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The Contribution of Forestry to Economic Development, with Special Reference to Employment and Income in Developing Countries: An Annotated Bibliography

By

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THE FORESTRY PRIVATE ENTERPRISE INITIATIVE

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THE CONTRIBUTION OF FORESTRY TO ECONOMIC
DEVELOPMENT, WITH SPECIAL REFERENCE TO
EMPLOYMENT AND INCOME IN
DEVELOPING COUNTRIES:
AN ANNOTATED BIBLIOGRAPHY

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SEPTEMBER 1987

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PREFACE

Rural economic development strategies in developing countries typically involve the promotion of agricultural enterprises. The emphasis is related to such goals as reduced hunger, food security, and self sufficiency in the production of staples. However, the longer term goals of a rising standards of living and improved public services including health and education are equally served by a variety of value producing economic activities including industrial forestry development.

Forest based economic activities offer several means of facilitating development including the generation of foreign exchange, the encouragement of investment in industrial or other development project, and a raw material base for future years.

This paper reviews the economic literature dealing with the role of industrial forestry in the economic development of developing countries and annotates the most important papers. The annotations have been recorded in a computerized database developed for this purpose. The annotations report the economic, environmental, policy, and administrative issues considered in each paper. The bibliographical entries have been cross-referenced using a system of key words including country or countries, enterprises, methodologies, and major focus. The computerized database was developed on D-Base III. The D-Base III system provides an inexpensive data storage/retrieval system. Users can search the database on the basis of any descriptors including author, title, date, publisher, or keywords discussed above. When the search is complete the user can make a hard copy of any or all of the entries found in the course of the search. The database can be added to or ammended. It can be transported to various sites in the U.S. and developing nations.

Certain themes or common threads were found in the literature. Many of the papers indicated almost unlimited potential for increased employment from managed forest industries. Actual experience, however, has been far less dramatic and in many instances, forestry and related industries have experienced declining employment. A key to achieving the more optimistic benefits is better education, property rights, and management to create more productive laborforces and more productive forest lands. In many cases unrestricted access, weak systems of property rights or enforcement, and immediate needs prevent the investment of time and money in forests.

The literature often overlooks the troublesome issue of efficiency versus high levels of employment. In developed countries efficiency and economic benefits have come from the substitution of capital for labor. It is clear that efficiency requires that labor be productive and that sufficient levels and types of capital be employed. But increased employment of under and unemployed workers is an important goal of rural development. Those articles which do address the efficiency/employment issue suggest that goals must be carefully weighed. Consideration of

the opportunity costs of the unemployed may lead to very different optimums for developed and underdeveloped countries.

A striking feature of the literature is its lack of specificity and quantification. Few studies have been able to quantify (in a generalizable fashion) the impact of industrial forestry on the economies of the countries or regions in question. Those that do make estimates of impacts vary widely. Estimates of employment per hectare range from .0005 to 5 jobs per year. The high figures included indirect effects based on very optimistic multipliers. Most estimates fall between .05 and 7.5 to 1.1 with most less than 2.0. In total terms, the papers indicated that enormous numbers of jobs could be created by better management of forests and the creation of forest related industries. Together the papers would predict that hundreds of millions of jobs could be created. One must keep in mind that developments of even a fraction of this magnitude would have enormous effects on prices of products and factors and should be viewed with extreme caution.

Overall, the articles reviewed in this paper suggest that forestry offers an extraordinary opportunity for rural economic development in developing countries. In particular, it provides an opportunity to use otherwise errodable, low valued, land to create valuable products for rural areas such as building material and fuel, and a renewable raw material for industrial development. Forestry tends to diversify rural economies, while creating employment opportunities for part-time farmers. It can reduce the incentive for rural peasants to migrate to cities already straining to provide adequate housing and service. It produces the foreign exchange needed to modernize and develop the countries' industrial sectors. It provides some incentive for rural residents to become better educated and to enter the economic mainstream.

Finally, this review indicates the many gaps in our understanding of the role of forestry. The wide range of estimates of forestry's potential for creating jobs is indicative of our lack of knowledge. The review points out the urgent need for better incentives, systems of property rights, enforcement of laws, and education, if we are to reduce the serious damage to fragile land and water resources. The need for research into the economic and biological needs of forestry in developing countries is great and urgent.

Thomas G. Johnson
September, 1987

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** Author(s): Adeyolu, S.K.

* Keyword(s): policy, management, furniture,
wood-based industries, sawmills

Adeyolu, S. K. "Forestry and the Nigerian Economy," Ibadan University Press, Nigeria, May 1975, p. 308.

A detailed and comprehensive analysis of forestry in Nigeria. Aspects covered include development of forest policy and administration, economic aspects of forest management; the economic importance of wood-based industries including employment; minor forest produce and the social benefits of forestry. Includes a thorough discussion of the impact of forestry and wood based industries on employment for the period 1957-1967. Tables of data regarding value added and employment generated by these activities are included. The forest industries ranked first in 1963 in terms of employment. The breakdown of labor requirements for the average sawmill, plywood and furniture plants is given (pp. 160-161) and range from 119 in the sawmills to 329 in the furniture industry.

* Countries: Nigeria

** Author(s): Ahmad, Iftikar.

* Keyword(s): employment, technology, agronomic, ecological, silviculture, logging

Ahmad, Iftikar. "Optimum Levels of Labor Intensity In Forestry," Proceedings of the Eighth World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 25-32.

Guest speaker address at the Seventh Technical Session of the Congress. Discusses the findings of an ILO project regarding the increased possibility for employment generation in forestry through the application of appropriate technology. The project was carried out in the Philippines. Labor, animal and mechanical productivity as well as costs are compared for various logging and silvicultural operations. The study concludes that there are strong reasons for introducing intermediate technology in forestry for enhancing employment creation. No quantitative data.

* Countries: Philippines

** Author(s): Ahmed, I. and Laarman, J.G.

* Keyword(s): Intermediate technology, employment, productivity, environment

Ahmed, I. and Laarman, J.G. "Technologies for Basic Needs: The Case of Philippine Forestry," International Labor Review, Vol. 117, No. 4, July 1978, pp. 491-500.

The article reviews intermediate technology alternatives for Philippine forestry recommended by the ILO in 1976-77 on the basis of a study in collaboration with the government of Finland and the Philippine Bureau of Forest Development. The focus is on technologies which would, ideally, improve working conditions, enhance work safety, protect the environment and generate a large volume of employment. The article shows that intermediate labor intensive technologies do exist for Philippine forestry, the use of which gives rise to increased productivity but decreased labor displacement when compared with more capital-intensive technologies. The authors estimate that the new technologies applied in future man made forests hold prospects for generating millions of man-hours of employment.

* Countries: Philippines

** Author(s): Asian Development Bank, Manila.

* Keyword(s): Investment, employment, plantation, self-sufficiency

Asian Development Bank. "Sector Paper on Forestry and Forest Industries," Manila, Philippines, Asian Development Bank, 1978, p. 78.

A sector paper which analyses the potential for forestry and forest industries in the Asia-Pacific region. Part of the paper analyses investment and employment (p. 34). The plantation establishment programs of countries in the region total 1.5 million hectares between 1980 and 1990. This is estimated to create 20000 to 50000 additional jobs depending on the degree of mechanization adopted. The bank estimates that for the developing member countries the annual outlay on new capacity to achieve self-sufficiency could amount to some \$1000 to \$2000 million and create more than 1 million additional jobs. Additional investment for export processing has the potential to employ 250000 to 1 million more people.

Countries: Asian and Pacific countries

** Author(s): Becker-Ritterspach, R.O.A.

* Keyword(s): restoration, employment, houses,
furniture, crafts, timber,

Becker-Ritterspach, R.O.A. "Urban Renewal: The
Restoration of Bhaktapur," *Unasyiva*, Vol. 30, No.
121, 1978, pp. 2-10.

Describes the results of a restoration project concerned with restoring wooden houses built on traditional patterns. The project led to a small scale timber industry and the manufacture of furniture. A center for skilled craftsmen was being planned and traditional arts and crafts developed as ancillaries to the project. During the peak season, the project employed about 200 carpenters, and traditional artisans and carpenters and builders found employment for their skills. The success of the project is expected to create a large number of jobs.

* Countries: Nepal

** Author(s): Burch, W.R. Jr.

* Keyword(s): policy, employment, wood products,
labor force

Burch, W.R. Jr. "Social Aspects of Forest Policy Research," In Research In Forest Economics and Forest Policy, Washington, Resources for the Future, 1977, p. 555
Washington, Resources for the Future, 1977, p. 555.

Deals broadly with the employment aspects of forest policy. Includes a table of employment generated in various wood product manufactures for the period 1947-1970 and a breakdown of the forestry labor force in terms of economic and social characteristics (pp. 367-368).

** Author(s): Chatterjee, N.

* Keyword(s): Input-output, employment

Chatterjee, N. "The Role of Forestry in the Indian Economy," *The Indian Forester*, Vol. 104, No. 2, Feb. 1978, pp. 61-78.

An empirical evaluation of the role of forestry in the Indian economy using input-output analysis. The analysis indicates that the role of forestry in generating domestic employment may be substantial. The labor constituent for domestic factors generated consequent to the supply of unit value of output is found to vary in the forestry sector from 66.12% for wood products to 27.24% for paper and paper products. This compares favourably with land based sectors which range from 47.40% for plantations (tea, coffee) to 45.07% for fruits and vegetables. The magnitude of the potential for domestic labor generation by the forestry sector is estimated to be 4.61% of total employment in contrast to 1.25%, 2.10% and 1.22% in the plantation, food grains, and fruits and vegetables sectors respectively.

* Countries: India

** Author(s): Chauvin, Henri.

* Keyword(s): tropical, costs, logging, social,
employment, investment

Chauvin, Henri. "Opening up the Tropical Moist Forest and Harvesting the Timber - Factors Conditioning Methods and Costs," Unasyiva, Vol. 28, No. 112-113, 1976, pp. 80-85.

Several factors influencing the method of harvesting and logging of timber are discussed, including social factors, since logging is an activity in which the more primary the work level the greater the number of workers needed. The employment potential is briefly analyzed. According to the author, "In regions where underemployment exists, logging can be planned along labor intensive lines to absorb and benefit excess manpower." Economic factors which effect investment decisions are also described. No quantitative data.

** Author(s): Convery, F.J. and Dripchak, K.

* Keyword(s): Impacts, energy, Income, employment, multipliers

Convery, F.J. and Dripchak, K. "Energy Crops, Forestry and Regional Development in Ireland," Dublin, Economic and Social Research Institute, 1983, p. 116.

Report of a study which had, among its main objectives, the determination of the 'regional impact of energy crops/conventional forestry planting programmes' in the western counties of Ireland. Income gains are estimated (p. 115) to amount to 7.1% of the 1977 aggregate family farm income. The net regional income multipliers are estimated, in terms of on-land employment, to be either neutral or mildly negative. Detailed tables of forward linkage employment impacts in energy crops and forestry are given. A rough estimate indicates addition of about 9000-10000 jobs to the regional economy phased in slowly over a period of 40 years using 250000 acres each of energy crops and conventional forestry as a benchmark.

* Countries: Ireland

** Author(s): Cooper, St.G.C. and Bacon, P.R. (eds.).

* Keyword(s): human resources, income, employment,
Imports, exports

Cooper, St.G.C. and Bacon, P.R. (eds.). "The
Natural Resources of Trinidad and Tobago," Edward
Arnold (Publishers) Ltd., London, U.K., 1981.

Includes a section on Human Resources which has
Income and employment tables. Also discusses
(Forests, pp. 78-105) employment in forestry and
wood based industries and imports and exports.

* Countries: Trinidad and Tobago

** Author(s): Cortes, E.V.

* Keyword(s): employment, wood manufactures

Cortes, E.V. "Research and Development in Labor Intensive Methods and Simple Tools in Philippine Forestry," Proceedings 8th World Forestry Congress, Jakarta, Indonesia, Vol. 4, 1978, pp. 723-734.

Part of the paper analyses forestry as a source of existing and potential employment. Gives a break-down of employment in the wood manufacturing and forestry industry by sector. Forestry's performance as an employer is considered disappointing, accounting for only 0.3% to 0.4% of the total work force.

* Countries: Philippines

** Author(s): D'Adamo, O.A.

* Keyword(s): demand, reforestation, employment,
furniture, housing, projections

D'Adamo, O.A. "Forestry and Socioeconomic
Development in Latin America," Proceedings 7th
World Forestry Congress, Centro Cultural General
San Martin, Buenos Aires, Argentina, Vol. 1,
October 1972, pp. 806-836.

The paper analyses the demand for forest products
for the 14 year period 1972-1985. The increased
requirement of sawn timber alone was estimated to
equal the yield from no less than 3000000
hectares. The potential for additional employment
in forest production and in industry and
reforestation programmes was estimated at 2000000
direct new jobs. Taking into account the secondary
industries (housing, furniture, containers, etc.)
over 15 million employment opportunities were
assessed. The major portion of the paper describes
how forestry may be used as a tool of development
in Latin America.

* Countries: Latin America

** Author(s): Dargavel, J.

* Keyword(s): employment, production, policies,
projections

Dargavel, J. "Employment and Production: The Declining Forestry Sector Re-Examined," Australian Forestry, Vol. 45, 1982, pp. 255-261.

Employment and other aspects in forestry and the Australian wood industry have declined. Expectations in the early 1970's that forestry projects would alleviate unemployment were belied, with either absolute or relative declines having occurred. Direct employment had been predicted to rise from 105000 in 1974, to 120000 by 1980 and to 186000 by 2000. Instead, overall employment fell in the first period. This paper analyses the trends in employment and production in the forestry sector and in associated industries. In the latter half of the period 1959-1979, employment in the sector declined 18% and the causes of this are assessed.

* Countries: Australia

** Author(s): Douglas, J.J.

* Keyword(s): plantations, development, employment, income, theory, productivity

Douglas, J.J. "A Re-Appraisal of Forestry Development in Developing Countries," Martinus Nijhoff/Dr. W. Junk Publishers, The Hague, 1983, p. 178.

Begins with a non-rigorous and non-comprehensive review of development economics theory. Spends much of book contrasting "The Original Westoby View of Industrialization and "Newer Approaches" of social forestry. Concludes "There is now little doubt that rural development which increases output, productivity and welfare of the agricultural sector must be a primary goal." Forestry assists development by providing fuel, settlement of shifting cultivators, reduced erosion, increased structural raw material inventories, and additional income opportunities. (p.115). "...deliberate industrialization via import substitution is ... largely inappropriate..." (p.131).

Book is largely an essay with little or no data. Examples drawn from LDCs, largely Bangladesh where author has done considerable work. Appendix A is on Bangladesh's economy, Appendix B on its forest industry, and Appendix C on conversion to forest plantations. Two tables in Appendix B contain data for paper and manufactured board by mill and year of production, domestic and export sales, average domestic and export price, production cost, operating surplus, output/employee, and labor productivity.

* Countries: Bangladesh

** Author(s): Earl, Derek.

* Keyword(s): fuel, firewood, charcoal, benefits,
energy, employment

Earl, Derek. "A Renewable Source of Fuel,"
Unasyiva, Vol. 27, No. 110, 1975, pp. 21-26.

Forests can be managed for the production of firewood and charcoal on a permanent, renewable basis. The author examines the use of fuelwood and charcoal in the world and recommends it in particular for countries with industrialized land and labor. The direct and tangible key benefits that can be derived from the managed use of forest energy resources are outlined and the potential for employment is touched upon.

** Author(s): F.A.O.

* Keyword(s): evaluation, capital, personnel,
primary manufacture

F.A.O. "Dominica - Preliminary Evaluation of a
Small Forest Industries Complex," Food and
Agriculture Organisation of the United Nations,
Rome, 1976, Revised Version 1978, p.36.

Report of a team investigating the forest industry
potential and the size and type of industry that
would be viable in Dominica. The manpower
requirements for the project are estimated at 44
men. The major portion of the paper analyses
capital and technical requirements of the
project.

* Countries: Dominica

** Author(s): F.A.O.

* Keyword(s): employment, planning, policy

F.A.O. "An Introduction to Planning Forestry Development," Rome, F.A.O., 1974, p. 86.

A paper laying out the framework for planning, development and exploitation of forest resources. Refers to the contribution that forestry can make to employment. The advantages of forestry as an employer in terms of dispersing employment and distributing employment in rural areas is discussed. Contains no quantitative data.

** Author(s): F.A.O.

* Keyword(s): employment, plantations, industry,
exports

F.A.O. "Development and Forest Resources in Asia
and the Far East Region," Rome, F.A.O., 1976, 1979
printing, p. 89

A study of the regional situation and trends in
the development of the forestry and forest
industries sectors. Includes an assessment of the
employment potential of forestry and forest based
industries in the region. Tabular data are
included indicating that an anticipated 2 million
hectares of forest plantations would generate
20000-50000 man years of employment between 1970
and 1990. Breakdowns of projected employment for
forest based industries and exports are also
given.

* Countries: Asia and Far East

** Author(s): F.A.O.

* Keyword(s): Industry, training, case studies, policy, processing, education, paper, fuel

F.A.O. "Appropriate Forest Industries," FAO Forestry Paper No. 68, F.A.O., Rome, 1986, p. 426.

Contains papers from FAO/Finland Expert Consultation on Appropriate Forest Industries in Jakarta, Indonesia on 9-10/85. Part I includes: common features of forest industries project; small scale processing enterprises; institutional requirements; people and industry; education and training; and what is appropriate? These are qualitative discussions with no data. Part II has many case studies including: bamboo industry (India); charcoal (Argentina); policy (Italy and Liberia); paper (Philippines); fibreboard (Kenya); sawmill and plywood (Tanzania and Indonesia); et al. Limited data and tables are included. Among those of interest are:

Annexes containing: percent employment by small scale industry (SSI) and nation; Philippines SSI growth rate 14.7 and 7.0% per annum for less than 10 workers and equal to or greater than 10 workers from 1967-72; Jamaica sold 78% and Bangladesh 46% of SSI to final consumer. (pp.89-97). Reed industry capital investment, fuel consumption, and wage per worker by industry. (p.104).

Argentina charcoal - production by province (p.113); monthly production (p.114); personnel and investment requirements (pp. 121-122); operating cost (p.124). Large scale forestry-livestock operation created 150 permanent jobs after 40 years (p.130).

Indonesian timber estates - Supervisory employees /K ha (p.212). Timber estate (about 50 K ha) employs 300 permanent people (p.213). Java has 2.9 M ha forest, employs 15000 permanent and 350000 seasonal (p.214).

Table of number of employees per unit of installed capacity by industry and skill level (pp. 241 & 243).

Kenya fibreboard mill cost 824000 KL (US\$ 1 M). Industrial group employs 800 workers and produces each month 1000 cubic meters sawnwood, 300 cubic meters plywood, and 250 t hardboard

(p.273).

* Countries: Argentina, India, Philippines, Italy,
Liberia, Kenya, Tanzania, Indonesia

** Author(s): Ferguson, I.S.

* Keyword(s): Input-output, multipliers, impact, income, employment

Ferguson, I.S. "Wood Chips and Regional Development," Australian Forestry, Vol. 36, No. 1, Oct. 1972, pp. 15-23.

The impact of a wood chip project on the regional economy is examined using data from an input-output analysis of the Western Australian economy. The analysis indicates that each \$100.00 of sales by forestry to final demand contains a total wage content of \$41.00. Indications are that the total effect of a wood chip project is substantial, probably of the order of double the direct employment. The income multiplier for forestry was found to be 1.69. For ancillary activities in the region such as saw milling and road transport, the income multiplier effect was 1.92 and 1.22 respectively.

* Countries: Australia

** Author(s): Ferguson, I.S.

* Keyword(s): employment, multipliers, economy, impact, linkages, input-output

Ferguson, I.S. "The Role of Forestry In Rural Development," Proceedings 8th World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 301-310.

The contribution of employment in forestry to the regional economy is examined in terms of its impact on the structure of the economy. This has been gauged by a study of the inter industry linkages. The overall magnitude of the impact on the economy has been estimated by development of income and employment multipliers. The nature of interindustry linkages with forestry is detailed. Analysis indicates that employment multipliers for forestry and saw milling are 1.65 and 1.73 respectively.

* Countries: Australia

- ** Author(s): Fortomann, Louise and Rocheleau, D.
- * Keyword(s): agroforestry, development, employment, women, training

Fortomann, Louise and Rocheleau, D. "Why Agroforestry Needs Women: Four Myths and a Case Study," Unasyiva, Vol. 36, No. 146, 1984, pp. 2-11.

In agroforestry projects the involvement of women is essential in project definition, design and implementation. Yet women still, for the most part, are being excluded from involvement. This study advocates the view that women are actively engaged in forestry although their role is not adequately recognized. The study looks at the role played by women in the Plan Sierra Development Project in the Dominican Republic. Recommends the increased employment and training of women in agroforestry. No quantitative data.

- * Countries: Dominican Republic

** Author(s): Fowler, K.S.

* Keyword(s): employment, model, input-output,
logging, sawmill, plywood

Fowler, K.S. "Toward a More Integrated Regional
Timber Model," Forest Science, Vol. 24, No. 4,
Oct. 1978, pp. 434-443.

This paper describes a model which quantifies selected socioeconomic effects resulting from changes in the rate of cutting of a forest. Submodels of the model consist of input-output analysis and employment regressions which assess the employment generated by various forest activities. The employment equations developed allow projection of employment in four economic subsectors (i) logging (ii) sawing and planing (iii) plywood and veneer and (iv) other forest products. An initial application of the model to Humboldt County in Canada indicated generation of employment for 9060 persons for a total cut of 1010 million bd feet in 1975 and projections of 6350 forestry related jobs for 907 million bd feet total cut and a total employment of 31000.

* Countries: Canada

** Author(s): Frick, Torsten.

* Keyword(s): tropical, labor, employment, pulp

Frick, Torsten. "Harvesting Mixed Tropical Timber for Paper," Unasyiva, Vol. 30, No. 122, 1978, pp. 4-24.

This is a technical report of how a company - Pulapeb S. A. of Columbia - harvests the jungle for pulpwood. The report includes a section on the labor aspects of the operation in terms of employment provided, area of breakdown of jobs, etc.(p.21). The project provided employment for 256 personnel at a production rate of 1.95 cubic million per man day.

* Countries: Columbia

** Author(s): Frykman, Bengt.

* Keyword(s): disabled, economic, profitability,
safety

Frykman, Bengt. "The Disabled Worker In Forestry,"
Unasylva, Vol. 34, No. 136, 1982, pp. 11-14.

A significant number of forest workers retire prematurely due to disabilities acquired while working. The article suggests ways in which disabled workers may be meaningfully employed in forestry and lists measures which can improve economic and safety aspects of the work, thereby increasing profitability. The paper does not deal with employment or income opportunities.

* Countries: France, Yugoslavia, Sweden, Denmark,
New Zealand, Netherlands

** Author(s): Germishuizen, P.J. and Vos, B.R.

* Keyword(s): employment, mechanization, planting,
labor, reforestation

Germishuizen, P.J. and Vos, B.R. "Man and Machine
In Re-Establishment Forestry at Usutu," South
African Forestry Journal, No. 110, Sept. 1979, pp.
27-30.

The paper reports a study of the Usutu Pulp
Company, which administers 60000 hectares of land
in Swaziland. The study pertains to the plans of
the company to re-establish 6000 hectares of
forests over a period of 24 months. The paper
gives a breakdown of the labor requirements for
different aspects of forestry. The labor
requirements in re-establishment operations are
calculated at 127 per hectare. This requirement is
compared with the benefits to be had by
introducing greater mechanization in
re-establishment forestry. The conclusion reached
is that while mechanization may be viable for some
aspects of the operations such as slash disposal
and primary spacing, planting will always be labor
intensive. The availability of adequate labor in
the locality is cited as an additional reason for
labor intensive practices.

* Countries: South Africa

** Author(s): Grant, R.K.

* Keyword(s): Impacts, development, employment,
Incomes

Grant, R.K. "Managing the Regional Impact of Forest Development Programs," New Zealand Journal of Forestry, Vol. 24, No. 2, 1979, pp. 198-204.

The paper proposes that in situations where the regional development impact represents an important part of the total benefits of a project, some effort must be made to manage the project so as to increase the impact on regional employment and incomes. The analysis concludes that if a forest project intends to alleviate low incomes, forest managers should adopt flexible employment policies which permit people to work in unskilled jobs on an intermittent basis. In terms of local income impact, the local effect of an afforestation project is significantly increased if the nursery supplying the trees is located in the development area. No quantitative data.

* Countries: New Zealand

** Author(s): Greig, P.J.

* Keyword(s): employment, multipliers, softwood,
income, plantations

Greig, P.J. "Some Social and Economic Consequences of Intensive Forestry," Australian Forester, Vol. 42, No. 4, Oct. 1979, pp. 207-214.

The social and economic consequences of developing softwood plantations in preference to the native hardwood industry in Victoria are explored by comparing relevant state statistics for Victoria with those of South Australia. The analysis indicates that if wood production in Victoria were wholly derived from softwood plantations, income of employees would increase 13% and job prospects for 'white collar' workers would increase 35% and for women the increase would be 50%. The size of the employment multiplier in the region due to forestry activities is estimated to be between 1.1 and 2.0. Employment trends also indicate that employment in the softwood sector would be more stable than in the hardwood sector.

* Countries: Australia

** Author(s): Hansom, O.P.

* Keyword(s): promotion, socioeconomic, development, employment, linkages

Hansom, O.P. "Forest Products Promotion to Enhance Socioeconomic Development," Proceedings of the Eighth World Forestry Congress, Jakarta, Vol. 2, Oct. 1978, pp. 81-89.

This paper describes and analyses how decision making regarding forest products promotion is geared towards socioeconomic development. The main aspects of the development of forest industries are the promotion of employment, the improvement of the local socioeconomic infrastructure, and those linkages with other industries and trades that result in multiplied benefits. Contains a section on how industry selection and policy may be oriented towards meeting employment needs and discusses the decision procedures in such cases. No quantitative data.

** Author(s): Hanson, A.G.

* Keyword(s): employment, multipliers

Hanson, A.G. "Effects of Forest and Forest Industry on Employment in Rural Areas," Proceedings 8th World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 239-252.

The paper gives the results of a study using multi-linear regressions to relate total population and total employment, in each area that was considered, to employment in the forestry and wood products, agriculture, fishing and mining industries. The results indicate an employment multiplier between 3 and 5 in magnitude. Previous researchers had derived employment multipliers of magnitude 2. The author concludes that for each person employed in the forestry industry, employment for about four other persons is generated.

** Author(s): Indonesia, Departemen Kehutanan.

* Keyword(s): transmigration, resettlement projects, employment

Indonesia, Departemen Kehutanan. "Contribution to the Realization of the Transmigration Projects," Jakarta, Dept. of Forestry, Republic of Indonesia, 1966, p. 15.

A study of the manner in which forestry and related industries could contribute in facilitating transmigration and resettlement of families from Java. Forestry's contribution in terms of building materials for the settlers and for providing employment is analysed. It is estimated that forestry projects in the resettlement areas could generate employment for 24000 families (consisting of 120000 persons) or, on the average, 2400 families a year over a 10 year period.

* Countries: Indonesia

** Author(s): Indonesia, Departemen Kehutanan

* Keyword(s): transmigration, resettlement projects

Indonesia, Departemen Kehutanan. "Forest Projects In Connection With Transmigration Problems," Jakarta, Dept. of Forestry, Republic of Indonesia, 1966.

A study carried out to assess the potential of forestry and forest based industry to enable migration of laborers in order to reduce the population of Java. Potential for transmigration and employment of labor in the seven regions considered ranges from 4000 heads of labor families in four of the proposed resettlement areas to 500 in three others.

* Countries: Indonesia

** Author(s): Ismail Bin Haji Ali, Haji.

* Keyword(s): development, history, future, role, socioeconomics

Ismail Bin Haji Ali, Haji. "Forestry In National Development," The Malaysian Forester, Vol. 35, No. 3, 1972, pp. 145-148.

Traces the history of forestry in Malaysia in the context of national development. The future of forestry and forest industries and the role they will play in the socioeconomic development of the country is discussed. Potential for establishing diversified wood-based industries is examined. The primary timber industries provide employment for 29000 people. Additional employment for 100000 people, mostly in the rural areas, is envisaged to meet the increased needs for forest products in the future.

* Countries: Malaysia

** Author(s): Johansson, P.O. and Lofgren, K.G.

* Keyword(s): perfect/imperfect markets, unemployment,
income generation

Johansson, P.O. and Lofgren, K.G. "The Economics
of Forestry and Natural Resources," Oxford
Oxfordshire New York, NY, USA, Basil Blackwell,
1985, p. 292.

A book dealing with the economics of forestry and
natural resources. Touches upon income generation
by forestry under various circumstances such as
perfect and imperfect market conditions. Analyses
the socially optimal cutting rules in unemployment
situations. No quantitative data.

** Author(s): Johnston, D.R., Grayson, A.J. and
Bradley, R.T.

* Keyword(s): policy, labor, planning, employment

Johnston, D.R., Grayson, A.J. and Bradley, R.T.
"Forest Planning," Faber & Faber Ltd., London,
1967, p. 529.

A book which deals broadly with forestry policy, planning, implementation and data collection. One chapter (# 28) is concerned with 'labor planning' and deals with such aspects as changing labor productivity through time (page 444) ; the means of calculating 'adjustments to broad predictions of labor needs' (page 445) and 'other factors governing the employment of labor'.

** Author(s): Jolly, M.S., Sen, S.K. and Das, M.G.

* Keyword(s): sericulture, economics, employment,
Income

Jolly, M.S., Sen, S.K. and Das, M.G. "Silk From
the Forest," *Unasyiva*, Vol. 28, No. 114, 1976, pp.
20-23.

The authors describe the Indian wild sericulture traditionally practiced and the way it is being made more economic through management and hybridisation of moths. The employment of forest dwellers and the income generated from the industry is also described. Its potential as a source of income and employment in developing countries is stressed. The authors assess the potential for employment in the temperate zone of India through sericulture to be nearly one million.

* Countries: India

** Author(s): Jones, P.H. and Darsidi, A.

* Keyword(s): Impact analysis, employment

Jones, P.H. and Darsidi, A. "Forestry in East Indonesia," Jakarta, Republic of Indonesia, Ministry of Public Works and Electric Power, Directorate General of Housing, Building, Planning and Urban Development, Directorate of City and Regional Planning, 1976, p. 103.

A study of the existing forestry situation and employment opportunities in each of 9 subregions in East Indonesia. The study includes an impact analysis of each subregion covering employment effects. By 1984 the total employment generated by proposed projects was estimated at 1,200, 1000, and 700 persons in the North Maluku, Central Maluku and South East Maluku subregions respectively.

* Countries: Indonesia

** Author(s): Khattak, G.M.

* Keyword(s): feasibility, socioeconomic, employment,
Income

Khattak, G.M. "The Feasibility of Forestry and Forest Industries in Hazara Division (Pakistan) - A Socioeconomic Study," Islamabad, Pakistan; Pakistan Academy of Sciences, 1982, p. 96.

A watershed management project motivated farmers to plant trees on their uncultivated land and this study examines the benefits of establishing an industry based on this afforestation. The report uses the findings of a number of specially commissioned socioeconomic and technical studies to make recommendations for starting industrial plantations and establishing wood industries in the area. It examines the financial returns on different rotations and the benefits to the employment and income of the local people.

* Countries: Pakistan

** Author(s): Khattak, G.M. and Anjad, M.

* Keyword(s): socioeconomic, manpower, afforestation, employment, harvesting

Khattak, G.M. and Anjad, M. "A Survey of Socioeconomic Conditions of Manpower Engaged in Forestry and Wood-Based Industries in Pakistan," Peshawar, Pakistan; Pakistan Forest Institute, 1981.

A small part of the report covers, in considerable detail, forest labor employed in afforestation, regeneration, and harvesting of timber and minor forest products. Contains tabular data on employment.

* Countries: Pakistan

** Author(s): Koehler, K.G.

* Keyword(s): processing, foreign investment,
employment, feasibility

Koehler, K.G. "Wood Processing In East Kalimantan:
A Case Study of Industrialization and Foreign
Investment in Indonesia," Bulletin of Indonesian
Economic Studies, No. 3, 1972, pp. 93-130.

A brief description is given of employment and
processing in forest industries of East Kalimantan
(Borneo) with special reference to sawmilling,
veneer and plywood and pulp and paper manufacture.
The impact of heavy foreign investment and timber
concessions, which characterize the industry, are
considered. Selected feasibility components of
wood industries are considered. The need for rapid
industrialization and, at the same time, the
minimization of social costs is emphasized.

* Countries: Indonesia

** Author(s): Kromm, D.E.

* Keyword(s): regional development, income, employment, multipliers

Kromm, D.E. "Limitations on the Role of Forestry in Regional Economic Development," Journal of Forestry, Vol. 70, No. 10, Oct. 1972, pp. 630-633.

A sizable forest resource managed for continuous yield is considered a stable and rewarding generator of local economic benefits. The author makes a qualitative analysis of the role of forestry in development in terms of income and employment multipliers. The regional economy in Northern Michigan is taken as an example. The conclusion reached is that the advantages of forestry in regional development are severely limited. No quantitative data.

* Countries: U.S.A.

** Author(s): Lauly, K.S. and Purushotham, A.

* Keyword(s): manpower, expansion, education,
research, productivity

Lauly, K.S. and Purushotham, A. "Total Manpower Needs for Expansion of Wood-based Industries Including Research and Education and Development Thereof," Indian Journal of Forestry, Vol. 3, No. 3, 1980, pp. 189-203.

The paper ascribes depletion and decreasing productivity in the forest sector to lack of appreciation of its importance and recommends introduction of appropriate educational schemes. Also analyses the state of forest and wood-based industries and makes recommendations for their improvement. The paper gives a detailed breakup of manpower employed under various categories in the wood processing industry in India (p.196). The manpower employed in wood and woodbased products is estimated at 26,37,803 persons.

* Countries: India

* Author(s): Marbail, D.A.

* Keyword(s): employment, multiplier, food for work
social

Marbail, D.A. "New Dimensions of Social Forestry In Forest Development Corporation Areas With Special Reference to Nasik Project Division," The Indian Forester, Vol. 109, No. 8, Aug. 1983, pp. 531-540.

Work by the Forest Development Corporation has increased employment substantially. The various schemes have increased employment by 42500 man days. This has given rise to secondary multiplier effects in transportation and tertiary effects in wood based industries. The effects of a "Food for Work" program are discussed. The article reviews various aspects of social forestry undertaken by the Forest Development Corporation and suggests further possibilities for improving the lot of the forest inhabitants.

* Countries: India

** Author(s): McKillop, W.

* Keyword(s): prices, expenditures, employment, income, multipliers, distribution, impact

McKillop, W. "Economic Costs of Withdrawing Timber and Timberland from Commercial Production," Journal of Forestry, Vol. 76, July 1978, pp. 414-417.

This paper discusses the costs of moving timberland from commercial production in the U.S.A. First, criteria for measuring impacts are developed. The criteria can be divided into those at the national, state, and local levels. These criteria include: 1) effects on prices, 2) consumer expenditures, 3) government revenues, 4) regional employment, 5) distribution impacts. Measurement of change in harvest requires careful consideration of substitution of sources. Change in regional employment and income requires the use of multipliers. Input-output is ideal, but export base is less expensive. Econometrically, base multipliers are also possible. The effect on government revenue must consider change in sales and loss of property assessment. Price changes depend on changes in imports and exports. A 50% reduction in national forest timber is estimated to cause a direct loss of 27000 jobs, a price decrease of 20% to 30% and a loss in balance of payments of \$200 to \$250 million per year. The paper uses an employment multiplier of 2 for redwood in Humboldt County.

* Countries: U.S.A.

** Author(s): Misra, S.N.

* Keyword(s): plantations, employment, government

Misra, S.N. "Introduction of Eucalyptus in the Lateritic Tract and its Impact on the Economy," Proceedings of Symposia Arranged in Connection with West Bengal Forest Centenary, 1964 Calcutta, Dept. of Forests, Govt. of West Bengal, 1966, p. 349.

Analyses the potential for growing eucalyptus in the lateritic tracts of eastern India and considers the ancillary industries that could be generated. Also touches on the potential for employment for the local landless that could be generated during lean periods of the year when demand for labor in agriculture is less. This will save the government a considerable amount of money that it spends on relief every year during such periods. Estimates indicate employment generation for 1100 laborers per day for raising 2000 acres of eucalyptus. About 65% of the formation cost of plantations is spent on employment of local labor.

* Countries: India

** Author(s): Nadeau, J.P.

* Keyword(s): employment, assessment, GNP, investment

Nadeau, J.P. "The Contribution of Forestry to the Regional and National Economies," Montreal, Service de la recherche (Terres et forêts), Ministère de l'énergie et des ressources, 1981, p. 32.

This paper reviews some quantitative methods for evaluating the contribution of forestry to social and economic development and analyses some applications of these methods in Quebec. The estimates indicate that an investment of one billion dollars would create 23000 additional jobs directly and indirectly, and would generate an additional one billion dollars of added value to GNP.

* Countries: Canada

** Author(s): Nilsson, Sten.

* Keyword(s): employment, policy, multiplier, goals, research, fuel

Nilsson, Sten. "Forestry for Employment Promotion - Aspects of Research Needs and Priorities," Proceedings of the Eighth World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 35-53.

Overview research paper, which tries to identify obstacles to forestry for employment promotion and the need for research to overcome them. The analysis indicates that analytic instruments for assessing different development policies, communication between forestry researchers and politicians, joint action between forestry and agriculture, research regarding the multiplier effect of forestry etc. are lacking. As a result, the employment potential in forestry is largely untapped. Various research needs of the forestry sector are identified. Forest energy is considered one of the best ways of creating employment in forestry and several authors are quoted to the effect that 100000 hectares of tropical forest can provide fuelwood equivalent to 4.2 million tons of coal and jobs for 42,500 persons. If fuelwood is converted to coal, then 75000 more can be employed.

- ** Author(s): Northern Ireland Forest Service.
- * Keyword(s): employment, mechanization, afforestation, policy

Northern Ireland Forest Service. "The Significance of Forestry as a Source of Employment in Rural Areas in Northern Ireland," Proceedings 8th World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 257-263.

This paper describes the government program of afforestation undertaken mainly to create employment opportunities. The scheme created opportunities ranging from 1,650 permanent industrial positions in 1959 to 1,406 jobs in 1971. Till 1960, the emphasis was on creating job opportunities and mechanization and labor saving devices were discouraged. Since then, to increase efficiency, mechanization has been introduced with a consequent reduction in employment. To relieve unemployment, a Rural Improvement Campaign was introduced to carry out various improvement schemes including road work, tree planting and improvement of facilities. This scheme has created employment for 896 persons out of 1,406 in state forestry as of October, 1977.

- * Countries: Ireland

** Author(s): Pardo, R.D.

* Keyword(s): logging, contracts, afforestation

Pardo, R.D. "Logging and People: The Social Dimension of Forest Utilization Agreements," *Unasyiva*, Vol. 37, No. 147, 1985, pp. 36-43.

Discusses factors to be considered if forest harvesting policy is to enhance lives of the rural population. Commends the forest village concept as stabilizing populations and providing off farm afforestation work. Also discusses employment stipulations in concessions and their implications for local employment in forest enterprises. The case is made that sustaining the people who depend on forests cannot be separated from sustaining the forest resource itself. No quantitative data.

** Author(s): Pertti, E.

* Keyword(s): employment, mechanization

Pertti, E. "The Significance of Forestry as a Source of Employment in Rural Areas of Finland," Proceedings 8th World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 285-299.

The paper analyses the growth and decline of forestry as a source of rural employment in Finland where approximately 70% of the land is under forest. The analysis indicates that the relative employment effect of forestry was about 8% in the 19th century, and grew during the 20th century to a peak of about 20% in the 1950's. This was followed by a period of mechanization which, the author concludes, reduced the labor input in forestry so that the relative employment effect of forestry diminished from 20% in 1955 to approximately 6% in 1975. Thus, mechanization of forestry has led to reduction of forestry's potential as an employer in rural areas and this has led to a depressing effect on the conditions in rural areas as a whole.

* Countries: Finland

** Author(s): Priasukmana, S.

* Keyword(s): logging, employment, transportation,
marketing

Priasukmana, S. "Logging Operations as a Source of Employment in Rural Areas," Proceedings 8th World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 345-352.

Analyses the job opportunities created due to the mechanical logging operations carried out in Indonesian forestry. The analysis indicates that 0.921 man days of manpower or 0.584 man days of workers per cubic meter log production was required. This requirement consisted of logging planning (5%), road building (7%), logging extraction (35%), transportation (17%), marketing (9%), and general services (27%).

* Countries: Indonesia

** Author(s): Pringle, S.L.

* Keyword(s): development, employment, income

Pringle, S.L. "Tropical Moist Forests in World Demand, Supply and Trade," *Unasyiva*, Vol. 28, No. 112-113, 1976, pp. 106-118.

Discusses how the potential for supplying wood outputs may best be employed to contribute toward achieving development objectives. The role of wood outputs in contributing towards income and employment is described. The contribution of forest products exports to per capita income is assessed at \$482 in Sabah, \$279 in Gabon, \$69 in the Ivory Coast, \$9 in Ghana, \$5 in Indonesia and \$2 in Brazil.

* Countries: Sabah, Gabon, Ivory Coast, Ghana, Indonesia, Brazil

** Author(s): Ramdial, B.S. and Chapman, I.

* Keyword(s): socioeconomic, employment, policy

Ramdial, B.S. and Chapman, I. "Trinidad and Tobago - Forestry Sector Report (Brief Overview)", in *Financiamiento del Desarrollo Forestal en America Latina*, 1982, p. 8.

Gives a short sketch of the contribution of forestry to socioeconomic development of the Islands. Outlines government forest policy and briefly reviews forest management, industries and current and future projects. The direct and indirect contribution to employment by forestry is assessed and a breakdown given.

* Countries: Trinidad and Tobago

** Author(s): Ranganathan, S.

* Keyword(s): employment, potential, agro-forestry

Ranganathan, S. "Agro-Forestry: Employment for Millions," India, Bombay Tata Press, 1979, p. 34.

Booklet which makes a case for more agro-forestry in India so that its direct and indirect effects may generate employment. Ranganathan estimates that the annual loss due to denudation of forests, if quantified over 20 years, would amount to Rs. 300,000 million. His analysis indicates that a 100 hectare forest farm can employ 50 persons, produce output worth Rs. 300,000 and earn profits of Rs. 150,000 per year. The national potential in India for increases in GNP and creating added employment through agro-forestry and multiple land use is estimated to be Rs. 10000 crores and 20 million people respectively.

* Countries: India

** Author(s): Rao, Y.S. and Chandrasekharan, C.

* Keyword(s): development, FAO, training, policy, fuel, education, research

Rao, Y.S. and Chandrasekharan, C. "The State of Forestry in Asia and the Pacific," *Unasyiva*, Vol. 35, No. 140, 1983, pp. 11-21.

The article summarizes the state of forestry in Asia and the Pacific on the basis of discussions at conferences arranged by FAO. The role of forestry in rural development particularly by "maintaining ecological balance, increasing the supply of products and in generating employment and income, especially for the landless" is discussed and its effectiveness in implementation in these regions is analyzed. The role played by FAO in encouraging social forestry is described. The role of forestry education, training and research priorities should be "geared to the eradication of poverty on the basis of a greater access of the rural poor to goods, services and opportunities generated by economic growth and to promoting self reliance and equitable participation of the rural people in forestry and forest-based activities". With this aim policy areas for governments are suggested. Income and employment potentials are not estimated but numbers of people relying on forests for fuelwood and the numbers in fuelwood deficit areas are estimated.

* Countries: China, Japan, Korea, Nepal, India, Bangladesh, Indonesia, Burma, Papua New Guinea

** Author(s): Ray, P.K.

* Keyword(s): economic impact, employment, skilled, seeds, unskilled, social, nursery, conservation

Ray, P.K. "The Impact of Forestry and Soil Conservation Works on the Rural Economy of Laterite Region of the Western District of West Bengal," Proceedings of Symposia Arranged in Connection with West Bengal Forest Centenary, 1964, Calcutta, Dept. of Forests, Govt. of West Bengal, 1966, p. 349.

A paper which describes, in general terms, the economic and social impacts of forestry and conservation, especially the employment generated for skilled and unskilled labor and also employment of women and children in seed collection and nursery work. No quantitative data.

* Countries: India

** Author(s): Robbins, S.R.J. and Matthews, W.S.A.

* Keyword(s): minor products, potential, income,
foreign exchange

Robbins, S.R.J. and Matthews, W.S.A. "Minor Forest Products," *Unasyiva*, Vol. 106, 1974, pp. 7-14.

The authors survey minor forest products and their potential for income generation and foreign exchange earnings. Many minor forest products such as turpentine from pines, perfumery oil, etc., are covered.

* Countries: India, Mauritius, Singapore, Brazil, Paraguay, Peru, Indonesia, Honduras

** Author(s): Roche, L. and Cooper, R.

* Keyword(s): development, production, manpower,
training, education

Roche, L. and Cooper, R. "Forestry for Local
Community Development : Manpower, Training and
Education Requirements," Commonwealth Forestry
Review, Vol. 59, No. 2, 1980, pp. 163-179.

A part of the paper makes an assessment of the
requirements of manpower, training and education,
projected to the year 2000 in different aspects of
forestry. A detailed tabular breakup of the
present and future requirements under categories
such as production forestry, forestry, and
Industrial wood supply is given for seven
northeast and east African countries - Ethiopia,
Kenya, Malawi, Somalia, Sudan, Tanzania, and
Zambia. On the basis of these projected
requirements, a strategy for training and
educating the required personnel is suggested.

* Countries: Ethiopia, Kenya, Malawi, Somalia,
Sudan, Tanzania, Zambia

** Author(s): Saldhana, C.J.

* Keyword(s): habitat, silviculture, displacement
policy

Saldhana, C.J. "Forests in the New Forest Policy,"
Center for Taxonomic Studies, Bangalore, India,
Social Action, Vol. 33, No. 2, 1983, pp. 184-193.

The paper looks at the damage to forests as well as the hardship of forest dwellers and suggests that intensive as well as extensive silviculture needs to be practiced to ameliorate the situation. Abuse of the privileges of forest dwellers has caused considerable damage, while on the other hand, eviction of these forest-dependents from their traditional habitat has led to extensive displacement and oppression. It is suggested that positive efforts to create an atmosphere where it becomes worthwhile to plant and preserve rather than to cut and sell should form the beginning of a "new forest policy".

* Countries: India

** Author(s): Sarkar, N.

* Keyword(s): afforestation, soil conservation, employment, impacts

Sarkar, N. "Note on the Impact of Forestry and Soil Conservation Works on the Rural Economy of Birbhum District and the Scope of Future Development," Proceedings of Symposia Arranged in Connection with West Bengal Forest Centenary, 1964, Calcutta, Dept. of Forests, Govt. of West Bengal, 1966, p. 349.

The article describes the benefits derived from afforestation plantation and soil conservation on a district in eastern India. The economic impacts in the form of employment provided during the slack season to agricultural laborers is estimated at 1.9 million man days in 1954. Families are estimated to benefit to the extent of Rs. 90.00 per annum. Employment in felling, extraction and transport operations is estimated to generate 46,970 man days/ year during the period 1961-1965.

* Countries: India

** Author(s): Sartorius, P. and Henle, H.

* Keyword(s): employment, linkages, development, policy, impact, manpower

Sartorius P. and Henle, H. "Forestry and Economic Development," Fredrick A. Praeger, N.Y., 1968, p. 340.

A text which attempts to explain the role of forestry in rural economic and social affairs and to summarize its impact on world wide development efforts. Shows some of the consequences that modern sustained-yield forestry may have upon the social environment. Areas discussed include 'Productivity of Labor' (p. 143) 'Forestry as a Source of Employment' (p. 159), 'Forestry's Backward and Forward Linkages with Developing Economies' (p. 197). Also included is a chapter titled 'Toward a Dynamic Manpower Policy in Forestry' which discusses manpower trends in advanced and in developing countries, and also a chapter on 'Forest Policy as a Solution to Unemployment' (p. 278) and, in this context, describes the experiences of China and North Africa.

** Author(s): Schmithusen, Franz.

* Keyword(s): human resources, development, training, policy, facilities

Schmithusen, Franz. "Human Resources Formation: The Weak Link In Forestry Development," Unasyiva, Vol. 35, No. 142, 1983, pp. 36-43.

The lack of trained personnel and educational facilities is, in many countries, still one of the principal impediments to forestry and forest industries development. The article analyses the effects of such a shortage of personnel and suggests changes in policy and training for more effective forestry and rural development. Personnel requirements for forestry management are analyzed in different areas of the world.

* Countries: Indonesia, Brazil, Chile, Columbia, Mexico, Peru, Asia, Far East, S. America

** Author(s): Schonau, A.P.G.

* Keyword(s): wattle, employment, silviculture,
mechanization, labor

Schonau, A.P.G. "Labor Requirements and Employment
In Silvicultural Operations In the Wattle
Industry," Suid-Afrikaanse Bosboutydskrif, Nr.
110, Sept. 1979, pp. 20-26.

The paper discusses the labor requirements of silvicultural operations in the wattle industry in South Africa, the relative importance of silviculture for employment, and prospects for employment in the future. Three methods of regeneration of wattle - seedlings, line sowings, and regrowth - are compared and details of labor requirements and costs are analysed. The conclusion reached is that, with improvements in methods and increased mechanization, the labor requirements to establish one hectare of wattle by the seedling method could be reduced from 77 man days to 41 man days. This was in contrast to the present average requirement, with all three methods of regeneration being practised, of 139 man days per hectare. The employment in 1979, in the wattle industry was about 20000 to 26000. If increased profitability could be ensured, by reduced man day requirements per hectare, and an afforestation policy implemented, an estimated total of 70000 workers could be employed in the forestry operations of the wattle industry.

* Countries: South Africa

** Author(s): Segerstrom, Gunnar.

* Keyword(s): employment, management, processing,
plantation, pulpwood

Segerstrom, Gunnar. "Creating Work and Caring
About Workers In Tropical Forestry," Unasyiva,
Vol. 28, No. 114, 1976, pp. 2-9.

The potential for employment in forestry in Asia and the Far East is assessed at 4.8 million full time workers if 100 million of the region's 518 million hectares of operable forest is converted to well managed forest. Such forests, in their productive stage, can provide continuous employment for 4.4 million full time workers. Wood processing could employ an additional 20 million. In all, as much as 200 million could benefit. A breakdown of the man day requirements for clear cutting tropical forests and establishing a plantation are given. Labor requirements for logging and supply of raw material to a large pulp mill is estimated at 2000 man years.

* Countries: Asia and Far East

** Author(s): Seneviratne, E.W.

* Keyword(s): training, manpower, development,
afforestation, education

Seneviratne, E.W. "An Appraisal of Trained Manpower Requirements for Forestry Development in Sri Lanka," *The Sri Lanka Forester*, Vol. 15, Nos. 1 & 2, 1981, pp. 12-16.

A brief study of the present and future requirement of trained manpower for forestry development in Sri Lanka and the educational requirements necessary for providing the manpower. The assessment is made on the basis of the annual afforestation programmes and concludes that a total of 2745 personnel of various categories would be required as against the present strength of 453.

* Countries: Sri Lanka

** Author(s): Seth, V.K.

* Keyword(s): employment, development corporations,
jobs, investment, wealth

Seth, V.K. "The Role of Forest Development Corporations in Generating Employment in Rural Areas - Case Study of Madhya Pradesh State Forest Development Corporation," Proceedings of the Eighth World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 213-225.

This paper examines the role of Forest Development Corporations (with specific reference to the Madhya Pradesh State Forest Development Corporation) in creating gainful employment and wealth. It is estimated that 25 million jobs could be created in the forestry sector in India through massive inputs and intensive forestry operations, with 50 million man-days of employment generated through FDC's. The labor component of forestry operations would be 70% of the annual cost. The investment required for the creation of such jobs would be a fraction of that required in a capital intensive industry.

* Countries: India

** Author(s): Sharma, S.N., Nath, P. and Gupta, P.G.

* Keyword(s): small-scale, semi-processed, investment, personnel, employment

Sharma, S.N., Nath, P. and Gupta, P.G. "Some Small-Scale Industries Based on Timbers of the Himalayan Region of Uttar Pradesh," Indian Forester, Vol. 104, No. 6, 1978, pp. 421-430.

This paper describes some industries which manufacture semi-processed wood products which may be established near the wood source, specifically in the Himalayan region but is of general applicability elsewhere. The investment needed to start these industries and the manufacturing processes are briefly described. Lack of skilled personnel poses a problem in setting up suitable industries. The employment potential of each industry is given and ranges from 16 to 35 depending on the nature of the industry.

* Countries: India

** Author(s): Slaguru, P. and Wigston, D.L.

* Keyword(s): manpower assessment, Industry, policy, workforce

Slaguru, P. and Wigston, D.L. "National Manpower Assessment and the Needs of the Forest Industry in Papua New Guinea," *Klink!!*, Vol. 3, No. 1, 1985, pp. 89-102.

Critically analyses the results of a government manpower assessment in the forest industry and, in the process, reveals some of the difficulties entailed in such a study. The progress and prospects of the government's program to replace expatriates in the workforce with local personnel is also discussed.

* Countries: Papua New Guinea

** Author(s): Singh, Y. and Purushotham, A.

* Keyword(s): development, employment, impact, conservation

Singh, Y. and Purushotham, A. "Development of Forests of the Western Ghats," Journal Timber Development Assoc. (India), Vol. 30, No. 4, Oct. 1984.

The forest resources of the Western Ghats, forming the coastal region of the West Coast of India are discussed in terms of resource development, and utilization, the effect of technical developments in wood processing on forest conservation, and the impact of development of the Western Ghats on employment opportunities for local people.

* Countries: India

** Author(s): Snider, G.B. and Ayer, H.W.

* Keyword(s): employment, multipliers, input-output, income, policy, distribution

Snider, G.B. and Ayer, H.W. "Determining local Employment, Distribution, and Tax Revenue Effects of Changes in Forest and Range Policies," Journal of Forestry, Vol. 80, NO. 4, April 1982, pp. 226-229.

This paper describes a method of measuring the changes in forest and range policy which was tried out in Arizona. It considers a 10% reduction in timber cut, a 20% reduction in grazing, and a 10% increase in tourism. Impacts are measured in terms of employment, income distribution, and tax revenues. The method uses from-to models and employment elasticities (by skill level). Since elasticities are economy wide, changes in employment (of given skill) effect changes in sales of lumber, tourism and beef. The elasticities are dependent on the relative sizes of these sectors. Therefore, they are not generalizable. Tax revenue effects are determined on a somewhat more ad hoc basis. Employment multipliers are not explicit, but rather implicitly incorporated in the elasticities. The study concludes that the policies will largely offset each other leaving a very minor overall effect.

* Countries: U.S.A.

** Author(s): Stumbo, D.A.

* Keyword(s): Industries, community development,
linear programming

Stumbo, D.A. "Choosing Forest Products Industries for Community Development Planning," Forest Products Journal, Vol. 29, No. 7, July 1979, pp. 16-27.

This study outlines the linear programming approach as adapted for community industrial development planning of forest-based industries and gives the results of a pilot test of the approach on Appomattox County, Virginia. Three potential community goals (community income, employment, and profit to private industry) were set as objective functions and optimised independently to obtain the optimum mix of industry for the community. In addition, the trade-off of each objective function with the others was examined to determine the cost in terms of one goal if another was considered. Results indicate this procedure can be a major contribution to preliminary planning of forest products industry development.

* Countries: U.S.A.

** Author(s): Sumitro, Achmad.

* Keyword(s): employment, management, investment, processing, harvesting, multipliers, income

Sumitro, Achmad. "The Significance of Forestry as a Source of Employment in Rural Areas," Proceedings of the Eighth World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 117-142.

Position paper submitted to the Seventh Technical Session. Reviews employment potentials in forestry through man-days required in all its activities taking into consideration the different employment policies, alternative land uses, forest management, degree of capital investment, extent of wood processing and its rural oriented nature. Employment ranges from 0.8 to 25.0 man-days per hectare per year. The former figure involves indigenous forests while the latter concerns plantations. Aspects of forest employment covered include employment in forest establishments, in road construction, in forest harvesting and in forest products processing. Income and employment multipliers are discussed.

* Countries: Ghana, Malaysia, India, Nigeria, Philippines, Thailand, Argentina

** Author(s): Synnott, T.J. and Kemp, R.H.

* Keyword(s): regeneration, finance, employment,
Income, silviculture

Synnott, T.J. and Kemp, R.H. "Choosing the Best
Silviculture System," *Unasyiva*, Vol. 28, No.
112-113, 1976, pp. 74-79.

The merits of natural regeneration, enrichment
planting, conversion and agri-silviculture in
tropical forestry are relative and depend upon
factors ranging from the ecology to the economy.
Choice of regeneration method can be linked to
objectives sought to be attained. Thus, wherever
provision of employment in rural areas is an
important social objective, the techniques applied
in regeneration can be chosen to be labor
intensive. No quantitative data.

* Countries: Philippines, Ghana, Trinidad,
Malaysia

** Author(s): Tewari, D.N.

* Keyword(s): development, tribals, environment, fuel, afforestation, conservation

Tewari, D.N. "Development Strategy for Forests, Tribals and Environment," *The Indian Forester*, Vol. 109, No. 11, Nov. 1983, pp. 795-803.

Forests and wasteland cover a third of the geographical area of India. About 15% of the country's population depend on these resources for their livelihood. This article suggests ways and means by which forests could play a dominant role in rural development and improvement of the plight of the poor by meeting their basic needs of fuel, fodder, food, fiber and building materials. It is estimated that 30 million people could be gainfully employed in afforestation, soil and water conservation, agroforestry and development of pastureland.

* Countries: India

** Author(s): Tolt, C.W.H. du.

* Keyword(s): employment, labor force

Tolt, C.W.H. du. "The Present Labor Force in the Forestry Industry and Ten Years Hence," South African Forestry Journal, Vol. 110, Sept. 1979, pp. 67-69.

The paper analyses employment potentials in the forestry industry during the 1980's. The suggested policy is one of reducing the labor force to a minimum and it is estimated that it would be possible, by 1990, to reduce the work force by 20%-25% from the current (1979) strength of 152228 employees.

* Countries: South Africa

** Author(s): Tomar, M.S. and Joshi, S.C.

* Keyword(s): fuel, afforestation, employment,
planning, deficit, plantation

Tomar, M.S. and Joshi, S.C. "Madhya Pradesh Forests and People's Needs: A Situation by 2000 A.D.," Indian Forester, Vol. 104, No. 10, 1978, pp. 661-675.

A study of the possible requirement of fuelwood, timber and fodder by the local population in the state of Madhya Pradesh in India by the year 2000 and how forestry can be geared to meet this demand. The authors make an estimate of the potential annual availability of fuelwood and timber, the deficit in these respects by 2000 A.D. and the extent of additional plantation required to alleviate this deficit. The analysis reveals a projected deficit of 7995 million cubic meters by 2000 A.D., and recommends a planning strategy that will work towards an annual fuelwood plantation target of 85400 hectares. A result of such acreage would be provision of employment of 18 million man days in the state, accounting for 6000 persons of the rural labor force.

* Countries: India

** Author(s): Toshitaka, U.

* Keyword(s): employment, private, government,
Impacts, social

Toshitaka, U. "Forestry and Mountain Village
Communities In Japan." Tokyo, Kokusai Bunka
Shinkokai (Japan Cultural Society), 1968, p. 107.

Describes the development of government and
private ownership of forests in Japan and their
Impacts on the social and economic structure of
the region including employment. No quantitative
data is given.

* Countries: Japan

** Author(s): UNIDO.

* Keyword(s): wood, processing, balance of payment, manpower, employment, development

UNIDO. "First World-Wide Study of the Wood and Wood-Processing Industries," Sectoral Studies Series No. 2, Sectoral Studies Branch, Division for Industrial Studies, Unido/IS. 398, August 3, 1983, p. 187.

A report on the wood and wood processing sector of the world. Provides a comprehensive coverage of the different countries of the world. Also deals briefly with the manpower requirements of the wood processing industry in developing countries (p. 83) and assesses its employment potential (p. 135). The advantages of resource based industrialization such as increase in value added and economic development, increased resource utilization, employment creation and increasing skill levels and on the balance of payment effect and distribution effect are described.

** Author(s): Varmah, J.C.

* Keyword(s): employment, direct, secondary, manpower

Varmah, J.C. "Forestry for Employment Promotion in India," Proceedings 8th World Forestry Congress, Jakarta, Vol. 4, 1978, pp. 311-329.

Gives a detailed breakdown of manpower requirements for various forestry operations. Describes and estimates employment opportunities under the categories 'direct', 'self', and 'secondary' employment based on forest industries. Concludes that forestry can generate 626 million man (mm) days in direct employment, 3537 mm days under self employment and 448 mm days of secondary employment.

* Countries: India

** Author(s): Westoby, J.C.

* Keyword(s): employment, rural economy, development
diversification

Westoby, J.C. "World Forest Development - Markets,
Men and Methods," Univ. of British Columbia,
Vancouver, Canada, 1965, p. 16.

A lecture delivered at the University of British Columbia that touches upon the significance of forestry in that it reaches back into the rural economy and also 'penetrates into many branches of the industrial sector'. Describes reasons why forests and forest industry have a claim to high priority in the development plans of many developing countries. These include the 'relief of under development and unemployment in the countryside and in general diversifying the rural economy'.

** Author(s): World Forestry Congress.

* Keyword(s): employment, development, safety,
health, women, training, labor

"Forestry for Employment Promotion," Proceedings
of the Eighth World Forestry Congress, Jakarta,
Vol. 4, 1978.

Contains proceedings of discussions held at the congress regarding forestry as an instrument for promotion of employment. Includes papers submitted to the congress on this aspect of forestry and covering areas such as the role of forestry in rural development, forestry and employment promotion in Northern Ireland, India, U.S.A., etc. Also covered are health and safety aspects of forestry and various aspects of women in forestry. The theme of the congress was "Forests for People" and the theme of all discussions is how to harness the potential of forestry as a provider of employment. Other aspects of forestry work (such as a source of exploitation of labor) and the role of ergonomics and training in forestry are also considered.

* Countries: Worldwide coverage

DESCRIPTION OF LITERATURE SURVEYED

The resources and facilities utilized in preparing the bibliography are summarized below:

LIBRARY RESOURCES

The services of the Virginia Tech library and the Library of Congress were utilized.

DATABASES

Two databases pertaining to forestry and economics were tapped for information regarding articles appropriate for the bibliography. These were:

CA3 Abstracts Database (Commonwealth Agricultural Bureaux)

Agricola Database

Information was obtained from these databases under the major heads of forests/forestry/silviculture/economic development/economics using one or more combinations of the subheads - labor/manpower/income/employment/multiplier/impact.

Articles obtained by the sponsors through the SOUTHFORNET interlibrary system and sent to us were also utilized in compiling the bibliography.

JOURNALS

A number of journals were examined in preparing the annotated bibliography. The journals were, in the main, for the period 1970 to 1986, as available. Besides these, sundry issues of other journals were examined on the basis of leads from bibliographies of articles. A list of the major journals studied follows:

American Forests
Australian Forestry
Commonwealth Forestry Review
Forest Farmer
Forest Notes
Forest Science
Forestry Chronicle
Forests and People
Indian Forester
Irish Forestry
Journal of Forestry
Malaysian Forester
New Zealand Journal of Forest Science
Nigerian Journal of Forestry (1971-1973)
Pakistan Journal of Forestry

Institute Papers, Oxford University, Imperial Forestry Institute
Quarterly Journal of Forestry
Scottish Forestry
Silva Fennica
Forestry (The Journal of the Society of Foresters of Great
Britain)
South African Forestry Journal
Unasyiva
Information Reports of Canada Forest Management Institute
Canadian Forestry Service Publications
Canadian Journal of Forestry Research
Indian Journal of Forestry
Australian Forest Research
International Labor Review
Journal of Agricultural Economics
Journal of Development Economics
Journal of Developing Areas
Journal of Development Studies
Institute of Development Studies (Bulletins)

In addition, the following literature sources were used in finding articles suitable for the bibliography:

Commonwealth Forestry Review
Journal of Economic Literature

Proceedings from the undernoted meetings, and papers presented thereat, were another source of articles for the bibliography:

International Union of Forest Research Organizations (IUFRO),
Referral Papers, 1967.
IUFRO World Congresses held in 1967, 1976, and 1981.
World Forestry Congresses (7th and 8th)

Several articles which, from their titles, seem suitable for inclusion in such an annotated index could not be followed up because they were in languages other than English. A short list of such articles is given below as an example.

Tanton, B. and Frances, R. "The Forest of Algoual as an Example of the Importance of Forestry to Employment in Rural Areas," Proceedings of the 8th World Forestry Congress, Jakarta, 1978, Language: French.

Frisk, T. "Labor Intensive Forestry Operations in Developing Countries," Proceedings of the 8th World Forestry Congress, Jakarta, 1978, Language: Spanish.

Neves, A.R., Ladeira, H.P., et al. "Socioeconomic Evaluation of a Reforestation Programme in the Region of Carbonita, Vale do Jequitinhonha, Minas Gerais," Dep. Eng. Flor., Univ. Fed. Vicosa, 36.750 Vicosa, Minas Gerais, Language: Portuguese.

Tersch, F. "Forestry From the Point of View of Economics," *Allgemeine Forstzeitung*, Vol. 93, No. 9, 1982, pp. 229-232, Language: German.

Sturaro, G. "Economic Aspects of Productive Afforestation," *Cellulosa e Carta*, Vol. 31, No. 5, 1981, pp. 3-29, Language: Italian.

CENECA, "World Forests and Their Part in Rural Life," Centre National des Expositions et Concours Agricoles, Paris, France, 1978, Language: French.

Yasugahira, S., "Economic Development Depending on Industrialization of Special Forest Products in Mountain Village," *Forest Economy (Ringyo Keizai)*, Vol., 35(6), No., 404, 1982, pp. 27-32, Language: Japanese.

COMMENTS REGARDING THE ANNOTATED BIBLIOGRAPHY

The intent, while preparing the annotated bibliography, has been to restrict it to articles pertinent to developing countries. As a result, most of the articles relate to findings in the developing countries. However, a few articles that deal with methods applied in the developed countries have also been included because it was felt that the methods and findings would have applicability in developing countries. In this category are articles by the following authors:

Author(s)	Page No.
Ferguson, I.S.	21
Fowler, K.S.	24
Greig, P.J.	29
Kromm, D.E.	42
McKillop, W.	45
Perttl, E.	51
Snider, G.B. and Ayer, H.W.	71
Stumbo, D.A.	72

A few other articles dealing with situations in a developed country context have also been included because their findings are considered to have implications for forestry and economics in developing countries. The articles by Dargavel, J. (page 13) and Grant, R.K. (page 28) are included for this reason.

It was found, during the searches for suitable articles, that quantitative articles dealing with forestry and economic development were not common. There are few developing countries for which data such as multipliers for various aspects of forestry have been calculated. Studies regarding the regional implications of forestry and economics are similarly scarce for the developing countries. Such studies, where available, were

generally restricted to countries such as India and Pakistan which have old and well established Forestry Institutes or to those which have recently begun a vigorous program of forestry development such as Indonesia. This statement is based on searches in English language publications and is reflected in the number of articles that are included in the bibliography from each of the various developing countries and the nature of the articles.

REPRESENTATIVE LIST OF REJECTED ARTICLES

Many articles were discovered but subsequently rejected because they did not satisfy all the criteria for inclusion in this bibliography. A representative, but not exhaustive, list of articles examined in the process of compiling the bibliography is given below:

Australian Forestry

Year	Vol.(No.)	Author(s), Title and Page No.
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1983	46(4)	Richards, B.N. "Forest Policy Directions In the Twenty First Century," p. 270.
1983	46(4)	Carron, L.T. "National Forest Policy - Myth, Manifesto, Mandate or Mandala ?" p. 261.
1981	44(2)	Griffen, D.M. "Australian Forestry and the Third World," p. 77.
1981	45(3)	Drielsma, J.H. "Employment Coefficients In Two New South Wales Forestry Sectors," p. 174.
1979	42(3)	Greig, P. "Employment Coefficients for Forestry Planning and Management," p. 181.
1979	42(4)	Greig, P.J. "Some Social and Economic Consequences of Intensive Forestry," p. 207.
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1974	37(2)	Reilly, J.J. "Impact of Softwood Plantations on Rural Economic Development In Australia," p. 142.

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1983	62(2)	Gane, M. "Forest Policy Making," p. 85.
1983	62(3)	Arnold, J.E.M. "Community Forestry and Meeting

Fuelwood Needs," p. 183.

- 1984 63(2) Stewart, J. "Community Forestry Development In Nepal," P. 121.
- 1984 63(2) Lowe, R.G. "Forestry and Forest Conservation In Nigeria," p. 129.
- 1984 63(2) Hilton, R.G.B. and Johns, R.J. "The Future of Forestry In Papua New Guinea," p. 103.
- 1982 61(2) Bonvoisin, S. "The Implications of Community Forest Projects, Gujarat, India," p. 145.
- 1980 59(2) Adeyoju, S.K. "The Future of Tropical Agroforestry Systems," p. 155.
- 1980 59(2) Roche, L. and Cooper, R. "Forestry for Local Community Development: Manpower Training and Education Requirements," p. 163.
- 1980 59(4) King, K.F.S. "Forestry's Contribution to Social and Economic Development," p. 515.
- 1979 58(2) Westoby, J.C. "Forest Industries for Socioeconomic Development," p. 107.
- 1978 57(2) Soekjman, A. and Banyard, S.G. "The Prosperity Approach to Forest Community Development In Java," p. 89.
- 1978 57(2) Haynes, G.D. "Land, Trees and Man," p. 99.
- 1977 56(2) Palmer, J.R. "Forestry In Brazil - Amazonia," p. 115.
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- 1975 54(3) Westoby, J.C. "Making Trees Serve People," p. 206.

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- 1981 107(5) Sangal, P.M. "Scope and Implications of Agroforestry In India," p. 289.
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Forestry," p. 164.

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- 1980 106(7) Romm, J. "Assessing the Benefits and Costs of Social Forestry Projects." p. 445.
- 1979 105(1) Srivastava, B.P. and Pant, M.M. "Social Forestry in a Cost-Benefit Analysis Framework," p. 2.
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- 1979 105(10) Sharma, R.P. "Employment Potential and Soil Conservation Work in U.P. Hills - A Linear Programming Approach," p. 691.
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- 1976 102(4) Chatterjee, N. "Forest Based Sectors and Interdependence In the Indian Economy," p. 212.
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Generator of Employment," p. 402.

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