at Avani Campus and a small scale carding machine complete with housing and solar power system to be installed at Dharamghar where artisans from 5 villages can use the facility. This would facilitate processing of wool at the village level and better finish of the product.

- Budget for the pilot project is as follows

PARTICULARS	AMOUNT
Calendering machine for calendering 20 mts, 2 KW capacity motor	50,000
Solar parabolic concentrator for generating steam (1liter of water evaporates with 0.136 kWh of energy. At 30% conversion efficiency, we would need a surface area of about 16 sq. mts of collector 30 liters of water needs to be converted to steam at 2.3 kgs/cm sq pressure	150,000
Milling machine for 4 meters fabric per cycle or 30 Mts. per day,1 kW capacity motor	50,000
Washing machine 30 Mts. per day I kW capacity motor	20,000
Spin drier .5 kW capacity motor	15,000
Carding machine 1 kW capacity motor	40,000
Spinning wheel 10, each of 100 W capacity motor (total power rating 1 kW)	40,000

5 kW power plant	900,000
Building	400,000
Adm. support	100,000
Installation costs	120,000
TOTAL	**1885,000**

ANNEXE VII.5

SILK AND TUSSAR

Four varieties of silk are produced in India: mulberry, tussar, eri and muga. Of all the varieties, mulberry silk is the most predominant. Most of the mulberry silk is produced in the Karnataka, Andhra Pradesh and Tamil Nadu. Small amounts are also produced in Uttaranchal, West Bengal and Jammu and Kashmir. Bihar is a major tussar producing state, followed by Madhya Pradesh. Muga is produced exclusively in Assam, while principal producers of eri are Assam, Orissa and Manipur and Madhya Pradesh.

Pure silk and tussar are mostly used for making sarees and clothes but these are commonly used as blending materials with other fibers. Silk/tussar is also used either as warp yarn or weft yarn in an apparel material or furnishing cloth with yarns of other fibers such as noile, pashmina, cotton, wool etc. Use of silk/tussar gives a luster to cloth and provides unique texture. Clothes made of mixed yarns, with silk and tussar as one of the yarns, are in demand in urban areas and also have good export market. Recent experiment at AVANI indicates that there is a growing demand of clothes made from tussar or silk as yarn material mixed with wool or pashmina. Silk and tussar fibers are gradually being introduced in Uttaranchal and these are expected to play a big role in the economy. In times to come silk and tussar could be replacements to other precious fibers such as pashmina, which is now scarce and expensive.

The State of Uttaranchal produces about 130 tons of mulberry silk every year. There is also a marginal production of temperate tussar. The temperate tussar means that the host plant is usually oak species which don't grow in tropical areas. The raw silk is available in Dehradun, Champawat and Haldwani districts of the state. The temperate tussar is grown mostly in Chamoli and Rudraprayag districts of Uttaranchal. India is the world's second largest producer of silk, next to China. Whereas China produces about 60,000 tons of silk ever year, India's output is about 13,000 tons. Silk is an animal fiber, produced by caterpillars belonging to the genus Bombyx. A single silk filament is the product of a series of stages derived from the cultivation of mulberry trees for feed to the propagation of the domesticated silkworm, Bombyx Mori. During the caterpillar phase, the worm wraps itself in a liquid protein secreted by two large glands in its head.
This secreted protein hardens upon exposure to the air. The resulting filament is bonded by second secretion, sericin, which forms a solid sheath or cocoon. Under natural conditions, a moth eventually breaks through the cocoon. In sericulture, the larva is killed in the cocoon by steam or hot air in the chrysalis stage before its metamorphosis. Sustained heat processing softens the hardened sericin so that the filament can be unwound, reeled and made into yarn.

Cocoon rearing, reeling and weaving are three essential links in the silk and tussar production. Though silk has very attractive luster and natural colour, yet silk is also dyed in various colours. Each of these activities is normally performed by a different groups of workers. The output of one group forms the next group's input; consequently, one group's income the next groups expenditure.

Cocoon rearing is essentially a peasant activity. Mulberry silk is grown in areas having milder climates and high humidity. The desired climate for mulberry silk production exists in the Terai and Bhabbar areas of the state of Uttaranchal, immediately south of the Himalayan foothills. The grower has to plant adequate number of mulberry trees for feeding leaves to the caterpillars. Once the cocoons are ready and fully formed these are dried. The key goal of cocoon drying is to protect cocoon quality, preserve condition of cocoons for reeling and prevention of damage caused by long periods of storage. The first hazard is the continued metamorphosis of the pupa. A newly emergent moth will pierce the shell rendering the cocoon useless for conversion to raw silk. Exposure to excessive moisture within the cocoon causes putrefaction and moulds. Drying kills the pupa and evaporates moisture that would, otherwise, ruin cocoons.

Temperate Tussar is reared in warm temperate to cold temperate region covering an altitude of 1,500 to 2500 meters above sea level where oak species (Quercus genus) grow luxuriantly in Uttaranchal. Manipuri oak is also a very suitable species for growing tussar caterpillars. It is under consideration of Uttaranchal government to plant Manipuri oak. Similar to rearing mulberry silk cocoon, the temperate tussar caterpillar also grows
indoors. A constant supply of oak leaves are needed for rearing caterpillars. After specific number of days of caterpillar rearing, the cocoons are dried so that the fibers can be reeled or spun after cooking.

Cocoon cooking unwinds the cocoon filament spun by the silkworm. The sericin covering around the cocoon filament is agglutinated after silkworm spinning, then hardened through the cocoon drying process. In preparation for reeling, it should be softened. Processing softens sericin by heat, water and steam. Ideally there will be uniform softening of the outer and inner cocoon shell.

Silk reeling is the process by which a number of cocoon baves are reeled together to produce a single thread. This is achieved by unwinding filaments collectively from a group of cooked cocoons at one end in a warm water bath and winding the resultant thread onto a fast moving reel. Raw silk reeling may be classified by direct reeling method on a standard sized reel, indirect method of reeling on small reels, and the transfer of reeled silk from small reels onto standard sized reels on a re-reeling machine. The last technique is primarily applied in modern silk reeling processes.

Spun silk/tussar yarn is usually made from cocoons already pierced by the moth. As a broken filament cannot be unraveled, its web is pulled out of cocoon and twisted into yarn either on spinning wheel or by rolling under the palm on a rough surface, such as the bottom of an earthen pitcher. With a foot pedal driven spinning wheel a woman can spin barely enough yarn in a day to make half to one metre fabric depending on yarn thickness and tightness of weave.

Uttaranchal grows about 130 metric Tons of mulberry cocoons worth Rs. 2.5 crores. A total of 2.5 lakh mulberry trees and 160 hectares of mulberry bush

plantation exists, employing 4000 farmers. Out of this, only 80 MT are processed in Uttaranchal. Clearly, there is income generating potential in silk cocoon processing.

Uttaranchal produces only 740,000 cocoons Oak Tussar worth Rs. 2 lakhs. According to a study done by ATI, a potential of 3 crore cocoons exist within Garhwal. Considering that a similar potential exists in Kumaon, there are promising prospects of Oak tussar cultivation and its income generation potential in post cocoon processing.

Scope for increasing much more land under cultivation. More appropriate land use instead of paddy cultivation. Both Mulberry and Oak are ecologically beneficial while giving economic returns. People also get a stake in managing of the forests.

Pithoragarh District has the Govt Mulberry plantation at the following places:

- Muani
- Chilia gaon, Thal
- Didihat
- Balmara, Jauljibi
- Pithoragarh

These farms together produce less than a Ton of Mulberry silk and there is no Oak tussar cultivation in Pithoragarh.

With spinning and reeling rates app Rs. 150 to Rs. 250 per kg of yarn, and a large demand for woven products, it has an excellent employment potential both in cultivation and processing.

Avani has participated in many exhibition and there has been a very good response to the products made of silk and tussar.

The project area in Kumaon has following scope in silk and tussar work:

1. Rearing Temperate Tussar caterpillars
   - Oak plantations
   - Tussar hatcheries for supplying genetically sound and healthy caterpillars
   - Caterpillar rearing units
   - Cocoon drying units

2. Processing of cocoons in tussar and mulberry silk
   - Reeling of mulberry silk and temperate tussar and tropical tussar
   - (if exported from Bihar).
   - Spinning of temperate tussar and silk
   - Rereeling
   - Dyeing
   - Blending and spinning of blended yarn

3. Weaving of pure tussar or silk, weaving blended yarns and mixed yarns for apparel material and furnishings.
Government of Uttaranchal is in the process of promoting a large scale tussar farming project in Garhwal. Avani is already involved in spinning, dyeing and weaving of both mulberry silk and oak tussar in a pilot phase and is looking forward to avenues of developing this activity into a full scale program.

The technology for silk growing, processing and weaving exists in the country. The following institutions are to be involved:

- Forest Department, Uttaranchal
- Central Silk Board, Dehradun, Bangalore, Bhagalpur
- National Institue of Fashion Design
- ATI Chamoli
- Department of Sericulture, Uttaranchal Government

As this activity requires extensive use of forest produce (oak leaves), Forest department's regulation need to be explored before going ahead with Oak Tussar farming. In this connection, a meeting was fixed with Chief conservator Forests, and Principal Secretary, Uttaranchal Government.

It seems that the Uttaranchal Government is going to undertake a massive Oak Tussar farming program in State. The Forest department has already given clearance to the use of forest for oak leaves for tussar farming.

This will not only exploit the forest potential of this area but also give people stakes in conserving the precious Oak forests, which are fast disappearing.

Contact was also established with the State Sericulture Department at Bhimtal. They will provide technical training and other assistance in silk farming.

A visit to the Central Silk Board (CSB) at Dehradoon was also organised. The CSB provides technical training and equipment for silk processing. This includes reeling of cocoons, spinning of pierced cocoons, weaving etc.

Thus, it can be concluded that potential for both, tussar farming and processing exists within Uttaranchal and the Government regulations are conducive to starting this as an economic activity in our villages.

- Future Plans

Since silk is a relatively new material for the spinners and weavers, we will develop our skills in the handling of this material.
The first step is the procurement of raw material. The State Sericulture Department has been approached for the provision of the cocoons. They have already provided us with some quantity which is currently being processed in the villages. The Sericulture Department will also help us in forming backward linkages for the rearing of the cocoons in our villages. A lot of the villagers who have a good forest base have expressed a desire to rear the cocoons. This would be a very important linkage for a continued source of raw materials.
We have also established contact with Appropriate Technology India, Ukhimath, who have been working very intensively on the rearing of tussar cocoons. We have procured some yarn from them and are using it in our products. We are hoping to have a good linkage with this group so that a continuous supply of silk

is ensured. They can also provided us help with the seed material for the cocoons whenever we take up the activity of rearing.

The spinning of pierced cocoons is easier because it fits into the existing skill of spinning and the results are quite good in a relatively short period of time.
For the reeling of unpierced cocoons we require more training input for which the master trainer and the spinning and twisting machines will be subsidised by the Central Silk Board. They will also train us in the weaving of this very fine yarn.

One round of training for spinning has already been conducted and we are hoping to do a follow up training for spinning, reeling and twisting.
The provision of special looms for silk will also be needed.

The next step is the dyeing of yarn. We have developed our skill in natural dyeing of tussar and mulberry silk yarn. It is envisaged that depending upon the plants available in a village, dyeing groups should be developed in the villages. If possible the groups should develop special colors in every village.
This means that all the wages starting from the raw material to the finished product will go to families in the villages of Kumaon, thereby providing a sustained source of livelihood in the village itself. This will have a direct impact on the out migration of people in search of jobs if we can provide source of income in their village itself.

Dastakar, a Delhi based NGO, which provide marketing support to organisations working with handicraft development was visited. The ready sales of all the products made with wool and tussar have provided us with a surety of finding markets of these products in future.
Gandhigram, a Tamil Nadu based NGO will provide technical inputs in vegetable dyeing and design of dyeing workshop. This is crucial to the technical feasibility of processing silk and wool.
Processing part of silk and tussar is being taken up with wool as same processes are involved in developing the products.

ANNEXE VIII

ANNEXE VIII.1

Working group (committee) formed on 7th December 2001 at SWRC's office Mangan North Sikkim.

Sl.no	Name	Qualification	Designation
1	Dr. N.T Lepcha	B.V.Sc & A.H	President.
2	Mr. Sonam Lepcha	B.A B.Ed	Vice President.
3	Mr. K.C. Bhutia	B.A	General Secretary.
4	Mr. Namgay Lepcha	B.E (Civil)	Jt. Secretary.
5	Mr. B Lepcha	B.A	Publicity Secretary.

Executive member

1 Mr. Loden Gyatso Lepcha	XII passed.
2 Mr. Sherap Lepcha	XII passed.
3 Mr. Nintso Lepcha	X Passed (Panchayat)/VEEC member.
4 Mr. Netuk Lepcha	XII passed.
5 Mr. Tashi Tshering Lepcha	X passed (Panchayat)
6 Miss Jay jay Lepcha	B.A (member MLAS) NGO
7 Mr. Nima Tsh Lepcha	X Passed (member VEEC)
8 Mr. Namgyal Lepcha	X (President MLAS) NGO
9 Mr. Ugen Paljor Lepcha	B.A (Jt.Sect MLAS) NGO
10Mr Dawa Lepcha	Diploma in Photography.
11 Mr. Gyan Ongdup Lepcha	XII
12 Mr.Norden Tsh Lepcha	XII (Panchayat)
13 Mr.Lopzang Lepcha	Under Matric (Panchayat)
14 Mr. Dupzor Lepcha	------do-----
15 Mr.Phurba Lepcha	------do-----
16 Mr.Dupden Lepcha	------do-----
17 Mr.Choden Lepcha	------do-----

15, Mr. Hika Lepcha —do— VEEC (Member)

Eco.Tourism (Upper Dzongu) North Sikkim (India)

Thank you.

ANNEXE VIII.2

STUDY OF ECO-TOURISM PROJECT: SYNTHESIS OF INFORMATION ON PROCESS

Sikkim Field Visit
26.11.01 to 10.12.01

- The visit's objective was to explore further the feasibility of an "eco-tourism" project in North Sikkim, with other economic activities inter-related to this core activity. Issues related to Government policies and perspective, as well as the expansion of the participatory approach to the whole area were identified as essential items if such a project is to be developed.

- Ten days were spent in Gangtok during which a lot of people were met (Government and Non-Government actors) and baseline information collected, followed by three days of field-work in Mangan / Upper Dzongu.

- A one-day workshop, held on 8/12/01 in Mangan, chaired by Mr. S.W. Tenzing, Chief Secretary of Sikkim, attended by top-level members of Forest and Horticulture Departments (Gangtok) as well as the District Collector (North) and District level officials.

- Impressed by the level of participation and awareness shown by the Village Environment and Energy Committees (VEECs) the C.S. committed to support the design and implementation of an eco-tourism project in Upper Dzongu, where other economic activities (farming and non-farming ones would supplement eco-tourism) would also get appropriate emphasis.

- "How to bring maximum benefit to local people of Upper Dzongu while maintaining bio-diversity and preserving the environment" was the core issue.

- "Bottom to top" planning process, as initiated by SWRC in the area, with the support from ASVIN and GERES since the beginning of 2001, is a key element to respond to the above question. The VEECs have now prepared a very elaborated plan for eco-tourism, mapping the area, listing the potential resources, selecting sites for eco-lodges.

- Started in Gangtok with Mika Lepcha, the discussion focussed on the practical steps to be introduced if the villagers want to keep the development of tourism under control and avoid any form of exploitation from outsiders (agencies from Gangtok, Darjeeling, etc.). The discussion continued prior to the workshop, and, on the initiative of some VEEC active members, a "working group" was formed.

- The idea is that this working group, initially informal, but gathering stakeholders from various background (and beyond the VEECs) would draft a proposal for new regulations to be introduced in Upper Dzongu for an eco-tourism project. It is meant to incorporate as many persons as possible in the area, and soon be endorsed by the local Panchayat system (elected people). The head of the Panchayat system (North

Sikkim), the *Zilla Adhaksha* North was met in Gangtok and was very supportive about the idea. A formal meeting could take place in January 2002 where all the heads of the panchayats concerned in Upper Dzongu will meet the group. This would give sufficient weight to the working group to become a recognised body, and some kind of power granted by the Government of Sikkim. In the meantime, taking advantage of the annual fair in Dzongu (starting on 28/12) the working group will widely inform the Dzongu inhabitants about this plan.

- The group, at present, consists of VEEC members, district level officials, and local resource persons. The Chief Medical Officer is the "acting president". Some other members are the President of Lepcha Youth Association (North), a Lama, said to be a very skilled carpenter (traditional design) in Upper Dzongu, a young man who tried to start a tourism project three years ago -but did not get the appropriate clearances-, the local representative of the Handicraft and Handloom Department, SWRC co-ordinator, Sikkim, etc. An updated list will soon be submitted. Besides gathering more people and drafting proposals, the acting group will directly interact with GERES representative. Formats on food and energy supply in lodges of the area were left and have to be soon sent back.

- The area of upper Dzongu is at present closed for tourism, although the Government of India gave a no-objection in this regards. The Home Department (Sikkim) has felt, till now, that it is too early to open the area due to lack of infrastructure for tourism. The Department of Forest, Environment and Wildlife has, so far, been fearing that the impact of tourism on environment would be negative.

- The working group gave a presentation during the workshop, and the Government of Sikkim response was extremely positive. The C.S. appreciated the ideas expressed by the people present and their willingness to take the responsibilities of controlling the tourism and play an active role as far as preservation of the environment is concerned.

- The officials from the Forest Department informed the participants that new guidelines are now being drafted for "Eco-Development Committees cum Joint Forest Management groups" (further contacts will be established with the concerned official in-charge). Such groups, once the notification is passed by the Law Department and after the Forest Officials have authenticated their capabilities in implementing the work (forest and environment protection, etc.) will have delegated powers granted by the GoS. One could think of regulation and management of eco-tourism (only the local committee could arrange permits for trekkers, enforce rules such as "no camping site", only village eco-lodge stay, determine the rates and manage the revenues, etc.).

- The C.S. encouraged the VEECs to take up this role of EDC-JFM, and form a network / committee of this groups that would be fully in-charge of eco-tourism development and management in Upper Dzongu. This would be a unique experience and one can say that the timing is absolutely adequate since no tourism development has taken place so far, and the right direction, based on villagers' planning, can be taken.

- It was assessed that a major project can not start before 2003 (many components could be funded by or through the GoS - a meeting will be organised in this regards in January 2002-). But, during 2002, a pilot phase should be launched, in order to keep everyone involvement and motivation. This would come in parallel to the planning work of the working group and the preparation of a network of EDC-JFM, with representatives at the area-level. The construction of one or two eco-lodge were proposed by the group, and initial information was collected about it, and a site visit organised. The working group is now preparing a document and a budget about it. It was stressed that it should incorporate and show the villagers' contribution clearly (labour, material…).

- Everyone was really excited by the perspective of this project, and the unique opportunity it offers to each stakeholder. The local participation, as well as the strong encouragement given by the GoS, thus lifting the major barriers to such project (lack of local planning and participation and regulations constraints).

ECO-TOURISM IN LEEK AREA[18]
ANSWERS

GERES appreciates the dynamic process taking place in Leek area, and would like to know more in detail how villagers understand eco-tourism, how they decided it is a good development option for them and how they plan to manage such a project.

Would the villagers be interested in a specific assistance on the energy, sanitation, waste treatment, and drinking water aspects? Two French students could help, in the coming months, if the project with GERES goes ahead, on the technical aspects of design of eco-lodges.

If yes, and in order to know better the field situation, GERES would like to know the following:

The answers are given in blue, following a meeting with Mr. Mika Lepcha, VEEC of Leek, in Gangtok on 29/11/01.

BACKGROUND OF THE PROJECT

- What did motivate the villagers to start building a first community lodge in the area?

Origin of the house

The house being built is located in Namprikdang, 4-5 km from Leek, accessible by road.
It is not directly linked to the project of eco-tourism the villagers are now elaborating.
It is actually an initiative from the Culture Dept. of Sikkim (1998) in order to preserve and maintain the culture and traditions of Lepcha community in Sikkim. In consultation with the Sikkim Lepcha Association (SLA), it was decided that a traditional house for "demonstration" would be built in Namprikdand (North Sikkim) and a museum and a structure to depict the stairway would be built at Daramdin (W. Sikkim). It is not to be used by tourists for accommodation.

Origin of the idea of eco-tourism

Mika Lepcha + Mendup Lepcha (President of Lingdem Gram Panchayat) attended a workshop (the first one) organised by ECOSS in Tashi Delek hotel on eco-tourism in April 2001. Having in mind that for the EU solar project financial contributions were required, and that cardamom cultivation is declining, there is a need to develop new economic activities. The presentation made by resource persons, the description of the first project in Yuksom on eco-tourism motivated them to discuss the idea with their village members. They felt it could be a good source of income, and provided it is done in a sustainable manner, the govt. could be persuaded to open the area to tourists.
The fact that SWRC reported that an eco-lodge is being built there seems to be a communication gap or an English mistranslation (!).

[18] In this document Leek means the area in general (incl. Namritang, Salim, Safo, Tholung, Sakyong, etc…). GERES mentions only Leek because of the reports from the field that several times gave this village name.

Anyway, it is interesting to take into account the present construction work as it gives a clearer idea of how Govt. operates on the field.

- What is the progress of the construction so far?

Construction started after August 2001. The foundation and pillar structures are done.

- Is there any broad map / design on paper of the building? If not, can one be prepared?

Yes. SLA gave two drawings and a map of traditional house the Dept. of culture. As this Dept. does not have the skill to work on construction, the project was given to the Building and Housing Dept. with a clear mandate to "make it look as much traditional as possible".
The main issue that came up during the discussion with Mika Lepcha is that the structure is made of RCC (foudation, pilars, etc.), which is not at all traditional!
It is not very clear how the decision was taken, since it shows a lack or vision and a contradiction with the initial idea!
At present there are very very few concrete houses in that part of Dzongu (in Sangla, Passingtang only), so under the pretext of "conserving tradition", the Govt. is actually bringing a concrete structure. One can also wonder how a facade work will look and how long it will last.
It is also not clear whether there was a debate in the villages about this issue RCC Vs. purely traditional. The Namprinktang Namsung Celebration Committee (whole Dzongu - Non Govt. committe) seems to have taken part to the initial talks with the Govt.
Mika Lepcha stated that the committee accepted to have a RCC structure because:

- The Govt. gives one time fund. Traditional house requires a lot of annual maintenance and repairs and probably there would be no fund to take care of that and a RCC structure would last longer.
- With a facade made of bamboo and cane, plus special attention given to the shape of the RCC pillar, plus a bamboo roof covering the RCC roof, they were confident that it will look totally traditional.
- They had no clear ideas how to raise fund for maintenance in case of 100% wood, bamboo, cane work (the idea is anterior -June 1998- to the "exposure" to eco-tourism, so no linkage could be created at that time).
- They wanted to match ("grab") the fund available from the Culture Dept., and a purely traditional house would not match it (!!) - see below, the contractor must have "influenced" the decision in some way -

After discussing with Mika Lepcha, we went to the Building and Housing Dept. in order to meet the Chief Architect, Mr. Subba. Being absent, we met the top official, Mr. N. K. Gurung, Principal Chief Engineer cum Secretary Building and Housing Dept. His view on this were that, beyond the question of maintenance, were that:

- The land selected for the construction is forest land and there was a problem to get a clearance from the Forest Dept. to start the construction (which, by the way, does not yet seem granted), and there is a ban on using wood and cutting trees.
- There could have been a lobby from the local contractor to do the work in that way.

One can here conclude *(and Mika Lepcha totally agreed with this)* that there has been a lack of vision, and personal stakes coming accross the process. This must be avoided in case of an eco-tourism project being launched in the area.

Mika Lepcha proposed that an inter-village committee will be formed and it will be in a position to set up clear rules (construction, architecture, consumption of goods, etc to fully benefit the local people). From our side we confirmed that we can help at the lobbying level (with the help of ECOSS, top administration members, etc.) to set up a clear and meaningful strategy.

- Estimate of budget for material, labour? Total cost?

Not available.

- What will be the use of the building? (only for tourism, or other purposes?)

Only for demonstration, visit, to set an "example". Basically the Govt. wants to show that it does work to preserve the traditions of Lepcha. As mentioned above, it will not be used for stay.

- Who are the partners for the work (funders, technical work, etc.?)

Dept. of Culture (initial idea, probably the funds)
Dept. of building and housing (one senior architect for the design, final map, costing and the integration of Lepcha "facade")
Public Work Dept. (for the construction, through a local constructor)

- Who is working on the construction site?

A contractor (Lahendup Lepcha) has taken the job, local labourers are engaged and Lepcha craftsmen will do the bamboo, cane exterior.

- Who is responsible for the supervision?

A Junior Eng. + Asst. Engineer from the Housing and Building Dept.

- What is the present production (agriculture, handicraft) that could be used / sold to tourists?

Not much at present as there is no local marketing for any product, and the main crop is cardamom.
Envisaged are:

- Vegetable cultivation
- Fruit production
- Poultry
- Ink-paper making
- Traditional hat (cane material) -beautiful and costly handicraft-, we met the man who revived this craft and he has two instructors in North Sikkim
- Dhup factory in Passigntang (incense sticks…)
- Milling facility in Passingtang (grinding of food grains, etc…)
- *More reports on this subject expected until end of next week*

TOURISM IN LEEK AND AROUND

- What is the present tourist flow in the area (number of tourists coming)?

It is a protected area, very few foreigners have come. One English couple, once came and spent a night in Leek (in the school). One other foreigner for research work (Malaysian) and the ASVIN team twice (stay in one house in Leek and Sakyong). For project / research work, the permission was obtained from the Sikkim Govt. For the few tourists / trekkers (see below), it is not clear whether they got a prior permission from Central Govt. Delhi or locally.
One SWRC staff member will check, if possible, the records at Mangan / Sangla bridge in order to assess the exact number of foreigners that have entered.
➔ Advocacy for permission to be issued under special conditions and special intermediary (Lepcha ASSo., ECOSS…) is a must, prior to the project.

- What is the tourist season?

Trekking up to Green Lake, Lachen, up (May, June, July, August). For lower altitude (the valley bottom is at 1000 m approx), winter is good, never very cold. One should avoid the monsoon (May end to Oct beg.). So, broadly from October, November + March, April, May if one combines low + high altitude.

- What is the trek the villagers have in mind?

Green Lake trek has two routes:

- Lachen - Zema - Thiela -Green Lake
- Mangan -Lingja - Tholong Gompa -Kesiong - Dikithang -Jhaltang -Green Lake. This second trek starts from Dzongu and three foreigners -may be more- did it (Namgyal guided them). It means that occasionally foreigners enter for trek.

- At present the tourists stay at night? If yes, how many nights?

In the case of the group mentioned above, they stayed at night:

- Tholong Gompa (4 1/2 hours from Lingja) - 1 night
- Walk by Kesiong, Lake then reach Dikithang (nomad place) (11 hours) - 1 night
- to Dawathnag (4 hours) then either proceed towards Lachen with night halt in Jakathang or directly back to Tholong. - 1 night
- In case of fourth day, then Jakthang to Lachen (4-5 hours).

Limit for the inter-village committee: up to Jhaktang

More night halts can be developed in case of eco-trail going throught he villages, in that case it could be more an "exposure" "cultural" trek.

- Where do they stay? (description of the house, facilities)

Tholong Gompa: in a Dhramsala with, common kitchen, people have to bring their food or in Govt. guest house (RDD house, concrete Govt. type), also self cooking.
Dikithang no structure, camping site
Jhaktang, no structure, camping site
These three places are high altitude.

- Proportion of Indian / Foreign tourists? Individual tourists or groups?

No individual Indian tourist, very few Foreigners as described. Sikkimeese trekkers (NCC National Cadet Corps, students) coming in groups. Some Indian groups also (army…)

- Tholong festival:

Tholong festival takes place every year (very important Buddhist place). And every three years, there is a major gathering (from everywhere in Sikkim, the Chief Minister and Governor come with many VIPs [on horseback]. Approx. 5,to 10,000 people (figure given by the villagers - to be checked). There are continuous 7-10 days of puja. The main programme is on one day. It is in July-August.
Night halt: huge crowd share tents.
There is a puja committee for organisation (people from Mangan, Sakyong, Pentong, Lingja, etc…). One permanent monk in Tholong.

- Are they trekkers (come by foot) or other?

The road only goes from Sangla - Passingtang + Nampringtang - Lingja. All other villagers on that valley are accessible by foot.

- Do they buy local products? What? To whom?

Trekkers bring everything from outside.

C) TECHNICAL SURVEY

I) Energy

Energy source
Which energies are available in Leek ? What are their rates ?

Availability: easy - medium - difficult

source	Cost / unit	availability	
Gas		No	
LPG		No	
kerozene	10 Rs/l (Govt.) 15 Rs/0.75 (Black)	difficult	Available at Mangan Used for light
wood	Market 30-40 Rs/bundle (20-30 kg but not properly dried) Village: own collection	easy	Mainly used for cooking
dung		No	
electricity	Sangla bridge, Nampriktang, , Passingtang,, Mantan, Tinbong up to Lingja. Other side Lindem and Laven, also electrified	irregular	

Is there scope for briquette (pine needle, other agro-waste)?
Unlike Kumaon, the place is humid and covered by forest. It will be difficult to dry any agro-waste satisfactorily prior to their partial combustion. The main agro-waste is the outer skin / peel of the cardamom (only the seed is used) but it is available is september / october when sun drying is difficult. Another way to add value to this waste is to use it for extracting dye (red color).
It seems, in North Bengal, some NGOs have used the same technique of briquetting. Can be further investigated.

Cooking

What is the traditional stove? (name, a short description, cost)
Punthop = fire place (Lepcha name). It is a wide open fire (rectangular) 5' x 2'. On top wood is kept on wide racks to dry + meat drying.

Which stoves are available? (name, a short description, cost)
Everyhouse makes its own stove / fire place described above.

Electricity

Is the village connected to the grid? Leek: no. Solar project (EU) completed.
What is the power supply schedule?

Solar Energy

For each season, at what time are sunrise and sunset?
Winter: 6.30 am to 3.30 pm
Summer: 6 am to 4.30 pm

What is the moonson period? Is solar energy suitable during this period (too much clouds?)
May end to September. Yes, it is working very well so far (2-3 hours light) [the design of the systems was taking into account the climatic conditions - battery sized accordingly]. In winter, they get more than three hours of light.

Does SWRC run a PV or solar water heater project?
It is planed, with assistance from EU project and a technician from Nepal (Surya Man Singh). A solar water heater fabrication workshop will be soon set-up in Mangan. With BSE trained to fabricate, install, and maintain.

Solar water heater

Are some solar water heaters implemented in the village? No
Where are they manufactured? What is their cost?

II) Sanitation

- Toilets:

What are the traditional toilets (dry, wet, flush, jungle?)
Majority go to the "open" (forest). Some 30-40% houses have toilets, which are always outside the house. Some have a water system (in general with running pipe water), and septic tank, some are dry systems (light structure around a hole in the ground, soil is thrown above the excreta. Once it is fully covered, they shift the structure to another place).

Are these human excreta processed? (compost…)
No, it does not seem acceptable.

- Water: how are the kitchen and bathroom water processed after use?

There is no water running in the house, every washing is done outside, generally houses have a nearby tape with running water from the upper side of the hill through pipes. There, they bath, and wash kitchen utensils. Water runs away, and is not used.

III) Water supply

What are the water supply systems?
Pipeline near the houses.

Is it drinking water? (for Leek Inhabitant, for foreigner)
Drinking water for villagers, summer time few cases of water borne diseases.

Where do the tourists purchase drinking water?
Can be purchased from Mangan, Sangla, Passingtang. But filter system would be better to avoid plastic bottles thrown outside.

IV) Traditional Lepcha building construction

What are the traditional Lepcha building construction technics
Entry on east. Orientation of village position, hill position, is important to determine the position + orientation of the house.
Wooden pillars.

How are the walls constructed? (stones, sun dried mud brick, cooked brick, wood…)
Criss-cross system of cane + bamboo that are attached to the wooden pillars.

How is the roof built (flat, slope, mud, stone.…)
Two slopes, thatch roof made of combination of small + big bamboo. This tends to disappear.
At present people used more and more tin sheets (Galvanised Corrugated Iron)

Mika Lepcha was asked to collect more infos from villagers on real traditional design.
What could be the design, according to them to accommodate 10 persons: detailed drawing, orientation, cost estimate to be obtained from an experienced local man (that will attend our meeting on 8/12), list of material required, position of rooms, windows, etc.
Feed-back expected on 7/12 afternoon in Mangan before meeting with C.S.

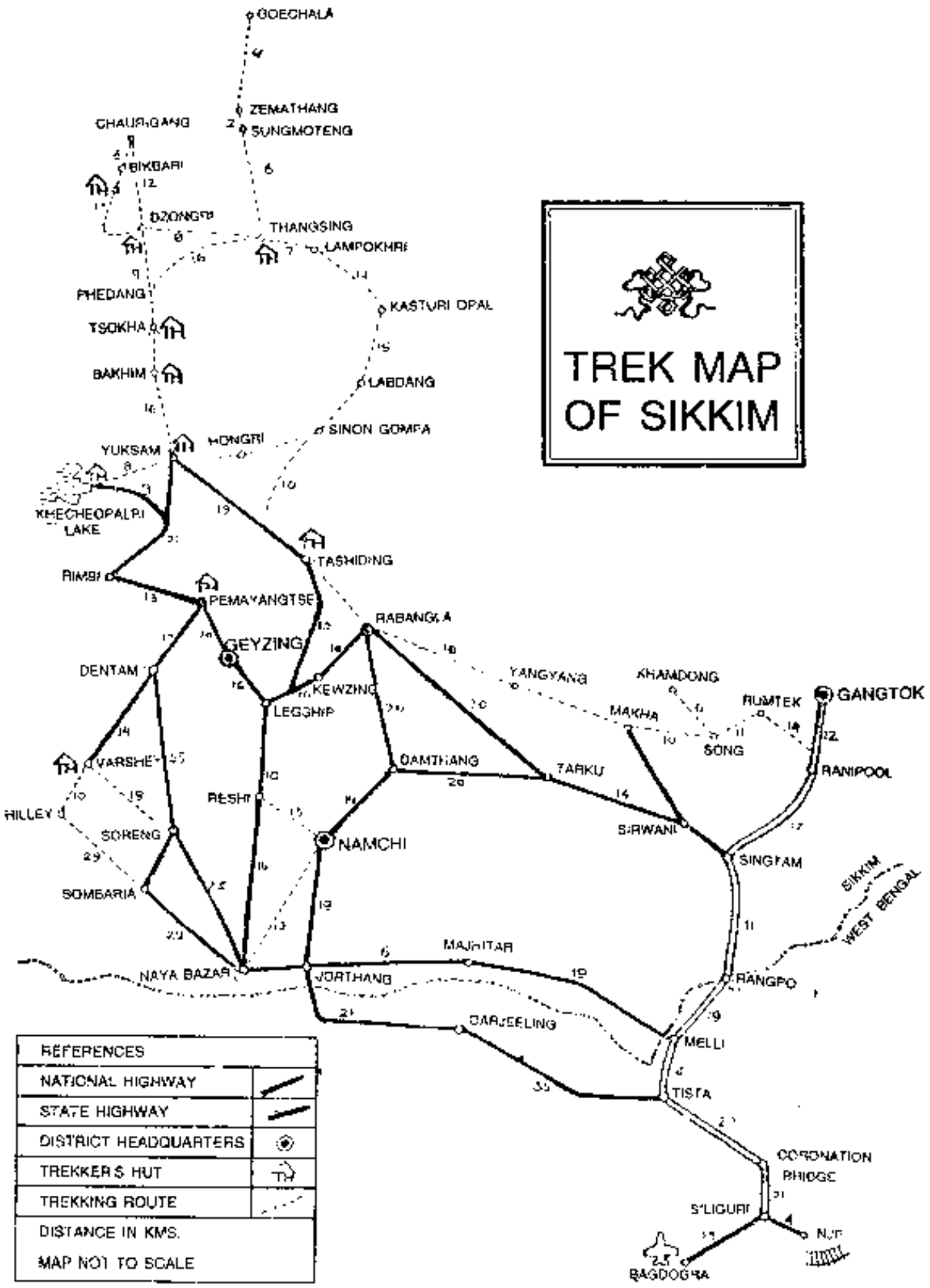
V) INCOME GENERATION ACTIVITIES

What are the plans? Linkages with eco-tourism?
To start with one eco-trail, going through the villages + option to go to the gree lake, then Latchen. At various points, handicraft could be sold and visits of various small scale cottage industries (dhup, milling, paper/ink making, hats fabrication etc.) organised.
Fooding (veg / non veg products) would be totally local (a resource person, Lepcha cook, is presently in Calcutta with the Govt. for an exhibition on Sikkim - he could train local villagers). Lodging would not be allowed in camping sites, but in eco-lodges. Strict rules within the area would be established so that no product from outside or travel Agencies from Gangtok could come in. Facilitation for permits, etc could be done by SLA and/or ECOSS, a lot of advocacy has to be done to get the total help from GoS.

All this will be detailed in the coming days and weeks.

It is expected that the inter-village committee for eco-tourism will be form, in the presence of the C.S., on 8/12. More and more work will be done through it, SWRC being a facilitator.

Trekking routes of Sikkim



(official map of GoS for trekking routes)

Regulations for Foreign Tourists

What are Inner Line Permits?

The entire State of Sikkim is under the restricted/protected area regime under the Foreigners (Restricted Areas) Order, 1963 and Foreigners (Protected Areas) Order, 1958. Under these two Orders issued under tha Foreigners Act, 1946 no foreigner can enter or stay in the State of Sikkim without obtaining permits from the designated authorities. These permits, officially termed Restricted Area permits/Protected Area Permits, are popularly known as Inner Line Permits.

Who can issue ILPs?

The following competent authorities have been designated to issue inner line permits :

* All Indian Missions abroad
* Ministry of Home Affairs
* All Foreigners Registration Officers
* Immigration Officers at Airports at Mumbai, Calcutta, Chennai and New Delhi
* Deputy Commissioner, Darjeeling
* Deputy Secretary/Under Secretary, Home Department, Govt. of West Bengal, Calcutta
* Government of Sikkim
* Chief Secretary, Gangtok
* Home Secretary, Gangtok
* Secretary, Tourism, Gangtok
* I.G.P. of Police, Gangtok
* Resident Commissioner, Sikkim House, New Delhi
* Deputy Secretary, Tourism, Siliguri
* Resident Commissioner, STCS, Calcutta
* Tourism Officer, Rangpo

Clearly, there are numerous authorities from which to obtain inner line permits. If one plans in advance it is best to take an endorsement on the visa itself for permission to visit Sikkim from Indian Missions when applying for Visa to visit India. Once in India, it could be most convenient to approach Government of Sikkim authorities at Delhi, Calcutta and Siliguri.

How much time does it take a get an ILP?

Normally the Inner Line Permits are issued off-the-counter without any delay. The permits would however be available only on government working days. One requires to produce the passport and visa in original to the competent authority.

Are there exceptions to the ILP regime?

Existing guidelines require that nationals of Pakistan, Bangladesh, China and Myanmar can be given Inner Line Permits only after approval from the Ministry of Home Affairs in New Delhi. Further all Bhutan nationals are exempt from the requirement of obtaining ILPs. They do not require to obtain permits to enter Sikkim. Permits to foreign diplomats and members of United Nations and International Organisations holding diplomatic/official passports are issued only at Delhi by the Ministry of External Affairs.

What is the duration of these inner line permits?

Normally the permits are issued for a duration of fifteen days for the specific purpose of tourism only. Once in Sikkim these permits can be further extended for 30 more days in two spells of 15 days each. These extensions are granted only at Gangtok by State Home Department. Extensions beyond the period of forty-five days are vary rarely given. Foreigners who wish to stay in Sikkim for purposes other than tourism for longer period of time are required to apply directly to the to Ministry of Home Affairs, New Delhi.

Once in Sikkim, what all places are 'open' for foreign tourists? What restrictions should be observed by foreigners?

Individual foreign visitors may visit/stay at any of the following towns in Sikkim

* **EAST** - Gangtok-Rumtek-Pakyong,Barapathing-Rongli-Renak-Aritar-Rorathang
* **WEST** - Geyzing . Pemayangtse . Khechepheri, Tashiding . Yuksom . Soreng
* **NORTH** - Phodong . Mangan . Singhik
* **SOUTH** - Namchi . Ravangla

Groups of foreigners (4 or more persons in a group) are allowed to visit following additional places/circuits. Permissions are granted for specific tour circuits as identified with definite entry and exit points and a specified mode of transport. Local tour operators only organize these trips and also provide a local Liaison Officer who accompanies the group.

I. East District

i. Gangtok-Penlong-Tinjure-Rumtek/Martam

II. North District

i. Gangtok-Chungthang-Lachen-Thangu
ii. Mangan-Lingzia-Shabrung-TholungMonastery-Kisong (except Yabok)
iii. Mangan-Lingzia-Sakyong-Royot Patam (except Gochala)-Dzongri-Yoksum
iv. Yumthang-Phuni-Phunichoka-Tarum Chachu-Chunbgthang
v. Dikchu-Phodong-Labrang-Namptam-Mangan-Maling-Singhik-Samartek-Chungthang
vi. Lachung-Yumthang-Yume-Samdong

III. South District

i. Sirwani-Temi-Damthang-Tendong-Namchi
ii. Damthang-Tendong-Damthong-Rabangla-Maenam-Yangaang-Singchuthang-Sirwani
iii. Rabangla-Maenam-Borong/Polout-Tashiding
iv. Kewzing-Rayong-Tinkitam-Legship

IV. West District

i. Yuksom-Dzongri (except Gochala)
ii. Yuksom-Dzongri-Thangsing-Lampokhri
iii. Utterey-Chewa Bhanjang-Dhond-Garakhet-Oktak-Dzongri
iv. Hilley-Versay-Singalila-Chewabhanjang
v. Hilley-via-Sombarey-Versay-Soreng
vi. Hilley-Versay-Dentam
vii. Pelling-Sangcholing-Khecheperi-Yuksom-Dubdi-Sinon-Tashiding.

V.

i. Tsomgo Lake in East Sikkim (day visit only)
ii. Mangan, Singhik, Toong, Chungthang, Lachung and Yumthang (for 5 days only)

It must be remembered that foreigners cannot stay at any place, which is not mentioned above. Violation of above instructions and conditions specified on permits are treated as an offence under the Foreigners Act and are punishable under law.

How to extend ILPs?

Foreign Visitors will have to apply for extension of ILPs to the Home Department, Government of Sikkim.

ANNEXE VIII.3

CONCEPT PAPER OF GERES FOR ECO-TOURISM DEVELOPMENT

Definition of Sustainable Eco-Tourism (S.E.T) : 2 principles

A - A strong decision making process is necessary to set-up conducive regulations, legal framework and co-ordination in planning and promotion activities. This has to take place at two levels**:**

1) **Local**: with **Eco-Development Committees (EDCs)** as defined by the Forest Department proposed notification, composed by 7 villagers out of 10 members.

2) **Sikkim level**: with a **Strategic Steering Group (SSG)** composed by Government Departments linked with eco-tourism development, EDC representatives, advisors, supporting NGOs, travel agency representatives.

Role of each stakeholders:

- EDCs: represent the village communities, make propositions to the SSG, implement and manage activities on the field.

- SSG: defines SET rules, based on EDCs propositions, defines responsibility distribution, and supervises rules application. SSG can also propose a financial plan. The SSG may facilitate the evolution and adaptation of legislation according to EDCs' experience.

B - Local economic development **must be a direct and indirect impact of the SET and, besides tourist services, the following activities must be integrated:**

- tourist products (handicrafts)
- food product supply (vegetable, meat...)
- general infrastructure (road, trail, energy supply….)

Market considerations will go beyond tourism (local, export…) and the main concern will be to get maximum benefit and income within the villages.

The GERES / SWRC proposal for 2002

Implementation of the decision making process

- to define the role of the SSG with the various stakeholders, and support from resource organisations (ECOSS…..)
- to set up the SSG

Launching of the Sustainable Eco-Tourism in Dzongu: preliminary phase 2002

- to initiate the setting up of the EDCs
- to prepare with the EDCs the setting up of economic activities
- to construct one eco-lodge

Linkages between Dzongri and Dzongu

- to facilitate exchanges of experiences
- to strengthen agro-economic activities directly or indirectly linked to tourism

Promotion and partnership outside Sikkim

- to investigate the possibility to link Sikkim with a French mountain district
- to define the eco-tourist profile with a market survey

Preparation of a long term programme in Sikkim

- to define, taking into account the result of the above work, a programme for the coming years.

Role of each stakeholders

GERES

- to co-ordinate and accompany the process of setting up EDCs and SSG
- to ensure the project engineering on economical activities
- to co-fund the 2002 activities and raise funds for the future programme
- to co-ordinate contacts between Sikkim and French Mountain districts

SWRC

- to help transforming VEECs into EDCs
- to facilitate the implementation of the activities on the field
- to ensure the follow-up at village and EDCs' levels

KCC

- to share their experience
- to train Dzongu stakeholders
- to facilitate the development of agro-economic activities

EXPECTED CONTRIBUTION FROM THE GOVERNMENT OF SIKKIM

- co-financing the 2002 activities and planning for co-financing of the future programme
- active participation of relevant departments to the SSG

ANNEXE VIII.4

ECO-TOURISM IN DZONGU: GERES PROPOSAL FOR THE YEAR 2002

The following chart is being submitted to the Working Group on Eco-Tourism for Dzongu as an initial proposal for collaboration, with practical activities to be initiated in 2002 with a view to develop a long-term programme of development of eco-tourism in Sikkim.
The same document will also be discussed with the Government of Sikkim, and other identified partners such as SWRC and ECOSS.
A budget is going to be defined and will be proposed as an annexure.
The present proposal, as well as the budget are subject to the approval of GERES board but can serve as an initial proposal on which identified partners are requested to react.

Items	**GERES proposal / perspective**	**Expected collaboration / Questions**	**From whom?**
	HUMAN RESOURCES to implement the **2002 ACTION PLAN**:		
	1 French staff in Sikkim for 7 months (to co-ordinate the activities to be taken up in 2002 and participate in the design of the future programme - in collaboration with emerging village / Dzongu / Sikkim level entities - cf. (1) decision making process)	▪ Facilitate Visa procedure / entry in Sikkim and stay in Dzongu ▪ Facilitate the setting-up of a field based office-cum-residence with basic facilities (electricity-telephone connection) in accessible place in Dzongu (Sangla, Passingtang?)	GoS Working Group
	1 local staff in Dzongu for 7 months (to work as assistant to the GERES staff, facilitate her/his contact and field work in Dzongu). Requirements: ▪ English speaking ▪ Residence and good contacts in Dzongu ▪ Background or interest in social / community work and Lepcha culture ▪ Already aware or involved in the present process ▪ Available for 7 months full-time work (most of the time in Dzongu villages)	Propose suitable candidates, as far as possible before 4 feb. 2002	Working Group
	Support from ECOSS (part-time team work - senior/junior) on the strategy for eco-tourism at Sikkim level and possibly design / organisation of trainings	*To be discussed with ECOSS*	
	Support from SWRC (part time team work) on the definition of the future programme implementation (Community Workers and Village Environment and Energy Committee consultation, Barefoot Solar Engineer network and utilisation / back-up from Chandey workshop for technical training, maintenance, etc.)	*To be discussed with SWRC*	

2002 ACTION PLAN WITH 4 COMPONENTS			
(1) TO SET-UP A RECOGNISED DECISION MAKING PROCESS			
1a. Village level	▪ To set-up the village level legal structure (Eco-Development Committee -EDC-, or Joint Forest Management -JFM- committee, or ?) depending on the village situation .	Co-ordinate with Forest department to define: ▪ the legal framework applicable to each Dzongu village ▪ the area covered by the committee ▪ the exact steps to be taken under the legal framework (elections, registrations, power granted, bank account, etc.) ▪ the possibility to convert VEECs into one of the recognised body Question: how to avoid the multiplication of committees in one village? Question: how to actively involve women [not only paper quota]?	Working Group + GoS (DFO)
1b. Dzongu level	To set-up a "Eco-Tourism Management Committee, Dzongu" (ETMC) with members from each EDC/JFM, local NGOs, Forest Department, Panchayat (to follow the same representation pattern as EDC/JFM)	Once this entity emerges and is operational, it will become the official partner for the programme definition and implementation and will thus replace the working group.	EDCs/JFM and local partners
1c. Sikkim level	▪ To take part in the expected on-going process to strengthen eco-tourism development strategies in Sikkim (fallout of the international conference, proposed co-ordination between the 5-6 eco-tourism projects planned in the State). ▪ To give the possibility to the Eco-Tourism Management Committee, Dzongu to interact with other stakeholders, Govt. Dept., and express the needs and requirements of Dzongu as far as eco-tourism is concerned (legislation, promotion, co-ordination with other development activities…)	Question: how to involve travel agents from outside in a meaningful manner (and minimises pressures from them)?	GoS ECOSS ETMC
(2) ECO-TOURISM STRATEGIC PLANNING AND INITIAL IMPLEMENTATION IN DZONGU			
Vision and definition	**Identification work by EDCs/JFMs…** Consultation at Eco-Tourism Management Committee level with external support for integrated tourism planning in Dzongu so that the following is discussed and defined: ▪ Tourism services ▪ Tourism infrastructures required ▪ Promotion activities ▪ Tourism products	The prerequisite being the creation and strong involvement of villagers in EDCs/JFMs The prerequisite being the creation of an ETMC and the strong involvement of its members	DFO, working group, VEECs, local NGOs EDCs/JFMs

Experience exchanges	**At different levels**: ▪ Dzongu-Dzongri: Linkages with Kanchendzonga Conservation Committee (KCC) (mutual visit to assess the existing situation, lessons learnt, possibility of cross-promotion activities, common rules…) ▪ From Nepal: following the Yuksam IYM meeting in April, visit of a delegation of villagers from Nepal in Dzongu (with an experience in tourism development [ACAP area], or tourist oriented village products [handmade paper]). ▪ To Nepal: exposure trip for a delegation from Dzongu villagers	WMPA perspective, partnership?	
Implementation of preliminary activities	**Conception and construction of an ECO-CENTRE**: ▪ Definition of the concept (accommodation based or wider with other services -information, meeting place, ETMC office, evolution perspectives) ▪ Site selection, design, ownership and management system ▪ Construction possibly started in 2002, provided funds are mobilised and above points defined **Handicraft development**: ▪ Feasibility studies ▪ Micro-planning **Promotional tools**: ▪ Possible immediate implementation of the activities defined under the "integrated tourism planning"; provisions kept for the realisation of tools like: photos, leaflets and video…	Inputs from ETMC, debates with other stakeholders Maximum financial contribution from GERES: 30% Financial contribution from GoS and EDCs/JFMs (through ETMC) With involvement of EDCs/JFMs Financial contribution from Forest dept, routed through EDCs/JFMs	
(3) AGRO-ECONOMIC DEVELOPMENT SUPPORT			
Experience exchanges	▪ From Nepal: following the Yuksam IYM meeting in April, visit of a delegation of villagers from Nepal in Dzongu (with an experience in agro-economic development [medicinal plants]). ▪ To Nepal: exposure trip for a delegation from Dzongu villagers	WMPA perspective, partnership?	
Implementation of preliminary activities	▪ Feasibility study and selection of agro-based products ▪ Micro-planning at EDCs/JFMs level, considering possible joint efforts / common issues (marketing…) ▪ Provisions kept for experimentation	Interaction with EDCs/JFMs, encourage entrepreneurs' initiative Interaction with DFO with regards to forest management and acceptability of proposed activities	
(4) ENERGY COMPONENT			
Experience exchanges	7. From Nepal: following the Yuksam IYM meeting in April, visit of a delegation of villagers from Nepal in Dzongu (with an experience in micro-hydro operation and management). 8. To Nepal: exposure trip for a delegation from Dzongu villagers	WMPA perspective, partnership?	
Micro-hydel of Passingtang	▪ To follow-up the project proposal to GoS / MNES ▪ To establish a plan of operation, utilisation [economic activities] and management (possibly in an phased manner over a long term period considering an initial over-sizing)	MAE (French Ministry for External Affairs) could support implementation of economic activities SWRC / BSE's network	

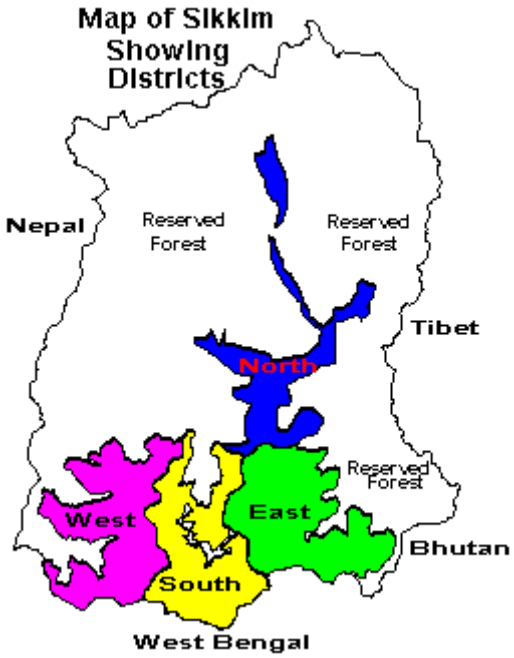
ANNEXE VIII.5

Launching a community-based tourism plan in Dzongu - Sikkim

Context

Sikkim

Sikkim has become the 22nd state of India in 1975. It shares borders with Nepal (West), Tibet/China (North) and Bhutan (East). The South part (with hills at 300 metres) has luxurious vegetation, and experiences a very strong monsoon. The highest peaks of Sikkim (Kangchenjunga – 8598m, the highest peak of India) are located in the West part. In the North, dry and elevated plateaux are protected from the monsoon.



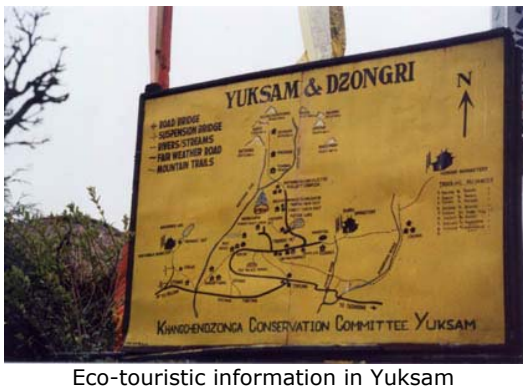
Parted in four administrative zones (South, West, east and North districts), Sikkim counts no more than 463 000 inhabitants, of which two dominant ethnic groups: Nepalese (of Hindu religion), who represent 75% of the total population, and various indigenous tribes of Sikkim, such as the Lepcha tribe (representing today only 18% of the overall population). The latter can be found further North, since it had to retreat to the more isolated regions in order to escape the Tibetan (religious) migrations. Although the tribal system is rather equal, it is obvious that the Buddhist monks remain privileged, while Nepalese society follow a cast system/hierarchy.

Particularly isolated, Sikkim has remained rural. Its population lives on agro-pastoral activities and forestry. In the long-term, management of real estates' growth has become problematic.

Agriculture traditionally managed by Lepcha (hunting and forest rotation) has become impossible considering the use made by Nepalese migrants of forests, while terrace development has been limited by the shrinking of exploitable areas.

Meanwhile, the Government, through a governmental decree, has created, in the Kangchenjunga area, a biosphere reserve where natural resources exploitation of flora and fauna is forbidden or seriously restricted in the buffer zones. This situation is partly due to the people and cattle's pressure on soils, endangering the fragile and unique (growth of various endogenous plants) ecosystem.

Meanwhile, tourism is developing fast in Sikkim: at the present time, over 100 000 Indians and 6000 foreigners visit the authorised areas of Sikkim (of which Dzongri might be among the most popular destinations). In these areas, the high seasonal concentration of tourist causes rapid deterioration of environment. This fact is even more alarming since tourist activities are characterised by their exogenous development. Indeed, tourist activity is managed by travel agents based either in Gangtok, the state's capital, or outside the state of Sikkim, hence mobilising very few local population (only a few hotels and porters).



Eco-touristic information in Yuksam

Dzongu

The region of Dzongu, located in the West area of the North district, is adjacent to the biosphere reserve.
Until now, due to a lack of adequate infrastructures to welcome tourists, the government of Sikkim does not allow tourists to visit the area, although potential for tourism (particularity the attractiveness of its ecosystem) is great. In reaction to this interdiction local populations have pointed out the great isolation of the area and its negative impact on socio-economic development. "Nature preservation does not need to be at the expense of local people".

In the framework of a program to develop economic activities in Sikkim, implemented and conducted in 2001 by the GERES and French co-operation (Ministry of Foreign Affairs), the willingness of Dzongu's populations to encourage the opening of the area to tourism has catalysed around a working group (which members are representatives of various villages in the area). This group has come up with the idea of implementing ecotourism, and started to work on this project.
Conscious of the uniqueness and the fragility of its ecosystem, as well as of its cultural heritage, local populations wish to control the development of a type of tourism respectful of their patrimony. It would have a lasting economical impact on the area and involve participation of indigenous populations.

The origin of a tourism project in Dzongu

In early 2002, considering the local population's dynamic, local authorities at all levels (panchayats, local state administrators, forestry department and the government of Sikkim) have responded in favour of the opening of the area following the ecotourist logic.


Building of eco-museum in Dzongu

While conducting a field mission in 2002, the GERES has offered to actively support this on-going dynamic, emphasising the following principles:

- tourism can become a enduring activity if each and every actor (population, local authorities, state's services and the government of Sikkim) concretely take part to the elaboration of local development plans for tourism, as well as to the setting of ecotourism rules and regulations. This should be conducted through working group. Moreover, local populations must be involved in such a way as to improve their living conditions.

- tourism must be thought of in terms of local development (infrastructures, services, handicraft…). However, in order to counter the unequal repercussion of the economic impact, some parallel activities such as agriculture must be particularly looked into and encouraged.

To materialise its involvement, the GERES wish to mobilise human and economic resources through an action program for the year 2002/2003.

Action program for 2002/2003

Its implementation will be characterised by five components:

1 – Implementing a decision-making process

At the local level, the ecotourism project must be promoted and implemented by local representative individuals of Dzongu. The setting of a Management Committee for Tourism in Dzongu (ETMC) will be considered as based on village committees in charge of natural resource preservation.

Villager's meeting for tourism project in Dzongu

This committee will be able to discuss implementation of tourist measures with the adequate authorities.

2 – Tourism strategy and micro-realisations:

Previous to the launching of funds on this project, the ETMC will be in charge of conducting a strategy plan with external support (refer to partners). This plan will set up priorities in terms of:

- tourist services and products
- infrastructures
- tourist promotion

To actually start the project on the field, various gathering activities are scheduled in order to mobilise in a concrete way various actors:

- Construction of an ecocentre, consisting in a reference building the gate of Dzongu (in the valley). Its construction will introduce innovations through the valorisation of renewable energies and local material use. It will be multi-purposed (functions are yet to be defined). Mainly, it should consist in:
  - an information centre focused on the area
  - a resource centre for tourist services
  - a catering and accommodation centre (ecolodge)

- Setting a frame for the sharing of experiences with the Dzongri area, and with resource individuals from Nepal on tourist products and services such as:
  - Hand-made paper production
  - Awareness-raising campaign aimed at tourists

3 – Agro-economic activities

A support will be given to various activities, directly or indirectly related to tourism:

- Market gardening and medicinal plants' cultivation
- Poultry production

It will support local actors in the improvement of these activities, conducting experimental work on alternative technologies (greenhouse seed production, solar poultry farm…)

Discussions about the micro hydro power plant

4 – Energy component

The area of Dzongu is only partially electrified, while the alimentation in the privileged areas is restricted (available for electric use only).

At the entry of Dzongu, a village has been identified for its hydroelectric potential that would allow the implementation of a 20 kW micro-hydro power plant

This energy source could provide enough power for economic activities that are, at the present time, absent or decollated from Dzongu. The main ones are:

- milling, flour-milling
- irrigation

5 – Partners and promotion

Local dynamic, although well motivated, will not be enough to win the challenge of lasting ecotourism. Indeed, tourist engineering means must be mobilised. This way, the initial program offers to solicit partnership with a French entity qualified on the problematic of alpine regions and on reserved and protected areas). This partner will be able to bring skills and experiences to the process of opening the Dzongu region to tourism.

Meanwhile, it is crucial that efforts are made to outline the area's identity. This consideration, completed by a market survey, will enable actors to truly identify the tourist profile of future visitors of the Dzongu region.

Partners

Local partners

- **PRAGYA** is a not for profit development organisation working in Inida for the sustainable development of the Himalayan region, with specific focus on the sectors of ecosystem conservation and natural resource management, culture conservation and management of traditional knowledge, and appropriate technologies and economic development. Pragya projects focus on indigenous mountain communities of the Himalayan region facilitating appropriate development in these threatened regions. She is interested in the project of Dzongu and ready to mobilize technical experts on field.

- **ECOSS**: (Ecotourism and Conservation Society of Sikkim) is a lobbying body in favour of ecotourism. Its functions will be, on the one hand, to pilot the ecotourist approach of the area, and on the other hand, to manage funds to be locally appointed.

- **The Government of Sikkim and the public departments**, in particular the forestry direction, will assume an accompanying function of the process as well as the mobilisation of necessary funds.

External partners

The GERES, French development NGO, which already conduct programs in the Himalayan area (therefore is present on the field) can participate through:

- a financial support through the European Commission's funds, presently allocated to the project.

- a technical accompanying, in terms of development engineering (resource engineer in economic development and ecotourism volunteer) and of energy use (eco-constructions and energy services).

National partners (yet to be mobilised)

- Savoy district council (territorial collectivity): an Indian and Nepalese delegation has been invited to Chambery (France) in 2000 in the framework of a collaboration of the Savoy district council with the GERES and ASVIN.