



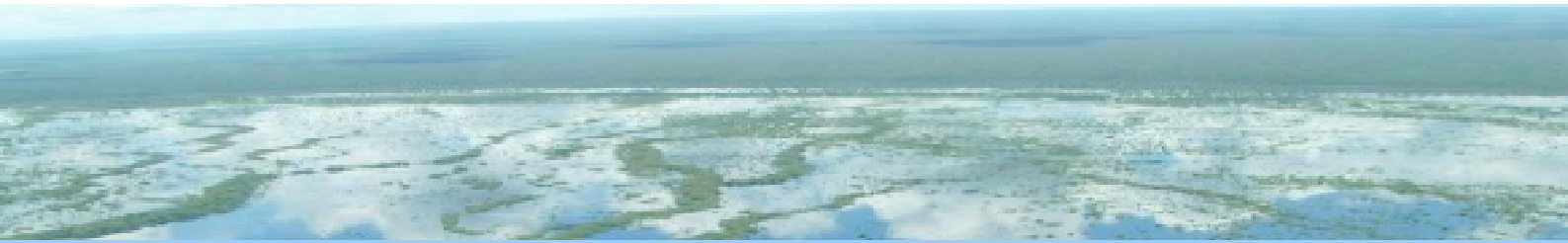
Government of Central Kalimantan



Government of Indonesia



Government of the Netherlands



# Master Plan for the Rehabilitation and Revitalisation of the Ex-Mega Rice Project Area in Central Kalimantan



## SUMMARY OF MAIN SYNTHESIS REPORT

OCTOBER 2008

Euroconsult Mott MacDonald and Deltares | Delft Hydraulics  
in association with  
DHV, Wageningen UR, Witteveen+Bos, PT MLD and PT INDEC



# **Master Plan for the Rehabilitation and Revitalisation of the Ex-Mega Rice Project Area in Central Kalimantan**

A Joint Initiative of the Governments of Indonesia and the Netherlands

## **SUMMARY OF MAIN SYNTHESIS REPORT**

***FINAL DRAFT  
October 2008***

## Preface

The Master Plan for the Rehabilitation and Revitalization of the Ex-Mega Rice Project area has been completed following the request of the Governor of Central Kalimantan for assistance from the Government of the Netherlands.

At the request of Bappenas, the Master Plan team has used Presidential Instruction (Inpres) No 2/2007 as a key reference but has been asked to consider ways in which Inpres 2/2007 could be improved based on new knowledge generated during the Master Plan project and, in particular, to “avoid the mistakes of the past”. The Master Plan team has therefore considered the best means of achieving the overall goal of the Inpres 2/2007 as stated by the President of Indonesia at the time Inpres 2/2007 was announced (see Box).

*“We want to rehabilitate and conserve a large part of the peat and land area and restore its condition. By doing this, we can prevent further degradation of the environment and restore the ecosystem. The second objective is to develop and optimize local agriculture in the remaining part of the area. Central Kalimantan is one of the provinces prone to forest fires. From year to year, it has been a source of the haze in our country. We really hope that this will decrease significantly as well as the other major problem of flooding. It is hoped that employment and agriculture can reduce poverty in the area. And, importantly, carbon dioxide emissions from Central Kalimantan will be reduced so that our atmosphere is more protected from global warming and climate change.”*

Dr. H. Susilo Bambang Yudhoyono, 16 February 2007 on announcing Inpres 2/2007.

The Master Plan team, drawing on international and national expertise including the University of Palangkaraya, has worked between October 2007 and October 2008 to collect existing and new data on the area, complete a range of analyses and work together with government and key stakeholders. A number of organizations made significant contributions to the formulation of the Master Plan including the Central Kalimantan Peatlands Project coordinated by Wetlands International and CIMTROP-UNPAR, who undertook surveys and provided important inputs to the Master Plan. CARE Indonesia provided a key role in leading community consultations held in nineteen sub-districts on the rehabilitation and revitalization of the EMRP area, which provided important information on community priorities. Bappenas, the three Working Groups of Inpres 2/2007, the Provincial Government of Central Kalimantan and District Governments of Pulang Pisau, Kapuas, Barito Selatan and Palangkaraya have assisted greatly through sharing information, knowledge and experience of the area.

Between July and October 2008, the draft Master Plan was presented to the three Working Groups of Inpres 2/2007 (Conservation, Cultivation and Community Empowerment), the Provincial Government of Central Kalimantan and other district stakeholders, the district governments of Pulang Pisau, Kapuas, Barito Selatan and Palangkaraya. Based on feedback from these meetings and expert reviews, the Master Plan was revised to produce a final draft version.

This Master Plan Summary Report is a condensed version of the Master Plan Main Synthesis Report and is aimed to be an accessible document for policy makers and others. In addition to this, a series of Master Plan Technical Reports have been completed.

The Master Plan team would like to thank all those who have given their time and knowledge during the planning process and hope that this Master Plan can provide a helpful guide to the rehabilitation and revitalization of this vast area and for the prosperity of the people living there. The Master Plan team takes full responsibility for any shortcomings in this Master Plan.

The Master Plan Team  
31 October 2008  
Palangka Raya

## Overview of the Master Plan

1. The Master Plan for the Rehabilitation and Revitalization of the Ex-Mega Rice Project (EMRP) Area presents a strategic framework and guidance for the implementation of Presidential Instruction 2/2007.
2. The area is a river delta of 1.4 million hectares dominated by more than 900,000 ha of peat with roughly 450,000ha being more than 3m deep. Deep peat (>3m) is protected under Presidential Decree 32/1990 and more than 400,000ha of the peat area >1m deep is now degraded and without forest cover.
3. Poverty is relatively high and the biophysical conditions remain challenging for agriculture. It is proposed that Inpres 2/2007 targets 227 villages and 450,000 people living within and around the EMRP area.
4. The Master Plan identifies seven key challenges for the rehabilitation and revitalization of the area: (1) wildfires, (2) peatland management and rehabilitation, (3) conservation and environmental management, (4) agriculture, (5) community and socio-economic development, (6) institutional and organisational capacity and (7) climate change.
5. Three future scenarios are analysed based on (a) a business as usual scenario, (b) a plantation scenario and (c) a rehabilitation and revitalization scenario. The conclusion is that only through a concerted effort to rehabilitate and revitalize the area can balanced development occur that leads to regional economic growth, poverty alleviation as well as positive environmental outcomes. Effective rehabilitation and revitalization of the area can also lead to significant reductions in greenhouse gas emissions.
6. The strategic approach of the Master Plan is based on three main pillars: (1) rehabilitate and conserve forests and peat lands, (2) provide an enabling environment for increased productivity of agriculture and (3) support the provision of basic infrastructure and services.
7. A spatial zoning of the area is proposed based on natural hydrological landscape units that defines four main management zones:
  - **Protection Zone (773,500 ha)** - Deep peat and biodiversity conservation.
  - **Limited Development Buffer Zone (353,500 ha)** - Cultivation with limited drainage and controls on existing drainage to minimize negative impacts on the hydrological function in the peat and maintain water levels as high as possible in the dry season.
  - **Development Zone (295,500 ha)** - Development in hydrological units without significant peat.
  - **Coastal Zone (40,000ha)** - Coastal protection and limited development.
8. Six main programs are proposed: (1) Fire prevention and management, (2) Spatial management and infrastructure, (3) Sustainable peatland management and conservation, (4) Agricultural revitalization, (5) Community empowerment and socio-economic development and (6) Institutional development and capacity building. Carbon finance, in particular, through projects to reduce emissions from the area can play an important part in achieving successful rehabilitation of the area.
9. It is considered vital that the following principles in the implementation of programs are adhered to: (1) an Adaptive Management Approach, (2) an Integrated Approach, (3) a Landscape Scale Approach, and (4) a Community-based Approach.
10. A summary matrix of the proposed interventions is presented. The key short-term actions and recommendations include:
  - Review and revoke permits for oil palm and other large-scale plantations that are on deep (>3m) and preferably on medium deep (1-3m) peat.
  - Revise the Annexes of Inpres 2/2007 with new knowledge of the existing conditions.
  - Revise the EMRP area part of the draft provincial spatial plan (RTRWP).
  - Focus agricultural revitalization on intensification, optimization and diversification of existing farm systems
  - Plan for only a limited expansion of new agricultural areas with a reduction in the target for new transmigrants
  - Take immediate action to build up fire prevention and management capacity prior to the 2009 dry season.
  - Further development of the knowledge base is needed.
  - Plan for an incremental program, starting with pilots in priority areas and learning by doing through an adaptive approach.

## 1. Introduction

In 1995, the Government of Indonesia initiated the Central Kalimantan Peatland Development Project – commonly known as the Mega Rice Project – to convert up to one million hectares of peat and lowland swamp for rice cultivation. The project involved extensive construction of thousands of kilometers of canals and has led to serious degradation and deforestation of the area as a result of drainage and wildfires. The land proved largely unsuitable for rice cultivation and roughly half of the 15,594 transmigrant families moved to the area have now left. Local residents have suffered through damage to the area's natural resources and the hydrological impacts of the project.

Recognising the need to address the situation, the Government has called for the rehabilitation and revitalization of the area through the issuance of the Presidential Instruction (Inpres) No 2/2007. Inpres 2/2007 contains three main interventions: (1) a Conservation and Rehabilitation Program, (2) an Agricultural Development Program and (3) a Community Empowerment Program, which proposes an additional 46,500 transmigrant families to be moved to the area. The Governor of Central Kalimantan has been appointed as the person



**Figure 1:** The Ex-Mega Rice Project (EMRP) area covers 1,462,000 hectares in the eastern part of Central Kalimantan.

responsible for the implementation of the Presidential Instruction with the intention that a Master Plan be produced to provide an integrated framework to rehabilitate and revitalize the EMRP area. This Master Plan, produced with the assistance of the Government of the Netherlands, is the result. Based on the most complete data available and current plans by relevant departments, it assesses the development and conservation potentials of the area, generates a number of development scenarios and provides strategic guidance and a framework with priority actions for the rehabilitation and revitalization of the area in line with the goals of Inpres 2/2007.

## 2. Existing Conditions in the Area

The EMRP area falls within the boundaries of four districts (Figure 1) - Kapuas (629,827ha of the EMRP area), Pulang Pisau (618,543ha), Barito Selatan (197,601ha) and Palangkaraya (16,324ha) – and is home 350,000 people.

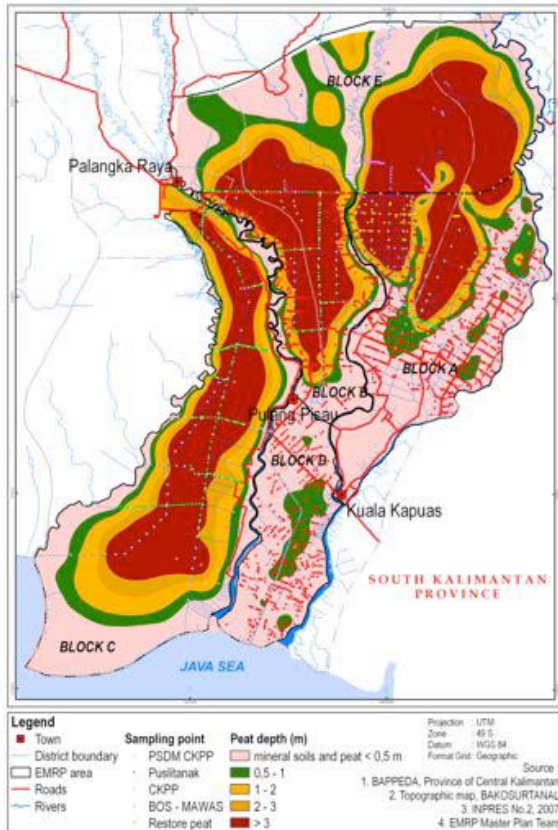
### Biophysical Conditions

**The EMRP area is a river delta landscape dominated by peat.** Peat of more than 0.5m depth covers about 920,000 ha of the EMRP area of which about 450,000ha has a depth of more than 3 metres (Figure 2). This deep peat is legally designated for protection under Presidential Decree 32/1990. The remaining 532,000 hectares consists mainly of mineral soils. Traditional settlements are mostly found along the riverbanks and levees, which are suitable for agriculture based on local water management and agricultural practices.

**The hydrology of the area is determined by (i) the sea tides entering the area, (ii) upstream river flows into the area and (iii) rainfall in the area.** The upstream areas of the rivers within the EMRP towards the main SPI canal are mostly non-tidal and their flows more seasonal being determined by river flows. River flooding is particularly problematic in these areas, especially along the Barito River, and needs management interventions including improved upstream watershed management. In parts of the south of the area tidal flooding occurs which has the potential for tidally irrigated agriculture. Drainage associated with the MRP has created problems with flooding in some areas during the wet season and water shortages during the dry seasons. Further peat subsidence in the area through inappropriate development and drainage may lead to floods becoming a more widespread problem.

**Peat domes exist between the main rivers but subsidence of peat near to the canals has caused the formation of 'mini peat**

**domes**'. These domes are caused by drainage impact of the canals on the peat being highest near to the canals, which has led to high rates of peat decomposition near to the canals. The result is that dry season canal water levels can be two metres or more below the highest parts of the peat dome.



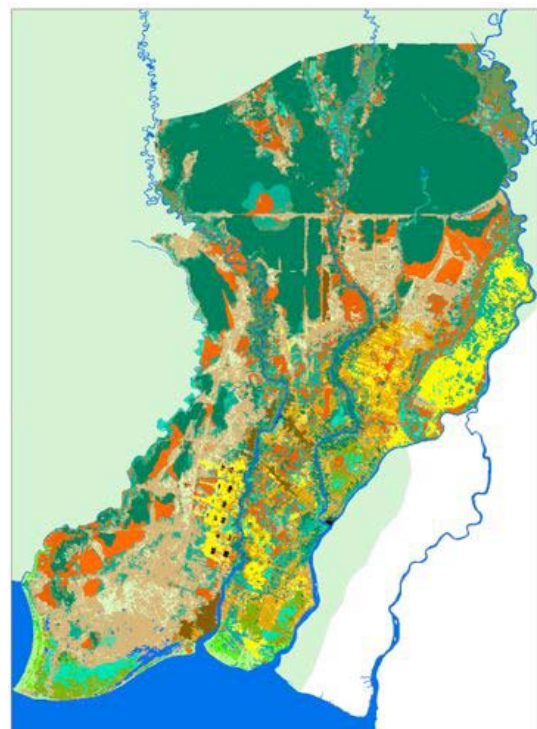
**Figure 2** – Peat depth map with sampling locations for the EMRP area. The map shows peat >3m deep (red area) with peat depth zones of 2-3m, 1-2m and 0.5-1m. The pink area represents mineral soils and shallow peat <0.5m.

**Hydrological assessments of the peatland suggest that groundwater levels are generally determined by local rainfall and evapotranspiration – groundwater flows are relatively limited.** The creation of the extensive canal systems and associated forest loss and degradation damaged the natural ‘hummock-hollow’ micro-topography over large areas. Even though the impact on groundwater depths is greatest near canals, the overall degradation and drainage has resulted in faster surface run off of rainfall from the peatlands and created a drier, fire prone landscape.

**Current land cover is dominated by forest, shrubland, degraded forest, agricultural land (including tree crops) and burnt forest and shrubs.** Healthy and partially degraded forests, cover about 550,000ha or 38% of the total area, while severely degraded forests cover a further 14%, shrublands and

grasslands cover 37%, and agricultural land makes up the balance with 12%. Overlay of the land cover map (Figure 3) with the peat depth map (Figure 2) suggests that roughly 400,000ha of peat more than 1 metre depth is now without forest cover.

**The area still has significant biodiversity value, especially in the remaining peat swamp forests and the mangroves in the coastal area.** Important species are found including the false gaviel (*Tomistoma schlegelii*) and a significant population of the orangutan (*Pongo pygmaeus*).



**Figure 3:** Land Use and Land Cover Analysis and Classification for the EMRP Area (based on SarVision 2008).

**Fire is the most critical cause of forest degradation in the EMRP area.** Drainage of peat and loss of forest cover has created ideal conditions for outbreaks of fire, which not only have created haze problems throughout the region (with associated health problems and economic losses) but contribute to global climate change. Almost all areas of the EMRP that are now non-forested have been burnt at some time between 1997 and 2006.

### **Socio-economic Conditions**

The area's economy is dominated by agriculture and a diversity of farming systems are found - rice based, tree crop based, and livestock based - depending on local conditions and the social groups involved. Significantly, the poverty levels of 36% in the EMRP area are the highest for the whole province, particularly in the transmigration settlements established as part of the Mega-Rice Project where poverty rates are as high as 60-70%.

**Basic services and rural infrastructures are poorly developed, especially in the remote areas.** Much of the area lacks adequate transportation systems, good quality fresh water and basic sanitation services. Health and education facilities are in need of increased staffing and remote villages have problems accessing these services. Inpres 2/2007 could provide a real boost, in terms of financing, to address these issues and make positive and much needed improvements in the provision of rural infrastructure and basic services.

**Land and water management practices are critical to agriculture in the area and are closely related to the ethnic and cultural background of communities and the biophysical conditions.** An important difference exists between management needs in the tidal lowlands and the non-tidal upstream areas, where flooding can be problematic. Large-scale transmigration started in the 1970s and 1980s in the swamp interior especially along the River Kahayan close to the peat. The layout of these schemes was based on early designs and water management is not effective with problems of limited water control, flushing and drainage, and acidity. The transmigration sites developed during the MRP in Block A are based on improved designs, however the supply canals do not function as envisaged as they pass over elevated peat domes. This area has a complex hydrology and construction of these systems was not completed.

**Agriculture, the key livelihood strategy in the area, is mixed in nature and a farm systems approach is taken in the Master Plan.** Farm systems have similar resource bases, enterprise patterns, household strategies and constraints that allow the development of specific development strategies and interventions that support farmers rather than specific commodities.

**Many farmers are subsistence farmers and do not sell their produce.** Many depend on off-farm work opportunities and the harvesting of forest products such as rattan, gelam and fish. Average incomes are reported in the region of Rp. 2-4 million per year. The

establishment of tree crops and the diversification of livelihood strategies from agriculture to off-farm income generating activities are major trends in the region.

Current problems faced by farmers for their livelihoods include: (a) land tenure issues, (b) access to finance, (c) access to markets and (d) skills and knowledge.

At present the biophysical conditions place limits on agriculture but improved agricultural techniques, better land and water management infrastructure and practices, and upgraded support services could help farmers raise productivity and provide easier access to markets. Across the area, fisheries and to a lesser extent forestry, provide an important contribution to local incomes, while new opportunities are emerging in the plantation sector, especially oil palm.

**Based on current land cover/land use and socio-economic aspects, the Master Plan identifies 12 Major Land Use Types in the EMRP area.**<sup>1</sup> Each major land use type has specific biophysical and socio-economic characteristics and requires a specific strategy for rehabilitation and revitalization.



*Flooding can be problematic, especially in the non-tidal areas of the EMRP area such as the Jenamas area along the Barito River in Block A.*

<sup>1</sup> Two main categories are defined: (A) *Natural habitats* including (1) Forest and degraded forest; (2) Heavily degraded forest, shrubland and grassland; (3) Mangrove forest; and (B) *Developed areas* including: (4) Traditional Dayak land use along rivers; (5) Traditional Banjar land use with large handils in tidal and semi-tidal areas; (6) Transmigration settlements in tidal area of Block D; (7) Transmigration settlements in tidal area of Block C; (8) Transmigration settlements in non-tidal area; (9) MRP transmigration in upstream semi-tidal area; (10) MRP transmigration; (11) MRP transmigration in non-tidal area; (12) Tambak.



### Institutions, Plans & Permits

Past reviews of development in the EMRP area have highlighted the dominance of specific sectoral interests and a lack of integrated and coordinated planning and development in the region. Positive steps are being taken by sub-national governments to address development needs in the EMRP area although national programs remain important. A number of initiatives focusing on community-based development have emerged at both the district and provincial levels. For example, Central Kalimantan provincial government has started the Village Safeguarding and Development program (PM2L), which promotes community-based development through the placement of village facilitators and focusing government resources to meet villagers' needs and aspirations. Such an approach should be expanded upon in the EMRP area with strengthening of village institutions being a significant need.

However, the policy for the EMRP area as defined by Inpres 2/2007 remains inconsistent with both a number of regional plans and policies as well as the detail within the annexes of Inpres 2/2007. Three main issues are highlighted:

- **Plantation permits** – Inpres 2/2007 allocated 17,500 ha of land for plantations. However, a review of permits issued up to March 2008 by district governments indicate that 28 permits, mostly for oil palm, have been issued covering 391,048 ha (Figure 4). Of these, 119,564 ha are found on deep peat (>3m) in contravention of Presidential Decrees 32/1990 and 80/1999. In order to reach the objectives of Inpres 2/2007, **it is strongly recommended that the permits on the deep peat are revoked or their boundaries revised away from the deep peat, and more advisedly, from much of the shallower peat.**
- **Transmigration** – Inpres 2/2007 proposes 46,500 families to be moved to the area based on the target of 93,000 ha of new irrigated rice land. A review of the proposed locations shows that a number of these are not suitable for transmigration based on factors such as unfavourable soil and water conditions, the presence of deep or medium deep peat and a remote location. **It is strongly recommended that the proposed new transmigration developments in Blocks B and C are cancelled.**
- **Road and Rail Development** – Road and rail development in the deep peat area may increase risks of further deforestation and peatland degradation, especially across peat domes.

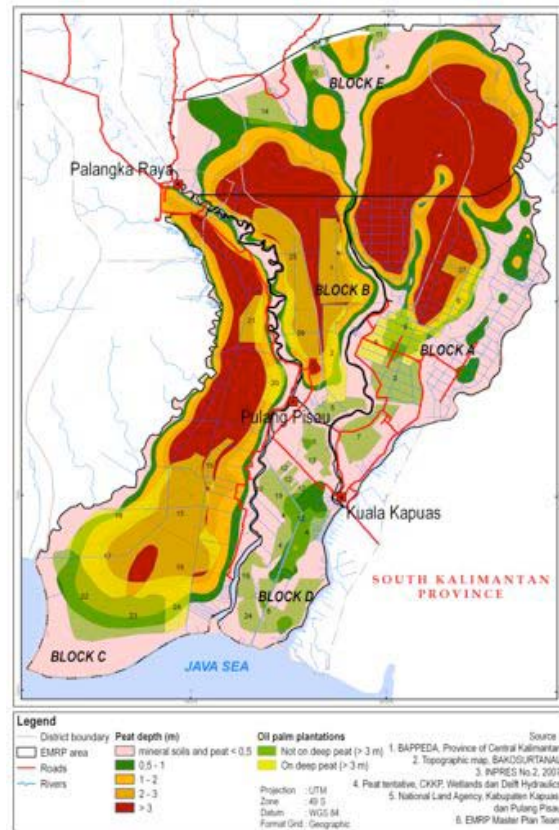


Figure 4: Overlay of plantation licenses (left, yellow shading) and the peat map. The red area shows peat >3m deep.

### 3. Challenges and Future Scenarios

Rehabilitation and revitalization of the EMRP area is an achievable policy objective but some major challenges have to be overcome and taken into serious consideration when planning the details of future interventions. In addition, three future scenarios – no significant progress with rehabilitation and revitalization, development of 390,000 hectares of plantations, or a successful rehabilitation and revitalization program – may occur given the existing situation. Policy makers need to be aware of these issues and possible scenarios before moving forwards with initiatives in the area.

#### Challenge 1: Wildfires

Human-induced wildfires are the most serious and immediate threat to the EMRP area. Once started, they are difficult to control, especially in peat. Without proper fire management many of the proposed interventions supporting the improved welfare of people and rehabilitation of the peatlands in the area will be impossible.

#### **Experiences and Potential for Fire Control =>**

Community-based approaches for the management of peatland fires in the EMRP by have been developed by the University of Palangkaraya (CIMTROP) through the EU-funded STRAPEAT and RESTORPEAT projects and the Dutch-funded CKPP project. Community fire brigades need upscaling and linking to a broader, effective institutional basis for fire prevention, management and suppression. In addition, farmers need viable alternatives to burning - the "no burn policy" should be focused on the private sector and government contractors but needs to ensure farmers do not cause wildfires.

#### **Experiences and Potential for Hydrological Rehabilitation =>**

Both the CIMTROP and CKPP initiatives have constructed dams to block canals with varying success. Dams constructed are typically composite dams consisting of gelam poles filled with either sand or peat. Problems include overtopping (water flows over the top of the structures), seepage (water flows through and around the structures) and destruction of dams through community action to bypass the dam or storm water flows. Further piloting of different structures is required. The Master Plan Guideline on Canal Blocking presents proposed design modifications and more detail on this issue.

### **Challenge 2: Peatland Management and Rehabilitation**

Past development in the EMRP has not considered the vulnerable nature of peatland and the impacts of drainage and clearance. Peatlands are a dynamic system and drainage leads to oxidation of peat and subsidence through the processes of compaction and peat loss as a result of oxidation. These processes lead to a change in the topography of peatland areas, which further affects hydrology and drainage leading to potential flooding problems.

An integrated, phased approach to peatland management and rehabilitation is required involving fire management (see above), hydrological rehabilitation, reforestation and community development that raises awareness and support for the proposed interventions and leads to long-term benefits for communities.

#### **Hydrological Management and Rehabilitation**

Appropriate management of peatland requires stopping the drainage of all deep (>3m) peatland (i.e. construction of canals and ditches) and minimizing the drainage of adjoining shallow (1-3m) peatland.

**On deep peat, further development should be prevented, current canals and ditches should be blocked and the ground water level raised where possible.** Hydrological assessments conducted by the Master Plan team suggest that canal blocking is unlikely to rewet large areas of peatland in the short-term but is valuable in limiting further degradation and changes in topography. Canal blocking may in many cases rewet zones of roughly 300-500m around a canal, which has value for ecological restoration and fire prevention. On shallow peat, drainage should be limited but, where it exists, water control structures should be introduced to ensure that water loss during the dry season can be minimized while during the wet season excess water can drain.

#### **Reforestation and Forest Rehabilitation**

An estimated 400,000 ha of peat more than 1m deep is now without forest cover and much of this needs to be reforested as part of the peatland and forest rehabilitation intervention. An additional 130,000ha of shallow peat (0.5m-1m) without forest could also be targeted for reforestation, although part of this area is likely to be used for agriculture by local communities.

**Enabling natural regeneration and succession to proceed is the most cost effective and important approach to reforestation, which requires wildfires to be eliminated from the area.** In the absence of fire, parts of the EMRP peatland area regenerate naturally, especially through pioneer species such as tumih (*Combretocarpus rotundifolia*). An IPB study at Kalamangan close to remnant forest found that although the seed bank was destroyed, wind-dispersed tumih regenerated four months after the 1997 fires and by 2004 a total of 103 species were found in their one-hectare study site.



*Drained, degraded and burnt peatland: canals should be blocked, further fire prevented and time given for natural regeneration. If the area cannot regenerate naturally, tree planting is required.*

**Given the regeneration barriers that exist and utility of trees for agro-forestry and other uses, reforestation through tree planting will be needed in the area.** In general, forests in the area have a range of

regeneration barriers: the absence of seed in the soil (the seed bank), reduced seed dispersal, competition, fire and soil nutrient availability. Although natural regeneration does occur, tree planting will be needed in (a) highly degraded areas that are not regenerating successfully, (b) in priority areas for biodiversity where enrichment of regenerating stands with certain peat swamp forest (PSF) tree species is valuable and (c) in and near villages where trees can provide livelihood opportunities and an incentive for peatland rehabilitation. In reforestation programmes, conditions of each site need to be understood so that appropriate species (and species-groups) are selected: blanket approaches are inappropriate. In most cases, using indigenous pioneer species appears most successful.

**Experiences and Potential for Reforestation =>** Various PSF restoration trials have been carried out in Central Kalimantan under the STRAPEAT, RESTORPEAT and CKPP projects by CIMTROP and the CKPP NGO consortium. At the same time, the Forestry and Agriculture departments of Central Kalimantan have also been involved in replanting programmes, most notably under the Gerhan programme. All replanting trials in the EMRP area have used only a limited number of species, often planted in single-species groups rather than in mixed assemblages, which will lead to artificial monocultures and potential pest problems. Also, the replanting trials have not recognised differences in hydrology and natural succession between areas to be replanted, and have taken a similar approach in all greening areas. Lastly, monitoring of seedling survival in greened areas has been variable. Monitoring is vital, as this provides information about survival, guides species choice, and will provide lessons about planting methodologies.

### Community Development in Peat Areas

The peat areas present specific issues for community development in addition to general issues discussed in Challenge 6 below. Communities, especially the Dayak communities, use the peat swamp forest and its waters for harvesting a range of non-timber forest products such as rattan, fish, *gelam* and *gemor*. A number of social challenges exist in the peat areas including: a broad range of people use the canals for transportation, which will require detailed participatory planning and negotiation of canal blocking in different areas; land tenure and boundary issues need resolving, requiring community mapping for resolving disputes; communities may wish to construct drainage canals for rubber and other crops, which can have negative impacts on the peat; and new transmigrants tend to have limited knowledge of effective ways of farming in peatland.

**Experiences and Potential for Community Development in Peatland Areas =>** Experiences of pilot projects in the area show that a community-based approach to peat rehabilitation is critical to the success of interventions. Planning in peatland areas will need to focus on how to minimize and mitigate unsustainable practices (e.g. deep drainage canals and ditches) and the sustainable management of peat land and its water resources (e.g. community involvement in the planning and construction of dams). Pilots of reforestation programs based on Payments for Environmental Services (e.g. CIMTROP Buy Living Trees, CKPP Biorights) have also been piloted, where communities are rewarded financially for successful reforestation outcomes.

### Challenge 3: Conservation and Environmental Management

About 555,000ha of peat swamp forest remains in a relatively good condition with conservation value and includes: (i) the **Mawas peat swamp forest** (288,000 ha), which comprises the eastern half of Block E and the northern part of Block A; (ii) the **Kapuas-Kahayan peat swamp forest** (250,000 ha), which comprises the western half of Block E and the northern part of Block B; and (iii) the **Sebangau-Kahayan peat swamp forest** (roughly 17,000ha) at the northern end of Block C.

**Fire, illegal logging and plantation development are the main threats to conservation in these peat swamp forest areas.** Mangroves in the south of the area are rich but threatened by brackish pond (*tambak*) development.

Environmental management in the area is beginning to address the key issues but needs to be strengthened to ensure effective outcomes (e.g. through improved Environmental Impact Assessments / ANDAL).

**Experiences and Potential for Conservation and Environmental Management =>** A number of conservation initiatives exist in the area: BOS and BKSDA are working to preserve the Mawas area, which requires formal status to be clarified; the Sebangau National Park Agency (*Balai Taman Nasional*) and WWF are working with in the Sebangau National Park to the west of the EMRP area; and CIMTROP manages the Sebangau Natural Laboratory Research area and a site in the north of Block C. Development of further partnerships and support for these organizations, including strong community partnerships in the Mawas and Sebangau areas, is required in order to improve conservation outcomes in the area. Strengthening environmental management including the EIA (ANDAL) process with a direct consideration of environmental impacts of development in peatlands is required.

## Challenge 4: Agriculture

About two-thirds of the total EMRP is dominated by peat while the mineral areas have extensive areas of (potential) acid sulphate soils, which create significant challenges for agriculture. Sustainability of agriculture in the EMRP area depends largely on proper management of these biophysical assets (i.e. the 'wise use' of peat land and improved management of land and water resources) and proper investments in human assets (e.g. agriculture, education and health services). The challenge is to identify specific rural development needs and opportunities and to focus investments in areas where the greatest impact will be achieved.

### Strengthening Farm Systems

Rice-based Farm System - Current biophysical conditions in the rice producing areas (mostly Block A and Block D) are marginally suitable for rice production. Currently about 110,000 ha is planted with rice with average yields of 1.5-2.5 tons per hectare. Key issues for the rice-based farm system in the area are: (i) low yields (especially as a result of poor biophysical conditions and poor land and water management practices), (ii) small farm size, (iii) limited farm diversification, and (iv) the absence of adequate local markets for agricultural products.

**A strategy of intensification and optimization of existing rice producing land to increase rice yields has the greatest potential for success.** This will require attention to land and water management, upgrading of agricultural and rural infrastructure and support services, especially the extension services. Limited new areas for agriculture could be developed in the most potential areas of block D and south of block A.

Tree-based Farm System - Rubber (33,500 ha in the EMRP area) and coconut (24,500 ha) are well established and are linked to smallholder agriculture, while oil palm is emerging as an estate crop with potential for jobs and a possible access to a new market for smallholder farmers. At present, there is suitable land for oil palm (perhaps 100-200,000ha) in the EMRP area, however more permits have been issued than suitable available land (see p. 7).

**More farmers in the EMRP area are specializing towards tree-based and other cash crops.** With relatively low labour requirements (e.g. rubber, fruit trees and vegetables), these provide opportunities to seek off-farm diversification to secure income.

However, many farmers in the EMRP are constrained by lack of resources (e.g. land, finance and quality seed) to make the transition to cash crops. Low yields, access to markets and farmer skills are the key challenges for tree-based systems in the EMRP area.

Livestock-based Farm System - The extent of the livestock-based farm system in the EMRP is limited to a number of the older transmigrant communities. The system consists of livestock and horticulture. Initial investments are high and without government support farmers do not have the financial capacity to buy livestock. No local breeding is done and all cattle are sold with new animals provided by the government.

Prospects for livestock (cattle and chicken) and horticulture seem good but need to consider how to integrate these into the existing traditional farming systems. For peat areas, livestock can offer income without the need for extensive land use and drainage assuming feed is readily available.

**Potential for Agriculture =>** Land and water management improvements are a pre-requisite for improving agricultural productivity. Assuming these are achieved, improving the skills and productivity of farmers (e.g. mechanization) remains a key issue. Current practices are based in local experiences but the exchange of knowledge between farmers is limited. Farmer field schools linked to research networks and strengthening of extension services could be developed. This would also involve a reorientation of field research away from experimental plots to on-farm research. Major investments in agriculture should be focused on the more fertile mineral soils of the area. Greater access to markets (through improved infrastructure) and better market information to farmers to ensure higher prices for produce are required. Intensification to improve yields in existing rice and tree-based farm systems and diversification of farm systems are strategies with the most potential for successful outcomes.

### Improving Land and Water Management

**Drainage management is the key to sustainable development of the EMRP area.**

However, drainage in peat areas (and to some extent mineral areas) will bring about irreversible changes that may conflict with peatland rehabilitation goals. The lowlands are dynamic landscapes and the sustainability of drainage schemes and reclamation projects is determined by present and future topographical relations of the land with river hydrology. Situations with poor drainage, both now and in the future, will lead to poorly performing reclamation schemes and the potential for increased flooding problems.

An essential feature of land and water management in (tidal) lowlands is the capability of the water management infrastructure to maintain a proper soil and water quality through controlled drainage and the flushing and leaching of acids and toxins. Poor water management and stagnant water conditions are a problem in the EMRP area and current designs and water management practices are neither complete nor adapted to the principles of controlled drainage, leaching and flushing. Careful attention needs to be given to water management between the peat and neighboring agricultural areas that requires a hydrological landscape perspective to land and water management, planning and development.

**Potential for Land and Water Management =>**

Land reclamation is a long-term and dynamic process. Interventions and designs need to take future drainage and flooding into account and planning is needed at the landscape hydrological scale rather than just scheme level. Redesign of existing schemes is required to improve soil and water quality and undeveloped land in and around agricultural blocks, especially in the MRP transmigration sites of Lamunti, Dadahup and Palingkau, need to be brought into production and management: the proposed transmigration "refill" program can contribute positively towards this goal. However, conservation and development areas should be spatially separated, preferably with a buffer zone. Successful development of existing transmigration areas is required to reduce pressures on forest and other peatland resources as part of an integrated lowland development strategy.

**Fisheries Development**

Acidity, resulting from drainage canals across the peat domes, and saltwater intrusion into the rivers places limits on the development of fisheries in the area and sedimentation of rivers as a result of deforestation causes a decrease in fish stocks. As a result, aquaculture practices are often unproductive due to the inappropriate selection of sites and water quality issues.

**Potential for Fisheries =>**

Opportunities in the future include (a) freshwater aquaculture brackish water ponds in coastal lowlands (*tambaks*), freshwater ponds (*kolam*) and cages (*karamba*) located in the rivers, (b) expansion of traditional pond capture fisheries (*beje*) and (c) development of ornamental fish of peatland waters. Current capture fisheries (including *beje*) require fish stock assessments to be undertaken to avoid unsustainable exploitation of the fishery. In general, an integrated plan for fisheries development is needed along with capacity development of the Fisheries Agency. Further details are provided in the Master Plan Technical Report on Fisheries.

**Challenge 5: Community and Socio-economic Development**

Communities in the EMRP area have many positive assets that form the basis for providing assistance for community and socio-economic development. However, communities in the EMRP also face a range of problems and constraints on their development.

Consultations and workshops with community representatives at sub-district and district levels identified four main issues: (a) locally weak institutional relationships, (b) poor supportive infrastructure and services, (c) lack of producer (including farmer) groups, associations and cooperatives, and (d) lack of secure land tenure. Programs need to focus on the four core issues but need to be adapted to the socio-economic context of the communities. Traditional leaders (e.g. the *damang*) should be engaged where possible.

**Potential for Community and Socio-economic Development =>**

On-farm and off-farm livelihood diversification strategies to reduce risks are common in the EMRP area. There is a clear trend away from rice cultivation towards tree crop farming and vegetable growing. The policy on zero burning accelerates this process. Village development visions include (a) to increase tree crop farming: rubber, rattan and fruit trees; (b) to increase food self-sufficiency; (c) good market access through road improvements and strengthened marketing networks; (d) good access to health and education services; (e) rehabilitation of secondary canals; (f) farming skills and strong farmer organizations; (g) strong partnerships with GOI and other partners who can support agricultural development.

**Challenge 6: Institutional and Organisational Capacity**

The rehabilitation and revitalization of the EMRP area is an immensely challenging program that requires integration and an innovative collaborative response from government, donors and NGOs.

**An effective institutional mechanism from Jakarta to Palangka Raya and through to the villages needs to be established.**

The establishment of the National Team for Inpres 2/2007 and the three working groups (*Pokja*) provides the potential for the development of an integrated response, which needs to be assured through effective planning, implementation, monitoring and evaluation (which requires a Standard Operating Procedure for integrated implementation of Inpres 2/2007) and the establishment of a supportive institutional mechanism from Jakarta to the villages. In Palangkaraya, a secretariat staffed by full-time professionals is required to

drive an integrated response with the coordinating teams at the province and district levels. Sub-districts (via the Camat) and villages (via village leaders) need to be a focus for action in the field and can play a key role in supporting an integrated and participatory approach.

**The technical knowledge base needs further development with a strong emphasis on monitoring and understanding outcomes.** Work undertaken by the Master Plan team has established that the knowledge base for successful rehabilitation and revitalization of the EMRP area remains limited. Basic inventory data is required, especially on topography, hydrology, peat characteristics and land suitability. Current knowledge of the functioning of the tropical peat ecosystem, while having advanced in the last 10 years, remains far from complete. Basic and applied research, especially relating to peat rehabilitation and carbon, needs to be completed. International, national and local expertise, especially from the University of Palangkaraya, needs to be mobilized to support development of this knowledge base.

**Local government and NGO capacities need to be built up to cope with the potential interventions and new approaches that need to be initiated.** Rehabilitation and revitalization of the EMRP area will require local organizations to acquire new knowledge and build capacity for the implementation of programs. Within government training institutions, there is limited capacity to train staff in lowland and peatland management, which requires upgrading. International and national expertise on peat and lowland management issues and training capacity should be mobilized. The development of key government training institutions and the University of Palangkaraya should be a priority for increasing knowledge and skills in local government and NGOs.

### **Challenge 7: Climate Change**

Climate change should become an integral part of all planning in the EMRP area. Climate change will most likely affect Indonesia and the EMRP area through longer dry seasons and an increase in frequency of floods. Climate change may therefore lead to an increase in fire risk and will affect agriculture. Although climate change is a global issue it needs to be addressed locally. There are two basic approaches to respond to this: (a) mitigation through reducing emissions and (b) adaptation to the expected impacts of climate change.

**Successful rehabilitation and revitalization of the EMRP can make a major contribution to climate change mitigation.** Estimates of carbon emissions from peatland in SE Asia are in the order of more than 1 billion tonnes of carbon dioxide per year on average (equivalent to ~4% of global emissions) and fire has been the major source of emissions over the last decade.<sup>2</sup> Conservation of peatlands and forests (which store carbon), fire prevention and limiting drainage (which can reduce ongoing emissions) can provide major emissions reductions of global significance and may generate significant revenues.

**Real incentives need to be developed to mitigate the risk of such emissions.** Carbon finance mechanisms such as REDD (currently under development), CDM (which as yet has no approved methodology for tropical peatlands), and “voluntary” carbon emission reduction schemes could make peatland rehabilitation economically attractive and provide a significant source of income for the region. Strong support and action from the Government to develop these mechanisms (including the sharing of benefits between government and communities) through pilots and other initiatives would be a strategic means of achieving the goals of Inpres 2/2007.

**With livelihoods so strongly rooted in climate sensitive sectors (agriculture and fisheries) adaptation will also have to be considered.** It is projected that sea levels will rise in this century by 0.2 - 0.6 meters. This will increase flooding along the coastal zone by 2050 (assuming a 20 cm rise in sea level) and saltwater intrusion in coastal areas, which will create problems with drinking water availability and tidal irrigation schemes. Future planning will need to take these issues into account.

**Potential for Responding to Climate Change =>** The EMRP area has been proposed by GOI as a pilot for REDD projects focusing on peatlands. At present, Australia has initiated the Kalimantan Forest and Climate Partnership focusing on 100,000ha of forested and degraded peatland in Block A and Block E; the CKPP consortium is planning a second project phase with a focus on carbon including mobilization of resources through Wetland International's proposed private sector supported Global Peatland Fund; and a private sector initiative to establish a carbon project in 50,000ha of degraded peatland in Block C. With interest in such initiatives since the UNFCCC meeting in Bali in December 2007, other donors are also interested in exploring opportunities to support carbon-related projects in the area.

<sup>2</sup> Hooijer et al. (2006) Peat CO2. Page et al. 2002

## Future Scenarios

Given the range of challenges as well as the prevailing biophysical and social conditions in the EMRP area, the Master Plan considers three possible scenarios for future development. These are not predictions of the future but have been developed to shed light on possible consequences of present decisions. The three scenarios and their potential outcomes 25 years from now (2033) are discussed in turn and summarized at the end of each discussion.

### Scenario 1. There is no change in the current development paradigm

In this scenario there is no more blocking of canals, no development of plantation permits, no more transmigration, government services remain unchanged, no carbon finance programs are implemented and fires continue at current frequencies with major fire outbreaks every 10 years.

**Outcomes** - By 2033, the population of the EMRP reaches approximately 630,000, land use remains suboptimal due to land and water management problems and is dominated by small holders who by 2033 will have used up most of what currently remains of idle land. Fire outbreaks occur at current levels within a ten-year cycle, and peat subsistence continues. Illegal logging in forests continues with a resulting reduction in locally needed forest products. Flooding remains a problem and the EMRP area remains a net emitter of carbon through fires and peat subsistence. Poverty is not alleviated and remains a chronic problem.

**Summary** – A future of low growth and continued environmental degradation. With this scenario there will be very slow growth in per capita income and poverty remains high. The area will remain a source of global carbon emissions.

### Scenario 2. Plantation development is implemented as currently planned

Large parts of the EMRP area are converted to oil palm concessions, there is no peatland rehabilitation, population growth naturally increases. Market conditions and government services remain unchanged, no carbon finance programs are implemented, and major fires occur at on a ten-year cycle (20 years for plantation areas).

**Outcomes** - The population of the EMRP area reaches approximately 630,000 by 2033. Smallholder farms cover less land area than the first scenario. Approximately 400,000 ha of the total EMRP area will be under plantations -

mostly large oil palm estates. Land use will be suboptimal due to land and water management problems. Fires remain at current frequencies. Peat subsidence remains high in the peat areas drained for oil palm and near the MRP canals. Peat may largely disappear in the southern parts of their current distribution in blocks B and C. Flooding will increase as peat subsides in the areas of peat with oil palm. Agricultural pest and diseases become a serious problem. Carbon emissions continue at high rate - especially if fire is used for land clearance for plantations. Although emissions from fire might be reduced in plantations these limited gains will be offset in the long-term by the emissions of carbon from the oxidizing peat. Regional economic growth will be largely dependent on the price of oil palm. Total tax revenues could be in the region of USD 70-80 million per year from the oil palm but the direct revenues for the province and districts would be in the region of USD 2 million dollars. These earnings could be offset by the need to build additional infrastructure to deal with the increased flooding caused by the loss of peat. Up to 60-100,000 low wage jobs could be created, but the risks regarding income based on the reliance on CPO prices would be higher than the diversified strategy farmers currently adopt.

**Summary** - This scenario produces high growth but at a higher risk and with negative environmental impacts on the peatland. The livelihoods of tens of thousands of people who work on plantations are dependent on continued high commodity prices and lack of pest invasions. Negative impacts on the peatlands and local hydrology are unacceptably high.

### Scenario 3. Peatland Rehabilitation and agricultural revitalization

Peatlands and their forests are rehabilitated, tree crop plantations – including 100,000ha or more of oil palm – are established in suitable clear areas in accordance with spatial plans, population growth increases naturally and carbon finance schemes are developed and implemented. Agricultural productivity improves - led by farmers and the private sector – doubling yields in 25 years.

**Outcomes** - Population reaches approximately 630,000 by 2033. Land cover includes large areas of regenerating forest along with oil palm and other tree crops. Land use is improved due to better management of land and water, which contributes to higher yields of rice and other crops in areas suitable for agriculture (ie. away from the deep peat). Rehabilitation of peat areas and effective fire management results in

a reduction in fires and carbon emissions leading to significant carbon revenues (possibly in the region of USD 50-100 million or more per year) that are shared equitably between project proponents, communities, farmers and government to provide positive incentives ensuring long-term sustainability.<sup>3</sup>

Annual economic growth averages 5% and is spread over a range of commodities and is driven by higher yields based on the revitalization program. Roughly 15-25,000 new jobs are created, especially in the plantation sector and through carbon projects with several thousand people employed in fire protection, water control, and reforestation etc. Household incomes rise due to improved agriculture and carbon revenues and with improved services infrastructure poverty rates are reduced.

**Summary – The scenario produces a balanced, sustainable development outcome.** The economy grows, poverty is reduced, environmental services are sustained, and carbon emissions are reduced.

#### Master Plan for Rehabilitation and Conservation

In 2007, the Department of Forestry completed a Master Plan for the Rehabilitation and Conservation of the EMRP area (Permen 55/Menhut-II/2008). The Master Plan considers three periods: (i) 2007-2011 to improve structure, (ii) 2011-2017 to rehabilitate function, (iii) 2017 onwards for long-term management.

The goals of the Master Plan are: (1) Protection of forest and establishment of boundaries according to function and (2) Forest rehabilitation and ecosystem restoration on the context of revitalization.

The Master Plan has three main *demand-driven* principles are:

1. Confirmation (*pengukuhan*) of the forest area that will be delineated must be completed **after** allocation of other land uses with commitment and support for the agreed forest land allocation;
2. The presence and recognition of communities living based on customary law (*adat*) shall be seen as an integral part of the conservation of the area and in the process of confirming the forest area and its status as state forest (*hutan negara*), forest under rights (*hutan hak*) and/or customary forest (*hutan adat*);
3. Conservation of the EMRP area will prioritise "access tenure" over "land tenure".

<sup>3</sup> This estimate is based on estimated current emissions from the EMRP area of 40-80 Mt/yr of carbon dioxide (roughly 11-22 MtC/yr). Assuming emissions reductions of 50% from interventions and a carbon price of USD10 per ton of carbon, this is equivalent to USD 50-100 million per year. For more information on the estimate of carbon emissions, see the Master Plan Technical Report on Peatland Subsidence and CO<sub>2</sub> Emissions.

## 4. Strategy for the Rehabilitation and Revitalization of the EMRP Area

The analysis of three future scenarios – supported by the feedback during consultations with stakeholders - indicate that "rehabilitation and revitalization" is the only positive future for the EMRP area, reinforcing that the issuance of Inpres 2/2007 was a highly appropriate policy decision.

The proposed long-term management goal for the EMRP area is to:

**"Create long-term prosperity for the local population through the rehabilitation of the area's ecosystems, developing appropriate infrastructure and public services, and increasing agricultural productivity".**

This goal has a three-pronged strategy:

- Rehabilitate and conserve forests and peat lands;
- Support provision of basic infrastructure and services;
- Provide an enabling environment for increased productivity of agriculture.

It is anticipated that achieving long-term sustainable management of the EMRP area will take more than five years as indicated in the Master Plan for Conservation produced by the Department of Forestry (see Box, left). The strategy for rehabilitation and revitalization presented here should be considered as an initial phase during which important steps can be taken and lessons learned.

#### Medium Term (Five Year) Goals

- Eliminate wildfires from the area
- Establish detailed spatial plans, effective systems to manage spatial development and develop macro-infrastructure;
- Rehabilitate and conserve existing peatland and forest resources;
- Increase agricultural productivity in the area through intensification and diversification of farm systems, upgrading of land and water management infrastructure and practices and limited development of new areas;
- Reduce poverty through community empowerment and socio-economic development;
- Establish an effective institutional basis and capacity for the rehabilitation, revitalization and long-term management of the EMRP area.



### Short-term Priorities for 2009

- Manage and mitigate risks especially fire;
- Resolve outstanding or potential conflicts regarding the draft provincial spatial plan (RTRWP) and oil palm plantation expansion;
- Develop the knowledge base, approaches and detailed plans for the achievement of the medium term goals;
- Review, continue and initiate new projects for rehabilitation and revitalization.

### Target Area and Villages of Inpres 2/2007

The Master Plan recommends the programs under Inpres 2/2007 are targeted at all 187 villages within the EMRP area and 40 villages in the surrounding area. As an area-based development initiative, Inpres 2/2007 will have greater impact if these additional villages are included. Programs will need to be adapted to the specific needs and socio-economic conditions in the villages.

### Key Principles

In translating strategies into management interventions and programs several key principles will be adhered to:

**1. Adaptive Management** - It is neither possible nor desirable to provide a “blue-print” for implementation of Inpres 2/2007. During implementation lessons will be learned as to what works and what does not and these lessons should be included in future planning. Adaptive management promotes a process of “learning by doing” and integrates planning and design with ongoing monitoring, assessment and evaluation.

**2. Adoption of an Integrated Approach** - Implementation of the master plan will be complex and will involve a large number of sectors - each with its own interests and responsibilities. A major challenge will be to integrate and harmonise these needs so as to reduce any conflicts and to maximise synergies.

**3. Planning and Implementation at a Landscape Ecosystem scale** - The different parts of the landscape should not be considered in isolation but integral components of a complex landscape mosaic, with each part having affects on its neighbours. The rehabilitation and revitalization program needs to take a resource-based approach to lowland management.

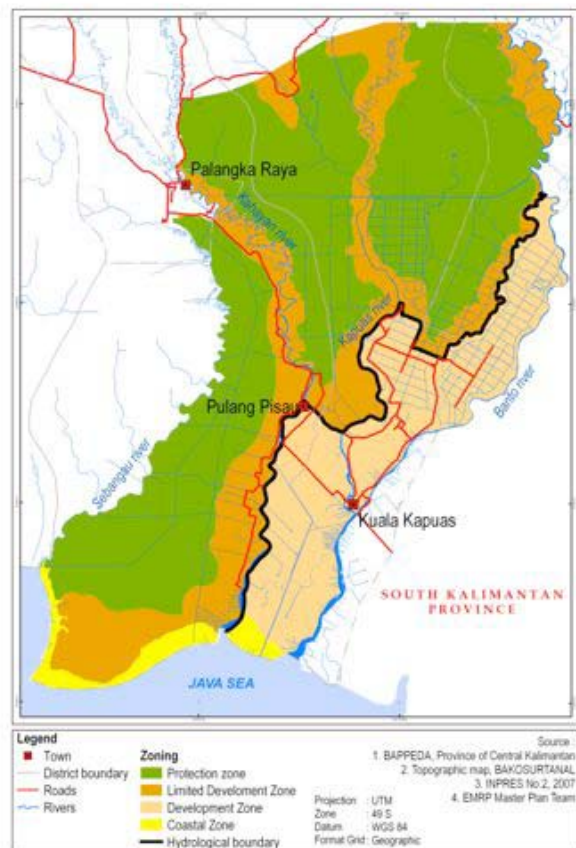
**4. Meaningful Involvement of Communities** - Communities in the EMRP area should be aware of and have a voice and role in planning for their environment and the development of their respective areas. Feedback from local communities is essential to measure the

effectiveness (or not) of interventions and will serve to constantly improve planning and future actions.

## 5. Spatial Zoning

Spatial zoning is a key aspect to the management of the area. The Master Plan defines two levels of spatial categories - Management Zones and Management Units.

**Management Zones** recognize that peat and lowlands need to be managed at a landscape level and are based on natural hydrological boundaries. The natural hydrological boundary that separates the peatland and predominantly mineral areas runs from the mouth of the Kahayan River to Anjir Kalampan, up the Kapuas River and through block A to the Barito River.



**Figure 5:** Proposed Management Zones in the EMRP Area

The EMRP area has four kinds of management zone (Figure 5):

**1. Protection Zone (Kawasan Lindung) - 773,500 ha** - Defined by combining the deep peat (>3m) and areas with high biodiversity value. The first priority in this zone is to conserve the remaining forest and peatlands by strong action against illegal logging and fires, and, where deforestation has taken place, through rehabilitation. Drainage should be

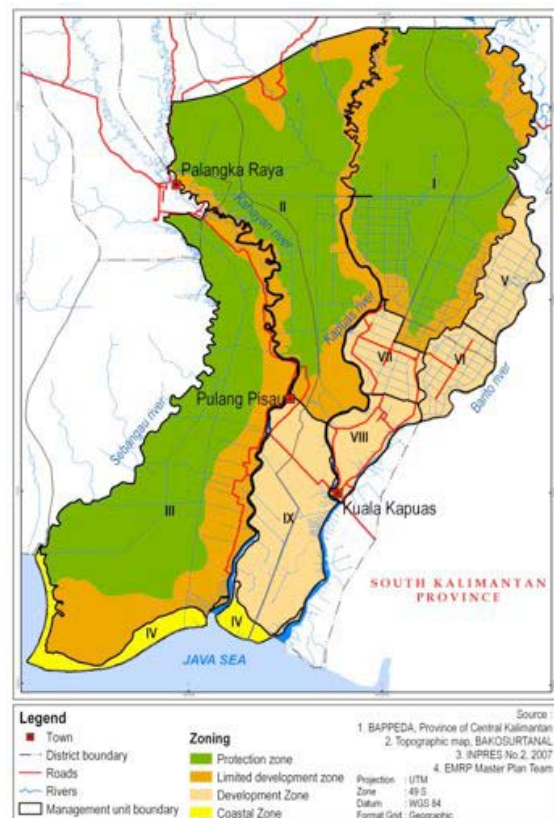
minimized and stopped altogether. Where drainage is currently in progress canal blocking will be needed. It is proposed that each of the three protection areas (green areas in Figure 5) become Forest Management Units (*Kesatuan Pengelolaan Hutan*). Some of the intact forests within this zone qualify as conservation areas.

**2. Limited Use Buffer Zone (*Kawasan Penyangga - Budidaya Terbatas*) - 353,500 ha** - This zone is effectively a buffer between the protection zone and the agricultural development areas defined by the hydrological boundary. This land surrounding peat domes with a peat depth of less than three meters needs to be managed with limited drainage. The zone also includes the strip of mineral soils near to the rivers where mostly Dayak communities live. Interventions in Buffer Zones can only be done if they do not conflict with the functions of the protection areas and the regional hydrology. Large-scale developments requiring drainage such as oil palm plantations and transmigration are not recommended for this zone.

**3. Development Zone (*Kawasan Budidaya*) - 295,500 ha** - This zone constitutes areas that are hydrologically independent of the peat domes and that have no biodiversity value. The zone has no significant peat deposits and is dominated by mineral soils, so development for large-scale agriculture, plantations, animal husbandry and fisheries can be the priority policy goal.

**4. Coastal Zone (*Kawasan Pesisir*) - 40,000 ha** - This zone is comprised of mangrove forests and other coastal land cover in the southern part of the EMRP area. Mangrove forests in good conditions and those that are regenerating have been proposed for conservation. Highly degraded areas could be considered for semi-intensive aquaculture.

**Management Units** are areas within the Management Zones that require integrated management to achieve the overriding policy goal. In the Protection Zone and Limited Use Buffer Zone, the Management Units are defined by the hydrological boundaries of these combined zones: hence 'protection' and 'limited use' is managed within a single unit. Management Units in the Development Zone are delineated in accordance with land suitability and socio-economic factors. The Coastal Zone is a single management unit. Nine management units (I-IX) are defined (Figure 6).



**Figure 6:** Proposed Management Units in the EMRP Area.

**Box: Criteria for Development in the Limited Development Buffer Zone**

Laws and regulations in Indonesia define that peat more than 3m in depth should be protected and conserved. However, this boundary is not a natural boundary and peat less than 3m deep still forms part of the peat dome and is hydrologically linked to the deeper peat. Peatland rehabilitation and 'wise' sustainable use of peatland therefore requires careful management of peat less than 3m deep, which in the EMRP area covers about 450,000ha of the area.

Given that peat less than 3m is not legally protected, the Master Plan proposes a limited development buffer zone. Within this zone large scale development, especially in peat over 1m should not occur if the area's peat resource is to be managed sustainably. As a result, development that requires extensive drainage of the peat such as large-scale plantations and transmigration should be prohibited in areas with extensive peat over 1m depth.

Where communities already exist in this zone, such as Dayak communities living along the Kahayan, Kapuas and Barito Rivers and transmigrants in Pangkoh, Lamunti and other transmigration areas, support should be given to assist communities to utilize the peat resource sustainably. This will require action to limit and control drainage (depth and intensity of drainage canals, water control structures) and to minimize new drainage in deeper peat areas. A combination of village-based resource planning and extension can help with this. Overall, the aim is to minimize drainage and degradation of the peat in this zone, while enabling communities to make sustainable use of their resources. Further definition of criteria in this zone is required, which could form the basis for local legislation on this issue.

## 6. Main Programs

Six main programs are proposed for the rehabilitation and revitalization of the EMRP area:

1. Fire Prevention and Management
2. Spatial Management and Macroinfrastructure
3. Peatland Management, Rehabilitation and Conservation
4. Agricultural Revitalization
5. Community and Socio-economic Development
6. Institutional and Capacity Development

### Program 1: Fire Prevention and Management

**Objective:** Eliminate wild fires from the EMRP area

It cannot be over-emphasized that prevention of fires is a major and urgent intervention. Without effective fire prevention and management, rehabilitation and revitalization efforts remain at great risk of failing.

**Approach:** Effective fire management requires several components. This first is effective fire management institutions and Indonesia is now fortunate in having a ministerial level agency *Badan Nasional Penanggulangan Bencana* (BNPB) to coordinate the prevention and response to fires and acts with its provincial offices BPBD. Other components considered important are the development of a **Fire Information System** to analyse fire risk and to predict where fires might break out, a **Fire Prevention Capability**, **Fire Preparedness** to ensure that the human and logistics resources are ready and adequate, **Fire Suppression** as a response to fires that have already started, and **Fire Impact Analysis** to assess causes of fires and to identify any culpable parties and, if necessary, to instigate any legal follow-up. Existing community-based approaches need to be expanded and linked to the broader fire prevention and management system.

**Priority Actions:** The following actions are recommended by the Master Plan to improve fire management in EMRP area (and Central Kalimantan as a whole):

- Clearly define and respect the roles and duties of the agencies and bodies tasked with undertaking fire prevention and management.
- Ensure effectiveness and finance of parties involved with fire management at all levels - national to village.
- Promote the establishment of clear operating procedures to ensure full

coordination, cooperation and communication between the parties involved.

- Support capacity building for all parties involved and have this reflected and supported in government programming and budgeting
- Promote the consistency of policies and regulations concerning fire management across all levels of government integrated with other sector plans.
- Strengthen and expand existing community-based fire management (and suppression) capacities and integrate the existing organizational framework
- Strengthen and expand other fire management (and suppression) capacities.
- Implement in concert with existing regulations and policies the aims of the Palangka Raya declaration on forest and land fires.

### Program 2: Spatial Management and Macro-infrastructure

**Objective:** Establish detailed spatial plans, effective systems to manage spatial development and develop macro-infrastructure

As one of the main goals of spatial planning is to define the pattern of macro-infrastructure development in support of regional development, these are combined into one programmatic focus. However, these are cross cutting issues and require an integrated development approach in the area.

Currently, spatial and development plans are not yet aligned to the plans for rehabilitation and revitalization in the EMRP area. Furthermore, there has been a systematic failure of the control of spatial development evidenced by the issuance of plantation licenses on deep peat.

Macro-infrastructure (roads, bridges, river transportation, water and flood mitigation) should be developed in accordance with the revised spatial plans for the EMRP area. This will include ensuring adequate transportation infrastructure is in place but that environmental impacts are mitigated and macro-infrastructure is not developed that compromises the rehabilitation and revitalization goals. An example of such development is the construction of roads into deep peat areas and through conservation areas. The Master Plan Technical Report on Green Engineering offers some suggestions for how infrastructure development in peatland areas can limit environmental impacts.

**Approach:** The Master Plan provides guidance for development of the area based on a vision of a rehabilitated and revitalization EMRP area, which can be used to develop detailed spatial plans that guide investments for macro-infrastructure in the area. At the present time, consultants mobilised by the Department of Public Works (Directorate General for Spatial Planning) are completing a review of spatial planning in the EMRP area. Once completed, a detailed spatial plan (*Rencana Tata Ruang Kawasan Strategis / Khusus*) will need to be completed by technical consultants that have an understanding of peat and lowland development. Institutional mechanisms based on Law 26/2007 on Spatial Planning will need to be implemented to control spatial development in the area.

**Priority Actions:** The following actions are proposed by the Master Plan for spatial planning and infrastructure in the EMRP area:

- Revise the Indicative Spatial Plan in the Annexes of Inpres 2/2007 and the draft provincial spatial plan (RTRWP) for the EMRP area using the new information from the Master Plan;
- Conduct detailed spatial planning in the EMRP area based on the Master Plan using technical consultants with experience and knowledge of peat and lowland areas;
- Update district spatial plans (RTRWK) based on the above;
- Ensure integration between spatial planning and development planning;
- Implement a mechanism from provincial to district levels that ensures spatial development is controlled according to spatial plans based on Law 26/2007;
- Produce a macro-infrastructure investment strategy based on the detailed spatial planning
- A multi-year construction program of macro-infrastructure based on the macro-infrastructure investment strategy.

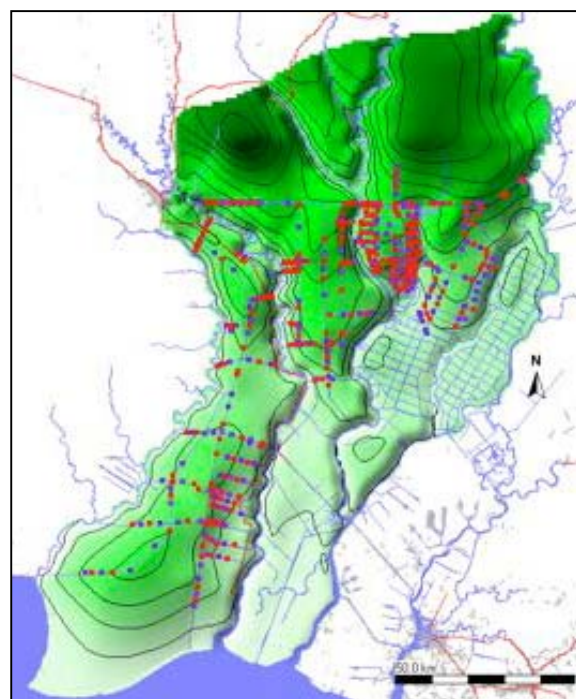
### Program 3: Peatland Management, Rehabilitation and Conservation

**Objective:** Rehabilitate and conserve existing peatland and forest resources

Peatland management, rehabilitation and conservation is focused on the Protection and Limited Use Buffer Zones. Primary interventions include (a) rehabilitation of hydrological functions and water management, (b) forest management and rehabilitation, (c) conservation and (d) establishment of protection and conservation boundaries and management arrangements. An integrated,

phased approach should be developed that combines these actions with (i) fire prevention and management and (ii) community and socio-economic development (see programs 1 and 5). Hydrological rehabilitation should be completed and monitored prior to or in parallel with any reforestation interventions.

**A) Hydrological Rehabilitation.** The rehabilitation of hydrological functions will take a long time, measured in decades, but the process should begin as soon as possible so as to reduce peat oxidation, allow natural regeneration of forests, and provide water for surrounding agricultural areas during the dry season.



**Figure 7:** Map of indicative canal blocking locations for an interval of 1.0 meter (as red dots) and additional locations for an interval of 0.5 meters (blue dots).

**In the Protection Zone, the approach calls for the development of a system of more than 700 composite dams to block drainage canals.** In order to avoid dangerous peak discharge flows, the dams should be spaced to create a difference in water head levels between dams of 0.2-0.3m (Figure 7). The first dams will be built at the center of the peat domes and then the network will be gradually expanded toward the periphery of the domes. Different designs are proposed by the Master Plan Technical Report on Canal Blocking that need to be matched to the width of canal or ditch and the canal side topography. Further piloting of different designs should be

undertaken combined with monitoring and research to assess their performance.

**These dams are expected to limit peatland degradation near to canals but not across the peat domes.** Hydrological rehabilitation of the peat domes is likely more dependent on establishing forest cover and a new equilibrium in the eco-hydrology of the system. Long-term monitoring and applied research will be required to assess the impacts of canal blocking.

**In the Limited Use Buffer Zone, the approach requires control structures.** Control structures need to be introduced to canals and ditches to enable effective control of water levels (i.e. drainage during the wet season and maintenance of high water levels during the dry season).

**In all areas, a community-based approach is required to plan, operate and maintain water control structures.** Community-based planning is critical for the success of hydrological rehabilitation as canals are used for transportation. It may, at present, not be viable to block certain canals and other approaches may need to be developed. For construction, in some areas community-based construction may be possible and desirable, but in many areas contractors (possibly in association with the local community) will be required to complete the number of structures needed.

**Priority Actions:** The following actions are proposed by the Master Plan for hydrological rehabilitation in the EMRP area:

- Selection of priority areas for canal blocking and water control structures - including the MRP canals (block A north, block B, Block C and the main SPI canal), ditches dug for illegal logging and more recently constructed canals and ditches – and consultative planning to produce a ‘Hydrological Rehabilitation Plan’ for each area of intervention.
- Establish a system to monitor the impacts of canal blocking **before** and **after** construction of the structure including at varying distance (minimum 1km) from the canal.
- Implement construction of canal blocking and water control structures.
- Review impacts using the monitoring system and an adaptive management approach to raise water levels as high as possible in the dry season (without excessive flooding in the wet season) in the Protection Zone and establish effective control of water levels in the Limited Use Buffer Zone.

## **B) Forest Management and Rehabilitation.**

Reforestation should be scheduled as an intervention *after or in parallel with* the completion of hydrological rehabilitation interventions in an area *and* the establishment of fire prevention and management capacity. As part of an integrated approach, the resolution of land tenure issues and the planting of economically valuable trees species can play an important role in providing an incentive to landowners and farmers for effective fire prevention and management.

For reforestation, six broad approaches are defined in the Master Plan:

- **Natural Regeneration:** allowing the system to regenerate naturally.
- **Assisted Natural Regeneration:** interventions to overcome barriers to natural succession including enrichment planting, site modification to stimulate growth and survival, and (large-scale) sowing of seeds.
- **Reforestation with Native Trees:** replanting with native species.
- **Commercial Reforestation:** private sector-led tree plantations.
- **Community-based Forest Management:** such as community forestry rights (HKM).
- **Community-based Agro-forestry:** planting of economically valuable tree crops.

The approach to reforestation in a particular area should depend primarily on (a) the condition of the forest cover, (b) the level on natural regeneration and succession and (c) social aspects. These aspects are covered in the five-year plan for forest and land rehabilitation in the EMRP area produced by BP DAS Kahayan. In addition, flooding is seen as a major barrier to forest rehabilitation in the EMRP area, which will need to be overcome.

**Further research, studies and trials are required focusing on (a) species selection, (b) silvicultural treatments and (c) natural regeneration and succession and ways of assisting it.** In general, pioneer species are likely to be tolerant of open, unshaded conditions, while species characteristic of primary peat swamp forest are likely to be more shade tolerant or shade requiring. However, many replanting trials seem to ignore this principle, and it would seem that at least some of the past failures can be attributed to selection of shade requiring species for replanting trials. On the whole, it would seem best to begin replanting with (fast growing) pioneer species, and conduct enrichment planting with shade requiring species during later stages.

**Priority Actions:** The following actions are proposed by the Master Plan for forest management and rehabilitation in the EMRP area:

- Studies of natural regeneration and succession that identify the main patterns of succession in the area and the barriers to natural regeneration and succession.
- Species selection trials with a broad range of species under different shading, soil (peat depth), flooding, and rainfall conditions (at least at 3 different locations in the EMRP area).
- Setting up of a silvicultural systems project to develop different silvicultural treatments which can be applied for the restoration of degraded peatlands.
- Set up a forestry rehabilitation platform involving all stakeholders involved in rehabilitation, which will be used to develop and evaluate concrete restoration plans.

**C) Conservation and Environmental Management.** Conservation interventions will focus on establishing and managing five conservation areas in the EMRP area. These should include the Kiapuk and Sebangau mangrove swamps (totaling 23,000 ha), the Mawas Peat Swamp forest (288,000 ha) in Blocks E and A, and the Kapuas-Kahayan peat swamp forest (250,000 ha) in Blocks E and B.

**Priority Actions:** The following actions are proposed by the Master Plan for conservation in the EMRP area:

- The abovementioned areas of high biodiversity value should be delineated and receive official status as conservation areas.
- Action against threats including on-going illegal logging in Block E and tambak development of mangroves needs to be taken.
- Participative, collaborative management arrangements for these areas involving representatives from government, local communities and third parties such as NGOs need to be defined and implemented.
- Strengthen environmental management capacities and guidelines for peatland management (including EIAs/AMDAL)

**D) Establishing Boundaries and Management Arrangements.** Forest land survey and inventory work is needed to (a) establish appropriate boundaries on the ground for the protection and conservation areas, (b) better understand the existing conditions and successional status of the land cover in the Protection Zone, (c) as a resource for detailed

forest planning and (d) to ensure that community and *adat* rights are recognised and protected.

**The Master Plan proposes that the three blocks that comprise the Protection Zone are defined as Forest Management Units (KPH) to achieve conservation and protection management objectives.** At present, there is limited active management of the area's forest and peatlands and this is required for the goal of peatland and forest rehabilitation and the long-term management of the area. A decision will need to be made where management authority for these FMUs (KPH) lies, either with the Department of Forestry and its technical agencies (UPT) or the Provincial Forestry Agency. Once established, each FMU / KPH will need to complete a detailed zoning and management plan of the forest area under its jurisdiction. This process will need to include a mechanism for establishing and accommodating community rights and access to these areas.

**Priority Actions:** The following actions are proposed by the Master Plan for establishing boundaries and management arrangements in the EMRP area:

- Definition of priority areas for protection, conservation and production (see Box on Master Plan for Conservation & Rehabilitation).
- Forest resource surveys and inventory in the Protection Zone.
- Community-based participatory land and resource mapping in villages within and neighbouring the Protection Zone to establish forest resource management and access rights.
- Establishment of three Forest Management Units (KPH) and collaborative management arrangements for the three blocks of the Protection Zone (Block E east-Block A north protection area; Block E west-Block B protection area; Block C protection area). Proposed conservation areas in these areas may be managed as part of the FMU/KPH.
- Production of detailed zoning and medium-term management plans based on the above.

#### Program 4: Agricultural Revitalization

**Objective:** Increase agricultural productivity in the area through intensification and diversification of farm systems, upgrading of land and water management infrastructure and practices and limited development of new areas

The approaches and strategies to improve agricultural production vary between the Limited Use Buffer Zone and the Development Zone.

**The basic principle for management of the Limited Use Buffer Zone is that there must be water management to reduce unnecessary drainage of the peat.** The key will be to bring production in line with better water management practices to limit peat degradation and, as such, new large-scale developments are discouraged. In general, while rubber and other crops are often favoured by smallholders in this area, the planting and management of commercial species tolerant to these wetland conditions (e.g. jelutung and possibly gelam, *Melaleuca*) could be promoted. For smallholder crops that require drainage such as rubber, water control needs to be introduced. Widespread development of oil palm is not recommended for this area as it will lead to extensive degradation of the peat.

However, some areas in this zone may be too large, too much at risk from fires, too far away from communities or too difficult to manage hydrologically without significant investment. Here there are possibilities for the development of industrial scale plantations managed by private companies with an interest in growing appropriate species and developing the techniques to ensure minimum drainage. Opportunities could be developed for the production of pulp and other products using trees that are water and acid tolerant.

**Management of the Development Zone can proceed without consideration of peat conservation and rehabilitation.** This area is dominated by (mixed) rice-based, tree-based and livestock-based farm systems and the main goal for agricultural revitalization is to increase the productivity of these systems. The Jenamas area developed during the MRP remains mostly uninhabited and unsuitable for agricultural development as a result of flooding and mitigating actions are unlikely to be cost effective. Part of the area is used for swamp buffalo, which is an entirely appropriate land use. Flood control measures in specific inhabited areas along the Barito River needs to be undertaken, especially in the Dadahup area and further north beyond Jenamas.

**Until major technical and social constraints in the existing transmigration schemes are resolved, new development and transmigration is discouraged.** Existing schemes remain marginal with significant problems and challenges. In transmigration areas, the revitalization programs under Inpres 2/2007 should focus on these existing areas

and any new development should focus on suitable areas in the development zone. Further detailed and accurate topographical, hydrological and land suitability data are still needed and should be developed as part of an “*Integrated Land Suitability Assessment*” approach that integrates land and water management, agricultural and socio-economic factors.

#### **A) Strengthening Agricultural Productivity.**

The main engine for improved agricultural production will be to intensify, diversify and optimize existing farm systems and farming practices through: (i) the provision of appropriate agricultural facilities and infrastructure; (ii) the enlargement and strengthening of the extension services with linkages to agricultural research; (iii) supporting increased access to finance and market opportunities; and (iv) upgrading of land and water management infrastructure and practices.

#### **Different approaches will be required for the different farm systems.**

Programs should be designed based on the specific needs of the three main farming systems – rice-based, tree crop based and livestock based – as well as the fisheries sector. Furthermore, Dayak, Banjarese and transmigrant villages tend to have different cultural and technological backgrounds and farming practices but also tend to live in different bio-physical environments. Further details of the challenges faced by each farm system are provided in the Master Plan Technical Report on Agriculture.

#### **Fisheries have good potential for further development.**

Pond and river (cage) aquaculture, ornamental fish and traditional fish capture (beje) all have potential. The coastal zone the focus of development will be the restoration and maintenance of the coastal protection and fishery functions that the mangrove forests provide. Only very limited tambak development should be considered here.

#### **B) Upgrading Land and Water Management.**

Local Dayak and Banjar residents land and water management practices based on *handils* do not need to be changed drastically but need rehabilitation and improved control of drainage and control structures between peat and non-peat areas. Transmigrants in the EMRP are generally settled in the swamp interior, where land and water management conditions and options are less favourable and significant improvements are required. Only in a small part of the swamp interior will tidal irrigation be

possible, not in continuous blocks as previous designs, but along minor depressions.

**The main land and water management improvements in the EMRP area will require redesigns of existing transmigration schemes based on accurate topographical, hydrological and land suitability assessments.** Upgrading of existing schemes should focus on flood control and drainage management, water circulation, leaching and flushing, and will require reducing the length and density of canals by adding new canals, the double connection of dead-ended canals, and water control structures. The upgrading of the existing hydraulic infrastructure of the transmigration schemes is a pre-condition for improvements in on-farm land and water management.

**Development of land and water management at the tertiary and on-farm level requires a different and long-term approach.** Land and water management development must be site-specific, addressing the micro-variations of soil and water conditions, and be closely linked to agricultural and socio-economic developments. Mechanized land preparation is important to further develop the soils but is only possible when the soil has reached a certain level of ripening. The limited number and capacity of farmers as well as the large areas of idle land also place constraints on what can be achieved in a given time frame. The proposed “refill transmigration program” can help address the issue of a lack of farmers in the ex-MRP transmigration areas in order to improve on-farm land and water management.

**Priority Actions:** The following actions are proposed by the Master Plan for agricultural revitalization in the EMRP area.

For all areas, several actions are recommended:

- Provision and upgrading of agricultural infrastructure and facilities;
- Enlargement and strengthening of the extension system aimed at the needs of farmers;
- Provision of quality seed and fertilizer;
- Access to finance (e.g. through an expanded BRI network);
- Access to markets through improved infrastructure, transport systems and better market information;
- Increased local processing capacity;
- Reorientation of agricultural research to on-farm research linked to extension services;
- Development of practical approaches for land clearance without fire and/or safe burning practices.

Specifically in the Development Zone and existing transmigration areas, the following are recommended:

- Integrated land suitability assessments and hydro-topographical studies in management units VI-IX
- Review and redesign, where needed, of land and water management infrastructure
- Reclamation of new agricultural land
- Strengthening of on-farm land and water management (*tata air mikro*)
- Monitoring and review of performance

The priority interventions for the development of fisheries involve:

- Cage / pond aquaculture with indigenous species
- Support for traditional fish capture ponds (*beje*) for local fish species
- Ornamental fish raising
- Limited tambak development in the coastal zone
- Supporting development of the fisheries sector through technical capacity building, monitoring of fisheries catches and stocks, integrated planning for fisheries and improvement of extension services.

### Program 5: Community and Socio-Economic Development

**Objective:** Reduce poverty through community empowerment and socio-economic development

The Master Plan recommends that community empowerment and socio-economic development programs focus on all communities in the proposed 227 target villages. It also recommends that the level of proposed transmigration is significantly reduced and that the Department of Transmigration focus on upgrading existing schemes such as Dadahup, Lamunti, Palingkau, Pangkoh and others.

**A) Community Empowerment.** Community empowerment should focus on:

- Strengthening of village institutions (including the transfer of the 43 transmigration settlements to local government as definitive villages, *Desa Definitif*)
- Active involvement of communities in development planning, implementation and action supported by community facilitators
- Improved governance with strengthened links between villages, the sub-district (camat) and district as a key coordination mechanism (e.g. *Forum Rehabilitasi & Revitalisasi Kecamatan*)



- Fiscal decentralization and community grants (e.g. PNPM, Alokasi Dana Desa)
- Placement of village facilitators to support community participation and development initiatives including community grants, problem solving and the integration of rehabilitation and revitalization projects in the villages;
- A public information campaign to provide communities with appropriate information about the rehabilitation and revitalization policy and associated interventions.

**B) Provision of improved basic services and rural infrastructure.** Community development will continue to depend on the provision of appropriate rural infrastructure and services. Priorities as expressed by the communities themselves include:

- Year round access (to and from the communities) - either by land (roads) or competitive river transport.
- Domestic water supply. Most surface water and shallow groundwater is unusable.
- Improvement of hydraulic infrastructure - for control of water, drainage, irrigation etc.
- Provision of reliable electricity.
- Upgrading of health and education services (focused mostly on quality and staffing)
- A rural infrastructure program possibly through PNPM or other community grants

Rural infrastructure developments should be planned and implemented in close consultation with the beneficiaries (communities). These have a better chance of being maintained if the local communities have been involved from the beginning in the planning, construction and operation.

**C) Socio-economic Development.** Poverty is relatively high in the EMRP area. One of the reasons is that the opportunities for commercializing agricultural and natural resource based commodities is hampered by poor transportation systems and processing facilities, lack of market information, and weak negotiation powers.

**Priority actions:** Strategies to improve this marketing situation include the following:

- Conduct market research and value chain analysis for key products such as latex from rubber and *jelutong*, rattan, vegetables, livestock;
- Catalyse, through market analysis, the formation of producers' groups, associations, and cooperatives for collective marketing and strengthen existing organisations through capacity building.
- The development of small and medium scale enterprises and agro-processing

- centers to create added value to commodities and improve the quality of primary processed products (e.g. rubber)
- Further development of agro-forestry and facilitation of community driven forest protection and rehabilitation
- Possible commercialization of non-timber forest products such as nipa, sago, medicinal plants, wild fruits etc.
- Development of Payment for Ecosystem Services schemes at the community level including benefit sharing from REDD.

**D) Transmigration.** Limited transmigration can be developed focusing on (a) the former MRP areas of Lamunti, Dadahup and Palingkau and (b) potential new transmigration areas in Block D and south of Block A. Potential target numbers of families are roughly 7,500 families for the refill program in the former MRP areas and several thousand (in the order of 5,000 - 10,000) new families in new areas of block D (e.g. Terusan Raya) and south of block A. Successful outcomes for transmigration to the area need to be assured through a detailed review and assessment of past and present approaches to transmigration.

## Program 6: Institutional and Capacity Development

**Objective:** Establish an effective institutional basis and capacity to rehabilitate and revitalize the EMRP area and achieve the long-term management goal

**A) Working Groups and Coordination Teams.** The three working groups established provide an important platform on which to build further integration and development of interventions in the area. These can build on the Master Plan with detailed project designs developed by multi-sectoral teams appointed by the working groups. Such an approach needs to extend from Jakarta to the province and districts so that detailed project designs are effectively coordinated and integrated with district and provincial plans and programs. Standard operating procedures (*juklak*) for the rehabilitation and revitalization projects carried out under Inpres 2/2007 should be developed where needed.

**B) Partnership, Provincial Secretariat and Technical Facility.** The rehabilitation and revitalization of the EMRP area will involve GOI, donors, NGOs and the private sector. It is proposed to form a '**Partnership for the Rehabilitation and Revitalization of the EMRP Area**' led by the Governor of Central Kalimantan to enable the development of a

collaborative integrated response. To support this and the implementation of Inpres 2/2007, a full time professionally staffed secretariat should be established in Palangkaraya aided by a Technical Facility to coordinate, support and guide the partnership. The secretariat would facilitate joint annual planning and reviews by GOI, donor and NGO projects (in line with the GOI annual planning cycle) to ensure that an effective, coordinated response occurs.

### **C) Long-Term Monitoring and Evaluation.**

The rehabilitation and revitalization of the EMRP area is a very complex undertaking. As explained earlier an adaptive (rather than a blue print) approach will be adopted and this will depend critically on information and feedback on the impacts of interventions used to promote development and conservation in the area. For this reason detailed and accurate monitoring is essential. Monitoring of compliance with approved plans and actions will also be undertaken.

Key types of information needed to support this effort include:

- Detailed spatial data on the situation at the onset of implementation - eg. the extent of peatlands and their depths, the extent of intact forest, land use in the Development Zone and Limited Use (Buffer) Zone.
- Data on fire locations and frequency, flooding, rate of forest loss, forest regeneration et
- Data on hydrology, groundwater depths, subsistence rates, rainfall data, and other biophysical parameters to assist in understanding impacts of interventions
- Monitoring of changes resulting from interventions - tracking of inputs, outputs, processes and impacts.

Data collection over the large area of the EMRP will involve many organisations and will have to be consistent. Protocols will need to be developed governing data collection and exchange and training given to those who collect the data. Further details of this are provided in the Master Plan Technical Report on Long-Term Monitoring.

**D) Capacity Building.** A program of capacity building for provincial and district government (including Camat and village leaders) is required to (a) increase knowledge and skills related to peatland rehabilitation and lowland development and (b) increase organization efficiency and effectiveness. Further details of this are provided in the Master Plan Technical Reports on Capacity Building and Training Capacity.

**E) Design Long-Term Institutional Arrangements.** During the implementation of Inpres 2/2007, a specific activity that needs to be undertaken is to review and design appropriate institutional arrangements for the long-term management of the area.

## **7. Economic and Financial Analysis**

Much of the financing of interventions needed to implement the Presidential Instruction will come from existing departmental budgets and will be executed through projects implemented by the technical department offices and technical agencies in the Province of Central Kalimantan. However, significant opportunities exist for additional funding from both the donor community and through carbon financing, which will be needed to undertake this program of work.

In the short and medium term, most jobs in the EMRP area will continue to be created in the agricultural sector, and not in the processing of agricultural produce or other industries. This suggests that economic development plans should aim at increasing the productivity of agricultural workers. During 2000-2006, agricultural productivity growth was low or negative for rice-based agriculture, which constitutes a primary source of income for most farmers in the area. This implies that the welfare of these farmers has not improved, and reinforces the notion that most farms are not (or barely) financially feasible, forcing farmers to seek additional sources of income.

The financial feasibility of a farm is difficult to assess, because the financial return on the investment of a farmer is heavily dependent on two highly volatile - and inherently unpredictable - factors: the market price for the farmer's produce and the cost of fertilizer. For example, the price of fertilizer doubled in 2005, whereas the world market price of palm oil increased by 25% in the first six months of 2007. Needless to say, farmers are aware of these changes and seek to benefit from expected increases in market prices. For example, many smallholders in the EMRP area are currently investing in rubber trees, to benefit from the historically high market world prices for this commodity, and are abandoning rice-based agriculture.

If the Government wishes to improve the financial feasibility of a farm, it should not seek to select the commodities that farmers should grow (as implied by the Inpres 2/2007 financing plan, which contains detailed provisions for investments in specific commodities and

processing) because it is unlikely that the Government will be better at selecting the highest-yielding commodities than farmers themselves. Instead, it should seek to remove or lower barriers that are currently preventing farmers (including but not limited to subsistence farmers) from generating higher financial revenue than is currently the case.

### Medium-Term Financing Plan

The Master Plan presents a highly indicative financing plan for a five-year program from 2009-2013 (see Table 1). The estimated medium-term investment is about IDR 7 trillion (USD 700 million), although a number of assumptions have been made that require further review. Overall this is lower than the initial estimate of IDR 9 trillion as this Master Plan proposes that only a limited transmigration program will be undertaken.

**Table 1:** Highly Indicative Financing Plan for Rehabilitation and Revitalization of the EMRP.

Program	Cost Estimate (IDR trillion)
1. Fire Prevention and Management	0.1
2. Spatial Management and Macro-infrastructure	1.0
3. Peatland Management, Rehabilitation and Conservation	1.5 <sup>a</sup>
4. Agricultural Development	1.7
5. Community and Socio-economic Development	2.2
6. Institutional and Capacity Development	0.2
<b>TOTAL</b>	<b>6.7</b>

a: The cost estimate for peatland management, rehabilitation and conservation is highly dependent on the area targeted for reforestation. The estimate provided here assumes IDR 1 billion (USD 100 million) for a mix of reforestation and enrichment planting covering up to 300,000ha.

### Potential for Financing

The rehabilitation of the EMRP area requires substantial investments from public and private sources in a large number of activities. Potential financiers of the rehabilitation and revitalization of the EMRP area consist of:

- Central government departments
- Sub-national governments (the province of Central Kalimantan and the four *kabupaten* that share a border with the EMRP area)
- Bilateral and multilateral development agencies
- Private financiers of conservation and carbon projects

**Central government ministries.** BAPPENAS has publicly stated that it seeks foreign co-financing of the substantial cost of rehabilitating the EMRP area. In November 2007, central government budgets covered less than 20% of the financing requirements for Inpres 2/2007 in 2008.

**Provincial and district governments.** As of November 2007, none of the sub-national governments involved in the implementation of Inpres 2/2007 had allocated a budget for the rehabilitation and revitalization of the area. The province of Central Kalimantan does not intend to allocate funds for this purpose, based on the argument that the rehabilitation of the EMRP area is a central government responsibility, and should therefore be financed from central government budgets.

**Bilateral and multi-lateral development agencies.** ADB, World Bank and IFAD may be willing to co-finance macro infrastructure and basic infrastructure. This group of financiers is likely to impose certain constraints. In addition, bilateral and multi-lateral development agencies also offer funding related to carbon emissions projects (e.g. the World Bank, UN) and debt for nature swaps.

**Private financiers.** Such financiers may be willing to mobilize 'carbon finance' for carbon emission reduction projects in conservation areas, provided that GOI agrees to enforce land use rights, and pledges to minimize infringements to the project area.

## 8. Revision of Inpres 2/2007

There have been calls from stakeholders to revise the Annexes of Inpres 2/2007 throughout the process of formulating this Master Plan. These Annexes can be improved and revision is recommended. The main revisions required relate to (a) spatial data and maps and (b) details of proposed interventions. Further details are provided in the main summary report and Annex 1.

## 9. Conclusions

The Master Plan intends to provide a guide to government and other stakeholders on the main issues, directions and actions that need to be taken in the implementation of Inpres 2/2007. The overriding goal in the formulation of the Master Plan has been to take a long-term view to ensuring that the "mistakes of the past are not repeated". With the broad acknowledgement of the importance of climate change in the COP-13 UNFCCC meeting in Bali in 2007, the implementation of Inpres

Inpres 2/2007 has even greater importance and will provide an opportunity to show Indonesia's commitment to responding to the challenges of climate change in future COP meetings.

The strategic considerations and programs for the rehabilitation and revitalization of the EMRP provide the basis for determining the priority actions and interventions (Annex 2). Development of integrated community-based interventions based on a landscape-scale adaptive management approach forms the basis for the rehabilitation and revitalization of the area based on the proposed Management Units.

#### Key Actions and Recommendations

The key short-term actions and recommendations of the Master Plan are:

- **Review and revoke permits for oil palm and other large-scale plantations that are on deep (>3m, and ideally on medium deep, 1-3m) peat.** Development of these plantations will require drainage of the peat and will lead to an irreversible loss of the peat, changes to the local hydrology and continued carbon emissions through peat oxidation.
- **Revise the Annexes of Inpres 2/2007.** The two annexes include details of interventions and proposed spatial plans for the area. These need to be updated based on new information and knowledge of the area.
- **Revise the EMRP area part of the draft provincial spatial plan (RTRWP).** The draft RTRWP is based on the outdated Inpres spatial plan and does not reflect current knowledge of the peat area. Legislation of this spatial plan for the EMRP area will compromise the objectives of Inpres 2/2007.
- **Focus agricultural revitalization on intensification, optimization and diversification of existing farm systems.** Existing cropland covers between 150,000-200,000 ha – the most potential means of increasing agricultural productivity from the area is to increase the productivity of existing farmland and farm system and bring idle land in these already developed areas into production.
- **Plan for only a limited expansion of new agricultural areas with a reduction in the target for the placement of new transmigrants.** Inpres 2/2007 targets the transmigration of 46,500ha to 93,000ha of new land. With current land use and land allocations as well as knowledge of recent land suitability assessment by the Department of Agriculture, it is clear that this target is unachievable. Limited expansion into new areas of Block D and the south of Block A could be implemented but the focus for agricultural revitalization should be on existing farms.
- **Take immediate action to build up fire prevention and management capacity prior to the 2009 dry season.** Fire remains the key risk and driver of peatland and forest degradation in the area. Although clear policies banning fire have been enacted, 2007 and 2008 have been unusually wet years which has limited fire risk. Immediate action needs to be taken to build up capacity to ensure there are no further extensive fires in the area as in previous years.
- **Further development of the knowledge base is needed.** Key information and knowledge is lacking for the EMRP area including accurate topography and hydrological information. This needs immediate attention in order to allow further detailed planning to proceed.
- **Plan for an incremental program, starting with pilots in priority areas and learning by doing through an adaptive approach.** The EMRP area is vast and complex area. The rehabilitation and revitalization program should start in priority areas and taken a phased incremental approach taking note of specific dependencies in interventions (e.g. reforestation is dependent on effective fire prevention and hydrological rehabilitation). Effective monitoring will be vital to learn from early pilots and to adapt subsequent interventions from early experiences.

Annex 1: Review of Specific Activities Listed in Annex I of Inpres 2/2007.

Program	Activity	Comment	
1. Conservation	4. Deep peat conservation.	This activity to be combined with 6. Hydrology conservation as part of the 'peat rehabilitation' activity proposed in the Master Plan.	
	5. Gelam forest conservation	Gelam is widely used, naturally regenerates and has a fast growth rate. This activity is not required and there is no need for gelam to be replanted. Gelam is a commercial species that is harvested by communities and may have potential as a plantation pulp crop, especially in the south of Block C. Further economic and silvicultural study of this is recommended.	
	7. Flora & Fauna Conservation	The proposed boundaries in Block A and E of the KFF need to be revised based on recent biodiversity assessment undertaken in the Master Plan. For example, this proposed area does not include much of the proposed Mawas conservation area with its important population of orangutan (estimated at 3,000 individuals).	
	9. Black Water Ecosystem Conservation	These black water ecosystems are likely to be deep water ecosystems, and although replanting may be attempted in the long term (e.g. with <i>Pandanus helicopus</i> and <i>Hanguana malayana</i> ), it should not be the initial focus of reforestation attempts. What is required in the short to medium term are some trials to assess the feasibility of such attempts, before venturing into large scale restoration trials. The process of natural succession may be very slow, for example, or these areas may be highly inaccessible, leading to unacceptably high costs.	
	10. Mangrove Conservation	Replanting of mangrove vegetation in these coastal areas is regarded as unnecessary. Disturbed mangroves south of the mouth of the Sebangau River are naturally regenerating and only require protection against further disturbance, while those east of the mouth of the Kahayan (southern tip Block D) near Pantai Kiapak are in a good condition. The coastal area in between is either unsuitable for mangrove (consisting of beach swales), or have been or are being actively converted to brackish-water fishponds (tambak) by Banjarese and Buginese settlers and/or Fisheries Department. Also, the existing mangrove area (about 23,000 ha) indicates a loss of only several thousand ha of mangrove, much less than the 27,100 ha indicated in the Inpres.	
	11. Fire	The importance of this action requires it to be elevated to the level of a program. Effective fire management also has cross cutting issues with cultivation, in particular through the enforcement of fire policies in agriculture (esp. plantations), issues of land tenure and the development of practical alternatives to fire for land clearance and agriculture in the area.	
	12. Reforestation	The current Annex targets 40,000ha in total for reforestation compared to the estimated 400,000 ha of deforested peat (>1m deep) in the area. It is recommended that studies of the natural regeneration of the area and an in-depth review of species trials and previous reforestation work are completed before a target is set for reforestation. Donor support may be critical here with Australia, for example, aiming to replant 100 million trees in the area through the KFCP. Assuming 1,000 trees per hectare, this could be equivalent to a target 100,000ha.	
	2. Cultivation	3. Management of the Swamp Reclamation Network	Detailed data remain lacking to assess the potential for swamp reclamation in the area and detailed topographical and hydrological assessments are required. The infrastructure of the existing schemes is functioning poorly and requires a complete redesign in the context of the hydrological landscape.
		5. Food crop development	Roughly 110,000ha of rice is found in the EMRP. The strategy for increasing rice production in the EMRP is more likely to be successful through intensification rather than extensification of the rice area. The targets for specific commodities (palawija) should be replaced by an approach that aims to strengthen and assist with the diversification, where appropriate, of the specific farm systems.

Program	Activity	Comment
3. Community Empowerment of Locals and Transmigrants	6. Horticulture development	The strategy is more likely to be successful through an approach that aims to strengthen and assist with the diversification, where appropriate, of the specific farm systems. The targets for specific commodities (palawija) should be removed and left to detailed planning and farmer choice.
	7. Plantations development	The strategy is more likely to be successful through an approach that aims to strengthen tree-based farm systems, with a specific focus on rubber, coconut and oil palm. The targets for specific commodities should ideally be left to detailed planning and farmer choice with the condition of no development of plantation crops in the Protection Zone and limited, controlled drainage primarily for existing smallholders in the Limited Use Buffer Zone.
	8. Fisheries	The fisheries interventions should not mention specific species, which should be left to detailed planning and farmer choice. A broader range of interventions than pond aquaculture is proposed in the Master Plan.
	9. Livestock	The strategy is more likely to be successful through an approach that aims to strengthen existing livestock-based farm systems and the diversification of other farm systems. The targets for specific commodities should be removed and left to detailed planning and farmer choice.
	10. Processing of agricultural products.	Agricultural processing interventions need to be based on a detailed study of product value chains and local markets, which can be seen as part of the strengthening of the farm system. The targets for specific interventions should be removed and left to detailed planning and farmer choice.
	12. Revitalising agricultural extension	This intervention will require significant work on strengthening the institutional and organizational capacity, relevant training of extension workers and a focus on on-farm research as opposed to dem plots. This should also ensure fishery and forestry extension workers are working with those communities where these are a significant part of local livelihoods.
	13. HTI	The identification of an area for HTI will need to resolve potential conflicts with existing permits, especially for oil palm, and be part of the overall approach to forestry and reforestation.
	2. Basic infrastructure	The targets for specific items require revision based on the reduced target for transmigration and coordinating with district government as part of detailed and participatory planning involving communities. There is also no program for village roads. Community driven development and grants can contribute significantly to this activity.
	3. Roads and Bridges	Roads and Bridges should be aligned with a revised spatial plan and the targets for each item revised in accordance with this.
	4. Infrastructure, Facilities & Services for Transmigrant Settlements	The target of 46,500 new transmigrant families should be revised and downgraded. The proposed new transmigration settlement at Terusan Raya, an expansion of an existing settlement, is in accordance with the Master Plan but other proposed areas in Blocks B and C are not. As previous studies by Indonesian experts, this Master Plan recommends that this activity should focus on existing transmigrant settlements and communities, although limited transmigration in Blocks A and D could be part of the overall program. The targets for specific items require revision. A key need – the conversion of 43 UPT from the Mega-Rice Project to definitive villages – needs to be part of this activity.
	5. Human Resource Development	On-going professional development and training could be considered for the newly recruited and existing staff in this activity. The targets for specific items require revision.
	6. Community Facilities	The targets for specific items require revision.
	7. Transport	The targets for specific items require revision.

Annex 2: Summary of the Programs and Main Interventions Proposed by the Master Plan.

Program	Interventions	Duration (years)	Lead Organisations	Location by Management Unit
<b>1. Fire Prevention and Management</b>	Strengthening and streamlining of policies, institutional mechanisms and operating procedures (including community-based brigades)	1	BNPB, BDPB, LH, Dephut, Pemda	I, II, III (priority)
	Capacity building of regional government for implementation	3	BNPB, BDPB, LH, Dephut, Pemda	I, II, III (priority)
	Integrated planning and budgeting for fire prevention and management	5	BNPB, BDPB, LH, Dephut, Pemda	I, II, III (priority)
	Strengthening and expansion of community-based brigades	3	BNPB, BDPB, LH, Dephut, Pemda	I, II, III (priority)
	Strengthening and expansion of non-community based fire prevention and suppression capacity	3	BNPB, BDPB, LH, Dephut, Pemda	I, II, III (priority)
	Public information campaign	5	BNPB, BDPB, LH, Dephut, Pemda	I, II, III (priority)
	Review, monitoring and legal actions (if required)	5	BNPB, BDPB, LH, Dephut, Pemda	I, II, III (priority)
	Revision of maps in Annex II of Inpres 2/2007	1	Bappenas, Pemda	All units
	Revision of EMRP area part of draft provincial spatial plan (RTRWP)	1	Pemda, Dephut	All units
	Review of status of area ( <i>kawasan khusus, kawasan strategis</i> )	1	Bappenas, PU, Pemda	All units
<b>2. Spatial Management and Macro-infrastructure</b>	Conduct detailed spatial planning in the EMRP area	2	PU, Bappenas, Pemda	All units
	Updating of district spatial plans (RTRWK)	2	PU, Bappenas, Pemda	All units
	Program for the standardisation of spatial data management	3	Bakosurtanal, Pemda	All units
	Development mechanism to control spatial development in line with UU26/2007	3	PU, Depdagri, Bappenas, Pemda	All units
	Program to improve spatial data on topography, relevant biophysical characteristics and integrated land suitability	3	Bappenas, Deptan, PU, Pemda	All units
	Produce a macro-infrastructure investment strategy	1	PU, Pemda	All units
	Multi-year construction program of macro-infrastructure construction	5	PU, Pemda	All units
	Develop a guideline and detailed plans for integrated peatland rehabilitation and conservation	1	All	I, II, III
	Use village facilitators (see program 5) to develop a community-based approach in planning, implementation, monitoring and evaluation	5	All	I, II, III
	<b>3. Sustainable Peatland Management, Rehabilitation and Conservation</b>	<b>A. Hydrological Rehabilitation</b>		
Development of 'Hydrological Rehabilitation Plans' for each management unit		1	Pemda, PU, Dephut	I, II, III
Establishment of hydrological monitoring system (as part of integrated long-term monitoring system)		1	Pemda, PU, Dephut	I, II, III
Construction of appropriate canal blocking structures including the SPI canal (mostly in the Protection Zone) and/or water control structures (mostly in the Limited Buffer Zone) to maintain dry season water levels as high as possible		5	Pemda, PU, Dephut	I, II, III
Continuous review of water management and control interventions and adaptation as needed		5	Pemda, PU, Dephut	I, II, III

Program	Interventions	Duration (years)	Lead Organisations	Location by Management Unit
<b>3. Sustainable Peatland Management, Rehabilitation and Conservation</b> (continued)	<b>B. Forest Rehabilitation and Reforestation</b>			
	Applied research and studies of natural regeneration and succession	5	Dephut, Ristek, LIPI, Pemda and others	I, II, III
	Species selection trials for reforestation	5	Dephut, Pemda and others	I, II, III
	Development of silvicultural treatments for forest rehabilitation	5	Dephut, Pemda and others	I, II, III
	Piloting of community-based forest management, reforestation and agro-forestry	5	Dephut, Pemda and others	I, II, III
	Reforestation of up to 500,000ha (depending on need)	5	Dephut, Pemda and others	I, II, III
	Establishment of a multi-stakeholder forest rehabilitation platform	5	Dephut, Pemda and others	I, II, III
	<b>C. Conservation and Environmental Management</b>			
	Delineation and confirmation of key areas with biodiversity value as conservation areas	1	Dephut, Pemda	I, II, III, IV
	Action against conservation threats (illegal logging, inappropriate tambak development, inappropriate plantation development)	5	Dephut, Pema	I, II, III, IV
	Development of collaborative, participative arrangements for the long-term management of conservation areas	5	Dephut, Pemda	I, II, III, IV
	Strengthening of environmental management and EIA's / AMDAL in peat and lowland	3	LH, Pemda	I, II, III, IV
	Review of EIAs (AMDAL) as applied in peatland in the EMRP and development of technical guidelines for these	1	LH, Pemda	I, II, III
	Strengthening of environmental management and EIA's / AMDAL in peat and lowland	3	LH, Pemda	I, II, III, IV
	<b>D. Boundary Establishment and Forest Management</b>			
Review Ministerial Decree 166/Menhut/VI/1996	1	Dephut, Pemda	I, II, III	
Review, revise and revoke plantation licenses	1	Dephut, Pemda	I, II, III	
Review boundaries of protection area (kawasan lindung) in Inpres 2/2007	1	Dephut, Pemda	I, II, III	
Forest resource survey, inventory and mapping	1	Dephut, Pemda	I, II, III	
Community-based participatory land mapping and consultations on proposed boundaries	1	Dephut, Pemda	I, II, III	
Issuance of a Ministerial Decree defining the state forest area	1	Dephut	All	
Establishment of boundaries on the ground	4	Dephut, Pemda	I, II, III	
Establishment of three forest management units (KPH) to manage the three blocks of the Protection Zone	1	Dephut, Pemda	I, II, III	
Detailed zoning and development of medium-term management plans for the three KPH	2	Dephut, Pemda	I, II, III	



Program	Interventions	Duration (years)	Lead Organisations	Location by Management Unit	
4. Agricultural Revitalization	Development of community-based forest and peat protection and rehabilitation along with financial mechanisms for sharing benefits from carbon finance with communities	5	Dephut, Pemda	I-III	
	Detailed planning of agricultural revitalization program	1	Deptan, PU, Pemda	(IV), V, VI, VII, VIII, IX	
	Integrated land suitability assessments	3	Deptan, PU, Pemda	(IV), V, VI, VII, VIII, IX	
	<b>A. Strengthening Agricultural Farming Systems</b>				
	Provision and upgrading of agricultural infrastructure and facilities (e.g. energy supply, transportation, mechanization, pre and post-harvest storage facilities, pest and seed centres, telecommunications, markets, agro-processing and packaging facilities, service centres)	5	Deptan, PU, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
	Strengthen the agriculture, fisheries and agro-forestry / forestry extension services (recruitment, institutional strengthening and training)	5	Deptan, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
	Reclamation of new agricultural land in suitable areas	5	Deptan, PU, Depnakertrans, Pemda	VI, VII, VIII, IX	
	Provision of increased access to finance (e.g. credit programs and expansion of network of facilities such as BRI) for farmers (including fisheries, agro-forestry and forestry)	5	Deptan, Depkeu, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
	Provision of increased market opportunities (e.g. through market and value chain analysis, price information and infrastructure development) (including fisheries, agro-forestry and forestry)	5	Deptan, Deperindag, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
	Provision of quality agricultural inputs to strengthen and diversify the rice-base, tree-based and livestock-based farm systems	5	Deptan, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
	Through the extension services, conduct local land suitability assessments and pest control assessment with farmers at the village level	5	Deptan, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
	Initiate on-farm research (as opposed to dem plots)	5	Deptan, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
	Development of practical approaches and systems for land clearance without fire (esp. large-scale) including safe burning practices for smallholders as a temporary measure	5	Deptan, Pemda	I, II, III, (IV), V, VI, VII, VIII, IX	
<b>B. Land and Water Management</b>					
Detailed topographical and hydrological surveys at the landscape scale in the transmigration areas (e.g. Pangkoh, Lamunti, Dadahup)	2	PU, Deptan, Depnakertrans, Pemda	II, III, VI, VII, VIII, IX		
Review and redesign of water management infrastructure in the major transmigration / production areas	2	PU, Deptan, Depnakertrans, Pemda	II, III, VI, VII, VIII, IX		

Program	Interventions	Duration (years)	Lead Organisations	Location by Management Unit
4. Agricultural Revitalization (continued)	Construction and rehabilitation of water management infrastructure	3	PU, Deptan, Depnakertrans, Pemda	II, III, VI, VII, VIII, IX
	Strengthening of on-farm water management practices and institutions (e.g. P3A etc.)	5	PU, Deptan, Depnakertrans, Pemda	II, III, VI, VII, VIII, IX
	Assessment and planning of flood control options on main rivers (especially Barito)	2	PU, Pemda	I, II, V, VI
	Implementation and construction of flood mitigation measures	3	PU, Pemda	I, II, V, VI
5. Community Empowerment and Socio-economic Development	On-going monitoring and review of performance of water management infrastructure and on-farm practices	5	PU, Deptan, Depnakertrans, Pemda	II, III, VI, VII, VIII, IX
	<b>C. Fisheries</b>			
	Detailed planning of fisheries programs	1	DKP, Pemda	I-IX
	Strengthening and expansion of (a) cage aquaculture, (b) pond aquaculture, (c) traditional pond capture (beje) fisheries, (d) ornamental fish raising, and (e) limited tambak and related infrastructure and facilities	5	DKP, Pemda	I-IX
5. Community Empowerment and Socio-economic Development	Institutional strengthening of the fisheries sector through technical capacity building, integrated planning for fisheries, monitoring of fisheries including catches and stocks	5	DKP, Pemda	I-IX
	Detailed planning of community empowerment and socio-economic development program including integration with other programs	1	Depnakertrans / Depdagri, Pemda	I-IX
	<b>A. Community Empowerment</b>			
	Recruitment, placement and support of village facilitators to facilitate community engagement in the implementation of Inpres 2/2007	5	Depnakertrans / Depdagri, Pemda	I-IX
	Public information on Inpres 2/2007, the Master Plan and programs	5	Depnakertrans / Depdagri, Pemda	I-IX
	Resolution of land tenure and land claim issues	1	Depnakertrans / Depdagri, BPN, Pemda	VI, VII
	Strengthening of village institutions	5	Depnakertrans / Depdagri, Pemda	I-IX
	Community planning, training and technical assistance to villages	5	All	I-IX
	<b>B. Basic Services and Infrastructure</b>			
	Upgrading health services (especially staffing and service quality)	5	Depkes, Pemda	I-IX
Upgrading education services (especially staffing and service quality)	5	Depdiknas, Pemda	I-IX	
Provision of basic rural infrastructure especially village roads, jetties, drinking water and sanitation (including through a community-driven grants approach)	5	Depnakertrans / Depdagri, Pemda	I-IX	
Program to increase access to electricity	5	Pemda	I-IX	
<b>C. Socio-economic development</b>				
Market research and value chain analysis for key products (not included in	2	Deperindag, Dephut, Pemda	I-IX	

Program	Interventions	Duration (years)	Lead Organisations	Location by Management Unit
<b>5. Community Empowerment and Socio-economic Development</b> (continued)	other programs) and commercialization of non-timber forest products			
	Facilitation of the formation of producers groups, associations, cooperatives for collective marketing and strengthening of these and existing groups through capacity building	5	Depnakertrans / Depdagri, Deperindag, Pemda	I-IX
	Upgrading of services and facilities in existing transmigrant communities	5	Depnakertrans, Pemda	I-IX
	Placement of additional transmigrants in empty plots in Lamunti, Dadahup and Palingkau (once land issues and services and facilities are upgraded)	5	Depnakertrans, Deperindag, Pemda	I-IX
	Development of agro-processing centres (e.g. rattan, cassava, fruits)	5	Depnakertrans, Deperindag, Pemda	I-IX
	Development of small and medium-scale enterprises	5	Depnakertrans, Deperindag, Pemda	I-IX
<b>D. Transmigration</b>				
<b>6. Institutional and Capacity Development</b>	Review approach to transmigration (food crops or other)	1	Depnakertrans, Pemda	I-IX
	Refill program for Lamunti, Dadahup, Palingkau	5	Depnakertrans, Pemda	VII, VII, VIII
	New transmigration (5,000-10,000 KK)	5	Depnakertrans, Pemda	VII, VII, VIII, IX
	Establish a 'Partnership for Rehabilitation and Revitalization of the EMRP'	5	Bappenas, Pemda	I-IX
	Continue with existing working groups and coordination teams and create new working groups to address the three new programs (fire prevention and management; spatial management and infrastructure; institutional and capacity development)	5	Bappenas, Pemda	I-IX
	Establish a full-time Inpres 2/2007 and partnership secretariat in Palangka Raya	5	Bappenas, Pemda	I-IX
	Establish a Technical Facility	5	Bappenas, Pemda	I-IX
	Establish a long-term monitoring and evaluation system	5	Bappenas, Pemda	I-IX
Review and revise relevant policies where appropriate and design institutional basis for the long-term management of the area	1	Bappenas, Pemda	I-IX	







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