

Continuity and Evolution of ASB-Brazil User Needs: Report of Consultations with Stakeholders in Brazil 24 July to 5 August, 2003

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1. INTRODUCTION

Deforestation Situation

Deforestation in the Brazilian Amazon reached one of its highest levels in 2002.¹ Most deforestation took place in the 'deforestation arc' along the southern parts of the Amazon, but no area was unaffected by this surge in forest clearing and burning. While nobody expected deforestation to stop, this surge took most people by surprise. Reasons for the spike in burning were often site- or state-specific, but pent up demand for cleared land, the slow return of economic growth, social instability and political uncertainty all seemed to have combined to both increase the demand for cleared land and to reduce the expected political and economic costs associated with converting forest to agriculture. Agencies at all levels responsible for monitoring and controlling forest conversion are redoubling their efforts to do so, with support from the international community. This spike in deforestation, with its unfortunate environmental effects, may provide ASB with a window of opportunity for establishing itself more prominently in the research and policymaking communities in the Amazon region.

Sociopolitical Setting

Brazil is experiencing difficult times. While everyone expects the political and social situations to improve and the economy to grow, most agree that the current transition will not be an easy or quick one. Pent up social tension is now clearly visible in Brazil, and this is exacerbated by the slow return of economic growth. Fiscal constraints hamper most public agencies, with possible long-term consequences for growth and equity.

Aware of this backdrop, a small team of ASB members (Thomas Tomich, Roberto Porro, Stephen A. Vosti, and Helmut Scheuch) traveled to Rondônia, Acre and Pará, and to São Paulo and Brasília to visit former research sites and to discuss with stakeholders (some identified long ago, others newly contacted) their concerns and ways in which ASB (perhaps in collaboration with the newly formed Amazon Initiative) could contribute via science, outreach and/or capacity strengthening to help solve important problems.

¹ INPE estimates for 2001-2002 indicate that deforestation in the Brazilian Legal Amazon reached 25,476 km², second only to the 29,059 km² of 1994/95 (<http://www.obt.inpe.br/prodes.html>).

Timing of the Brazil Trip

Embrapa has long been ASB's principal collaborator in Brazil, the recipient of most of our research and outreach products, the focus of most of our training and capacity strengthening activities, and one of our primary sources of research support (making important and very timely financial and in-kind contributions). Therefore, the trip was in part timed to receive updates from Embrapa centers and Embrapa HQ regarding new research, outreach, and capacity strengthening objectives and priorities. Regarding the receipt of updates, the trip turned out not to be ideally timed. Embrapa HQ is in the process of rewriting its Plano Diretor (strategic planning document), which, once completed, will serve as a guide for rewrites of center-specific planning documents. However, regarding the potential for ASB to influence the planning documents at HQ and especially at the center level, timing for our trip was good, since we put on the table the results of published and more recent collaborative research directly relevant to the Amazon. Consequently, ASB is now better positioned to participate in discussions at HQ and at the centers regarding future research, outreach and capacity strengthening activities (see *Next Steps for ASB*, below). An example of the potential for this sort of collaboration will be CIPEA, Embrapa's Internal Commission for Research and Sustainable Development in the Amazon, which was created in the late-1990s and is currently in the process of review and restructuring.

2. STAKEHOLDER CONSULTATIONS

Subsets of Stakeholders Consulted

Time constraints precluded a comprehensive canvassing of all ASB stakeholders in the Amazon region of Brazil. However, a broad set of stakeholders were involved in formal and informal discussions at each site visited. (A travel itinerary and meeting agenda is presented in Appendix 1, and a list of individuals contacted appears in Appendix 2.) Policymakers from virtually all levels (local, municipal, state, national and international) were contacted and most found the time to discuss key issues. A concerted effort was made to go beyond the traditional ASB stakeholder base comprised of small-scale agriculturalists occupying colonization projects; farmers and ranchers representing a broad range of activities and scales of operation were included in discussions, as was a small but important set of representatives from the commercial sector. More needs to be done to establish effective links with a larger set of stakeholders in Brazil (and throughout the Amazon region), and efforts to do so are underway.

Issues Raised by Stakeholders

What follow are two sets of issues raised by these stakeholders. The first set we label 'enduring issues,' since many of these have been voiced in the past and were indeed some of the main reasons that ASB became active in the region. The second set we label 'emerging issues,' since they are different from those we heard in the past. Some issues appear in both sets, as the nature and/or intensity of the concern have changed, and/or the groups of stakeholders voicing

these concerns have changed. There is no particular order in which the issues included in either set are presented.

It is noteworthy that some groups within and outside the Amazon have long raised some of the issues that we categorize as ‘emerging.’ For example, national and international environmental groups have long suspected that the gains from converting forested land to agriculture would be fleeting and that growth based on such a strategy would fail. At the plot and farm levels, farmer innovations combined with new production technologies emerging from organized research have demonstrated that in many areas the gains from forest conversion can be sustained. At a more aggregate level, however, *municípios* and states faced with the near exhaustion of their agricultural frontiers are now wondering where the next 20 years of agricultural growth will come from and are seeking innovative ways to increase productivity growth in established agricultural areas – the principal remaining source of growth in rural areas. Hence, an ‘old’ issue is being addressed in a somewhat ‘new’ way by a ‘new’ group.

To facilitate comparisons across sets of issues and to make them more compatible with Millennium Assessment activities/concerns, we have grouped entries into the following sub-categories: driving forces of land use and land cover change; human wellbeing, sustainable livelihoods, and poverty reduction; environmental services, conditions and trends; and responses and scenarios.

Enduring Issues

Driving Forces of Land Use and Land Cover Change

Road Construction – This has been a very important issue for over 40 years. However, previous Brazilian and international concerns focused mainly on regional integration (via road networks) within Brazil. More recently, concerns have shifted somewhat to regional/international integration via overland links to the Pacific and Atlantic. While much is known about the effects of road construction on deforestation (and, consequently on CO₂ emissions and biodiversity losses), less is known about practical ways of reducing the environmental consequences of roads over the long term in Brazil. Moreover, much less is known about the extent to which lessons derived from Brazilian experiences (regarding roads-deforestation links) can be usefully conveyed to the tropical forest areas in neighboring countries.

Credit for Establishing Agricultural Activities – Subsidized credit for establishing agricultural activities in the Amazon region has been available for decades. Loan programs have been available to small-scale and other farmers (though the volume and terms of loans were and continue to be different), and have often focused on particular production activities (e.g., cattle ranching, coffee, AFS, etc.). Initially, very little was known about the environmental effects (via deforestation) of these loans; we now know much more. We learned more recently that deforestation (once begun) does not completely depend on the flow of loanable funds to farmers; production operations in many areas became profitable quickly, and hence deforestation has

become self-financing. Still, concerns about insufficient credit among farmers persist, as do concerns among environmentalists about the effects of credit that is or will become available.

Human Wellbeing, Sustainable Livelihoods, and Poverty Reduction

Human welfare – There has always been a concern for human welfare in the region, a concern that drew the CG centers to this area and that led to the ASB focus on small-scale agriculturalists, the group of potentially poor inhabitants responsible for much forest conversion to agriculture, and whose income poverty was, in many cases, reduced by this practice. Many smallholders remain poor, especially in very rural areas. In addition, many of those who have escaped poverty (traditionally measured) remain very dissatisfied with the incomes their farming activities provide.

Income from Agroforestry Systems (AFS) – With a few very notable exceptions (e.g., RECA), most efforts to establish and intensify agroforestry systems and to commercialize the products these systems produce have not met farmers' expectations regarding income generation, and many have simply failed. In most cases, lack of appropriate technical support, failure to meet product quality standards for most non-local outlets, underestimates of establishment and especially labor costs, and low market prices (at least seasonally) have led to low levels of profitability. Farmers feel that product quality and labor productivity issues can be addressed, but fear that market forces (i.e., low market prices) and market structure (i.e., low returns to farmers' efforts in the overall supply chain) are the primary obstacles to success. That said, even if successful, few farmers in colonization projects in the western Amazon and along the TransAmazon highway envision AFS occupying large areas in their plots. Yet, the contribution to farmer income and to environmental services could be substantial even from these limited areas.

Environmental Services, Conditions and Trends

Local Air Pollution – Residents of the Brazilian Amazon, especially those occupying land along the southern 'arc of deforestation,' have suffered for many years from the very serious air pollution caused by the burning of forests. This pollution disrupts air traffic for days at a time during the August-October burning season, and causes respiratory problems that extend well beyond that season and depending on winds can affect the health of individuals living hundreds of miles from the burning sites.

Responses and Scenarios

Lack of Social Science/Policy Research Expertise within Embrapa – This is a continuing problem in the Amazon, where Embrapa's success in attracting and retaining social scientists has been limited – the notable exception being the Embrapa research station in Belém. This has led to a strong bias towards the biophysical sciences in research agendas and to research projects that have been less effective and useful for policy than they might have been.

Lack of Integration Among Embrapa Centers – This, too, is a perennial problem, that has been overcome at times by discipline-specific efforts to link across centers (e.g., forestry scientists, agroforestry researchers, pasture specialists, etc.). The lack of discipline-specific efforts is more prominent among social scientists and policy researchers in the Amazon centers.

Road Maintenance – This, too, is a long-standing concern. Many major and minor roads have been built over the past several decades, only to deteriorate (in some cases very quickly), sometimes becoming impassable. The inability to assess user fees and/or collect local tax revenue to fund road maintenance has meant that federal funds (when available) have been used to cover maintenance costs. Such funds are in short supply now and into the foreseeable future.

Agricultural Extension – The availability of agricultural extension has been insufficient in the Amazon for many years. Moreover, the training of extension workers has usually been incomplete, e.g., most were trained in traditional annual crop or cattle production systems, and few were trained in the management of tropical soils, forestry, etc.

Impact Assessment – Embrapa and other research collaborators have always been concerned with the impacts of their efforts/products on development objectives. Some efforts to measure these impacts were undertaken at Embrapa HQ, but none incorporated indicators of direct effects on human welfare or on the environment.

Duplication of Research Efforts in the Amazon – Duplication of research efforts, within and outside of Embrapa, has always been a concern, especially among those agencies providing funding for research in the region.

Information Available to Smallholders -- The importance of increased, improved and timelier information transfers (especially to smallholders) was noted in many discussions. There was a sense among stakeholders that as the information age unfolds in rural Brazil, the gap between smallholders and larger-scale producers regarding access to price data, technological innovations, etc., is increasing.

Gaps and Overlaps in Policy Domains – There is a long history in the Amazon of uncertainty and sometimes tension regarding which political entity has jurisdiction over/responsibility for what sets of resources and physical capital. Such uncertainty may be at least partially responsible for the recent upturn in forest conversion. The nullification at federal level of the Rondônia land use zoning law was a case in point that seemed to have left state-level policymakers wondering what, if any, degrees of freedom they had in managing trade-offs among development objectives within their policy domains.

Emerging Issues

Driving Forces of Land Use and Land Cover Change

Migration Within Brazil – While the interregional movement of populations within Brazil has slowed dramatically from the levels of the 1970-80s, significant *within*-region migrations are occurring and are of concern. For example, migrants from Rondônia to Mato Grosso, perhaps a byproduct of land consolidation and/or changes in product mix and mechanization in the former state, are putting pressure on restricted lands and on state and municipal services in the latter.

International Migration – While official data are not available, there is a sense among stakeholders that the amount of cross-border migration between Brazil-Peru and Brazil-Bolivia is increasing, though perhaps only seasonally. Most agreed that the paving of the final sections of the roads linking Brazil to the Pacific will dramatically increase these migratory flows. Personal observation suggests that institutions charged with managing these international borders are not prepared to deal with these imminent and potentially very large flows.

Regional/International Integration – There is great interest in establishing links with countries sharing the Amazon, especially Peru and Bolivia, and this interest has been the driving force behind the paving of several roads in Brazil that will comprise the overland link to the Pacific Ocean. Little is known about the social, economic or environmental effects of these nearly-completed links, but most agree that deforestation will increase and that there will be dramatic increases in cross-border flows of labor, inputs and products. Very little is known about the potential for policymakers to manage the effects of this international/regional integration once the process begins in earnest. Groups such as the Acre-based MAP initiative are beginning to monitor the environmental indicators in all three countries, with strong participation of social groups and grassroots organizations. Monitoring the economic or human welfare consequences of this process are just beginning, and regional modeling exercises aimed at predicting the effects of this integration under different policy scenarios are in the planning stages.

Human Wellbeing, Sustainable Livelihoods, and Poverty Reduction

Human Welfare – As indicated above, there has always been an interest in human welfare among stakeholders in the region. Now, there seems to be a greater awareness of the plight of the poor, increased effort to locate and identify the poor, and more emphasis being placed on resolving the food security and other problems faced by the poor. The international community, which by and large has focused on environmental issues in the region, now views poverty alleviation in the area as a necessary condition for achieving key environmental objectives, though differences exist among groups regarding how poverty reductions might best be achieved, and what the environmental effects of poverty reduction would be. Some groups feel that community-led development is the answer; others feel that broad, science-based and policy-promoted intensification of agricultural and forest extraction is the proper path. These (and other) possible paths to poverty alleviation need not be mutually exclusive. A common underpinning to all current poverty-focused research and action is the need to better understand who and where the

poorest groups in the Amazon are, and what the environmental consequences of different methods of alleviating their poverty might be.

Sources of Income Gains for Alleviating Poverty – A broader set of income sources are now being contemplated for use in the fight against poverty and to boost economic growth even among the nonpoor. For example, discussions at every level of government and civil society have increasingly focused on managed forestry (generally intended to mean the extraction of timber and NTFP) and all the policy and technological changes necessary to promote it efficiently and equitably. The establishment of pastures to support cattle ranching continues to gain support via government initiatives, and adoption is becoming more common by producer groups that until recently were only marginally involved in this activity. While the potential incompatibility between these two income sources (and others) is acknowledged and debated, there is general consensus that stagnation of productivity in forests or in agricultural activities practiced on cleared land would be undesirable – the conceptual transition from ‘sustainability’ to ‘sustainable intensification’ regarding development objectives seems to have been made by many stakeholders in the region.

Diversification of Income-Generating Activities in Extractive Reserves – There has been a dramatic increase in the diversification of income-generating activities within extractive reserves. Traditionally, rubber tapping and Brazil nut extraction were the primary activities. Now, cattle production, timber extraction, annual crop production and AFS are increasingly being practiced. Technical assistance to support this diversification of production activities is lacking, as are market channels for efficiently getting products from these sometimes very remote areas to market.

Benefits of Forest Conversion to Agriculture – There is general agreement that farmers have benefited from past deforestation and conversion of land to agriculture. There is also a shared perception that economic stratification and social differentiation have increased in these areas. Questions remain regarding whether smallholders and others could have benefited even more if more appropriate technologies had been available for the region from the outset of the colonization process, hence improving the trade-offs between forest conversion, income generation, and social equity. With the legally available forest margin rapidly disappearing and with conflicts among previous beneficiaries of deforestation rising over who can/should have access to remaining forested lands, questions now focus on where future income and wealth gains will come from, and how these gains can be extended to a larger number of stakeholder groups. The challenge is to respond to the observed trends showing that experiments with intensification of production systems *other than* pasture/cattle have generally failed to boost incomes for large numbers of farmers for extended periods of time, though many non-pasture/cattle systems (e.g. AFS) can generate large environmental benefits.

Changes in the Food/Fiber Markets – Changes in the structure of markets for food/fiber are evident in many parts of the region. The share of food/fiber market dominated by large supermarkets is growing and will continue to grow, and spot markets for food/fiber products will be increasingly replaced by contracts (often long-term contracts) in which product quality and delivery reliability will become more important and product prices less so. There will likely be important (and probably negative) implications of these trends for many of ASB’s traditional ‘clients’ (smallholders).

Focus on Smallholders – There was a consensus that while the original exclusive focus of ASB on smallholders in the western Amazon was necessary and beneficial, future efforts should include other resource user groups. Special attention should be paid to rubber tappers, those inhabiting and cultivating seasonal flood plains (*riberinhos*), and other marginalized groups.

Beyond the Economic Value of Rural Activities – Researchers and policymakers need to go beyond simple income/economic measures of the value of alternative land and forest uses. There are many non-monetary, private benefits associated with farming/forest management, and many social benefits from these activities as well. In considering ways to promote systems that provide such benefits, though, policymakers should pay attention to potential increased vulnerability of farm households (brought about by, e.g., slower income growth and/or increased seasonal swings in income) that can come with some of these agricultural and extractive activities. They should do so, however, acknowledging the potential trade-offs between individual and community vulnerability, and take action to promote household *and* community welfare.

Environmental Services, Conditions and Trends

Environmental Services Provided by Forests (and other land uses) – Discussions are ongoing at all levels of government regarding how to identify and measure the environmental services provided by forests and alternative land use systems, on the values of these services, and on mechanisms for compensating individuals managing these forest and alternative systems. These discussions are driven by the felt need to compensate individuals, communities, municipalities, states, etc. for conserving forest (primarily) and for adopting land use patterns that may be less profitable but socially more valuable. The Brazilian federal government has recently initiated a program in 17 Amazonian sites that aims to compensate smallholders for the environmental services they generate.² Similar programs are likely to be developed, increasing the need to provide technical support and to assess their effectiveness. With this and all similar programs, however, how the ‘bill’ for environmental services would be apportioned across different groups of beneficiaries within and outside the region remains to be addressed. Stakeholders in Brasilia were particularly interested in the potential for international carbon markets to complement national programs.

Water Quality – The effects of deforestation and land use on local hydrology and water pollution (pesticides, mainly) was deemed an important emerging issue.

Trees in Pastures – Improved cattle herds may be less tolerant to direct sunlight, therefore requiring more shade in pastures and watering areas. Trees may be a way to provide such shade; little research seems to have been done on the economic performance of shade (perhaps multipurpose) trees vis-à-vis man-made edifices (barns, etc.) for shade provision.

Recovering Gallery Forests – Recovering the borders of streams and larger waterways, via reforestation with native and other trees, is increasingly seen as paying private benefits to farmers. These areas are of limited use for grazing, of limited practical use for traditional agriculture and of

² Programa de Desenvolvimento Sustentável da Produção Familiar Rural na Amazônia – Proambiente, implemented by the Ministry of the Environment.

virtually no use to mechanized agriculture. Widely perceived private benefits of reforesting these areas include increased steam flow to sustain larger cattle herds (which may not happen in reality) and increased supply of wood products needed for constructing/maintaining fences, barns, etc.

Fisheries and Other Aquatic Resources – Perhaps due to ASB's exclusive focus on smallholders in Acre/Rondônia, the issue of aquatic resources was not chief among stakeholder concerns in the past. This is no longer the case, and both *in situ* management/conservation of fish resources and fish farming are now on the agenda for discussion.

Responses and Scenarios

Improvements in Pasture and Livestock Management – Important innovations in pasture and livestock management have emerged over the past decade, many of which are available to producers operating at different scales, and all of which have the potential to dramatically improve pasture productivity, extend pasture life and increase the profitability of cattle operations. Legume-based pastures, improved pasture management using electric fences, and artificial insemination to improve herd quality are all being adopted and refined; large-scale enterprise are leading the way, but adoption among smallholders is increasing quickly. Adoption of improved pasture management, especially among small-scale farmers, is constrained by a lack of a trained cadre of extension workers. The private sector is actively promoting components of this technology package that make use of purchased inputs, namely electric fencing and artificial insemination. Whether and to what extent improved pasture productivity will limit pasture expansion remains an open question, even considering legal restrictions.

The Challenges of Managed Forestry -- The knowledge gaps and institutional/bureaucratic obstacles to the adoption of small-scale managed forestry were deemed very important. The lack of a cadre of well-informed and properly-trained agricultural extension agents generally hampers the transition from 'traditional' agriculture to more sustainable and profitable agriculture, especially among smallholders, and this is especially true for forest-based production systems. But unlike many traditional production systems, managed forestry systems will have to be monitored for at least two reasons: first, technical knowledge regarding the resilience of forest under different management schemes in the Amazon is just beginning to accumulate, so mid-stream course corrections in extraction rates, etc., may be needed; second, private incentives to manage forests in unsustainable ways are large. Finally, there are concerns about the extent to which forest management will eventually produce forests comprised primarily of species valuable to landowners, with unknown consequences for some environmental services.

Large-Scale, Mechanized Farming – Over the past decade or so there has been a dramatic increase in large-scale mechanized farming in the region. In addition to mechanized pasture management, soybeans, cotton, corn and other crops are being produced, and public research and private experimentation are underway to identify varieties that fit the agroecological setting and the specific areas in the region where topographical conditions will most likely support this form of agriculture.

Credit for Enhancing Agricultural Productivity – As indicated above, credit programs for establishing agricultural activities in the Amazon region have been available for decades. Most of the more recent agricultural loan programs now focus on improving productivity and profitability. Some of the most recent and many of the planned credit programs also aim to promote the on-farm provision of environmental services, though methods for effectively, efficiently and equitably doing so are only now being systematically addressed.

Loans for Forest Management – The World Bank is now preparing to loan Brazil (at federal level) substantial amounts of money to support development and management of the forest sector. The details of the loan are being worked out.

Foot-and-Mouth Disease – Rondônia is now certified to be free of foot-and-mouth disease and has a vaccination program in place to support that certification and to monitor animal health. Acre has a vaccination program in place and expects to be certified free of foot-and-mouth disease by the end of 2003. This will have major implications for trade in animal products for Brazil in general, and for Acre and Rondônia in particular.

Changing Structure of Product Markets – Changes in the structure of markets for food/fiber are evident in many parts of the region. The share of food/fiber market dominated by large supermarkets is growing and will continue to grow, and spot markets for food/fiber products will be increasingly replaced by contracts (often long-term contracts) in which product quality and delivery reliability will become more important and price less so. The possible effects on human welfare were noted above; here we focus attention on the possible effects of such structural changes on deforestation and land use.

Changes in Input Market Structure – Alongside changes in product market structure are important changes in markets for key agricultural inputs. For example, the increasingly important role of renting/leasing inputs (especially land) was noted by stakeholders. Questions arose regarding the ability of resource-poor farmers to engage in such transactions and the terms of trade they would face if they did so.

Ecological/Economic Zoning – Since ASB began activities in Acre and Rondônia, there have been state-level efforts to develop land use zoning plans. The Rondônia plan was finished and approved at state level in June 2000, but then vetoed in August 2001 by federal action that modified the national forestry code. Finalization of the Acre plan is pending. There is great hope that such zoning exercises will provide a socially acceptable and scientific basis for land use policy in the Amazon, and some efforts have begun at municipal level to refine state-level zoning maps, most of which are done at a scale greater than 1:100,000. There are concerns, however, that the federal mandate limiting deforestation to no more than 20% of *any* operational holding in forested areas of the Amazon (regardless of its suitability for different forms of agriculture and/or the environmental services it might provide) may undermine the usefulness of these zoning efforts.

Conservation Units – Increased attention is being paid to the identification, formalization and management of conservation units in the Amazon. These units generally provide, or are expected to provide in the future, important environmental services. Managing resources within and around

these conservation units is a high priority, especially among policymakers at state, national and international levels.

‘Recovery’ of Undocumented or Improperly Documented Lands – Efforts have been underway at state and federal levels to clarify property rights in the Amazon. Such efforts have netted millions of hectares of forested land that now are ‘back’ in the hands of federal and state agencies, both of which now must develop strategies for sustainably using these forests to meet societal objectives. Some schemes envision providing blocks of forest to smallholders for managed forestry and limited agricultural activities. Other schemes envision forest concessions to large-scale logging companies. Given that Brazil’s concentration of land ownership is among highest in the world,³ using these forests to establish efficient, equitable and environmentally sustainable production systems in the Amazon should be a priority.

Decentralization of Policy Action – A strong movement is underway to delegate much policymaking to the municipal level, though the pace of município creation has slowed significantly over the past several years. Identifying effective policy tools and local sources of tax revenue are among the key issues.

Need for Real-Time Policy Guidance – Almost every policymaker we spoke with was frustrated by the unavailability of scientific information to guide policy decisions. How to fill this gap, though, will be a difficult challenge. Groups that fill this gap in the context of developed countries (universities, consulting firms, etc.) either do not yet exist in the Brazilian Amazon or are unequipped to respond to policymakers needs in a timely fashion.

Building Predictive Capacity in the Region – Policymakers indicated a need for methodologies to assess the effects of policy action on development objectives. There are very few models available in the region for predicting the effects of price/technology changes (induced by policy action, or otherwise). The models that do exist are generally in the hands of national or international research groups, and hence are not available to respond to short-term needs of policymakers. Moreover, existing models would have to be updated before they could be effectively used to predict the effects of some of the fairly dramatic changes occurring within and outside the region.

Lack of Linkages Among NARS Within the Amazon Region – National and international organizations have increasing interest in reducing duplication in research and (especially in the short term) learning from experiences in agricultural research in neighboring countries. PROCITROPICOS had been promoting such exchanges for some time, as have product- or production system-specific research networks focusing on pasture, rice, etc. The felt need now is to link and intensify such exchanges, especially as regional integration becomes more international.

Consolidation of Research Activities in the Amazon – There is a growing sense of urgency associated with consolidating research, training and capacity strengthening in the region. Part of this urgency is driven by the limited amount of resources available for such activities, and the

³ According to the 1996 Agricultural census, landholders in Brazil with more than 1,000 hectares (1.1% of the total) own 42% of the land, while those with less than 50 hectares (78% of the total) own 13% of the land. In the Legal Amazon, those with more than 1,000 ha (1.8% of the total) own 63% of the land, while those with less than 50 ha (74% of the total) own just 5% of the land.

consequent need to do more with lower levels of funding; efficiency gains are the only answer, so the search for such gains is on. For example, groups like LBA and the IAI are trying to establish and help manage strategic linkages among organizations doing research in the Amazon region.

Efficiency and Cost Effectiveness of Organizations/Institutions – Alongside the increasing concern for impact (and hence, impact assessment) is the related concern for organizational/institutional efficiency and cost effectiveness. Some measures of efficiency and effectiveness at the level of research stations have been developed and are being used by Embrapa HQ. Other organizations (IBAMA, WWF-Brazil, IPAM, IMAZON and PESACRE to take a few examples) are also undergoing reviews/restructuring to boost efficiency and effectiveness.

Environmental Education – Much time and effort is being spent on educating teachers and school-aged children about environmental services, and the importance of and methods for managing the natural resource base to ensure these services exist in the future.

How Best to Use Increasingly Sophisticated Monitoring Equipment to Meet Development and Conservation Objectives – Through the SIPAM program in Porto Velho, Belém and Manaus, huge investments have been made in equipment that can (among other things) monitor land use, fires, air traffic, communications, etc. Much of this technology is in place and available for some uses by researchers and other members of civil society. Just how this will be accomplished, who will pay the marginal costs associated with using this equipment, and how research based on these investments will contribute to/jibe with research on land use and land cover change being undertaken by other groups in Brazil are questions that remain to be addressed.

3. SUGGESTED NEXT STEPS FOR ASB IN THE AMAZON REGION

Practically, the tasks of recasting ASB for the next decade, selecting key issues for ASB focus, seeking funding to pursue these issues, establishing new and rekindling old organizational links, and deciding on the proper balance of research, outreach and capacity strengthening activities must be pursued simultaneously and are in fact endogenous to one another. We present the results of our thinking about these issues in separate sections below, knowing full well that the links among them will influence the choices made.

While we are surely ‘preaching to the choir’ on this issue, aiming to enhance the ability of ASB to generate more and better-quality international public goods should be an important guiding principle in defining what ASB should become and what it should be engaged in over the next 10 years.

Recasting ASB for the Next Decade

ASB as it was originally and purposefully established in the Amazon did a very good job at narrowing the geographic and substantive focus of its research and capacity strengthening activities. There is much good, published material and many important capacity strengthening successes that are directly attributable to ASB. It is now time for ASB to recast itself based on its successes and lessons learned, to address a broader set of issues in a much broader geographic area, and to respond to a larger set of constituents.

An important first step in this recasting process will be to update the institutional/organizational ‘landscape’ of research in the entire Amazon Region. There is a much larger set of actors now than in the past, and their objectives are now clearer. The objective of this updating would be to identify gaps and overlaps in objectives and activities, and begin to identify where and how ASB (once recast) could most effectively and efficiently contribute to achieving development objectives. Note that one of the most important steps will be to look beyond Brazil in this updating process, a vision that is shared by the majority of our traditional collaborators.

A second step in this recasting process would be to reexamine the documents that emerged from a similar (but geographically more narrowly focused) review process undertaken a few years ago in Acre. At that time, a group of active ASB researchers sat down and thought about the future of ASB, and suggested modifications to the objectives and activities of the ASB program (Guevara, Ruben. 2000. “ASB-LA Synthesis and Planning Report” A report of results from ASB Regional Research Synthesis and Planning Meeting for the Western Amazon Basin: Brazil and Peru. Rio Branco, Brazil, 5-7 October 2000). Some of the results of that thinking might be of use in the current recasting of ASB.

Finally, although perhaps somewhat cumbersome, it might be very useful at least in the early stages of recasting ASB to consider several alternative ‘recastings’ or ‘futures,’ perhaps sharing these with researchers and donors.

Key Issues for ASB Attention

In our view, the following issues identified in discussions with stakeholders during this trip should be of high priority for ASB in the Amazon, in part because of past research in Brazil and Peru, and in part because of ASB's strong comparative advantage in the areas of human welfare, predictive modeling and international comparisons. We list them in no particular order.

Before presenting our list, however, we would encourage those charged with recasting ASB in the Amazon to consider the potentially large (and as yet, generally untapped) value added associated with bringing to the Amazon region the lessons learned from *other* ASB sites, which were strategically chosen in part for this purpose. Moreover, lessons learned from research and practical experience in the Amazon might have much to offer to other ASB sites and regions.

- The ASB Matrix – New and promising alternatives to traditional uses of land and forest are emerging throughout the Amazon. The ASB matrix is a very useful tool in analyzing these alternatives and helping policymakers decide among which to promote and how to do so.
- Human welfare – The welfare of smallholders in colonization projects in Brazil was the exclusive poverty focus of ASB in the past. The focus now needs to be and can effectively be expanded to include new groups within and outside Brazil. The focus can also be broadened beyond traditional income-based measures of poverty to include new income sources, indicators of socioeconomic marginalization, etc. Research on conservation investment poverty might also be quite fruitful.
- Payment for environmental services – The size and timing of payments to farmers (and others) needed to secure environmental services, and the markets and other institutional requirements to efficiently and effectively make such payments, are all issues that will be important to the future of the Amazon. These issues are also of keen interest to the international community. ASB already has much to contribute in this area, and should map out a research agenda to produce even more.
- Agroforestry systems – Given ASB's affiliation with ICRAF, past work on these land use systems and continued interest in AFS among stakeholders, ASB should continue work in this area, with careful focus on the real potential for AFS to resolve environmental and poverty problems broadly and over the long term. Assessing this 'real potential' will require examining growth and structural changes in the markets for AFS final and intermediate products, and the practical role of price (and other) policy in shifting incentives in favor of AFS. ASB should avoid building the hopes of small-scale agriculturalists and policymakers solely on the basis of the agronomic performance of any land use system.
- Managed forestry – This will be key to the future of the Amazon and its inhabitants, and ASB has a strong comparative advantage in the socioeconomic analysis of these systems, especially in the context of small-scale agriculturalists. Given ASB's affiliation with CIFOR, this would be a natural avenue of research to pursue.

- Improved pasture/cattle management systems – Much progress has been made over the past decade or so in identifying better ways to establish and manage pastures in the region, and in tending to the cattle that depend on these pastures. Many of the innovations emerging from research organizations (public and private) and from farmers' fields are scale neutral – e.g., even smallholders can benefit from their adoption and use. ASB has done much work on traditional and improved pasture/cattle production systems in the context of smallholders in the western Brazilian Amazon, and some of the results and lessons learned could be of use to policymakers promoting improved systems within and outside Brazil. Perhaps ironically, it may be these more intensive pasture/cattle systems that take pressure off the forest margins (applied by those currently occupying these areas, at least in the short run). In any event, this is a very important set of innovations to a production system that occupies over 80% of all cleared land in the western Brazilian Amazon – ASB must, therefore, be directly involved in research on it.
- International/Regional integration – The area of the Amazon shared by Bolivia, Peru, and Brazil would seem a very natural place for ASB to establish a long-term research program, building on work done in Brazil and Peru, and calling on modeling work done by other groups in other regions. Very soon, paved roads will link these countries and dramatically alter the flows of people, inputs, products and capital among them. The general consequences for deforestation are easy to predict (forests will fall more quickly once the roads are completed), but the spatial patterns of deforestation, the effects on human welfare of this rapid integration and the potential for policymakers in the region to manage it are not known. ASB can and should take an active role in helping provide the scientific input needed to guide this process.
- Environmental education materials – ASB should continue to collaborate with universities, NGOs and others in developing environmental education materials for dissemination and use by others. Discussions of trade-offs would be among ASB's most important contributions to these materials.
- Enhancing policy modeling capacity – In responding to the request by policymakers for input into the policymaking process, ASB might strategically identify one or perhaps two universities or research organizations that could be trained in the modification and use of the household and macroeconomic models developed for Brazil by ASB. ASB might also develop a meso-level model for use in examining the environmental and other effects of international/regional integration.
- Impact Assessment – The ASB matrix and existing predictive models could be modified and used to address this important issue. There would be great international public goods value associated with this avenue of research.
- Land use zoning – If ASB is able to make practical and policy-relevant the concept of land use mosaics in an Amazonian context (drawing on more advanced ASB landscape-scale work in SE Asia), this research could be very useful to development planners at federal, state and perhaps especially municipal levels involved in zoning activities.

- Hydrology and water quality issues – These are new and generally local issues for ASB in the Amazon, but ASB might consider some strategic research on them (again with an opportunity to draw on the more advanced watershed-scale work in SE Asia), especially in areas experiencing prolonged seasonal dry periods and those in which mechanized annual crop production is becoming important.
- Recovering gallery forests – Given their relative unsuitability for agriculture and grazing, this could be an important entry point for recovering degraded lands; ASB's land use mosaic concept might be very usefully deployed in prioritizing areas and in providing details of recommended recovery schemes.

In our view, the following activities would *not* be the best use of ASB resources. Again, we list them in no particular order.

- Providing real-time guidance to policymakers – ASB has developed tools for responding to such needs and should work to convey these tools to others and to build local and regional capacity which, in turn, would interact with policymakers to address day-to-day issues.
- Coordinating research generally in the Amazon – Except in the context of its own research program, ASB should not take on any responsibilities associated with coordinating research within the region. One possible exception would be ASB careful reviews of draft planning documents produced by NARS and/or other research groups in the region.
- Teaching – While ASB should play an important role in collaborative efforts to generate training and extension materials, ASB should not take on large-scale teaching commitments; where possible, ASB should focus training activities on training of trainers.

Establishing a Fundraising Strategy

In developing a strategy for funding ASB activities in the Amazon, we suggest ASB look to traditional sources of financial support and to identifying new sources. Expanding the geographic focus of ASB activities in Brazil beyond the western Amazon and extending research to actors other than smallholders should enhance fundraising efforts from both sets of sources.

Solidifying and Increasing Traditional Sources of Support for ASB

The CGIAR has been a very strong supporter of ASB since its inception, and ASB should continue to cultivate this source for additional support. In particular, CIAT and ICRAF, centers that pooled resources to hire Dr. Porro, should ensure that this joint hire has sufficient resources to make this experimental position successful. Moreover, once success has been demonstrated, we recommend that each center have at least one full-time research fellow whose exclusive responsibility be the Amazon region. The region is too large and too important (politically and

otherwise) for each center *not* to have a significant, coordinated presence for an extended period of time.

Embrapa has also been a strong supporter of ASB activities in Brazil, both from HQ and from the three centers most actively involved in research and capacity strengthening (Acre, Rondônia, and Belém). HQ has supported ASB via its contributions to CGIAR centers. Embrapa centers have provided financial and especially in-kind support for research. ASB should approach HQ for increased support via CGIAR contributions earmarked for ASB/Amazon Initiative activities, and Embrapa centers should be approached for renewed support for ASB collaborative activities in the Amazon. Beyond that, ASB should approach CIPEA to jointly solicit funds nationally (e.g., from BASA) and internationally (e.g., from the IDB) to fund research and other activities – activities focused on regional/international integration would likely be high priorities with such donors. Lastly, other Embrapa centers and Embrapa HQ should be approached by ASB for support, initially, in part, to cover the costs of transferring/training in ASB research methods developed and tested in Acre/Rondônia, and over the longer term to help realize the Embrapa objective of making their technologies and other products broadly available in the Amazon region.

New Sources of Support for ASB

With the publication of the Phase II ASB Brazil Report and other important books/research papers, and with the explicit intent of expanding beyond the western Brazilian Amazon and to focus on groups other than smallholders, ASB is now better positioned to expand its network of donors. For example, the objectives and scope of work of the IAI is now very much in line with the recast ASB. The same is true for USAID, perhaps especially in Peru and Bolivia, and for UNDP in Brazil. Reviews of the current mandates and activities of these groups will help identify gaps that ASB could fill, even in the short term (see the final section of this report). Finally, as ASB moves from plots and farms to watersheds and landscapes, and as ASB refines its research and policy messages to focus on environmental services and their private and social values, the environmental community will become more interested in supporting ASB activities. The team's visit to WWF-Acre highlighted the increasing similarity between ASB objectives and those of WWF, which has moved significantly towards embracing development and environmental objectives jointly. There would appear to be potential to build new partnerships along these lines within the framework of ASB or of the Rainforest Challenge Partnership, which includes ICRAF/ASB, CIFOR, IUCN, and WWF.

Identifying Strategic Partnerships for the Recast ASB

Rekindling Old Alliances

ASB always had solid and able partners in Brazil, and most were in the area of agricultural research. While the very strong link between Embrapa and ASB may have in some ways biased the nature and scope of past activities, this link was forged for strategic and practical reasons, some of which remain quite relevant today. When ASB began, many groups did the important work of monitoring land use/land cover change and attempting to discover policy and other factors influencing these changes, but Embrapa was one of the most important organizations actively *seeking to develop* alternatives to slash-and-burn agriculture. In the dozen years or so since ASB began activities in Brazil, the organizational landscape has changed considerably and there is now a larger number of groups seeking to identify alternatives to forest conversion. That said, Embrapa remains an important contributor to this effort, and is expected to remain so into the foreseeable future, in part because Embrapa itself has broadened the focus of its research efforts to include forests, alternative pasture management strategies, etc. This broader focus is in part a result of collaboration with ASB.

Seeking New Partners

While some carefully chosen research and other activities undertaken collaboratively with one or more Embrapa stations in the Amazon will likely continue, the potential for ASB to extend its network of collaborators is now quite large. Universities within and outside the region now have greater capacity to enter into collaborative research relationships with ASB than was the case 10 years ago, and most see the clear benefits of multidisciplinary research done properly and with policy purpose. NGOs (e.g., PESACRE) and research organizations (e.g., IAI) seemed quite eager to interact and establish links with ASB during recent visits, in part because ASB was viewed as having a set of portable and tested research tools that would allow collaborators to quickly address issues involving trade-offs among development objectives.

Exploring Modalities for Broader Collaboration and Enhanced Impact through the Amazon Initiative

The Natural Resource Policy Specialist for the Amazon, who also serves as ASB's regional facilitator, and the ASB Global Coordinator will follow up on the resolutions of the ASB Global Steering Group in March 2003 on the Amazon Initiative. Specifically, they will work with ASB partners Embrapa, INIA, CIAT/TSBF, CIFOR and ICRAF and with the other Amazon Consortium partners to explore:

- opportunities for consolidation of activities within the Amazon region; and
- means and modalities to establish an appropriate interface between the Amazon Consortium and the ASB Global Consortium.

ASB is committed to support the implementation of the Amazon Initiative Consortium. Depending on the priorities and path followed by the AI in “taking off,” it is likely that most of ASB activities in the Amazon will become part of the Amazon Initiative programmatic agenda. Yet, ASB will not extend its coverage to all AI activities, and certain ASB activities in the Amazon might reach beyond the portfolio addressed by the AI Consortium. It is advisable, therefore, that a small group (including ASB Global coordinator, ASB Regional facilitator, the chairperson of the AI steering committee, and perhaps two other specialists) meet once the AI Consortium and the role played in the Consortium by the Natural Resource Policy Specialist for the Amazon have been better specified (perhaps in March-April 2004). The objectives of this meeting will be: (1) the analysis of eventual complementarities, overlaps and differences between ASB and AI agendas for research, outreach, and capacity strengthening; (2) the identification of issues/activities/programs covered by the AI that would match closely with those of ASB; (3) the discussion of other means (in addition to the work of the Regional facilitator) for the effective integration of ASB in the above-mentioned programs, and in activities that are eventually not part of the AI; and (4) a discussion of the intellectual property rights over research products generated by the various institutions involved (ASB, ICRAF, CIAT, Embrapa, and others).

Identifying an Efficient Collection of ASB Research, Outreach and Capacity Strengthening Activities

ASB needs to consider extending beyond its traditional (science/research-based) program to embrace a broader set of stakeholders using a new set of products. There are surely gains associated with such ‘stretching’ exercises. The challenge is to find the proper mix of research, outreach (traditional), outreach (new) and capacity strengthening activities and associated products for ASB to engage in producing/delivering over the next decade or so, acknowledging there will be trade-offs. Indeed, one of the great challenges the new set of ASB managers will face is that of predicting what these trade-offs will be (e.g., how much research will have to be foregone to generate teaching materials, since ASB cannot do more of both in the short term), and choosing an optimal mix of ASB products. There is, of course, no easy formula for deriving this optimal mix, so we suggest that managers contemplate several alternative mixes over the short and medium terms and discuss these with donors and other stakeholders.

Building on Past Accomplishments

Lastly, almost regardless of the institutional evolution of ASB over the next few years in the Amazon, there are a series of products and activities based on past research that could help address some of the stakeholders’ issues outlined above. Note that these products/activities could be usefully targeted at Amazonian countries other than Brazil, as well as within Brazil. Note also that most of the issues identified for ASB action above also appear in this final section, but now with greater clarity regarding the timing with which they might be pursued.

In the very short term, ASB might consider the following:

- The ASB Phase II summary document could be widely disseminated and discussed within the research, university and policymaking communities. Working with information dissemination personnel (within Embrapa, for example), newsworthy bits could be extracted from that report for broad dissemination/use.
- ASB researchers could review and comment on the soon-to-be released draft Embrapa-HQ strategic planning document, and perhaps more important, become involved in the process of revising the center-specific planning documents that all Embrapa centers working in the Amazon will begin preparing once the HQ document is formally released. This is a once-in-four-years opportunity to help guide Embrapa research in the region.
- Prompted by changes in the federal government and in the recent spike in forest conversion, other agencies, such as INPE, are also in the process of reviewing their research, outreach and capacity strengthening activities in the region. ASB might usefully become involved in these review processes, too.
- The World Bank is involved in ongoing discussions with the Government of Brazil for a forestry sector loan. ASB materials and expertise could be made available to both parties.

In the short term, ASB might consider the following:

- Policy briefs focusing on particular issues and based on past research (that summarized in the Phase II ASB Brazil report and other more recent research products) could be produced, disseminated and discussed. Policy briefs could be published in English, Spanish and Portuguese to reach the broadest possible audience in Latin America, and could be prepared in collaboration with ASB HQ in order to distill from Brazil-based research lessons that might be relevant broadly in the humid tropics, and also to help bring lessons learned from other ASB sites to the LAC community.

In the medium and longer term, ASB might consider the following:

- Produce a Brazil/Peru synthesis paper based on the ASB matrices and provide some initial insights into what the environmental, economic and social consequences of regional/international integration in the western Amazon might be.
- Expand and update the ASB matrix for Acre and Rondônia, adding new land use systems (e.g., mechanized agriculture, pasture management with electric fences) and update old ones.
- Apply the ASB matrix in strategic sites across the Amazon, within and outside of Brazil, and derive site-specific and especially cross-site results relevant for national and international policymakers.

- Strengthen social science and policy research at selected Embrapa centers and/or at selected universities in the Amazon.
- Refine and update the bioeconomic model to address key environmental and human welfare issues, and to respond to policymaker needs.
- Modify the bioeconomic model to make it suitable for addressing issues associated with resources users other than smallholders occupying colonization projects. Rubber tappers and other marginalized groups would be high priority.
- Initiate a modeling effort (CGE, probably) to examine the economic, environmental and welfare effects of regional integration in the western Amazon.
- Update the macroeconomic model for Brazil and using it to examine some of the important macroeconomic issues identified by stakeholders.

APPENDIX 1: TRAVEL ITINERARY AND MEETING AGENDA

	AM	PM
July 24 Thursday	Arrival in São Paulo (Guarulhos) TT: AA 963 - 8:07 am SV: AA 951 - 8:50 am 45 min travel to SJ Campos	São José dos Campos, SP Meetings: IAI (Eduardo Banus and Gerhard Breulmann) Meetings: INPE (Dalton Valeriano) Travel: Guarulhos @ 6 pm 7:15 pm VASP 4262/4374 (1:40 pm PV)
July 25 Friday	Porto Velho 8:30-12:30 am: meeting at Embrapa, with government agencies, universities, NGOs Presentations by Vosti and Porro	Porto Velho 3:00-5:00 pm: visit to SIPAM 00:05 am VASP 4374 (00:05 am R. Bco)
July 26 Saturday	Rio Branco 8:00-9:30 am: Planning meeting with Embrapa researchers 9:30-11:00 am: Meeting with Foster Brown	Rio Branco 1:00 pm: travel to Xapurí and Brasiléia
July 27 Sunday	Brasiléia/Assis Brasil 7:00-9:00 am: visit to farms along the road Brasiléia-Xapurí 9:00 am: travel to Assis Brasil visits along the road, and meet INIA researcher at the Brazil/Peru border	Assis Brasil/Xapuri 1:00 pm: travel Assis-Brasil / Rio Branco
July 28 Monday	Rio Branco Meetings: State Secretaries: (Denise Garrafiel, Francisco Cartaxo)	Rio Branco Mid-term internal evaluation 8:00 pm: Visit to Agricultural Expo, meeting with Asuero Veronez (CNA)
July 29 Tuesday	Rio Branco Meeting Embrapa-AC Presentations by Vosti and Porro	Rio Branco Meetings: State Secretaries: Carlos Ovidio Rocha and Gilberto Siqueira Meetings: NGOs: WWF and PESACRE
	AM	PM
July 30 Wednesday	01:10 am VARIG 4374 (Brasilia 6:20 am) Brasilia (9:00 am – 12:00 noon) World Bank: PPG-7, "Programa Nacional de Florestas:" J. Leitman, Gregor Wolf, Adriana Moreira, Chris Diewald, Adilson Serrão, David Kaimowitz	Brasilia Ministry of Environment (3:00-4:00 PM): Paulo Kageyama (Dir. Biodiversidade) A. C. Vicente (Dir. Florestas) Tasso Rezende, David Kaimowitz
July 31 Thursday	Brasilia Participation in CIFOR forum on forestry and local governments Meetings: USAID (Eric Stoner)	Brasilia Meetings: OTCA (Sergio Sanchez) Meetings: UNDP (Carlos Castro)

August 1 Friday	Brasilia 9:00 am: Meeting at Embrapa Clayton Campanhola - president Herbert Lima – executive director Sebastião Barbosa – Coordinator for International Cooperation Avílio Antonio Franco – Director of R&D Jamil Macedo – Chief CPAC	Brasilia Visit to CPAC (Cerrado Center), Embrapa 11:20 pm VARIG 2608 (1:50 am Belém)
August 2 Saturday	Belém Field visit: Igarapé Açú (Proj. Tipitamba)	Belém Field visit: Igarapé Açú (Proj. Tipitamba)
August 3 Sunday	Belém open	Belém open
August 4 Monday	Belém CPATU-Embrapa: Joint position meeting Meeting: Tom Tomich, Rafael Posada, Adilson Serrão, David Kaimowitz, Roberto Porro	Belém CPATU-Embrapa Amazon Initiative Steering Committee (A)
August 5 Tuesday	Belém Amazon Initiative Steering Committee (B)	Belém Amazon Initiative Steering Committee(C)

APPENDIX 2: STAKEHOLDERS CONSULTED

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