

## **Part II: Budget Notes**

All GEF-funded items under outcomes 1-3 will be contracted, as packages, through competitive bidding, and will therefore be accounted for under Atlas budget line 72100 (Contractual Services – Companies). The breakdowns between budget items, shown below, are therefore indicative as they will depend on the breakdowns proposed in the winning bids).

### **General Cost Factors:**

Long-term national consultants are budgeted at \$1,000 - \$3,800 per month, according to level and responsibilities. This is based on UNDP standard costs.

Short term international consultants (IC) are budgeted at \$550/day and long term international consultants at \$7,500 - \$8,000/month.

### **Outcome 1:**

*Items funded by GEF are as follows:*

1. **Local consultancy outputs** (\$182,400, consisting of 96 months of long term consultant support at the rate of \$3,800/month):
  - Facilitating the development of a supportive legal framework for SFM (Output 1.1, 48 person/months)
  - Developing national capacities and political will in FA and GDANCP for the promotion of SFM (Output 1.2, 48 person/months)
2. **International technical assistance outputs** (\$44,000, consisting of 80 person days of short term consultant support at the rate of \$550/day, for travel and per diem budgets, see travel budget)
  - Advising on the development of a wood energy strategy (Output 1.1, 40 person days)
  - Advising on institutional strengthening (Output 1.2, 40 person days)
3. **Contractual services.** \$399,840 has been budgeted for contractual services, to be allocated as follows:
  - Training of NCFPCC to fulfil functions outlined in NFP (Output 1.2, \$17,000)
  - Train 200 CFMC members/yr/cantonment (Output 1.2, \$130,000)
  - Training of FA and GDANCP staff (Output 1.2, \$252,840)
4. **Travel:** \$25,960 has been budgeted for travel under this outcome, allocated as follows:
  - **\$20,960** for economy class travel for international consultants to undertake the required advisory and training support. Consultants would need to travel to Phnom Penh where FA and other relevant Government agencies are located, as well as to the field sites.
  - **\$5,000** for travel and per diems by national consultants to attend meetings and workshops in Phnom Penh (these national consultants will be based in provincial centres)
5. **Information technology equipment:** \$5,000 has been budgeted for computers and other essential office equipment for national consultants based in province-level offices.

*Items to be co-funded by UNDP/Unfunded are as follows:*

6. **Travel and DSA of Government staff:** \$40,000

7. **Technical coordination (all outputs):** \$72,000 consisting of 9.6 months of the CTA salary @ \$7,500

**Outcome 2:**

*Items funded by GEF are as follows:*

8. **Local consultancy outputs** (\$627,000, consisting of 504 months of long term consultant support at the rate of \$1,000 - \$3,175/month):
  - Support to FA and GDANCP in developing development of community-based forest management (Output 2.1, 48 person months @\$2,000/month)
  - Development of models for rapid CF allocation and quick benefit generation from community management of forests (Output 2.2: 288 person months @\$800/month)
  - Support to resource inventories of CFs and CPAs to highlight management opportunities and requirements for biological safeguards (Output 2.2: 24 person months @ \$1,200/month)
  - Advice, training and troubleshooting for forest-based business (Output 2.2: 96 person months @ \$1,200/month)
  - Advice, training and troubleshooting in support of the development of efficient charcoal production centres (Output 2.2: 24 person months @ \$3,175/month)
  - Advice, training and troubleshooting in support of the development and application of forest management practices and the establishment and management of woodlots (Output 2.2: 24 person months @ \$3,175/month)
9. Certification of Standard Green Charcoal labels (\$25,100)
10. National travel and DSA of national consultants: \$4,200

*Items to be co-funded by UNDP/Unfunded are as follows:*

11. **Technical coordination (all outputs):** \$72,000 consisting of 9.6 months of the CTA salary @ \$7,500
12. **Local consultancy inputs** (\$172,800, consisting of 108 months of long term consultancy support:
  - Business development specialist (Output 2.2): 12 person months @ \$8,000/month)
  - Business skills trainers (Output 2.2): 96 person months @ \$800/month)
13. **Travel:** \$332,223 has been budgeted for travel under this outcome, allocated as follows
  - \$314,943 has been budgeted for motorcycle running costs, DSA and local hotel costs for field staff (Output 2.2)
  - Travel and DSA of Government staff: \$17,280 (all outputs)
14. **Equipment** (all outputs):
  - Project vehicle - \$35,000
15. **Miscellaneous expenses** (all outputs):
  - Fuel and insurance (all outputs: \$57,600)
  - Vehicle maintenance (all outputs: \$5,000)
16. **Contractual services.** \$1,028,000 has been budgeted for contractual services under this outcome, as follows:
  - Demarcation equipment and costs (Output 2.2: \$50,000)
  - Patrol costs (Output 2.2: \$50,000)

- CF/Private woodlot & nursery franchise development (Output 2.2: 100,000)
- Meeting expenses (Output 2.2: \$50,000)
- Study tours (Output 2.2: \$24,000)
- Charcoal tests (Output 2.2: \$25,000)
- Driver (all outputs: \$14,400)
- Training on rural energy service entrepreneurs (Output 2.2: \$132,600)
- Business start-up grant fund (Output 2.2: \$690,000)
- Charcoal production centres start-up grant (Output 2.2: \$92,000)

**Outcome 3:**

*Items funded by GEF are as follows:*

17. **Local consultancy outputs** (\$216,000, consisting of 96 months of long term consultant support at the rate of \$1,500 - \$3,000/month):
  - Development of capacities among local technology suppliers for production, distribution, maintenance and financing of improved cook stoves (\$144,000)
  - Advice and development of technical capacities for stove production (\$72,000)
18. **International technical assistance outputs** (\$48,000, consisting of 6 months of long term consultant support at the rate of \$8,000/month, for travel and per diem budgets, see travel budget)
19. **Contractual services:** \$583,335 has been budgeted for this outcome, as follows:
  - Business Development of 100 cook stove distributors (\$164,000)
  - Technical training, stove pressing, improved kilns and clay mixing (\$70,000)
  - Training for 800 producers of palm sugar stoves(\$150,000)
  - Business support to vattanak stove producers (\$99,335)
  - Development and Monitoring of carbon payment mechanisms for palm sugar, NKS stove production, Charcoal Kilns and other rural energy services (\$100,000)

*Items to be co-funded by UNDP/Unfunded are as follows:*

20. **Technical coordination:** \$72,000 consisting of 9.6 months of the CTA salary @ \$7,500
21. **Travel:** \$13,440 consisting of DSA and travel for Government staff
22. **Contractual services:** \$244,000 has been budgeted for this outcome, as follows:
  - Cook stove production centres start-up grant (\$180,000)
  - Risk-sharing for loans to stove producers (\$24,000)
  - Risk sharing 2000 Palm Sugar Producers and ceramic parts producers (\$40,000)

**Outcome 4: MONITORING, LEARNING, ADAPTIVE FEEDBACK & EVALUATION**

*Items funded by GEF are as follows:*

23. **International consultants:** \$55,000 are budgeted under this component, consisting of 100 person days of short term consultancy at the rate of \$550/day, for mid-term and final external project evaluations (for travel and per diem budgets, see travel budget)
24. **National consultants:** \$8,000, consisting of 40 person days of short term consultancy for mid-term and final external project evaluations at the rate of \$200/day)

*Items to be co-funded by UNDP/Unfunded are as follows:*

25. **International consultants:** \$11,000 are budgeted under this component, consisting of 20 person days of short term consultancy for development of project communication strategy @ \$550/month
26. **Travel:** travel and DSA for international consultants responsible for mid-term and final external reviews: \$17,644
27. **Contractual services:** \$32,000, consisting of audit (\$3,000/year) and measurement of impact indicators (\$5,000/year)
28. **Materials:** \$10,892 (\$5,000 for communication materials and \$5,892 for inception workshop)

**Project Management**

*Items funded by GEF are as follows:*

29. **Technical coordination** (to be contracted through competitive bidding, and to be accounted for under Atlas budget line 72100 (Contractual Services – Companies)): \$144,000 consisting of 19.2 months of the CTA salary @ \$7,500

*Items to be co-funded by UNDP/Unfunded are as follows:*

30. **National consultants:** \$57,600, consisting of 48 person months of Project Operations Manager @ \$1,200/month)
31. **Travel:** \$10,000 has been budgeted for travel costs and DSA for the CTA and Project Operations Manager visiting provinces
32. **Communication and audio-visual equipment:** \$4,800 internet costs for project office
33. **Information technology equipment:** \$12,000 (4 computers, 1 photocopier, 1 printer and furniture for project office)

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#### 4. MANAGEMENT ARRANGEMENTS

227. The organizational structure of the project is shown in Figure 10. The principal elements of the structure are as follows:

##### *Implementing Partner*

228. The Implementing Partner of the Project will be the Forestry Administration (FA), which will appoint the Project Manager.

229. The decision that FA will occupy this role is based on the following considerations:

- National ownership and leadership:
- Alignment with NFP:

230. The FA complies with these requirements given that it is the lead institution of the forest sector, with legal responsibility under a 2008 restructuring Sub-decree to ensure sustainable forest management for the benefit of society, economic and environment including the biodiversity conservation and cultural heritage, to ensure the sustainable management and development of permanent forest estate related to forest field, biodiversity, wildlife and its habitats and to develop and implement the National Forest Program and national forest management plan for the process of sustainable management and development of the Cambodia forest sector.

231. In complement to the analyses presented in the Barriers section and 275. Annex 14 of this document, a detailed capacity assessment of FA will be carried out at project inception in order to confirm the project's strategies for capacity strengthening in order to support SFM and fill the IP role.

232. As IP, FA will appoint a dedicated person, preferably the chief or deputy chief of the Community Forestry Office to be Project Manager. He or she will provide project management support including planning, reporting, management coordination, and project risk management. He/she will be technically and administrative supported by Chief Technical Advisor (CTA) and Project Operation Manager (POM). He will be guided by the Project Board.

233. The Director of FA, or his senior representative (Deputy Director of FA in charge of community forestry), will be Project Director and will approve project annual work plan, budget and financial report together with UNDP. The Project Director will assist in addressing risks that would affect the outcomes and impacts of the project. The Project Director will guide the project to build synergy and alignment with the TWG F&E and other Development Partners (DPs). The Project Director and Project Manager will promote national ownership and leadership by assigning dedicated staff from FA to work and support project implementation.

##### *Project Board*

234. The Board will consist of the following members:

- 1) **The Executive**, who will represent the project ownership and will chair the Board To provide a check and balance to the Implementing Partner, the Executive role of the Board will be assigned to a senior person from the Ministry of Agriculture, Forestry and Fisheries (MAFF). This person will be designated by the Minister and will not be a member of the Forestry Administration, given that the FA will be the project's Implementing Partner.
- 2) A representative of the **Senior Supplier**, who will provide guidance regarding the technical feasibility of the project. This role will be filled by UNDP. DANIDA will be

invited to sit with UNDP in the Senior Supplier position, to build synergy of joint supports to the forestry and environment sectors from this project.

- 3) **Senior Beneficiaries**, who will represent the interests of those who will ultimately benefit from the project and ensure the realization of project results from the perspective of project beneficiaries. The following beneficiaries will be represented on the Project Board:

- The Ministry of Environment
- The Ministry of Industry, Mines and Energy.
- The Ministry of Land Management, Urban Planning and Construction.

235. UNDP will provide **Project Assurance**, supporting the Project Board Executive by carrying out objective and independent project oversight and monitoring functions.

236. The Project Board will be responsible for making executive decisions for the project, in particular when guidance is required by the Project Manager. The Project Board will play a critical role in facilitating inter-ministerial coordination, project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It will ensure that required resources are committed and will arbitrate on any conflicts within the project or negotiate a solution to any problems with external bodies. In addition, it will approve the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the Project Board will also consider and approve the quarterly plans and will also approve any essential deviations from the original plans.

237. In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP

238. A part time/full time CTA will perform advisory functions to the project manager and decentralized government bodies.

#### ***Project Manager***

239. The Project Manager, who will be a member of Forestry Administration staff and whose salary will be covered by the FA, will have the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager's prime responsibility will be to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

#### ***Project Support***

240. A Chief Technical Advisor and a Project Administrator, both of whom will be appointed through competitive processes, will provide project administration, management and technical support to the Project Manager. The preparation and presentation of Annual Work Plans and Budgets, quarterly reports and PIRs will be the joint responsibility of the Project Manager and the CTA, as will the supervision of the plans and activities of contractors and the corresponding approval of disbursements of project funds to them. The Chief Technical Advisor will not only provide some management support to the Project Manager and Director but also provide technical quality control of deliveries of project outputs of component I, II and III; and provide strategic

advisory support to build synergy, coordination and alignment to support National Forest Programme and TWG F&E.

***Other Responsible Parties***

241. The project's targets will be achieved through collaboration between the FA (Implementing Partner), UNDP (Senior Supplier), contractors and a number of national Executing Agencies, namely GDANCP, the Directorate of Energy in MIME, MLMUPC and Commune Councils. The respective responsibilities of these Executing Agencies in relation to project targets are summarized in 275. Annex 13.

242. The implementation of Components 1-3 of the project will be supported by contractors, which will be selected through processes of competitive bidding and whose terms of reference are set out in 275. Annex 10. It is foreseen that each component will be headed by a technical specialist in the relevant field, and that field level activities will be supported by facilitators, based where possible in Government offices in the provinces.

243. The Project Manager, in agreement with the CTA, will advance GEF and UNDP funds to the selected contractors on a quarterly basis, on the basis of quarterly progress reports, work plans and budgets. The contractors will in turn be responsible for ensuring the correct implementation of their proposed activities in compliance with their terms of reference and their quarterly work plans, and for the correct and transparent management and use of project funds, in close collaboration with and in support of staff of relevant Government institutions (including FA, GDANCP and the Directorate of Energy) and other stakeholders as appropriate. The work of the contractors will be subject to joint supervision by the Project Manager and the CTA.

***Technical Support***

244. In addition to its Project Assurance role, UNDP will contribute technical expertise to the project as required, particularly in relation to the development and promotion of the participation of the private sector in forest-based businesses, and to the promotion and monitoring of livelihood and gender considerations in the project. Partnerships with Government agencies and NGOs constitute a cornerstone of the design of the project.

***Priority Operating Costs (POC) for Nationally Implemented Projects***

245. On 12 July 2010 The Royal Government of Cambodia (RGC) introduced, a new salary incentive mechanism, Priority Operating Costs (POCs), by Sub-Decree #66.

246. UNDP has aligned itself with the UN Country Team which sees POC as a positive step in harmonizing and aligning incentive payments to one mechanism and one grid. The UN Country Team and the Development Partner community acknowledge that POC is an interim mechanism. Each POC will undergo a review prior to the 2011 Cambodia Development Cooperation Forum and all POC payments will cease on 30 June 2012.

247. For this project POC payment is eligible from 1 March 2011 to 30 June 2012. POC is budgeted and reflected in the project Annual Work Plan and Budget which will be reviewed and approved by the Project Board. Project will fulfil all the requirements for establishing POC scheme which are: POC Terms of Reference; management contract, position descriptions, merit-based selection, POC work plan, personal service contracts, and a system to manage performance and accountability. For more information on POC, please refer to the POC Guidance Note.

248. Table 18 summarizes the inputs to be provided by each of the principal institutional stakeholders in the project.

**Table 18. Key institutional partners**

<b>Institution</b>	<b>Inputs</b>
Forestry Administration	<ul style="list-style-type: none"> <li>- Project Management</li> <li>- Support to community-based forest management on FA land for FA production forests</li> <li>- Support to development and replication of four models of community-based forest management</li> <li>- Support to the development of a favourable enabling environment within the context of the Forest Law.</li> <li>- Assign dedicated staff to support project implementation</li> <li>- Host the project by providing office space to project staff at national and provincial level.</li> <li>- Effectively support project implementation in partnership between NGOs, private sectors, MOE, MIME, and FA.</li> <li>- Provide an effective leadership in solving project management issues.</li> </ul>
GDANCP (MOE)	<ul style="list-style-type: none"> <li>- Provision of guidance and oversight to the project through membership of the Project Board</li> <li>- Assign dedicated staff to work with relevant components and activities of project</li> <li>- Representation of the interests of communities on MOE's Protected Areas land, through membership of the Project Board</li> <li>- Support to community-based conservation and protected area management on MOE land</li> <li>- Support to development and replication of models of community-based conservation and forest management (CPAs)</li> <li>- Support to the development of a favourable enabling environment within the context of the Protected Area Law.</li> </ul>
General Department of Energy (MIME)	<ul style="list-style-type: none"> <li>- Provision of guidance and oversight to the project, particularly on energy-related issues, through membership of the Project Board</li> <li>- Support to the development, promotion and dissemination of technologies and businesses that reduce unsustainable demand for fuel wood</li> </ul>
Ministry of Land Management, Urban Planning and Construction	<ul style="list-style-type: none"> <li>- Provision of guidance and oversight to the project through membership of the Project Board, particularly on issues related to land use planning (provincial, district and commune level) such as PLUP and CLUP</li> <li>- Support to the integration of issues related to community-based forest management and conservation in mechanisms of land use planning and state land mapping</li> </ul>
MAFF	<ul style="list-style-type: none"> <li>- Chair of the Project Board</li> </ul>
TWG F+E	<ul style="list-style-type: none"> <li>- Take lessons learned from the project</li> <li>- Replicate good practices of the project</li> <li>- Promote synergy, coordination and communication between project support and the secretariat of the TWG</li> <li>- Include project work plan into the TWG work plan.</li> </ul>
Contractors (to be selected through competitive bidding)	<ul style="list-style-type: none"> <li>- Technical support for the implementation of Components 1-3</li> <li>- Strengthening of the capacities of institutional and local stakeholders</li> <li>- Promotion of coordination and integration of activities between</li> </ul>



	institutional stakeholders
National and international NGOs (see Baseline section)	- Support to Government institutions and local stakeholders in the development, promotion and dissemination of models of community-based forest management and conservation
Commune Councils	- Guidance on CFs being part of commune development plans and commune land use plans (CLUP) - Support on setting aside part of CDF for CF
Community-based forest management and conservation organizations (CFs and CPAs)	- Representation of the interests of forest users and other forest stakeholders -

### **Audit arrangements**

249. UNDP, as part of its assurance function, shall be responsible for arranging the annual external audit of this project, including interim audits or spot check in between. The terms of reference for such audits shall follow UNDP requirements. The UNDP Country Office will draw up an annual audit plan for Nationally implemented and NGO implemented projects by November each year and inform the respective Implementing Partner. Findings are referred to the project team for response and appropriate remedial action.

### **Collaborative arrangements with related projects**

250. The project will form part of a diverse portfolio GEF projects managed by the UNDP Country Office, including the BD project “Establishing Conservation Areas Landscape Management (CALM) in the Northern Plains” and the SLM project “Building Capacity and Mainstreaming Sustainable Land Management in Cambodia”. The CALM project, in particular, relates to the mainstreaming of biodiversity and community based livelihood conservation into the productive landscape. WCS, which is the IP of that project, is a member of TWG F&E and these two projects can create a strong alliance on promoting community based forest resources management, in part through that mechanism.

251. Given the degree of overlap between the Boards of these projects and the present project, in terms of the institutions represented, opportunity will be taken wherever possible to hold joint Project Board meetings. As well as increasing efficiency in the use of time of the participants, this will facilitate the identification of opportunities for coordination between these projects, for the sharing of lessons learnt and for other synergies.

252. Project activities in support of the definition of sustainable funding mechanisms for SFM will be closely coordinated with current and proposed UN initiatives in support of REDD. In particular it is proposed to develop a series of GEF proposals on REDD in different countries in the Mekong Basin region (Cambodia, Lao PDR, Vietnam and Thailand) in a coordinated fashion so as to promote regional cooperation on SFM, community-based forest management, and the development of REDD(+)-readiness in the Lower Mekong Basin sub-region

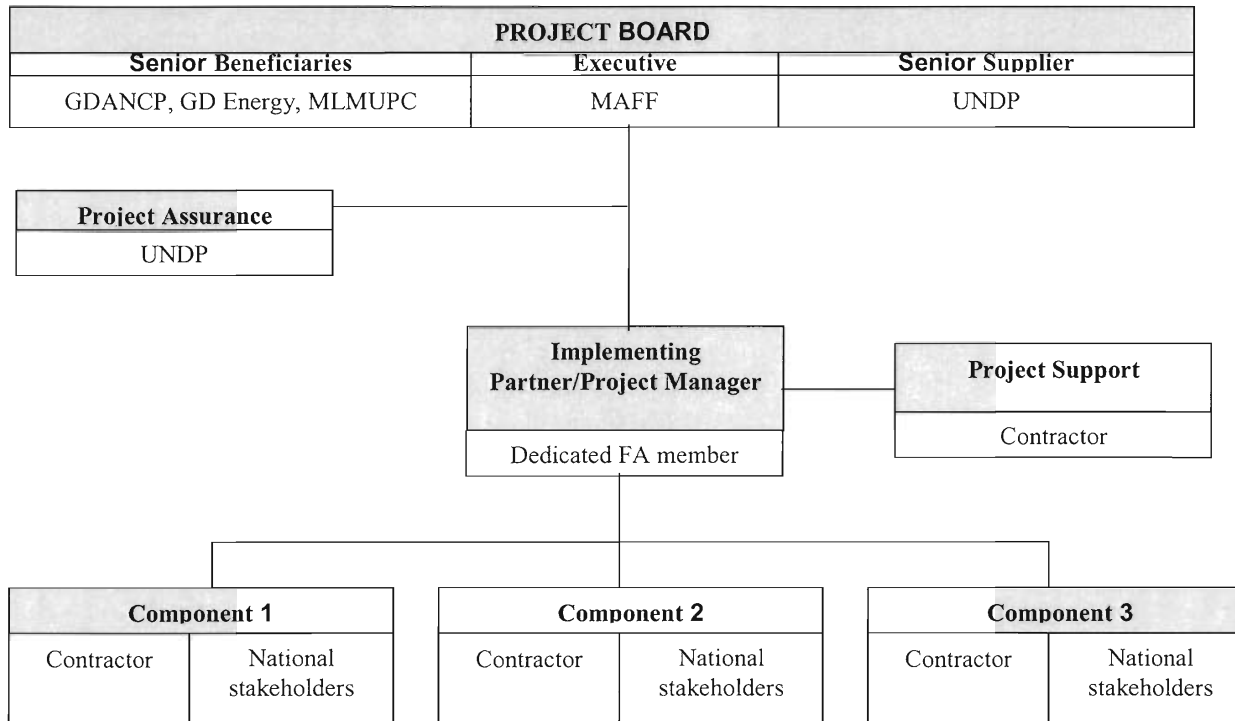
253. Coordination between the activities of this project and other projects supporting the implementation of the National Forest Programme will be promoted through the mechanism of the Technical Working Group on Forestry and the Environment (TWG F&E). It is proposed that the Project Manager, Chief Technical Advisor and Administrator/Assistant of the present project will be physically located in the office of the Secretariat of the TWG (F&E), which in turn is located in the headquarters office of the Forestry Administration. Project work plans will be harmonized with those of the TWG (F&E).

254. Similarly, coordination between the present project and other initiatives related to wood energy will be promoted through the mechanism of the Wood Energy Working Group, which is led by the General Department of Energy, of the Ministry of Industry Mines & Energy and also includes MOE, MRD and research institutes and the NGO GERES.

**Agreement on intellectual property rights and use of logo on the project's deliverables**

255. In order to accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF project publications, including among others, project hardware and vehicles purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF.

Figure 10. Project Organisation Structure



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## 5. MONITORING FRAMEWORK AND EVALUATION

256. The project will be monitored through the following M&E activities. The M&E budget is provided in Table 19 below. The M&E plan of the project will be closely aligned and harmonized with that of DANIDA and TWG (F&E), as shown in 275.Annex 16.

### **Project start:**

257. A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

258. The Inception Workshop should address a number of key issues including:

- a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- b) Assist the partners to understand capacity gaps and needs and how the project could promote capacity development to government agencies to produce project results.
- c) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- d) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- e) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- f) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.
- g) Discuss and review project M+E framework in line with M+E framework of DANIDA.
- h) Review and discuss about communication strategy and gender mainstreaming strategy of the project.

259. An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

### **Quarterly:**

260. Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.

- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high.
- Other ATLAS logs will be used to monitor issues, lessons learned etc.

### **Annually:**

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

**Periodic Monitoring through site visits:**

261. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

**Mid-term of project cycle:**

262. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (insert date). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

263. The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

**End of Project:**

264. An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

265. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

266. The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

267. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out

recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

**Learning and knowledge sharing:**

268. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

269. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation through lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

270. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

**Table 19. M&E work plan and budget**

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> <li>▪ Project Manager</li> <li>▪ UNDP CO, UNDP GEF</li> </ul>	Indicative cost: 5,893	Within first two months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> <li>▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.</li> </ul>	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> <li>▪ Oversight by Project Manager</li> <li>▪ Project team</li> </ul>	To be determined as part of the Annual Work Plan's preparation. Indicative cost: \$20,000	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RTA</li> <li>▪ UNDP EEG</li> </ul>	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> </ul>	None	Quarterly
Mid-term Evaluation	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RCU</li> <li>▪ External Consultants (i.e. evaluation team)</li> </ul>	Indicative cost: 40,322	At the mid-point of project implementation.
Final Evaluation	<ul style="list-style-type: none"> <li>▪ Project manager and team,</li> <li>▪ UNDP CO</li> <li>▪ UNDP RCU</li> <li>▪ External Consultants (i.e. evaluation team)</li> </ul>	Indicative cost : 40,322	At least three months before the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ local consultant</li> </ul>	0	At least three months before the end of the project
Audit	<ul style="list-style-type: none"> <li>▪ UNDP CO</li> </ul>	Indicative cost : 15000	Yearly

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time frame
Visits to field sites	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RCU (as appropriate)</li> </ul>	(3,000 per year)  For GEF supported projects, paid from IA fees and operational budget	Yearly
<b>TOTAL indicative COST</b> Excluding project team staff time and UNDP staff and travel expenses		US\$ 121557 (5% of total GEF funding)	

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## 6. Legal Context

271. This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

272. Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the Implementing Partner.

273. The implementing partner shall:

- a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

274. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

275. The Implementing Partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document".



Annex 1. **Summary of Biodiversity Values of the Target Provinces**

The mountains of south-western Cambodia are a moderate centre of endemism with many unique plants and animals such as the chestnut-breasted partridge (*Arborophila mandellii*) and the Cambodian laughing-thrush (*Garrulax ferrarius*). The Phnom Aural massif contains some species that have not been found anywhere else, such as the Aural horned frog *Megophrys auralensis*. Fish and plant collecting expeditions have found dozens of species never before recorded in Cambodia, and many species are awaiting names. The endemic species are chiefly at high elevations or in the species-rich lower evergreen forests, and a few lower plants and invertebrates may be endemic to the hot springs (source: MOE).

**Table 20. Ecoregions represented in the target provinces (source: WWF)**

Province	Area (km <sup>2</sup> )	Ecoregions represented	Conservation status	Global 200
Battambang	11,702	Cardamom Mountains rain forests (IM0106)	Relatively Stable/Intact	X
		Central Indochina dry forests (IM0202)	Vulnerable	
		Tonle Sap freshwater swamp forests (IM0164)	Vulnerable	
		Tonle Sap-Mekong peat swamp forests (IM0165)	Critical/Endangered	
Kampong Chhnang	5,521	Cardamom Mountains rain forests (IM0106)	Relatively Stable/Intact	X
		Central Indochina dry forests (IM0202)	Vulnerable	
		Tonle Sap freshwater swamp forests (IM0164)	Vulnerable	
Kampong Speu	7,017	Cardamom Mountains rain forests (IM0106)	Relatively Stable/Intact	X
		Central Indochina dry forests (IM0202)	Vulnerable	
		Tonle Sap freshwater swamp forests (IM0164)	Vulnerable	
		Tonle Sap-Mekong peat swamp forests (IM0165)	Critical/Endangered	
Pursat	12,692	Cardamom Mountains rain forests (IM0106)	Relatively Stable/Intact	X
		Central Indochina dry forests (IM0202)	Vulnerable	
		Tonle Sap freshwater swamp forests (IM0164)	Vulnerable	

Most of the detailed studies of biodiversity that have been carried out in the project area have been focused on protected areas. Tables X and X show IUCN Red-Listed plants and animals of Cambodia, highlighting which species are known or likely to occur in Phnom Aural Wildlife Sanctuary, which is entirely contained within the project target provinces (the CPAs to be supported by the project are located within the Multiple Use Zones of the Phnom Aural and Phnom Samkos Wildlife Sanctuaries).

**Table 21. IUCN Red-Listed plants of Cambodia, showing which species are known or likely to occur in Phnom Aural Wildlife Sanctuary (source Aural WS Management Plan)**

Name	Local name	English name	Red List Status	Phnom Aural Wildlife Sanctuary
<b>CRITICALLY ENDANGERED</b>				
<i>Aquilaria crassna</i>	Chan Kreusna	Agar wood	CR A1cd	<b>Confirmed.</b> Very widespread, but mature individuals are now scarce.
<i>Hopea helferi</i>	Koki Daek		CR A1cd+2cd, B1+2cd	<b>Confirmed.</b> Semi-deciduous and evergreen forests up to 1,000m. Some big specimens can still be seen in this Wildlife Sanctuary (Khou <i>et al.</i> , 2005).
<i>Dipterocarpus dyeri</i>	Chheuteal Th'ngor		CR A1cd+2cd, B1+2cd	<b>Confirmed.</b> In semi-deciduous forest.. In semi-deciduous forest.
<i>Shorea guiso</i>	Chor Chong	Guijo	CR A1cd	<b>Confirmed.</b> In semi-deciduous and hill evergreen forest
<i>Shorea hypochra</i>	Koki Phnong, Kam Nhan	White meranti	CR A1cd	<b>Confirmed.</b> In hill evergreen forest in the Wildlife Sanctuary.
<i>Aglaia pleuropteris</i>			. CD D	To be confirmed
<i>Dipterocarpus baudii</i>			CR A1cd+2cd	Likely to be native to this area, in lowland evergreen forest. Occurs in adjoining areas in Thailand.
<i>Dipterocarpus turbinatus</i>	Chheuteal Dang		CR A1cd+2cd	To be confirmed. Likely to be native to this area, in semi-deciduous or evergreen areas. Occurs in neighbouring parts of Thailand.
<i>Hopea latifolia</i>	(Koki)		CR A1c, B1+2c	May occur in the Wildlife Sanctuary in semi-deciduous forest (but not recorded in adjoining parts of Thailand).
<i>Hopea siamensis</i>	(Koki)		CR A1c, B1+2c	May be present. Occurs in neighbouring parts of Thailand (Koh Chang).
<i>Shorea thorelii</i>	Kh'chov, Ph'choek Odam		CR A1cd	Expected to occur in the Wildlife Sanctuary. Occurs in neighbouring parts of Thailand.
<b>ENDANGERED</b>				
<i>Azelia xylocarpa</i>	Beng		EN A1cd	<b>Confirmed.</b> Especially common in semi-deciduous and semi-evergreen forests (Khou <i>et al.</i> , 2005). Becoming critical endangered due to high demand in furniture market.
<i>Anisoptera costata</i>	Phdeak		EN A1cd+2cd	<b>Confirmed.</b> In semi-deciduous and evergreen forests below 500m. Endangere (Khou <i>et al.</i> , 2005).
<i>Dalbergia oliveri</i>	Neang noun		EN A1cd	<b>Confirmed.</b> In semi-deciduous forests, but becoming rare (Khou <i>et al.</i> , 2005). Becoming critically endangered
<i>Dipterocarpus alatus</i>	Chheuteal Toek	Indonesian gurjun	EN A1cd+2cd, B1+2c	<b>Confirmed.</b> In semi-deciduous and evergreen forests up to 600m (Khou <i>et al.</i> , 2005).
<i>Shorea henryana</i>		White meranti	EN A1cd	<b>Confirmed.</b> In semi-deciduous forest, rare (Khou <i>et al.</i> , 2005).
<i>Hopea ferrea</i>	Koki Th'mor		EN A1cd+2cd,	<b>Confirmed.</b>

<i>Hopea recopei</i>	Popel		B1+2c EN A1cd+2cd, B1+2c	<b>Confirmed.</b>
<i>Dipterocarpus costatus</i>	Chheuteal Bangkuoy		EN A1cd+2cd	<b>Confirmed.</b> In semi-deciduous forest.
<i>Hopea pierrei</i>	Koki Kh'sach		EN A1c+2c, B1+2c, C1, D	<b>Confirmed.</b> In evergreen forest in the Wildlife Sanctuary.
<i>Shorea roxburghii</i>	Popel (toch)		EN A1cd	<b>Confirmed.</b> In mixed deciduous and semi-deciduous forest in the Wildlife Sanctuary.
<i>Vatica cinerea</i>	Chramash		EN A1cd	<b>Confirmed.</b> it can be seen in semi-deciduous and evergreen forest in the lowland area.
<i>Dalbergia cambodiana</i>			EN A1cd	Likely to occur in the Wildlife Sanctuary. (Reported in SW Cambodia by Dy Phon, 1970).
<i>Hopea pedicellata</i>	(Koki)		EN A1c+2c	May occur in the Wildlife Sanctuary, but not recorded in adjoining parts of Thailand.
<b>VULNERABLE</b>				
<i>Dalbergia cochinchinensis</i>	Kranhoung		VU A1cd	<b>Confirmed.</b> In open dipterocarp woodland, semi-deciduous and hill evergreen forest up to 1000m a.s.l. (Khou <i>et al.</i> , 2005). Becoming critical endangered due to high demand in furniture market.
<i>Pterocarpus indicus</i>	Th'nong	Burmese rosewood, red sandalwood	VU A1d	<b>Confirmed.</b> In semi-deciduous forest.
<i>Hopea odorata</i>	Koki M'sao		VU A1cd+2cd	<b>Confirmed.</b> Still be seen in significant number though it is in high demand for construction.
<i>Cycas siamensis</i>	Siamese cycad		VU A2c	<b>Confirmed.</b> It was found in pine ridge.
<i>Cycas pectinata</i>	(Cycad)		VU A2c	To be confirmed.
<i>Intsia bijuga</i>	Phkay Proek/ Ko Koh Prek	Bornean teak	VU A1a	Probably native to lowland evergreen forest, but produces one of the most valuable timbers.
<i>Mangifera flava</i>	(Mango)		VU B1+2c	Likely to be rare, if present. Only one previous record in Cambodia.
<i>Xylopia pierrei</i>	Kray Sor, Kalav		VU A1a	To be confirmed.
<i>Wrightia lecomtei</i>	P opech Chanva		VU D2	To be confirmed.
<b>LOWER RISK/ NEAR THREATENED</b>				
<i>Dialium cochinchinensis</i>	Kralanh	Velvet tamarind	LR/nt	<b>Confirmed</b> in semi-deciduous and evergreen in lowland.
<i>Aglaia edulis,</i> <i>Aglaia odorata,</i> <i>Aglaia sylvestris</i>	Trayormg ( <i>A. odorata</i> )		LR/nt	All three species could occur here.
<i>Cycas elivicola</i>	(Cycad)		NT	To be confirmed
<b>DATA DEFICIENT</b>				
<i>Dalbergia entadoides</i>	Khnay Maonsbat		DD	To be confirmed.
<i>Nageia fleuryi</i>			DD	To be confirmed.
<i>Nepenthes anamensis</i>		(Pitcher plant)	DD	To be confirmed. One species was seen on the ground cover of Pine

				forest in the Wildlife Sanctuary. Many others observed in Kirirum National Park.
<i>Nepenthes thorelii</i>	Bangpong, Sramoac (Pursat)	(Pitcher plant)	DD	Likely to be present in this area. Confirmed in SW Cambodia by Dy Phon (1970)
<i>Sindora tonkinensis</i>			DD	To be confirmed.

**Table 22. IUCN Red-Listed animals from the Cardamom Mountains, showing which species have been confirmed from Phnom Aural Wildlife Sanctuary**

Scientific name	Local name	English name	Red List Status	Phnom Aural Wildlife Sanctuary
<b>CRITICALLY ENDANGERED</b>				
<i>Crocodylus siamensis</i>	Kropeu	Siamese crocodile	CR A1ac	To be confirmed. Verbal reports suggest that crocodiles used to occur in the Stoeng Thom, but none were found on recent surveys, probably due to hunting. The species may however occur in low numbers elsewhere in the Wildlife Sanctuary, especially lower rivers far from roads and human settlements.
<b>ENDANGERED</b>				
<i>Panthera tigris</i>	Kla thom/dombong	Tiger	EN C2a(i)	<b>Confirmed</b> , but rare. Tracks continue to be found around Phnom Aural, and recent sightings have been reported by villagers. One tiger was seen by project staff on Phnom Aural in 2001.
<i>Elephas maximus</i>	Dom rei	Asian elephant	EN A1cd	<b>Confirmed</b> . One group occurs around the Dei Kraham hills/northern part of the Wildlife Sanctuary, and there have been occasional records in the south., especially in the hills near Roleark Kang Chung
<i>Bos javanicus</i>	Ton saong	Banteng	EN A1cd+2cd, C1+2a	<b>Confirmed</b> . Mainly in the less disturbed drier forest areas.
<i>Arborophila cambodiana</i>	Moan krich	Chestnut-headed partridge	EN C1+2a,D	<b>Confirmed</b> . Abundant in evergreen forests.
<i>Indotestudo elongata</i>	Andouek prich	Elongated tortoise	EN A1cd+2cd	<b>Confirmed</b> . Appear to be very common.
<i>Cairina scutulata</i>	Teaprei slabsar	White-winged duck	EN A1cd+2cd C1+2a	Not confirmed, but reported to occur.
<i>Pelochelys cantori</i>	Kanteay kbal kongkeb	Cantor's giant softshell turtle	EN A1cd+2cd	May be present.
<b>VULNERABLE</b>				
<i>Macaca leonina</i>	Sva traus	Pig-tailed macaque	VU A1cd	<b>Confirmed</b> .
<i>Hylobates pileatus</i>	Toch makot	Pileated gibbon	VU A1cd+2cd	<b>Confirmed</b> . Abundant in taller forests.
<i>Ursus thibetanus</i>	Klar khmom thom	Asiatic black bear	VU A1cd	<b>Confirmed</b> .
<i>Prionailurus viverrinus</i>	Kla Trey	Fishing cat	VU C2a(i)	<b>Confirmed</b> . Common.

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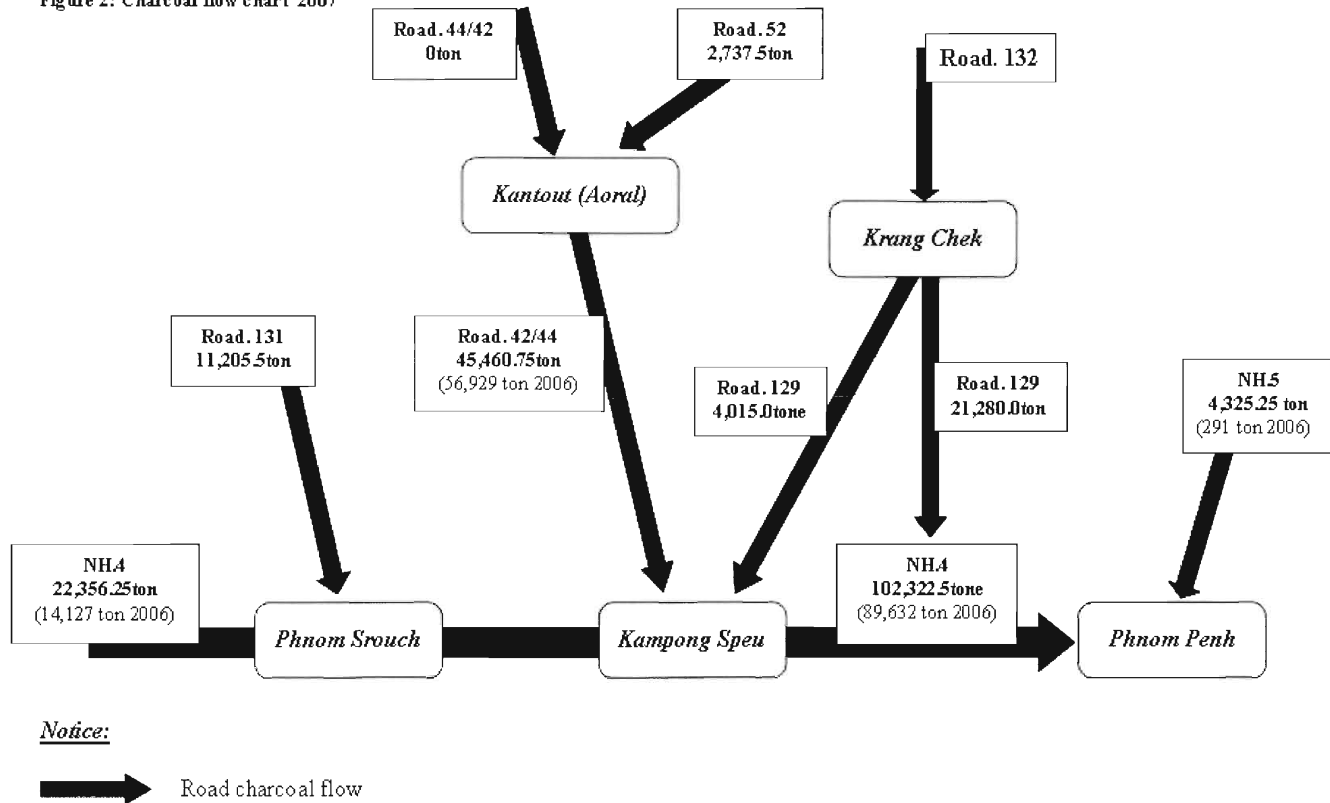
<i>Neofelis nebulosa</i>	Kla popok	Clouded leopard	VU C2a(i)	<b>Confirmed.</b>
<i>Catopuma temminckii</i>	Kla leung meas	Asian golden cat	VU C2a(i)	<b>Confirmed.</b> Not uncommon
<i>Bos frontalis</i>	Khting	Gaur	VU A1cd + 2cd+ C1+2a	<b>Confirmed.</b> Common, especially on Phnom Aural.
<i>Naemorhedus sumatraensis maritimus</i>	Kes	Southern serow	VU A2cd	<b>Confirmed.</b> Not uncommon
<i>Hystrix brachyuran</i>	Prorma	South-east Asian porcupine	VU A1d	<b>Confirmed.</b> Not uncommon
<i>Cervis eldi siamensis</i>	Romeang	Eld's deer	VU A2c (DD for this subspecies).	<b>Confirmed.</b> In wetter parts of the lowland plains, including east, centre and south-west of the Wildlife Sanctuary.
<i>Pavo muticus</i>	Kngauk	Green peafowl	VU A1cd+2cd, C1+2a	<b>Confirmed.</b>
<i>Leptoptilos javanicus</i>	Tradork toich	Lesser adjutant	VU C1	<b>Confirmed.</b>
<i>Cuora amboinensis</i>	Andaek bitmuk snouk khmau	Asian box turtle	VU A1d+2d	<b>Confirmed.</b>
<i>Amyda cartilaginea</i>	Kantea	Asiatic softshell turtle	VU A1cd+ 2cd	<b>Confirmed.</b> Common.
<i>Paa fasciculispina</i>	kon kep krouch	Spiny mountain frog	VU	<b>Confirmed.</b> Common.
<i>Cuon alpinus</i>	Chkai prey	Asian wild dog	VU C2a	Probably present, based on reports and tracks.
<i>Lutra lutra</i>	Peir pie (kbal sam peth)	Eurasian otter	VU A2cde	To be confirmed. (at least one large otter species is present)
<i>Lutrogale perspicillata</i>	Peir pie (ro khloun ror logn)	Smooth-coated otter	VU A1acd	To be confirmed. (at least one large otter species is present)
<i>Macaca arctoides</i>	Sva angkout	Stump-tailed macaque	VU A1cd	Not confirmed, but probably present.
<i>Rattus sikkimensis</i>	Kandal pahaan	Sikkim rat	VU A1c	To be confirmed.
<i>Grus antigone</i>	Sarus crane		VU A1cde +2cde	Probably occurred here in past (based on place names and interviews), but current status is uncertain.
<i>Aquila clanga</i>	Greater spotted eagle		VU C1	May be recorded on migration.
<i>Mycteria cinerea</i>	Milky stork		VU A2cd, C1	Not confirmed or reported. Probably absent.
<i>Oriolus mellianus</i>	Chiektum brak	Silver oriole	VU C1	Probably present in low numbers.
<i>Manouria impressa</i>	Andaek toek kal banlamuay	Impressed tortoise	VU A1acd, B1+2acd	Probably occurs here, at higher elevations
<i>Heosemys grandis</i>	Giant Asian pond turtle		VU A1d+ 2cd	May be present.
<i>Siebenrockiella crassicolis</i>	Andaek kaek khmau	Black marsh turtle	VU	Probably present.
<b>LOWER RISK/ NEAR THREATENED</b>				
<i>Macaca fascicularis</i>	Sva k'dam	Long-tailed macaque	LR/nt	<b>Confirmed.</b> Not uncommon.
<i>Manis javanica</i>	Pongroul	Sunda pangolin	LR/nt	<b>Confirmed.</b> Not uncommon, but increasingly hunted.
<i>Amblyonyx cinereus</i>	Peir pie touch	Oriental small-clawed otter	LR/nt	<b>Confirmed.</b>
<i>Lophura diardi</i>	Sdach kolit	Siamese	LR/nt	<b>Confirmed.</b>

		fireback		
<i>Buceros bicornis</i>	Kengkong thnout	Great hornbill	LR/nt	<b>Confirmed.</b> Common.
<i>Carpococcyx renauldi</i>	Coral-billed ground cuckoo		NT	<b>Confirmed.</b>
<i>Cochoa viridis</i>	Green cochoa		LR/nt	<b>Confirmed.</b>
<i>Cyclemys dentata</i> complex (probably <i>C. aripsons</i> )	Andaek saum chhmoul	Leaf turtle	LR/nt (as <i>C. dentata</i> )	<b>Confirmed.</b> Common.
<i>Rana mortenseni</i>	Morten's frog		LR/nt	<b>Confirmed.</b> Common.
<i>Theلودerma stellatum</i>			LR/nt	<b>Confirmed.</b>
<i>Myotis annectans</i>	Praw chim	Hairy-faced bat	LR/nt	May be present.
<i>Harpiocephalus mordax</i>	Praw chim	Hairy-winged bat	LR/nt	May be present.
<i>Niltava davidi</i>	Fujian niltava		LR/nt	Probably present.
<i>Ichthyophaga humilis</i>	Lesser fish eagle		LR/nt	Probably present.
<i>Ichthyophaga ichhyaetus</i>	Grey-headed fish eagle		LR/nt	May be present.
<i>Alcippe rugogularis</i>	Rufous-throated fulvetta		LR/nt	May be present.
<i>Ephippiorhynchus asiaticus</i>	Angkut khmau	Black-necked stork	NT	May be present, but scarce.
<b>DATA DEFICIENT</b>				
<i>Trachypithecus villosus</i>	Sva peam/ kmau	Griffith's silver langur	DD	<b>Confirmed.</b>
<i>Helarctos malayanus</i>	Klar khmom touch	Malayan sun bear	DD	<b>Confirmed.</b> Common on Phnom Aural.
<i>Nycticebus bengalensis</i>	Ror ngy bra peh	Slow loris	DD	<b>Confirmed.</b>
<i>Xenophrys auralensis</i>	Kong kep phnom krevanh	Cardamom horned frog	DD	<b>Confirmed.</b> Common on Phnom Aural.
<i>Philautus cardamomus</i>	Kahn chagn chek phnom	Cardamom tree frog	DD	May occur at higher elevations

Annex 2. Wood and Charcoal flow figures for Phnom Penh 2006 and 2007 (source: MIME-GERES-UNDP report, May 2007)

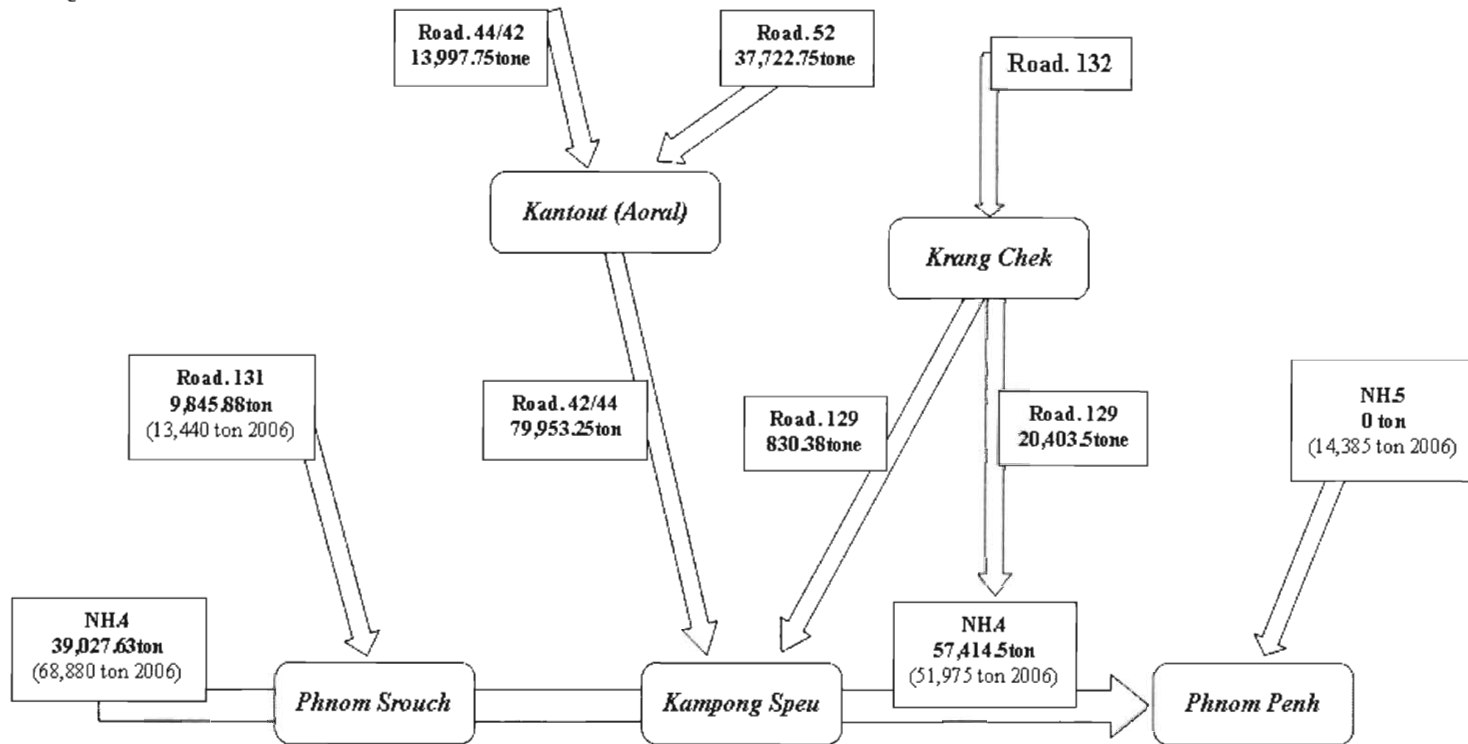
Charcoal demand for Phnom Penh 2006 and 2007

Figure 2: Charcoal flow chart 2007



Total Wood Flow Diagram 2006 and 2007

Figure 3: Firewood flow chart 2007



Notice:

➡ Road firewood flow

103



### Annex 3. Lessons learned on Bio-Energy in Cambodia

Cook stove dissemination in urban areas has been relatively successful in Cambodia, and over the last ten years, it reached a production of over 250,000 stoves per year. GERES realized a verified emissions reduction of 182,000 tons of CO<sub>2</sub> yearly, through 200,000 distributed stoves in use, during the period 2003-2007; followed by the biodigester program with over 5,000 biodigesters installed over the last 3 years saving 30,000 tons of CO<sub>2</sub> per year. However, these programmes have been heavily reliant on donor funding.

In this annex the following technologies are analyzed:

1. Residential Cook stove
2. Palm Sugar Stove
3. Charcoal Kilns
4. Biodigesters
5. Water filters and cook stove retailing

Each of the technology promoters has developed a business plan and additional technical assistance is needed to enable the business environment: for instance, without training, producers of improved palm sugar stoves could not purchase the efficient stove and without reasonable credit or revolving funds the stoves are too expensive to be economically viable, as micro-finance institution (MFI) credits are too expensive.

#### 1. Residential Cook stoves

Cook stoves have been successfully disseminated in urban and peri-urban areas. Over the last decade the NGO GERES has supported the existing stove market and about 25% of the Traditional Lao Stove (TLS) market is now replaced by the efficient New Lao Stove (NLS) with a monthly production of 20,000 stoves, representing a one million dollar yearly market. About 25 SME's that only produced the TLS are now producing between a few hundred to 3000 stoves per month. With these stoves the producers and the workers earn a higher salary and there is still a high demand for more NLS. The success factors are:

- Existing market of 80,000 TLS per month;
- Producers can earn a higher profit by producing the NLS (\$0.57 compared to \$0.37 for the TLS);
- NLS saves 22% fuel compared to the TLS;
- NLS has a nice advanced look.

Even though the NLS seems to be obviously more attractive to producers, it took many years before producers started to trust the stove and stove market and even now many producers are still producing the TLS although they could easily access training facilities and start producing the NLS as the market demand for the stove is high. Reasons for producers not to start NLS production:

- Takes time to learn how to make the stove and loss of income during that time;
- lack of investment money for tools and machinery, MFI loans to high interest;
- Lack of trust in the market and afraid to lose TLS market;
- Training facility far away;
- No clear information about training possibilities.

There are approximately another 50 local producers that could be trained to produce the NLS.

GERES has received large amount of carbon credits that could be used to also promote the existing TLS producers to start making the NLS. The market for the NLS will be mainly urban areas as the stove is especially good for burning charcoal and according to a 2007 UNDP study the demand for charcoal stoves will increase during the coming decades. The large amount of stoves could also generate large amounts of carbon credits (about 0.7 CO<sub>2</sub> equivalents per stove per year). The replacement of 60,000 TLS per month by NLS could generate 720,000 stoves per year and at \$10 per ton CO<sub>2</sub> an additional finance source of over 7 million dollars per year.

## **2. Neang Kongrey Stove**

The World Bank-ESMAP Program in 2008 supported GERES to provide technical assistance to traditional pottery and stove producers in Kampong Chhnang to setup a model production facility. The facility is now operating and producing more stoves than the two firing kilns can handle and already after 6 months of operation need extension.

The Neang Kongrey was chosen as it is much cheaper than the NLS and has a similar efficiency. The retailing price could be around \$1.5 compared to around \$4 for the NLS. During the project it was recorded that rural poor families are interested in the NKS but a payment scheme even for the low price of the NKS would make many more families willing to buy the stove.

The success of the NLS production is based on the skills of pottery producers; GERES has tried to train non pottery people interested to start making stoves however they have not succeeded in setting up stove production facilities. The strategy should therefore be to engage only existing pottery producing families and business.

By analyzing the existing stove market the largest existing traditional stove market is the NLS. The average income of these producers is relatively good and it would be attractive for them to start producing the NLS. However analyses of the model production facility in Kampong Chhnang show no profit of the NKS for management, depreciation and maintenance cost. These are all paid for by GERES. The production process is also slow, according to experienced traditional pottery producers that are now working in the model production facility say that they used to earn more money with some traditional pottery production however are interested to learn how to make the NKS.

The quality of the NKS produced in the Model Production Facility is better and the size is larger than the NKS produced by a handful of women producers that were trained by GERES during previous years. However GERES did not increase the retailing price upsetting some of these individual NKS producers.

The challenge is how to scale up and build more NKS production facilities in other parts of Cambodia. The stove producers market study show that the largest market is that of the TLS and with the existing production methods the NKS would not be a good business proposition for these TLS producers.

## **3. Palm Sugar Stove**

GERES has developed a very efficient palm sugar stove based on post-combustion technology called the "Vattanak Stove". Now about 40 stoves have been constructed and over about 20 tons of granulated palm sugar produced and half of it exported to Japan. For the next season about 100 stoves will be installed. GEF funds could up-scale the program by providing technical assistance to train stove producers and provide a revolving fund for farmers to prepay the stove that costs about \$80.

The profit of traditional palm sugar production has recently dropped dramatically as a result of the increase price for wood and as a result many farmers have ceased production. GERES and DATE have developed a process to make granulated palm sugar that has a higher market value. The market of granulated sugar over time has not increased much with Confirel marketing only around 6 tons per year. GERES created a social venture Company ECO-Biz to create a large market for granulated palm sugar. The aim of GERES is to reduce fuel wood demand and the Vattanak stove is only marketable in combination with the granulated sugar as the margin on the traditional palm sugar paste is too low to pay back the investment cost of the Vattanak Stove.

GERES needs technical assistance support to train palm sugar stove producers and setup a number of ceramic parts production facility as the Vattanak stove consist of over 20 different ceramic parts. ECO-Biz is looking for investors and also for a revolving fund to pre-finance the Vattanak stove that could be paid back out of granulated palm sugar sales over one season. With TA and revolving fund in for years time at least 4 thousand efficient palms sugar stoves could be sold to producers. At the same time the supply of fuel wood will become sustainable as community forestry's will be linked with palm sugar producers to purchase wood

from fast growing tree plantations. GERES together with ECO-Biz have developed an investment plan and detailed needs for TA support.

#### **4. Efficient Charcoal Kilns**

In the first Community Forest in Cambodia in Tramkak, Takeo Province, a few households are producing charcoal from sustainably grown wood and earning an addition income to support their livelihoods. The two charcoal kilns these families are using are efficient Yoshimura kilns that can produce about 30% more charcoal with the same amount of wood; the quality of the charcoal is also much better (higher caloric value).

In Kampong Speu about 5,000 families are producing charcoal for the high demand of the Phnom Penh market (about 100,000 tons/year) representing a 25 million dollar market (1kg of charcoal cost \$0.25). These families collect the wood in degraded forest and shrub lands turning deciduous forest into deserted landscapes. Managed deciduous forest and shrub lands could be managed to produce much higher amounts of wood biomass by additional tree planting, thinning of existing forests and proper management. This could increase the value of wood and could produce timber and smaller wood for poles, charcoal and firewood.

Members of communities with Community Forests are very interested to be trained how to increase the value of the forest. GERES is experimenting with tree planting in Kampong Chhnang providing support both to individuals and community forestry's. One aspect is that they guarantee to buy the wood for a certain price from the tree farmers. The wood can be used to make charcoal, but also sold to palm sugar producers.

GERES has outlined a business model that actually shows that if wood is purchased at \$5 per m<sup>3</sup> the efficient charcoal kilns are economically viable. Even with higher prices of wood, the charcoal kilns would not make as much profit but could provide work to existing charcoal producers that are now illegally making charcoal from all kinds of forests including protected areas. Eventually carbon credits that could be generated with these efficient charcoal kilns could increase the profitability and once a market for wood vinegar is created the profitability of charcoal centres is high.

The business model will be similar to that of Tramkak where existing charcoal producers in communities, often poor landless families, will be offered the opportunity to run the charcoal production. The Community Forest members or individual tree farmers will be paid for the wood production.

#### **5. Biodigesters**

The National Biodigester Program (NPB) is coordinated by MAFF by the Department of Animal Health and Production with technical assistance provided by SNV, the Dutch development organization with funding from the Dutch government. The program has disseminated over 5000 biodigesters over the last three years and the monthly production rate is increasing. During the World Bank ESMAP Program ASTAE funding was secured to develop a private sector development plan and now over 15 SMEs are setup that promote, contract, construct and maintain biodigesters. The NBP program is requesting additional donor funding so upscale the private sector development to also setup and train companies in other provinces where NBP is active. NBP has developed an outline for this program.

#### **6. Dissemination of water filters and cook stoves to rural areas**

Cook stove and water filters that can both save about 0.3 tons of CO<sub>2</sub> per year are not yet widely available in rural areas. Actually most of the 13,000 villages only have very simple household shops selling small amounts of MSG, sugar, ships and always noodle soup but for most supplies families rely on the 5-15 km distant district market. Cook stoves are available on most district markets but efficient cook stove only in larger district markets and towns. Water filters are only distributed around the production centre and in areas where NGOs are active.

As part of the World Bank EMSAP Program, RDI has developed a business model and trained retail point in villages to disseminate solar charged battery lanterns and water filters. During the initial phase of the project it became clear that rural families prefer to own the technology above renting but need a purchase scheme as

they have not enough cash purchase at once. Rent-to-own or hire/purchase schemes have been evaluated very positively, also as part of Japanese Trust fund project on optimisation of rural energy services. The selection of potentially qualified entrepreneurs was essential during this project and the Cambodian Indian Entrepreneurship Development Centre (CIEDC) has been involved in selecting the entrepreneurs by putting leaflets in villages, interviewing over 60 candidates and selecting 25 participants for a three week business training. RDI is interesting to also include cook stoves in the dissemination. Initially project funding could subsidize the initial stock of products at retail outlet but after year two carbon credits could provide necessary financial support to upscale and coordinate the supply to rural areas.

**Table 23. Monthly capacity of stove production in 14 provinces**

N0	Province	Type of stove												Total
		NLS	NKS	TLS	KCNT	Seam	KPTS	VNS	Barrel	Iron	Cement	Hours-shoe	VTN	
1	KCM	180	0	27,250	0	0	0	0	0	0	0	0	0	27,430
2	KTH	0	0	1,200	0	0	0	0	0	0	0	0	0	1,200
3	KCN	13,090	4,478	0	740	6,865	0	1,160	0	0	0	0	10 set	26,343
4	KSP	0	0	3,260	0	0	0	0	0	0	0	400	0	3,660
5	PST	0	0	1,400	0	0	0	0	0	0	0	0	0	1,400
6	BTB	1,065	0	5,090	0	0	0	0	0	0	0	0	0	6,155
7	SRP	3,300	0	3,600	0	0	0	0	0	0	0	0	0	6,900
8	BMC	0	0	6,750	0	0	0	0	0	0	0	0	0	6,750
9	TKO	1,250	0	7,100	0	0	0	0	0	0	0	0	0	8,350
10	KPT	610	0	6,590	0	0	4,785	6,885	0	0	0	0	0	18,870
11	PRV	1000	0	0	0	0	0	0	0	0	0	0	0	1,000
12	SVR	0	0	120	0	0	0	0	10	0	810	0	0	940
13	KND	320	0	8,600	0	0	0	0	0	0	0	0	0	8,920
14	Kraches	0	0	100	0	0	0	0	0	0	0	0	0	100
<b>Total</b>		<b>20815</b>	<b>4478</b>	<b>71060</b>	<b>740</b>	<b>6865</b>	<b>4785</b>	<b>8045</b>	<b>10</b>	<b>0</b>	<b>810</b>	<b>400</b>	<b>10</b>	<b>118,018</b>

Note: KCNT= Kampong Chhnang Traditional stove  
 KPTS= Kampot traditional stove  
 VNS= Vietnam stove (produce in Kampot province)  
 VTN= Vattanak stove

*KIT*

#### Annex 4. Summary of Project Climate Change Strategy

##### 1. Overview of CC-related elements in project

The project will adopt a multi-pronged approach to delivering CC benefits. It will include a number of activities, and associated outputs, that are specific to CC issues and others that deliver simultaneous benefits for CC, BD and LD focal areas.

The project will address, simultaneously, the following three considerations that are of fundamental importance to delivering CC benefits:

1. Supporting the sustainable management and effective conservation of existing forests, in order to protect them against conversion to other land uses and against unsustainable fuel wood extraction.
2. Increasing the sustainable supply of fuel wood in order to provide alternatives to illegal and unsustainable supply.
3. Reducing demand for fuel wood by promoting energy efficient technologies for fuel wood use.

**Table 24. Summary of outputs with CC relevance**

Outcomes	Outputs with CC relevance	CC Implications
1	1.5: Wood Energy Strategy	Overall planning framework <b>linking supply and demand</b> sides of CC issues
	1.6: National Woodlots Programme	Harmonized and strategic framework for increasing sustainable <b>supply</b> of fuel wood
2	2.1 Plans for the development of community-based forest management and conservation 2.2 Legal formalization of selected Community Forests and Community Protected Areas 2.3 Management Plans for Community Forests and Community Protected Areas 2.4 Business and Enterprise Development Plans for Community Forests and Community Protected Areas 2.5 Funding mechanisms for CF/CPA businesses 2.6 Programme of capacity building for forest users 2.7 Clearing house for information on business opportunities and markets related to SFM	Outputs in support of this outcome will result in the development of capacities for implementing <b>'supply-side'</b> practices with potential for delivering CC benefits, namely: <ul style="list-style-type: none"> <li>- Forest protection (including active forest management for non-fuel wood products as an incentive for protection), resulting in reduced emissions due to avoidance of deforestation and degradation</li> <li>- Active management of natural forests for fuel wood, resulting in increased sustainable supply of fuel wood</li> <li>- Woodlots, resulting in increased sustainable supply of fuel wood.</li> </ul>
3.	3.1 Cook stove production centres 3.2 Funding mechanisms for cook stove production 3.3 Cook stove dissemination mechanisms 3.4 Training programme for cook stove producers	All outputs under this outcome will result in reductions in unsustainable levels of <b>demand</b> for fuel wood, thereby leading to reduced emissions

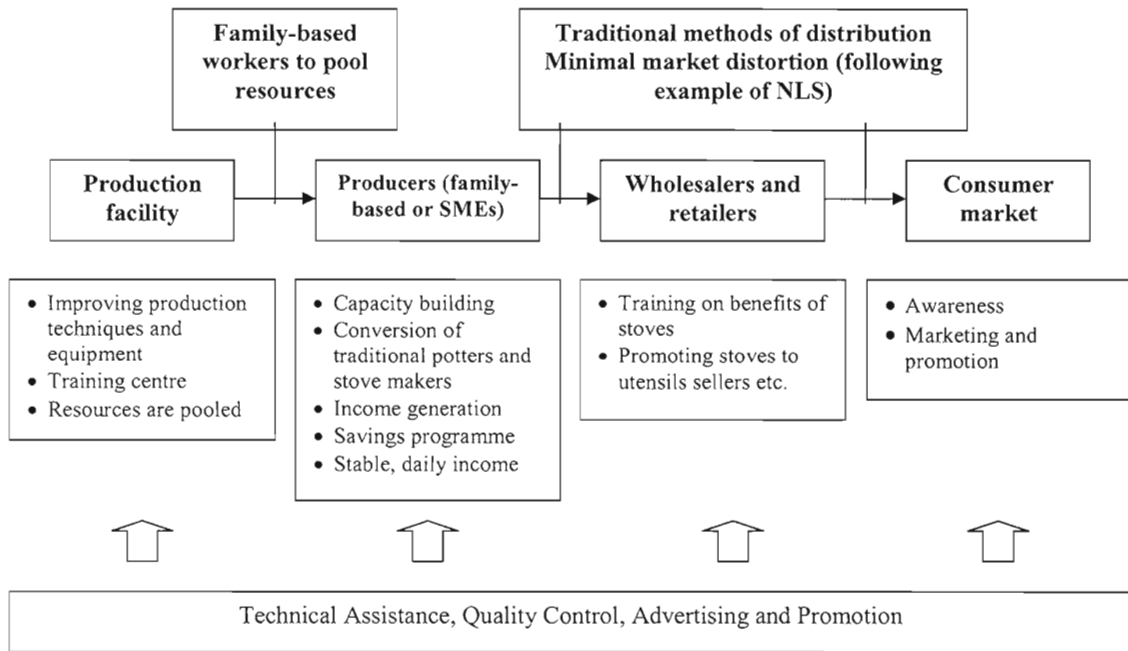
A further key feature of project design will be the use of voluntary carbon payments to ensure the financial sustainability and ongoing replication of CC-related elements (see Box 10). This will build on successful experiences to date by the NGO GERES, in relation to cook stoves, and will also be applied to woodlots.

## 2. Funding use for CC

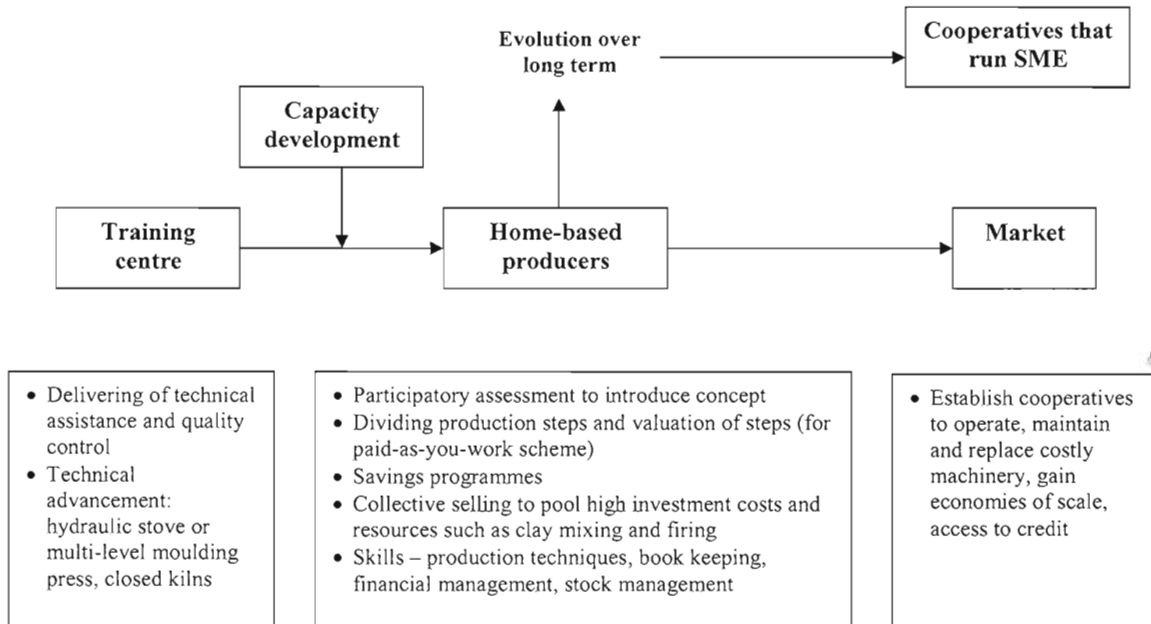
Given that Outcome 3 is the only Outcome specifically focused on CC issues (activities under Outcomes 1 and 2 will also deliver benefits for BD and LD focal areas), all of the CC funding available will be dedicated to Outcome 3<sup>56</sup>. Table 13 in the Project Document summarizes how these funds will be invested under Outcome 3:

Activity	Quantity	Financing source	
		GEF	UNDP
Component manager	48 person months	144,000	
International consultant on business development	8 person months	60,000	
Stove production expert	48 person months	72,000	
Stove production business development facilitator	48 person months	72,000	
Business Development support	100 cook stove distributors	80,000	
Business Development support	Technical training, stove pressing, improved kilns and clay mixing	70,000	
Training of palm sugar stove producers	800 palm sugar stove producers	150,000	
Business support to palm sugar cook stove producers and cook stove distributors	9 palms sugar cook stove producers and 17 cook stove distributors	99,335	
Development and Monitoring of carbon payment mechanisms for palm sugar, NKS stove production, Charcoal Kilns and other rural energy services		100,000	
Start-up grants for cook stove production centres	6 cook stove production centres		180,000
Risk sharing for loans from micro-finance institutions	100 cook stove producers		24,000
	800 palm sugar stove producers and ceramic parts producers		40,000
DSA for external experts and advisors			13,440
	<b>Totals</b>	<b>847,335</b>	<b>257,440</b>

3. Business model concept for Neang Kongrey Stoves (source: GERES)



4. Production strategy for Neang Kongrey stoves (source: GERES)



## Annex 5. CO<sub>2</sub> Emission Reduction Estimates

### *Summary*

One of the expected outcomes of the UNDP-GEF SFM project is to facilitate a major uptake of efficient cook stoves in Cambodia. The efficient New Laos Stove has been successfully introduced to replace the charcoal stove, though limited to the major urban centres. This now account for about 20% of the total cooking stoves market in Cambodia. On the other hand, the SFM project will enable the production of the more affordable Neang Kongrey Stove (NKS) which has a similar efficiency to that of the New Laos Stove. The more affordable NKS, that is also more suitable for fuel wood, has the potential to reach rural areas and replace a further 40% of the traditional cook stoves market that can help raise the efficient stoves' share to 60% of the total cook stoves market in Cambodia.

Palm sugar stoves and charcoal kilns form an important part of forestry related businesses that provide additional income to farmers. However, their contributions to the total CO<sub>2</sub> emissions reduction will be relatively small since these technologies are still in their start up phase.

Increased biomass production from degraded forest will generate additional biomass and stimulate the development and implementation of VER schemes. A suitable VER scheme will be developed as part of the project. UNDP co-funding for REDD and REDD+ will provide assistance to develop these schemes. The total potential for carbon credits is high but not yet proven in Cambodia. The project is unique as it realizes CO<sub>2</sub> reduction in both the demand and supply sides of wood energy in Cambodia.

### **Direct CO<sub>2</sub> Emissions Reductions**

#### Assumptions

The assumptions used in the estimation of CO<sub>2</sub> emissions reductions are as follows:

#### **Improved cook stoves (NKS):**

- Replacement of traditional households cook stoves ( $\eta = 18\%$ ) by efficient models( $\eta = 30\%$ );,
- The 6 cook stove production centres directly supported by the project investment grants and capacity building will produce and distribute 90,000 NKS in project year 3, and then 180,000 per year from project year 4 into the foreseeable future.
- For the purpose of calculating the direct impacts of the project, it is assumed that the cook stoves produced can only be attributed directly to project support for a period of 10 years (until year 12 after project start-up) – the impacts of these stoves will however last for another year (until year 13 after project start-up), given the estimated 2 year lifespan of cook stoves.
- Estimated CO<sub>2</sub> emission reduction per NKCS = 0.22 tCO<sub>2</sub>eq/year
- Useful life of NKS = 2 years

#### **Improved palm sugar stoves**

- Replacement of traditional palm sugar stoves ( $\eta = 23\%$ ) with efficient palm sugar stoves ( $\eta = 49\%$ ).
- With direct support by the project, a total of 800 efficient PSCS will be produced and distributed in project year 3
- Estimated CO<sub>2</sub> emission reduction per PSCS = 1.9 tCO<sub>2</sub>eq/year
- Useful life of PSCS = 10 years, with adequate maintenance



### Efficient charcoal kilns

- Replacement of traditional charcoal kiln ( $\eta = 25\%$ ) with efficient charcoal kiln ( $\eta = 34\%$ ).
- With direct support from the project, a total of 16 efficient charcoal kilns will be produced in project year 3
- Estimated CO<sub>2</sub> emission reduction per efficient charcoal kiln = 7.68 tCO<sub>2</sub>eq/year
- Useful life of efficient charcoal kiln = 10 years, with adequate maintenance

**Table 1: Numbers of EE units in use per year, as a direct result of project support**

	Units in use							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7-12	Year 13..
Technology	PY1	PY2	PY3	PY4	PY+1	PY+2	PY+3-8	PY+9...
Improved cook stove (NKS)	0	0	90,000	270,000	360,000	360,000	360,000	180,000
Palm Sugar Stove	0	0	800	800	800	800	800	0
Efficient Charcoal Kiln	0	0	16	16	16	16	16	0

### Direct CO<sub>2</sub> Emission Reductions

The emissions reductions directly attributable to the project as a result of direct support, in the form of start-up grants and capacity development, to the production of improved cook stoves, palm sugar stoves and charcoal kilns, are shown in Table 2.

Total direct emissions reductions during the life of the project will be 82,486 tCO<sub>2</sub>eq. This will rise in year 5 (1 year after project closure) to an annual level of 80,843 tCO<sub>2</sub>eq, which will be sustained until year 12 (8 years after project closure) and will then fall back to 39,600 tCO<sub>2</sub>eq in year 13 (9 years after project closure) once the palm sugar stoves and charcoal kilns produced with project support reach the end of their useful life.

**Table 2: Direct CO<sub>2</sub>e Emissions Reduction During and After Project Implementation**

	CO <sub>2</sub> Emission Reduction, tons							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7-12	Year 13..
Technology	PY1	PY2	PY3	PY4	PY+1	PY+2	PY+3-8	PY+9...
Improved cook stove (NKS)	0	0	19,800	59,400	79,200	79,200	79,200	39,600
Palm Sugar Stove	0	0	1,520	1,520	1,520	1,520	1,520	0
Efficient Charcoal Kiln	0	0	123	123	123	123	123	0
<b>TOTAL</b> <sup>57</sup>	0	0	21,443	61,043	80,843	80,843	80,843	39,600

<sup>57</sup> Savings from reduced deforestation and avoided degradation for the community woodlots have not been included. This will be determined during the initial stages of project implementation when the specific sites and tree species have been identified and selected.

## Indirect CO<sub>2</sub> Reductions

There will be a significant amount of indirect CO<sub>2</sub> emissions reductions that can be attributed to the SFM project. The indirect impacts are attributed to, but not limited to, the facilitation/creation of the following major conditions:

- Major contribution to the development of a National Cook stove Programme.
- The Palm Sugar Stove production capacity development will eventually lead to a high number of the efficient micro-enterprise efficient stoves development that will extend to other industries such as small noodle factories and rice wine producers resulting in, at least, 10,000 efficient stoves.
- Contribution to the biodigesters private sector development has a national potential of 180,000 biodigesters.
- The project's support to the development of carbon credit financing will provide opportunities for other projects/sectors to use the scheme.

### Potential Indirect National CO<sub>2</sub> emissions reduction potential (Bottom-up Approach)

The estimated potential level of CO<sub>2</sub> emissions reduction directly attributable to the project is about 80,843 tons of CO<sub>2</sub> equivalents per year. Based on a bottom-up approach, using a replication factor of 3 (market transformation), the project's indirect impacts can be conservatively estimated as 242,529 tons of CO<sub>2</sub> equivalents of emissions reduction per year. This is based on the assumptions discussed above, based on potential market development and potential co-financing of other donors in the forestry and energy sector.

### Potential Indirect National CO<sub>2</sub> emissions reduction potential (Top-down Approach)

Using the top-down approach, the total national potential for the three technologies based on technology and market development potential, and employing a GEF causality factor of 40 per cent, the indirect CO<sub>2</sub> emissions reduction is estimated to be 88,970 tons of CO<sub>2</sub> equivalents of emissions reductions per year. The 40 percent causality factor is being used as there is strong donor interest to build on successes at the community level in Cambodia.

**Table 3: Potential Indirect National CO<sub>2</sub> emissions reduction potential (Top-down Approach)**

Technology	Number of units utilized/yr	Total emissions reductions/year
Efficient Household Cook stoves <sup>58</sup>	750,000	165,000
Palm sugar stoves <sup>59</sup>	10,000	19,000
Charcoal Kilns <sup>60</sup>	5,000	38,425
TOTAL		222,425
<b>At GEF Causality Factor 40%</b>		<b>88,970</b>

<sup>58</sup> CO<sub>2</sub> emission reduction potential, ton per unit = 0.22

<sup>59</sup> CO<sub>2</sub> emission reduction potential, ton per unit = 1.9

<sup>60</sup> CO<sub>2</sub> emission reduction potential, ton per unit = 7.685

**Table: Summary of CO<sub>2</sub> Emissions Reduction Attributed to the Project**

Particulars	Quantity (tons)	Remarks	
Direct CO <sub>2</sub> during project	82,486	Estimations for carbon savings from avoided deforestation are not included.	
Direct Post-Project CO <sub>2</sub>	80,843/year	Years 5-12	
	39,600/year	Years 13	
Indirect CO <sub>2</sub>	88,970 – 242,529/year		Major contribution to the cook stove sector and policy enabling for upscaling, spinoff and contributions from rural enterprise efficient stoves and energy efficient charcoal kilns.

**Figure 1: Efficient Household Cook stoves CO2 calculations**

*Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass*

*Type II.G Efficient*

Emission Reductions would be calculated as:

$$ER_y = B_{y,savings} \cdot f_{NRB,y} \cdot NCV_{biomass} \cdot EF_{projected\_fuel}$$

Where:

- $ER_y$  Emission reductions during the year y in tCO<sub>2</sub>e
- $B_{y,savings}$  Quantity of biomass that is saved in tonnes
- $f_{NRB,y}$  Fraction of biomass saved by the project activity in year y that can be established as non renewable biomass using survey methods
- $NCV_{biomass}$  Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
- $EF_{projected\_fuel}$  Emission factor for the substitution of non-renewable biomass by similar consumers. The substitution fuel likely to be used by similar consumers is taken: 71.5 tCO<sub>2</sub>/TJ for Kerosene, 63.0 tCO<sub>2</sub>/TJ for Liquefied Petroleum Gas (LPG) or the IPCC default value of other relevant fuel

**STEP 1.**

$$B_{y,savings} = B_y \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$$

Where:

- $B_y$  Quantity of biomass used in the absence of the project activity in tonnes
- $\eta_{old}$  Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction)
- $\eta_{new}$  Efficiency of the system being deployed as part of the project activity (fraction)

$B_y$	900 kgs	180,000 households	
$\eta_{old}$	18%	18	Traditional Lao Stove
$\eta_{new}$	30%	30	Neang Kongrey Stove

$$B_{y,savings} = 64,800,000.000 \text{ kgs}$$

**STEP 2.**

$f_{NRB,y}$  63% percentage of biomass that is non-renewable

$NCV_{biomass}$  15 Wood (air dried)  
Source: IPCC Default Factors, 1996

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STEP 3.

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$EF_{\text{projected\_fossilfuel}}$

EF<sub>CO<sub>2</sub></sub>, fossil

Kerosene ▼

Source: IPCC Default Factors: Table 1-2, 1996.

Leakage Deduction

STEP 4. Final Calculation

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$$ER_y = B_{\text{y savings}} \cdot f_{\text{NRB,y}} \cdot NCV_{\text{biomass}} \cdot EF_{\text{projected\_fossilfuel}}$$

64,800,000.000      x      63%      x      15      x      71.50      =

Total Project Savings

Saving per cookstove

**Figure 2: Efficient Palm Sugar Stove CO2 calculations**

*Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass*

*Type II.G Efficient*

Emission Reductions would be calculated as:

$$ER_y = B_{y,savings} \cdot f_{NRB,y} \cdot NCV_{biomass} \cdot EF_{projected\_fuel}$$

Where:

- ER<sub>y</sub> Emission reductions during the year y in tCO<sub>2</sub>e
- B<sub>y,savings</sub> Quantity of biomass that is saved in tonnes
- f<sub>NRB,y</sub> Fraction of biomass saved by the project activity in year y that can be established as non-renewable biomass using survey methods
- NCV<sub>biomass</sub> Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel: 0.015 Tj/tonne)
- EF<sub>projected\_fuel</sub> Emission factor for the substitution of non-renewable biomass by similar consumers. The substitution fuel likely to be used by similar consumers is taken: 71.5 tCO<sub>2</sub>/Tj for Kerosene, 63.0 tCO<sub>2</sub>/Tj for Liquefied Petroleum Gas (LPG) or the IPCC default value of other relevant fuel

**STEP 1.**

$$B_{y,savings} = B_y \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$$

Where:

- B<sub>y</sub> Quantity of biomass used in the absence of the project activity in tonnes
- η<sub>old</sub> Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction)
- η<sub>new</sub> Efficiency of the system being deployed as part of the project activity (fraction)

B <sub>y</sub>	<input type="text" value="6,000"/> kgs	<input type="text" value="800"/> producers		
η <sub>old</sub>	<input type="text" value="23%"/>	28	Efficiency	Traditional Palm Sugar Stove
η <sub>new</sub>	<input type="text" value="49%"/>	49	Efficient	Vattanak Stove

B<sub>y,savings</sub> =  kgs

**STEP 2.**

f<sub>NRB,y</sub>  percentage of biomass that is non-renewable

NCV<sub>biomass</sub>  Wood (air dried)   
 Source: IPCC Default Factors, 1996

107x

STEP 3.

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$EF_{\text{projected\_fuel}}$

EF<sub>CO<sub>2</sub>, fossil</sub>

Source: IPCC Default Factors: Table 1-2, 1996.

Leakage Deduction

STEP 4. Final Calculation

---

$$ER_y = B_{\text{yearly}} \cdot f_{\text{NGV}} \cdot NCV_{\text{ biomass}} \cdot EF_{\text{projected\_fuel}}$$

2,546,938.776      x      63%      x      15      x      71.50      =

Project Saving

Saving per Vattar Stove

### Figure 3: Efficient Charcoal Kilns CO2 calculations

#### Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass

##### Type II.G Efficient

Emission Reductions would be calculated as:

$$Er_y = B_{y.savings} \times f_{NRB,y} \times EF_{projected\ fuel}$$

- Er<sub>y</sub> = Emission Reduction during the year y in tCO<sub>2</sub>e
- B<sub>y.savings</sub> = Quantity of Biomass that is saved in tonnes
- f<sub>NRB,y</sub> = Fraction of biomass saved by the project activity in year y that can be established as a non renewable using survey methods.
- NCV biomass = Net caloric value of the non-renewable biomass that is submitted (IPCC default for wood fuel, 0.015 TJ/tonne)
- EF<sub>projected fuel</sub> = Emission factor for the substitution of non renewable biomass by similar consumers or IPCC standard EF for biomass fuel used

#### STEP 1.

$$B_{y.savings} = B_y \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$$

Where:

- B<sub>y</sub> = Quantity of biomass used in the absence of the project activity in tonnes
- η<sub>old</sub> = Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction)
- η<sub>new</sub> = Efficiency of the system being deployed as part of the project activity (fraction)

B <sub>y</sub>	19,200 kgs	16	producers
N <sub>old</sub>	25%	28	Traditional Ki
N <sub>new</sub>	34%	51	Efficient Charcoal Kiln

B<sub>y.savings</sub> = 81,317.647 kgs

#### STEP 2.

f<sub>NRB,y</sub> = 100% percentage of biomass that is non-renewable

NCV<sub>biomass</sub> = 15 Wood (air dried)  
Source: IPCC Default Factors, 1996

#### STEP 3.

EF<sub>projected biomass</sub>

EF<sub>biomass</sub> = 112.00 Wood  
Source: IPCC Default Factors: Table 1-2, 1996.

Leakage Deduction = 10%

#### STEP 4. Final Calculation



#### STEP 4. Final Calculation

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ER y = B year savings x f NRB,y x NCV biomass x EF biomass

$$81,317.647 \quad \times \quad 100\% \quad \times \quad 15 \quad \times \quad 112.00 \quad =$$

Project Saving 122.952 tCO<sub>2</sub>e/year

Saving per Efficient Kiln 7.685 tCO<sub>2</sub>e/year

#### Non Renewable Biomass

At present negotiations might result in a possibility to claim 100% NRB. This would also result in a much higher carbon saving for cook stoves. For charcoal the NRB is already put at 100% as it can be easily proven that charcoal production directly leads to deforestation.

Annex 6. Carbon calculation 617Ha Dry Deciduous Forest in Kampong Chhnang.

Example based on Bro Snib Community Forest

**Limitation:** For this example only the above-ground biomass (Carbon) will be measured.

**Current forest condition:** 40% very degraded, 60% degraded forest

**Current management:** Assuming there is currently no management or protection scheme in practice, there will be no significant regrowth due to continuous firewood collection and repeated logging. Very degraded forest does not have the capacity to reestablish itself.

**Current estimated carbon stock:**

The mean carbon stock in above-ground biomass per unit area is estimated on the basis of field measurements in permanent sample plots. Calculations use the Biomass Expansion Factor. The wood density is assumed to be 0.545t/m<sup>3</sup>.<sup>61</sup>

Forest type	Area (Ha)	Percentage	Average volume per ha (m <sup>3</sup> /ha) <sup>62</sup>	Total standing Biomass (m <sup>3</sup> )
Degraded	370.2	60%	35	<b>12957</b>
Very degraded	246.8	40%	4	<b>987.2</b>
<b>Total</b>	<b>617</b>	100%		<b>13944.2</b>

Carbon content in Biomass, live or dead, herbaceous or woody, is 48-52% carbon; the calculations use 50% biomass as conversion factor. One ton Carbon = 3.67 tCO<sub>2</sub><sup>63</sup>

Forest type	Area (Ha)	Total Volume (m <sup>3</sup> )	Volume (tC)	tCO <sub>2</sub> e
Degraded	370.2	12957	7061.565	12958
Very degraded	246.8	987.2	538.024	987
Total	617	13944.2	7599.589	13945
Baseline	617	2468	1345.06	2468

Meaning that under these conditions: **1 m<sup>3</sup> of standing biomass is 1 tCO<sub>2</sub>e**

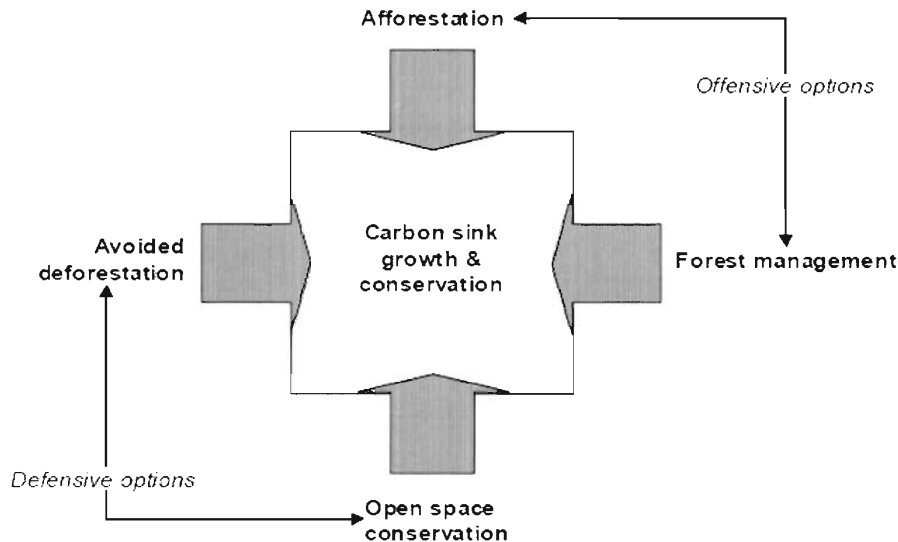
<sup>61</sup> Common range for unknown tropical species (Brown, 1997)

<sup>62</sup> GERES, forest inventory Kampong Chhnang, 2009

<sup>63</sup> tCO<sub>2</sub>e is traded, Carbon is not

W-7

*The scenarios*  
Sequestration options



**Defensive Scenario (REDD for undefined period)**

Under an avoided deforestation scheme one protects the forest resources from being eliminated or degraded and calculates the emissions avoided as a result. The carbon stock one is protecting is the standing stock – baseline stock (continued deforestation without protection). In the example of Bro Snib the baseline is 617Ha of very degraded forest.

The avoided emissions are:  $13945 - 2468 = 11477 \text{ tCO}_2\text{e}$  (over a defined project period, but with proven permanence).

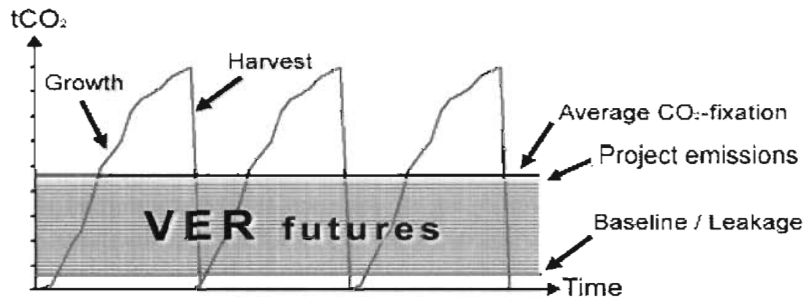
**Offensive scenario (Carbon credits from Improved forest management or SFM)**

If one looks at the sequestration or activities to promote sequestration and an increased carbon stock in that a forest it is called REDD+, AR-CDM or carbon from SFM, meaning that one calculates the increment in carbon sink by project activities, such as forest regrowth, liberation thinning and enrichment planting, which would not have occurred in the absence of the project.

The carbon sequestration will now be calculated of a function of the time horizon and the management scheme.

- In case of AR-CDM, the sequestered carbon is near permanent, and the forest is growing to its maximum capacity
- In the case of selective logging the carbon stock, is at a near constant level of predefined harvest
- In case of rotation forest management the carbon stock is either high or low during fixed intervals, with on average a predictable carbon stock (see figure below)

## Rotation forest carbon fixation



The carbon credits (average carbon sequestered) are a function of the interval in harvest and the growth rate of the forest. The possible amount of Emission reductions is calculated using the mean of the tCO<sub>2</sub>e fixation during the first rotation period.

In the example of Bro Snib ( 617Ha of very degraded and degraded forest) and a rotation period of 10 year<sup>64</sup>. The avoided emissions are:  $(43193 - 13945)/2 = 14624 \text{ tCO}_2\text{e}$  (with a perpetual series of rotations).

### Related sources:

- Brown, 1997, Estimating biomass and biomass change in tropical forests: a primer. (FAO forestry paper 134) Food and Agriculture Organization, Rome, Italy
- Carbonfix voluntary standard for sustainable forest management: <http://www.carbonfix.info/>
- Muukkonen J., 2009. Carbon sequestration: Forest and soil
- VCS Methodology: Conversion of Low-productive forests to High-Productive forests (under review): [http://www.v-c-s.org/methodology\\_ifmtarrlof.html](http://www.v-c-s.org/methodology_ifmtarrlof.html)

<sup>64</sup> Average annual growth rate 7m<sup>3</sup> per Ha

## Annex 7. Business models for energy-efficiency and forest-based businesses

This annex presents a number of “business models” covering a wide range of forest-based businesses, including both timber and NTFPs, as well as energy-efficient stoves, community commercial woodlots, community commercial extractive forestry, bamboo, wild honey, medicinal plants, efficient cook stoves, efficient palm sugar stoves, efficient charcoal kilns, and ecotourism. These business models are intended to guide the injection of business perspectives into the entire CF/CFA development and registration processes, and especially in the management plans and enterprise development plans. They are intended to be used as an initial “menu of opportunities”, not as prescriptions for all community forests. They are not “business plans”. Business plans will be developed in a collaboration between the project team and community members, using already well tested approaches and templates, as for example in the “Community-Based Tree and Forest Product Enterprises: Market Analysis and Development (MA&D) Manual” published by FAO and RECOFTC. Such business plans will be highly site specific and cannot be detailed at this stage.

**Table 25. Rationale for businesses considered**

<b>Business models</b>	<b>Rationale</b>
1. Sustainable fuel wood production (woodlots)	Supply of sustainable alternative sources of fuel wood in order to reduce unsustainable extractive pressures on forests. CC, BD and LD benefits due to avoided deforestation and forest degradation.
2. Cook stoves	Reduction in demand for fuel wood in order to reduce levels of unsustainable extraction. Direct CC benefits due to reduced levels of emissions.
3. Vattanak improved palm-sugar stove	
4. Charcoal production	Reduction in quantities of fuel wood needed to make charcoal, therefore direct CC benefits. CC, BD and LD benefits as efficient charcoal production has the potential to generate forest-based income and therefore to motivate and fund forest protection.
5. Biodigesters	Reduction in quantities of fuel wood needed for cooking, therefore direct CC benefits.
6. Commercial community forestry	Generation of forest-based income, in a manner compatible with biodiversity conservation, has the potential actively to contribute to forest protection (and therefore deliver BD, CC and LD benefits) by providing local communities with increased motivation and financial resources with which to carry out sustainable forest management and protection.
7. Bamboo basketry and bamboo-cement wallboard	
8. Wild honey	
9. Medicinal and aromatic plants	
10. Community-based ecotourism	

## 1. SUSTAINABLE FUEL WOOD PRODUCTION (WOODLOTS) CASE

### Key Business Facts:

- Cambodia has a huge demand for fuel wood, 5 million t/yr, which represents 7 million tCO<sub>2eq</sub> per year, and is equivalent to the annual increment of 1 million ha. of forest (estimated at 5t/ha/yr). This demand for fuel wood is highly unlikely to be satisfied by fossil or solar alternatives in Cambodia in the medium-term future.
- Many community forestry areas comprise mostly or only degraded forest types, which provide an opportunity for silvicultural management which emphasizes native and fast-growing introduced trees for fuel wood and charcoal. This is an important entry point for landscape regeneration, and for building local capacity to manage.
- Business planning for such production can be, and under the National Forestry Plan should be, an integral part of the management planning step in the development of Community Forestry Groups. The project will support CFs in resource inventory and assessment, opportunity identification (elements of management planning), business planning, and seed capital provision for joint ventures between CFs and private enterprises. These may be implemented under a franchise model, which is simply a set of contracts between one or more lead firms and a group of CFs, in which the lead firms would supply technology, training, market access and capital to the producers.
- Complete economic analyses of fuel wood plantations (taking into account establishment and maintenance costs and land opportunity costs) are still under development; however, the expectation that prices for fuel wood will increase significantly when the present supply of rubber wood (from the re-development of old rubber plantations) runs out, and the fact that prices for charcoal have increased by more than 100% over the last three years, combine to suggest that fuel wood plantations will become highly attractive in coming years. This is especially so if they are designed to include additional high value species such as teak, sandalwood, eaglewood (Aquilaria) and other agri-silviculture components, fitted into specific niches in the management plan.
- This emphasis on woodlots for fuel wood and charcoal is a key element of the project design, explicitly linking the strengthening of community forests and clusters of community forests with the fuel wood supply issue (Component 2); with the wood energy demand side (component 3); and with the need for focused interventions at the regulatory level to enable forest-based businesses to prosper in a sustainable way.

### **Baseline Conditions & Business model**

In Cambodia, most households have no access to clean and safe cooking fuels. Nationally, 84% depend on firewood for cooking, while in rural areas that percentage goes up to 94%. As a result, Cambodia is highly dependent on firewood. While the percentage of families using firewood is slowly declining, in absolute terms the demand is rising due to population growth. In rural areas, other wood-based fuel sources, such as charcoal, are of an insignificant magnitude, while in the urban areas 20% use charcoal

Many of the CFs in the project area contain significant zones of degraded forest, as a result of previous logging concessions, “anarchic logging” and un-managed fuel wood/charcoal production. These areas were once ecologically diverse with significant micro-habitat variation and a range of tree species. In Kampong Speu especially there are extensive formerly forested hillside areas now denuded or covered with very low value secondary growth, with a high density of small trees. Simple management practices, such as thinning of trees, can provide more space for some trees to grow bigger. These thinnings can provide an initial source of income by selling the poles and making charcoal from the branches. The larger trees can also be used for fuel wood, or over a number of years provide excellent timber (dipterocarps). If produced under sustainable forest management practices these can be certified as such, attracting premium prices.

With relatively low cost training, communities can plant additional trees in patches of these landscape units where natural re-growth is not happening, including preferred local species and exotics such as acacia, eucalyptus and leucaena for fuel wood, specialty trees (teak, sandalwood, eaglewood), and rubber and fruit trees. Details of these management regimes will depend on slope, exposure, soil type, hydrology, and market considerations.

Alternatively the “woodlot” can be managed to emphasize fuel wood production, by selecting fast-growing species which can be coppiced (cut and regrown from the remaining root and stem).

	<p>Once the landscape unit has been restored to tree cover and more suitable hydrological conditions re-established the possibility exists for introduction of a range of other higher value tree species, including but not limited to teak, eaglewood and sandalwood, as mentioned above. On the other hand, some areas have already been colonized by pioneer species of small bamboos (<i>russei prik</i>), which can be used directly as inputs to the bamboo cement-board enterprises discussed in this annex, or as grazing for goats for which good local and international markets exist.</p> <p>As part of the CF development support from the project, integrated forest management and business plans will be developed that include investment requirements (nurseries, planting, protection, processing) and time-series estimates of probable harvest of fuel wood, timber, for poles, charcoal and other products. Possibilities for non-timber products will also be considered, as for example the observation in Kampong Thom that plantations of acacia for firewood and pulp attract wild bee populations (<i>Apis dorsata</i>) for which management systems have already been established in Cambodia (see honey case in this annex).</p>
<b>Uses, Markets, Prices</b>	<p>Demand for tree stems is driven by a range of end uses, including fuel-wood (and charcoal), fibre for paper and similar products; e.g. from fast growing acacias and eucalypts, construction poles, high quality timber and veneer, and specialty products such as sandalwood and aquilaria crassna (eaglewood or oil of aloes wood).</p> <p>Potential revenues from fuel wood alone can range from \$25 to \$150 per hectare per year, while specialty products and carbon credits make the landscape level value proposition much more attractive. Charcoal prices have increased from \$0.12/kg, three years ago, to about \$0.25/kg now. Fuel wood and charcoal prices will rise again sharply very soon, when the present supply of rubber wood runs out, from re-development of old rubber plantations. Teak can fetch over \$3,000/m<sup>3</sup>. Premium eaglewood with good oil development can sell for several hundred dollars per kilogram</p>
<b>Other Partners</b>	<p>GERES has already done planning and analysis work on 6 CFs in the target area in Kampong Speu, focused on the fuel wood and charcoal supply-side aspects (as well as on the demand side - see other items in this annex, especially re efficient charcoal kilns and wood stoves).</p>
<b>Needs</b>	<p>Existing analysis needs to be broadened to include full economic balances (taking into account establishment and management costs, land and labour opportunity costs and discount rates), social aspects (cultural, tenure, distributional and livelihood considerations) and the potential of integrating non-fuel wood components in a more complex system, offering better rewards to the stakeholders, both local communities and larger investors.</p> <p>Competition by fuel wood from illegal sources remains a problem, although the fact that in some areas (such as Kampong Speu and Kampong Chhnang) illegal fuel wood has to pass through the communities where woodlots may be established raises the possibility of these communities participating in enforcement. Component 1 of the project deals with the regulatory environment, and will work with FA to address regulatory and enforcement issues, to ensure that market forces have a chance to work in favour of sustainability and improved livelihoods. This work will be designed in response to real needs identified by the business plans.</p>
<b>Replication</b>	<p>This model is necessarily described here in rather abstract and anecdotal terms. The important idea to be stressed is an approach to using landscape resources which is based both on methodically facilitated community/private sector participation, and on management informed by economic and biological/ecological science. As noted in the main text of the proposal, the project will use proven participatory and analytical (business and ecology) tools at each site. The outcomes will be quite site-specific. However the basic methods will be customized to suit Cambodian conditions, and clustering of CF/CPAs will increase the possibilities for synergy. Constraints due to business environment issues will be addressed in Component 1 as noted.</p>
<b>Safeguards</b>	<p>At present, fuel wood is formally classified as an NTFP and, as such, an open access resource. Regulatory provisions will be explored under Outcome 1 in order to ensure that investment by local communities in establishing sustainable sources of fuel wood is rewarded by secure access</p>

	<p>to the resulting products and benefits.</p> <p>Dedicating land to fuel wood production for the benefit of specific communities and user groups raises the risk of elite capture and exclusion of other stakeholders from access to that land, on which they may rely for informal livelihood support activities. Restrictions on the current unsustainable trade in fuel wood may also affect the livelihoods of those involved. Participatory social analyses will be carried out on a case-specific basis to scope such impacts and identify corresponding mitigation measures, support will be provided to the design and monitoring of benefit sharing arrangements, and partnerships will be developed with livelihood support projects in order to identify opportunities for compensating and offsetting such impacts, as appropriate.</p> <p>The resource assessments carried out during the management planning process will include assessments by biologists of the conservation importance of each site and the biological impacts of the plantations, in order to minimize the risk of marginalizing globally important biodiversity through forest management or the establishment of plantations.</p> <p>Under Outcome 1, the project will work with FA in order to raise awareness of the proposed woodlot business model and develop appropriate guidelines for royalties and taxation.</p>
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<b>2. EFFICIENT FUEL WOOD AND CHARCOAL COOK STOVES</b>	
<b>Baseline Conditions &amp; Business Concept.</b>	<p>More than 80% of Cambodian families live in rural areas and rely on biomass fuel (wood, charcoal, and animal dung) for cooking. Though they live in rural areas, 89% of rural families procure wood-stoves by purchasing from markets in towns. They use different types of cook stove ranging from simple three-stone stoves, to the more sophisticated Traditional Lao Stove.</p> <p>The efficiency of traditional stoves is quite low (10% for the Three Stone stove up to 14% for the Traditional Lao stove), and all emit hazardous smoke and gases that primarily affect the health of women, the main users of the stoves.</p> <p>Stoves are delivered by a traditional supply chain involving producers, distributors and retailers. Most traditional stoves are produced in the province of Kompong Chhnang and distributed by a fleet of small trucks and oxcarts to the whole country. The most common fuel used with the traditional stove is firewood and to a lesser extend charcoal and agricultural residues.</p> <p>In 2001, a Cambodian technician from GERES-Cambodia developed a new stove design based on the Traditional Kampong Chhnang stove. The stove is called Neang Kongrey (the name of a hill in Kampong Chhnang that according to a well-known Cambodian mythical story is a kneeling lady). The Neang Kongrey Stove (NKS) has a similar look as the traditional Kampong Chhnang Stove, i.e. a terracotta clay vessel in the shape of an inverted, truncated cone of about 40 cm height and 15 litres volume, with an internal grate, air-control dampers, and pot rests around the upper rim.</p> <p>Laboratory tests show that the NKS consumes nearly 40% less firewood than the Lao Kompong Chhnang Stove. The carbon emission implications of deploying a significant number of NKS and other efficient stoves are shown in Table 17 in the main text and in Annex 5 above: about 97,000 t/y CO<sub>2eq</sub> from the project itself and about 1,619,865 t/y CO<sub>2eq</sub>, if deployed nation-wide.</p> <p>Experience thus far indicates that stove users recognize and are willing to pay a slightly higher price for the advantages of the NKS stove (fuel savings and less smoke). The limitation on uptake appears to be mainly on the supply side, i.e. getting existing stove producers trained to produce the new model, reducing costs by introducing some simple mechanization and scale economies, and improving the delivery end of the supply chain to reach smaller villages at a distance from district towns. Pilot work has included the establishment of training centres in several locations, which enable bulk preparation of clay, larger kilns for firing, and initial formation of cooperatives.</p> <p>The project will build on this work by GERES by introducing a commercial model for organizing groups of stove producers, facilitating improvements in the marketing strategy, and supporting the development of mechanization technology for initial steps of stove production.</p>
<b>Uses, Markets, Prices</b>	<p>The total population in Cambodia is about 14 million people of which 85% (about 2,178,000 families) live in rural areas. The average rural family size is 5.4.</p> <p>If all rural families purchase efficient cook stoves, the potential market for the NKS is about 1,938,000 families. A GERES survey found that families in rural areas utilize on average 2 stoves. The total number of stoves needed could be as many as 3.7 million.</p> <p>Pilot work shows that production costs for NKS stoves are only slightly higher than those for traditional stoves, about US\$0.64 per unit as compared to US\$0.52.</p>
<b>Business Model</b>	<p>Building on the pilot work, the project envisions four NKS training and production centres to be set up in Kampong Cham and Kampong Chhnang, each one located close to a group of traditional stove producers. The centres will provide technical training for quality control, facilities for firing and assembly of clay stoves, and scale economies for marketing. These centres will be facilitated to develop into independent SMEs (see Outcome 3).</p>
<b>Other Partners</b>	<p>GERES has been the main promoter of efficient cook stoves in Cambodia thus far. Cambodia Indian Entrepreneurship Development Center can provide business development services to the</p>

	<p>centres. They will develop a package of incentives for stove producers and retailers in rural areas to help sales of improved cook stoves, such as training, and financial incentives for producers, retailers and demonstrations for consumers.. .</p> <p>The project will identify potential private sector partners among the business communities in producing provinces (Kampong Chhnang, Kampong Cham, Kampong Speu, Pursat, Kandal, Takeo) and possibly elsewhere.</p>
<b>Safeguards</b>	<p>Wood Energy policy at and implementation capacity of MIME has not yet been developed. This will be addressed under component 1. As noted, it is unlikely that wood energy use in Cambodia will be supplanted by other technologies within the next two decades.</p>

<b>3. VATTANAK IMPROVED PALM-SUGAR STOVE</b>	
<b>Key Business Facts:</b>	
<ul style="list-style-type: none"> <li>• This technology saves up to 40% of fuel wood requirement for very poor local producers of palm sugar.</li> <li>• The new stove also makes possible a much improved final product in the form of granulated palm sugar, with significantly higher market value and potential for regional and global export.</li> <li>• Production of the new stoves by local masons has been piloted, and a commercialization strategy is in place making the stove accessible to very poor producers.</li> </ul>	
<b>Business Concept &amp; Baseline Conditions</b>	<p>In Cambodia as in other countries in Southeast Asia, the sugar-palm tree <i>Borassus flabellifer</i> is commonly grown in lowland areas. The tree provides a sweet sap which is collected by sugar producers and boiled to evaporate the water (80%) to produce palm sugar. Much like maple products in North America, it is usually sold as a semi liquid paste or more rarely in solid pellet form. Inefficient traditional wood-stoves are used for this transformation.</p> <p>GERES-Cambodia has designed a very efficient new palm sugar stove, named “Vattanak”, based on Efficient Lateral Inverted Combustion (ELIC) Technology developed by the French organization Planète Bois. Field tests of this stove in the palm sugar industry show that it consumes 40% less firewood than the traditional stove. The principle of the Vattanak stove is to separate the combustion process into two components, in the first chamber, drying and pyrolysis of the wood takes place and in the second chamber, gas resulting from the pyrolysis is burned at high temperature by introduction of secondary air. This results in very complete combustion and therefore high efficiency and low emissions. The chimney contributes to the improved burning process and a smoke free environment around the stove.</p> <p>The World Bank – ESMAP /DfID Program, supported GERES-Cambodia with the development of “Commercialization strategies for the efficient Vattanak stove”.</p> <p>GERES has also demonstrated the economic possibilities of producing high quality granulated palm sugar through the use of the ELIC technology. This should allow the producers to increase significantly their incomes, and in association with financial schemes, should also make the Vattanak Stove affordable, even for very small producers.</p> <p>The pilot project has demonstrated a high interest from palm sugar producers to adopt the Vattanak stove. A strategy for broad scale dissemination of the Vattanak stove should include:</p> <ul style="list-style-type: none"> <li>• Action to reduce the supply cost of the technology;</li> <li>• Promotion of the benefits of the technology;</li> <li>• Training on the production of granulated sugar;</li> <li>• A competitive grant mechanism to support the targeted elements of the production process, or to pre-finance stove installation;</li> <li>• Subsidy based on carbon credits;</li> <li>• National and international marketing of granulated palm sugar.</li> </ul>
<b>Uses, Markets, Prices</b>	<p>Palm sugar is used in many Asian dishes, and has therefore an international market. Current wholesale prices in Cambodia for granulated palm sugar are about US\$1,100 per ton. Granulated palm sugar (as distinct from the traditional paste and cake) is a product recently developed by a local NGO “DATE”. This product has a very high potential in local and international markets. It is already popular and sold in local supermarkets, and high end hotels and restaurants provide palm sugar sachets. DATE and Confirel are both attempting to get this product onto export markets, but detailed market assessments and strategies are not yet in place. This would be part of the project support.</p>
<b>Business Model</b>	<p>A commercialization strategy for the stoves was designed and implemented in pilot trials by Geres, comprising a subsidy component of \$25 to cover the transportation cost and salary of village technicians and the remainder paid by the producer. The wholesale price includes a margin to pay the total stove price of \$70 back in one or two seasons. Further work by the</p>

	project team will be needed to develop a viable, demand-driven solution for deploying this technology on a larger scale. More information from the Geres pilot work will be available by the time this project reaches the inception stage.	
<b>Financial Summary</b>	<b>Palm Sugar Revenues (farm gate)</b>	<b>US\$/kg</b>
	Traditional paste	0.49
	Granulated	0.61
	Difference	0.12
	Seasonal Production per household	750 kg
	Net revenue gain from new technology per year (more than additional cost of Vattanac Stove). 40% saving on fuel wood costs is additional benefit	US\$90
<b>Other Partners</b>	GERES and EcoBiz have taken the lead in promoting the Vattanac stove in Cambodia. Confirel is presently the leading firm in the palm sugar business in Cambodia. The project will also be working with Cambodian micro-finance institutions, banks such as ACLEDA, and private investors, in developing financial support schemes for these and other businesses within its purview.	
<b>Needs</b>	The Vattanac improved palm sugar stove has already been successfully piloted in Cambodia, and is ready for large scale dissemination. Needs, to be addressed through the project, include training for stove producers, a financing scheme for sugar producers linked to a wholesale distributor, and business development support.	
<b>Replication</b>	The project will support the development of a supply chain which will produce over 800 improved stoves over the four years. Potential expansion beyond that is over 20,000 improved stoves nationally. In addition, during the pilot commercialization, a Vattanac stove was also constructed for a local distillery in Kampong Chhnang, which benefited greatly from the fuel savings. Research should be conducted to assess the benefits of the Vattanac stove in this and other industries such as tofu, noodle, soy sauce, and fish sauce production	
<b>Safeguards</b>	Even with the new stoves, palm sugar production is still a heavy user of fuel wood. Business development efforts should link this demand with sustainable supplies from CFs.	

4. EFFICIENT CHARCOAL PRODUCTION							
<p><b>Key Business Facts:</b></p> <ul style="list-style-type: none"> <li>Charcoal will continue to be the domestic fuel of choice in Cambodian urban centres for at least a decade or more.</li> <li>New charcoal production technologies (Yoshimura Kiln) are available and tested in Cambodia, which produce more and better charcoal per ton of wood input, can make use of smaller off-cuts, and reduce emissions of methane (CH<sub>4</sub>), qualifying the enterprise for carbon credits.</li> <li>These enterprises would be most likely to be successful in CFs operating fuel wood oriented woodlots, where branch wood and thinnings from silviculture would be available early in the development of the woodlot.</li> </ul>							
<p><b>Business Concept &amp; Baseline Conditions</b></p>	<p>In Cambodia, most households have no access to clean and safe cooking fuels. Nationally, 84% depend on firewood for cooking, while in rural areas that percentage goes up to 94%. As a result, Cambodia is highly dependent on firewood. While the percentage of families using firewood is slowly declining, in absolute terms the demand is rising due to population growth</p> <p>Fuel wood is used as raw wood, or in the value-added form of charcoal, which is cheaper to transport and burns cleaner. In Phnom Penh, 40% of households use charcoal as main source of energy for cooking. The annual demand is estimated around 90.000 tons. Preliminary studies<sup>65</sup> show that the demand for charcoal is increasing in urban centres of the country, and in rural middle class households The national annual demand is estimated to increase to between 2 and 7 thousand tons in 2030 (UNDP/MIME/GERES 2008).</p> <p>The traditional charcoal production supplying these markets has been demonstrated to be a factor of deforestation in Kampong Speu, Battambang and Siem Reap provinces, and no doubt elsewhere. The illegality of the activity has not ended it, in absence of acceptable alternatives and of effective control. The illegality has made charcoal producers more vulnerable and has weakened all initiatives toward sustainable charcoal production.</p> <p>Traditional earthen-construction charcoal kiln technology is inefficient, and polluting. In 2004 GERES Cambodia introduced a low cost, efficient kiln technology from Indonesia, named the Yoshimura Kiln (YMK), constructed of brick and capable of precise control of the combustion processes. Moreover, operated in series (“battery”) of four kilns the pyrolysis gases from each kiln can be used to fire and dry the next kiln, prior to the actual carbonization step, making the production process even more efficient, avoiding methane (CH<sub>4</sub>) emissions into the atmosphere (and thus qualifying for CDM credits), and producing a much better quality charcoal.</p>						
<p><b>Uses, Markets, Prices</b></p>	<p>Charcoal currently is used for domestic and restaurant cooking, and in commercial laundry services where it is cheaper than electricity for clothes irons<sup>66</sup>. Good quality charcoal sells for about US\$0.25 per kg in Phnom Penh</p>						
<p><b>Financial Summary</b></p>	<p>The following table shows a very rough calculation of the returns on a single YMK installation compared to a traditional unit, using moderately optimistic assumptions for the cost of wood input, efficiency of the kiln, and price of the charcoal. YMK charcoal is better quality (more efficient pyrolysis) and thus is assumed to have a higher selling price. Overall the returns are positive, the payback time on the investment is just over two years, and two well-paid jobs are created. This assessment is very sensitive to expected efficiencies of the YMK and the higher value of the charcoal.</p> <table border="1"> <thead> <tr> <th></th> <th>Traditional</th> <th>Yoshimura</th> </tr> </thead> <tbody> <tr> <td>Input cost - wood off cuts (\$/KG)</td> <td>0.008</td> <td>0.008</td> </tr> </tbody> </table>		Traditional	Yoshimura	Input cost - wood off cuts (\$/KG)	0.008	0.008
	Traditional	Yoshimura					
Input cost - wood off cuts (\$/KG)	0.008	0.008					

<sup>65</sup> GERES for GVEP 2005 and UNDP REP-PoR 2005

<sup>66</sup> The singed polyester clothing from un-controlled iron temperature is an externality. Market determined electricity prices in Cambodia would change many things in the economy, including the demand for fuel wood and charcoal.

	Output value (Factory gate) \$/kg	0.13	0.15	
	Input Weight kg	600.00	1500.00	
	output weight kg	100.00	350.00	
	Input cost/cycle	5.00	12.50	
	output value/cycle	12.50	52.50	
	Labour/cycle (2 pers-days @\$2)	4.00	4.00	
	Gross operating profit/cycle	3.50	36.00	
	Cycles/mo	2.50	2.50	
	Gross operating profit/mo	8.75	90.00	
	Capital outlay for construction	10.00	2000.00	
	Interest cost/mo (12%/annum)	0.10	20.00	
	Net/mo	8.65	70.00	
<b>Business Model</b>	<p>There would be some economies of scale with kilns grouped in batteries of 4 or more, in addition to the efficiency gains. An enterprise managing a group of such battery operations on a franchise or similar basis could procure the carbon credits available from the CH<sub>4</sub> emission reductions. The charcoal production would also be linked to a woodlot operation as described in another case herewith, so there would be synergies with respect to available raw materials and management of carbon credits. As with most other forms of energy infrastructure, loan guarantees or other forms of start-up capital assistance (grant, revolving fund) would likely be necessary given the payback period.</p>			
<b>Other Partners</b>	<p>GERES has been the pioneer promoter of this technology, and has spun off a commercial entity called "EcoBiz". In the project implementation, support to enterprises wishing to invest in this sector would be provided on a competitive basis.</p>			

5. BIODIGESTERS																			
<b>Key Business Facts:</b>																			
<ul style="list-style-type: none"> <li>• The National Biodigester Programme (NBP) has supported the transformation of many individual masons into 15 construction enterprises, providing construction and after sales services for household-level biodigesters in six provinces. This will be extended to a total of twelve or more provinces over the next 2 years.</li> <li>• These enterprises are supported by business development services provided by a local/international training institution</li> <li>• Biodigester units cost the household about US\$350, plus a subsidy of US\$150 paid to the enterprise through local banks and MFIs. The subsidy is paid from carbon credits now in place via SNV from HIVOS, a voluntary carbon credit scheme.</li> </ul>																			
<b>Baseline Conditions &amp; Business model</b>	<p>The domestic consumption of fuel wood in Cambodia is not balanced by sustainable production. Many households own two or more cattle used for draft power and for financial security. The average farmer will also own some pigs for income generation. Most farmers till small plots of land to satisfy the family's need for rice and vegetables. The quality of the arable land is mostly poor; the average rice yield per hectare is 1.3 tonnes compared to 3 tonnes in the neighbouring countries. Biodigester technology can therefore play an important role to improve the quality of life for many rural households, especially for women, by reducing indoor air pollution and reducing the daily workload, and as a tool in an integrated farming system by using the full potential of digester effluents;</p> <p>The Cambodia National Biodigester programme is a joint venture between MAFF Department of Animal Health and Production (DAHP) and SNV-Netherlands Development Organisation. SNV is providing technical assistance. A senior biogas advisor is full time attached to the programme while other advisors are involved part-time on topics like governance and business development.</p> <p>The overall objective of the NBP is the establishment of a permanent domestic biodigesters sector on a commercial, market oriented basis, for the dissemination of biodigesters as an indigenous, sustainable energy source in selected provinces of Cambodia. This requires a multi-stake holder approach with a prominent role for the private sector on the marketing, construction and after-sales service of domestic biodigesters. A biodigester fixed dome model suitable for mass distribution in Cambodia has been selected and further adapted to the local conditions. Detailed manuals for construction, operations, and repair and maintenance for the Farmer's Friend Biodigester have been prepared, and quality standards on construction and O&amp;M of biodigesters have been formulated. The program has installed over 5,000 biodigesters over the past three years and the monthly production rate is increasing.</p> <p>During the World Bank ESMAP Program funding was secured to generate a private sector development plan and now over 15 SMEs are setup that promote, contract, construct and maintain biodigesters.</p> <p>..</p>																		
<b>Other Partners</b>	SNV, CIEDC, World Bank, GERES, and Amret and Prasac Microfinance Institutions																		
<b>Target market and replication</b>	<p>Depending on availability of funding, the NBP is targeting the following numbers of biodigester units:</p> <table border="1"> <thead> <tr> <th>Provinces</th> <th>Up to 2009</th> <th>2010</th> <th>2011</th> <th>2012</th> <th>total</th> </tr> </thead> <tbody> <tr> <td>Kg. Cham</td> <td>1310</td> <td>600</td> <td>700</td> <td>700</td> <td>2560</td> </tr> <tr> <td>Kandal</td> <td>460</td> <td>200</td> <td>250</td> <td>350</td> <td>910</td> </tr> </tbody> </table>	Provinces	Up to 2009	2010	2011	2012	total	Kg. Cham	1310	600	700	700	2560	Kandal	460	200	250	350	910
Provinces	Up to 2009	2010	2011	2012	total														
Kg. Cham	1310	600	700	700	2560														
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<b>Svay Rieng</b>	1030	450	500	600	<b>1980</b>
<b>Takeo</b>	1625	500	600	650	<b>2675</b>
<b>Kg. Speu</b>	775	400	450	500	<b>1625</b>
<b>Kg. Chhnang</b>	410	300	350	400	<b>1060</b>
<b>Kampot</b>	715	500	550	600	<b>1715</b>
<b>Prey Veng</b>	275	450	500	550	<b>1175</b>
<b>Kg. Thom</b>	-	150	250	400	<b>800</b>
<b>Siem Reap</b>	-	200	350	450	<b>1000</b>
<b>Pursat</b>	-	200	250	400	<b>850</b>
<b>Battambang</b>	-	150	350	400	<b>900</b>
<b>Total</b>	<b>6600</b>	<b>4100</b>	<b>5100</b>	<b>6000</b>	<b>21800</b>

With additional funding it will be possible for the programme to extend to 4 provinces with good domestic biogas potential. These provinces are situated around the Tonle Sap lake, an area famous for its biodiversity but under threat because of, among other reasons, the demand for biomass as a fuel.

Siem Reap in particular is very promising for domestic biodigester development. It is the 4th largest province in agricultural output with approximately 70,000 households owning cattle and/or buffalo and 65,000 families having pigs. Furthermore, a large part of the population is living in areas designated as Angkor park zones. In these areas the households cannot collect firewood from the forest but they can keep livestock. The following data are according to a 2007 NCDD database:

#### ANGKOR PARK

- 105 villages (Most fully, some partly)
- 24.300 families
- 10.993 families with cows/buffaloes
- 27,468 total cows/buffaloes
- 7.284 families use cow/buffalo for labour
- 7.766 families with pigs
- 1.165 families with more than 3-4 pigs (heads)

Furthermore, Siem Reap has a good number of NGOs and programmes/projects active in conservation and sustainable agriculture. NBP has already been approached by some of these NGOs for possible cooperation in biodigester dissemination and has assisted one NGO in the training of their staff.

#### Safeguards

Biodigesters are only feasible for households with at least a minimum number of livestock, so the technology does not address the needs of the poorest. Social marketing will be needed to overcome the reluctance of people to move the waste slurry from the digester to the agricultural fields.



## 6. COMMERCIAL COMMUNITY FORESTRY (CCF) CASE

### Key Business Facts:

- Areas with relatively intact mature forest are available in buffer zones of protected forests and elsewhere, which can be managed for sustainable production of high-value timber.
- The Forest Administration and Wildlife Conservation Society are piloting a “Community Forest Enterprise” (CFE) in Mondulakiri Province, on lands formerly under forest concession but not yet logged. CFEs are structured similarly to community forest associations elsewhere in the country, but with focus on commercialization.
- Management plans will emphasize sustainable timber harvest, with revenues appropriately shared between the CFE and the national treasury. Much of the timber produced and sold in Cambodia is illegally sourced. Community management, authorized under the Sub-Decree on community management, is a potential source that will increase the availability of legal timber derived from responsible forest management.

### **Business Concept & Baseline Conditions**

Resources and incentives are needed to enable community groups to manage commercial timber resources on a sustainable basis, providing livelihoods for members and contributing to the conservation of the biodiversity resources in protected area buffer zones and other management units. In Mexico, up to 80% of the forest estate is managed in this manner.

In Cambodia, the Forest Administration and development partners are supporting a project, led by the Wildlife Conservation Society (WCS), to pilot the establishment of village level forest management (FM) units, linked at sub-district (commune) level into Community Forestry Enterprises. These CFEs are structured similarly to the more familiar Community Forestry Associations, but have been renamed to emphasize the intention to transform them into commercial enterprises.

The CCF form of community-based forest management being piloted in Mondulakiri Province is developing a community forestry model at a scale never before attempted in Cambodia, and aims to create a new system for the sustainable utilization of Cambodia’s valuable forest resources. It builds on the existing legal framework for Community Forestry (CF), but by utilizing a large area of high-value forest, the system allows for economies of scale that should enable the profitable and sustainable harvesting of forest products, principally but not only timber.

CFE management is supported at the outset by a board with external representation, gradually to be phased into completely local participation. The CFE will act as the main body responsible to manage the forest area, to market and sell forest products, to pay taxes and to ensure the fair distribution of benefits. The CFE will create a management plan that is approved by the FA, and will be responsible for its implementation. Technical support (Accountant, professional Forest Operations Manager, and Law Enforcement Teams) will be subcontracted, to compensate at the beginning for low capacity levels among the CFE leadership. FM groups will participate in the law enforcement effort. Participatory patrols can be used to control minor infractions and look for more significant problems. More serious issues will be dealt with by FA personnel sub-contracted to the CFE.

### **Uses, Markets, Prices**

Timber from CFE managed operations can be certified as sustainably harvested if the supply chain is appropriately monitored.

The project proposes that timber harvesting rights will be assigned to community-based forest enterprises (CFEs) set up at the commune level. Income to the Royal Government of Cambodia will be through timber royalties, taxes and service contracts to technical line agencies such as FA. Communities will benefit financially through direct employment in forestry activities, and profit sharing. Communities will benefit additionally from increased business skills, increased tenure security, and continued access to NTFPs.

A market analysis of the Cambodia timber trade was undertaken in August 2008 on behalf of the Forestry Administration and the Wildlife Conservation Society with the purpose of evaluating

	<p>options for the development of Commercial Community Forestry (CCF) in the Seima Biodiversity Conservation Area.</p> <p>The CCF project in Mondulkiri is expected to manage 29,600 hectares of forest for production. Inventory indicates that the standing volume of trees greater than 60cm dbh is over 160m<sup>3</sup>/ha and of this over 50% is Sralao (<i>Lagerstroemia spp.</i>). It is intended that the area will be managed on a 30-year cycle and that production from an annual coupe of 990 hectares will initially be restricted to two trees per hectare. The yield of sawn-timber, allowing for a probable low recovery rate of about 26%, is expected to be about 2,400m<sup>3</sup>.</p> <p>Cost of production and transport to villages is estimated to be about \$110/m<sup>3</sup>. Management cost are estimated to be about \$40/m<sup>3</sup> including harvesting. Timber should be transported from villages to Keo Seima market and from there using large trucks for the remainder journey. The total cost for transport from villages to Phnom Penh will be about \$87/m<sup>3</sup>.</p> <p>With reasonable profits, which could be \$40/m<sup>3</sup> or more, and full royalty charged it is expected that timber can sell in Phnom Penh for about 15% less than current prices for illegal timber.</p>
<b>Business Model</b>	<p>The CFE will initially be formed as a loose association of FM group members who will develop the CFE. With project facilitation they will develop statutes and regulations. The formation of a registered enterprise is likely to be a complex process. The first level of legal recognition for the CFE will probably be through a commune <i>Deika</i> but later it is intended that it will be registered as a small business. The CFE will then be positioned to make sales contracts with specialized buyers interested in certified sustainably harvested timber.</p> <p>Consultant studies for the Mondulkiri project indicate there will be no problem finding buyers for the timber that will be produced from the that project. The quality of boards that can be produced is consistent with what is widely being sold at present and should not be an issue for local market sales. The local market can easily absorb all sawn-timber produced by the communities and prices are acceptable.</p> <p>Distribution of the timber should be done in a way that it is sold to people who require and support the idea of legally and sustainably produced timber and may accept small price premiums or even be willing to invest in the project. This would require some form of centralized marketing rather than piecemeal sales to any opportunistic buyer.</p> <p>The primary roles of the FM Groups are to enable representation of each village in the CFE and to monitor the activities of the CFE. FM group members will in effect be the stockholders in the enterprise, with the power to select and remove members of the CFE, to approve annual work plans and to scrutinize the budgets. FM group members will be the first choice for selecting staff and day labourers, where possible. The FM Group will also participate in profit-sharing according to agreed principles.</p>
<b>Other Partners</b>	Wildlife Conservation Society Tropical Forest Trust
<b>Needs</b>	There are a number of legal issues to be resolved concerning duration of tenure and status of forest businesses. These have been recognized by senior management of the FA as resolvable, and are presently being studied.
<b>Replication</b>	The WCS pilot is being done in the context of the Siema Biodiversity Conservation area in Mondulkiri province. When the GEF/UNDP SFM project begins sometime in the latter part of 2010, the experience from that rather difficult context will have been documented. This will provide the basis for the business specialists in the project team and colleagues in FA and GDANCP to identify locations with the necessary preconditions for similar initiatives.
<b>Safeguards</b>	In the pilot, the FA and the partner organizations have formed a management advisory board to guide the CFE. The formation of the board is a condition set by the FA. It will have a mandate from the FA to be involved in management, for example the power to block any decision, but not the power to make own decisions. The FA will maintain influence over CFE activities through its role as regulator, and by setting the legal framework in which the CFE operates. The extra

assistance provided by the advisory board means that the enterprise will be able to begin operating in a relatively short period of time. Initial gaps in capacity and governance will be filled by these partners.

When the CFE board reaches agreed levels of capacity the non-government partners will withdraw: firstly losing the power of veto, before finally leaving the board completely. External partners (e.g. WCS) will then shift to a monitoring and supporting role.

There is great potential for forestry contractors to abuse their relationship with a CFE. The use of contractors in forestry operations will need to be carefully regulated and supervised to ensure that the contractor follows a clear plan. The complicated logistics of organizing and implementing the forest operations need to be carefully managed. It is essential therefore for the CFE to use a professional forest manager to coordinate all these activities. This individual or group will act as the bridge between the CFE and any contractors. They help to coordinate work groups in the forest during the inventory, and harvesting. Transport of wood needs to be planned so that wood is moved efficiently from several felling sites, loaded onto contracted transport and taken to a mill. The forest manager will have to ensure that clear chains of custody exist and are documented. This is needed to provide assurance to the buyers that all the wood they are receiving does indeed come from the CFE, and has not been mixed with un-documented wood during transportation or processing. Together with the accounting team and CFE board the forest manager will ensure that all paper work is in order, and that the wood can be documented as coming from a verified legal origin.

Consultant discussions with people involved in the timber trade and processing indicate that the issue of source and legality was not important. Almost without exception Cambodian users, although widely aware that most timber is illegally harvested, are concerned solely with availability and price. Timber trade is conducted with impunity. It appears that no formal restrictions are applied although informal payments to facilitate transport are routine. There is no pressure for anyone to show any concern.

The exceptional cases, where concerns about legality were expressed, included:

- Architects and building contractors involved in projects financed by private sector foreign investors demanding the use of legally and/or sustainably sourced timber
- some handicraft manufacturers and furniture producers with a social conscience and an awareness of the destructive nature of illegal timber production
- donor financed school development projects experiencing major problems in transporting consignments of school furniture, which are routinely impounded by police, a problem which may be resolved by exclusive use of legally sourced timber.

It will be essential that the sawn-timber from commercial community forestry is recognized as legal and is not subjected to hindrance or unofficial payments to enforcement agencies, as is common when illegal timber is transported in Cambodia. These unofficial payments make illegal timber unexpectedly expensive.

## 7. BAMBOO BASKETRY & BAMBOO-CEMENT WALL BOARD

### Key Business Facts:

- In the target area, bamboo is used extensively for basketry, mostly by women working at home. The value chain extends into markets in Thailand and has been well studied. The natural supply of bamboo is declining. Management and cultivation are readily feasible.
- Simple hand-powered mechanization of raw material preparation (splitting and trimming bamboo stems) could make these women's labour much more profitable for their households. This mechanization could be done by local micro-enterprises.
- Village level centralization of the splitting and trimming would consolidate the flow of waste materials, so that additional products can be made from them, including charcoal and bamboo-cement wall board. The wall board is already being produced in other countries, as a long lasting component for low-cost housing.
- Charcoal production would be done by local micro-enterprises using the efficient steel kilns which have been developed. Bamboo-cement wall board requires a small to medium enterprise with more than \$250,000 capital, for hydraulic presses and other processing equipment.
- The project will work with potential investors and with groups of CF/CPAs to develop a franchise model, in which the lead firm provides technology and technical support to local micro-enterprises (splitters, weavers, charcoal makers) and establishes larger scale facilities for production and marketing of wall-board.

### **Business Concept & Baseline Conditions**

Cambodia has extensive resources of both wild and domesticated bamboos. The status and trends of the bamboo resources in the country have been poorly described as to species composition, extent, condition and utilization patterns, but evidence is that the resources are in decline. As elsewhere in Asia, bamboos are important materials for rural livelihoods, for house construction, a wide range of baskets and other tools, and as human food (bamboo shoots). There is significant export of unprocessed bamboo to Vietnam and Thailand. Large numbers of utilitarian bamboo baskets are exported to Thailand and some to Vietnam, through informal border trade. In Cambodia, bamboo is classified as a non-timber forest product, therefore the legal regime is favourable for managed exploitation by CF/CPAs.

CF/CPAs in the target areas frequently have resources of several species of bamboo, some more or less domesticated (*russei srok* and *russei ping pong*) and some wild (*russei prei* and *russei klei*). These have multiple uses, including woven utilitarian basketry for domestic and export markets, transportation of fruit and vegetables, dried fish etc., and in Kampong Chhnang specifically for handling rice and other foods. Raw materials are harvested under informal local arrangements and sold to weavers, who are mostly women working part-time in their homes. Availability of raw material is declining through un-managed exploitation. Simple technologies are available for managing and increasing bamboo stocks.

About 35% of the labour involved in basketry is splitting, trimming, and other preparation of the bamboo stems (culms) prior to actual weaving. These processes are currently done with hand tools but can be very easily mechanized with simple, even hand-powered equipment, as is done elsewhere.

Processing generates considerable volumes of waste, which are normally burned but have other higher value uses if sufficient volumes are collected in one place. The large butts at the base of the culms make excellent charcoal, and the waste fibre can be used to make bamboo/cement fibre-board, to replace wood in low-cost but durable housing construction. Bamboo and other wood fibre cement wall-board technologies are in commercial application in many countries.

The key livelihood strategy is therefore to protect and enhance the specialized employment of village women, by managing the raw material supply, consolidating the raw material handling, mechanizing the primary processing, and at the same time enabling value-added utilization of the waste materials at a scale sufficient to justify substantial investment. These opportunities provide the primary entry point for local businesses.

<p><b>Uses, Markets, Prices</b></p>	<p>The bamboo basket supply chain in Kampong Chhnang was most recently reviewed in 2007<sup>67</sup>. Markets are in the provinces to the north and in Thailand via the crossing at Poipet. Competition for some of the primary products (baskets) is from substitutes made from plastic.</p> <p>In spite of the significant input in terms of labour, bamboo handicraft producers generally get a relatively small part of the added value, with collectors and traders taking advantage of a dominant position in the value chain, quite often associated with credit or cash advance services to producers. A CF/CPA might be able to capture some of this value for its members by entering the downstream part of the value chain in partnership with selected traders. Thus, market opportunities exist, and the selling of handicraft products appears not to be a major obstacle. However, the sector is not very adaptable to changes in demand, partly due to very high specialization of producers and absence of innovation in the design of products.</p> <p>A 2006 study<sup>68</sup> of the bamboo sector in Cambodia found that for women in Rolea B'ier district of Kampong Chhnang, the five months during the dry season is a period of intensive production of bamboo products. There is a decline of products and number of producers during the seven months of the rainy season because the villagers are busy with rice cultivation. About 90% of families in Trapheang Trach and Teuk Chegh villages are bamboo processors. Each of them can produce around 80 baskets per month on average in the dry season and around 20 baskets per month in the rainy season.</p> <p>In 2005, producers in Trapheang Trach were able to produce around 160,000 baskets, using 16,000 stems of Russei Srok and 16,000 stems of Ping Pong (one stem of bamboo and one stem of Ping Pong can be used to produce 10 baskets with 60 cm of diameter and can be sold for 1,200 Riel (US\$0.30) per basket at the producer's house). Given the relatively short basket production season, labour productivity (especially women's labour productivity) is a critical determinant of household income from basket making. There are opportunities for the application of simple technologies to improve productivity (and hence income) in the time consuming stages of production (e.g. splitting bamboo).</p> <p>Curly masses of wood or bamboo shavings are often called "excelsior". If bamboo excelsior is mixed with ordinary cement, placed in a flat mould and held under pressure in a hydraulic press until the cement sets, the result is a 1m x 2m panel which can be used as construction material. It is water, fire, and insect resistant, can be cut with a hand saw, and will hold a nail and a coat of paint or stucco. Among many others, a Philippine company OmniBoard<sup>69</sup> currently produces a line of house-building panels and pre-formed components made from bamboo, shredded <i>gemelina</i> wood, and cement. Given the demand for low-cost housing in Cambodia, this represents a significant business opportunity.</p>
<p><b>Business Model</b></p>	<p>Predictable quantities of raw materials would be made available under a quota/contract system administered by the CF/CPA Committee, consistent with the management plan. Entrepreneurs in the community would be assisted to set up micro-industries to do bamboo primary processing, selling weaving splits to the households doing the weaving, and waste material to a larger enterprise (perhaps in the district town) which would produce bamboo-cement board. OmniBoard Philippines may be interested in exploring a joint venture with a Cambodian enterprise. Bamboo charcoal can be produced also at the community level, using the efficient kilns being introduced by Geres. Briquetting may have to be done more centrally if required. Bamboo charcoal has export market possibilities as well.</p>

<sup>67</sup> "Bamboo Handicraft Production and Value Chain Analysis in Kampot and Kampong Chhnang – Cambodia". GRET, December 2007, For World Bank, IFC MPDF, Unifem, and Oxfam Hong Kong. Email: gret@camnet.com.kh

<sup>68</sup> Cambodia Bamboo Sector Feasibility Study, Draft Final Report, 22 May 2006, Oxfam Hong Kong and IFC/MPDF.

<sup>69</sup> www.omniboard.net

<b>Other Partners</b>	<p>Prosperity Initiative: In 2009 the United Nations Development Fund for Women (UNIFEM) signed a contract with Prosperity Initiative<sup>70</sup> to implement the project Improving Bamboo Handicraft Value Chains for Women's Economic Empowerment in Cambodia and Lao PDR. The project is one of several around the world under the World Bank Gender and Development Action Plan's Results Based Initiative (RBI) which seeks to pilot, measure and ultimately scale up proven interventions for women's economic empowerment. UNIFEM are the World Bank's implementation partners, while the International Centre for Research on Women (ICRW) leads the impact assessment component for the World Bank's RBI globally. Prosperity Initiative will manage the Lao and Cambodia project, which aims to create jobs and increase income for bamboo handicraft producers through innovations in the sector and introduction of new business opportunities. The \$620,000 project will work with approximately 1,500 households in target provinces in both countries, where more than 80% of the people involved in the subsector are women. The work will focus on improvement of processing productivity, and enhanced market linkages and design. In Kampong Chhnang this project is already active in training producers, working with collectors and traders of basketry and other handicraft, and exploring the parts of the supply chain on the Thai side of the border.</p> <p>The International Network for Bamboo and Rattan (INBAR)<sup>71</sup>: Also in early 2009 delegation of experts from the Food and Agriculture Organization (FAO) Rome was hosted by Prosperity Initiative to establish the feasibility of the Bamboo Carbon Trade Project in North-West Vietnam. The delegation included advisors from INBAR to provide carbon and bamboo science expertise, and Eco-Securities, a major carbon trade brokerage firm to ascertain the viability of various carbon trade options in the industry.</p>
<b>Conditions for Business Development</b>	<p>The fundamental requirement is for a sustainably managed raw material supply for both household and larger enterprises. The SFM project will focus initially on building capacity among CF/CPAs to establish and maintain the institutional basis for sustainable management, and to deal from a position of strength with partners and other entities in the business environment. As noted, bamboo is an NTFP, so the legal regime for its commercialization by CF/CPAs is less problematic than for timber.</p>
<b>Needs</b>	<p>Identification of clusters of CF/CPAs with significant bamboo resources or land on which they can be grown; Identification of private sector partners, coordinated development of business plans and CF/CPA management plans, facilitation of business start-ups and ongoing M&amp;E.</p>
<b>Replication</b>	<p>Available quantitative data on forest and bamboo resources in Cambodia are completely unreliable. The anecdotal evidence gathered by the 2006 study cited earlier supports the view that there has been a considerable decrease in wild bamboo resources, due to over-exploitation, land encroachment, land grabbing, converting forest bamboo into seasonal and permanent farming, and significant exports of raw bamboo to neighbouring countries. Provinces with the largest reserves of bamboo include Preah Vihear, Battambang, Koh Kong, Siem Reap, Kampong Thom, Monduliri, and Kratie. Provinces with smaller, but significant, areas of bamboo included Pursat, Steung Treng, Prey Veng and Svay Rieng. Wherever there are such resources combined with functioning CF/CPAs, there will be opportunities for replication.</p>
<b>Safeguards</b>	<p>Measures will be required to assist CF/CPA members to ensure transparency in financial dealings by their committees.</p> <p>Successful businesses will take measures to increase their raw material supply, putting pressure on the CF/CPA management committees to increase extraction rates to unsustainable levels.</p>

<sup>70</sup> <http://prosperityinitiative.org/News/Prosperity-Initiative-News/Prosperity-Initiative-Begins-Lao-PDR-and-Cambodia-Bamboo-Handicrafts-Project.html>

<sup>71</sup> [www.inbar.net](http://www.inbar.net)

WJK

## 8. WILD HONEY

### Key Business Facts:

- Cambodia has extensive resources of wild honey-bee populations, which are keystone species (obligate pollinators) in the conservation of montane and wetland forests. As no population studies have been done the trend is unknown but thought to be decreasing.
- Cambodian and export markets for wild forest honey are growing rapidly, especially with the decline of conventional honey production in many places due to “colony collapse disorder”.
- There is some (not much) traditional management of the honey-bee populations, done by traditional honey hunters. The supply chain is informal and the product is often unsanitary and adulterated (sugar water, pollen, and some dead bees).
- There is already significant public-private experience in developing the Cambodian wild-honey opportunity, and a very good model is in place in the Danau Sentarum National Park in Indonesia.
- A franchise model is proposed, in which one or more private companies will contract with CF/CPAs to provide technical support to the management, and to process and market the honey and wax for candles, batik, hand creams and other value added products.
- One preliminary estimate<sup>72</sup> of potential gross revenue is US\$4M per year from 500 tons of honey at village gate.

### **Business Concept & Baseline Conditions**

After millions of years of co-evolution between wild honeybees and the flowering plants, the honeybees are the principal pollinators of many tropical forest trees and other species. Without them the plant populations would die off. Thus wild honeybees are keystone species, whose status can provide indicators for purposes of monitoring ecosystem health.

Data for these indicators can be collected by the honey hunting communities themselves, given effective training during baseline surveys, data protocols designed by competent bee biologists, and the support of a GIS team. Geo-referenced monitoring of the bee populations, habitat variables, and human economic activities, can provide highly relevant data for outcome monitoring.

Wild honey is an important cash source for many people in biodiversity rich forest areas in Cambodia, especially the wetlands and upland areas. In some locations the bee colonies are harvested under some form of traditional management. Artificial nesting sites (“rafters”) are sometimes used to attract and make accessible the migrant wild honeybee populations (*Apis dorsata*). In other locations the colonies are taken by anyone who finds them, and often destroyed in the harvesting procedure. CF/CPAs offer the best strategy for organizing and managing the honey harvest, because the community-based social capital is already in place.

Because of the seasonal nature of honey hunting and the informality of the supply chains, wild honey is usually overlooked in rural livelihood surveys. Studies on wild honeybees, beekeeping and honey are lacking through most of Asia. Here in Cambodia the very few studies which exist have been done at a provincial or village level. There have been no published studies (or even credible estimates) of the number of colonies of the various species of honeybees that are harvested in Cambodia. No comprehensive data exists to give a reliable estimate of Cambodia’s actual honey production, much less its potential.

A recent partial survey funded by USAID<sup>73</sup> stated that the honey-hunting communities interviewed gave widely ranging estimates of their seasonal output, from 2,000 to 8,000 kg/season. In 2008 a Cambodian company (Cambodia Biologicals) bought 900 kg (said to be about half of the production) at US\$8.00 per kg from its partner CF “Phnom Teub Cheung” in Srey Ambel District, Koh Kong Province. In 2009 an NGO has offered to buy 1,600 kg from the WWF supported project among the Bunong People in Mondulkiri. If we assume that half of

<sup>72</sup> Cambodia Honey Value Chain Assessment, May 2009, Prepared for the USAID Cambodia MSME Project

<sup>73</sup> Cambodia Honey Value Chain Assessment, May 2009, Prepared for the USAID Cambodia MSME Project.

	<p>perhaps 500 CFs, CPAs and CFiAs have honeybee resources, the low end estimate of 2,000 kg per year, and a village price of US\$8/kg, we have a potential of 500,000 kg at an annual village value of USD4 million, possibly more, given an effective program to promote the industry. This figure represents a USD750/ per year income for more than 5,000 families, based on seasonal work for one or more family members.</p> <p>Wild honey production in Cambodia is village based, with very low standards of quality and hygiene. The product is often adulterated with sugar water, and usually contaminated when processed by hand in the village. Supply chain linkages are informal and lack information flow back to producers. Regulations exist, but they are neither appropriately designed nor consistently applied.</p> <p>Wild honey is very much an infant industry in Cambodia, but it has an interesting potential. In Indonesia, NGOs have been working with the rafter beekeepers in Danau Sentarum National Park in West Kalimantan, a seasonally inundated forest very similar to Cambodia's Tonle Sap. Community based organizations have been developed to organize and promote rafter beekeeping as an income generating activity, and modern marketing methods have been applied (www.maduhutan.com). These efforts over the last decade are a model for other projects to emulate in developing sustainable management of the wild honey value chain, as one livelihood element of community-based biodiversity management regimes.</p>
<p><b>Uses, Markets, Prices</b></p>	<p>There is strong demand for wild honey in Cambodia, where it is considered (correctly) to have medicinal properties. One wealthy woman at a trade fair was overheard to say "I need this for my family, it will make my husband strong". However given the irregularities described in the Cambodian supply chain, there is little consumer confidence unless the buyer knows the seller well. Export sales similarly will need certification as wild-harvest or organic, to assure consumers of validity of claims for purity and sustainable harvest.</p> <p>The USAID study showed typical prices paid for honey in Cambodia along the value chain:</p> <p><b>Producer</b> – A typical "farm-gate" price paid to the honey hunters ranged between \$3-5 per litre (average price per kg was \$4.95).</p> <p><b>Collectors</b> – The mark-up for collectors, who are the intermediates between honey hunters and traders, is about \$0.75 to \$1.00 per litre, or 25%. Most frequently they buy field processed honey or honey in the comb. If the collectors are also traders their profit increases substantially. Traders usually move the bulk honey rapidly to market either to retailers or further along the chain to other traders, shortening the turnover time on the operating capital and, incidentally, reducing the fermentation.</p> <p><b>Trader</b> - Average price per kg is \$9.72/kg. If this holds true across the board there is about a 100% mark-up from farm gate to retail. Average moisture content of these samples was 24.4%. Often due to poor storage the honey will ferment before it reaches the consumer.</p> <p><b>Retailers</b> – Spot data collected in two Phnom Penh markets showed retail prices of \$15 to \$20 per litre, or about \$10 to \$13 per kg for liquid honey with high moisture content.</p> <p><b>Supermarkets</b> – for comparison, prices for imported honey in Cambodian supermarkets range from \$6/kg for Vietnamese conventional honey to \$15/kg for specialty New Zealand mono-floral honeys.</p>
<p><b>Business Model</b></p>	<p>One or two private enterprises serving as "franchisers", providing technical and financial support to the CF/CPA management committees. Chain of custody control provided by honey-hunter group leaders within the community. Honey packed in re-usable plastic bags in the forest, sealed and uniquely coded by the collector. Processing (extraction, filtration packing) done in central location (district town). Centralized management of marketing in Cambodia and for export. Biodiversity management provided collaboratively between franchiser and CF/CPA to maintain validity of sustainability assertion in the marketing story-line.</p>
<p><b>Other Partners</b></p>	<p>Several donor and NGO programs dealing with biodiversity conservation, community forestry, and sustainable livelihoods have identified indigenous beekeeping as an element of their</p>

*Kit*



	<p>programs but generally have not put much effort into its development. The important exceptions are WWF in Monduliri province, the regional NTFP EP project, Community Forestry International (PACT/CFI), and the NZAID funded Cambodia Agribusiness Development Facility (CADF) in Siem Reap and Banteay Meanchey provinces. As noted above, the USAID funded MSME project in Cambodia has done some serious preliminary work, and has tentative plans to make significant investment in the honey value chain.</p> <p>On the private sector side, several companies are marketing Cambodian honey to the tourist and urban markets but, with one or two exceptions, all appear to be simply buying from middle-persons without involving themselves in supply-chain management or quality control. There is also evidence that cheaper conventional Thai, Vietnamese and Chinese honey is being fraudulently sold as a Cambodian wild product.</p>
<b>Conditions for Business Development</b>	<p>PACT/CFI has already some preliminary data (which needs to be expanded) on which CF/CPAs in the country have wild honey resources. Management plans in these communities need to be designed to take the wild honeybee populations into account. These activities are appropriately funded from public resources (this project). An overall marketing plan needs to be developed, including national branding for export, and appropriate certification needs to be obtained. These could be done on a public-private partnership basis, with interested investors who want to become franchisers under the program.</p>
<b>Needs</b>	<p>Some NGOs and one private company are engaged in attempting to develop the Cambodian wild honey supply chain. Success will require investment in third-party certified compliance with standards for sustainable management, product traceability, and product quality. This is necessary to access high-priced niche markets among consumers who are environmentally and socially concerned, and who are willing to pay for the substantial management costs which reliable satisfaction of that concern requires. Again, well developed CF/CPA offer the necessary social capital to implement the supply side of such enterprises.</p>
<b>Replication</b>	<p>The case study published by PACT/CFI of the Koh Kong pilot project, and the Indonesian Danau Sentarum experience offer good models for the design of a program which would involve CF/CPAs in many areas of the country. The wild honey opportunity in Cambodia is therefore ready for immediate exploitation. The data already in hand from PACT/CFI, and probably from FA Cantonment or Triage level (and MOE Cluster) personnel, can be used to identify potential participating communities. A larger scale roll-out can then be designed.</p>
<b>Safeguards</b>	<p>A key conclusion of the USAID study was the need to involve participating communities in technically sound participatory monitoring of the status of the bee populations, as key-stone species for intact forest ecosystems. The project will need to field a team of forest ecologists and tropical bee experts to design the monitoring program and train participants in reliable data collection.</p>

## 9. MEDICINAL AND AROMATIC PLANTS

### **Key Business Facts:**

- Medicinal and aromatic plants (MAP) are an important resource in Cambodian healthcare, and represent a significant opportunity to manage supplies and add value to products for local and international markets.
- Existing supply chains are characterized by poor information flow, lack of stable trading relationships, and missed opportunities for value addition.
- The international NGO TRAFFIC has begun to inventory and prioritize opportunities, and to implement in Cambodia the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP).
- ISSC-MAP can provide the basis for incorporating sustainable MAP harvest into CFA/CPA management plans, providing the supply-side predictability needed for successful business planning.

### **Baseline Conditions, Uses, and Markets**

Medicinal and aromatic plants (MAP) are extensively used for health care in Cambodia by both urban and rural people. MAP have important roles in Asian medicine, especially Chinese, and are gaining acceptance in western medicine as well. Therefore, markets are expanding while supplies are dwindling fast due to over-exploitation and habitat destruction. A recent study<sup>74</sup> has found that Cambodia has 824 MAP species, equivalent to 30-40 percent of total recorded plants in this country. Of these MAP species, about 200 species are commercially traded in Phnom Penh and exported via Vietnam.

An assessment by the Faculty of Science at the Royal University of Phnom Penh (RUPP) is that more than 1,000 plant species may be used one way or the other as medicinal plants in Cambodia. The Centre for Traditional Medicine of the Ministry of Health has a collection of about 400 different medicinal plants collected from all over Cambodia. More than 300 different medicinal plants are traded at the main national market place for medicinal plants in Phnom Penh. In an assessment by RUPP in one village the local use of more than 100 different medicinal plants was found. In one assessment by the NGO Concern, in one of their supported community forest area, of main Non-Timber Forest Products (NTFP) in community forestry there are about a dozen different medicinal plants specially recognised as being very important for trade.

Plants of high demand and high market price are under threat from over harvest and unsustainable collection practices. At present, medicinal and aromatic plants such as *Aquilaria crassna* (agarwood), *Coscinium fenestratum* (yellow vine), *Scaphium macropodium* (malva nut), *Strychnox nux-vomica*, *Cinnamomum cambodianum* and *Cinnamomum parthenoxylum* are particularly threatened.

Encouraging sustainable wild medicinal and aromatic plant collection by means of MAP market chain development, and value-added MAP products through MAP processing, is a strategy for community-based sustainable MAP production, harvest and management. Such a strategy can contribute to rural livelihood improvement and conservation of biodiversity resources.

To address the population decline of MAP worldwide, especially in developing countries, an International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP) has been developed. This aims to sustain livelihood of MAP dependents, the international MAP market and their biodiversity resources. This standard has being piloted through implementation in 7 countries worldwide, including Lesotho, Bosnia, Brazil, Nepal, India, China and Cambodia. The standard focuses on social, human and economic aspects.

The implementation of this standard in Cambodia is being carried out through the project "Saving Plants that Save lives and Livelihoods" implemented by TRAFFIC Southeast Asia. The focus is on community-based MAP management, MAP resource assessment, MAP market chain study and legal review of MAP.

### **Sources, Markets, and**

Two examples among many possibilities of supply of MAPs were given by the study cited above. The following volume and price data were for the Phnom Penh market in 2003 and 2008:

<sup>74</sup> Market Chain of Tepirou bark and Krakoa fruits. Study for Traffic International by Khou Eang Hourt et al, February 2009

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<b>Prices</b>	<b>MAP COMMODITY</b>	<b>2003 VOLUME AND PRICE</b>	<b>2008 VOLUME AND PRICE</b>
	<b>Tepirou Bark</b>	27,000 kg at US\$0.28/kg	15,000 kg at US\$0.50/kg
	<b>Krakoa Fruit</b>	22,000 kg at US\$3.00/kg	9,000 kg at \$3.50/kg
	The supply source of Tepirou bark is from Kampong Speu, Koh Kong and Sihanouk Ville. The supply of Krakoa fruits is from Ratanakiri, Monduliri, Kratie, Kampong Cham, Kampong Thom, Kampot, Kampong Som, Pursat and Battambang provinces. Tepirou bark is only for local use, and Krakoa fruit is for either local or international markets via Vietnam.		
<b>Business Model</b>	Some MAP such as <i>Amomum ovoideum</i> are easily cultivated in degraded areas or open patches in the canopy created by selective harvest of large trees. Others such as <i>Aquilaria crassna</i> and the species of <i>cinnamomum</i> are themselves trees requiring longer term planning. The GEF/UNDP project will collaborate with TRAFFIC to identify priority community locations and MAP species, and to link with private sector players in Cambodian and international MAP markets.		
<b>Other Partners</b>	TRAFFIC South-east Asia Greater Mekong Programme International Union for the Conservation of Nature (IUCN)		
<b>Conditions for Business Development</b>	<p>A recent study<sup>75</sup> of MAP exploitation in one CPA, <i>Prek Thnot</i> in Kampot province, has shown the following conditions to be required for sustainable business development:</p> <ul style="list-style-type: none"> <li>• Targeted improvements in the market chain and the development of value added products.</li> <li>• Simultaneous management of all NTFP exploitation within the target area, on the basis of a management plan.</li> <li>• Assessment and monitoring of target species integrated into the management plans in a manner that ensures scientific validity, while enhancing the level of community participation and ownership of the assessment.</li> <li>• Field assessments of MAP and other NTFP species should be undertaken within the context of synecological studies, to promote a multiple MAP/NTFP approach in support of more effective management of plant resources, as well as sustaining income generation for local communities over the longer term. These assessments need to be designed and supervised by competent field botanists and plant ecologists, of which there is now a small but significant core group in Cambodia.</li> </ul>		
<b>Replication</b>	The project business team will work with TRAFFIC, RECOFTC, PACT and other NGOs to develop a broad strategy which links international players in MAP markets, and the Cambodian supply chain players, with CF/CPA which have MAP resources in their management areas. Such an approach will ultimately take in CF/CPA in many areas of the country		
<b>Safeguards</b>	Extraction of MAP and other NTFP can lead to reduction of biodiversity if one or a very few species are favoured. The ISSC-MAP approach stresses multi-species management to maintain diversity. Traditional knowledge of MAPs also presents intellectual property rights issues which need to be addressed.		

<sup>75</sup> Resource Assessment of *Amomum ovoideum* Gagnep. and *Cinnamomum cambodianum* Lecomte in Prek Thnot Community Protected Area. Prepared by David Ashwell, Koy Ra, So Ben and Khou Eang Hout On behalf of TRAFFIC South-east Asia Greater Mekong Programme and the Eco Systems Initiative, January 2009

## 10. COMMUNITY-BASED ECOTOURISM

### Key Business Facts:

- Tourism visits to Cambodia are concentrated on the Angkorean temples, and an opportunity exists to market ecotourism destinations to tourists already arrived in the country, as well as tourists seeking “green” holidays.
- The country has numerous small potential ecotourism destinations in its many parks and community protected areas, but these remain mostly undeveloped.
- Planning for infrastructure investment is required, as are safeguards for biodiversity and other environmental values potentially threatened by improved access.
- Community protected areas provide the context for such planning and protection for some of these sites.
- Some donor agencies are active in this sector, and some priority development opportunities have been identified and studied. Several private firms are also considering initial ventures.
- The project will include identification and assessment of community-based ecotourism opportunities in the resource inventory and management planning stages of CF and CPA development.

### **Baseline Conditions & Business model**

Cambodia’s tourist industry is mostly focused on the Angkorean temple complex and related monuments around the country, plus the notorious and rapidly growing vice industry. This is a very limited product line, and the average foreign tourist stay in Cambodia is less than 3 days. The IFC is working to promote an increase in the number of alternative tourist destinations and their visibility. Their “Stay Another Day” publication includes some interesting eco-tourism destinations, for example home-stays with local families in Virachey National Park, and elephant treks to indigenous Phnong villages in Mondulkiri.

Cambodia has a wide range of potential ecotourism sites, from villages on the shores of the Tonle Sap lake, to waterfalls, forest walks, and rare birds in community forest areas. Travel agencies in Phnom Penh claim that the international demand for this kind of product is very much greater than the supply.

Several donors have begun to support the appropriate development of this sector, most notably the EC via the Asia Invest Program, which is supporting a collaboration between the Netherlands agency SNV and the Cambodian Community-based Ecotourism Network (CCBEN). Their project “Community based tourism (CBT) as an International Business - Common Quality Standards and Marketing for Community Based Tourism in Asia”, covers Indonesia, Mongolia and Cambodia, and is working on quality standards for CBT, marketing and networking capacity building, business partnership facilitation, and management development including business association formation.

Eco-tourism worldwide is becoming a very sophisticated industry sector, no longer the exclusive territory of young back-packers and Deep Ecologists. The demands of the “silver and gold set”<sup>76</sup> (well-off retirees) for comfort, convenience, safety, interesting and hygienic food, and other amenities, is setting a high standard for management of ecotourism destinations. Such clientele are also increasingly conscious of sustainability and ethical issues in tourism, and as in many other domains (organic foods, fair trade) a number of certification schemes have arisen to assure the consumer of the validity of the claims of suppliers. However this very sophistication has complex implications for the capacity and infrastructure requirements which enterprises have to meet to succeed, assets which are in limited supply in Cambodia.

Community based ecotourism development requires all the same approaches as other businesses, but community involvement procedures make this process longer than standard business development. Private sector partners are required, but they must receive support to cover the costs of sharing all of their business planning, management, operations, and marketing tools.

Among perhaps other tactics, the project will attempt to get niche players in the Cambodian boutique tourism segment to work with CFs, to offer an alternative to their boutique places in Phnom Penh. This will link the CF destination to existing well-developed marketing programs,

<sup>76</sup> “silver in their hair and gold in their pockets”.

	as well as perhaps some design and financing, allowing the CFs to focus on site management.
<b>Other Partners</b>	<p>CCBEN and SNV may be willing to partner with the Project in deepening the engagement with communities operating or contemplating enterprises in this domain. GTZ is supporting a tourism development program in Kampong Thom province.</p> <p>On the private sector side, a number of international firms are targeting the development of green and biodiversity friendly tourism destinations in Cambodia. Food and Beverage Solutions Inc, the owners of the well known FCCC hotels in Phnom Penh and Siem Reap are developing “carbon neutral” accommodations linked to ecotourism destinations in Cambodia, in cooperation with the NGO GERES. Rainbow Lodge in the southern Cardamoms in Koh Kong (<a href="http://www.rainbowlodgecambodia.com">www.rainbowlodgecambodia.com</a>), linked to the local forest-dwelling community and accessible only by boat, is an example of the kind of developments which are emerging.</p> <p>Green Ventures Co., Ltd (GV) is the Cambodian subsidiary of the Dutch-based International Consultancy Europe (ICE BV), a development and investment group specialized in sustainable development projects in emerging markets. ICE has provided technical support for the design of an ecotourism development project in the Southern Cardamom Mountains. This project “Scaling Up Ecotourism in the Central Cardamom Protected Forest” proposes a partnership between Conservation International (CI) and GV to collaborate in the development of a sustainable tourism master plan for the Central Cardamoms and/or the development of individual project initiatives, which would contribute to the economic sustainability of conservation in the area. Some of these would undoubtedly be linked to CFs and CPAs.</p>
<b>Replication</b>	Lessons learned from community-based ecotourism initiatives in the project area will inform the development of the sector elsewhere in the country.
<b>Safeguards</b>	Bringing tourists into fragile areas risks unintended environmental and social impacts. In some cases, managed group tours may be the only mode of operation compatible with the conservation of the values of the destination. Improved access infrastructure risks exploitation by poachers from outside the community. These issues will need to be carefully addressed in the management and business plans.

## Annex 8. Management Effectiveness Tracking Tool

### I. Project General Information

1. Project Name: Strengthening sustainable forest management and bio-energy markets to promote environmental sustainability and to reduce greenhouse gas emissions in Cambodia
2. Project Type (MSP or FSP): FSP
3. Project ID (GEF): **3635**
4. Project ID (IA): 4136
5. Implementing Agency: UNDP
6. Country: Cambodia

Name of reviewers completing tracking tool and completion dates:

	<b>Name</b>	<b>Title</b>	<b>Agency</b>
<b>Work Program Inclusion</b>	Adrian Barrance	Project Design Consultant	UNDP Cambodia
<b>Project Mid-term</b>			
<b>Final Evaluation/project completion</b>			

7. Project duration: Planned 4 years Actual \_\_\_\_\_ years
8. Lead Project Executing Agency: Forestry Administration
9. GEF Strategic Program:  
Strengthening the policy and regulatory framework for mainstreaming biodiversity (SP 4)

#### 10. Production sectors and/or ecosystem services directly targeted by project:

10. a. Please identify the main production sectors involved in the project. Please put “**P**” for sectors that are primarily and directly targeted by the project, and “**S**” for those that are secondary or incidentally affected by the project.

Forestry: P

### II. Project Landscape/Seascape Coverage

11. a. What is the extent (in hectares) of the landscape or seascape where the project will directly or indirectly contribute to biodiversity conservation or sustainable use of its components? An example is provided in the table below.

<b>Targets and Timeframe</b>	<b>Foreseen at project start</b>	<b>Achievement at Mid-term Evaluation of Project</b>	<b>Achievement at Final Evaluation of Project</b>
<b>Project Coverage</b>			
Landscape/seascape area directly covered by the project	36,932km <sup>2</sup>	-	-
Landscape/seascape area indirectly covered by the project	181,035km <sup>2</sup>	-	-

**Explanation for indirect coverage numbers:**

The figure of 36,932km<sup>2</sup> given for the direct area of influence of the project is the total area of the four provinces in which the project will work at field level. In these provinces, the project will support the development of capacities of staff in FA cantonment and MOE province and district offices, and plans for the development of community-based forest management and conservation activities.

The figure of 181,035km<sup>2</sup> given for the indirect area of influence of the project is the total terrestrial area of Cambodia, given that the objective of the project (to strengthen national SFM policy, integrate community-based sustainable forest management into policy, planning and investment frameworks and create markets for sustainable bio-energy technologies that reduce CO<sub>2</sub> emissions) has national scope.

11. b. Are there Protected Areas within the landscape/seascape covered by the project? If so, names these PAs, their IUCN or national PA category, and their extent in hectares.

	<b>Name of Protected Areas</b>	<b>IUCN and/or national category of PA</b>	<b>Extent in hectares of PA</b>
1.	Phnom Samkos	Wildlife Sanctuary	333,750
2.	Phnom Aural	Wildlife Sanctuary	253,750
3.	Central Cardamoms	Protected Forest	402,000
4.	Kirirom	National Park	35,000
5.	Tonle Sap	Biosphere Reserve	316,250
6.	Samlaut	Multiple Use Area	60,000

11. c. Within the landscape/seascape covered by the project, is the project implementing payment for environmental service schemes? If so, please complete the table below. An example is provided.

<b>Targets and Timeframe</b>	<b>Foreseen at Project Start</b>		<b>Achievement at Mid-term Evaluation of Project</b>		<b>Achievement at Final Evaluation of Project</b>	
	<b>Extent in hectares</b>	<b>Payments generated (US\$)</b>	<b>Extent in hectares</b>	<b>Payments generated (US\$)</b>	<b>Extent in hectares</b>	<b>Payments generated (US\$)</b>
<b>Coverage</b>						
<b>Environmental Service</b>						
N/A						

**III. Management Practices Applied**

12.a. Within the scope and objectives of the project, please identify in the table below the management practices employed by project beneficiaries that integrate biodiversity considerations and the area of coverage of these management practices. Please also note if a certification system is being applied and identify the certification system being used. Note: this could range from farmers

applying organic agricultural practices, forest management agencies managing forests per Forest Stewardship Council (FSC) guidelines or other forest certification schemes, artisanal fisher folk practicing sustainable fisheries management, or industries satisfying other similar agreed international standards, etc. An example is provided in the table below.

Specific management practices that integrate BD	Name of certification system being used	Area of coverage foreseen at start of project	Achievement at Mid-term Evaluation of Project	Achievement at Final Evaluation of Project
Community-based management of natural forests, including sustainable extraction of timber and NTFPs under strict BD safeguards provided for in management plans	To be defined, may include FSC	13,500ha (20CFs and 10CPAs in four target provinces)		

#### **IV. Market Transformation**

13. For those projects that have identified market transformation as a project objective, please describe the project's ability to integrate biodiversity considerations into the mainstream economy by measuring the market changes to which the project contributed.

Name of the market that the project seeks to affect (sector and sub-sector)	Unit of measure of market impact	Market condition at the start of the project	Market condition at midterm evaluation of project	Market condition at final evaluation of the project
N/A				

#### **V. Policy and Regulatory frameworks**

For those projects that have identified addressing policy, legislation, regulations, and their implementation as project objectives, please complete the following series of questions: 14a, 14b, and 14c.

**An example for a project that focused on the agriculture sector is provided in 14 a, b, and c.**

14. a. Please complete this table at **CEO endorsement for each sector** that is a primary or a secondary focus of the project.

Please answer YES or NO to each statement under the sectors that are a focus of the project.

	Sector	Forestry
<b>Statement: Please answer YES or NO for each sector that is a focus of the project.</b>		
Biodiversity considerations are mentioned in sector policy		YES
Biodiversity considerations are mentioned in sector policy through specific legislation		YES
Regulations are in place to implement the legislation		YES
The regulations are under implementation		YES
The implementation of regulations is enforced		YES
Enforcement of regulations is monitored		YES



14. b . Please complete this table at **the project mid-term for each sector** that is a primary or a secondary focus of the project.

Please answer YES or NO to each statement under the sectors that are a focus of the project.

	Sector	Forestry
<b>Statement: Please answer YES or NO for each sector that is a focus of the project.</b>		
Biodiversity considerations are mentioned in sector policy		
Biodiversity considerations are mentioned in sector policy through specific legislation		
Regulations are in place to implement the legislation		
The regulations are under implementation		
The implementation of regulations is enforced		
Enforcement of regulations is monitored		

14. c. Please complete this table at **project closure for each sector** that is a primary or a secondary focus of the project.

Please answer YES or NO to each statement under the sectors that are a focus of the project.

	Sector	Forestry
<b>Statement: Please answer YES or NO for each sector that is a focus of the project.</b>		
Biodiversity considerations are mentioned in sector policy		
Biodiversity considerations are mentioned in sector policy through specific legislation		
Regulations are in place to implement the legislation		
The regulations are under implementation		
The implementation of regulations is enforced		
Enforcement of regulations is monitored		

All projects please complete this question at the project mid-term evaluation and at the final evaluation, if relevant:

14. d. Within the scope and objectives of the project, has the private sector undertaken voluntary measures to incorporate biodiversity considerations in production? If yes, please provide brief explanation and specifically mention the sectors involved.

No

## **VI. Other Impacts**

15. Please briefly summarize other impacts that the project has had on mainstreaming biodiversity that have not been recorded above.

N/A

Annex 9. Risk Log

#	Description	Date Identified	Type	Impact	Probability	Countermeasures / Management response	Owner	Submitted, updated by	Last Update	Status
1	<b>Limited viability of forest-based businesses</b> due to low productive potential of forests, limited capacity or interest of forest communities to organize and limited interest from private sector due to unproven viability		Environmental, organizational, other	4	3	Tailoring of SFM practices to different forest types, inclusion of complementary sources of incentives, systematization and sharing of experiences on benefits of organization and entrepreneurship and potential viability of businesses, provision of start-up funding				
2	<b>Limited and/or ineffective participation of Government staff</b> due to limited technical capacity and lack of salary supplements		Financial/operational	4	3	Provision of DSA and training to Government staff in order to maximize motivation and capacities				
3	<b>Limited commitment and participation by Government</b> (e.g. reduced political commitment to decentralizing forestry and supporting demarcation, continued favouring of powerful actors through ELCs, inadequate capacity in FA to fulfil role as implementing partner, slowness in developing pending regulations or MAFF issuing agreements, reluctance of sectors to collaborate)		Political, organizational	4	3	Initial capacity assessment to confirm FA capacities as IP; monitoring and troubleshooting by UNDP and diverse Project Board; inter-institutional/inter-sector Project Board; support and facilitation of collaboration at field and province levels; monitoring, systemization and awareness raising on social benefits and resource sustainability achievable through decentralization; support to formalization of occupancy and usufruct rights of forest communities				
4	<b>Co-financing arrangements and/or partnerships do not transpire</b>		Organizational, strategic, financial	4	2	Diversification of co-financing sources (main source of cash co-financing is UNDP over which greatest degree of control exists); negotiation and communication of opportunities for synergies and mutual benefits with partners; generation of income sources such as carbon payments/REDD to support demarcation costs				

DAK

#	Description	Date Identified	Type	Impact	Probability	Countermeasures / Management response	Owner	Submitted, updated by	Last Update	Status
5	<b>Inadequate local governance conditions</b> prevent threats to forests from being effectively combated and SFM benefits being shared and reinvested		Organizational	4	3	Generation of income (e.g. from forest-based businesses and carbon payments) that will be reinvested in forest protection; facilitation of participatory formulation of culturally-acceptable benefit sharing rules;				
6	<b>Climate change</b> increases frequency of forest fires and livelihood vulnerability of forest communities, and reduces their commitment to SFM		Environmental	2	3	Generation of income (e.g. from forest businesses and carbon payments) that will be reinvested in forest protection, and support to diversification of productive and livelihood support options				
7	<b>Large size and complexity of project target area</b> affects practicability of field operations, increases costs and limits field level impacts at individual sites		Operational	4	3	Project will mainly focus initially on only provinces (operations in other provinces will be limited and largely indirect); effectiveness will be subject to continuous review				
8	<b>Emergence of alternative technologies</b> with which energy efficient cook stoves are unable to compete in the market		Other	4	2	Monitoring of consumer preferences; ongoing R&D in order to adapt technologies and maintain their competitiveness				

## Annex 10. Terms of Reference for Key Staff and Contracts

### **Individual Staff**

#### **1) Project Manager (FA staff member)**

1. Provision of overall oversight, coordination and monitoring of project activities and impacts
2. Capacity development strategy that benefit FA, MOE and MIME that should be carried out by sub-contractors.
3. Maintenance of constructive relations with key project stakeholders, including Government institutions, donors and NGO partners, informing them and consulting with them as appropriate regarding strategic project decisions, and, in discussion with the CTA, promoting the balanced participation of different Government entities in project activities and benefits.
4. Support to UNDP in the preparation of annual Project Implementation Reviews (PIRs), incorporating inputs provided by project contractors in relation to each of the project's components.
5. Support to contractors in the preparation of Annual Work Plans and Budgets (AWPBs) and review of the AWPBs prior to their presentation to the Project Board for approval, in order to ensure their feasibility, relevance, correspondence with project resource availability and the harmonization of the activities proposed under each component
6. Review of quarterly work plans, expenditure reports and disbursement requests prepared by contractors, and recommendation to UNDP regarding their approval or, where necessary, modification prior to approval.
7. Provision of continuous supervision of and advice to project contractors in order to ensure effectiveness and efficiency, harmonization between the activities carried out under each component, correspondence with national priorities and community needs, and correspondence with the project's participation strategy.
8. Review and updating of project risk log and corresponding mitigations strategies
9. Development and implementation of a project communication strategy, in order to facilitate effective and constructive communication between different project stakeholders and adequate understanding of the objectives, strategies and advances of the project stakeholders at all levels.
10. Notification of the Executive of the Project Board regarding aspects which may require the Board to be convened.

#### **2) Chief Technical Advisor (to be provided by contractor selected through competitive bidding for the execution of Components 1 and 2 of the project)**

1. Provision of advice and strategic approach to the Project Manager on technical aspects of project implementation, particularly the following:
  - The strengthening of institutional capacities and the development of a favourable regulatory framework
  - Capacity development strategy that benefit FA, MOE and MIME that should be carried out by sub-contractors.

- Technical inputs into the annual and quarterly work plans
  - The incorporation of livelihood and gender considerations into project implementation and monitoring
  - Technical quality review of key project outputs,
  - Provide inputs into the design technical work package (TOR for contracts) and key technical delivery milestones
  - Aspects associated with the development and strengthening of community-based organizations and businesses
  - Links between forest communities and the private sector
  - The effective implementation of the project's participation strategy, in order to ensure that all stakeholders (particularly women and marginalized groups) are adequately considered and represented.
2. Provision of advisory support to the Project Manager regarding the coordination, management and monitoring of the implementation of project activities, in particular the following:
    - Support to be provided to UNDP in the preparation of annual Project Implementation Reviews (PIRs), incorporating inputs provided by project contractors in relation to each of the project's components.
    - Implementation of the monitoring and evaluation strategy of the project
    - Review and updating of project risk log and corresponding mitigations strategies
    - Development and implementation of project communication and gender mainstreaming strategies
  3. Coordination and delivery of Component 1 of the project regarding the development of a national enabling environment for SFM, in compliance with the general terms of reference for contractors set out below, ensuring the achievement of the targets set out in the results framework in relation to that Component.
  4. Provide strategic advice and support to promote synergy, alignment and coordination of various Development Partners to support the implementation of the National Forestry Programme, and provide technical strategic advisory support to TWG (F+E).

**Contractors responsible for Project Components (NGOs or companies)**

Execution of Components 1-3 of the project (corresponding to Outcomes 1-3 of the results framework) will be contracted out to NGOs or companies, through a process of competitive bidding. The contracts that will be undertaken are as follows:

1. Support to the development of an enabling environment of capacities and tools at national level for SFM (Project Outcome 1)
2. Strengthening of capacities in Government institutions and local communities for the implementation of forest management and conservation in CFs and CPAs (Project Outcome 2)
3. Support to the production and dissemination of efficient cook stoves in order to reduce demand for fuel wood (Project Outcome 3).

Each contractor will be responsible for the achievement of the outcome in question and of the corresponding impact targets specified in the results framework, through the delivery of the corresponding outputs (listed under the corresponding outcome in the Project Document), as well as the

measurement of the outcome indicators (the contractor responsible for Outcome 3 will also be responsible for measuring the impact of the adoption of improved cook stoves in terms of reduced carbon emissions, which is an indicator at Objective level).

Each contractor will be supervised by, and report to, the Project Manager. The outputs and the activities required in order to ensure their delivery will be subject to periodic review by the Project Manager, with the support of the Chief Technical Advisor, on the basis of ongoing monitoring of their effectiveness and of external conditions that may affect their relevance. Modifications to the outputs and to the impact targets will be proposed in the Quarterly Work Plans that will be subject to joint approval by the Project Manager and UNDP, under the advice of the CTA.

Each contractor will have the following responsibilities:

- 1) Selection of the technical and support staff required for the effective execution of project activities, permitting the timely delivery of project outputs and achievement of outcome indicator targets. The candidate selected in each case for the post of Component Coordinator will be subject to approval by the Project Board and candidates selected for lower technical levels will be subject to approval by the Project Manager.
- 2) Definition and establishment of logistical resources and procedures required to ensure the efficient and effective delivery of project outputs.
- 3) Definition and establishment of administrative procedures required to ensure the efficient and transparent use of project financial resources and the optimum use of human resources, in accordance with the rules of both UNDP and the contractor and subject to approval by the Project Manager, CTA and UNDP.
- 4) In consultation with the Project Manager and CTA, preparation of AWPBs for approval by the Project Board.
- 5) In consultation with the Project Manager and CTA, preparation of inputs corresponding to the project component under the responsibility of the project contractor, required for the completion of the annual Project Implementation Review (PIR) by UNDP.
- 6) Preparation of quarterly work plans, expenditure reports and disbursement requests according to the formats and procedures of UNDP, subject to approval by the Project Manager and UNDP, under advice from the CTA.
- 7) Efficient, transparent and effective use of project funds, in accordance with the provisions of the approval AWPBs and within the limits of the quarterly budget disbursements by UNDP.
- 8) Development and maintenance of constructive relations with members of Government institutions, NGOs and community-based organizations, in accordance with the provisions of the participation strategy of the project, in order to develop capacities, promote synergies and ensure coincidence with Government policies and community needs, paying particular attention to ensuring that the needs of women and disadvantaged groups are taken into account.
- 9) Ensure that their activities contribute to the development of lasting and relevant capacities among institutional counterparts, based on in-depth analyses and monitoring of institutional capacities of the institutions in question.
- 10) Coordination of activities with the contractors responsible for the other project components in order to optimize the effectiveness, efficiency and consistency of the project.
- 11) Establishment and implementation of mechanisms and procedures for the monitoring of the effectiveness and impacts of activities and outputs under the contractor's responsibilities, in accordance with the indicators specified in the results framework and with the frequency specified in the monitoring and evaluation strategy of the project (see Table X of the Project

Document), and for the incorporation of the results of monitoring into project management decisions (reporting any modifications that may be required to the Project Manager for approval). Particular attention will be paid to incorporating livelihood and gender considerations into monitoring.

**Contractor responsible for Impact Monitoring**

A contractor (NGO or company) will be appointed to undertake monitoring of the impacts of the project at Objective level on global environmental benefits, specifically the following:

- 1) Stability of indices of ecosystem health, diversity and condition in target community-managed forests
- 2) Reductions in the deforestation rates in the provinces targeted by the project under Component 2
- 3) Improvement in the canopy density and structure of forests in the provinces targeted by the project under Component 2.

For each indicator the contractor will be required to define baseline values within 6 months of project start-up, and to re-measure the values during the 6 months prior to the mid-term and final external evaluations of the project. The indicator “reduction in CO<sub>2</sub> emissions nationally due to adoption of improved cook stoves” will be measured by the contractor responsible for Outcome 3 of the project.

Annex 11. Stakeholder Involvement during the Project Preparation Phase

Institution	Representative	Consultative mechanism
<b>Governmental Organization</b>		
<b>Ministry of Environment</b>		
GEF focal point for biodiversity conservation and climate change	- HE Lonh Heal, Director General, MoE - Long Rithyrak, Deputy Director General	Bilateral talk (courtesy)
General Department of Administration for Nature Protection and Conservation	- HE Chay Samith, Director General	Bilateral talk (courtesy)
Department of National Parks and Wildlife Sanctuaries	- Sy Ramony, Director	Bilateral talk, focused group meetings and workshop
Department of Research and Community Protected Area (CPA) Development	- Srey Marona, Director of Department; - Kim Sarin, Deputy Director of Department; - Heng Hong, Office Head	Bilateral talk, focused group meetings and workshop
Provincial Department of Environment, Kg Speu	- Sing Bunthoeun, Director, - Koy Sonin, Deputy Director - Phan Sopheap, Deputy Director - Chea Tith, Deputy Director - Bun Thol, Senior Provincial Adviser, Project Support to Democratic Development through Decentralization and De-concentration/UNDP	Focused group meeting and workshop
Provincial Department of Environment, Kg Chhnang	- Pov Bunthan, Director - Kim Chanbophat, Acting Director, - Beur Bunthan, Deputy Director, - Yim Narith, Deputy Director, - Chivin Virak, Extension Officer, - Hong Sopheap, Officer, - Pen Ratha, Officer, - Eurn Sothy, Officer, - You Sokum, Officer	Focused group meeting and workshop
Provincial Department of Environment, Pursat	- Thay Chantha, Director	Focused group meeting
Provincial Department of Environment, Battambang	- Chhay Yuob, Director	Focused group meeting

159



Aural Wildlife Sanctuary, Kg Speu	- Chhun Chhieng Heng, Director	Bilateral talk, Focused group meeting and workshop
Aural Wildlife Sanctuary, Kg Chhnang	- Chhon Sopheurn, Director	Focused group meeting
Samkos Wildlife Sanctuary, Battambang	- Kao Chon, Director	Focused group meeting
Kirirom National Park, Kg Spe	- Chea Tith, Director	Focused group meeting
Cardamom cluster	- Than Kimhong, Director	Focused group meeting and workshop
<b>Forestry Administration, Ministry of Agriculture, Forestry and Fisheries</b>		
Forestry Administration (FA)	- HE Ty Sokun, Director General - HE Chea Sam Ang, Deputy Director General - Chheng Kimsun - Keo Omalis, FA focal point	Pre LPAC briefing, bilateral talk (courtesy), focused group meeting and workshop
Community Forestry Office	- Samreth Vanna, Deputy Director - Lao Sethaphal, Acting Office Head; - Long Ratanakoma, Vice Office Head - Horm Visal, staff	Bilateral meetings, focused group meetings and project workshop
Reforestation Office	- Nuon Sam Ol, Vice Office Head	Bilateral talk and focused group meeting
Provincial Forestry Cantonment of Kampong Chhnang	- Sin Kosal, Chief - Chea Buntha, forester	Bilateral talk and focused group meetings
Provincial Forestry Cantonment of Kampong Speu	- Po Bunleng, Chief - Nem Pheun, forester	Bilateral talk and focused group meetings
Provincial Forestry Cantonment of Pursat	- Kim Chantha, Acting chief	Bilateral talk and focused group meetings
Provincial Forestry Cantonment of Koh Kong	- Chhay Saran, Chief	Focused group meetings
Provincial Forestry Cantonment of Battambang	- Ly Choubeang, Chief	Focused group meetings
<b>Ministry of Industries, Mines and Energy (MIME)</b>		
General Department of Energy	- HE Tun Lean, Director General - Victor Jona, Deputy Director General,	Bilateral talks
<b>Ministry of Social Affairs and Vocational Training</b>		
Cambodia- India Entrepreneurship Development Center	- Pann Nora, Director, Cambodia-India Entrepreneurship Development Center - Teang Sak, Deputy Director, CIEDC	Meeting
<b>Ministry of Land Management Urban Planning and Construction (MLMUPC)</b>		
General Department of Land Management	- Prak Angkeara, Deputy Director, - So Than, Phnom Penh based TA hired by Danida - Chum Sinara, Kampong Speu province based TA hired by Danida	Meeting

<b>Non-Governmental Organization</b>		
Recoft	<ul style="list-style-type: none"> <li>- James Bampton , RTA</li> <li>- Edwin Payuan., CTA</li> </ul>	Bilateral talk, focused group meetings and project development workshop
Geres	<ul style="list-style-type: none"> <li>- Iwan Baskoro, Country Director;</li> <li>- Mathieu van Rijn, Forester;</li> <li>- Minh Cuong Le Quan, Climate Change Unit Manager</li> <li>- Loh Wang Chin, Project development officer</li> </ul>	Bilateral talk, focused group meetings and project development workshop
Wildlife Alliance	<ul style="list-style-type: none"> <li>- Lesley Perlman, Program manager</li> </ul>	Focused group meeting
WCS	<ul style="list-style-type: none"> <li>- Tom Evans, Deputy Country Director and TA</li> <li>- Hugo Rainey, Technical Adviser Northern Plains</li> </ul>	Bilateral talk, focused group meeting and workshop
FFI	<ul style="list-style-type: none"> <li>- Emily Woodfield, Country Director</li> <li>- Oum Sony, Head of Community and Environment, Cardamom Mountain Wildlife Sanctuaries Project;</li> <li>- Oliver Nelson, Landscape Manager, Cardamom Mountain Wildlife Sanctuaries Project</li> </ul>	Bilateral talk, focused group meetings and project development workshop
CI	<ul style="list-style-type: none"> <li>- Seng Bunra, Country Director;</li> <li>- David Emmett, Adviser</li> <li>- Heng Bunny, Community Engagement Program Manager</li> <li>- La Pengly, LE manager</li> <li>- Chay Chetha, FA-CI Counterpart</li> </ul>	Bilateral talk, focused group meeting and workshop
LWF	<ul style="list-style-type: none"> <li>- Sam Inn, Deputy Representative;</li> <li>- Lor Bunnath, Project Manager</li> <li>- Ly Sovann, Assistant Finance and Admin Manager</li> </ul>	Bilateral talks and workshop
Mlup Baitong	<ul style="list-style-type: none"> <li>- Va Moeun, Director</li> </ul>	Bilateral talk, focused group meeting and workshop
Pact/CFI	<ul style="list-style-type: none"> <li>- Amanda Bradley, Program Director, Community Forestry Partnership Program</li> <li>- Srey Neang Meas, Forest livelihood program</li> </ul>	Bilateral talk, focused group meeting and workshop
DAI (Development Alternative Inc.)	<ul style="list-style-type: none"> <li>- Sun Boreth, Team leader for value chain strengthening; and</li> </ul>	Bilateral talk

	- Ponreay Phoung, CBNRM specialist	
WWF	- Seng Teak, Director of the WWF Cambodia Program	Workshop
Concern Worldwide	- Pel Piseth, Program Manager	Bilateral talk
CDA	- Chee Boreth, Director; - Rith Bo, Program Manager - Smoeun Boreth, Project Manager	Bilateral talk and focused group meeting
Green Venture	- Delphine Vann, Country Manager	Bilateral talk
ADI	- Tim Purcell, Director - Prom Tola, Associate Consultant	Bilateral talk
Oxfam GB	- Khieng Sochivy, Policy and Programme development manager - Bun Chantrea, Program coordinator	Bilateral talk and focused group meeting
EPDO	- Sok Sovanna, Officer	Workshop and focused group meeting
CIRD Cambodian Institute for Research and Rural Development	- PRAK Sereyvath, Researcher	Bilateral talk
Anakot Koma (Pursat)	- Khem Sokhon, Director - Mey Hy, Community facilitator - Sin Mao, staff - Ket Kosal, staff	Field site visits
<b>Local Authority and Community-Based Organization</b>		
Pro Ngil commune council, Kravanh district, Pursat	- Lek Los, Commune councilor - Duong Vibol, Commune councilor - Hun Bonakmy, Commune councilor - Chhun Phumy, Commune councilor - Oak Chheum, Commune councilor - Matt Sary, Commune councilor - Mat Las, Commune councilor - Res You, Commune councilor	Community meeting/ Field site visits
Communities forestry (Svay Park, Samrong Yea, Kampeng, Pro ngil, O'srav, and O'baktra), Pro ngil commune, Kravanh district, Pursat	- Toch Chanthy, Management committee - Toam Leub, Management committee - Sn Hoeurng, Management committee - May Theurm, Management committee - Seung Kun, Management committee - Aun Pek, Management committee - Seng Oeurn, Management committee,	Community meeting/ Field site visits

	<ul style="list-style-type: none"> <li>- Seung Tha, Management committee</li> <li>- Tes Chheang Ly, Management committee</li> <li>- Yeum Bunly, Management committee</li> <li>- Phin Veun, Management committee</li> <li>- Chheum Heap, Management committee</li> <li>- Hay Hong, Management committee</li> <li>- Ny Heng, Management committee</li> <li>- San Chheap Ly, Management committee</li> <li>- Ieng Eurn, Management committee</li> <li>- Hear Nhim, Management committee</li> </ul>	
Communities protected areas (Maplang, Cheung Leang, Sneng, Anlungsvay, Preythom Anlung Thma), Aural Wildlife sanctuary, Tuek Phos district, Kampong Chhnang	<ul style="list-style-type: none"> <li>- Bun Yea, Management committee</li> <li>- Uk Chea, Management committee</li> <li>- Ith Oun, Management committee</li> <li>- Prak Kimseng, Management committee</li> <li>- Hing Sin, Management committee</li> <li>- Mil Sim, Management committee</li> <li>- Oam Hun, Management committee</li> <li>- Soum Socheat, Management committee</li> <li>-</li> </ul>	Community meeting/ Field site visits
Phum Pra Yat Community Protected Area, KgSpeu	<ul style="list-style-type: none"> <li>- Koy Nay, Chairman</li> </ul>	Focused group meeting
Community Forestry in Kampong Leng District, Kampong Chhnang Province	<ul style="list-style-type: none"> <li>- Mean Ean Ly, Governor of Kampong Leng District</li> <li>- Khiev Sophat, Senior Provincial Adviser, Project Support to Democratic Development through Decentralization and De-concentration/UNDP</li> <li>- Ros Buntha, Local administration adviser, PSDD/UNDP</li> <li>- Huong Vanny, Office chief, Provincial Environmental Department</li> <li>- Chin Cheng District, working group member, Provincial district hall</li> <li>- 2 representatives of police force</li> <li>- 29 representatives of village authorities and members of community forestry</li> </ul>	Community meeting/ Field site visits

	organizations	
Sen Monorom Community Forestry, Aural district, Kampong Speu province	<ul style="list-style-type: none"> <li>- Mr. Put Theay, Sen Monorom CF Chairman</li> <li>- Mr. Sot Sok, Sen Monorom village head, Haong Samnam commune, Oral district, Kampong Speu province</li> <li>- Mr. Un Yoeun, Sen Monorm CF Secretary</li> </ul>	Community meeting/ Field site visits
Community Conservation Area in Thma Don Pov commune, Thma Baing district, Koh Kong province	<ul style="list-style-type: none"> <li>- Mr. Kev Sarun, Commune Head</li> <li>- Mr. Ney Eng, Commune Council</li> <li>- Mr. Chan Doeun, Vice Chief of Management Committee, Natural Resources Protection Community (NRPC)</li> <li>- Mr. Yem Sokhon, Director, Thma Don Pov Primary School</li> <li>- Mr. Hang Horn, District Army Officer</li> </ul>	Community meeting/ Field site visits
Partnership forestry in Kratie province	<ul style="list-style-type: none"> <li>- 3 FA cantonment foresters</li> <li>- 1 RECOFTC community development facilitator</li> <li>- 5 commune members</li> </ul>	Community meeting/ Field site visits
Commercial community forestry (CCF) in Mondulkiri province	<ul style="list-style-type: none"> <li>- Mr. Pet Pektra, Deputy manager, Sema biodiversity conservation program, Keo Seima district, Mondulkiri province (WCS)</li> <li>- Mr. Hing Mesa, Commercial community forestry specialist, Seima biodiversity conservation program</li> <li>- Mr. Pyeub Pe, Commune head, Sre Prah commune,</li> </ul>	Community meeting/ Field site visits
Tasal Community Protected Area, Aural Wildlife Sanctuary, Kampong Speu	<ul style="list-style-type: none"> <li>- Mr. Au Sok, Management Committee Member, Tasal Community Protected Area, Aural Wildlife Sanctuary</li> </ul>	Community meeting/ Field site visits
<b>Donor Agency/Development Partner</b>		
UNDP Cambodia	<ul style="list-style-type: none"> <li>- Jo Scheur, Country Representative</li> <li>- Sophie Barance, Deputy Country Director</li> </ul>	Bilateral talk
UNDP RTA	<ul style="list-style-type: none"> <li>- Sameer Karki, RTA</li> </ul>	Meeting
DANIDA	<ul style="list-style-type: none"> <li>- Jacob Jepsen, Councilor, Danida (NREM program)</li> <li>- Lic Vuthy, Program Officer</li> </ul>	Bilateral talk, Development partner meeting and workshop

AFD	- Audrey Rousson, Chargée de projets agriculture et environnement	Bilateral talk
JICA	- Siv Cheang, Program Officer, Agriculture and Rural Development	Development partner meeting
ITTO	- Ly Chou Baeng, ITTO Country Assistant - Chan Ratha, ITTO Secretary	Bilateral talk
FAO	- Mr Chuop Paris, Assistant to FAO Resident Representative	Bilateral talk
GEF-UNDP Sustainable land management project	- Keang Seng, project manager - Eduardo Queblatin, CTA - Ear Chong, Project Coordinator	Bilateral talk and workshop
TWG (F&E) Secretariat	- Sok Srun, Coordinator	Bilateral talk and workshop
National Forest Program	- Sok Heng, Coordinator	Workshop

## Annex 12. **Participation strategy**

### **Principles**

Project design recognizes that, in order for it to deliver significant local and global benefits in a viable and sustainable manner, community-based forest management and conservation require the effective participation of a wide range of institutional actors from different sectors, particularly forestry, environment and energy. It also requires synergies between institutions responsible for natural resources and for social development.

Project design also recognizes that involving local people in forest management is a long-term learning process, and that the level of participation is a key factor affecting communities' contribution to forest management; at the same time participation is conditioned on the existence of sufficient incentives to commit local people to specific, measurable actions that improve the sustainable management of forests. There is a need to provide equitable share of benefits to local communities and mitigate any negative impacts to women, poor and disadvantaged groups. The call for participation needs be supported by training and capacity development for strengthening the management committee and households. The project recognizes that motivation for community participation is also grounded in the communities' feeling of attachment to their own forest areas and the anxiety communities feel in risking losing the land to ELC and state capture. The project also recognizes – and will address in its implementation – that different social actors in the communities are not all equally entitled to manage resources and derive benefits. The project does not start from scratch. The communities engaged in CF or CPA development are already organized and have already made demands. The project will build upon this already established capacity for participation.

In the SFM project, partnerships will be developed with local NGOs that implement rural livelihood and empowerment projects in the selected provinces, covering also areas where Community Forestry sites are identified. The emphasis of the project on creating incentives with local communities through sustainable business development relies on careful assessment, carried out with the full participation of the communities themselves, of the sustainable harvest potential within an SFM framework, and on training of the communities to make up for lack of commercial know-how and information, address lack of capital and their inability to take risks due to small margins for survival. Also the weak governance in rural areas and limited public support for CF investment and advisory services will be addressed through project-supported interventions.

### **Strategies and mechanisms**

#### ***Project Board***

The Project Board will constitute the main formal mechanism for ensuring consistency between the plans and actions of the project and the priorities of the host country Government, and for ensuring broad institutional participation in the guidance of the project. To this end, the Board will include representatives from MAFF (forestry sector), MOE (environment sector), MIME (energy sector) and MLMUPC (social, infrastructural and development planning). The membership and functioning of the Board are set out in Section 0 on Management Arrangements. The presence of UNDP on the Board will help to promote balanced consideration of issues related to different sectors, and expertise regarding the consideration of social and development issues.

#### ***UNDP Project Support***

UNDP will provide advice to the Project Manager and CTA on the promotion of participation and the monitoring of its effectiveness, in particular in relation to women and marginalized sectors of the target population.

### ***Staffing***

National ownership of and participation in the project will further be promoted by the appointment by FA (as Implementing Partner), of a full time Project Manager (see Terms of Reference in Annex), who will be supported by a CTA. The Project Manager will interact regularly with FA HQ in order to ensure continuous alignment of the project with FA priorities. The CTA, meanwhile, will advise the Project Manager on a continuous basis on how to ensure the effective participation of other institutional actors, other than FA (particularly GDANCP and MIME) in the planning, implementation and monitoring of project activities, and will contribute to the monitoring of the effectiveness of participation at all levels.

The project will in addition deploy provincial province and field level staff (see Section 0 on Management Arrangements) who will interact directly with local communities, for example in relation to the formalization of CFs and CPAs and the development of pilot forest-based businesses.

### ***Involvement of provincial, cantonment, PA and division level staff of FA and GDANCP***

The project's actions at each of these levels will be subject to joint planning with project staff from these offices. Where possible project staff will seek to carry out joint planning exercises in which staff from both FA and GDANCP take part. The project will also seek to involve Government staff at these levels in the implementation of all aspects of project activities, providing them with DSA and logistical support as necessary in order to permit this.

### ***Local level organizations***

*Commune Councils* are the locally elected bodies charged with servicing local communities, including preparing budgets for how to spend the Annual Commune/Sangkat Fund (block grant of at present US\$10,000) and endorse communities' requests for a particular area as CF to the cantonment. They will represent the first point of contact between the project and local stakeholders, at commune level. At the level of target communities, project staff will interact principally with *CF and CPA management committees*. These local level bodies will act as the fora within which the planning of the project's actions at community-level will take place and the channel whereby community members can express their needs and concerns in relation to the project.

Project staff will produce lists of participants in all meetings held with local level bodies, disaggregating participants by gender. Given the risk of these bodies being subject to elite capture, UNDP will in addition realize specific specialist studies in order to determine their effectiveness in representing the interests of disadvantaged sectors of society and, as necessary, will recommend complementary strategies and mechanisms for ensuring the representation of those sectors.

The project will empower CF communities for SFM through training on the roles and responsibilities of different actors in Community Forestry Management Committees including elections, CF regulations, CF Committee by-laws, CF demarcation, cantonment level CF mapping, CF Agreements between CF Committees and the FA, and management planning that includes business development plans. This empowerment that enhances the opportunities for participation includes financial management and reporting. The project will enhance better representation of women and men in the management committees of the community forestry and community protected areas. In addition, the project will seek to empower vulnerable groups such as women to have active participation and raise their voice in the decision and planning process.

CPAs located inside a PA are also citizens within communal boundaries: they elect commune council members and can submit proposals for use of Commune funds to their benefit. For both CPAs and CFs their management committees will need training and support to be able to formulate proposals and follow through with commune councils. New organic laws under the D&D Framework require Commune Councils to prepare land use plans which provide entry points for CF considerations. Baseline activities by NGOs for community empowerment in the same areas will help make these communities able to make demands participating in the development of decentralized SFM.



Project staff will interact with these bodies and with the Provincial Rural Development Executive Committee engaged in provincial development planning to elicit provincial support for sustainable land- and forest management in the province.

Well thought-out study tours among CF communities, among CFs and CPAs and study tours for central government staff to the field provide the means for vertical participation in the project. Seminars on lessons learnt from the field based on M&E results will provide a forum for participation by the main stakeholders and feed into regulatory changes.

***Forest-based businesses***

The promotion by the project of forest-based businesses will strengthen the abilities of community members to participate in receiving benefits from forests. It also has the potential to strengthen their financial capacities to participate in the active protection and management of the resource. This depends however on the existence of mechanisms to ensure benefit sharing and reinvestment, and to avoid elite capture of benefits and of control over resources. To this end, the project will support the development of such mechanisms and the monitoring of their effectiveness, using indicators such as the economic status and gender of business members.

***Monitoring***

Indicators in the project results framework, related to economic benefits resulting from participation in forest-based businesses, will be disaggregated by gender (at the moment when baseline and target values are defined – as stated in the results framework, values for these indicators will be defined at project start-up). This will be the responsibility of the contractor responsible for the component in question; however UNDP will provide advisory support on methodological aspects of the monitoring of gender, livelihood and participation considerations.

Annex 13. Specific roles of Executing Agencies in relation to project targets

No	Executing agency	Roles and responsibilities																
1	FA	<p>By Year 4 ministerial declarations (<i>prakas</i>) also exist for:</p> <ul style="list-style-type: none"> <li>▪ Production-Based Community Forestry</li> <li>▪ Community Conservation Forests</li> <li>▪ Partnership Forests</li> </ul> <p>All CF management plans in 4 target provinces incorporate landscape and ecosystem approach</p> <p>Criteria, procedures and technical means to classify and demarcate forest lands developed giving priority to areas suitable for CF</p> <p>1 mill ha (out of 1,6 mill) for CF identified</p> <p>By year 4, average time for MAFF to issue declarations on Community Forests: less than <b>4 months</b></p> <p>Financial strategies exist in MAFF to support SFM, including opportunities for REDD and carbon financing</p> <p>Increased funds become available in a sustainable manner to support community-based forestry by year 4:</p> <ul style="list-style-type: none"> <li>▪ Forest/wood energy related carbon credits (1,500,000US\$)</li> <li>▪ Other funding sources (banks, green funds etc.) (500,000US\$)</li> </ul> <p><b>50</b> community-managed forests nationwide have management plans covering at least XXX ha</p> <p><b>30</b> charcoal and timber business in target provinces (with project support), covering 20,000ha</p> <p><b>20</b> CFs, covering 15,000ha are managed in accordance with management plans that provide for environmental and financial sustainability and opportunities for business development</p> <p>Four cantonments covering XX ha have plans for development of community-based forest management</p> <p><b>X</b> CFs covering <b>X</b> ha have completed all procedural requirements to operate</p>																
2	GDANCP	<p>All CPA management plans in 4 target provinces incorporate landscape and ecosystem approach</p> <p>Financial strategies exist in MOE to support SFM, including opportunities for REDD and carbon financing</p> <p>10 CPAs have management plans</p> <p>20 ecotourism business elsewhere in the country (with project support)</p> <p><b>10</b> CPAs covering 5,000ha are managed in accordance with management plans that provide for environmental and financial sustainability and opportunities for business development</p> <p>2 PAs covering 587,602 ha (Samkos and Aural wildlife sanctuaries) have management plans with zoning and provision for 10 CPAs</p> <p>All 29 existing CPAs in Kampong Speu, Kampong Chhnang and Pursat, covering 21,767ha, have completed all procedural requirements to operate</p>																
3	MIME	<p>National Wood Energy Implementation Strategy exists by year 4</p> <p>Increased market share of improved technologies:</p> <table border="1"> <thead> <tr> <th>Technology</th> <th>Number sold per year</th> <th>Market share</th> <th>tCO2e per year</th> </tr> </thead> <tbody> <tr> <td>NKS</td> <td>180,000</td> <td>17%</td> <td>36,900</td> </tr> <tr> <td>Palm Sugar Stove</td> <td>800</td> <td>4%</td> <td>1,520</td> </tr> <tr> <td>Efficient Charcoal Kilns</td> <td>16</td> <td>2%</td> <td>To be calculated</td> </tr> </tbody> </table>	Technology	Number sold per year	Market share	tCO2e per year	NKS	180,000	17%	36,900	Palm Sugar Stove	800	4%	1,520	Efficient Charcoal Kilns	16	2%	To be calculated
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NKS	180,000	17%	36,900															
Palm Sugar Stove	800	4%	1,520															
Efficient Charcoal Kilns	16	2%	To be calculated															
4	MLMUPC	Communal land use planning throughout 4 target provinces reflects SFM by integrating CF and CPA development and sustainability																
5	Commune	FA Division staff and PA staff in 4 target provinces collaborate with local commune councils in integrating SFM into local land use planning and																

	Councils	possible local budget support;
		Development budgets of local authorities (communes and districts) in 4 target provinces make specific provision for SFM
		XX households (XX% of total) derive income by year 4 (to be defined at project start-up)
		Average of \$XX received per household in year 4 (to be determined at project start-up)

4.1

Annex 14. UNDP SFM Capacity Development Scorecard –MAFF (FA and CFO) & MOE (Department of Research and CPA)77

Strategic Area of Support	Target for CD	Outcomes	Outcome Indicators (Scorecard)	Initial Evaluation	Expected Outputs	Program Activities	Target	Evaluative Comments
MAFF oversight and support to SFM	Systemic	Time spent on vetting and endorsing CF applications less than 4 months	0 -- There is a general lack of planning and management skills; 1-- Some skills exist but in largely insufficient quantities to guarantee effective initiation 2 -- Necessary skills available but bureaucratic hurdles many 3 -- Adequate quantities of the full range of skills necessary available	1	New regulations for MAFF procedures	Support through NFP Action Plan to create change in procedures	3	Too many bureaucratic procedures and committees make endorsement cumbersome and time consuming
Protocols for transparency	Systemic	Efficient communication strategies with policy makers, NGOs and local forest managers and communities	0 -- There is a general lack of management skills; 1-- Some skills exist but in largely insufficient quantities to guarantee effective initiation 2 -- Necessary skills available but bureaucratic hurdles many 3 -- Adequate quantities of the full range of skills necessary available	1	<b>Communication strategies</b>	Support through NFP Action Plan to change procedures	2	At present FA is rather inward looking and has no experience in communicating to the public
Definition of roles and responsibilities for central and local staff	Institutional	Institutional reforms with clear job descriptions	0 -- There is a general lack of job descriptions 1-- Some description exist 2 -- Descriptions available but bureaucratic hurdles to adopt the roles 3 -- Adequate descriptions of full range of skills necessary	1	Description of, in particular, roles and responsibilities of cantonment and division level staff for decentralised forest management	On the job training of local staff	2	Only high level staff so far have job description but no evaluation takes place ever and no key performance indicators found
Inclusion of MOE in the FA controlled TWG- F/E	Institutional	Both FA and GDANCP participate regularly in TWG meetings	0 -- There is a general lack of MOE attendance 1-- Some attendance exist s 2 – Attendance semi-regular 3 – Attendance full online with FA and MOE contributions to TWG Action Plans	0	Shared strategies on SFM by MOE and FA	Project management located at TWG secretariat to facilitate MOE participation addressing constraints	2	Existing jealousies make MOE feel resentment against a stronger FA
FA capacity to engage and build consensus among all stakeholders for decentralised forest management	Institutional	FA and relevant MOE departments show political will to give mandates to cantonments and departments	0 -- There is no political will at all, or worse, the prevailing political will runs counter to the interests of SFM; 1 -- Some political will exists, but is not strong enough to make a difference; 2 -- Reasonable political will exists, but is not always strong enough to fully support	1	Political will transformed into action and operational initiatives	Awareness raising of decision makers  Building provincial coordinating body  Learning by doing	3	There is a low level of awareness of some local level staff as well as among local authorities

<sup>77</sup> This assessment will be validated with project stakeholders at time of project startup

		to coordinate forest management at provincial / cantonment level	SFM; 3 -- There are very high levels of political will to support SFM					
<b>Capacity building and awareness raising of provincial / cantonment and district line agencies</b>	Institutional	SFM inter-ministerial bodies at provincial level establish partnerships needed to achieve the objectives of SFM	0 -- SFM institutions operate in isolation; 1 -- Some partnerships in place but significant gaps and existing partnerships achieve little; 2 -- Many partnerships in place with a wide range of agencies, NGOs etc, but there are some gaps, partnerships are not always effective and do not always enable efficient achievement of objectives; 3 -- SFM institutions establish effective partnerships with other agencies and institutions, including provincial and local governments, NGO's and the private sector to enable achievement of objectives in an efficient and effective manner	0	Alliances with other ministries' provincial departments, PA staff, NGOs and communities	SFM project staff works closely with cantonment staff and other line agencies of province using existing training manuals as well as learning through doing	2	Decentralised level staff is often interested in local issues and care about results, but do not have the skills and knowledge to put things in motion
Capacity to monitor, evaluate, report and learn	Individual	Individuals carry appropriate values, integrity and attitudes towards learning	0 -- Individuals carry negative attitude; 1 -- Some individuals have notion of appropriate attitudes and display integrity, but most don't; 2 -- Many individuals carry appropriate values and integrity, but not all; 3 -- Individuals carry appropriate values, integrity and attitudes	1	Reporting from cantonment level highlight lessons of importance for policy level and scaling up the approach	Responsible actors made aware of the importance of BD and PAs	2	Personnel value SFM but do not necessarily have correct attitudes or interest in establishing lessons learnt
FA capacity to mobilize information and knowledge	Institutional	FA cantonments and divisions have the information needed to do their work	0 -- Information is virtually lacking; 1 -- Some information exists, but is of poor quality and of limited usefulness and difficult to access; 2 -- Much information is readily available, mostly of good quality, but there remain large gaps due to distance and communication; 3 -- Adequate quantities of high quality up to date information for protected area planning, management and monitoring is widely and easily available	2	Available information on rules and approaches and modalities for SFM utilized and applied	Cantonments can make their own management plans for SFM in their jurisdiction	3	Cantonments need official mandates and support to take action to prepare own action plans
CFO and cantonment capacity to carry CF forward in more cantonments	Institutional	Cantonments have enhanced regular contact with MOE PAs	0 -- inter-ministerial interaction virtually lacking; 1 -- Some interaction exists, but is of poor quality and of limited usefulness 2 -- Much interaction takes place, but	1	Provincial level forest land use and land management plans	Identify and support cantonments' CF establishment to develop management plans	2	No encouragement from central level to cantonments and PAs to

7/12/20

and integrate these in a landscape approach that features neighbouring CPAs			there remain large gaps due to distance and communication; 3 -- Adequate interaction of high quality up to date information for CF and protected area planning, management and monitoring is widely and easily available		exist covering both jurisdictions	within a landscape approach that includes CPA conceptually covering KS, KChh and Pursat provinces including CPAs conceptually and operationally in a land use plan		interact at the local landscape level
CFO/cantonments' capacity to engage with local authorities	Institutional	Commune councils undertake commune land use planning without explicit focus on options for CF. Cantonment mainly to point out State Public Land forming part of the PFE.	0 – CF integration in commune LUP is virtually lacking; 1 -- Some information exists, but is of poor quality and of limited usefulness 2 -- Much information is readily available, mostly of good quality, 3 -- Adequate quantities of high quality up to date information for CF is widely and easily available	1	5 commune land use plans include attention to both CF and CPA that fall within the commune's boundaries	FA Division staff and PA staff with the SFM project TA collaborate with local commune councils in integrating SFM into local land use planning	2	FA and MOE departmental support and encouragement to decentralised level staff is warranted  Communities that are directly related to an SFM landscape-based approach need to be converted into SFM allies and reap benefits from environmentally sustainable income from the forest
MoE /GDANPC has capacity to support village CPA development for management plan preparation for CPA in the sustainable use zone	Institutional	Department of Research & CPA of DGANPC has staff that is knowledgeable about steps in CPA development and management plan preparation	0 – support skills for CPA virtually lacking; 1 -- Some support exists 2 – Much support is found, but there remain large gaps due to distance and communication; 3 -- Adequate support of high quality and up to date information for CPA development	1	10 CPAs in Aural and Samkos WS have developed management plans that includes a landscape approach and business plans	Identify and support CPAs to develop management plans with environment friendly business options and a landscape approach covering KS, KChh and Pursat provinces and selected CF sites outside the WS	2	Basically the GDANPC's Research / CPA Department is underfunded and staff is on loan to NGOs and other agencies
PA superintendent and rangers have capacity to monitor and prepare lessons learnt	Individual	PA superintendent and rangers work with already started CPA for management plan preparation	0 -- Human resources are poorly qualified and unmotivated; 1 -- Human resources qualification is spotty, with some well qualified, but many only poorly and in general unmotivated; 2 -- HR in general reasonably qualified, but many lack in motivation 3 -- Human resources are well qualified and motivated	1	CPA management plans	5 rangers and PA director/WS participate in the development of management plans with business options and a landscape approach that conceptually and practically integrate CF lands outside the WS with	2	PA Director responsible for CPA development and knows the framework. Rangers have limited knowledge and work mainly in protection against offences rather than working with communities. In general foresters and PA staff have limited social consultation skills

						CPA inside		Initiation of CPA sites undertaken by NGOs
<b>Rangers have capacity to consult with CPA communities in a trustworthy manner</b>	Individual	Individual rangers are appropriately skilled for their jobs in social consultations with CPA communities	0 -- Skills of individuals do not match job requirements; 1 -- Individuals have some or poor skills for their jobs; 2 -- Individuals are reasonably skilled 3 -- Individuals are appropriately skilled for their jobs	1	Selected rangers skilled in developing management plans with CPA	On the job training with rangers	2	Rangers are local hire staff and not government staff  Only five rangers out of 20 work with CPA intermittently
MoE coordination with other Govt. agencies	Institutional	Landscape/provincial plan with multi-stakeholder participation	0 -- There is no political will at all, or worse, the prevailing political will runs counter to the interests of SFM; 1 -- Some political will exists, but is not strong enough to make a difference; 2 -- Reasonable political will exists, but is not always strong enough to fully support SFM; 3 -- There are very high levels of political will to support SFM	0-1	Provincial DoE and PA staff will engage in landscape level approach to SFM for Kampong Speu, Kampong Chhnang and Pursat and feed modalities to policy level	Landscape level approach within two provinces covering 3-4 SFM modalities	2	MoE and its departments are regularly withdrawn from the process of SFM due to bureaucratic differences with the FA

7/11

Annex 15. Summary of proposed partnership arrangements

Partner	Baseline results related to project objectives	Partnership arrangements		Partnership nature/mechanisms
		Project role	Partner role	
FA	<ul style="list-style-type: none"> <li>- FA has completed the preparation of the National Forestry Program</li> <li>- Has established 337 CFs covering 312,000 ha</li> </ul>	<ul style="list-style-type: none"> <li>- Support to implementation of NFP</li> <li>- Furthering of process of CF establishment (legalization and management planning)</li> <li>- Support to introduction of business elements into CF planning and management</li> <li>- Training and advice to cantonment level staff</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure project correspondence with NFP</li> <li>- Vehicle for replication of lessons and models from the project to FA staff nationwide</li> </ul>	<ul style="list-style-type: none"> <li>- Member of Project Board</li> <li>- Technical staff would participate actively in implementation of project activities in CFs</li> <li>- Project staff would train and advise cantonment level staff</li> </ul>
GDANCP	<ul style="list-style-type: none"> <li>- Has developed first steps of 80+ CPAs in Cambodia, many of which are located in the Wildlife Sanctuaries of the target provinces, but finalization of management plans leading to SFM and income and incentives for the communities is still lacking.</li> <li>- Has had limited support to actually undertake protection</li> </ul>	<ul style="list-style-type: none"> <li>- Training and advice to province and district level staff</li> <li>- Furthering of process of CPA establishment (legalization and management planning)</li> <li>- Support to introduction of business elements into CPA planning and management</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure project correspondence with PA laws and policy</li> <li>- Vehicle for replication of lessons and models from the project to MOE staff nationwide</li> </ul>	<ul style="list-style-type: none"> <li>- Member of Project Board</li> <li>- Technical staff would participate actively in implementation of project activities in CPAs</li> <li>- Project staff would train and advise province and district level staff</li> </ul>
MIME	<ul style="list-style-type: none"> <li>- Has long term commitment to support efficient cook stove development and signed MOU with GERES to support technical assistance to the cook stove market to convert to improved cook stove models.</li> <li>- MIME plans to setup a National Cook stove Program Unit.</li> </ul>	<p>A National Cook stove Program to be setup at MIME could oversee and advice the implementation of Component 3 or the SFM Project</p>	<ul style="list-style-type: none"> <li>- Overall guidance to project, via WEWG and Project Board, to ensure correspondence with energy policies</li> <li>- Channel (via WEWG) for coordinating SFM project with other donors</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Coordination between other donors and improved cook stove technologies. Linkages with FA and the Wood Energy Working Group</li> </ul>
RECOFTC	<ul style="list-style-type: none"> <li>- Has enabled the legalization of 46 CFs covering 35,378ha through signed community forestry agreements (s) and</li> </ul>	<ul style="list-style-type: none"> <li>- Build on RECOFTC support to date in registering CFs in the pilot/target area, supporting management and business</li> </ul>	<ul style="list-style-type: none"> <li>- Continued support to FA in registering a large number of additional CFs, providing the basis for further replication</li> </ul>	<ul style="list-style-type: none"> <li>- Sequential in the project's pilot/target area, commencing with joint systematization of</li> </ul>



Partner	Baseline results related to project objectives	Partnership arrangements		Partnership nature/mechanisms
		Project role	Partner role	
	<ul style="list-style-type: none"> <li>around 100 CFs are in process of getting legalized..</li> <li>- Effective up-stream support to FA and Regional FA Cantonments to streamline CF registration.</li> </ul>	<ul style="list-style-type: none"> <li>planning and the establishment of forest-based businesses to ensure their sustainability</li> <li>- Identification of opportunities for BD-friendly forest-based businesses for wider application by RECOFTC</li> <li>- Joint systematization of lessons learnt on CF, and communication to policy level</li> </ul>	<ul style="list-style-type: none"> <li>of the SFM- and business-based models developed by the project</li> <li>- Joint systematization of lessons learnt on CF, and communication to policy level</li> </ul>	<ul style="list-style-type: none"> <li>experiences to date</li> <li>- Parallel (different areas of attention), with ongoing interchanges of experiences between different areas of the country</li> </ul>
PACT/CFI	<ul style="list-style-type: none"> <li>- Supported to CF in the field with registration and initial business development training.</li> <li>- Is engaged in support to legislative development</li> <li>- Development of business training manuals</li> <li>- Has developed experiences with REDD</li> </ul>	<ul style="list-style-type: none"> <li>- Identification of additional options for BD-friendly forest-based business to which the business training manuals can be applied</li> <li>- PACT/CFI supports the development of CF communities' involvement in REDD carbon finance in Oddar Meanchey province</li> </ul>	<ul style="list-style-type: none"> <li>- Continue its relationship with FA and GDA NCP on development of legal rules for benefit sharing between government and community This may relate to taxation.</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- PACT/CFI may be a contractor in the project to implement one of the components</li> <li>- PACT/CFI to work with SFM project on REDD issues</li> </ul>
WCS	<ul style="list-style-type: none"> <li>- Has a long term relation with FA and good experience in biodiversity and forest protection.</li> <li>- High potential but newly developed commercial community forestry (CCF) model has not yet been evaluated</li> </ul>	<ul style="list-style-type: none"> <li>- Further replication and validation of CCF model outside of original Mondulkiri area</li> <li>- Insertion/strengthening of business aspects of CCF model</li> <li>- Identification of additional opportunities for BD-friendly forest-based businesses for wider application by WCS</li> <li>- Joint systematization of lessons learnt on CCF, and communication to policy level</li> </ul>	<ul style="list-style-type: none"> <li>- Continuation of pilot of CCF model in Mondulkiri, generating lessons applicable in the project pilot/target area</li> <li>- Joint systematization of lessons learnt on CCF, and communication to policy level</li> </ul>	<ul style="list-style-type: none"> <li>- Parallel (different areas of attention) – interchanges of experiences between Mondulkiri and project pilot/target area</li> </ul>
FFI	<ul style="list-style-type: none"> <li>- Has developed 20 Community Protected Areas (CPAs) inside Aural and Samkos.</li> <li>- Although FFI has no money for protection and continuation of work the</li> </ul>	<ul style="list-style-type: none"> <li>- Build on FFI work to date, by supporting development of forest-based businesses</li> <li>- Identification of additional opportunities for BD-friendly forest-based businesses for wider application by FFI</li> </ul>	<ul style="list-style-type: none"> <li>- Joint systematization of lessons on CPAs, and communication to policy level</li> </ul>	<ul style="list-style-type: none"> <li>- Sequential: project would provide continuity to FFI activities in pilot/target area</li> </ul>

Partner	Baseline results related to project objectives	Partnership arrangements		Partnership nature/mechanisms
		Project role	Partner role	
	<p>CPAs are still there and have opportunities to develop NTFP businesses that result in active protection of the CPA area,</p> <ul style="list-style-type: none"> <li>- FFI is at present only supporting few CPAs due to lack of funding</li> </ul>	<ul style="list-style-type: none"> <li>- in CPAs supported by FFI</li> <li>- Joint systematization of lessons on CPAs, and communication to policy level</li> </ul>		
CI	<ul style="list-style-type: none"> <li>- Development of Community Conservation Areas in Koh Kong and has secured funds for protection for the coming 4 years</li> <li>- Development of facility to generate yearly funds for protection.</li> </ul>	<ul style="list-style-type: none"> <li>- Validation and replication of PES mechanisms and CCAs developed by CI, in adjoining areas, inserting them into landscape approach</li> <li>- Identification of additional opportunities for BD-friendly forest-based businesses for wider application by CI</li> <li>- Joint systematization of lessons on CPAs, and communication to policy level</li> </ul>	<ul style="list-style-type: none"> <li>- Generation of mechanisms for PES</li> <li>- Joint systematization of lessons on PES and CPAs, and communication to policy level</li> </ul>	<ul style="list-style-type: none"> <li>- Parallel (different areas of attention): interchanges of experiences between Koh Kong and project pilot/target area</li> </ul>
GERES	<ul style="list-style-type: none"> <li>- Has been supporting the private sector in promotion and dissemination of energy efficient cook stoves, largely focused on urban areas</li> </ul>	<ul style="list-style-type: none"> <li>- Expansion of cook stove promotion into rural areas through training and business support</li> </ul>	<ul style="list-style-type: none"> <li>- Systematization of lessons learnt on cook stove production and marketing and carbon funding mechanisms, for adaptation/application to rural markets</li> </ul>	<ul style="list-style-type: none"> <li>- Parallel (different areas of attention): interchanges of experiences between project and partner in rural and urban areas respectively</li> </ul>
Lutheran World Federation and Mlub Baitong	<ul style="list-style-type: none"> <li>- Have provided livelihood support and training to CPAs and CF in the project target areas.</li> <li>- They have a long term commitment in the area.</li> </ul>	<ul style="list-style-type: none"> <li>- Insertion of business approach to CF management, complementing partners' work on livelihood aspects</li> <li>- Development and recommendation of sustainable forest management models</li> <li>- Support to legalization of CPAs and CFs</li> </ul>	<ul style="list-style-type: none"> <li>- Systematization of lessons learnt on livelihood and cultural aspects</li> <li>- Continued attention to livelihood and cultural aspects, complementing SFM project attention to business aspects and management/business planning</li> </ul>	<ul style="list-style-type: none"> <li>- Parallel (in same area): coordination of activities to ensure that they complement each other</li> </ul>
Wildlife Alliance	<ul style="list-style-type: none"> <li>- Forest protection in the southern Cardamoms</li> </ul>	<ul style="list-style-type: none"> <li>- Provision of business start-up funds to communities supported</li> </ul>	<ul style="list-style-type: none"> <li>- Systematization of lessons learnt on establishment of</li> </ul>	

Partner	Baseline results related to project objectives	Partnership arrangements		Partnership nature/mechanisms
		Project role	Partner role	
	<ul style="list-style-type: none"> <li>- Eco-tourism development and honey businesses</li> <li>- Development of CF</li> </ul>	<ul style="list-style-type: none"> <li>by Wildlife Alliance</li> <li>- Identification of additional opportunities for BD-friendly forest-based businesses for wider application by CI</li> <li>- Insertion of business approach to CF management</li> <li>- Development and recommendation of sustainable forest management models</li> </ul>	CFs and development of NTFPs	

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Annex 16. Relation between the M+E systems of the GEF project, DANIDA and the TWG (F+E)

UNDP	DANIDA	Suggestion for synergy with Forestry Programme Based Approach
<b>1. <u>Project Work plans and Budgets</u></b>	<b>1. <u>Project Work plans and Budgets</u></b>	
Quarterly work plans	-	
Annual work plans	Annual work plans integrated into the work plan of TWG F+E	Project work plan to be integrated into TWG annual work plan
Quarterly Budgets	-	
Annual Budget	Annual Budget	Annual budget to be included into the TWG work plan budget Joint UNDP/DANIDA work plan could be a good option
<b>2. <u>Progress Reports</u></b>	<b>2. <u>Progress Reports</u></b>	
Quarterly progress report	-	
Annual Progress Report (APR) for UNDP		Progress and issues of UNDP project to be captured in the TWG annual report
Annual Project Implementation Review (PIR) for GEF	-	
<b>3. <u>Financial Reports</u></b>	<b>3. <u>Financial Reports</u></b>	
Quarterly CDR	-	
Annual CDR <sup>78</sup>		
Funding Authorisation Certificate of Expenditures (FACE)		
Annual independent Audit	Annual independent Audit	
Spot checks	-	
Implementation of audit recommendations	-	
Project Chief Technical Advisor M+E framework		
<b>4. <u>Project Evaluation</u></b>	<b>4. <u>Project Evaluation</u></b>	
Mid-term evaluation	Annual joint appraisal mission	Include into the work plan of TWG
Final Evaluation	Build into a new M+E unit of FA (TOR is in Khmer)	Include into the work plan of TWG
Project Impact Monitoring		
<b>5. <u>Overall Technical Oversight</u></b>	<b>5. <u>Overall Technical Oversight</u></b>	
Field visits- by project teams and UNDP		Build into the work plan of the M+E unit of FA
Project Chief Technical Advisor		
Project Impact Monitoring		

Consultant  
M+E framework

**6. Day-today Management oversight**

Project Manager (Chief of Community Forestry Office or Deputy Director of the Forestry Administration who is charge of Community Forestry Office Government staff)  
Project Chief Technical Advisor (International)

Project Operation Manager (national professional)

**7. Financial flow**

Direct payment to sub-contractors  
Advance payment based on FACE

**8. Financial accounting system**

Atlas

**9. Project management oversight**

Project board with three roles, 3-4 times a year

**10. Project Management Office**

has not yet decided

**11. Project Director**

Propose to be FA Director

**12. Other**

Lessons learned Log and risk log

Fiscal year: 01 January-31<sup>st</sup> December

**7. Day-to-day Management oversight**

Coordinator (National Professional) serves as the coordinator of the TWG Secretariat and management of DANIDA support

Project Accountant

**8. Financial accounting system**

Accounting manual already in place for the TWG

**9. Project Management Oversight**

No project board. Use TWGE+E as policy board. Annual project review take place

**10. Project Management Office**

Used the secretariat of TWG as project management office

**11. Project Director**

FA Director

**12. Other**

Fiscal Year: 01 January - 31<sup>st</sup> March

Requests DANIDA to provide incentive to Project Manager

Project Advisor and Project Finance Officer should be based at secretariat office of the TWG for good coordination and communication

UNDP can present to the TWG E+E project progress and management issues (at outcome and impact level). UNDP will not seek the endorsement of TWG on the project report and work plan. UNDP will request DANIDA to sit into the board of UNDP project

Project management office should be either the office of community forestry or M+E office of FA

FA Director to sign on work plan, and CDR with UNDP

Build into the learning management system of TWG F+E or in the new M+E unit of FA

167