

Maximizing socioeconomic approach in studying people-forest interactions¹

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Abstract

Study on people-forest interaction increased rapidly in last two decades along with development of several methods in approaching this topic. In any circumstance, this is study about people and their behavior towards the forest; hence behavioral science that rooted in interdisciplinary socioeconomic approach will continue to exist. Unfortunately, the use of socioeconomic approach in people-forest interaction studies has been single disciplined and use limited technique with limited time frame, as consequences it lacks of comprehensiveness in understanding a complex and multi dimensional people-forest interaction. In addition, socioeconomic studies have emphasized so much on people and lacks of appreciation on forest aspect.

This paper argues that socioeconomic approach in studying people forest interaction can be maximized by employing interdisciplinary socioeconomic approach with a combination of techniques. Hence, the use of traditional techniques in data gathering for various socioeconomic aspects, i.e. livelihood, forest institution, and forest management-- are useful and can be supported various level of analysis. These techniques minimally range from key informants, historical documentary data, map, group interview, household survey, and observation.

The paper will discuss importance of triangulation in maximizing socioeconomic approach in studying people-forest interaction. At the end it would suggest that application of triangulation also means that forestry researcher should cope with latest development on forestry research methodology.

Key words: Forestry Research, Triangulation, Nature Reserve, Indonesia, West Sumatra

Introduction

“...much forestry research was wasted because it was irrelevant, excluded people and their knowledge, and treated trees as an isolated system, with poor communication of research results.” (Nair et al., 1995)

“...as forestry moves to become more local, and more empowering, it is the methods rather than the data which will be most sought after” (Lawrence, 2000)

“...hence proposals for interventions must be context-specific, providing reference to particular forests and socioeconomic and political conditions. (Angelsen and Wunder (2003, page 18)

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Above excerpts emphasize the need for improving forestry research methodology, since it is clear that forestry is not only dealing with trees but dealing with people. Forestry research is more than simply studying trees in its biological and ecological term, such tree growth, biological and physical factor that affect the growth (see for example CIFOR 2002), but it is a study about forest in relation with people. As forest in many instances is common property adds to forest research methodological puzzle. Hence, methodology is indeed a matter. Understanding relationship between trees and people then would need an understanding about forest condition, people condition, and relationship between people condition and forest condition. Forestry research definitely needs multiple approaches in terms of research methods and techniques as well as in the context of historical perspective.

Through out this paper, in order to improve forestry research, I would like to reveal that forestry research need triangulation in the research methods. The triangulation is intended to explore the multifaceted aspect of forestry. The basic principles of triangulation in forestry research is understanding people, their condition, understanding forest and its condition, and how forest condition and people socioeconomic condition influence each other. This can be approached by using various methods and techniques. The researcher, in turn, should also expand their capacity to integrate these methods and techniques.

I based this paper on my current study about people forest linkages in a protected area under current government decentralization in Indonesia. Having background in agricultural socioeconomic and social development study, forestry is a new field for me, I also need to learn allot about forestry by applying triangulation principles in my research. I just want to reveal in this paper how and why triangulation is a must in forestry research.

Some basic concepts

Before I continue, let me be clear with myself on the terms I use through out this paper. These are; research, forestry, and triangulation.

Research here means an academic endeavor where systematic attempts are made to answer research questions using empirical data. Hence, I focus on research to which the researcher is an outsider to object of the study; hence he/she need to learn a lot about the object. This might sound exploitative research as the researcher work more for his/her interest in answering to his/her research question. In addition, following Myers (1997), I focus on qualitative research that involves the use of qualitative data, such as interviews, documents, and participant observation data, to understand and explain socioeconomic phenomena pertaining to forestry. According to Myers (op cit.), qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions. To be more specific about philosophical basis of the research I am dealing with, I mean as research here is critical research (Habermass cit in MacIsaac, 1996) to differentiate it with positivist and interpretive ones. This philosophical basis would distinguish research methodology; critical researchers assume that social reality is historically constituted and that it is produced and reproduced by people. The main task of critical research is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light. Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination (Myers 1997).

Forestry has been defined as 'the science, art and practice of managing and using trees, forests and their associated resources for human benefit.' (Ministry of Forestry, British Colum-

bia n.d <http://www.for.gov.bc.ca/hfd/library/documents/glossary/index.htm>). This definition reflects that forestry is about the tree in relationship with people; especially how trees and forest land are managed for human benefit. Hence, forestry has been shaped and reshaped by historical events; it creates domination of a group by another group.

I take proposition of International Forestry Resources and Institution (IFRI) that it is human behavior that determines forest condition (Wertime et al 2003). Human behavior is an aspect that best depicted by using of socioeconomic approach. Hence, creative uses of socioeconomic tools in studying forest-people relationship are a matter of art in research. Researcher need to choose all appropriate tools in his/her reach in studying the subject. In addition, as seen from excerpt earlier, more and more realization in last decades is that people are important component in forestry, as such as forestry is dealing with behavior. More forestry researches recently are carried by social scientist. Center International Forest Research (CIFOR), for example, affirms that their understanding of how forests work, why they matter and what is happening to them is based on research conducted by ecologists, anthropologists, sociologists and economists (CIFOR 2003, p.4). Hence, forestry research is a multifaceted task that requires integration of disciplines and triangulation of research methods.

Triangulation. In simple definition, 'triangulation refers to the use of more than one approach to the investigation of a research question in order to enhance confidence in the ensuing findings' (Bryman, n.d). This can be two or more research methods are employed. Fielding and Schreier (2001) identify three meanings or models of triangulation: (1) triangulation as the mutual validation of results obtained on the basis of different methods (the validity model), (2) triangulation as a means toward obtaining a larger, more complete picture of the phenomenon under study (the complementarity model), and (3) triangulation in its original trigonometrical sense, indicating that a combination of methods is necessary in order to gain any picture of the relevant phenomenon at all (the trigonometry model). Denzin (1970 cit in Fielding and Schreier 2001) distinguished four forms of triangulation: (1). *Data triangulation*, which entails gathering data through several sampling strategies, so that slices of data at different times and social situations, as well as on a variety of people, are gathered. (2). *Investigator triangulation*, which refers to the use of more than one researcher in the field to gather and interpret data. (3). *Theoretical triangulation*, which refers to the use of more than one theoretical position in interpreting data; and (4). *Methodological triangulation*, which refers to the use of more than one method for gathering data.

Hence, two meanings of triangulation have emerged; triangulation as a process of cumulative validation or triangulation as a means to produce a more complete picture of the investigated phenomena (Kelle op cit). In ethnographical research according to Burgess (1984, p.5 cit in Fielding and Schreier (2001) the context of triangulation is that it involves developing "relationships between the researcher and those researched". Such relationships make available a range of techniques for checking interpretations which arise from the more intimate and sustained nature of this form of fieldwork. Knafl and Breitmayer (1989) suggest that 'multiple data collection techniques contribute to the completeness function of triangulation by providing explanatory insights about data from varying sources (pp.234-5 cit in Massey, 1999).

The usual emphasis in triangulation is on combining methods, e.g., survey questionnaires with non-standardised interviews using a number of data sources (self, informants, other commentators), a number of accounts of events, or a number of different researchers (see Fielding & Fielding 1986). Triangulation reduces the risk of systematic distortions inherent in the use of only one method" (Maxwell 1998, p.93 cit in Kelle (2001). Triangulation tends to support interdisciplinary research rather than a strongly bounded discipline (Olsen 2004).

Forestry research, as I will be elaborating in later part, can be benefited from application of triangulation in all senses; data sources, data collection techniques, as well as methods.

The Study and the Area

I employed triangulation approach in an explorative research that aimed at 1). exploring historical and contemporary linkages between forests and livelihoods of the local people in the study area; 2) identifying major factors influencing the above linkages during the last 30 years/decades; 3) analyzing whether government decentralization and revitalization of traditional village government affect forest and livelihoods linkages in study area; and 4). suggesting, based on the findings, alternative policy measures and implementation strategies for enhancing forest conservation and poverty reduction within the broad framework of current decentralization policy of the government.

The study area was Barisan I Nature Reserve, a protected area encompassing 74,000 hectares in West Sumatra province, Indonesia (Figure 1). This is a long established protected area dated back to Dutch colonial time in early 20th century. According to the IUCN protected areas classification, this site belongs to category VI which by definition contains predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while at the same time providing a sustainable flow of natural products and services to meet community needs (IUCN 1994). The government of Indonesia, however, considers this area as a Nature Reserve forest, which means that it should be a forest area having the main function of preserving plant and animal diversity and ecosystems, and also as the place for life-supporting system (Forestry Law No. 41/1999).

The reserve straddles four autonomous districts: the urban area of Padang City (the capital of West Sumatra Province), the peri-urban area of Padang Pariaman District in the Western part, accessible rural areas of Tanah Datar district and poorly accessible rural areas of Solok district in the southern and in the eastern parts. Thus, the area also has a varying degree of market access and physical setting. Being fall under different administrative jurisdiction means that people forest interaction in different districts might be affected by each district government policy, especially under government decentralization policy, hence triangulation of data sources become significant.

Barisan I Nature Reserve has important environmental functions such as maintaining water quality, supplying water to Singkarak Lake where a 154 MG hydroelectric power plant operates, supplying water to a number of small scale irrigation systems surrounding the forest reserve, and supplying piped water to villages and town. Hence, triangulation in term of sources of data from various forest users is required.

Physically, this reserve represents a contiguous forest that according to recent forestry Law has a complex system of forest management. It has a core conservation area where the central government is responsible for management. Under current decentralization law, the part surrounding the core area is within the authority of district government. Outside of that is a buffer region communal forest which is under village management. This reserve is surrounded by 23 *nagaris* (traditional village) that have traditional claim of land rights inside protected areas. Having this sophisticated forest management system, the reserve entails a multi stakeholder forest with multiple forest uses. Hence, triangulation is a necessity in studying this reserve.

Research process

As an outsider, studying a 74,000 forest protected area that straddles in four administrative jurisdiction requires several stages and a lot of menial works to understand people-forest interaction. In field application, I follow the several steps keeping in mind the necessity of triangulation and multi-stakeholders of the reserve. As a researcher with paramount objective is to satisfy my curiosity I keep in mind that I have to use all my curiosity senses. This intuition derived me for more, when I read, I want to hear, when I heard I want to see, when I see I want to touch, when I touch I try to understand, when I understand I try to interpret, when I interpret I try to draw conclusion.

The first step I did was mapping the reserve using secondary data such as report and document available. Reserve maps and administrative maps are very important tools in this process. From this I could delineate boundary of my study areas, identifying administrative jurisdiction, such as number of districts, sub-districts, villages, and sub-villages in reserve vicinity.

Knowing the reserve boundaries, I begun questioning forms of people-forest interaction in all villages surrounding Barisan I Nature Reserve. This brought me into interviewing key informants at provincial level, districts level, sub-districts levels, village levels, and sub-villages levels. All in all there were four interviews with official from Natural Resources Conservation Unit (UKSDA), Ministry of Forestry; 5 interview with provincial forestry service, six interviews with district level officials; 10 interviews with Sub-District (Kecamatan) administrators; 25 interviews with village (*Nagari/Kelurahan*) administrator; 17 interviews with head of sub-village head; and two interviews with the forest farmer group. These interviews focus on resources mapping, people-forest interaction, and impact of these interaction on forest condition. Interview from one level to next level brought up more information and issues that can not be answered at that level and need further interview at lower level.

Having enough information on people-forest linkages qualitatively triggered next question on how important is forest in household livelihood. This question can not be answered by key informant interview. This led to conducting a household survey. I selected 11 out of 23 traditional villages surrounding the reserve as sites for detailed study. These villages were purposively selected based on number of forest related activities including farming, fuel wood collection, non timber forest products collection, hunting and trapping, and timber felling. Within these 11 villages I purposively selected 17 sub-villages which in direct border with reserve and then I randomly selected ten percent of the households (N = 299) in each sub-village for household survey.

Finished with household survey, many question remain on my mind such as how is forest condition in nearby villages given particular pattern of people-forest interaction, how is forest farming being practiced how its effect forest condition, how timber cutting and hauling being carried out, how the people do hunting and trapping, how NTFP being collected. All in all, I want a bigger picture of people forest interaction. This led me to do direct observation by visiting forest, observing forest farming and other activities carried out in forest as well as to check out tree condition. To this end I develop forest observation form and taking forest plot sample just to provide evidences of forest cutting, remaining trees, and potential growth. Hence, IFRI research technique provides help as guide for forestry research. Still to complete a clearer and bigger picture, I use satellite imageries to spot forest area cleared for farming.

Triangulation in forestry research, field notes

Why I had to go through those various stages in the research process? Forestry research can be benefited from a combination of qualitative and quantitative methods where applicable. Combining qualitative and quantitative methods is an issue of across-method triangulation (Fielding and Schreier 2001). I have some arguments for the importance of triangulation for forestry research. These among others are; the facts that the forest sector involves multi stakeholders, importance of local knowledge, sensitive issues on forest-people relationships under a common property regime, the limits of key informants, and so on.

Initial interviews with key informants and secondary data, I found six types of forest-people linkages, these are; forest clearing for farming, tree cutting widely known as illegal logging, timber hauling, hunting and trapping, collecting firewood, gathering NTFP, and settlement inside protected areas known as enclaves (Table 1). Sample photos of various forest activities are shown in Annex 1. I questioned all of these activities to all key informants at various levels and I found out their knowledge is different. Hence, I have to search for the answer using various sources and techniques using triangulation principles.

My field work reveals two types of triangulation in forestry research; data sources and data collection techniques.

Data sources Triangulation

I have several reasons why triangulation of data sources is important. These are, forest multi stakeholders, local knowledge vs scientific knowledge, sensitivity of people-forest linkages, and local cliques.

Forest multi stakeholders

Forests and protected areas involve multiple stakeholders; government --central government, provincial government, district government, down to village government--, non government, and local communities. An attempt to understand the people-forest relationship should approach these different stakeholders. These stakeholders should be incorporated as sources of data. Each level has a different role and different interests and even manages different parts of the forest within the protected area system. Their views and interests on other stakeholders are different, also their understanding of the protected areas. Relying on one source of data at this time endangers coming up with a conclusion bias. Government and local communities often have different perceptions and understandings about the forest. Their interests are opposite to each other; government interest is on conservation while local people's interest is on exploitation and extraction. Hence, triangulation means gathering data from various stakeholders to get a complete picture of the people-forest relationship. Biggs and Mutsaers (1992) call this an actor-oriented approach, a holistic approach that identifies major actors in an overall research system.

Local knowledge vs Scientific Knowledge

Studying forests involves knowing tree taxonomy in local terms and scientific terms. Forestry researchers should combine both local knowledge and scientific knowledge. Hence, triangulation involves combining local knowledge and scientific knowledge in labeling a species. Local forest users are very rich in local knowledge on tree species; they could name particular trees, local uses of trees, as well as trees that are not useful at all, and tell the abundance of species. However, their knowledge is only applied locally.

Table 1: Result of Triangulation

| People-forest linkages | Site | Result from Key informant interviews | | | | Household survey | Field observation | Forest measurement (basal area) | Interpretation of satellite images |
|--------------------------------|--------------|--------------------------------------|------------------------------|----------------------------------|------------------|------------------|-------------------|---------------------------------|------------------------------------|
| | | Provincial government official | District government official | Sub-district government official | Village official | | | | |
| 1. Forest clearing for farming | Padang | Yes | n.a | Yes | Yes | 48.6% | Observed | (Being processed) | (medium) |
| | Pd. Pariaman | No | n.a | Yes | No | 60.0% | Observed | | (low) |
| | Tanah Datar | Yes | Yes | Yes | No | 81.1% | Observed | | (high) |
| | Solok | Yes | Yes | Yes | No | 67.5% | Observed | | (high) |
| 2. Hunting and gathering | Padang | Do not kow | n.a | n.a | No | 8.6% | No | | Inapp. |
| | Pd. Pariaman | Do not kow | n.a | No | Yes | 22.7% | Observed | | Inapp. |
| | Tanah Datar | Do not kow | n.a | Yes | no | 21.6% | Observed | | Inapp. |
| | Solok | Do not kow | Yes | n.a | Yes | 13.8% | Observed | | Inapp. |
| 3. NTFP collection | Padang | Do not kow | n.a | No | Yes | 11.4% | No | | Inapp. |
| | Pd. Pariaman | Do not kow | n.a | Yes | Yes | 17.3% | Observed | | Inapp. |
| | Tanah Datar | Do not kow | n.a | Yes | Yes | 9.5% | Observed | | Inapp. |
| | Solok | Do not kow | Yes | n.a | Yes | 26.3% | Observed | | Inapp. |
| 4. Firewood collection | Padang | Do not kow | n.a | Yes | Yes | 57.1% | Observed | | Inapp. |
| | Pd. Pariaman | Do not kow | n.a | Yes | Yes | 77.3% | Observed | | Inapp. |
| | Tanah Datar | Do not kow | n.a | n.a | Yes | 70.3% | Observed | | Inapp. |
| | Solok | Do not kow | n.a | Yes | Yes | 76.3% | Observed | | Inapp. |
| 5. Timber cutting | Padang | Yes | Yes | Yes | Yes | 21.4% | Observed | | Inapp. |
| | Pd. Pariaman | Yes | Yes | Yes | Yes | 22.7% | Observed | | Inapp. |
| | Tanah Datar | Yes | Yes | Yes | Yes | 28.4% | Observed | | Inapp. |
| | Solok | Yes | Yes | Yes | No | 3.8% | Observed | | Inapp. |
| 6. Enclave | Padang | Yes | n.a | n.a | Yes | Inapp. | No | | No |
| | Pd. Pariaman | No | n.a | n.a | No | Inapp. | No | | No |
| | Tanah Datar | Yes | n.a | n.a | Yes | Inapp. | Observed | | Yes |
| | Solok | No | Yes | n.a | Yes | Yes | Observed | | Yes |

n.a = data are not available

Inapp. = inapplicable

To bring this knowledge to scientific world, scientific knowledge also needs to be use in data collection. This involves triangulation of investigator where botanists get involved in.

Sensitive Issues of People forest linkages

People forest linkage under common property regime often involving sensitive issue such as illegal harvesting, under which data collection might have some level of difficulties. In this case, triangulation of data from different sources is necessity. Other wise important information might be missing. Some respondent denies if illegal harvesting happen in their village, but when this phenomenon is addressed to other respondent, different respond is obtained. Those who involve in illegal activity would not tell it to researcher or they defend themselves from doing those harvest, it is commonly found in studying a commons property. The users know that there are regulation and control; there is also rule breaker and free rider. In forestry sector, the issue of illegal harvesting is paramount. In many cases involve external actors as well as local forest users. This all require triangulation sources of data using various technique to explore the nature of illegal harvesting, who does what and why.

Local clique

In line with sensitivity issue, another reason for conducting data sources triangulation is that people in villages are not a homogenous group, they consists of sub groups based on different basis; political, economic, genealogic, social, cultural, age, and sex, etc. In many cases, they consist of clans, sub clan, original settlers or late comer, elites and commoners, forest dependant and non forest dependent. Each of them has different interest and opinion about forest. As much as possible, knowing these sub-groups and their interest over forest bring different color of data on people-forest interaction.

I found some village headman defending the practice of tree cutting in protected areas. They even claim that the scale of cutting is small so it does not affect forest condition so much. The others claim that tree cutting has been conducted for long time, from generation to generation, so it is difficult to curtail. When I ask the same question to other people of different group, they reveal that those village headmen involve in tree cutting and that's why they defend the practice. This kind of information could only be obtained from other people far from inner circle of local politic.

Data collection Triangulation

Aside from gathering data from various sources, triangulation in data collection techniques is also necessary. Aside from collecting data using key informant interview above, I employed several other data collection techniques, such as household survey, direct observation, forest mensuration, and interpretation of satellite imageries.

Household survey

If all of those key informant interviews are not able to reveal any details about people forest relationship, researcher need to use another data collection technique. Hence, he/she move from data sources type of triangulation into data collection technique type of triangulation. Many facts can not be revealed by key informant interview, especially quantitative data. In addition, no secondary data are available on number of household involved in various activi-

ties in the forest as well as data on how important is forest in their daily livelihood. Household survey is necessary to overcome this drawback.

Application of household survey through face to face interview also opens more chances to talk to villagers, to hear, and to observe daily life of household. In many times, face to face interview reveal many facts and information beyond the questionnaire. When there dissatisfaction of rural people on particular issues in their village they often reveal it to researcher, regardless researcher ability to give instances way out to the problem. Rural people also kind of reporting to the researcher of their complains. As much as possible, interviewers take notes on necessary information revealed by respondent beyond questionnaire.

Direct Observation

Having listened to several key informants, household interview, and some times group discussion, I complete my data collection by doing direct observation. This involve going into the forest, observe forest related activities being carried out such as farming, timber cutting, timber hauling, and other forest activities. By doing direct observation I convinced that the data I collected earlier using various techniques are confirmed and I know details and better. By doing direct observation, researcher watching, direct observation suggests a more detached perspective, striving to be as unobtrusive as possible so as not to bias the observations; researcher is observing certain sampled situations or people rather than trying to become immersed in the entire context (Trochim 2002). By doing direct observation, I could see even the very sensitive forest related activities such as timber cutting and timber hauling as well as forest clearing inside protected areas. These data collection triangulation technique again gives researcher more confidence that data are valid and reliable. They did not come out of nothing. I did not only observed, but when possible I tried myself doing what people do in the forest such as hauling timber, so I sense the quality of the job.

Forest mensuration

Forestry research would not be complete without knowing the condition of tree in the forest. To this end, forester has developed forest mensuration technique, a subject which deals in its simplest form with forest measurements (Rogers, n.d). Traditionally, these are measurements of trees and stands, or the primary wood products that are harvested from them, and the estimation of growth and yield.

Forestry research needs to check forest condition under different type of people-forest relationship and management. Attention should be given to forest health that reflects tree basal areas and potential growth of trees. In my case, I did measure forest under conservation area, forest protection areas, and under community forest areas.

Use of aerial photograph

In large forest track like Barisan I Nature Reserve, it is almost impossible to carry out a representative forest plot sampling. The availability of aerial photograph, sometimes for free, provide uncensored data to the researcher to overcome forest size. Satellite imageries make data available beyond administrative jurisdiction. These images are powerful in assessing forest condition as they reveal forest cover and other land uses. If images are available for different times, time series data can be generate from satellite imageries (see Burgi and Turner 2002, Hansen 2005). Satellite imageries also show impact of physical and infrastructure development such as road construction on forest (Nelson and Heilerstein 1997).

Satellite imageries reveal that large track of forest in Solok District has been cleared for annual crop farming. Having this forest degradation, local government with village government begun regulating locally forest extraction and forest clearing.

Problem I encountered

Having applied all necessary data collection techniques and data sources, it does not mean my field work has no draw back. I realized that I could not reach all forest representatively. There are some physical barriers such as distance and high terrain with steep slope. Even though some key informants reveal that forest cutting has reach conservation forest, I can not seem them all. Here is among difficulties working with very large forest with elevation from 100 0 2300 meter above sea level.

Implications for Forestry Research, a concluding remark

I finally draw implication of this finding on forestry research methodology. Forest and other natural resources involve multi uses and multi users which among them are in conflict. Natural resources researcher need to gain data from all of those users. Given physical and socio-economic characteristics of nature and the dependant people, triangulation in term of research methodology is a necessity. Hence, forestry research need to always develop capacity in executing forestry research using various approach and techniques. To this end, the methodology developed by IFRI, is an example of how triangulation in forestry research has been taken into account.

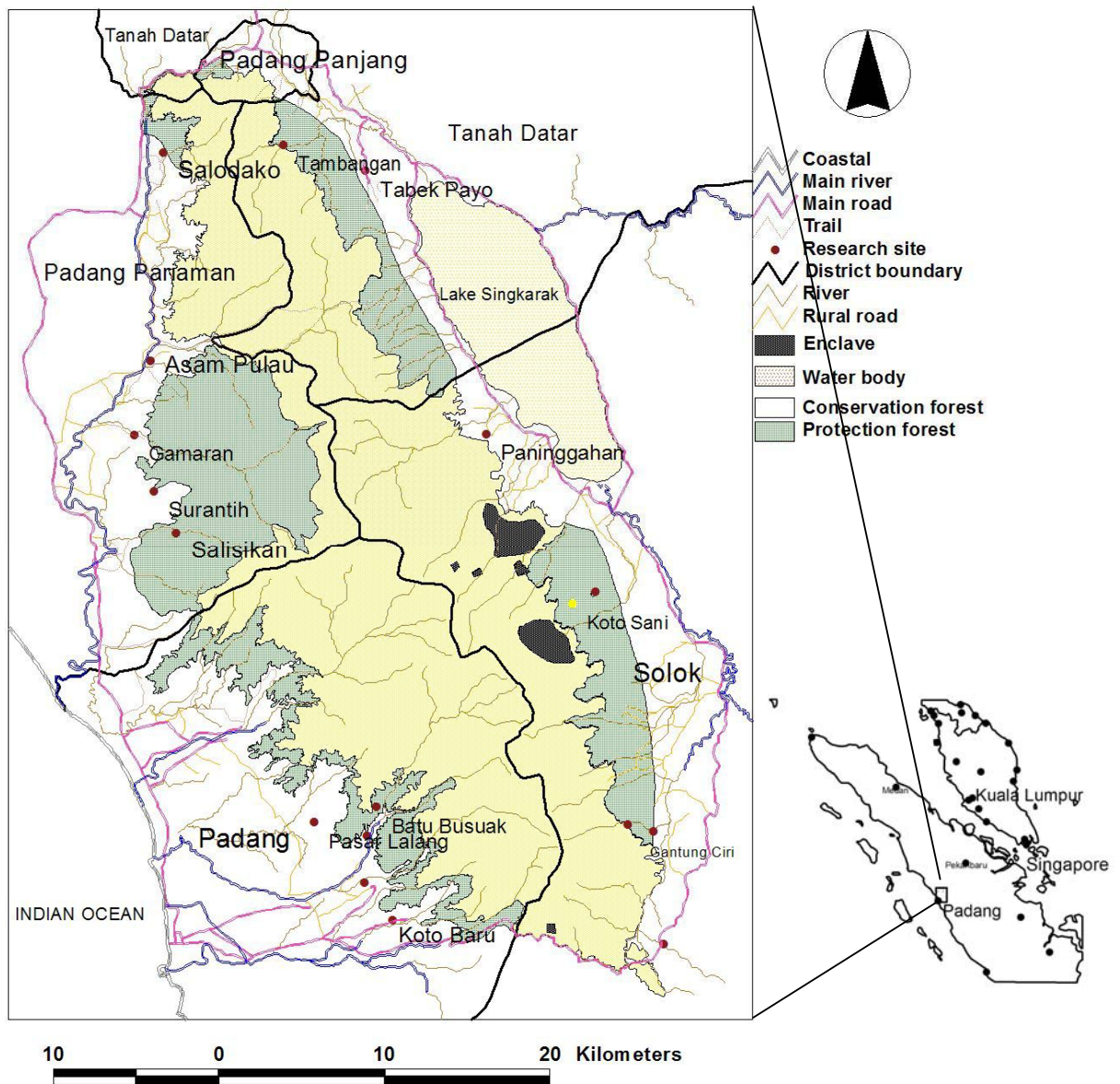
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Figure 1. Barisan I Nature Reserve in West Sumatra, Indonesia



Annex 1: Forest clearing for farming



Annex 2: Firewood collection



Annex 3: Timber cutting and hauling



Annex 4: Hunting and trapping



Annex 5: NTFP



Annex 6. Forest cleared for farming as of 2000

