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Cambodia Tree Seed Project

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DANIDA

Proceedings of the 5th Regional Consultation of Tree Seed Projects in South-East Asia

Volume I

4th – 7th February, 2003
Siem Reap, Cambodia

Cambodia Tree Seed Project
Institutional Capacity Building of the Tree Seed Sector

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Fact Sheet

Consultation: An annual event since 1999, for Danish supported projects concerning forest tree seed in South-East Asia.

Host: Department of Forestry and Wildlife/Cambodian Tree Seed Project.

Venue: The Consultation was held over a four-day period, with two days of presentations and discussions at the Salina Hotel. The remaining 2 days were spent on field trips, to visit seed sources, and a biosphere reserve, including flooded forest.

Agenda: See Annex 1

Objectives: To bring together staff members of the country projects to exchange information and experiences, to provide a forum for discussion for the advancement of the tree seed sector and forest genetic conservation.

Participants: Representatives of the country projects in Cambodia, Vietnam, Indonesia, Lao PDR and Nepal, Danida Forest Seed Centre, the Royal Danish Embassy, Department of forestry and Wildlife, and support staff from CTSP. A full list of participants is provided in Annex 2.

Presentations: A detailed list of papers presented and distributed to participants is located in Annex 3.

Proceedings: Recorded and documented by the Cambodia Tree Seed Project.

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DAY 1 – TUESDAY 4TH FEBRUARY

Opening Ceremony

The National Project Chief and Deputy Director of the Department of Forestry and Wildlife (DFW), ***Mr. Chea Sam Ang*** welcomed all participants to the Salina Hotel. He stated it to be an honour to Chair this 5th consultation, held in Siem Reap, the capital of the Khmer Empire during the 12th century. He encouraged active participation throughout the consultation in order to exchange experiences and information.

Mr. Ty Sokhun, Director General of the Department of Forestry and Wildlife, also welcomed all participants and expressed thanks to the Royal Government of Denmark for its support to DFW through the DANIDA Cambodia Tree Seed Project (CTSP), which is playing an important role in ongoing forestry reforms. Mr. Ty Sokhun continued to outline some results of the reforms, especially in relation to the adaptation of forest policy, legislation, codes of practice for forest management, and the cancellation of a number of forest concession agreements. The latter resulted in the transfer of 3 million hectares to protected area status, to be managed for the conservation of forest genetic resources. DFW is keen to promote tree planting, but for this it is important to establish a forest seed sector. CTSP is greatly assisting the Royal Government of Cambodia, through DFW, to achieve this by ensuring the availability of good quality seeds through the establishment of seed sources and conservation of forest genetic resources. Mr. Ty Sokhun formally declared the consultation open.

National Natural Resource Environment (NRE) Programme, Policies, Priorities and Visions from a Donor Point of View - Mr. Mogens Christensen

The Royal Government of Denmark, as the donor, provides support over a 5-year period to the environment sector. The future is difficult to plan as the Royal Government of Denmark plans budgets over a 2-year period only, and any plans have to withstand political changes.

In Cambodia, the NRE Programme has a clear focus on poverty alleviation in line with the policies of the Royal Government of Cambodia (RGC). It adopts a programmatic approach that requires donor coordination. In this respect Danida is a core member of the Working Group on Natural Resource Management, consisting of donors and government representatives. Forestry is a hotly debated and critical issue, of which seed is one important element. CTSP works with many aspects of forestry reaching different levels of authority. Whilst CTSP is included as part of the regional programme, it is viewed rather as a national project with links to other countries, as RGC has assumed significant ownership of the project. Mr. Christensen ended his presentation with the hope that specific country experiences would benefit the group as a whole.

Participatory and/or Decentralised Approaches

Seed for People Programme – Mr. Suharisno

In the past, timber extraction has primarily been from the natural forest, but over the last decade, the Government of Indonesia has enhanced the development of plantations to replace the role of the natural forest. In this process, the importance of good quality seed was recognised, and appropriate programmes and policies formulated. The changing internal and external environment has resulted in a restructuring of government orientation towards decentralisation and community-based efforts. Attention is given to small-scale private forestry as it is flexible and wide-ranging. However, most small-scale farmers do not use certified forest tree seed, and hence, through the Seed

for People Programme, the government facilitates small farmers to become familiar with good quality seeds. Four examples were highlighted, in Jembrana (Bali), Lumajang and Lamongan (East Java), and Sukoharjo (Central Java), illustrating the potential for activities to be initiated by the government, community, private sector, or a combination of these.

Making Village Seed Source Management Sustainable – Mr. Long Boung

The presentation described a pilot site located in Colexim Forest Concession in Kampong Thom Province. The seed source was established by DFW/CTSP, for 6 species, with the work coordinated by CTSP, and implemented by villagers with food support from the World Food Programme. Seeds have also been collected by villagers for planting in an ex-situ demonstration plot to raise awareness of indigenous species. Two main risk factors for in-situ conservation were identified, one from illegal logging in the surrounding area, and the second is related to the loss of support from the World Food Programme. It was recommended that DFW should extend its co-operation with WFP to other seed source areas.

Seed Collection and Seed Source Management as Village Development Projects – Mr. Khamphone Mounlamai

This is a new activity within the Lao Tree Seed Project. Relatively abundant forest resources are quickly disappearing in Lao PDR, and the government plans to rehabilitate 2 million hectares of degraded land by 2020, but there are no identified seed sources within the country. Seed collection and seed source management is relevant at the village level as local people live close to the forest, and could also generate an income for the villagers.

Strengthening Tree Germplasm Security for NGOs and Smallholders – Mr. Frans Harum

In Indonesia, as in other South-East Asian countries, tree planting on farms and community lands is rapidly increasing as tropical forests are disappearing. However, farmers can lack experience in tree planting, and government extension services are limited, leaving a gap often filled by NGOs. Based upon these findings, IFSP and ICRAF established this collaborative project to strengthen the technical skills of NGOs and smallholder farmers in relation to tree seed collection, handling, storage and utilisation, and to increase the availability and use of high quality seed by these groups. Farmer Demonstration Trials have evolved to test and demonstrate the advantages of good germplasm, to inspire NGO and farmer innovation, and to serve as a future source of on-farm seed production. The trials have so far proven to be successful. The second phase will extend focus to the development of 5 NGO-based tree seed supply enterprises.

DFSC – Decentralisation, Small Farmers and Sustainability: the Case of a National Tree Seed Programme – Mr. Soren Moestrup

This presentation was based on a paper describing the NTSP in Tanzania (Iben Nathan 2000). The main themes were related to sustainability, and whether the NTSP was fulfilling its basic objective.

At the outset of the project, NTSP decided that it would aim to benefit small farmers only indirectly through seed sales to development projects. However, a study in 1998 found that NTSP met about 5% of the total needs for seeds in Tanzania, as only those

customers living close to the seed centres, or larger scale customers able to pay transport costs, could access NTSP seeds.

Today, the majority of tree planters are small farmers, and in the case that small farmers form a potential market for tree seeds, it is a market that is expected to grow, thus the market needs to be extended. NTSP needs to adopt the 'farmers way of thinking' to better meet their requirements. Decentralisation of the seed centres would better serve smaller customers, such as NGOs and farmers, although this option has been considered too expensive. However, this does not have to be the case, if it involves private dealers, local government, farmer organisations, and other institutions with distribution of agricultural inputs. In this way, tree seeds can be distributed through existing channels, thus increasing the potential for sustainability.

Mr. Moestrup concluded that in the past there has been too much focus on quality seed production, and too little on distribution, which is an important factor in ensuring that users can access good quality seeds.

Discussion, Comments and Questions

Following each presentation, time was allocated for questions and comments. It was noted that the case studies differ considerably from the traditional approaches, posing a range of challenges. In general, discussions related to individual presentations focused on similar issues, and so they have been grouped accordingly as below.

- **Appropriate levels for seed source management and seed supply**

It is important to consider whether seeds should be produced locally or distributed through a centralised system. Experiences from the countries represented indicated the following :

- For Indonesia, central government manages the seed supply by connecting users to appropriate sources. Individual management units could produce seeds but this will depend on the level of demand.
- In Cambodia, DFW are responsible for the management of seed sources, and several have already been established but they are remote and cannot be protected without local participation, or strong forest concession management.
- In Nepal different districts produced specific species for exchange between each other. However this did not work well, as such collaboration will only work alone if there is a need for it. If users do not prioritise tree planting, it will not work, but raises the question of the importance of good quality seed to the user.
- Seeds produced through a centralised system are expected to be of better quality.

- **Determination of species at the local level**

Species selection is generally done with farmers, but according to planting plans for the area. However, it is important to note that the species required by small holders may not be consistent with those promoted by the tree seed centres.

- In Indonesia, species selection depends on the plantation plan, so for example, in Bali, a scarce commercial species is used, and the plantation will become a conservation centre in the future.
- In Cambodia, CTSP works with farmers. Species selection is primarily based on the Nationall Priority Species List but also on availability of suitable sites. This list is facilitated by the project in a National Cross Sectoral Environment.

- **The importance of encouraging farmers to use good quality seeds**

In the past, tree improvement has been linked to industry and large scale tree planting, but with the present shift towards small holders, it is important that they are convinced of the advantages of using good quality seeds.

- Discussion began with the potentials of documentation and demonstration plots, which take time to establish. Other options raised were extension and marketing.
- The distribution system is considered highly important in promoting the use of good quality seeds.

- In Indonesia most users want an improved quality of tree, and so obtain the seeds through the government.
- For farmers quality seeds are more expensive
- It is necessary to consider whether it is better to sell seeds or seedlings, as it is difficult to ask farmers to buy 1kg seeds as it is much more than they need, it would be easier to sell seedlings.

- **Sustainability of decentralised approaches**

The decentralised approach is a recent one for national tree seed programmes.

- In Cambodia, it is necessary to pay local people in order to encourage their participation in the protection of seed sources, but WFP support cannot be relied upon in the future. Within seed source areas, local people also collect resin, fruits and vines from the forest. It was suggested that this area provides an excellent opportunity for development as a community forest for seed collection and forest product harvesting.
- In Nepal, small holders cannot depend on seed sales alone, and other silvicultural practices are required to enhance their income.
- In several countries there is a lack of information on seed markets.
- In comparison to seed collection, more income can be gained by cutting one dipterocarp tree.
- In the case that seed collection alone cannot sustain the local people, it was suggested that a government subsidy should be considered along similar lines to those made available in Europe. This was a hotly debated topic, as there was a strong argument that if the approach was not sustainable, the project was not achieving its objectives, and should therefore, be reviewed.

Forest Genetic Resources and Pilot Seed Network

Forest Genetic Resources and An Assessment of the Conservation Status of Selected Species in Lao PDR – Mr. Chanhsamone Phongoudome

In 1999, LTSP identified 35 species for conservation, improvement or seed procurement. Selection of species followed defined criteria that the species must be indigenous, economically important for timber and NTFPs, and have threatened status. Information collected improved the level of knowledge regarding the different species. Each species was ranked according to its conservation status to enable prioritisation for conservation. As many species are classified as endangered or vulnerable, identification of additional protected areas for in-situ conservation is difficult. Therefore, it was recommended that local people become involved in conservation activities through a socio-economic context, to be promoted through the Village Development Programme, as outlined above.

Priority Species for Gene Conservation in Cambodia and their Distribution – Mr. Arvid Sloth

The process began with the identification of species by working groups, in view of the fact that little relevant information was available and accessible before 1995. The species were ranked against IUCN Red List and CTSP defined criteria, and a list of 21 identified as priority species. Potential stands, identified by resource people with experience of forest inventory, were verified, digitalised and mapped. It was noted therefore, that although the maps are up to date, they probably do not reflect the entire distribution of all species, and could be continuously updated as new information becomes available.

Initial Results and Experiences of Pilot Study on Forest Seed Network Establishment in Thanh Hoa and Nghe An Province – Mr. Nguyen Huu Hieu

The Government of Vietnam prepared a tree-planting programme to cover 5 million hectares by 2010. Of the total, 4 million hectares will be new forest, with the remainder being classified as restoration oriented protection forest. However, the present seed supply system is inadequate and cannot ensure good quality seeds for this programme,

and in response, the Seed Network was established. The provincial level was considered the most appropriate level for seed source management. The 2 provinces of Thanh Hoa and Nghe An were selected for pilot studies, as they were considered representative of other provinces, had large reforestation programmes, and had basic information available. Seed sources have been qualified and registered, and contracts made with the seed source owners, which will be able to meet 40% of the demand in Thanh Hoa and 90% of demand in Nghe An. However, seeds produced through the Network are more expensive than those purchased through the market, and buyers have received a subsidy. Although the Network serves all seed users, its focus is to serve the government tree-planting programme.

Discussion, Comments and Questions

The discussion following this session focused on Lao PDR and Cambodia, as outlined below.

- **Lao PDR**
  - The focus is on endangered species, whilst in conservation the focus is more generally on common species. However, although the presentation shows only the first steps, it is unlikely that species not endangered will be included.
  - The extent of species selection within the government plans was questioned, and it was noted that different projects focus on different species. For example, the ADB project focuses on teak and eucalyptus both of which have a commercial value, whilst this project focuses on indigenous species.
- **Cambodia**
  - To help in working towards conservation activities, an agro-ecological map would be useful, but they do not exist in Cambodia. Some dated vegetation maps were examined, but not considered appropriate to indicate potential areas of seed stands.
  - Although there have not been any taxamonic studies in Cambodia, the sources referenced used the same species commonnames as in the Priority List.

Gene Ecological Zonation Based on Eco-Zonation

Gene Ecological Zoning in Cambodia – the Results So Far – Mr. Ignas Dummer

The objective of this activity is to establish an eco-zonation map of Cambodia as a guide in the identification of seed source areas, and to assist in the planning of forest genetic conservation. Data regarding climate, forest cover and type, and soil is used to identify zones that have uniform ecological conditions, similar phenotype, and tree species. Work is in the initial phases, but is nevertheless progressing, and a series of maps are being developed based on the data obtained, which will feed into the final map. Experience to date illustrates a lack of quality information and a lack of experience in gene-ecological zonation mapping. Information related to climate is expensive in Cambodia. The consultation participants were requested to provide comments and advice on the process and future steps.

Tree Planting Zones for the Benefit of Small Holders in Nepal – Mr. Lokendra Purush Dhakal

An ecological map of Nepal has been developed by TISC, and describes 38 forest types. This map is used as the base for defining the planting zone map. During the period of 1992 – 1997 tree planting by the forestry office has declined dramatically, whilst those by Forest User Groups (FUGs) have constantly increased. Today, the majority of trees planted are fodder trees planted by farmers. Agricultural development is greatly constrained by livestock malnutrition, and tree fodder is considered to be one of the most

important tree products. However, an improved quantity and quality of leaf fodder could contribute to poverty alleviation. The planting zone map was developed to better serve the needs of the farmers. In it's development, parameters included rainfall, temperature and altitude, with forest type used as a proxy indicator for soil. The coverage of the map was restricted to an elevation of 60 – 2,000m, as around 70% of the population lives within this range. The planting zone map can be used to show the distribution of individual tree species, and assists in the support of farmers to identify new species. Tree seed distribution will be through a decentralised system, using farmers associations or seed cooperatives.

Report on Survey of Forest Seed Sources and Forest Seed Deployment Zones in Vietnam – Mr. Tran Danh Tuyen

Vietnam has a large reforestation programme as outlined earlier, with the highest demand for seeds in the 3rd Stage. Currently, there are many seed sources accessed for forestry activities, but without an official classification system, it is difficult to assess the seed quality. With this in mind, a seed source survey was completed in 2002 of 150 seed sources including 40 species. The seed sources were registered and classified into 6 levels. In matching the seed sources to the planting sites there are many factors to consider, the appropriate choice of seed source can increase production by 20 – 50%. Such work generally requires costly and time consuming testing, but to overcome this difficulty, Vietnam is collaborating with CSIRO to develop a software package to identify seed use zones for specific species based on parameters related to climate. A map and data-base has been developed for the 40 species, with plans to extend to 100 species this year.

Discussion, Comments and Questions

Following this particular session, the questions were specific to the country presentations as detailed below.

- **Cambodia**
  - It is not advisable to move seeds from one zone to another, although some trees may grow well in other areas. Usually zone borders are not well defined, and are always likely to pose difficulties.
  - In zoning, consideration should be given to the scale of work in terms of regional, national or provincial boundaries.
  - Cambodia is a very flat country and so it may be very difficult to show zoning.
  - Due to the lack of information in Cambodia, proxy indicators could be established for climate and soil condition. For example, in Nepal, vegetation is used as a proxy indicator of soil type, as the soil maps are not at the same scale as other maps used.
  - Consideration should be given to the main use of the map, and the map kept simple.
  - Without knowing critical factors between species, and with such limited data, perhaps a vegetation map is the only option. It could certainly be useful in testing the map currently being developed.
  - However poor the data, it can be used, and updated as new information becomes available.
- **Nepal**
  - Due to the large variation in Nepal this map was considered to be a great achievement, but questions were raised over its practicability.
  - The decentralisation process uses FUGs, and all information generated is passed on to them through an extension mechanism of farmer networks.
  - The basis for the borders were contours, defined at 500 foot intervals, climatic data gave clues to population. Although it is very difficult to designate borders on the ground, species can be linked with forest types.
  - Potential distribution zones were identified through work on indicator species and delineated areas.

- **Vietnam**
  - The accuracy of the species site matching model was questioned. It is a programme that can assist in the identification of areas for planting against certain parameters. The model was developed for Vietnam by CSIRO as an attempt towards a flexible system that is easy to work with.
  - It was noted that soil was not included in the model despite its importance in matching species and sites. CSIRO does not have soil parameters in their system.
  - It is easy to make a map but problematic to match individual species growth requirements.
  - Care should be taken with using computer systems as they cannot identify exact planting sites.

Innovative Developments in the Seed Sector

Development and Changes in Structure and Emphasis in the Forest Seed Sector (and a Guess on the Future) – Dr. Bjerne Ditlevsen

The seed sector is small in comparison to other forestry operations, but highly complex. It is also relatively new. Seed sectors are linked to tree planting activities, but have a broader focus, from tree improvements to policy development. Over the last 50 years there has been a clear change of emphasis. One outcome is a split within the sector between commercial and less commercial species. High quality seeds are probably found within the commercial sector, where the returns on investment can be optimised. On the other hand, the use of low quality seed is likely to be due to institutional and organisational issues (lack of awareness, lack of incentives, inclination to reduce costs). The percentage distribution between good and poor quality species is still unknown.

Experience has shown that in general, seed programmes cannot be maintained on termination of external support. In the future, it is expected that commercial operations will probably continue, but the rest of the sector will continue to rely on donor support. If decision makers cannot be convinced of the importance of this sector, adjustments must be made to the programmes to reduce the input level as one of the means towards sustainability.

Discussion, Comments and Questions

This session led to a long and lively debate as summarised below.

- **Small Holders**
  - The presentation outlines the commercial sector and government/donor sector, but it is unclear where small holders fit in. It is hoped that farmers will buy seeds, so they could be in the commercial sector, especially for fruit trees, but could be in either sector depending on the benefit. However, fruit trees may not be under the jurisdiction of the forestry sector.
- **Use of Local Species**
  - In view of the presentation, it was questioned whether project focus on the use of local tree species is a positive or negative one. Emphasis on these is due to decision makers realising the importance of gene conservation through bringing the species into use. It is positive but hard to maintain, because of their long rotation.
  - Perhaps fewer species could be identified that can be used over a wider area.
  - One change of emphasis is towards gene conservation for endangered species, but in Nepal many of the best genetic resources are located in farmlands. Perhaps uneconomic seed sources could be omitted from programmes as gene conservation could be taken over by biodiversity projects.
- **Centralisation of Activities**
  - If new species are taken into use, seed institutions could take on technical developments, but there would be no capacity building in the country, and would go against the discussion of many years for national seed centres.
  - The possibility of CFOR taking research responsibility should be investigated, as better coordination is needed to reduce duplication and to include a wider range of stakeholders.
  - Centralisation is politically unacceptable.

- **Sustainability of Activities**
  - Seed centres should be sustainable, and it is necessary to face the fact that in many circumstances, quality seed supply needs to be considered as a public good that should attract government subsidy. Another view is that quality seed should not be given away, and rather than encourage the government to do this, users should be encouraged to buy them at least at cost price.
  - Any subsidy has to be repaid through good seed, and it may be better to focus on outreach activities. Good seed accounts for only about 1% of total plantation costs, but the willingness to pay for seed still needs to be proven.
  - According to the graph presented, good quality seed could be described as better than average, or better than rubbish.
  - Vietnam has enough seed sources to meet demand but its difficult to get people to use good quality seeds, and they may need stronger regulations or subsidy.
  - In Nepal, the focus is on small holders, yet the cost is not high, and can be sustained with outreach and motivation
  - Many messages have been based on large scale production, but they need to be reviewed, and more is needed on research and development.
  - Emphasis should be on distribution to ensure users get the seed
- **Future of NTSPs**
  - The only reason it is necessary to convince decision makers of the importance of the seed sector, is if national programmes are not fulfilling their objectives (meeting 5% of the demand in Tanzania is not satisfactory). Despite high donor support, NTSPs do function as they should.
  - Some governments are convinced, and programmes are continuing.
  - In Indonesia, the seed sector may not become one of low input, over the past few years the trend has been towards growth, as there is less natural forest. Vietnam may invest more but purely within the commercial sector.

Closure of Professional Programme for Day 1

Mr. Chea Sam Ang reviewed the day's activities. He thanked all participants for sharing their experiences, which can be used in seed source conservation in Cambodia. If these sources are lost now, they are lost for future generations.

Mr. So Thea informed all participants of the plans for the seed sources field trip tomorrow.

At the end of the session, and on behalf of the Department of Forestry and Wildlife, ***Mr. Sok Srun*** invited everyone to a buffet dinner and traditional Khmer dance performance at the Tonle Sap Restaurant.

DAY 2 – WEDNESDAY 5TH FEBRUARY

The participants gathered after breakfast for departure to field sites. The itinerary included three seed sources, each with different characteristics, as outlined below. Discussions held at the site are included in the text.

The first stop was ***Anouksavery Plantation***, where ***Mr. Sour Hay*** explained the history of the location in terms of forest loss. Recent collaboration with AEON, Japan, led to the reforestation of 5 hectares in 2002. The project rehabilitates forestland and acts as an ex-situ conservation site for ten indigenous species. Although there are no established seed sources in this area, seeds were collected from about 20 mother trees within the natural forest of Angkor Park. The seedlings were planted randomly with a density of 1,000 – 1,500 per hectare.

It is possible that after a few years the faster growing species may form a canopy and dominate the plantation, but the trees will be monitored and managed in order to avoid this, and it is expected that the firewood trees will die when the timber trees grow. A 5-year monitoring plan has been developed to assess which species are best suited to this site, but some results can already be seen.

A water supply and irrigation system was installed, as the seedlings need watering every two days. People are employed at the plantation to guard, maintain and protect the saplings. It was concluded that this is a good effort on a difficult site, but one main area of concern is whether the trees can be kept alive.

The group moved on to the second site, within Angkor Park, where ***Mr. Sok Srun*** outlined the development of a ***Seed Source of Dipterocarpus alatus***. This area is unusual in Cambodia, as it is easily accessible and well protected (falling under the jurisdiction of the Apsara Authority). A total of 43 trees have been identified for seed production. Seeds are collected from the ground, and therefore, there can only be 50% certainty that seeds are from the identified mother trees, rather than others in the vicinity. It was thought that this would only cause a problem if the mother trees were close together, but in this case, they are spread over a larger area, so it will not matter if some seeds are collected from other trees.

There were two suggestions for improved seed collection – firstly, tarpaulin could be laid on the ground under the tree to protect the falling seed from insect attack. Secondly, it should be possible to climb the trees to collect the seeds.

The third stop was in Samroang Wood Forest Concession, approximately 70 km northeast of Siem Reap Provincial Town. ***Mr. So Thea*** introduced the ***Seed Source Establishment of Dalbergia cochinchinensis Pierre***. The criteria for the selection of mother trees were that they should have good phenotype and be separated by at least 50 metres. Selection led to the identification of 121 trees, each marked and tagged with an identification number to enable monitoring, but they have not been mapped as mapping was considered to serve little purpose. This is a difficult area to protect, as there are few alternative options for people who cut trees. Local people are hired to climb the trees to collect seeds, although there has been no research on seed quality.

Currently there is little demand for seeds, a situation expected to change in response to government plans for increased levels of tree planting activities. Some seeds from here have been transferred to an ex-situ site of many species, but the main priority is to conserve in-situ sources wherever possible. Management plans will be developed for all of the in-situ seed sources, but so far, the focus has been on protection.

On the return trip to Siem Reap, time was allocated for the group to sample the splendour of Angkor Park. A local guide was hired to explain the fascinating history of Banteay Srey, Bayon, and Angkor Wat. The day ended with a buffet dinner at Chao Praya Restaurant in Siem Reap.

DAY 3 – THURSDAY 6TH FEBRUARY

This second field visit demanded an almost pre-dawn departure from the hotel, for a day in the Tonle Sap Inundated Forest, in order to visit the ***Prek Toul Bioreserve and the Flooded Forest of the Tonle Sap***. The guides today were ***Ms. Natalie Nivot*** and ***Mr. Frederic Goes*** from ***Osmose***, a group focusing on education, conservation and ecotourism within the bioreserve.

The Tonle Sap is the largest freshwater lake in Southeast Asia. It is connected to the Mekong River, to which it provides a unique reverse-flow system, with a capacity to expand its surface five-fold and its volume 70 times at the peak of the flood. The lake's seasonally flooded swamp forest is the largest remaining tract in Asia, it is one of the most productive fisheries in the world, and has the most significant colonies of large water birds in the region.

On arrival at the port, the participants divided into 3 boats to cross the lake to Preak Toul, a 'floating village', where they transferred onto a flotilla of small rowing boats. The trip into the bioreserve provided a great opportunity to see not only the trees of the area, but also to see a large number of water birds of highly endangered species. The bird colony is located within a fishing concession, which restricts the work of Osmose at certain times of the year, as the concessionaire controls the access to the river. There are three main tree species in this area, which are highly resilient, able to withstand submersion under 10 metres of water for several months of the year. They shed their leaves under water, and seed dispersal is by water flow, wind and fish.

The villagers of Preak Toul rely on the forests of the upland areas, for wood and resin to build and maintain their boats, and bamboo to construct their fishing equipment, and to build rafts on which to float their houses. At the same time, the people of the uplands rely on the lowland communities for fish, which provides around 70% of their protein intake.

Lunch was provided in Preak Toul, which was followed by a walk around the village to learn about livelihoods. These included crocodile raising, and floating gardens, which supplement fishing activities. There is no agricultural land in the village, but a small area has been identified for a plantation of flooded forest species, which would be highly beneficial in protecting the village and the river from wind.

Following the day on the river, many participants returned to Siem Reap tired and with sunburnt faces. A farewell dinner was greatly enjoyed at the Grand Hotel d'Angkor.

DAY 4 – FRIDAY 7TH FEBRUARY

The final day of the Consultation was held at the Salina Hotel. ***Mr. Chea Sam Ang*** began the proceedings by requesting feedback and comments on the field trips.

Discussion of Field Visits

Field Visit to Seed Sources

- **Identification and management of seed sources**
  - Two of the seed sources visited focused on only one species, although among the 23 seed sources, some have more, for example, in the Colexim Concession seed source, 6 species are found. In Samroang Wood focus is on 1 species but when work began other species were found which are under consideration for inclusion. It is preferable to have more than 1 species in 1 seed source, but it is not always possible to find good stands with other species in the same location.
  - Seed sources growing from an old stump may not look good, but the genetics may be the same as selected stands.
  - The participants observed many areas of grass burning, and as dipterocarp forests burn very easily, it was suggested that they need protection against fire. In Cambodia fire is usually in the deciduous forest, not evergreen, and the seed source is in the semi-evergreen, where there are no serious fires.
  - Even in a country with a lot of natural forest, it is difficult to find undisturbed areas. There are too few stands left, which result in inbreeding. In Vietnam there has been research into *dalbergia* and it would be advisable to closely follow this to gain information on genetics and inbreeding. In this case it may be better not to put too much emphasis on mother trees until further information is available, but rather try to maintain other species.
  - In this seed source, there has been no thinning, and the participants were asked for advice. Trees obstructing the growth of *dalbergia* mother trees can be thinned, and it was recommended that 15 mother trees per hectare are maintained in the natural forest. In Indonesia, seed sources are managed through thinning, etc. to improve the stands. If the seed source is cleaned, it should be easy to clear the area under the trees to ease seed collection.
  - The argument for protection is based on the fact that as soon as cutting has started it will accelerate illegally. For some species, pollination might also become a problem if thinning or clearing are undertaken.
  - Pollination studies could improve knowledge.
- **In-situ v ex-situ conservation**
  - The situation within the country is a factor in the choice of in-situ or ex-situ, for example, Lao and Cambodia have rich natural forest in which it is easy to find good seed sources, but in Vietnam seed sources are more generally located in plantations.
  - It is a good idea to plan for ex-situ sites, Nepal has an intensive domestication plan, and lessons learned in ex-situ indicate a need for flexibility in species selection and number.
  - It took a couple of hours to reach the seed source, which was very far away from the users, and in the wet season it would be very difficult to get there. Therefore, ex-situ sites would be more practical in bringing the source closer to the user.
  - Many seed sources are inaccessible and under threat. It would be worthwhile to start domestication, which can be protected, and may provide a better seed source than the natural forest.
  - In Cambodia locations in the natural forest are preferred, if they are available. Access is not considered to be a difficulty, and ex-situ sites can be established later. The establishment of more seed sources is planned with the aim of locating different species in the same locations.
- **Sustainability**
  - Indonesia has a lot of seed sources, which are recorded in a database, but the main problem is that users do not use these sources. Some seed sources are in the natural forest, but people living in and around the area do not protect them, and continue illegal logging. The most important thing for seed source development is sustainability. There is no programme yet, but based on experience, the government will encourage participation from stakeholders. For example, forest companies must provide finance, and the private sector will develop finance for all the seed sources it needs for plantations. Rural people still need input from the government and through this system the government can maximise its inputs to small forestry holders.

- In Cambodia, the local community is encouraged to collect seeds. The project identifies appropriate and good stands for collection and facilitate the contact between villagers/seed collectors and seed users. At the end of CTSP, it is hoped that the seed sources can be sustained. The project and DFW focus on decentralisation, and Declarations are being established so that everyone is aware of the protection status of the source.
- The problem faced in seed sources is to maintain them as they are as they are not very productive, other activities need should be integrated into the natural stand for additional NTFP production to increase the benefits to the local community.

Field Visit to Prek Tuol Bioreserve

- **Jurisdiction**
  - The importance of conserving the flooded forest and its wildlife was noted, and the DFW can co-operate with the Department of Fisheries, because they are part of the same Ministry.
- **Bamboo**
  - A great deal of bamboo was in use but it was not planted in the area, rather it is grown in the upland areas and transported to the area by river. Bamboo can grow by water, as there are examples from China, and there were some stands in the village. However, before planting is initiated, the producers in the upland areas should be consulted, as they may depend on bamboo sales to purchase fish and other goods.

Legal Aspects of Seed Procurement and Gene Conservation

Legal Measures and Experiences for Seed Sources – Mr. So Thea

The Royal Government of Cambodia has a keen interest in biodiversity conservation, and 26 protected areas exist, covering 4.5 million hectares (25% of the total land area). Jurisdiction for the forestry sector is divided between the Ministry of Agriculture, Forests and Fisheries, and the Ministry of Environment. A series of legislative documents have been, or are in the process of being, adopted. Within the natural forest, there are 23 seed sources in 11 sites, covering 17 species. Declarations for 2 of the sites have been developed, and a further 7 are in the preparatory stage. The remaining 2 will not need declarations, one being under the jurisdiction of the Apsara Authority, and the other on private land. The latter may require a contract with the owner of the mother trees.

Policy, Legislation and Regulation of Forest Seed Sector in Vietnam – Mr. Nguyen Xuan Lieu

Vietnam has adopted decentralised policies, and the forest seed sector has received support largely from national and international donors and institutions. Policy support for the forest seed sector has been issued through a range of Decisions and Inter-Ministerial Circulars. A total of 95 nature reserve areas, covering over 2 million hectares were selected as representative of most of the ecosystems in the country.

In March 1997, guidance was issued for the implementation of the legislative framework on the management of forest tree seed, regulating the use of genetic resources.

However, the development of new, and improvement of existing, policies and laws will assist the forest seed sector to gain better achievements in the future. Examples include the Forest Development Strategy, the Forest Sector Support Programme, the on-going VTSP, and the modernisation and industrialisation programme. In the latter, the forestry seed sector is of high priority.

Preparation of Regulations on Forest Tree Seed in Indonesia – Mr. Petrus Daru Darmojo

The Directorate Forest Tree Seed (DFTS) is responsible for the facilitation of all components and to establish regulations for forest tree seed. In order to establish regulations, IFSP assists DFTS in the formulation of decrees and guidance, which has included regulations on certification of forest tree seed sources, and of forest tree seed quality. In addition, there has been a review of the Ministerial Decree as decentralisation/autonomy issues were not accommodated in the original, and to reflect the restructuring of the Ministry of Forests and the Tree Seed Centre. Several internal and external problems were identified.

Discussion, Comments and Questions

The presenters were asked for examples of good enforcement of regulations.

- **Implementation**
  - In Vietnam, the government issues decrees and the provinces follow them, but in practice they identify those they view as relevant according to their own interpretation. The most important decree is No 7, stating that the owner of planting material has to be certified by a seed laboratory.
  - Implementation of regulations in Indonesia has highlighted some problems. For example, moves towards decentralisation show that the national level has advanced knowledge, in comparison to the provincial level that is still at the initial stages, and the gap between the two is an important issue. Therefore, it is not possible to implement one regulation broadly, but it is also a problem to set up different regulations.
  - Many mother trees are located on farmlands, an important fact to consider when preparing regulations. It is difficult to regularise farmland tree sources when so many people are involved. Nepal has guidelines to gain consensus from farmers to manage the trees, but have little experience.
  - Since there is a poor enforcement history in the tree seed sector, maybe simpler regulations are needed. Project advisers need to react to the fact that many regulations are not followed. They could reduce the level of ambition, so that they can be more enforceable, and should take care not to support regulations that are difficult to implement.
  - The seed sector is difficult to control, and activities in the sector have to do with trust as the quality of the seed cannot be seen until it has grown.
- **Standardisation**
  - In Indonesia, 2 regulations have recently been signed, providing a consistent format for seed centres and seed sources, which formerly certified quality themselves. Guidelines accompany the regulations.
  - There should be a standard quality system so that the producer can declare the quality, with random checks by an independent inspector. To achieve this, there is a need for further guidance on definitions of quality.
- **Environmental Impact Assessment**
  - None of the presentations included environmental regulations for the introduction of foreign species, and it was suggested that these be incorporated. Indonesia regulates the introduction of foreign seed, not only in forestry, but for the whole seed sector.

Can Small Holders be Supplied with Quality Tree Seed Through Commercial Distribution of Tree Seed in Small Bags? – Mr. Soren Moestrup

This presentation was based on a discussion paper referring to Tanzania (Nathan and Thomsen 2001). The background is that although NTSP produces quality seeds in large quantities, they are unable to reach small holders. Studies have shown that small holders form the majority of tree planters in the region, and therefore, constitute a large potential market. Whilst private seed dealers distribute to small holders, they rarely deal

in tree seeds. It is suggested that these channels could be used to distribute small amounts of appropriately packaged tree seeds to small holders.

The advantages of such a system would be that small holders receive a choice of tree species, and producers and distributors make a profit without significant investment. Local sales agents would act as focal points for information exchange in terms of changing needs and available species and knowledge. As seeds of different species differ, it will be important that the bags contain certain relevant information. The seed bags can be labeled with the point of origin and so NTSP can match them with planting sites, and provide good seeds to farmers currently using poor seeds. However, there is a concern that the procurements may become too centralised, and the species selected for distribution may be biased towards orthodox and popular ones. The exact costs of packaging, production and distribution are unknown, but according to the NTSP seed catalogue, the price of 10 – 20 seeds ranges from $0.007 - $0.2, and the price of one seedling is $0.1 - $0.6. Whilst it is a common assumption that small holders cannot afford to buy seeds, interviews indicate that they can when the seed is relevant, sold in small quantities, and is sold close to the small holder. Based on this paper, a research proposal has been developed for further testing in Nepal.

Discussion, Comments and Questions

- Small bags are used for horticultural species, so this idea could work, but if people cannot read and write, the bags need a trademark to ease recognition. However, it is important to analyse the risk factor of moving towards a centralised system, and of branding.
- The small holder could sell some of the seedlings produced, thereby recouping the costs of the seeds.
- The training focus should be on seed dealers, their scale of work should be defined, and they should be certified.
- The distribution channel is important, in Nepal, the dealers not only distribute seeds but also information and technology.
- The testing in Nepal gives high priority to commercial species but should also involve some other species. Some species do not have a high potential, but are requested by farmers. The demand for different species is huge, but only in small quantities.
- This is a very convenient system for orthodox species but many indigenous species are difficult to distribute in this way. Therefore, the system us biased against many indigenous species. However, similar issues arise in the distribution of other short life products, so a system must be in place to inform villagers when the short life species are available.
- It is important to agree on a starting point, farmers do not get the seeds they need so something should be tried.

Experiences of Dalbergia sissoo Improvement in Nepal – Lessons Learned – Mr. KR Shrestha

The tree improvement strategy was formulated in 1993, at which time, only sissoo was found to have sufficient economic importance to justify an intensive approach. The strategy contains a breeding programme, which aims to deliver improved seed to the users in the shortest possible time, a research programme in support of the breeding programme, and gene conservation, including the promotion of in-situ conservation and the establishment of clone banks. Genetic gains are being reached through a series of successive steps, which are expected to increase the value of production 20 – 30% over other good seed sources. A plan for the second generation breeding seed orchard improvement will be based on a large number of progenies. Supplementary to this is the in-situ conservation of sissoo in its natural habitat in three national parks. Although circumstances have invalidated the original assumptions, the breeding programme remains justifiable on economic and social terms, and will contribute towards the

conservation of the species. The programme has provided the forestry sector with experience to conduct domestication of a range of multipurpose species.

Project Monitoring for VTSP – Dr. Bjerne Ditlevsen

The review mission of 2002 identified monitoring as a weakness within the project, and recommended improvements. An analysis of the project assumptions and indicators highlighted needs for improvement of the project matrix. The paper presented stems from this and may prove useful to other projects currently developing monitoring systems. All levels of the project matrix can be monitored, using indicators and assumptions, for resource control, progress of implementation, and changes in the project environment. Project implementers can monitor activities and outputs, and can compile information to aid monitoring of the objectives by the evaluation team at the end of the project. Indicators can be qualitative, quantitative, or behavioural, and should be formulated as positive conditions that are specific and can be validated.

Planning of Work at the Directorate of Forest Seed and Regional Tree Seed Centres in Indonesia – Dr. Peter Ochsner

The main objective of this paper is to share experiences with others who may be undergoing the same process. Although work planning is not a new concept, experiences within Indonesia have highlighted the need for a better system of planning. This stems from the unusual requirement of two budgets, one for administrative costs, and the other for activities. Although this system provides a complete overview of planned activities, they may not all be accepted, and cannot be changed. Furthermore, the budgets are released at different times of the year, not always in accordance with planned activities. In addition to improved annual plans, five-year log frames have been developed to focus the activities into a more coherent long term plan.

Tree Seed Video and Seed Songs – Mr. Douangphet Lattanasouk

LTSP produced a video to raise awareness of the project and its activities. Issues raised included the establishment and preservation of seed sources, the economic value of indigenous species, planning for sustainability of indigenous species, the differences between good and bad mother trees, reasons for collecting seeds from good mother trees. Unfortunately, it was not possible to access the songs on the video.

Next Consultation

Nepal expressed a keen interest in hosting the 6th Consultation. Whilst this would be a great honour for TISC, it is not yet possible to confirm because the project is due to end in February next year. However, a proposal will be submitted to the higher authorities, which may need another month. In addition, the political situation remains unstable. For these two reasons, Indonesia's offer was accepted as an alternate venue, should it be necessary. Discussion followed regarding the subject of the next consultation, suggestions were offered but no decision taken. The 6th Consultation will be held during the first week of February, 2004.

Closing Ceremony

No other issues were raised, but thanks were expressed, along with a few final comments as below.

- Thanks to Cambodia for organising such a successful consultation, in a very pleasant atmosphere, with interesting field visits. CTSP was reminded that at the time Cambodia was proposed as the host for this Consultation, it was not thought to be possible, so this has been a great achievement.
- Thanks to the Royal Government of Cambodia, the Director General of DFW, and the Counsellor of the Royal Danish Embassy. This consultation has been a rewarding experience for the participants in terms of new ideas, and provided an opportunity to visit the temples of Angkor and a biosphere reserve.
- Thanks to Mr. Chea Sam Ang, Mr. So Thea, Mr. Arvid Sloth, and the organisers from CTSP
- Thanks to Danida in supporting the participants to attend the Consultation.
- Although the visit to the biosphere reserve did not focus on tree seeds, it still provided a valuable lesson for development activities – that all stakeholders must be invited to participate.

The discussions came to an end with a comment that participants would carry the "smile of Angkor" with them from Cambodia.

Mr. Chea Sam Ang thanked all the participants for taking the time to join the discussions, to share experiences and to offer recommendations. He reviewed the Consultation proceedings and highlighted the main results and remaining open questions. He expressed thanks to Danida for their continued support to the Tree Seed Sectors in South-East Asia, and wished all participants a safe journey home. Mr. Chea Sam Ang finished by declaring the 5th Consultation closed.

Abbreviations

ADB	:	Asian Development Bank
CIFOR	:	Center for International Forestry Research
CSIRO	:	Commonwealth Scientific and Industrial Research Organisation
CTSP	:	Cambodia Tree Seed Project
Danida	:	Danish Agency for Development Assistance
DFSC	:	Danida Forest Seed Centre
DFTS	:	Directorate Forest Tree Seed
DFW	:	Department of Forestry and Wildlife
FUGs	:	Forest User Groups
ICRAF	:	International Centre for Research in Agro forestry
IFSP	:	Indonesia Forest Seed Programme
IUCN	:	International Union for Conservation of Nature
Lao PDR	:	Lao People Democratic Republic
LTSP	:	Lao Tree Seed Project
NGOs	:	Non-Governmental Organisations
NRE	:	Natural Resource Environment
NTFPs	:	Non-Timber Forest Products
NTSP	:	National Tree Seed Programme
RGC	:	Royal Government of Cambodia
TISC	:	Tree Improvement and Silviculture Component
VTSP	:	Vietnam Tree Seed Programme
WFP	:	World Food Programme

ANNEX 1

5th REGIONAL CONSULTATION
TREE SEED PROJECTS IN SE-ASIA
4 – 7 February 2003, Cambodia

Final Programme

Time	Activities	Responsible/Comments
	Monday 3rd February	
All Day	Arrival of participants. Shuttle service from airport. Check in hotel, Payment for rooms to Salina.	Salina Hotel Management.
	Tuesday, 4 February	
07:00	**Breakfast at Salina**	Salina
07:30	**Registration**	Ms. Tina
08:00	**Address by CTSP Project Chief and Chair**	Mr. Chea Sam Ang, Project Chief
08:10	**Opening**	Mr. Ty Sokhun, Director General of DFW
08:30	**The National Natural Resource Environment Programme, Policies, Priorities and Visions from a Donor Point of View**	Mr. Mogens Laumand Christensen, Counsellor, Cambodia
08:50	**Programme, Logistics and Practicalities**	Mr. Arvid Sloth
09:00	**Coffee Break**	Salina
	<u>Participatory and or decentralised approaches</u>: Lessons learned, including questions	Chair: Mr. Chea Sam Ang
09:20	• Indonesia - *Seed for People*	Mr. Suharisno
09:40	• Cambodia - *Making Village Seed Source Management Sustainable*	Mr. Long Boung
10:00	• *LAO PDR – Seed Collection and Seed Source Management as Village Development Projects*	Mr. Khamphone Mounlamai
10:20	• Indonesia - *Strengthening Tree Germplasm Security for NGOs and Smallholders*	Mr. Frans Harum
10:40	• DFSC – *Can Smallholders be Supplied with Quality Tree Seed through Commercial Distribution of Tree Seed in Small Bags?.*	Mr. Soren Moestrup
11:00	Sum up, questions and **plenary discussion** of lessons learned	Chair
11:30	• Forest Genetic Resources in LAO P.D.R (handout haves)	Mr. Chanhsamone Phongoudome
11:40	• Forest Genetic Resource Distribution in Cambodia	Mr. Arvid Sloth
11:50	• Pilot Provincial Seed Supply System, Vietnam	Mr. Nguyen Huu Hieu
12:10	Sum up, questions and **plenary discussion** of lessons learned	Chair

12:30	**Lunch at Salina**	Salina
	Display/distribution of extension/technical materials Settlement of Registration Fee	 Ms. Tina
	Gene Ecological Zonation Based on Eco-Zonation	
14:45	- as Currently Being Done in Cambodia	Mr. Ignas Dummer
15:15	Tree Planting Zones for the Benefits of the Smallholders	Mr. Lokendra Purush Dhakal
15:45	**Seed deployment ,** Seed Sources/Site Matching **,** Vietnam	Mr. Tran Danh Tuyen
16:15	**Coffee Break**	Salina
16:30	Innovative Developments in the Seed Sector: A Review of Developments and Changes in Design and Emphasis; and a Guess on the Future	Dr. Bjerne Ditlevsen
16:45	Closing of the day's professional programme	Mr. Chea Sam Ang
19:00	Welcome dinner by DFW at the Tonle Sap Restaurant	

	Wednesday, 5 February	
07:00	**Breakfast**	Salina
07:30	Departure from the hotel entrance, practicalities and departure for field excursion.	Tour leader: Mr. So Thea
08:15	The Complexity of Using Indigenous Species in Plantations.	Mr. Sour Hay, PFO, Siem Reap
09:00	*Dipterocarp alatus* Seed Source: How High Standards can we Afford to Set?	Mr. Sok Srun
09:30	Group photo in front of Bayon Temple and depart to seed source	Mr. Long Boung
11:00	*Dalbergia cocinchinensis* Seed Source in Natural Forest. Protection by Villagers or District Forest Office; - a Possibility?	Mr. So Thea
13:00	Lunch at Kbal Spean, historical forest site	
15:00	Departure	
15:30	Banteay Srey Temple with guides.	
16:00	Departure to Siem Reap via Angkor Wat.	
17:00	Sun set at Angkor Wat	
18:45	Departure for Siem Reap.	
19:00	Buffet dinner at Chao Praya restaurant.	
21:00	Return to Salina Hotel – sleep, sleep, sleep	

	Thursday, 6 February	
05:30	**Departure from hotel by mini busses**	
07:30	Excursion to **Preak Toul Bioreserve** (UNESCO classified and world famous flooded forest and bird sanctuary) • Flooded Forest, Species Composition, Propagation, • Community Forestry and Community Fishery • History and Hydrology Systems of the Tonle Sap • UNESCO Man and Biosphere Program • Water Bird Colony Conservation Program • Osmoses Eco-Tourism and Education Program in the Flooded Forest • Interactions Between Fishing Concessions, Fishing Communities, the Sanctuary, the Provincial Fishery and Forestry Office • Breakfast and lunch will be served in floating villages	Osmose/CTSP
17:00	Return to Salina Hotel	
19:00	**"Farewell Dinner"** at the Grand Angkor Hotel	

	Friday 7 February	
07:00	**Breakfast**	Salina
	Legal Aspects of Seed Procurement and Gene Conservation:	Chair: Mr. Chea Sam Ang
08:00	Legal Measures and Experiences for Protection of Seed Sources by CTSP	Mr. So Thea
08:30	Legal Arrangement for Establishment and Protection of Forest Seed Resources in Vietnam.	Mr. Nguyen Xuan Lieu
09:00	Legislation and Regulations of Forest Seed in Indonesia	Mr. Petrus Daru Darmojo
09:40	**Coffee**	Salina
10:00	**Can Smallholders be Supplied with quality Tree Seed Through Commercial Distribution of Tree Seed in Small Bags?**	Mr. Soren Moestrup
10:20	**Experiences on Dalbergia sissoo Improvement in Nepal**	Mr. KR Shrestha
10:40	**Project Monitoring**	Dr. Bjerne Ditlevsen
11:00	**Planning Processes**	Dr. Peter Ochsner
11:30	**Tree Seed Video and Seed Songs**	Mr. Douangphet Lattanasouk
12:00	Lunch at Salina	Salina
13:00	Next consultation	Chair: Mr.Chea Sam Ang

13:30 14:00	AOB Closing Shuttle transport to Siem Reap Int. Airport for connecting flights to BKK, Phnom Penh, and HCMC. End of Programme	Mr. Chea Sam Ang
	Potential individual arranged extended stay for the exploring of Angkor Wat.	

Practical info:
The Meeting room will be equipped with white board, OHP and LCD. A laptop (with Word, Excell and Powerpoint software) will be available in connection with the LCD.

For the Tonle Sap tour it might be a good idea to bring binnocular.

Room rate at Salina Hotel is 35 USD

NB: Please remember to bring any kind of extension material and selected books or papers for showing and/or distribution to other projects .