Food for thought

Managing land use change in Wayanad

Land use change in Wayanad is a visible process that is driving ecological, social and economic transformation in rural areas. The BioDIVA research group examined the complex dynamics of these changes, in close collaboration with resource users, policy makers and administrators.

In this briefing note, we outline our suggestions for how authorities, civil society and policy makers can respond to this challenge in ways that preserve Wayanad's unique character as a hot spot of socio-ecological diversity. We propose five fields of action:

1. Maintaining 'eatable landscapes' through the conservation of native food crops and traditional agro-ecosystems
2. Preserving specialty rice
3. Ensuring fair labour policies
4. Supporting seed distribution systems

From research to results

For the past four years (2010 to 2014) the BioDIVA project has undertaken research into land use changes that are occurring in Wayanad. As the project comes to an end we would like to express our sincere thanks to all those who have collaborated in the work and contributed to its success.

In return, we hope that the project outcomes will contribute to sustainable agricultural development in Wayanad, by helping local land users and decision makers to assess the current situation, improve the management of agro-ecological resources, and devise effective strategies for future land use.

The aim of this briefing note is to share the knowledge that has been gained with local stakeholders.

The following sections outline the principal results of the project. Further details can be found in the BioDIVA Briefing Notes Nos. 1 to 5.

TOPICS

PRACTICAL RELEVANCE OF THE RESULTS

In the side panels of this briefing note, a ten point agenda summarizes the practically relevance of the results of the BioDIVA research project

1. Ecologically sustainable agriculture and land use must also be socially sustainable, based on fair wages for agricultural labourers, rather than underpaid family labour.

Causes and impacts of land use change in Wayanad: The social-ecological explanation

The BioDIVA project studied the complex interactions between social, economic, ecological and institutional changes that are driving land use change in Wayanad, with a focus on rice agro-ecosystems and their agrobiodiversity.

Land use change triggers transformation in agro-ecosystems, often in with detrimental effects on agrobiodiversity. Drivers of land use change may be biophysical, climatological, or of human origin, and these drivers often interact with each other in complex ways.

To understand the cause-and-effect processes involved requires a holistic approach that draws both on the results of scientific research and the knowledge and know-how of local stakeholders. Research methods are needed that enable collaboration among scientists from diverse backgrounds, and facilitate participation by practitioners and decision makers

To this end, the BioDIVA project represented the complex patterns of land use in Wayanad using selected indicators that describe the principal features of the current situation and enable comparison with past scenarios.

1."Eatable landscapes" under threat: Loss of agrobiodiversity leads to the disruption of ecological services

The traditional landscape of Wayanad was "eatable" in the sense that a wide variety of native food crops, grown for subsistence and sale on local markets, were an integral part of the landscape.

Market-led changes are leading to a focus on cash crops by farmers, with a loss of this traditional agrobiodiversity.

These change in land use systems also lead to the disruption of ecological services. The diverse structure and composition of traditional landscapes played a crucial role in support preventing soil erosion, ground water recharge, pollination, and control of pests and diseases. Less diverse landscapes have a reduced capacity to perform these regulation and support functions

Thus conservation of native food crops and traditional agro-ecosystems is a priority, not only to preserve the biodiversity that is a key component of Wayanad's unique cultural heritage, but also to ensure the long-term sustainability of agricultural landscapes. One way to achieve this would be to develop ecotourism initiatives, in close collaboration with local farming communities, to provide direct economic incentives for the conservation of the region's agrobiodiversity.

The Wayanad agricultural landscape is characterized by many permanently fallow rice paddies.

2. The need for institutional reform to promote conservation of local agrobiodiversity

The project undertook a detailed study of formal and informal seed distributions systems in Wayanad, in order to improve understanding of the institutional framework for the management of local agrobiodiversity, with special emphasis on local rice varieties.

On a formal level, the management of agrobiodiversity is shaped by rules and regulations set by central government agencies, including the Indian Biological Diversity Act of 2002, and by decisions of local political authorities in the agricultural sector. At the same time, informal seed exchange flows and actions by stakeholders and interest groups also influence the availability of seeds and their use by farmers.

Thus the actions of professional agencies at national and regional levels interact with a multitude of local rules, regulations and agreements, giving rise to a complex institutional landscape in which the decisions are made that determine the use, preservation and loss of local rice varieties. The project used the Net-Map Method to plot and analyze the results of interviews conducted with politicians, administrators and civil society representatives, to generate an overview of the institutional landscape of agrobiodiversity conservation on a district level.

The conservation of agrobiodiversity in rice cultivation is likely to work best on a local level where production (sowing and harvest) and reproduction (seed selection, storage and exchange) are closely linked to each other. Ideally higher level institutions should work in harmony with local institutions to facilitate, regulate and support these processes.

However the project's research showed that the dominant economic development paradigm among official agencies acts as a barrier to effective cooperation between farmers and local and national level institutions, leading to the rapid loss of traditional rice varieties.

The non-transparent structures of official institutions, and the emphasis placed by government agricultural extension services on increasing outputs and incomes, combine to prevent the voices of local farmers from being heard.

PRACTICAL RELEVANCE OF THE RESULTS

2. Marketing local rice varieties such as Gandhakasala as premium export products could provide economic incentives for farmers to conserve local agrobiodiversity.

3. To boost local demand for rice, and increase the prices paid to farmers, institutional innovations at district level are urgently required to promote local marketing initiatives that connect producers to consumers.

4. Timely and relevant information on trends and patterns of land use change at local and at district level is needed to inform policies geared towards maintaining ecological connectivity and vital ecological services

PRACTICAL RELEVANCE OF THE RESULTS

5. An incentive system is required to encourage farmers to allocate land, irrigation and energy resources to the cultivation of traditional rice varieties

6. Anti-poverty and rural employment programs need to be adapted to local needs, including the conservation of local agrobiodiversity.

7. Focusing on agrobiodiversity as an asset for maintaining environmental flows and for climate change adaptation could help raise awareness of the wider significance of resilience for the sustainability of eco-systems and societies.

8. Incentive systems designed to slow or reverse the decline in rice cultivation and help conserve agrobiodiversity should include specific mechanisms to compensate rice farmers for the high cost of agricultural labour.

In particular, the potential benefits from conservation of local agrobiodiversity are largely ignored by official agencies. Research by the project showed that the specialty rice Gandhakasala has the potential to act as flagship export variety for the whole region. Growing and marketing this and other local crop varieties could help conserve agrobiodiversity while boosting economic growth. Achieving the institutional reform required to facilitate such initiatives remains a challenge for the future.

3. Fair labour: Welfare and income in traditional rice cultivation

Labour is a key factor in rice production and the majority of agricultural labour is done by women. Rice cultivation is associated with higher labour costs in Kerala, due to the application of protectionist economic policies and the presence of strong trade unions. These high labour costs are the main reason for declining rice cultivation: as female wages increase, farmers become increasingly reluctant to expand the area of rice cultivation.

The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) program, which provides guaranteed employment to unskilled labourers in rural areas, reduces the supply and increases the costs of labour in rice cultivation because many employees choose to accept the work offered by this program in preference to working in the rice fields, where wages are low. The negative effects of the MGNREGA program are compounded by rural to urban migration, particularly by young people, which further reduces the supply of labour and inhibits paddy cultivation. A key challenge is to incorporate the younger generation into agricultural labour force. Inclusion of paddy cultivation among sectors supported by the MGNREGA programme could help stem the outward flow of labour, reduce the gap between supply and demand, and provide farmers in Wayanad with an incentive to increase the area under paddy cultivation.

Unlike other Indian states, Kerala offers few economic incentives for rice cultivation. Furthermore, compared to banana and ginger, the rice market in Kerala is poorly organized. The post-harvest processing and transaction costs involved in rice are higher compared to these competing crops. However, even though the income and welfare of rice farmers in Wayand are relatively lower than those of cash crop farmers, there is evidence that rice farmers do respond positively to higher prices for paddy by allocating more area to paddy cultivation. Hence, an adequate pricing policy could improve sustainability of paddy cultivation and its associated agrobiodiversity.

Conversion of rice paddy to cassava field

4. Diversity of people: The social organization of agrobiodiversity use

For both the Kuruma and Kurichya indigenous groups, the primary purpose of agriculture is food security rather than economic profit, although each group has its own distinctive social organisation and farming systems.

Subsistence rice cultivation plays an important role in maintaining Adivasi [indigenous] culture and traditions. For example, traditional rice varieties feature prominently at religious festivals and weddings.

The Kurichya cultivate 12 different land races of rice. The Kurichya farming system is based on collective land ownership among families and traditional knowledge of natural resource management.

Although women do most of the agricultural work, men decide which crops are to be cultivated. In other words, agricultural decision-making processes are gendered. Kurichya women farmers have few spaces for participation in decision making, except in the Kudumbashrees (Women Self Help Groups).

Whereas men are seen to possess "formal" knowledge of agriculture and the environment, women see themselves as bearers of "informal" knowledge. Higher status is accorded to formal knowledge, although women's knowledge of agrobiodiversity conservation and sustainable natural resource management is considerable. This dualism is a expression of the deep-rooted patriarchal structures of Kurichya society and an example of the hierarchical relations between Kurichya men and women.

Changes in land use impact on the social organization of agrobiodiversity use and gender relations on a micro (household) level.

PRACTICAL RELEVANCE OF THE RESULTS

9. Existing self-help groups (Kudumbashrees) offer women the opportunity to generate incomes from farming. However, financial returns are low. Incorporation of agrobiodiversity management in these governmental programmes could enhance their status and provide increased benefits to the women involved.

10. The diversity of social organization, traditional farms systems and agrobiodiversity knowledge of indigenous communities is a valuable resource for sustainable development. Steps should be taken to enhance the role of indigenous communities and other local groups such as Kudumbashrees in agrobiodiversity conservation programmes.

In Wayanad, the availability of agricultural land is decreasing due to ongoing conversion of farmland for housing developments. The younger generation, particularly young women, shows little interest in agriculture. Such agricultural and social changes interact and mutually affect each other.

Nonetheless, the Kurichya joint family system has shown great adaptive capacity in the face of socio-political and agrarian transformations. As such it represents one potential pathway towards sustainable agricultural development and the conservation of agrobiodiversity. However official decentralization policies fail to recognise the distinct contribution of such cultures and leave no space for pluralistic concepts of development at the local level. Our results highlight the potential of integrating traditional knowledge systems into the current environmental discourse.

5. Ecology: Ecological impacts of conversion practices in rice cultivation systems

Rice cultivation systems face changes on two levels. On a farm level, there is a shift towards more intensive management practices. At the landscape level, there is a move away from paddy to other crops such as bananas. These two interrelated transitions in turn affect the web of interactions among plants and animals associated with rice fields, leading to complex patterns of change in the structure of the agro-ecosystem that are not easy to disentangle.

Our ecological study of rice systems focused on populations of leafhoppers, a common pest species, and spiders, which are predators of leafhoppers. We found that the presence of home gardens within rice agro-ecosystems was associated with increased populations of spiders. This might be because home gardens provide an alternative habitat that predators can retreat to when their principal habitat is threatened by cultivation practices or during the fallow periods.

Both species richness and the abundance of predators in rice paddies decrease with increasing distance to the nearest adjacent habitat. Conversely, the number of leafhoppers in the paddy field is reduced when there is enhanced presence of spiders and greater plant diversity. These results suggest that maintaining additional source habitats for predators such as spiders within paddy fields could promote natural pest control. A more general conclusion is that conserving structural diversity (herbs) contributes to maintaining the diversity of predators (spiders) and to the maintenance of healthy ecosystems with well-functioning ecosystem services.

A study of herbs in rice paddies revealed a slightly higher density of individuals, and a greater diversity of plant species, in more intensively cultivated fields and in fields close to banana plantations. This increased abundance and diversity could be linked to higher levels of nutrient supply. Our study was not able to consider the possible impacts of the presence of these plants on the health of the rice agro-ecosystem. To address this question, further study is required of the functional traits of the species concerned.

Institute of Environmental Planning
Leibniz University Hannover
Herrenhäuser Str. 2
30419 Hannover
Germany

Prof. Dr. Martina Padmanabhan
Chair of Comparative Development Studies - Southeast Asia
University of Passau
Dr. Hans-Kapfingerstr. 14b
94032 Passau
Germany

Contact: Dr. Silvia Werner, Email: werner@umwelt.uni-hannover-de
Phone: +49 (0)511-762 19540
www.biodiva.uni-hannover.de

MSSRF,
Community Agrobiodiversity Centre,
Puthurvayal P.O., 673 121 Kalpetta,
India, Email: cabcmssrf@dataone.in

Authors: Martina Padmanabhan, Nidhi Nagabhatla, Monish Jose, Lydia Betz, Suma T.R., Silvia Werner

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