



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

14887

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Distr.
LIMITED
UNIDO/IS.543
24 July 1985
ENGLISH

INDUSTRIAL PROGRESS OF SELECTED SECTORS IN THE DEVELOPING ESCAP REGION

Final Report of the UNIDO/ESCAP workshop on
Accelerating Growth Through Co-operation in Selected
Industrial Sectors in the Developing Countries of the ESCAP Region

Bangkok, Thailand, 1 - 5 July 1985

Sectoral Working Paper Series

No. 33

Sectoral Studies Branch
Division for Industrial Studies

V.85-29367

SECTORAL WORKING PAPERS

In the course of the work on major sectoral studies carried out by the UNIDO Division for Industrial Studies, several working papers are produced by the secretariat and by outside experts. Selected papers that are believed to be of interest to a wider audience are presented in the Sectoral Working Papers series. These papers are more exploratory and tentative than the sectoral studies. They are therefore subject to revision and modification before being incorporated into the sectoral studies.

This document has been reproduced without formal editing.

The designations employed and the presentation of material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Preface

UNIDO's Division for Industrial Studies and the ESCAP/UNIDO Division of Industry, Human Settlements and Technology have jointly carried out a project on "Review and appraisal of industrial progress at the regional level". This project has been executed in two phases. Phase I of the project consisted primarily of analysis of statistical data and based on the findings and recommendations a summary was prepared under the title "Industrialization trends in developing ESCAP countries" (E/ESCAP/IHT.6/10). Phase II of the project included the preparation of several sectoral studies, specially in those sectors more relevant for the region. The selected sectors were as follows: capital goods industries, iron and steel, petrochemical and chemical industries and wood and wood products.

The studies prepared by consultants to UNIDO and ESCAP were submitted for discussion in the Workshop on Accelerated Growth Through Co-operation in Selected Industrial Sectors in the Developing Countries of the ESCAP Region which was convened at Bangkok from 1 to 5 July 1985. This sectoral working paper, therefore, presents the final report of the Workshop as adopted by the participants.

Conclusions and recommendations for each of the selected sectors were formulated. Specific action for joint work for UNIDO and ESCAP was also suggested, inter alia, the organization of a seminar on numerically controlled machine tools, an expert group meeting on the agricultural machinery industry and an expert group meeting on iron and steel as well as the development of a strategy for the development of the wood and related wood-using industries. It was furthermore recommended that studies be prepared on the fisheries industry, the electric power equipment industry and the building materials industry.

CONTENTS

| | <u>Paragraphs</u> | <u>Page</u> |
|------------------------------------|-------------------|-------------|
| 1. ORGANIZATION OF THE WORKSHOP | 1-13 | 1 |
| 2. PRESENTATION OF THE ISSUES | 14-32 | 6 |
| 3. SUMMARY OF DISCUSSIONS | 33-61 | 12 |
| 4. CONCLUSIONS AND RECOMMENDATIONS | 62-67 | 21 |
| ANNEX I List of participants | | 29 |
| ANNEX II List of documents | | 35 |

I. ORGANIZATION OF THE WORKSHOP

1. The Workshop on Accelerating Growth Through Co-operation in Selected Industrial Sectors in the Developing Countries of the ESCAP Region was convened at Bangkok from 1 to 5 July 1985. It was attended by experts from the People's Republic of China, Czechoslovakia, India, Indonesia, the Republic of Korea, Pakistan, the Philippines, Singapore, Thailand and the United Kingdom. An expert from Technonet Asia also participated. The list of participants is attached as annex I.
2. The joint ESCAP/UNIDO Division of Industry, Human Settlements and Technology is carrying out a study project entitled "Review and appraisal of industrial progress at the regional level".
3. Phase I of the project consisted of a systematic review of past trends (1960-1980), a brief survey of medium-term industrial development plans and an analysis of selected strategic issues of industrialization in the countries of the ESCAP region. The main objective of this phase was to identify the major trends in industrial development, analyze some of the related issues and problems and identify several dynamic and promising industries for further study. The statistical data were supplied mainly by the UNIDO Statistics and Survey Unit. An abridged version of the phase I study was presented to the ESCAP Committee on Industry, Technology, Human Settlements and the Environment and to other UN fora in 1982 and 1983.
4. Based on the main findings and recommendations of the phase I study endorsed by the Committee and Commission Sessions in 1982 and 1983, phase II of the project was initiated, which included the preparation of several sectoral studies. The Sectoral Studies Branch of UNIDO has co-operated in undertaking the studies. The sectors represent growing and promising industries that are of continuing relevance in the industrial development strategy of the ESCAP developing countries. The studies were prepared by consultants to UNIDO and ESCAP with the following sectors and coverage.

| Sector | Coverage |
|------------------------------------|--------------------------|
| Capital goods industries | South Asia |
| Capital goods industries | South East and East Asia |
| Iron and steel | Developing ESCAP region |
| Petrochemical industries | Developing ESCAP region |
| Other chemical industries | Developing ESCAP region |
| Wood and wood products | |
| (prepared by UNIDO/TECHNONET ASIA) | |

5. The major objective of these studies was to provide a review and analysis of past developments (1970-1982), present situation, basic problems and future trends and prospects (1985-1990, and if possible, 1990-2000) in these sectors. On this basis, possibilities of extension, modernization and development of local capacities had to be identified, spelling out clearly the main constraints and obstacles. The studies also aimed at presenting the impact of development of these industries on the overall economic progress including the fulfilment of various specific policy objectives, such as the major directions of industrial policy reorientation recommended by the ESCAP Ministers of Industry as well as other issues related to the role of industry in the implementation of the regional strategy for the Third United Nations Development Decade.

6. The studies present information in respect of each sector, as follows:

(a) Policy implications, import substitution and export promotion, external and domestic markets, upstream and downstream linkages, specialization and diversification in these sectors;

(b) Technological issues related to the type of technologies used, degree of adaptation, technological back-up services, research activities, local manufacturing of equipment, etc.;

(c) Problems of size and scale economies, infrastructure, management, planning, financing, capacity utilization, marketing and quality control;

(d) Aspects of strategy at the national, sub-regional and regional levels for establishment and development of these industries as a base for co-operation and plan harmonization;

(e) Development goals, government plans and programmes in these industries in each country, trends observed and specific factors determining demand;

(f) Medium-term projection of demand (until the year 1990) and thereafter to the extent possible, by individual countries and for the region as a whole;

(g) Employment and investment implications for these sectors of industry;

(h) Characteristics of observed demand (stability, shifts, price elasticities, cycle, etc.) and the present supply-demand gap, implications, required activities to reduce the gap, project identification, etc.

Opening session

7. The opening statement was delivered by Mr. S.A.M.S. Kibria, Executive Secretary of ESCAP. The Executive Secretary welcomed the participants and stated that although the industrial sectors in the countries of the region had performed remarkably well during the 1960s and 1970s when compared with the performance in the other developing parts of the world, Asia and the Pacific is also a region of rampant poverty and degrading living conditions for a large majority of its people. Industrial expansion in developing ESCAP countries has not been successful in decreasing mass poverty. The prospective for industrial growth should thus be closely interlinked with social development objectives and strategies for industrial development, whether at sectoral or sub-sectoral levels, and should have an anti-poverty orientation and focus. He informed the Workshop that the secretariat is currently undertaking a project on the social aspects of industrialization, in which the gamut of social factors related to industrial development are examined. He

further pointed out that the secretariat had always stressed that policies and strategies for growth and social equity be pursued jointly, as one cannot expect that the latter would automatically emanate from the former.

8. The Executive Secretary mentioned that the growth and equity aspects of the industrialization process is very closely linked with the issue of technological choice and employment promotion. This region is well endowed with human resources both in terms of its quantitative and qualitative aspects. The more effective utilization of this vital resource has been a matter of increasing concern in the region. Consequently, the Workshop may wish to give special attention to the question of the development of human resources while considering the sectoral studies.

9. The Executive Secretary further expressed that the Workshop provides a unique opportunity for discussing the issues and problems related to the existing situation and prospects for future development of the sectors covered. Participants include experts with theoretical and methodological knowledge as well as those who have practical experience in designing and implementing sectoral industrial development plans and policies. Such cross-fertilization of theoretical knowledge and practical experience should result in the evolution of pragmatic policy prescriptions at national, sub-regional and regional levels.

Election of officers

10. The Workshop unanimously elected Dr. A.A. Faruqui (Pakistan) as Chairman, and Ms. Visavarunee Onsuwan (Thailand) and Dr. A. Holub (Czechoslovakia) as Vice-chairpersons.

Agenda and organization of work

11. The Workshop adopted the following agenda:

1. Opening of the workshop
2. Election of officers
3. Adoption of the agenda and organization of work

4. Presentation of issues
5. Discussion of issues in working groups
6. Conclusions and recommendations for further action
7. Other matters
8. Adoption of the report.

12. Two working groups were formed. Working Group I dealt with the capital goods and iron and steel industries, while Working Group II considered the petrochemical, chemical and wood industries. The vice-chairpersons served as chairpersons for the working groups.

Documents

13. The list of documents is attached as annex II.

2. PRESENTATION OF THE ISSUES

14. Dr. V.J. Ram, Chief of the ESCAP/UNIDO Division of Industry, Human Settlements and Technology, mentioned that the study project on review and appraisal of industrial progress at the regional level was undertaken jointly with UNIDO in two phases. Phase I dealt with general macro-level analysis of trends and issues of industrialization in the ESCAP region during the sixties and the seventies and phase II covered the regional analysis of selected industrial sectors such as capital goods, iron and steel, chemicals, petrochemicals and wood processing industries.

15. He further stated that the Workshop was convened to exchange information and experience related to the sectors covered, to add further information and critically review the study reports, to provide guidelines for identifying possible areas for economic, technological and financial co-operation at regional and global levels and to contribute towards the orientation of the technical assistance programmes and other work of international organizations such as UNIDO and ESCAP.

16. He expressed the hope that concrete suggestions would emerge from the deliberations of the Workshop which will provide guidelines in the follow-up activities to be undertaken by UNIDO and ESCAP in these and other industrial sectors.

17. The representative of the UNIDO secretariat welcomed the participants and expressed gratitude to ESCAP for the organization of the Workshop. After introducing the UNIDO Sectoral Studies Branch's work programme, he explained the different phases of the project and provided further information on the substantive and organizational aspects of the Workshop. He further pointed out the importance assigned by the Sectoral Studies Branch to the sectors analyzed and the special efforts made through action-oriented studies to strengthen the link between research and operational activities. Research co-operation with other international organizations and United Nations agencies and bodies, he noted, is increasing, as exemplified in the organization of the ESCAP/UNIDO Workshop on Selected Industrial Sectors.

18. He also informed the participants about the papers to be discussed in the different working groups and the special relevance of the synthesis paper furnished as a reference to the participants. The synthesis paper, he further explained, contains a short analysis of each of the sectors covered in the Workshop as well as the issues which are not only common to all the sectors, but also specifically related to the sectors in question.

19. The representative of the UNIDO secretariat in introducing the synthesis paper, referred to the varied growth rates of manufacturing value added in East and South-East Asia and South Asia. Industrialization had been a key factor in the development strategy in those sub-regions during the past decade. The growth of the industrial output has been accompanied by significant structural changes towards increased local processing and manufacture of final products.

20. Policies and strategies, growth rates in manufacturing value added and attainment of development objectives have varied between countries and sub-regions of developing Asia. The developing countries in East and South-East Asia achieved an exceptionally high growth rate during the 1970s in the manufacturing sector and were able to adjust to the difficulties of the decade better than the other developing regions. It does not follow, however, that important development goals were automatically achieved, as the expansion in the manufacturing sector did not make a satisfactory contribution in creating employment opportunities or in meeting other social needs.

21. Developing countries of South Asia, in comparison to East and South-East Asian nations, had relatively weaker industrial performance. The growth in manufacturing value added for the sub-region, averaged 5 per cent from 1976-1980, compared with 9.7 per cent for Asian countries as a whole. Of particular concern was the limited effect of the industrial growth on alleviating the serious unemployment problem in both urban and rural areas in the South Asian sub-region.

22. The situation in the 1980s is rather different. It seems highly questionable that a continuation of the same industrialization patterns will be able to maintain industrial growth in East and South Asia. No elements in

the international economy and internal constraints require the formulation and implementation of new strategies, giving special emphasis to sub-sectoral priorities.

23. An attempt was made to assess the emerging issues related to the fundamental challenges for the region, the possible directions of growth, the issues of structural changes and redeployment, and the role of regional co-operation. In this context, the following issues were presented as common for all the sectors in the developing economies of ESCAP:

(a) The structure and trends of the ESCAP market for the products of these sectors;

(b) Obstacles to increase the installed capacity for the development of local and regional industries;

(c) Experiences and prospects for regional and international co-operation in the field of production.

24. The issues at sectoral level were suggested for further discussion in the working groups.

Summary of discussions

25. In the plenary session one important general point, which received widespread support from the participants, was that care must be exercised in the formulation and implementation of plans for the development of the specific sectors. Several participants from the region expressed the view that in some instances policies had been implemented without a sufficiently rigorous analysis of the costs and benefits involved. On occasion this has led to a waste of precious resources. As one participant put it, account must be first taken of the opportunity costs involved in developing projects in the sector. In some cases the opportunity cost will be so high as to effectively rule out the project. Accordingly, it was felt important not to make the mistake of assuming, without a rigorous justification, the necessity of developing particular sectoral projects. The social costs of such

shortsightedness could be substantial. This, in turn, raises inherent difficulties for sectoral analyses. This follows from the fact that in order to examine the feasibility of a sectoral project it is necessary to go beyond the sector itself in order to analyze the opportunity cost (i.e. alternative ways of allocating the resources). While it is not expected that such opportunity costs could be adequately taken into account in the present Workshop (as a result of the lack of data and time), it was nonetheless felt that the point about opportunity costs was important and needed to be kept in mind, when analyzing the sectors.

26. Similarly, the question of the allocation of resources to production for the domestic market and production for export received detailed attention. In this connection it was stressed that conditions differ between countries in the region and account would have to be taken of these differences in formulating trade strategies. While the countries with relatively large domestic markets had the option of basing strategies entirely, or partly, on this market, other countries with smaller markets did not have the same range of alternatives and were forced, in view of efficiency considerations, to turn immediately (or at any rate sooner) to the export market. Further, the point was made that an important question of sequencing arises in choosing an appropriate trade regime for the development of a particular sector.

27. In the case of infant industries involving complex product and process technologies it might in some instances be appropriate to produce entirely for the domestic market until such time as the necessary capabilities were accumulated to produce at internationally efficient levels. Once cost and quality approximated international best-practice levels, exports could then follow. In a number of cases this was the path followed by Japanese industries (for example, automobiles and computer numerically controlled machine tools) and other countries such as the Republic of Korea (for example, in the area of complex electrical power equipment where exports were planned for the future but have not yet been realized).

28. This does raise central issues regarding the dynamic process whereby the industry in question eventually achieves international competitiveness. The experience with, and critique of, import-substitution regimes has taught that

infants do not necessarily grow up. Accordingly, the achievement of international competitiveness cannot be taken for granted as an automatic process. Rather, steps have to be taken at both the enterprise level and that of government policy to ensure that efficiency, in terms of both price and quality, is increased over time at a sufficient rate. It was also noted that technology policy and trade policy are closely related and therefore have to be jointly considered. Clearly, decisions regarding exports will have a central bearing on the choice of both product and process technologies.

29. It was stressed that the countries in the ESCAP region are heterogeneous, thus raising the possible need for differential treatment. The point was made by one participant that there is frequently an incorrect tendency to generalize from the experience of the most industrialized developing countries of the region (the area of Hong Kong, Republic of Korea and Singapore) to the other countries of the region. Such a tendency was inappropriate in view of the special conditions that existed in these countries. These included cultural factors and the favourable conditions that existed in the world economy in the 1960s when these countries first entered the export market on a substantial scale. A long discussion followed from this point regarding the most appropriate way to categorize the developing countries of the ESCAP region. Such a classification should enable countries to be grouped together for policy purposes. It was agreed that a classification based on per capita income level was inadequate and this criterion was accordingly rejected in favour of other criteria dependent on indicators of industrialization.

30. Another issue that received detailed attention was the question of co-operation both at sub-regional and regional levels. A number of participants noted that the question of co-operation had been widely regarded in many fora as a priority for policy. However, it was noted that frequently a disparity emerged between rhetoric and reality. Examples were given in some of the background papers. It was stressed that a careful analysis was required of both the costs and the anticipated benefits of co-operation in order to decide in what circumstances such co-operation was desirable. The analysis of costs was frequently absent in discussions of co-operation and it was accordingly felt that this should be kept in mind in the present Workshop. Nevertheless, despite the caveat, it was stressed that in some

instances co-operation, including regional co-operation, had been, and would continue to be, successful. The example of regional urea projects in ASEAN was mentioned as a case in point. It was further noted that there may be good possibilities for private sector participation in regional co-operative endeavours and for co-operation at the enterprise level.

31. It was also noted that an impediment to regional integration frequently lay in adverse attitudes. For example, attitudes were frequently biased against the regional sourcing of technology inputs in favour of the purchase of technology from the highly industrialized countries. While the latter was in some cases justifiable in terms of cost and quality considerations, in other cases the discrimination against regional technology was inappropriate. Lack of adequate flows of information among countries on available technologies was mentioned as a factor contributing to this problem. The suggestion was made that in some instances the pooling of regional resources (including finances and high level manpower) for the purposes of undertaking R&D might be feasible.

32. It was noted that particular attention should be paid to the activities of government enterprises in view of their importance in most countries in the region. In this connection an issue of major concern revolves around the steps that might be taken to improve the efficiency of these enterprises in order to increase their social contribution.

3. SUMMARY OF DISCUSSIONS

Summary of discussions - working group I

Capital goods industry

33. The discussion began with the emphasis on the special role of the capital goods industry in the national economy. The capital goods industry is not only important because of its role in the process of accumulation but equally and perhaps even more important as a catalyst for technical change. Technical change is the most significant contributor to economic growth and productivity and therefore the role of the capital goods industry as a catalyst of technical change is much more important. The question is how to promote technical change and in this connection, the development of the capital goods industry assumes added significance, because this industry lies at the heart of technical change.

34. Unfortunately, the collection of data on capital goods production and trade does not involve the concept of the role of the industry as a means of increasing productivity. The ISIC category covers a heterogeneous range of products such as radios and electrical fans which are not strictly "means of production". If one is interested in the dynamic role of the capital goods industry, it is necessary to make a finer distinction than that ISIC has done. But in practice it is difficult to separate these two functions of the capital goods industry because they are not mutually exclusive.

35. The discussion then focussed on the role of the microelectronics industry which most participants believe has one of the best potentials for increasing productivity in all sectors. Whoever controls the electronics industry controls the future means of production because the next generation of capital goods industry will have a significant microelectronics component. Countries in the region are urged not to neglect the development of this industry. Not every country has to get into the production of electronics hardware but all countries should seriously consider paying some attention to the development of electronics software. There is a need to understand and learn how to link existing machinery with micro-processors and with computers. Computer

numerically controlled machine tools, CAD/CAM systems and flexible manufacturing systems will emerge as important technological developments and will have a significant influence on the industrial development of the region in the next decade.

36. Another issue which drew intensive discussion was the question of how to select the appropriate capital goods products for adaptation and further development. Participants agreed that the comparative advantage theory was unable to provide useful indications given the limitations of this theory. Given the present limitations, the method used by Japan, and the Republic of Korea should be studied and adapted for countries interested in rational product selection.

37. In the discussion, it was also pointed out that many of the countries of the region have a large agricultural base; therefore the capital goods sector could be started with simple machine and tools manufacturing processes. The conditions for the production of those products could depend on natural resource endowments, and the infrastructure and skills available. The objective is to make capital goods locally, utilizing specialized production and multi-purpose units chiefly related to agricultural implements, equipment and machinery, common to all production processes.

38. The discussion also concentrated on the analysis of the linkages. In fact, the participants emphasized the importance of the backward linkages and the need to create the necessary infrastructure in terms of raw material and components support, power availability, design process inputs, development of technological and engineering skills and co-operation in research and development.

39. There was also agreement on the need to integrate the industrial master plan with the country's overall national development plan. The careful preparation of an industrial master plan will help countries identify the appropriate capital goods industry for development. The formulation of this plan should be set in the context of anticipated industrial and technological developments over the next ten or twenty years. A very close relationship between national and sectoral strategies needs to be established so that

national economic plans have an integrated linkage with the sectoral strategies and the two are leading towards accelerated industrial growth and development of the engineering and other capital goods industries. The industrial and national plans will have to start building up a capital goods base and integrating it with other sectors.

40. There was some pessimism about the scope for regional co-operation in the capital goods industry because of the complexities of the sector. The automobile industry in the ASEAN Industrial Complementation Scheme was used to illustrate the difficult problems which would arise in such co-operation. Co-operation may be more feasible in the exchange of information especially of country experiences in the development of this industry. Wider publicity of the success in planning the development of the capital goods industry and the problems facing the motor car industry in Australia and the Philippines may provide useful information to help countries plan and select the appropriate capital goods industry for future development.

41. Finally the discussion turned to the importance of formulating an effective marketing programme for the capital goods industry. Countries should incorporate an export marketing component in their capital goods strategy to ensure improvements and efficiency in the development of the industry. The key objective is "learning through exporting". The production of capital goods solely for the domestic market should be discouraged. It is necessary to undertake in the first place an inventory of the capital goods requirements in individual countries and to identify the areas in which production facilities exist. This calls for an in-depth industry/market survey.

Iron and steel

42. The discussion began by noting the central role played by the iron and steel industry in a number of countries in the ESCAP region. In these countries the iron and steel industry had made use of local resources such as iron ore, coking coal, gas and water. The development of the associated infrastructure including transportation networks and electrical power generation had benefitted, not only the iron and steel industry itself, but also industrial development more generally in these countries. On the output

side the industry had helped to stimulate the development of user industries such as automobiles, construction components, transportation equipment and machinery. In this sense the iron and steel industry had been thought of as a basic industry as a result of its industrial linkage-intensity. Accordingly, countries in the region with domestic supplies of some of the inputs needed for iron and steel production had developed this industry.

43. However, despite the progress that has been made in this industry in the ESCAP region, account was also taken in the discussion of the difficulties currently confronting the further development of iron and steel production. Particular mention was made of the conditions of excess capacity in the world economy and of national budgetary constraints. The latter had resulted in the temporary shelving of plans for the development of new integrated steel plants in the Philippines and Thailand. In the case of India financial constraints had resulted in a greater proliferation of direct reduction mini mills than would otherwise have occurred, distributed in various parts of the country. It was also noted that, while the integrated plants enjoyed cost advantages over the mini mills, the latter, as a result of their smaller capacity and regional dispersion, economized on transport costs and contributed to the regional dispersal of industrial activities.

44. It was felt that in some cases the iron and steel industry presented excellent opportunities for regional co-operation in cases where the necessary inputs were distributed in close proximity but on different sides of the national boundary. The case of Bangladesh and India was cited as an example. In other cases countries lacking some of the necessary inputs could meet their requirements through imports from other countries in the region with adequate supplies, provided competitive cost and quality requirements were met.

45. In the discussion account was also taken of the different circumstances of the various countries in the region through consideration of a helpful map in the iron and steel working paper showing the distribution of the necessary inputs. It was acknowledged that in some countries iron and steel production would be limited with a corresponding need to import.

46. It was further noted in the discussion that the introduction of new technologies had facilitated substantial improvements in productivity and quality. Examples were new ways of distributing the raw material in blast furnaces and of increasing blast temperatures based on electronically controlled systems. It was stressed that substantial gains could be made from the diffusion of such new technologies which in many instances could be introduced in conjunction with existing facilities and equipment. This would be facilitated if countries in the region had good access to information regarding the new technologies and the way they might be adapted to local circumstances. With regard to adaptation, it was furthermore noted that the experience of countries in the region in improving, adapting and modifying processes might be of particular relevance to other countries in the area confronting similar production difficulties. In this connection, it was pointed out that regional experience might in some instances be of even greater relevance than that available in the highly industrialized countries, since developing country conditions are frequently substantially different from those in the developed countries. This, in turn, suggested that a potentially important role could be played by regional institutions specializing in the collection and dissemination of relevant technical information.

47. Finally, it was noted that plans for the further development of the iron and steel industry must be formulated and considered within the context of national plans taken as a whole. In this way it would be possible to reconcile any apparent inconsistencies between the various plans and attach priorities to the development of various sectors and projects. Special emphasis should be given to the carrying out of applied and industrial R&D in this industry. It was also noted that the development of the iron and steel industry would also have to take account of regional and social objectives.

Summary of discussions - working group II

48. A brief presentation of the review paper dealing with the petrochemical, chemical and wood industries in the developing ESCAP region was made. It was emphasized that these three industries were resource-based as they were

critically linked to the supplies of natural resources of specific types. The participants emphasized the need for the region to maintain comparative advantage for its resource-based industries.

Petrochemical industry

49. In presenting the comprehensive study on the petrochemical industry in the developing ESCAP region, a review was made of the growth patterns of the industry in the global as well as the regional context, the main structural problems and issues dealing with the role of technology, development of human resources, public and private sector enterprises, linkages of small and medium scale with large scale industries, the question of pricing and the role of transnational corporations.

50. It was noted that the consumption of petrochemical products in the region was at a very low level compared to the developed countries. As such, although the world petrochemical growth would be slower than in the past, the region's growth in demand would be higher than in the developed countries. There was therefore considerable scope for the development of this industry in the region.

51. In the deliberations, it was pointed out that there was an anomaly regarding the petrochemical industry in the region because on the one hand there is underutilization of capacity, while on the other hand petrochemical products were being imported in the region.

52. The petrochemical industry is a very capital intensive industry which requires a high degree of technical, managerial and marketing expertise. Accordingly, there was a need to strengthen these skills for the effective operation of the industry. It was emphasized that technological enhancement was continuously to be aimed at in order to achieve self-reliance and international competitiveness. In this respect, the participants felt that there was a need to strengthen the existing R&D institutions and to allocate greater resources to R&D activities.

53. Considerable attention was given to regional co-operation in the deliberations. It was brought out that the ESCAP region comprises countries with different resource endowments and at different stages of development so that it should provide fertile ground for greater regional industrial co-operation, particularly for this industry which is now operating with serious underutilized capacity but at the same time is faced with the necessity to import both basic and end-petrochemical products. One participant especially wondered why ASEAN, all through these years, had not taken up the petrochemical industry as a possible area for its regional economic co-operation. Greater regional co-operation in the establishment and operation of complementary petrochemical complexes can increase intra-regional trade in petrochemical products. It was noted that the petrochemical industry in one ESCAP country was usually set up as a national concern without paying adequate regard for its counterpart in another ESCAP country. There is a lack of information regarding various aspects of the industry.

Chemical industry

54. The chemical industry of the developing ESCAP region focussed on four major sub-sectors: basic organic chemicals, basic inorganic chemicals, fertilizers and pesticides, drugs and pharmaceuticals. It was noted that most branches of the chemical industry in the region were set up as import substitution industries, and in some countries these industries have heavy government involvement, particularly for fertilizers, pesticides, bulk drugs and pharmaceuticals. It was also noted that the chemical industry in the region has experienced rapid expansion during the past decade and a half and also shows great potential for further growth, as the industry not only has extensive linkages with all the other industries but also is directly connected with development strategies geared to the satisfaction of basic needs. Increasingly, the developed countries are moving away from the production of basic industrial chemicals and going into higher value-added specialized chemical products, thus leaving room for the expansion of the chemical industry in the developing countries. Some sub-sectors of the industry are characterized by the extension of large, medium and small firms.

55. The discussions revolved around the role of TNCs in the development of the chemical industry, particularly the drugs, pharmaceuticals and even fertilizer and pesticide sectors; government participation in the industry, particularly for countries in South Asia; and the nature of technological progress in certain sub-sectors of the industry, bringing to the fore the problem of fast obsolescence in the production technology. It was recognized that it would be very difficult for the region's chemical industry to avoid involvement with TNCs, which, as in the case of pharmaceuticals, control patent rights and basic industry technology.

56. The government's role in the industry was also brought out, based on the experience of India. Government intervention in the market, for achieving some desirable social goals, had not always been conducive to the expansion of the industry. For instance, the imposition of stringent price controls on some common drugs for the sake of poor consumers, has tended to squeeze the profit margins of the drug companies, and thereby reducing their investment and research and development spending. This pointed to the need for periodic review of these prices keeping in view the rise in raw material and wage costs to generate investment and higher production. Also, many government-owned companies, due to limitations imposed by complicated bureaucratic procedures, have not always been able to operate in an efficient manner. This raises the issue of achieving a proper balance between the demand for social equity and the demand for economic efficiency.

57. The discussion also brought out the concern for the lack of linkages between big enterprises and the many small firms in the industry. Small firms are particularly in need of appropriate government assistance for their economic and technical upgrading. There is also a need for closer linkages between large and small units.

The wood industry

58. The ESCAP countries, particularly those with large forest resources, have a strong precondition for the development of wood-using industries. The wood industry carries profound socio-economic implications in terms of employment generation, rural development and meeting some of the basic needs. Apart from

the pulp and paper sector the wood industry is not particularly capital and technology-intensive so that the less developed members of the region can enter into the industry relatively easily. The skill requirement of the industry, especially for its downstream activities, is not high; and, above all, female labour can be employed in certain activities - hence an industry which can raise the level of female participation in the labour force.

59. The wood industry is also capable of technological advance, not just in terms of progress in mechanical technology but also innovation as embodied in designs and advanced craftsmanship and wood based material usage. Furthermore, resource-poor countries can also enter into this industry with imported raw materials. This has been the case for secondary mechanical wood processing, as represented by the growth of furniture and joinery industries in the forest-deficit ESCAP countries.

60. The discussions brought out two complex problems for certain countries: (a) the serious problem of forest over-exploitation with little regard to a balanced demand and supply timber budget; and (b) rising protectionism in some advanced countries which have imposed high effective rates of protection on imported wooden products.

61. The forest-deficit ESCAP countries, are concerned with the problem of maintaining their long-term comparative advantage for the wood industry, since they realize that in the long run there will be an inevitable shift of wood processing activities from forest-deficit to forest-surplus countries. The forest-deficit ESCAP countries on their part would need to continue their efforts to upgrade their wood industry by going into high-quality wood products manufacturing.

4. CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations - working group I

Capital goods industry

62. The participants concluded that the capital goods industry plays a crucial role in the industrialization process in the developing countries of the ESCAP region and that ESCAP and UNIDO should undertake further analysis of this industry at the national level. Specifically, it was suggested that the project on "Review and appraisal of industrial progress at the regional level" should be continued in order to implement actions in the capital goods industry in the following areas:

(a) An analysis should be undertaken by UNIDO and ESCAP on the strategies for the development of the capital goods industry, the role and extent of government participation, and the role of the transnational corporations in the region.

(b) It is also highly desirable to analyze the role of marketing in the capital goods industry within the framework of the international market conditions affecting these products.

(c) It is recommended that a survey be prepared on the "vision" of global industrial development, especially emerging industries and technologies which may have a profound influence on the pattern of industrial development up to the end of this century. It is also suggested that UNIDO and ESCAP jointly organize a seminar on computer numerically controlled machine tools in order to formulate a strategy among the countries of the region for the further development of this industry at regional level.

(d) The participants recommended that UNIDO and ESCAP should organize an expert group meeting on the agricultural machinery industry, in which the experience of the member countries of the Regional Network on Agricultural Machinery (RNAM) should be emphasized in order to strengthen the capital goods industry.

(e) It is recommended that UNIDO and ESCAP make widely available the document on the capital goods industry in South-East and East Asia through appropriate channels to the governments of the region as well as to other users interested in this industry.

(f) Special consideration should be given by UNIDO and ESCAP to the organization of similar meetings, in which specific topics affecting the development of the industry should be analyzed.

Iron and steel

63. Since the iron and steel industry has been recognized as a basic industry in view of its industrial linkage intensity, the participants concluded that a comprehensive strategy has to be evolved by each of the developing countries in the ESCAP region to meet their requirements of iron and steel in the long-term perspective covering a twenty year period. This will not only provide a stimulus to their respective economies but would also enable them to play an important role in the international trade in iron and steel. The participants suggested that concrete actions should be undertaken by ESCAP and UNIDO by:

(a) Dissemination of information on research and development activities, including pilot plants, feasibility and pre-investment appraisals; and providing studies relating to consultancy and project engineering services for setting up steel plants and also to collaborate in the development of national consultancy services for project engineering.

(b) Formulating the choice of technology appropriate for a given scale of production and a given product mix.

(c) Assessing capital availabilities and assisting in negotiations of developing countries with private and official sources of capital.

(d) Exploring the possibility of regional and inter-regional groupings to overcome limitations, if any, of domestic markets for facilitating growth of steel-making capacity; and training of personnel, wherever there are gaps at the national and regional levels.

(e) Making available the document prepared for the Workshop to the government officials and policy makers of the region through appropriate channels.

(f) Organizing an expert group meeting in which the linkages between the capital goods and the iron and steel industry should be emphasized.

Conclusions and recommendations - working group II

Petrochemical industry

64. The participants concluded that the petrochemical industry in some countries of the region occupied a very important place in the overall industrialization process and these countries should provide facilities for sharing of experiences with other developing countries of the region. Furthermore, it was also emphasized that there exist good prospects for enlarging the base of the petrochemical industry in the region, both in terms of size and product diversification. It was therefore suggested that ESCAP and UNIDO should undertake activities in the following areas:

(a) To initiate action to set up a regional clearing house for information exchange and dissemination. Such arrangements should also be charged with the responsibilities of gathering industry-specific information as well as building up a regional data base on the petrochemical industry. In this respect, the initial work may be undertaken by ESCAP/APCTT (Asian and Pacific Centre for Transfer of Technology).

(b) To set up a mechanism for pooling the existing technical resources of the various petrochemical industries for use within the region for co-operative utilization. Some ESCAP countries such as the Republic of Korea

and India have well-established petrochemical complexes and their technical know-how and industry-specific experiences would be valuable to the other developing countries of the region.

(c) Most industries in the region are currently suffering from serious capacity underutilization, and there is a need to undertake a comprehensive study analyzing the causes, both technical and economic, for such capacity underutilization.

(d) To carry out a feasibility study to increase the industrial complementation of the petrochemical industry in the region.

(e) To explore ways and means whereby intra-regional trade in petrochemical products can be increased.

(f) There is a need for some national petrochemical industries to undergo vigorous rationalization programmes through technical upgrading and diversification, particularly with more efforts towards developing downstream activities.

(g) To undertake regionally-oriented R&D work and to develop schemes for training of personnel for the industry, taking account of existing institutions in the area.

(h) Further studies are needed to analyze the upstream and downstream activities of the petrochemical industry.

Chemical industry

65. The participants felt that the chemical industry had bright development prospects both within the region and externally. It recommended that ESCAP and UNIDO should undertake the following activities to enhance the production of industrial and other chemicals:

(a) There is a need for a mechanism to facilitate the pooling of technical know-how and sharing of industry experiences on a regional basis with a view eventually to increase the level of regional technical self-reliance.

(b) There is need for a study to examine the prospects and possibilities of the pooling of R&D and other facilities to meet the technological requirements of the region's chemical industry.

(c) A study should be conducted to explore ways and means to improve structural linkages between small firms and large firms; and to assist the small firms in their upgrading.

(d) A study should be conducted to look into the public sector involvement in the various branches of the chemical industry. For the government-owned companies, the problem of rendering them more efficient through greater professional management and more public accountability should be seriously looked into.

(e) Since many chemical industries have been set up under import substitution, a study should be made to examine whether these industries have experienced similar problems that have plagued the consumer goods industries in the earlier phase of import substitution.

(f) An in-depth study should be made on the alternative use of natural gas and methanol.

(g) A study should be undertaken on the feasibility on the industrial complementation with regard to fertilizers, pesticides, drugs and pharmaceuticals and industrial chemicals for possible greater regional economic co-operation arrangements.

Wood and wood products

66. The participants concluded that the wood industries can play an important role in the industrialization process of the Asian developing countries. It was suggested that further action should be undertaken by ESCAP and UNIDO, as follows:

(a) An in-depth study should be conducted to find out the causes for the structural imbalance between upstream and downstream settings of the wood industry in selected ESCAP countries.

(b) It is suggested to consider the setting up of a regional centre for the wood industry for the purpose of conducting R&D, training courses and upgrading the levels of design skills and mechanical know-how employed by the industry. The regional organization should also promote a more aggressive marketing strategy for the wood products of the region. Such an organization can hold exhibitions and trade fairs, and design competitions, and disseminate market information.

(c) There is a need to look into the feasibility of establishing "clusters" of wood and related wood-using industries to facilitate the development of the industry. Such a strategy may also accelerate the regional development programme of the countries of the region.

(d) Forest-rich countries should be alerted regarding the potential disastrous ecological consequences due to uncontrolled forest exploitation; and a regional scheme should be set up to train forest maintenance personnel and to share experiences in forest management.

(e) While technological progress in the wood industry should be promoted, it is also important to maintain an appropriate balance of man and machine in the industry; attention of governments should be given to the negative results of labour displacement due to the too rapid mechanization of production.

(f) ESCAP and UNIDO should commission a study on the paper and pulp industry, which deals with the chemical wood processing aspects.

(g) Further investigate the issues relating to employment generation for female workers in this sector.

(h) Extend technical assistance packages to those countries which have critical shortages of forest resources, on the alternative usages of wood materials and introduction of appropriate technology.

General conclusions and recommendations

67. The participants concluded that the Workshop provided an excellent opportunity to exchange ideas on the development of various sectors analyzed in the working groups, mainly capital goods industry, iron and steel, petrochemicals, chemicals and wood industries. They stressed the importance of the project "Review and appraisal of industrial progress at the regional level" and requested ESCAP and UNIDO to support the continuation of this project, specifically, they recommended that ESCAP and UNIDO:

(a) Undertake further detailed study on the capital goods industries and the petrochemical industry, as suggested in the discussions of the working groups.

(b) In considering the inclusion of other sectors to be analyzed in the future, special emphasis should be given to the electrical power equipment industry, fisheries industries and the building materials industry, sectors which are of basic importance in the countries of the region.

(c) Start surveys for the identification of sectors in which joint ventures may be feasible and identify the corresponding partners as well as the requirements for financing, skilled labour and other factors necessary for the setting-up of these joint-venture industries.

(d) The chemical, petrochemical and wood industries raise immense problems of industrial safety hazards and environmental pollution. Information on safety and pollution aspects should be disseminated and a study should be undertaken on these problems surrounding these three industries.

(e) The industries analyzed in the Workshop involve TNCs, and the role of the TNCs in the development of these industries should be properly examined in greater detail. Hence, the Workshop recognized the important role TNCs could play in the provision of additional technical, financial and managerial resources as well as access to markets for outputs of these industries in the ESCAP region. ESCAP and UNIDO, in collaboration with the United Nations Centre on Transnational Corporations (UNCTC), should expand its technical assistance activities to strengthen the capabilities of ESCAP developing countries in dealing with TNCs.

(f) The comprehensive report of phase I of the project "Review and appraisal of industrial progress at the regional level" should be up-dated and disseminated by the ESCAP secretariat.

List of participants

Prof. Prakash Narain Agarwala
Managing Director
Educational Consultants India Ltd.
Ministry of Education
Government of India
R.71 Greater Kailash I
New Delhi, 110048
India

Dr. Azimuddin Ahmad Faruqui
Managing Director
c/o ENAR Petrotech Services Limited
4th Floor Karim Chambers
Karachi
Pakistan

Dr. Alois Holub
Institute of Economics
Praha I, Politických Vězňů 7
Czechoslovakia

Mr. Itichai Patamasiriwat
Engineer
Ministry of Industry
Bangkok
Thailand

Ms. Janthee Jongnitayagal
Senior Economist
Industrial Economic and Planning Division
Office of the Permanent Secretary
Ministry of Industry
Bangkok
Thailand

Mr. Kyung-Jong Kim
Deputy Director
Industrial Policy Division
Ministry of Trade and Industry
Seoul
Republic of Korea

Mr. Kittha Minakan
Senior Economist
Industrial Economics and Planning Division
Office of the Permanent Secretary
Ministry of Industry
Bangkok
Thailand

Mr. G. Mukherji
Vice Chairman
Steel Authority of India
Ispat Bhawan
New Delhi 110003
India

Mr. Soodsakorn Putho
Chief, ESCAP Section
Foreign Relations Division
Office of the Permanent Secretary
Ministry of Industry
Bangkok
Thailand

Ms. Suthum Phanichvong
Economist
Ministry of Industry
Bangkok
Thailand

Ms. Nerissa Roberto
Chief, Industry Development Specialist
Bureau of Industrial Development
Ministry of Trade and Industry
Manila
Philippines

Mr. Guo Tai
Head
Agricultural Transport Machinery Research Group
Chinese Academy of Agricultural Mechanization Sciences
Beijing
People's Republic of China

Ms. Visavarunee Onsuwan
Economist
Office of Basic Industry Development
Office of the Permanent Secretary
Ministry of Industry
Bangkok
Thailand

Ms. Wilawan Ritruethai
Foreign Relations Officer
Ministry of Industry
Bangkok
Thailand

Prof. John Wong
Associate Professor
Department of Economics and Statistics
National University of Singapore
Singapore

Other organization

Asian Network for Industrial
Technology Information and
Extension (TECHNONET ASIA)

Mr. Mohd. Shahabuddin Faruque
Industrial Development Officer
TECHNONET ASIA
1, Goldhill Plaza
Podium Block 35-37
Singapore 1130

UNIDO expert

Mr. Martin Fransman

Department of Economics
University of Edinburgh
Edinburgh EH8 9JY
Scotland
United Kingdom

UNIDO secretariat

Mr. L. Pineda-Serna

Industrial Development Officer
Division for Industrial Studies
Sectoral Studies Branch, UNIDO
Vienna

ESCAP secretariat

Mr. S.A.M.S. Kibria

Executive Secretary

Mr. V.J. Ram

Chief
ESCAP/UNIDO Division of Industry,
Human Settlements and Technology

Mr. F.V. Ovseenko

Chief
Industry Section
ESCAP/UNIDO Division of Industry,
Human Settlements and Technology

Mr. R.M. Notosuwarso

Chief
Technology Section
ESCAP/UNIDO Division of Industry,
Human Settlements and Technology

Mr. M. Rahmatullah

Chief
Human Settlements Section
ESCAP/UNIDO Division of Industry,
Human Settlements and Technology

Mr. B.P. Dhungana

Economic Affairs Officer
Industry Section
ESCAP/UNIDO Division of Industry,
Human Settlements and Technology

| | |
|-------------------------|--|
| Mr. Frank Eppert | Associate Programme Management Officer ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Ms. Suriya Kongsiri | Administrative Assistant ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Ms. Morakote Niyomsen | Statistical Assistant ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Mr. A.S.H.K Sadique | Regional Adviser on Industrial Development ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Mr. H.G.R. Reddy | Senior Industrial Development Officer ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Mr. U. Myint | Industrial Development Officer ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Mr. Gilbert Blumenstiel | Associate Expert ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Mr. G. Neubauer | Associate Expert ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Mr. E. Stegner | Associate Expert ESCAP/UNIDO Division of Industry, Human Settlements and Technology |
| Mr. Bienvenido Rola | TNC Affairs Officer ESCAP/UNTC Joint Unit on Transnational Corporations |
| Mr. Chee Peng Lim | TNC Affairs Officer ESCAP/UNTC Joint Unit on Transnational Corporations |
| Ms. S. Takahashi | Chief Programme Co-ordination and Monitoring Office |
| Mr. R.C. Stubbs | Senior Programme Officer Programme Co-ordination and Monitoring Office |

Mr. Chhor Kylin

Chief
Division of Administration

Mr. Hunter H.T. Chiang

Chief
Conference and General Services Section

Mr. Takashi Endo

Chief
United Nations Information Services

ANNEX II

List of documents

Review and issue documents

1. Synthesis paper - UNIDO
2. The capital goods sector and the iron and steel industry in the ESCAP developing countries: review of the studies and issues for discussion - Mr. B. Chattopadhyay
3. The chemical, petrochemical and wood industries in the ESCAP developing countries: review of the studies and issues for discussion - Prof. J. Wong

Background documents

1. Capital goods industry in South Asia - Mr. P.C. Dhall
2. Capital goods industry in South-East Asia - Mr. C.P. Lim
3. Iron and steel - Mr. G. Mukherji
4. Chemical industry - Prof. P.N. Agarwala
5. Petrochemical industry - Dr. A.A. Faruqui
6. Wood processing industry - UNIDO/TECHNONET ASIA
7. The situation status of wood processing industries (Furniture/Joinery Sector) in selected countries of the ESCAP region - TECHNONET ASIA

Information documents

1. The situation of the electric power equipment industry in
 - (i) India - prepared by Mr. Y. Krishnamurthy
 - (ii) Indonesia - prepared by Mr. Djurzan Hamid
 - (iii) Pakistan - prepared by Mr. Parves A. Butt
 - (iv) Republic of Korea - prepared by Mr. Han Kwae Lim

2. Asian industry in figures: a statistical profile of key sectors in selected ESCAP countries - UNIDO/IS.390
3. Industry and development - Global report 1985 - ID/333
4. Regional industrial co-operation: experiences and perspective of ASEAN and the Andean Pact - UNIDO/IS.401
5. Main trends and issues in industrialization of the ESCAP region - IHT/HLEGMI/1.

For the guidance of our publications programme in order to assist in our publication activities, we would appreciate your completing the questionnaire below and returning it to UNIDO, Division for Industrial Studies, D-2119, P.O. Box 300, A-1400 Vienna, Austria

QUESTIONNAIRE

Industrial progress of selected sectors in the developing ESCAP region

(please check appropriate box)

yes

no

- | | | |
|--|--------------------------|--------------------------|
| (1) Was the analysis sound? | <input type="checkbox"/> | <input type="checkbox"/> |
| (2) Was the information provided new? | <input type="checkbox"/> | <input type="checkbox"/> |
| (3) Did you agree with the conclusions? | <input type="checkbox"/> | <input type="checkbox"/> |
| (4) Did you find the recommendations sound? | <input type="checkbox"/> | <input type="checkbox"/> |
| (5) Were the format and style easy to read? | <input type="checkbox"/> | <input type="checkbox"/> |
| (6) Do you wish to be put on our documents mailing list? | <input type="checkbox"/> | <input type="checkbox"/> |

If yes, please specify subjects of interest

- | | | |
|--|--------------------------|--------------------------|
| (7) Do you wish to receive the latest list of documents prepared by the Division for Industrial Studies? | <input type="checkbox"/> | <input type="checkbox"/> |
| (8) Any other comments? | | |

Name:
(in capitals)

Institution:
(please give full address)

Date: