PARC Project

May 2004

POLICY BRIEF

Biodiversity Conservation through Landscape Ecology: The PARC Approach

Pac Ta Mountain, Na Hang Nature Reserve

Defining landscape ecology

In common with many other emerging nations, Viet Nam is struggling to reconcile the needs for rural development to support growing and often marginalized rural communities, with protection of its natural resources.

Viet Nam's landscape is constantly changing as land use changes. Sometimes the resources base benefits where forests are protected and allowed to regenerate naturally, bare land is reforested, or where swidden land is converted to more intensive agriculture. Sometimes resources are lost where forests are exploited for timber, cleared for agricultural or grazing, or burnt by spreading wildfires.

Demands on the rural landscape are many and often conflicting. Conservation agendas require the protection of natural habitat. Rural development agendas require increased agricultural productivity and improved market access at the local level. Meanwhile, national development agendas require dams for electricity production, pulpwood plantations, timber forests and mines.

All these conservation and development demands are superimposed upon a finite landscape.

Landscape ecology incorporates conservation and human dimensions to create a sustainable and harmonised living environment. The landscape can be viewed as a complex jigsaw puzzle with many overlapping pieces, representing areas where conflicts for land exist. In essence, landscape ecology is the science of fitting together pieces that do not fit.

PARC Project seeks to develop effective models for the conservation of Viet Nam's biological diversity through a landscape ecology approach. Its focus is on building local capacity to implement integrated conservation and development programmes through the participation of local communities and government sector agencies.

PARC Project was established on the realisation that a system of protected areas is unlikely to be maintained successfully if it is established without reference to the rest of the landscape. Protected areas do not exist in isolation, immune to other processes and demands in their vicinity. To create processes for long-term biodiversity conservation, PARC analyses the entire pattern of demands on the landscape to link conservation and development goals, which then form integral components of an overall government agenda.

This paper describes the landscape level approach to conservation in Viet Nam that has been explored by PARC Project.

Conservation planning at the landscape level

PARC has abandoned the traditional approach of protected area management, which focussed on the development of a detailed management plan for individual protected areas. Traditional management plans are mostly developed in isolation from local communities, fail to address root causes of land degradation and are ultimately unworkable. Operational planning has been the central pillar of protected area planning for PARC Project. While it remains important, operational planning is only one component of PARC's five-tier planning process.

PARC's five-tier planning process

1. Conservation strategy development
Planning appropriate land management for the entire landscape - not restricted to protected areas. This incorporates national and local level development and conservation agendas based on landscape level evaluations and prioritisations.

2. Financial mechanisms
Strategies for long-term financing of conservation in biodiversity-rich areas linked with economic development in buffer zones.

3. Operational planning
Guidance documents for managers of protected areas and community-managed areas of high biodiversity, based on conservation needs and in line with available financial resources.

4. Landscape unit management
Detailed management prescriptions for a specific unit in the landscape, such as a lake important for fisheries and aquatic birds, or a cave complex important for bats and guano collection.

5. Site plans
Detailed day-to-day management plans and prescriptions for individual locations, such as ranger posts and tourist attractions.

While following the internationally-accepted protected area zonation system, PARC has adapted approaches to the specific regulations of the Government of Viet Nam concerning protected areas, and to the prevailing land laws and the devolved responsibilities of rural communities.

Adopting such an approach is not without problems, however. A principal obstacle has been the division of responsibility for landscape elements between many authorities. Protected area authorities are not responsible for buffer zones (buffer zones do not exist as legal entities) and development agendas for land adjacent to protected areas can be established without reference to those protected areas. This typically leads to conflicts of use. A main role of the PARC approach is to reduce the likelihood of these conflicts occurring.

Srepok River, Yok Don National Park

Putting it into practice: Approaches to conservation in a human-dominated landscape

Conservation planning developed by PARC involves a range of stakeholders within and outside the authorities traditionally involved with biodiversity conservation. In some cases, co-management responsibilities are introduced, in other cases conservation management responsibility is assumed directly by local communities. In all cases, conservation decision-making is linked closely with an assessment of the needs of rural populations for natural resources.

Evaluation of conservation criteria at the landscape level includes an assessment of existing protected areas but is by no means limited by their boundaries. A picture of conservation values of the entire landscape is built up by analysing field conservation measures and biological and physical information, and by geographical analysis of forest cover. Each conservation value, or criteria, is graded and forms a layer in a cumulative analysis. Put all the layers together and the resulting map will show biodiversity 'hotspots'. In most cases, however, the biodiversity-rich areas, representing priorities for conservation management, will not be restricted to the defined protected areas within the landscape. The goal of this systematic analysis is to establish *conservation as a component of rural land use*.

Participatory resource use planning is a cornerstone for the development of conservation management strategies for the landscape *(PARC Policy Brief: Integrating Conservation and Development through Participatory Resource Use Planning)*. Through this approach, Village Development Plans are developed. These five-year plans include maps of current natural resource use and document vegetation cover. They identify human uses of biodiversity-rich areas (these areas are identified by the process described above), and include village commitments to adopt sustainable use policies in return for recognition of user rights and support of improved livelihoods. The plans provide budget calculations to implement identified activities. The central goal of these plans is *development in support of conservation*.

Reconciling resource use is complex, but the bottom-up approach implemented by participatory resource use planning, superimposed on conservation evaluation, provides a basis for zonation of the landscape. In the experience of PARC, stakeholders are able to appreciate this approach and to reach agreement on limiting local use of resources in key areas. In effect, the pieces of the puzzle can be made to fit.

Certainly, national-level infrastructure development projects such as a major dam or road can introduce new pieces to the puzzle, and this would require adjustment of all the others. If this occurs, the process described above can assist by accommodating the new pieces to limit adverse effects on biodiversity conservation and the socio-economic development aspirations of local communities.

Decentralisation of conservation

A current policy of the Government of Viet Nam is to decentralise natural resource management responsibilities.

Legislation allows for provincial management of protected areas falling totally within a province (only multi-province national parks are managed centrally). Decision No. 08/2001/QD-TTg of the Prime Minister, "Promulgation of Regulations on Management of Special-use Forests, Protection Forests, and Production Forests" allows for a new form of landscape management 'Species or Habitat Conservation Area' which is recognised nationally but managed cooperatively between local communities

and local forest authorities. PARC Project has used this legislation to extend conservation into the wider landscape and to establish conservation management as a community activity.

This new legislation also allows for communities to manage certain areas ('landscape management units') within existing protected areas, such as areas of open water. PARC Project has used this legislation to foster community management of fisheries, extending local community rights into protected areas.

There are thus a number of approaches or tools that can be used to enhance landscape level conservation. These range from creation of new national parks and nature reserves, or extension of existing areas (a traditional approach), to co-management or community management of designated areas, and even household level management of forests allocated under Government common land forest protection programmes.

Innovative approaches to the management of protected areas

PARC Project has made a detailed examination of the way in which protected areas function - or do not function. This has led to a re-thinking of the way in which protected areas are financed (*PARC Policy Brief: Covering the Costs of Viet Nam's Protected Areas*). The aim has been to prescribe financing mechanisms for protected areas to undertake their main role of habitat protection and biodiversity conservation. Beyond financing, this has also led to a re-thinking of the way in which protected areas are managed on a day-to-day basis.

PARC Project has also supported the government in piloting a new protected area management approach based on the concept of operational planning. This adapts a number of international management planning approaches to the Vietnamese context. Protected areas are currently established with a ten year Construction Investment Plan that supports only infrastructure development. Funds for staff salaries and conservation activities are applied for annually from other sources and are not cohesively planned. There are always gaps in funding. The operational planning approach progresses from the Construction Investment Plan and integrates this and other financing resources within a planning and implementation process that focuses on long-term biodiversity conservation (and not only on infrastructure).

Operational planning works on the basis of detailed day-to-day prescriptions for protected area staff, including detailed management responsibilities for landscape units and individual key sites. Integral to the approach is a monitoring system that feeds biodiversity and human impact information into management decision-making. While this may seem fundamental, the establishment of management targets and the monitoring of achievements is not a current feature of protected area management in Viet Nam.

Operational planning also links closely with the implementation of Village Development Plans resulting from the participatory resource use planning exercises. Where appropriate, the operational plan provides detailed prescriptions for sustainable use within co-managed areas of the landscape. The plan would also identify conservation management targets, as defined by resource users, and means of monitoring resource use and conservation.

Innovative approaches to community-based conservation

Although the Government of Viet Nam has a policy of decentralising management responsibilities, this has not yet been followed by decentralisation of decision-making. Laws governing the use of protected areas are in some cases contradictory and in many cases unworkable. Protected area management authorities are empowered to adapt management practices to suit local conditions and this can mean the involvement of local people should they chose to be involved. Experi-

ence in co-management is very limited, however. Protected area authorities have generally been slow to embrace local communities as partners rather than agents of destruction. Whereas, to local communities, forest protection authorities may be viewed as restricting their options for livelihood improvement.

Government reforestation programmes have for some time supported individual households to protect small common land forest plots and to obtain some limited benefits from them. The household has not had any say, however, in how those plots should be managed – the household is employed to protect the plot not empowered to manage it. Since the household receives no direct benefit from good management, and because their success in managing the plots is rarely monitored, the existing forest land allocation programme has had limited success.

Pilot projects aimed at mobilising local people to participate in biodiversity protection and forest protection have been established in several important biodiversity areas in Viet Nam. These projects generally work on the basis of Government-approved forest protection and utilisation contracts, where, again, local people are employed to protect forest and may obtain some fringe benefits from harvesting non-timber forest products. Although these approaches aim to create an incentive for forest protection, they fall short of actually giving local people a say in management processes.

Community-based conservation, wherein local communities and government authorities are equal partners, has rarely been attempted in Viet Nam. PARC Project piloted cooperative management approaches in several landscape units, whereby actual management responsibilities are ceded to or shared with local populations.

It is expected that PARC Project pilots in community-based conservation and co-management will encourage and support policy revision at the government level. This is still needed in order to improve the potential for community empowerment and involvement in conservation management at the landscape level.

The cases of Ba Be, Na Hang and Yok Don

Different protected areas interact with their surroundings in different ways, and may require different solutions effectively to link conservation and development needs. PARC Project has operated in three sites in Viet Nam, each with rather different management structures and faced with different socio-economic pressures.

The three field sites at which PARC Project has piloted landscape management approaches are:

- Yok Don National Park (a centrally-managed national park);
- Ba Be National Park (a provincially-managed national park); and,
- Na Hang Nature Reserve (a provincially managed nature reserve).

These areas were chosen to provide a range of scenarios to test innovative management and biodiversity conservation approaches that could lead to policy prescriptions.

At each field site, PARC Project was presented with an existing protected area isolated, in management terms, from its surroundings. In the case of neighbouring Ba Be National Park and Na Hang Nature Reserve, the surrounding areas supports a dense human population. The area surrounding Yok Don National Park is sparsely populated but large areas are managed by state-owned logging companies. All three protected areas have human settlements within their boundaries, extensive agricultural development in the buffer areas and heavy encroachment into the protected landscape.

Conservation strategy development

At each site, a first step was to redefine the conservation priorities across the landscape, rather than to concentrate conservation efforts on the established protected areas. This redefinition was undertaken by hotspot analysis, including geographical analysis and the results of broad biodiversity surveys.

- At Yok Don, the analysis clearly defined a biodiversity hotspot within the national park, that is Yok Don Mountain. It also highlighted the importance of the biodiversity-rich area south of the park under the jurisdiction of a state-owned logging company.
- At Ba Be – Na Hang, hotspot analysis highlighted the very complex nature of the landscape and indicated several biodiversity-rich areas outside the existing protected landscape in need of conservation attention.

As a second step, participatory resource use planning was used to redefine existing protected area boundaries, and to explore possibilities for gazettement or the introduction of community management of other important areas.

- At Na Hang, this assisted in fixing boundaries of the nature reserve that were acceptable to both the nature reserve authority and the local communities (legal boundaries between populated and protected areas of the involved communes were not previously defined). Boundaries of enclaves were also arrived at through a participatory process, which aimed to limit expansion and adverse effects of in-reserve villages, ensure that uses of forest areas were sustainable, and engage the households in participatory conservation programmes.

Based on conservation hotspot analysis and participatory resource use planning, a third step included zonation of the landscape and development of a strategy suitable to implement conservation actions compatible with local community resource needs.

- At Ba Be – Na Hang an Endangered Primate Recuperation and Management Programme has been implemented focussing on the conservation of two endangered primates, the Tonkin Snub-nosed Monkey *Rhinopithecus avunculus* and Francois' Langur *Trachypithecus francoisi*, across the landscape. This has involved improved protection within existing protected areas, extension of protected areas into important additional habitats, creation of new co-managed protected areas and engagement of the local community and institutional stakeholders in active conservation programmes.
- To the south of Ba Be, an upland area was identified as important for the survival of the Vietnamese Salamander, a locally distributed endemic species. A community-managed conservation programme was therefore developed, focussing on community-based reforestation and protection of the upland watershed that supports this species.

Establishing financial support for conservation actions

While PARC Project has provided financial resources for planning and initiation of specific conservation actions, Government funding sources are being engaged to provide at least a minimum level of support for protected areas and community managed areas in the long-term. Additional potential funding sources include tapping into tourism revenues and, in the case of Na Hang, accessing a proposed conservation fund provided by the electricity company operating the Gam River Dam (See *PARC Policy Brief: Covering the Costs of Viet Nam's Protected Areas)*.

Landscape of Ba Be National Park

Operational planning for effective protection and community participation

PARC has improved the capacity of protected area authorities for planning, funding and implementing conservation programmes through an operational planning process adapted to Vietnamese protected area administration systems. The concept of operational planning is also extended away from existing protected areas into areas under gazettement as new provincial and community-managed Species and Habitat Conservation Areas.

- In all three PARC Project sites the pilot operational planning processes are approved by the Government of Viet Nam as potential models for future uptake throughout Viet Nam's protected area system. The introduction of operational planning to elucidate conservation (as opposed to construction) goals is likely to be a pre-requisite for future funding from donors such as the World Bank.
- Setting conservation targets and monitoring achievements is an integral part of operational planning. PARC Project has introduced pilot approaches and is developing a monitoring database for wider adoption among protected areas.
- All three PARC Project sites introduce some examples of community co-management of resources within the protected area. These are important models in themselves and are aimed at encouraging and supporting the government to further revise legislation to facilitate community empowerment and cooperative management.

Co-management of landscape units

Certain landscape units assume high importance for effective management, often because of potential conflicts of resource usage.

- Yok Don Mountain forms an isolated 'island' of evergreen forest amid the dry deciduous forest of the lowlands of the national park. In addition to supporting species not found elsewhere in the landscape, except in evergreen forests further south, the mountain forms a refuge for many species during the dry season. As such, it is a favourite hunting ground for local people. In this case, biodiversity values justify prohibiting the hunting of key species and management is designed to protect the habitat. In the meantime, controlled eco-tourism is being introduced to part of the mountain.
- Also at Yok Don, the potential for co-management of freshwater resources is being explored, partly to compensate for prohibiting hunting in key areas of the national park. Villages with user-rights over stretches of the Srepok River will have these rights recognised and gain exclusive access to stretches of productive water within the park. In

return, the households will assist the national park authorities in excluding commercial fishermen who come from urban centres.

- At Be Be, the management of fisheries on Ba Be Lake has been handed over to a cooperative comprised of representatives from local communities. Damaging fishing practices such as dynamiting and use of small mesh nets are prohibited and self-policed. As part of the cooperative management agreement, it has been proposed that the cooperative also assumes responsibility for managing and monitoring tourist attractions on the lake, and would obtain a percentage of tourism revenues as an incentive.

Managing key sites for conservation

Biodiversity surveys and human threat analyses, pinpoint key sites for conservation. As a result, ranger stations are often established and tasked with managing particular sites, for which they are given detailed day-to-day work plans (included within the operational plans). In addition, multi-agency groups, often including local people, may be tasked with management of key biodiversity sites.

- At Yok Don, biodiversity surveys have documented the use of dry season waterholes by endangered bird species such as the Giant Ibis *Pseudibis gigantea*. These waterholes are also used as watering places by local domestic buffalo herds, which graze in the park as part of a tacit agreement with the national park authority. The waterholes require some level of management, however. Their use by endangered waterbirds and domestic buffalos is compatible (perhaps even synergistic). Setting traps and snares around the waterholes needs to be prevented, however, as does direct contact between domestic and wild mammals which may result in diseases being spread into wild populations.
- At Ba Be, the Puong Cave is a popular tourist attraction and a through route for transport along the Nang River, but it is also home to large and important bat colonies. Currently the cave is viewed only as a potential tourism development site. PARC Project has tried to promote an integrated site management approach, whereby local people would manage the site and take tourists to the cave, but would be required to prevent disturbance to the bat colonies, as well as controlling littering and preventing tourists from defacing cave walls.

Puong Cave

Changing the game: Imposing major infrastructure projects on the managed landscape

Landscapes evolve over time and the pieces of the puzzle shift. How to cope with the introduction of major new threats or demands on the landscape, such as a major infrastructure project, is a common problem facing conservation strategies.

PARC has developed conservation strategies that are adaptive to new threats and challenges. Involving communities and

institutional stakeholders in conservation activities provides a link between conservation and development agendas. Protected areas are not viewed as isolated units, with their own exclusive management plans, but as a part of the human landscape and a part of the development agenda.

However, local conservation and development agendas can be severely strained by the imposition of national-level infrastructure projects, usually developed with little local consultation. PARC Project's conservation strategies have had to face this test at Na Hang, where the construction of the Gam River Dam is leading to the loss of large areas of both protected forest and agricultural land beneath the resulting lake.

In this case, the landscape level analysis of conservation priorities enabled swift action to compensate for the loss of substantial parts of the protected area due to dam construction. A procedure for protected area extension and gazettement of new areas could be defined immediately, to compensate for the loss of protected area habitat. A new Species and Habitat Conservation Areas was established at Xuan Lac adjacent to the nature reserve and a proposal for another adjacent protected area at Sinh Long is supported by provincial authorities. Links with the rural development plans enabled clarification of land compensation and other requirements for displaced families, and also enabled PARC Project to recommend areas where households should not be resettled due to potentially high conservation impacts. The dam construction company was also engaged constructively in supporting biodiversity monitoring to reduce threats imposed by an influx of labourers, and to provide long-term financial support from electricity revenues, as is the case in similar projects elsewhere in the region.

Managed in isolation, the Na Hang protected area would be severely impacted by the dam construction. Because conservation management is an element of overall landscape management, the effects of the dam construction, while severe, can be mitigated.

Landscape management in Viet Nam

PARC Project has piloted a number of innovative approaches to conservation management at sites operating under different government administrative structures. The sites face a number of common problems: among the most important are low staff capacity and lack of funding for conservation activities. Nevertheless, PARC Project has demonstrated that re-thinking management approaches and moving away from the concept of isolating protected areas within the developing landscape can provide distinct benefits for forest and biodiversity conservation.

Experience has shown that managing protected areas as islands within a human-dominated landscape, without linkages and benefits accruing from these areas to the local communities, is an unworkable approach. Integrated conservation and development projects attempt to solve this problem, but have generally failed because they focus too much on the needs of protected areas, and try to define buffer zone management strategies accordingly. Landscape ecology is evolving as a alternative approach that places conservation within an overall integrated planning framework, rather than setting aside conservation areas that are supposed to then remain inviolate. Conservation needs to be established as a viable form of land use, alongside competing demands. It also needs to be a part of overall landscape management, not a consideration that need be applied only in protected areas.

PARC Project starts from the premise that local communities can be engaged as active partners in development of an efficient land management strategy that includes both conservation and development goals. In effect, local communities can be brought onto the side of conservation, providing incentives and benefits accrue to them. The project demonstrates a truly integrative approach, where conser-

vation criteria extend outwards from protected areas into the wider landscape and, in turn, local community user rights extend inwards into protected areas under co-management agreements. In effect, the entire landscape is managed to promote both conservation and appropriate development.

Approaches developed by PARC Project to achieve this harmonisation of conservation and development agendas, and important lessons to be learned, include the following:

- PARC Project has developed and promoted a five-tier participatory planning process, adapted to the specific legislative conditions of Viet Nam, to achieve landscape level integrative conservation and development. The process is adaptive and can accommodate shifts in local or even national development policy without totally compromising conservation priorities.

Lesson learned. Development of landscape level conservation strategies through hotspot or similar analyses can maximise conservation efficiency and build in flexibility and adaptability to changing environmental pressures.

- Within the overall landscape, PARC Project has demonstrated that local communities can develop and take charge of their own land management strategies that can incorporate conservation as well as development goals. Local communities have been engaged as partners in developing new co-managed protected areas as well as in developing sustainable use strategies for areas previously zoned as totally protected.

Lesson learned. Landscape level conservation management provides a basis for engaging local communities in co-operative management initiatives, or encouraging communities to develop their own conservation initiatives to tap into government funding programmes. This promotes the participation of local communities even though the legislative support for co-management of protected areas is currently weak.

Lesson learned. Prioritising landscape units and key sites within protected areas, and defining feasible means of managing or co-managing these sites together with in-reserve communities, can be important steps towards getting the community on the side of conservation.

- Within designated protected areas, PARC Project has piloted a planning process that supports the role of protected areas in protecting and conserving biodiversity. This is defined by the government as a primary role of Viet Nam's protected area system, but planning and financing systems are not yet sufficiently developed to support this primary objective.

Lesson learned. Operational planning and monitoring, linking investment and recurring funding to identify and fill gaps in conservation funding, and the prioritisation of conservation over infrastructure development are all important for wider application in Viet Nam's protected area network. ■

Related PARC Project documents:

Available from:
www.undp.org.vn/projects/parc

Operational Plan for Ba Be National Park

Operational Plan for Na Hang Nature Reserve

Operational Plan for Yok Don National Park

A Conservation Strategy for the Ba Be / Na Hang Conservation Complex

Bat Survey and Management Plan for Puong Cave, Ba Be National Park

Yok Don National Park Hotspot Analysis

PARC Project Sites *in* Viet Nam

Ba Be National Park

Ba Be National Park was originally gazetted in 1977, then established as a national park in 1992. It covers an area of 7,611 ha including the 500 ha Ba Be Lake, the largest natural lake in Viet Nam. The national park was administered by the Ministry of Agriculture and Rural Development before being transferred to Bac Kan Province in 2002.

A network of rivers and streams connect the lake to evergreen forests that cover adjacent ranges of limestone karst mountains, giving the park a spectacular landscape. There is a high diversity of flora and fauna, in particular there are over 300 species of butterfly and about 80 species of freshwater fish. The national park is noteworthy for its small resident population of endangered Francois' Langurs.

Na Hang Nature Reserve

Na Hang Nature Reserve covers an area of 41,930 ha, comprised of limestone mountains under tropical moist forest, with smaller areas of mixed lowland evergreen and semi-evergreen broadleaf and bamboo forest.

The nature reserve has global biodiversity significance as the only known protected area with extant populations of the critically endangered and endemic Tonkin Snub-nosed Monkey. This species, once thought extinct, was rediscovered in 1992, which led to the forests of Na Hang being designated a nature reserve in 1994. It is managed by Tuyen Quang Province.

Yok Don National Park

Established in 1991, Yok Don National Park lies in Dak Lak Province in the Central Highlands of Viet Nam, next to the border with Cambodia. It is managed by the Ministry of Agriculture and Rural Development. In 2002, the park was expanded to cover a core zone of 115,545 ha (twice its original area) and a buffer zone of 133,890 ha. Most of this area was formerly managed as production forests.

The park occupies a relatively flat area with two small mountains to the south of the Srepok River. It is mainly under natural forest and includes the only protected area of dry dipterocarp forest in Viet Nam, as well as evergreen hill forests and riverine forests. The national park is an important site for the conservation of large mammals and regarded as one of the most important areas in the country for birds.

PARC Project

Creating Protected Areas for Resource Conservation using Landscape Ecology

PARC is an Integrated Conservation and Development Project of the Socialist Republic of Viet Nam. From 1999 to 2004, the project has piloted a landscape ecology approach for conserving Viet Nam's diverse biological heritage. This approach integrates conservation and development by using resource use planning as a basis for project activities at three sites: Yok Don National Park, Ba Be National Park and Na Hang Nature Reserve.

The project is co-financed by the Global Environmental Facility and the United Nations Development Programme. It is implemented by the Forest Protection Department of the Ministry of Agriculture and Rural Development and the United Office for Project Services. IUCN - The World Conservation Union provides technical assistance at the national level and Scott Wilson Asia - Pacific Ltd. provides technical assistance at the site level.

PARC Project policy briefs

This series of policy briefs describes the planning approaches taken by PARC Project as part of its framework of integrating biodiversity conservation and socio-economic development. As such, the series should serve to strengthen policy for protected area management in Viet Nam by sharing the experiences gained from the project. This policy brief is one of four that have been published so far:

1. Covering the costs of Viet Nam's protected areas
2. **Biodiversity conservation through landscape ecology**
3. Integrating conservation and development through participatory resource use planning
4. Management planning for protected areas in Viet Nam

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