

BIODIVERSITY CONSERVATION: STUDIES IN ITS ECONOMICS AND MANAGEMENT, MAINLY IN YUNNAN, CHINA

Working Paper No.24

**Sustainability of Land Use in North-East India:
Issues Involving Economics, Environment and
Biodiversity Issues and Implications**

by

Clem Tisdell

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**WORKING PAPERS ON BIODIVERSITY CONSERVATION:
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**Sustainability of Land Use in North-East India: Issues
Involving Economics, Environment and Biodiversity Issues
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¹ A report to ACIAR on the Prefeasibility Mission of Professor Clem Tisdell and Dr. Kartik Roy to North East India.

² School of Economics, The University of Queensland, St. Lucia Campus, Brisbane QLD 4072, Australia
Email: c.tisdell@economics.uq.edu.au

³ School of Economics, The University of Queensland, St. Lucia Campus, Brisbane QLD 4072, Australia
Email: k.roy@uq.edu.au

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Research for ACIAR project 40, *Economic impact and rural adjustments to nature conservation (biodiversity) programmes: A case study of Xishuangbanna Dai Autonomous Prefecture, Yunnan, China* is sponsored by the Australian Centre for International Agricultural Research (ACIAR), GPO Box 1571, Canberra, ACT, 2601, Australia. The following is a brief outline of the Project

Rural nature reserves can have negative as well as positive spillovers to the local region and policies need to be implemented to maximise the net economic benefits obtained locally. Thus an 'open' approach to the management and development of nature conservation (biodiversity) programmes is needed. The purpose of this study is to concentrate on these economic interconnections for Xishuangbanna National Nature Reserve and their implications for its management, and for rural economic development in the Xishuangbanna Dai Prefecture but with some comparative analysis for other parts of Yunnan

The Project will involve the following:

1. A relevant review relating to China and developing countries generally.
2. Cost-benefit evaluation of protection of the Reserve and/or assessment by other social evaluation techniques.
3. An examination of the growth and characteristics of tourism in and nearby the Reserve and economic opportunities generated by this will be examined.
4. The economics of pest control involving the Reserve will be considered. This involves the problem of pests straying from and into the Reserve, e.g., elephants.
5. The possibilities for limited commercial or subsistence use of the Reserve will be researched.
6. Financing the management of the Reserve will be examined. This will involve considering current sources of finance and patterns of outlays, by management of the Reserve, economic methods for increasing income from the Reserve and financial problems and issues such as degree of dependence on central funding.
7. Pressure to use the resources of the Reserve comes from nearby populations, and from villagers settled in the Reserve. Ways of coping with this problem will be considered.
8. The political economy of decision-making affecting the Reserve will be outlined.

Commissioned Organization: University of Queensland

Collaborator: Southwest Forestry College, Kunming, Yunnan, China

For more information write to Professor Clem Tisdell, School of Economics, University of Queensland, St. Lucia Campus, Brisbane 4072, Australia or email c.tisdell@economics.uq.edu.au or in China to Associate Professor Zhu Xiang, World Bank Loan Project Management Centre, Ministry of Forestry, Hepingli, Beijing 100714, People's Republic of China.

Sustainability of Land Use in North-East India: Issues Involving Economics, the Environment and Biodiversity

1. Introduction

Appendix A of this report sets out the terms of reference of the Prefeasibility Mission to North-East India. The mission was to identify priority land use issues in North-East India in relation to (a) agricultural land use and (b) forest resource use and to report to ACIAR on these with a view to developing a proposal for joint research. All the issues set out in the mission statement were found to be of considerable importance to the sustainable development of N.E. India. Furthermore, because shifting agriculture is widespread in N.E. India, agricultural land use and the sustainability of forest resources were found to be closely connected.

N.E. India consists of seven hill states: Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. Of these, Assam is the least hilly since much of it lies in the plains of the Brahmaputra river system. Most of N.E. India, however, consists of hills or mountains deeply dissected by rivers and streams due to uplifting of the land. Because of this terrain, travel in this region of India is difficult and slow.

Tribal people make up the overwhelming majority of the population of these states, except for Assam, and shifting agriculture and forest resources play a major role in their economic life. Rising populations and desire for an improved standard of living in this region (where the incidence of poverty is high e.g. it is reported that over 50 per cent of the population of Mizoram is below the poverty line) have resulted in lack of sustainability of traditional practices in agriculture and forest use. Consequently, there is a need to search for alternative methods of agriculture and forest use and to evaluate their sustainability from an economic, social and biophysical point of view.

2. The Mission and its Travel

The mission consisted of Professor C.A. Tisdell and Dr K.C. Roy of the Department of Economics of The University of Queensland.

Calcutta is the nearest international airport for entry to N.E. India and virtually one full day's

travel from Calcutta is required to reach Aizawl, the capital of Mizoram, by the fastest possible method. The most practical method is to fly to Silchar in Assam and then to take a road journey of 6-7 hours to Aizawl via a narrow, winding road through the mountains.

Both Dr Roy and Professor Tisdell travelled to Calcutta. Dr Roy flew directly from Australia and Professor Tisdell from Bangkok where he participated in a co-ordination meeting for ACIAR Research Project No. 9204; He flew directly from Bangkok arriving in Calcutta in the afternoon of Wednesday, 20 September. Arrangements were finalised for the visit to N.E. India in Calcutta, appropriate consultations were completed and relevant data collected. Travel to N.E. India was undertaken on Monday, 25 September departing Calcutta early by plane for Silchar in Assam from where the mission was to travel by car to Aizawl, the capital of Mizoram. The Pro-Vice-Chancellor, North Eastern Hills University (NEHU), Mizoram Campus, had sent a car to meet us at the request of Dr K. P. Nath. Because a Restricted Area Permit is required for visits of foreigners to N.E. India, we visited Mizoram House in Silchar to complete formalities. We found that formalities had already been completed (see Appendix B) unbeknown to the car driver. We arrived in Aizawl late in the day, remaining there until the following Saturday when the return journey to Calcutta was completed. We departed by jeep from Aizawl for Silchar at 5 a.m. and did not arrive back in Calcutta until the late afternoon because of delay in the plane flight from Silchar. Departed from Calcutta on Monday, 2 October arriving in Brisbane on Tuesday, 3 October. The travel schedules are shown in Appendix C.

The mission was carried out in the minimum time possible. Because of the time constraint, distances involved and travelling conditions, it was only possible to spend time in Mizoram in N.E. India, but coincidentally some of Assam was seen. However, as a result of the consultation process, contacts have been established with other N.E. Indian states.

3. Consultation and Other Relevant Activities Undertaken by this Mission

The consultation process and data gathering commenced first of all in Calcutta. In Calcutta arrangements were finalized for travel to the state of Mizoram in N.E. India (i.e. flights confirmed, Indian currency obtained and communications from Mizoram via Dr R. K. Sen received) and discussions were held with Dr Raj Kumar Sen of the International Institute of

Development Studies (IIDS) on sustainability issues relevant to N.E. India. Relevant books and several papers were made available for prior reading (e.g. Dr J.P. Mishra, Assistant General Manager, State Bank of India, Central Office, forwarded a copy of his paper “An Approach for Sustainable Development of Agriculture in Hills of Uttar Pradesh” through Dr Sen for Professor Tisdell’s consideration prior to his visit to the N.E. Hills. It raises a number of issues worth following up in the N.E. Hills.) In addition Clem Tisdell made a public seminar presentation on sustainability at the College (a College of Calcutta University) of the Ramakrishna Mission Institute at Belur Math, Howrah. This was organized by IIDS (Dr R.K. Sen) and Professor S.K. Ghosh of the Economics Department of the College and chaired by the Principal, Swami Medhasananda. Dr K.C. Roy also participated and useful feedback was obtained.

In Mizoram, N.E. India, the first major activity was to participate in the International Seminar on “Environment, Biodiversity and Sustainable Development in North East India” held at NEHU, Mizoram Campus, 26-27 September. The program is included as Appendix D. The chief organizer of the seminar was Dr K.P. Nath (Head of Department of Education) and he had some support from members of the Economics Department and others. The Ministry of Finance, Mizoram, helped to sponsor the seminar and NEHU Mizoram Campus also contributed. Given the large size of the N.E. of India and difficulties of reaching Aizawl, most contributors were from Mizoram. However, there were also some contributors from Arunachal Pradesh.

The seminar proved to be of great value in familiarising the mission with priority agriculture and forest issues in N.E. India, especially Mizoram, and facilitated communication with a wide group of participants. Both Dr Roy and Clem Tisdell made presentations (copies of papers already forwarded to ACIAR) and each chaired a seminar session. Presentations were made by Professor Lalthantluanga, Pro-Vice-Chancellor, NEHU, Mizoram Campus, The Minister of Finance (Mizoram) and the Minister of Environment and Forests (Mizoram). The PVC, NEHU, Mizoram Campus was in attendance during the whole of the seminar and participated enthusiastically in discussions about the possible future collaborative ACIAR Project. He was most supportive.

During the seminar and afterwards consultations were held with the following people from NEHU, Mizoram Campus:

1. Professor R. Lalthantluanga, Pro-Vice-Chancellor, Mizoram Campus, NEHU
2. Dr K.P. Nath, Reader, Head of Department of Education
3. Professor K.K. Upadhyaya, Head of Department of Economics
4. Dr Lianzela, Reader in Economics
5. Dr Thangchungnunga, Lecturer in Economics
6. Mr Vanlalchhawna, Lecturer in Economics, Hrangbana College
7. Professor L.K. Jha, Head of Department of Forestry
8. Mr J.H. Lalramnghinglova, Research Scholar, Department of Forestry (on leave from Department of Environment and Forestry, Government of Mizoram)
9. Mr Ramachandra Laha, Lecturer and Head, Department of Botany, Government Kolasib College, Mizoram. Also researching towards a Ph.D. under Dr L.K. Jha.

Consultations with Conference Participants from Arunachal University:

1. Mr P.K. Kuri, Lecturer, Department of Economics (specializes in Agricultural Economics)
2. Dr N.B. Biswas, Reader, Centre for Advanced Studies in Education

In addition, informal discussions were held with a number of those present at the seminar, including government representatives. For instance, Professor Tisdell discussed the possible ACIAR project with the Minister of Finance (Mizoram). He was supportive of it but suggested that it would be best if any request for involvement of his Department or other government departments be channelled through Professor Lalthantluanga, Pro-Vice-Chancellor, Mizoram Campus of NEHU.

It transpired from a meeting following the seminar that there was active support for the project from Mizoram Campus of NEHU. Representatives from Arunachal University who could not stay for the afternoon meeting also expressed strong support at a lunch time meeting with them. Further discussions about the project also took place on Thursday and Friday with representatives from NEHU (Mizoram Campus).

The following was agreed in principle:

1. NEHU (Mizoram Campus) would be major collaborating body in India.
2. Professor Lalthantluanga would be the 'patron' (co-ordinator) of this project at Mizoram and Dr K.P. Nath the project leader there.

3. All the people from Mizoram Campus named above would be interested in involvement in the research. Subsequent discussions would be arranged at Mizoram Campus to arrange matters there as further specification of the project becomes necessary.
4. If funds are sent to any other N.E. Hills state, it would be more efficient if these were sent directly rather than via NEHU, Mizoram Campus.
5. Mizoram Campus has a number of joint research projects with other overseas institutions and has experience and flexibility in managing research funds.
6. Mizoram Campus has excellent connections with government departments and public bodies e.g. its PVC is on several public bodies, and Dr Lianzela is a member of the Mizoram State Planning Board and also the Mizoram Resource Mobilisation and Tax Enquiry Committee. Professor Jha has experience in extension work and a number of his higher degree students are from the Department of Environment and Forestry. This all augurs well for applications of research results.

Discussions with representatives from Arunachal University (mentioned above) indicated their interest and capacity to contribute. They stressed the following:

1. The importance of having local tribal people involved in the project to help ensure its success.
2. Mr Kuri, on behalf of himself and Dr N.C. Roy of Arunachal University, presented a useful paper on changing land rights in Arunachal Pradesh based on original survey work and Dr Biswas presented a valuable paper on wildlife conservation in Arunachal. A paper on forestry in Arunachal Pradesh was also available from Dr A. Mitra, Reader and Head, Department of Economics, Arunachal University, but he was not able to attend the seminar.
3. Given its much greater natural forest cover and the presence of different tribal groups in Arunachal Pradesh, it would be useful to include it in the project. It would also give northerly sampling in contrast to Mizoram which is the most southerly of the N.E. Hill states.
4. From the discussions, it was clear that scope existed for the creation of a research cell at Arunachal University. It was suggested that the most appropriate leader for the project there would be Professor T. Mibang, Head of the Department of Tribal

Studies, Arunachal University. He is from Arunachal Pradesh, of tribal background, well respected and with good contacts. Representatives from Arunachal University were given a detailed overview of the possible ACIAR sponsored research project and offered to use it to consult with colleagues at their University.

Although it was not possible in the time available to consult with appropriate people from N.E. Hill states other than Mizoram and Arunachal Pradesh, NEHU (Mizoram) staff have close contacts in other states and provided names of suitable contacts there. These included:

1. In Meghalaya, Dr Eugene Thomas, Senior Lecturer, Department of Economics, NEHU, Shillong (the central campus) was recommended as a suitable participant. He is a Khasi, and so comes from the major tribal group of this state. Also another useful contact could be Professor S. K. Mishra, Head, Department of Economics, NEHU, Mayurbhanj Complex, Shillong -7930014. A message has been sent to Dr Eugene Thomas via a Khasi visitor to Mizoram indicating our interest in making contact with him.
2. In Manipur, suggested useful contacts were Professor N. K. Singh, Department of Economics, University Manipur, Imphal and Dr M. P. Singh, Vice-Chancellor, Central Agricultural University, Imphal. Both are local people.

Bio-data has been collected from more than ten interested staff at NEHU, Mizoram Campus and at least three staff from Arunachal University. Also apart from all the seminar papers -

3. A number of the published articles of Dr K. P. Nath on the Mizos and their socio-economic practices were received and some articles by Dr Lianzela.
4. Dr Lianzela donated his most recent book *Four Decades of Planning in Mizoram*, Gosen Press, Aizawl, 1995, and his book *Economic Development of Mizoram*, Spectrum Publications, Guwahati, 1994, was purchased. These provide a useful overview of development issues and problems in Mizoram, and are also of wider relevance to N.E. India.
5. Professor L. K. Jha kindly donated the following of his important books:
 - (with P. P. Sen) *Social Forestry*, Himalayan Publishing House, Bombay, 1991.
 - (with P. K. Sen Sarma) *Forestry for the People*, Ashish, New Delhi, 1994.
 - *India's Forest Policies: Analysis and Appraisal*, Ashish, New Delhi, 1994.

- *Advances in Agroforestry*, APH Publishing Corporation, New Delhi, 1995.

These books contain material of relevance to N.E. India. Professor Jha has a special interest in alley cropping and agroforestry as an alternative to shifting agriculture.

4. The *Statistical Handbook of Mizoram - 1994* was obtained.

It might be noted that Dr Nath has special responsibility for economics in the Department of Education and has a multidisciplinary background. He completed his B.Sc. from the University of Calcutta, then a Master of Education and later a Ph.D. in Tribal Studies dealing with socio-economic aspects of the Mizos. He knows the Mizo language, can communicate readily in it and mixes well with the local people.

In addition, On Thursday 28 September Professor Tisdell and Dr Roy accompanied by Dr Nath and Mr Vanlalchhawna travelled from Aizawl to the countryside to observe agricultural activities, particularly shifting agriculture, at first hand. We travelled towards the Burma border. Around Aizawl it seems that much of the agricultural land has fallen into private hands. Labourers are often sent out for the day from Aizawl or nearby to work the land near Aizawl. On our return, we saw a number of labourers waiting for trucks to give them a lift home. Further away, we visited Sesawng village and Professor Tisdell interviewed the President of the Village Council (Panchayat) through an interpreter. The President was both friendly and helpful inviting the group for tea and biscuits and bananas which he had grown himself. He and his wife were quite practical in their enterprise.

He has been a beneficiary under NLUP and has given up shifting agriculture. He has (and is continuing) to plant bananas as a commercial crop. These have been interplanted with mango (Bombay variety) and jack fruit. Once the bananas near the end of their useful fruiting life, these other fruit trees will have grown sufficiently to replace them and start to provide cash income.

His bananas are sold through a middleman to the Aizawl market and he believes that the price is quite favourable. He intends to extend the size of his orchard through a relative who has available land.

Land in Sesawng is not yet privatised, as seems to be the case closer to Aizawl, but it is sufficiently close to the Aizawl market to be in a process of change as far as land use and property rights are concerned. In more remote areas, such change possibly has not yet occurred due to lack of access to markets.

The mission continued to Thingsul town in the neighbourhood of Chaifil Tlang mountain range before returning to Aizawl. At Thingsul a visit was made to the Public (State) High School and discussions were had with the Headmaster and staff and visitors from Shillong. The school teaches some agriculture and has some interest in nature conservation, but the length of stay did not enable these aspects to be explored in depth.

This one day journey provided some useful insights into the agricultural situation and state of forest resources in the area travelled.

5. Priority Areas Identified for Research on Sustainable Agriculture and Forestry Resources

In N.E. India forest resources and agriculture are closely connected because of the prevalence of shifting agriculture. Consequently the two sub-themes for research were found to overlap.

From the contacts made, it seemed advisable in the research to concentrate on Mizoram and Arunachal Pradesh, with some attention being given to Meghalaya because of its central location. Mizoram now has relatively little forest cover whereas Arunachal Pradesh still has considerable forest cover (the most in India) and can provide a useful comparison with Mizoram. There is likely to be some scope for research in Manipur (and other N.E. Hill states) as the project develops, but this would have a lower priority.

In relation to the broad issues and specific goals set out in the terms of reference of the prefeasibility mission:

- In Mizoram, land use changes are being fostered by the New Land Use Policy (NLUP). This policy is designed to foster transition from shifting agriculture to settled agriculture and to commercial activity by subsistence villagers. Property rights to land and natural resources are also a major issue in Arunachal Pradesh. While proposals for land reforms have been introduced to the parliament of Arunachal Pradesh (A.P.) these have not yet been passed due to opposition from those supporting traditional

land rights.

- Technological transition in agriculture is being encouraged in Mizoram under the NLUP, cropping patterns are recognised to show sustainability deficiencies and sloping agricultural land technology (SALT) such as alley cropping is being explored. The methods being considered (e.g. by Professor Jha, NEHU, Mizoram Campus) are relevant throughout the hilly area of N.E. India.
- Several of the N.E. Hill states are net food importers. Mizoram for instance imports basic foodstuffs e.g. rice and milk and relies heavily on subsidies from the central government to make ends meet. Even then the incidence of poverty is high. This financial dependence may not be sustainable politically in the longer run. There is a risk because as the political situation changes, the subsidy from the central government may be reduced. Consequently there is a desire: for greater food self-sufficiency in N.E. India. How to achieve this objective or generate sufficient exports sustainably from this region to pay for its food ‘imports’ making use of comparative advantage is an important issue.
- The development of the livestock industry in some parts of N.E. India e.g. Mizoram, has occurred rather late. Traditionally, it has been said that the Mizos did not keep cattle and engaged in little animal husbandry. Animal husbandry is not as yet well integrated with agriculture in several areas of N.E. India. Supply of animal foodstuffs is in short supply. Several sustainability issues connected with livestock are worth exploring. Dr Lianzela has for example written on the livestock industry.
- Government economic intervention is prevalent in N.E. India. The efficiency and sustainability implications for agriculture and forestry of government policies are worth exploring. Examples have occurred in the past where state governments have encouraged land use changes without adequate attention to the economics of these, including the markets available for the produce. In most cases, the motivation for intervention is idealistic e.g. to encourage economic development or bring about desirable changes in the distribution of income, but the effects are sometimes different to those intended e.g. because sustainability issues and opportunity costs are not fully considered.

The following specific points should be considered:

- It is becoming increasingly difficult to sustain the productivity of agriculture in the N.E. Hills of India due to soil erosion on sloping lands, leaching of plant nutrients (especially nitrogen) and reduced fallow periods for land due to population and production pressures. At the same time, many of the states have a paucity of river flats for cultivation.
- In many instances, the sustainability problem in relation to agriculture is exacerbated by existing communal rules and regulations. For example, the Mizos reallocate land for shifting agriculture on a regular basis by a ballot system. However, in A.P. families are allocated tribal land for shifting agriculture on a semi-permanent basis. The situation varies between tribal groups with differing implications for agricultural sustainability. In some cases also communal rules are undergoing change or evolution. These and other socio-economic factors are worth exploring from the point of view of land use sustainability.
- As already indicated, a number of government policies and regulations e.g. NLUP, have important implications for sustainability of agricultural land use. Systematic research on the economic and ecological implications of these for land use and its sustainability is required.

In relation to forest resources, while N.E. India is relatively well endowed with forest resources containing much biodiversity, forest cover there has been much reduced due to shifting agriculture and logging. The remaining forest stocks vary from state to state. Whereas the forest cover of A.P. is estimated to be about 61.5% of its geographical area, the forested area is much less in Mizoram, and variations in the quality of remaining forest resources must be taken into account. Estimates of forest cover based upon legal status of forest land sometimes give an inflated view of forest resources, the discrepancy being made obvious by satellite imagery.

The legal status of forests in N.E. India affects property rights and has important implications for sustainability of forests. British practice was generally to claim most natural resources such as forests for the Crown despite the fact that local people already had *de facto* title to them and that they were an integral part of their economy. Although a large area of forest passed from the control of local communities to state or central government under this system

(which was continued with the independence of India) not all forests were effectively severed from local control. In Mizoram for example, approximately half of the forested area is state-owned and the other half is village council controlled, except in the Chhlmtpuipui District where it is district council owned.

Nevertheless, villagers do collect timber and other resources from the state owned forests. Provided that this is not for commercial purposes, it appears to be tolerated without royalty payment. A large portion of village council controlled forest is said to be unclassified state forest. Legally the Forest Department appears to be entitled to royalties from timber cut commercially from such land. At the present time, it is clear that property rights in forest land contain a considerable element of uncertainty and this could affect the sustainability of forest resources. Also there is variation in rights between N.E. Hill states. In some cases the local village is entitled to a share of royalties from utilisation of local forest resources e.g. A.P. Furthermore, increasing pressure is being put on forested areas by villagers as a source of firewood, food and herbs.

A precarious situation exists in N.E. India as far as conservation of wildlife and biodiversity is concerned. The rich biodiversity of this area is disappearing rapidly as population increases and economic growth occurs. It is a challenge to devise socio-economic strategies which will enable economic growth to occur and economic security to be improved in N.E. India and conserve the-wealth of biodiversity that it-contains.

The situation as far as wildlife sanctuaries and national parks are concerned leaves considerable room for development. It seems that progress has only occurred recently in establishing such protected areas in Mizoram, possibly under some urging from the central government. As at September 1995, 941 km² had been set aside for nature protection in Mizoram, that is, 4.4 per cent of its area, a percentage not above the Indian average. It seems that there is little effective conservation of wildlife outside these wildlife sanctuaries and national parks. To a large extent this is due to customs and socio-economic reasons. This adds to the urgency of the problem because although wildlife (fauna and flora) are renewable resources, they are finite in their capacity to withstand harvesting and environmental change. As the Minister for Environmental Forestry (Mizoram) made abundantly clear, the loss of biodiversity and natural living resources is a matter for regret and sadness in N.E. India. Furthermore, it can have adverse economic consequences for the region e.g. reduce future potential for cultivation of some indigenous species of plants e.g. bamboos, medical and

herbal plants, and undermine the potential for developing ecotourism/tourism locally.

The potential of SALT such as alley cropping and agroforestry to reduce pressure-on natural forest resources in the region is an important issue. Plantation forestry and social forestry should also be considered. Considerable planting of teak has for example been undertaken in Mizoram.

6. Outline of Socio-Economic Research Proposal

The socio-economic research proposal is to undertake co-operative research in “Sustainability of land use in North-east India: Issues involving economics, the environment and biodiversity” paying particular attention to agricultural land use sustainability and forest resource management. The principal collaborating institutions would be North East Hills University (Mizoram Campus) and Arunachal University (subject to further exchange). A smaller involvement by NEHU (Shillong, Central Campus, Meghalaya) is envisaged with some potential involvement from The University of Manipur and/or the Agricultural University of Manipur and other N.E. states once further suitable contacts are established. It seems best, however, to concentrate the main focus on Mizoram and Arunachal Pradesh. Collaboration at NEHU (Mizoram) will involve the Departments of Economics, Education and Forestry. At Arunachal University collaboration is expected to involve Economics, Education, possibly Forestry, and Tribal Studies. Suggested contacts for other states at this time are with Economics and Agricultural Economics.

All the university personnel specifically mentioned above are expected to be involved in the project. In Mizoram, the following have been identified as useful research topics at this time:

1. Case studies of three villages to examine property rights and changing property rights and socio-economic factors affecting these changes and their implications for local land use. One village should be close to Aizawl since the closer villages appear to be more subject to change because of easier access to markets. Another ought to be further away and a third in a more remote location e.g. in the Champhai subdistrict. This study will help in identifying communal rules and regulations affecting the sustainability of land use as well as sustainability problems faced by the villages.

2. The New Land Use Policy needs to be evaluated. This can be done both at a general level and by interviewing a sample of beneficiaries under the scheme.
3. The influence of government intervention in agriculture and forestry can be assessed from a sustainability viewpoint e.g. the impact of subsidies for particular agricultural inputs and products. In the past, it seems that inadequate attention has been given to markets when promoting particular agricultural products e.g. pineapple production, and promotion of some agribusinesses seems to have proceeded without full consideration of sustainability of supply. In the future this may become an issue if bamboo is, for instance, used for paper production.
4. The sustainability of livestock production in the economy of Mizoram and the integration of livestock into the village economy is worthy of investigation given that Mizoram's livestock industry is still being developed.
5. The socio-economics of introducing a number of alternative types of SALT need to be assessed. These may provide an alternative to shifting agriculture and can have a number of desirable environmental impacts. Several different possibilities for alley cropping should be considered. Professor Jha already is investigating some alternative possibilities and is interested in the socio-economic evaluation of these. Agroforestry, the three-zoned system of hill use, terracing and so on can also be considered.
6. The possibility of relieving pressures on natural forests through appropriate SALT, agroforestry and plantation forestry needs to be considered.
7. Property rights in relation to forests and forested areas need to be identified and their implications for sustainability of forests assessed.
8. Attitudes to nature conservation need to be assessed. In fact this can be done through school-based surveys. Dr Nath (and Dr Biswas) have experience in this area.
9. Prospects for economic benefits to the local region via biodiversity conservation need to be considered e.g. socio-economic prospects for tourism and ecotourism.
10. North-east India is rich in species of bamboo. Some are edible and are important in local diets and other bamboos are suitable for paper production and fabrication. In many cases, natural stands are being unsustainably harvested. There is a need to see how they can best be cultivated e.g. introduced into alley cropping. Most have not been analysed for their nutritional value and Dr Jha's team would like to be able to have some funding to enable this analysis to be completed. Forest medical plants and herbs are also under pressure from overharvesting. The economics and

possibility of cultivating these needs exploration and is for example. of interest to Dr Jha and his team.

11. There is a need to examine closely government policies, especially economic policies and regulations that influence the use and management of forest resources. This will be done in some depth for Mizoram and A.P. and in less detail for other states in N. E. India.

In Arunachal Pradesh, similar agricultural land use issues and matters involving forest management will be considered to those indicated above for Mizoram with particular attention being given to identifying communal rules and regulations influencing land use sustainability and the use and management of forest resources. Customs and regulations in A.P. are not identical to those in Mizoram. Customs often vary with tribal groups. In A.P. allocation of land to families for shifting agriculture is often on a permanent basis whereas in Mizoram it is reallocated regularly by ballot. A more detailed plan for A.P. can be drawn up in due course but village surveys (limited number) are planned. Particular attention will be given to measures for preserving the endangered flora and fauna of A.P. and attitudes of local people to such conservation. To place this study in context, an overview of measures to protect endangered flora and fauna in the N.E. region will be completed.

Depending upon the outcome of further communications, selected aspects of the above issues will also be considered in relation to Meghalaya and Manipur, for example.

7. Concluding Comments

Suitable researchers to collaborate in social and economic (and biophysical research) have been identified and consulted at North-Eastern Hills University (Mizoram Campus) and this Campus is interested in being a partner institution. Consultation has also been undertaken with representatives from Arunachal University, that is presenters of papers at the International Seminar in Mizoram. They would be able to contribute to the project identified and a suitable team of collaborative researchers can be assembled from Arunachal University which has the potential to be a partner institution. A contribution from NEHU (Shillong, Central Campus) is also possible, but like that from Manipur, is expected to be on a much smaller scale. Bio-data on suitable contributors to this research project will be sent under separate cover.

The suggested research project would run in the first instance it is envisaged for three years with potential extension for another three years with changed focusing. As mentioned in a previous document, the land use issues of this region are not peculiar to N.E. India but also occur in several countries in S.E. Asia e.g. Myanmar (Burma).

The project is feasible within a reasonable budget. Given the prior consultation that has occurred, it can commence most quickly in Mizoram and after further consultation in Arunachal Pradesh. The results will not only benefit the N.E. region of India, but will be of value to several other regions in S.E. Asia.

APPENDIX A

Terms of Reference

Prefeasibility Mission to North-East India

Sustainability of Land Use in North-East India: Issues Involving Economics, the Environment and Biodiversity

A. Agricultural Land Use Sustainability - Kartik Roy and Clem Tisdell

1. To consult widely with relevant State and National Government officials; rural community representatives and potential collaborators from various North-East Universities in relation to the following broad issues:
 - land reform and the need for land use planning for transforming traditional agriculture;
 - technological transition in agriculture, cropping pattern and sloping agricultural land technology (SALT) as an alternative to shifting cultivation; and
 - other relevant agricultural land use sustainability issues.

The specific goals of the mission in relation to these themes are to:

- ascertain specific sustainability problems facing the rural communities in the North-East region of India;
- identify communal rules and regulations influencing the respective land use sustainability issues;
- identify socio-economic factors influencing the respective land use sustainability;
- identify government policies especially economic policies and regulations that affect the sustainability of land use;
- identify priority economic (and ecological) research relevant for addressing the above identified issues; current capacity and institutional needs to strengthen the scope for research in his area and develop sustainable management strategies and environmental monitoring processes; and

2. Define the scope of a collaborative research initiative which would address the priority sustainability issues identified by the mission, particularly in relation to the above mentioned themes.
3. Identify potential partner institution(s) and researcher(s) to collaborate in social and economic (and biophysical) research.
4. Prepare an outline of economic (“socio-economic”) research proposal(s) for submission to ACIAR covering all or part of this initiative as appropriate.

B. Forest Resource Management - Clem Tisdell and Kartik Roy

1. To consult widely with relevant State and National Government officials, rural community representatives and potential collaborators from various North-East Universities in relation to the development of forestry; commercial plantation and reservation policies, measures for preserving the endangered flora and fauna of the region.

The specific goals of the mission will be to:

- ascertain specific priority forest development and management issues facing the rural communities and the State Government in the North-East region of India;
 - identify communal rules and regulations influencing the use and management of forest resources;
 - identify socio-economic factors influencing the use and management of forest resources;
 - identify government policies especially economic policies and regulations that influence the use and management of forest resources;
 - identify priority economic (and ecological) research relevant for addressing the above identified issues; and
 - current capacity and institutional needs to strengthen the scope for research in this area and develop sustainable management strategies and environmental monitoring processes.
2. Define the scope of a collaborative research initiative which would address the priority sustainability issues identified by the mission, particularly in relation to the above mentioned themes.

3. Identify potential partner institution(s) and researcher(s) to collaborate in social and economic (and biophysical) research.
4. Prepare an outline of economic (“socio-economic”) research proposal(s) for submission to ACIAR covering all or part of this initiative as appropriate.

APPENDIX B

Notice of Permission to Enter Mizoram

20142

MIZORAM HOUSE SILCHAR - 6

Date

Prof. C. A. Tisdell and Dr. Kartik Ray are visiting Mizoram for important official work. A copy of the permission obtained from the Home Ministry, Govt. of India for Prof. C. A. Tisdell for the visit is being attached.

Hence, they may be allowed to enter Mizoram without causing any inconvenience to them.

Police Check Gate
Vairangte

CHECKED
SP. P. 28/1/15
IN-CHARGE
POLICE CHECK GATE
VAIRENGT. MIZORAM

Liaison Officer
Govt. of Mizoram
SILCHAR

APPENDIX C

Travel Schedules of Clem Tisdell and Kartik Roy

C.A. Tisdell

Wednesday 20 September 1995	Thai International TG313	
	Depart Bangkok	11.45
	Arrive Calcutta	12.40
Monday 25 September	Indian Airlines IC253	
	Depart Calcutta	08.00
	Arrive Silchar	09.05
Monday 25 September	Travel by car	
	Depart Silchar Airport	10.00
	Arrive Aizawl	17.00
Friday 29 September 1995	Travel by Jeep	
	Depart Aizawl	05.00
	Arrive Silchar Airport	11.30
Friday 29 September 1995	Indian Airlines IC254	
	Depart Silchar	15.30 (delayed flight)
	Arrive Calcutta	16.35
Monday 2 October 1995	Thai International TG314	
	Depart Calcutta	13.55
	Arrive Bangkok	17.40
2 October 1995	Thai International TG997	
	Depart Bangkok	23.45
3 October 1995	Arrive Brisbane	11.30

K.C. Roy

As above with the exception of initial flights to Calcutta which were as follows:

Friday 15 September 1995	Thai International TG994	
	Depart Brisbane	23.59
Saturday 16 September 1995	Arrive Bangkok	06.00
Saturday 16 September 1995	Thai International TG313	
	Depart Bangkok	11.45
	Arrive Calcutta	12.40

BIODIVERSITY CONSERVATION

WORKING PAPERS IN THIS SERIES

1. Biodiversity Conservation: Economics, Gains and Costs in China Illustrated by Xishuangbanna Nature Reserve, Yunnan by Clem Tisdell and Xiang Zhu, February 1994.
2. Does the Economic Use of Wildlife Favour Conservation and Sustainability by Clem Tisdell, March 1994.
3. The Environment and Asian-Pacific, Particularly East Asian, Economic Development by Clem Tisdell, March 1994.
4. Presenting Requests for Financial Support for Protected Areas: The Role for Environmental Economics and Commonsense by Clem Tisdell, March 1994.
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6. Conservation, Protected Areas and the Global Economic System: How Debt, Trade, Exchange Rates, Inflation and Macroeconomic Policy Affect Biological Diversity by Clem Tisdell, March 1994.
7. Environmental and Resource Economics: Its Role in Planning Sustainable Development by Clem Tisdell, April 1994.
8. Conservation of Biodiversity is the Most Important Aspect of Ecologically Sustainable Development: An Economic Perspective by Clem Tisdell, April 1994.
9. Ecotourism, Economics and the Environment by Clem Tisdell, October 1994.
10. Socio-Economic Issues and Strategies for Biodiversity Conservation in China with Observation from Xishuangbanna by Clem Tisdell, November 1994.
11. Ecotourism – Its Boundaries and its Economics with Examples from China by Jie Wen and Clem Tisdell, February 1995.
12. Reconciling Economic Development, Nature Conservation and Local Communities: Strategies for Biodiversity Conservation in Xishuangbanna, China by Clem Tisdell and Xiang Zhu, February 1995.
13. Tourism Development in India and Bangladesh: General Issues and Ecotourism in the Sunderbans by Clem Tisdell, March 1995.
14. Trends in Tourism Development in China: Issues and Opportunities by Clem Tisdell, March 1995.
15. Tourism Development and Conservation of Nature and Cultures in Xishuangbanna, Yunnan by Clem Tisdell and Xiang Zhu, May 1995.
16. Protected Areas, Agricultural Pests and Economic Damage: A Study of Elephants and other pests from Xishuangbanna State Nature Reserve by Clem Tisdell and Xiang Zhu, May 1995.
17. Financing Nature Reserves in China – The Case of the State Nature Reserve of Xishuangbanna, Yunnan: Financial Issues, Political Economy and Conservation by Clem Tisdell and Xiang Zhu, August 1995.
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20. The Environment, Biodiversity and Asian Development by Clem Tisdell, September 1995.
21. Biodiversity, Conservation and Sustainable Development: Challenges for North-East India in Context by Clem Tisdell, September 1995.

22. Economic and Environmental Perspectives on Sustainable Agricultural Developments by Clem Tisdell, September 1995.
23. India's Economic Development and Its Environment: General Patterns, Issues and Implications by Kartik Roy and Clem Tisdell, September 1995.
24. Sustainability of Land-Use in North-East India: Issues Involving Economics, the Environment and Biodiversity by Clem Tisdell and Kartik Roy, December 1995
25. Criteria for Sustainable Tourism: Why a Cautious Attitude is Needed by Clem Tisdell, January 1996.
26. Protected Areas, Agricultural Pests and Economic Damage: Conflicts with Elephants and Pests in Yunnan by Clem Tisdell and Xiang Zhu, January 1996.
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28. Economics as a Basis for Conserving Nature by Clem Tisdell, February 1996.
29. Final Report on ACIAR Small Project: Economic Impact and Rural Adjustment to Nature Conservation (Biodiversity) Programmes: A Case Study of Xishuangbanna Dai Autonomous Prefecture, Yunnan, China by Clem Tisdell, March 1996.
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