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REPORT OF THE REGIONAL SEMINAR ON THE EXPANSION OF THE AGRICULTURAL  
FRONTIER AND THE ENVIRONMENT IN LATIN AMERICA

(Brasilia, 10 to 13 November 1981)



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CHAPTER 10

The first part of the chapter discusses the importance of maintaining accurate records of all transactions. This is essential for the proper management of the business and for the preparation of financial statements. The second part of the chapter deals with the various methods of recording transactions, including the double-entry system and the use of journals and ledgers. The third part of the chapter covers the process of adjusting the accounts at the end of each period to ensure that they are in balance and that all transactions are properly recorded. The fourth part of the chapter discusses the preparation of the financial statements, including the balance sheet, the income statement, and the statement of cash flows. The fifth part of the chapter covers the final steps in the accounting cycle, including the closing of the books and the preparation of the final financial statements.

Preamble

The present report contains the conclusions and recommendations of the Regional Seminar on the Expansion of the Agricultural Frontier and the Environment in Latin America, held at Brasilia from 10 to 13 November 1981.

This Seminar was the culmination of an endeavour to analyse one of the four processes of interaction between development and environment considered by the CEPAL/UNEP Project on Horizontal Co-operation in Latin America relating to styles of development and environment. The other three processes are: environmental management in large dams, metropolitanization and environment; and agrarian policies and peasant survival in highland ecosystems.

The Seminar was sponsored jointly by the Economic Commission for Latin America (CEPAL), the United Nations Environment Programme (UNEP), the National Association of Centres of Postgraduates in Economics of Brazil (ANPEC), the Department of Economics of the University of Brasilia, in co-operation with the Department of Planning of the Office of the President of the Republic of Brazil, through the Scientific and Technological Council (CNPq), and the Ministry of the Interior of Brazil, through its General Secretariat and the Special Department for the Environment (SEMA).

The purpose of this Seminar was to consider the characteristics of the expansion of the agricultural frontier in the region and their relationships with the predominant development style, emphasizing environmental and social aspects of the process, with a view to recommending optional development policies that would make it possible to carry out the process of expansion in question at a minimal environmental and social cost.

With a view to achieving these objectives, 22 papers were prepared, 16 of which concern studies of Brazil. Furthermore, contracts were concluded with regard to three non-Brazilian Latin American case studies, on the basis of predetermined methodology, on: the Argentinian-Paraguayan-Bolivian Gran Chaco; Peru, and Colombia. Two general interpretation studies were also prepared.

## I. ORGANIZATION OF WORK

### Place and date

1. The Regional Seminar on the Expansion of the Agricultural Frontier and the Environment in Latin America was held in the auditorium of the Faculty of Technology of the University of Brasilia from 10 to 13 November 1981.

### Attendance

2. Fifty-eight experts participated in the meeting.<sup>1/</sup>

### Opening and closing

3. Mr. Jayme Costa Santiago, Secretary General of the Ministry of the Interior of Brazil, attended the opening meeting;<sup>2/</sup> also present were Mr. Paulo Nogueira Neto, personal representative of the Special Secretary for the Environment of Brazil, and Mr. Lynaldo Cavalcanti de Albuquerque, President of the National Council of Scientific and Technological Development, Mr. Luis Otavio Morais de Souza, Vice-Rector for Academic Affairs of the University of Brasilia, and Mr. Flavio Versiani, Executive Secretary of the National Association of Centres of Postgraduates in Economics of Brazil (ANPEC), took the floor at the inaugural meeting.

4. The closing meeting was held on 13 November, and statements were made by Mr. Charles Mueller, on behalf of the University of Brasilia, and by the Co-ordinator of the Joint CEPAL/UNEP Development and Environment Unit.

### Agenda

5. The Seminar adopted the following agenda:
1. Opening meeting;
  2. General introductions to the topic;
  3. Presentation of case studies;
  4. Round-table meeting on the expansion of the frontier as an alternative for agricultural growth;
  5. Conclusions;
  6. Closing meeting.

### Officers

6. In the course of the three days of debate meetings were chaired alternatively by Messrs. Patricio Fernández, Project for the Integrated Development of the Araguayan-Tocatins Basin (PRODIAT-OAS); Tulio Barbosa, National Institute for Settlement and Agrarian Reform of Brazil (INCRA); Said Dal-Rosso, Department of

<sup>1/</sup> See the list of participants in annex 1.

<sup>2/</sup> In Brazil the Ministry of the Interior plays the role of a regional and urban development agency and a territorial management body.

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#### Brief outline of work

7. Following an introductory statement on development styles and environment in Latin America, placing special emphasis on the process of expansion of the agricultural frontier, made by the Co-ordinator of the Joint CEPAL/UNEP Development and Environment Unit, the series of 21 statements concerning the papers submitted to the Seminar began.<sup>3/</sup>

8. As part of the work of the Seminar a round-table meeting was held on the expansion of the agricultural frontier as an alternative for agricultural growth in Brazil, under the chairmanship of the Co-ordinator of the Joint CEPAL/UNEP Development and Environment Unit and with the participation of Mr. Raymundo Fonsêca Souza, Director of the Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA); Mr. Paulo de Tarso Alvim, Director of the Comissão Executiva do Plano de Recuperação da Lavoura Cacaueira (CEPLAC); and Mr. Elmar Wagner, Chief of the Centro de Pesquisa Agropecuaria dos Cerrados (CPAC-EMBRAPA).

#### II. CONCLUSIONS

9. The principal factors that have given a boost to the processes of occupying new productive areas in Latin America are the following: (a) the process of agricultural modernization, as a result of the need for changes in the pattern of production and technology in order to meet new external and internal requirements, which calls for new land and leads to the expulsion of the peasant population; (b) State plans concerning settlement and investment in infrastructure, principally in roads; (c) international demand for natural resources, especially timber, minerals and oil, and (d) domestic urban/industrial demand for those same resources.

10. The processes of expansion of the agricultural frontier in Latin America form a major part of the agricultural development strategy of most of the countries in the region. In turn, these strategies fit into the context of the process of global economic development, which to a large extent corresponds to a transnational style that is becoming dominant.

11. The region's agricultural development strategies are having the following effects, inter alia, on the new environment:

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<sup>3/</sup> See the list of papers submitted to the Seminar in annex 2.

(a) An increase in capitalist forms of production, which predominate over other previously existing forms and co-exist with such forms, resulting in a considerable amount of structural disparities, with an increasing predominance of the former type;

(b) Changes in the production pattern caused by domestic demand and the requirements of international markets (particularly in the case of timber and minerals) and by changes in consumer food habits (especially grains and meat); such changes take place in the context of an increasingly transnational development style;

(c) Social differentiation with complex and disparate processes of proletarianization and reorganization of peasant economies, and the establishment of new stratifications in peasant sectors and among agricultural wage-earners;

(d) Balanced use of renewable natural resources, with marked deterioration processes in over-used areas.

12. The dynamics of the process of expansion of the agricultural frontier depend chiefly on the following factors:

(a) Capitalist development of agriculture for the purposes of export output, energy crops, or industrial crops;

(b) The displacement of food production towards medium and small-scale farmers and the peasantry;

(c) Imposition of a technological model that usually displaces manpower;

(d) Population explosion as a result of unemployment and underemployment in traditional rural areas;

(e) Concentration of land tenure;

(f) Public investment in infrastructure, particularly roads;

(g) Fiscal incentives;

(h) Settlement programmes.

13. Systems and ways of occupying new areas result in major environmental changes at a high ecological cost. In general, there is a considerable ecosystemic harvest in the initial years of occupation of new land and, subsequently, ecological unsustainability owing to processes initiated by the action of man, such as deforestation, erosion, soil, depletion, sedimentation, and loss of flora and fauna.

14. These serious problems are relegated to a subordinate level owing to the importance attached to growth in the agricultural product and employment. The lack of "heritage accounts" that calculate losses of natural resources makes it impossible to provide proof of deterioration in the social heritage.

15. The general analysis of the region indicates that, if a system of occupation that minimizes the ecological cost is not used, a major proportion of the land's estimated potential (assessed on the basis of the use of non-deteriorating technology) is lost. In other words, before land is occupied there is a given potential in the new areas, which diminishes as virgin land is occupied by agricultural activities, owing to the high ecological cost of the occupation systems currently used.

16. Policies concerning the monitoring that there should be of the process of opening up and occupying new areas do not have the desired effect owing to the low level of attention devoted to the process in question by the State. Attempts to control or correct negative effects tend to be made once the need to do so becomes obvious, frequently at a point where the negative social and environmental

/effects are

effects are virtually irreversible. This is why many of the measures adopted are ultimately not very effective or are only palliatives that transfer problems and pressures in time and space.

17. The current expansion of the agricultural frontier is taking place largely in the humid tropical and subtropical areas of the region. In the case of the former areas, the existing systems and ways of occupying new land do not currently permit maintenance of medium and long-term farming operations. In the latter areas, owing to their greater physical disparities and to the diversity of their systems of occupation, and since there are more technological alternatives, with areas with a high level of unsustainability, areas with efficient and consolidated agriculture, and a whole intermediate range, there is a variety of situations.

18. The technological model applied to agricultural activity on the frontier replicates the technological pattern of the consolidated agricultural areas. It is therefore necessary to replace the natural ecosystem, which is diversified and therefore endowed with a high degree of stability, with a specialized and unstable agrosystem, which means that permanent subsidies (mainly energy subsidies) are required. Often times this technological model tends not to make the best use of the attributes of the ecosystems of virgin areas (water-retaining capacity, recycling, shade, etc.) and brings to bear untenable objectives of maximizing the productivity of the land. In these frontier areas it would be more appropriate to give priority to a technological model which would make it possible to take advantage of the attributes of the tropical or subtropical ecosystem against a background of resource conservation and hence of a permanent population.

19. The traits which characterize the present process of developing the frontier in Latin America are closely linked to the growth of capitalism, which is setting up a complex migratory pattern related to employment and unemployment. The factors responsible for expulsion from the consolidated farm areas are the same as those which promote migration to frontier areas. Once these areas are settled, the migratory flows act as a means of escape from employment difficulties in the areas of origin and at the same time are a source of labour on the agricultural frontier enabling capitalist growth there. The frontier settlements created as a result of the migratory flows contribute to the process of accumulation originating in situ by setting up economic flows between the urban centres and the frontier areas which have a negative effect on those areas. In this situation, frontier producers tend to consume the natural resources in order to survive. This explains their low standards of living and their eventual migration to new frontiers and frequently -as a last resort- to urban areas.

20. One matter of real importance is the analysis of the relationship between the incentives for the economic occupation of new spaces and the measures for the conservation of natural resources. In general in Latin America it may be seen that there is pressure on the State to provide infrastructure and credit for the use of resources with no reference to their conservation.

21. In considering the variety of factors which tend to make the agricultural frontier more dynamic, great importance has been attached to tax incentives, technical assistance, credit policies, input policies and the provision of infrastructure, especially roads. With regard to the latter, for example, roads are often built with priority given to minimizing distances regardless of the conditions found in the ecosystems which they traverse. This has frequently resulted in the occupation and destruction of unstable and vulnerable ecosystems.

22. Tax incentive, in particular reductions for certain kinds of exploitation (stockbreeding, for example), result in the occupation of spaces beyond their natural capacity and also encourage land speculation.

23. The exploitation of forests and mines in many parts of the region is largely responsible for the processes whereby the ecosystem is deteriorating. The pressures resulting from the energy crisis and the marked decline in the area covered by forests worldwide tend to aggravate this situation.

24. The agricultural potential of Latin America is very great; evaluations with different degrees of detail are available for the countries of the region, which give us some understanding of the great gap between the present and the potential use of the resources. Moreover, although limitations exist, the technology required to develop the frontier with less deterioration is available. The basic problem therefore is not a lack of potential or technology. It lies in the systems governing the possession of resources and in the technical and social relationships to which those systems give rise.

25. It should be noted that the observation of negative results from the process of developing the agricultural frontier often leads to the contention by ecologists that any substitute for the natural plant cover is bad. Appropriate environmental management may, however, make it possible to turn the natural environment into an artificial environment which can be maintained and is of greater use to society. When forest ecosystems are involved, deforestation is a necessary stage in the formation of a well planned agrosystem of this sort.

### III. RECOMMENDATIONS

#### A. General recommendations

26. Meeting in plenary, the Seminar recommended:

(a) Identification and study of ecological threats in their real dimension and the social consequence of an approach to agricultural expansion which consists to a significant degree on pushing back the agricultural frontier into areas which man's activities may easily cause to deteriorate.

(b) Consideration of measures for:

(i) Halting the occupation and opening up of areas with a fragile ecology until they have systems which are ecologically viable;

(ii) Allowing the consolidation and development of frontier areas which are already occupied and partially affected with a view to their becoming economically viable;

(iii) Making land in areas which have already been opened up more accessible through land redistribution, taxation of idle land, granting of credit to small farmers, etc.;

(iv) Increasing the number of jobs in infrafrontier areas.

(c) Attempts to convince governments of the enormous desirability of replacing partial and short-term measures and programmes with medium- and long-term planning incorporating the social and environmental dimensions.

(d) Introduction of a strategy for developing the frontier in each country in a manner as consistent as possible with the global development strategy. In this connexion, it is important to study alternative costs in investments in agricultural development since marginal costs may be lower in areas where agriculture has been consolidated or semi-consolidated. There are at present

/important technological

important technological innovations which make it possible to intensify the development of land in extensive use (e.g., the cerrado in Brazil). This raises a number of questions on agricultural development options, which should be looked into.

(e) The establishment of subsidies and preferential supports for areas which the State has designated as priority areas for purposes of developing the frontier with a view to creating new job opportunities, raising production, achieving territorial integration, settling the land, conserving resources and similar aims. These objectives cannot be attained (or will be attained only in part) if an integral and consistent strategy is not established on all fronts. This strategy must make a distinction in respect of other areas and other sectors of the economy which are not involved in the process. It is important as of now to discard the misconception that new areas must produce surpluses for the development of other areas. On the contrary, to achieve the objectives listed above, the frontier must be subsidized until it can be consolidated.

(f) The main policies contained in the policies for developing the frontier include those relating to:

- (i) Land tenancy;
- (ii) Credit;
- (iii) Agricultural inputs;
- (iv) Road infrastructure;
- (v) Marketing and processing of commodities;
- (vi) Technologies for the appropriate use of the ecosystem;
- (vii) Resource appraisal;
- (viii) Technical assistance and agricultural extension;
- (ix) Research into the behaviour of the ecosystem;
- (x) Labour;
- (xi) Training;
- (xii) Conservation of resources;
- (xiii) Prevention of social diseases;
- (xiv) Physical follow-up;
- (xv) Anthropological research.

(g) Study and review of the model relating to the adoption and generation of technology, with special attention given to the analysis of the appropriation of surpluses in the sale of technological inputs, the sale of technology itself and the marketing of the production generated by that technology. It is also necessary to study how the style of development penetrates the technology option, which appears to be uniform and neutral but in fact involves a whole system for the appropriation and concentration of goods and resources.

(h) Analysis of experience with planned settlement, bearing in mind that many of the region's settlement programmes have originated in response to population pressures and serious social problems, in the absence of the necessary fiscal, social and economic assessments.

(i) The giving of preference to consideration of the processes observed in the Amazon system since the estimates of significant change in the use of virgin and semi-virgin ecosystems indicate that it is for the most part in this space that the agricultural frontier is being developed. The application of resources and technologies there on the basis of the transfer of the technology used in temperate areas is causing marked deterioration. This raises the need

/for change

for change in the policies relating to this vast area. These changes must be aimed at the establishment of a structure of production which is different from the present one and at using the ecosystem more constructively by conserving its resources rather than stripping it down.

(j) More attention to detail in prospecting for resources and observing the behaviour of ecosystems.

(k) Greater thoroughness in the periodic appraisal of the stage reached in deforestation and follow-up on other developments.

(l) Projecting the prospects in respect of space occupation to various future dates, estimating the deteriorating effects it may have. This work, begun at regional level, must be pursued in each of the countries in those aspects, which meet their individual needs.

(m) Elimination of government subsidies for activities which destroy the ecosystem.

(n) A thorough exploration of the historical motivations behind the frontier development processes.

#### B. Special recommendations

27. The participants made the following special recommendations:

(a) That special environmental co-operation programmes, including training programmes and seminars for regional planners and persons in positions of responsibility in wet tropical areas, be held for the purpose of exchanging experience and above all of making the ecological and social limits of the frontier development processes generally known.

(b) That agricultural experiments in the tropical wetlands be appraised as a matter of urgency in order to quantify their sustained output.

(c) That CEPAL and the Department of Economics of the University of Brasilia as a matter of urgency assess the technical and economic feasibility of the forest, croplands and grasslands systems recently recommended by various advanced research centres.

(d) That the CEPAL/UNEP Environment and Development Unit finalize the preliminary map on proposals for developing the agricultural frontier and their probable impact on the ecosystems, which was prepared under the CEPAL/UNEP project on Horizontal Co-operation in Latin America relating to Styles of Development and Environment. In view of the importance of this study for Brazil, it is recommended that the analysis pertaining to this country be extended and broken down by states, regions and/or development authorities.

(e) That, in view of the importance of the map referred to, a similar one be prepared for Central America, the Caribbean and Mexico, using an appreciably larger scale (1:500 000 to 1:100 000) in the case of Central America and the Caribbean.

(f) That, inasmuch as the map referred to in the preceding recommendations has resulted in pin-pointing areas of particular dynamism and vulnerability in the development of the agricultural frontier, CEPAL should intensify its contacts with the respective governments and join the search for appropriate technical and economic solutions.

(g) That the role of road infrastructures in the deterioration of wet tropical ecosystems be reconsidered at regional level as a matter of urgency and that the ecological costs be included in the estimate of the corresponding investments.

/(h) That

(h) That the CEPAL/UNEP Development and Environmental Unit hold a seminar on possible alternatives for the tropical wetlands of Latin America in conjunction with high-level centres in the region, including the Institute of Advanced Research of Pará, the Agricultural Research Centre of Brazil and the University of Brasilia.

(i) That a project aimed at technical exchange between Latin America and Africa be formulated with the objective of making use of the ecological similarity, the Africanization of some Latin American ecosystems due to the introduction of flora native to Africa and the cultural links between the two regions and of analysing technologies and systems brought from Africa during the periods of forced migration.



Annex 1

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Annex 2

DOCUMENTS SUBMITTED AT THE SEMINAR

Symbol <u>1/</u>	Author	Body	Title
E/CEPAL/ PROY.2/R.5	Julio Carrizosa	CEES-Colombia	La ampliación de la frontera agrícola en el Caquetá (Amazonia colombiana)
E/CEPAL/ PROY.2/R.6	Jorge Morello	FUDAM-Argentina	El gran chaco: El proceso de expansión de la frontera agrícola desde el punto de vista ecológico ambiental
E/CEPAL/ PROY.2/R.7	Oficina Nacional de Evaluación de Recursos Naturales (ONERN)	ONERN-Peru	Expansión de la frontera agropecuaria en el eje San Ramón-La Merced de la selva central del Perú
E/CEPAL/ PROY.2/R.8	Nicolo Gligo and Jorge Morello	CEPAL/UNEP	Perspectivas de la expansión de la frontera agropecuaria en el espacio sudamericano
E/CEPAL/ PROY.2/R.9	Alejandro Colomés	CEPAL	La gestión ambiental y la expansión de la frontera agropecuaria en América Latina
E/CEPAL/ PROY.2/R.10	Fernando Homem de Melo	IPE/USP-Brazil	As metas de produção de alimentos, de exportáveis e de bio-energéticos e o seu impacto sobre a incorporação de terras a agricultura
E/CEPAL/ PROY.2/R.11	Hélène Riviere D'Arc and Hervé Theyry	Institut des Hautes Etudes de l'Amérique Latine CNRS-Paris	Fronteira/Fronteiras. Os fenômenos de fronteiras na América Latina
E/CEPAL/ PROY.2/R.12	Philip M. Fearnside	INPA-Brazil	Alternativas de desenvolvimento na amazonia brasileira: Uma avaliação ecológica
E/CEPAL/ PROY.2/R.13	Carlos Marx Ribeiro Carneiro	IBDF-Brazil	Monitoramento das modificações espaciais no ecossistema florestal da região amazonica brasileira

1/ All the papers for this Seminar were prepared under the Project on Horizontal Co-operation in Latin America relating to Styles of Development and Environment and are for restricted use.

Symbol <u>1/</u>	Author	Body	Title
E/CEPAL/ PROY.2/R.14	Charles Curt Mueller	University of Brasilia-Brazil	O estado e a expansão da fronteira agrícola no Brasil
E/CEPAL/ PROY.2/R.15	Susanna Hecht	University of California at Los Angeles-USA	Deforestation in the Amazon Basin: Magnitude, Dynamics and Soil Resource Effects
E/CEPAL/ PROY.2/R.16	Francisco B.B. Magalhães	Ministry of the Interior-Brazil	Rondônia - Um caso de expan- são acelerada
E/CEPAL/ PROY.2/R.17	Atila T. Calvente	CNPq-Brazil	A unidade familiar de produção e o capital: O caso de Rondônia
E/CEPAL/ PROY.2/R.18	Bertha Becker	UFRJ-Brazil	A atuação do estado na expan- são da fronteira: Uma contri- buição geo-política ao estudo da região do Araguaia- Tocantins
E/CEPAL/ PROY.2/R.19	Fernando A. Oliva Perpetuo	CEDEPLAR/UFMG- Brazil	Getat: Consideração política da questão da terra
E/CEPAL/ PROY.2/R.20	Luis E. Aragón	NAEA/UFPa-Brazil	Despovoamento rural da amazonia brasileira
E/CEPAL/ PROY.2/R.21	Donald R. Sawyer	CEDEPLAR/UFMG- Brazil	Ocupação e desocupação da fronteira agrícola no Brasil: Ensaio de interpretação estrutural e espacial
E/CEPAL/ PROY.2/R.22	Luc T.A. Mougeot	NAEA/UFPa-Brazil	Ascensão sócio-econômica e retenção migratória durante o desenvolvimento da fronteira na região norte do Brasil
E/CEPAL/ PROY.2/R.23	Susanna Hecht	University of California at Los Angeles-USA	Agroforestry in the Amazon Basin: Practice, Theory and Limits of a Promising Land Use
E/CEPAL/ PROY.2/R.24	George Martine	ILO/CNRH-Brazil	Expansão e retração de emprego na fronteira agrícola
E/CEPAL/ PROY.2/R.25	Philippe Léna	INPA-Brazil	Expansão da fronteira agrí- cola em Rondônia ocupação do espaço e dinâmica da estruc- tura agrária

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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This not only helps in tracking expenses but also ensures compliance with tax regulations.

In the second section, the author outlines the various methods used for data collection and analysis. These include surveys, interviews, and focus groups. Each method has its own strengths and limitations, and the choice depends on the specific research objectives.

The third section delves into the statistical analysis of the collected data. It covers topics such as descriptive statistics, inferential statistics, and regression analysis. The goal is to identify patterns and trends in the data that can inform decision-making.

Finally, the document concludes with a summary of the findings and recommendations. It highlights the key insights gained from the research and provides practical advice for implementing these findings in a real-world context.