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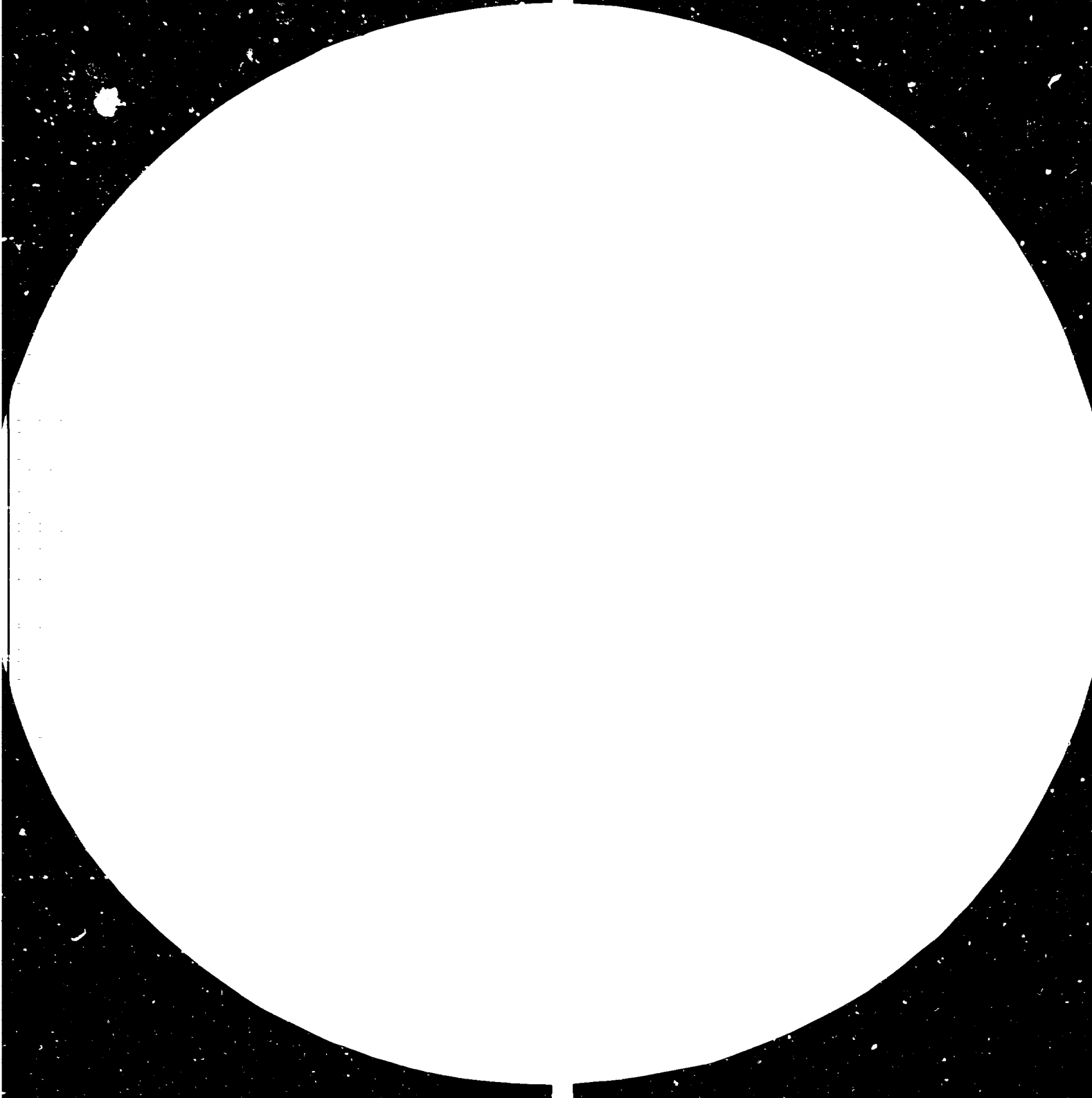

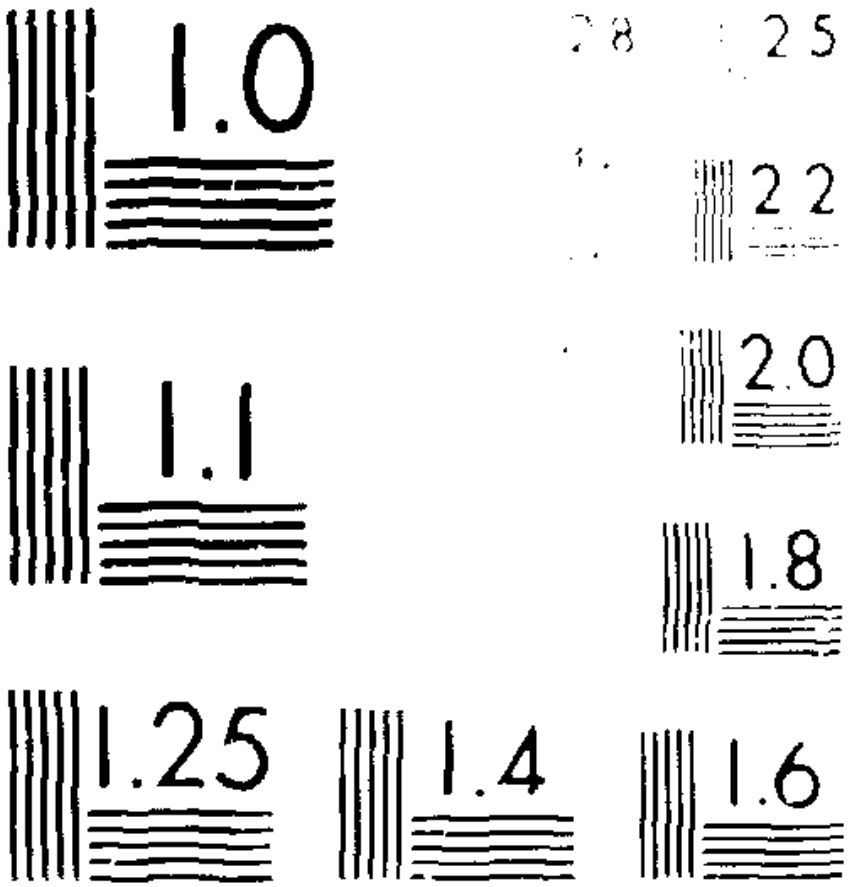
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TIES NEWSLETTER

TECHNOLOGICAL INFORMATION EXCHANGE SYSTEM

Issue Number 11 12039 September 1981

Dear Reader,

The Group of 77 held a High Level Conference on Economic Co-operation among Developing Countries at Caracas, Venezuela, from 13 to 19 May 1981. In its report, the Group of 77 reiterated its firm commitment to the principle of collective self-reliance and stressed that economic co-operation among developing countries is an integral part of the collective action of the Group for the restructuring of international economic relations and the establishment of the New International Economic Order.

The Conference adopted a Programme of Economic Co-operation among Developing Countries which, if implemented in a concrete, coherent, integrated and timely manner, will have mutually beneficial results for all developing countries. With regard to the field of technology, the Conference maintained that co-operation in this field is of critical importance as it constitutes an essential factor in the promotion and development of a sound programme of action in other fields of economic co-operation among developing countries. On the issue of technology, the Conference recommended inter alia the following actions:

- The Technological Information Exchange System (TIES), under the auspices of UNIDO, should be strengthened and enlarged to include other developing countries;
- The existing associations of national technology registries in developing countries should be encouraged;
- A bulletin containing information on technology surveys and research, technology transfer contracts and laws and available technologies should be published.

UNIDO is very pleased that such an eminent forum as the Group of 77 has actively supported UNIDO in its efforts to promote TIES and TIES-related activities. Such encouragement is important to the UNIDO Technology Programme in the performance of its tasks.

I would like to take this opportunity to say that the UNIDO Technology Programme will endeavour to follow up on the recommendations of the Group of 77, not only with respect to the TIES and TIES-related activities, but with respect to other technology-related aspects as well, to the extent that resources permit.

G.S. Gouri

Registry activities

First Meeting of Andean Technological Information System Committee

The first meeting of the board of directors of the Andean Technological Information System, which was established recently by Decision 154 of the Andean Pact was held at Lima, Peru, at the headquarters of the Executive Board of the Cartagena Agreement. The main objective of the meeting was to establish priorities for the rapid implementation of the projects contained in Decision 154. One of these projects is the establishment of a system to exchange information contained in technology transfer contracts. Collaboration with UNIDO's Technological Information Exchange System (TIES) was recommended at the meeting and the committee adopted a resolution which clearly establishes links between TIES and the Andean Group in this particular project. The first collaborative activity will be the preparation of a study on technology transfer in the pharmaceutical industry in the Andean Region, which will be presented at the next TIES meeting by one of the participants from the Andean Registry.

Indonesia - UNIDO Co-operation on Technology Transfer Issues

An advisory mission to Indonesia was undertaken by UNIDO in July 1981. The mission had a twofold purpose, firstly to study the present situation in Indonesia with regard to import of technology so as to propose a comprehensive and efficient system regulating the inflows of foreign technology into the country and secondly to prepare a technical assistance programme to implement such a system, if desired.

The findings of the mission will be discussed during a high level ASEAN policy meeting on the regulation of imports of technology which will take place at the end of September at UNIDO headquarters.

Indian Directory for Technology Transfer Proposed

Following a meeting of the Indian Standing Committee on Technology Transfer in the Field of Pharmaceutical Industry held earlier this year, it was decided that a directory of technologies available in the Indian drug industry should be drawn up. Opportunities for establishing technology transfer agreements with a number of developing countries have been identified during visits by Indian delegations to other developing countries but one major

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difficulty which has been identified is the non-availability of consolidated information on the technologies available, thus the need for a directory. To be compiled under the auspices of the Council of Scientific and Industrial Research, the directory will contain only those technologies which are available for export to other countries, are efficient and are likely to enhance the Indian industry's reputation in this field.

Towards a Transfer of Technology Policy for Egypt

This article is taken from the July issue of Investment Review, a quarterly journal on investment conditions in Egypt. The author of this article is Dr. W.G. Wahba, Director General, Research Promotion and Marketing, Foreign Investment Authority.

"In the flux of change that now characterises Egypt, it needs to be made certain that approvals of foreign contracts, whether involving technology alone, or it being accompanied by foreign investment, do not by inattention or disregard have unanticipated adverse impact on other sectors of the economy. Unguided, technology itself, as well as the terms under which it is acquired, can cause unacceptable distortions in society which may also become well - high irreversible. Uncontrolled acceptances or technologies can increase, rather than decrease, the country's technological dependence.

Transfer of Technology (TOT) Policy is not an extraneous injection. The more direct objectives of such a policy are to define those considerations which must guide the evaluation of contractual conditions in transfers of foreign technology to the country.

Technology policy cannot stand isolated from social issues.

It is necessary, therefore, to determine whether or not technological dependence might deepen. What penalties would have to be paid and who will pay them? This should lead, however, to another question as to whether or not such adverse social consequences could not be redressed, or alleviated, by spreading the 'technological load' over the overall production system.

If the latter approach has meaning, then technology policy must absorb the task of outlining the strategies which will:

(a) allocate sources of technology to the users of technology in the context of equity and appropriateness;

(b) ensure that the weaker sectors maintain, and not lose their viability by unrestricted exposure to competition from other sectors;

(c) upgrade overall utilization of technology by conscious development of capabilities in national managers and engineers;

(d) reduce technological dependence on overseas sources by internal transfers of technology; and

(e) stimulate local innovations and domestic developments of commercially competitive technology.

Correspondingly, institutional structures must be created in order to implement TOT policy. For the regulation of foreign technology a specialized agency is a sine qua non since international transfers of technology have bequeathed a new 'knowledge system', application of which requires multi-disciplinary skills. Technology policy must, therefore, delegate to this agency the role and functions of channelling of foreign transfers of technology.

In essence, the activities covered by the concept of TOT policy has as their main objective the acquisition of technology to be used in productive areas, as well as the development of a national capacity for autonomous decision making in matters of technology."

Registry news

Korea Institute of Science and Technology (KIST) and Korea Advanced Institute of Science (KAIS) Merged into New R and D Conglomerate

Last January, Korea's two leading R and D institutes, the Korea Institute of Science and Technology (KIST) and the Korea Advanced Institute of Science (KAIS) were merged into a new R and D conglomerate, the Korea Advanced Institute of Science and Technology (KAIST).

Dr. Lee, Choochun, a former KAIS professor of physics, was appointed the first president of KAIST and Dr. Kim, Chun Su and Dr. Park, Song Bai, the vice presidents for research and academic affairs respectively.

The merging is motivated by the need of maximizing the efficiency of the two institutes by utilizing fully the manpower and facilities of both institutes. Therefore, KIST is strengthened with basic research in the academic environment of KAIS while graduate students of KAIS have opportunities to have on-the-spot training at KIST.

The Technology Transfer Center of KIST, an active TIES member over the past years, will continue to be the national focal point for technology transfer under the new institutional arrangement.

New Policy on Import of Technology

The following article originally appeared in The Hindu, Madras, India, Vol. 7: No. 34, 22 August 1981.

"From Our Special Correspondent - New Delhi, August 12.

A policy statement is being formulated to prevent indiscriminate import of repetitive technology and ensure the absorption and adaptation of that already imported.

During the Janata regime, a detailed exercise was made by the then National

Committee on Science and Technology (NCST), headed by Dr. Atma Ram, and a comprehensive draft policy statement was brought out. It was discussed by the Cabinet a number of times, but did not get through.

The recently set-up Science Advisory Committee to the Cabinet (SACC) has started the exercise all over again and is drafting a policy statement.

Prof. M.G.K. Menon, Secretary, Department of Science and Technology (DST), told pressmen here that the proposed policy would be on the lines recommended by the working group on S and T for the Sixth Plan.

This implies that it will provide for a national register of foreign collaborations. It will stipulate that there should be a firm commitment to associate appropriate Indian R and D activity with all imports of knowhow and thereafter a commitment to ensure a scale of investment in R and D for the absorption of the imported knowhow.

The policy will seek to change the administrative procedure for approving import of technology.

At present, it involves only a formal notice to the domestic sector of the existence of an industrial demand for such a technology.

Moreover, the onus is on the domestic S and T agencies to demonstrate that in a particular case the import of technology is not required.

It is felt that industries and user Ministries do their technology shopping first, fix a collaborator and then come to the approval authority where they face the domestic S and T supply system.

This procedure will be changed in the new technology policy, which will put the onus on the seeker of foreign technology to demonstrate that the import is necessary. The potential importer will be required to shop first in the domestic market before seeking approval for import.

In reply to a question, Prof. Menon said that in the new policy the emphasis on self-reliance would be greater than it was in the policy drafted by the NCST.

Giving a resume of the directions in which the DST had been functioning to promote science and technology by strengthening the infrastructure facilities, he said an integrated research system on the use of renewable energy sources suited for villages in different locations had been proposed. The first such project was being set up at Salogipalli in Medak district of A.P.

Under the science and technology promotion programme, the DST had in the last five years supported 500 research projects, in which more than 1,000 scientists were involved. In 1980 81,115 new projects had been initiated.

A positive result of the promotion of inter-disciplinary areas of S and T had been the emergence of the area of bio-medical technology. The Sri Chitra Tirunal Institute of Medical Sciences and Technology, which had been taken over by the DST, would be devoted to this area.

Research projects for support had been identified in areas of major thrust like life sciences and chemical sciences.

In this context, Prof. Menon said a National Institute of Immunology had been set up as a registered society under the DST to deal with immunological research at both cellular and molecular levels covering human and animal health problems."

Recent legislation

China

In the second issue of the TIES Newsletter of March 1980, we published an unofficial translation of the text of the People's Republic of China's Law on Joint Ventures which came into effect on 1 July 1979. In continuation we now reproduce the full text of the "Detailed Rules and Regulations for the Implementation of the Income Tax Law of the People's Republic of China Concerning Joint Ventures with Chinese and Foreign Investment".

Detailed Rules and Regulations for the Implementation of the Income Tax Law of the People's Republic of China Concerning Joint Ventures with Chinese and Foreign Investment

Article 1

These detailed rules and regulations are formulated in accordance with the provisions of Article 17 of the Income Tax Law of the People's Republic of China Concerning Joint Ventures with Chinese and Foreign Investment (hereinafter called Tax Law for short).

Article 2

"Income derived from production and business" mentioned in Article 1 of the Tax Law means income from the production and business operations in industry, mining, communications, transportation, agriculture, forestry, animal husbandry, fisheries, poultry farming, commerce, tourism, food and drink, service and other trades.

"Income from other sources" mentioned in Article 1 of the Tax Law covers dividends, bonuses, interest and income from lease or transfer of property, patent right, ownership of trade marks, proprietary technology, copyright, and other sources.

Article 3

"A local surtax of 10 per cent of the assessed income tax" in Article 3 of the Tax Law means a surtax to be computed and levied according to the actual amount of income tax paid by joint ventures.

Reduction or exemption of local surtax on account of special circumstances shall be decided by the people's government of the province, municipality or autonomous region in which the joint venture is located.

Article 4

A foreign participant in a joint venture, who wants to remit its share of profits from China, shall report to the local tax authorities; the remitting agency shall withhold an income tax of 10 per cent from the remittance. No tax shall be levied on that part of its share of profits which is not remitted from China.

Article 5

"The first profit-making year" mentioned in Article 5 of the Tax Law means the year in which a joint venture has begun making profit after its losses in the initial stage of operation have been made up in accordance with the provisions of Article 7 of the Tax Law.

Article 6

A participant in a joint venture, who reinvests its share of profit in this enterprise or in other joint ventures with Chinese and foreign investment for a period of not less than five years in succession, may receive a refund of 40 per cent of the income tax already paid on the reinvested amount upon the examination and approval of the certificate of the invested enterprise by the tax authorities to which the tax was paid.

Article 7

The tax year for joint ventures starts from January 1 and ends on December 31 on the Gregorian calendar.

Article 8

The amount of taxable income shall be computed by the following formulae:

1. Industry:

a. Cost of production of the year is equal to direct material used in production of the year plus direct wages plus manufacturing expenses;

b. Cost of production of the year is equal to inventory of semi-finished product at the beginning of the year and in-production product plus cost of production of the year minus inventory of semi-finished product at the end of the year and in-production product;

c. Cost of sale of products is equal to cost of product of the year plus inventory of product at the beginning of the year minus inventory of product at the end of the year;

d. Net volume of sale of product is equal to total volume of sale of product minus (sales returns plus sales allowance);

e. Profit from sale of product is equal to net volume of sale of product minus taxes on sales minus cost of sale of product minus (selling expenses plus administrative expenses);

f. Amount of taxable income is equal to profit from sale of product plus profit from other operations plus non-operating income minus non-operating expenditure.

2. Commerce:

a. Net volume of sale is equal to total volume of sale minus (sales returns plus sales allowance);

b. Cost of sales is equal to inventory of merchandise at the beginning of the year plus [purchase of the year minus (purchase returned plus purchase discount) plus purchase expenses] minus inventory of merchandise at the end of the year;

c. Sale profit is equal to net volume of sale minus sale tax minus cost of sales minus (selling expenses plus overhead expenses);

d. Amount of taxable income is equal to sale profit plus profit from other operations plus non-operating income minus non-operating expenditure.

3. Service trades:

a. Net business income is equal to gross business income minus (business tax plus operating expenses plus overhead expenses);

b. Amount of taxable income is equal to net business income plus non-operating income minus non-operating expenditure.

4. Other lines of operation:

For other lines of operations, refer to the above-mentioned formulae for calculation.

Article 9

The following items shall not be counted as cost, expense or loss in computing the amount of taxable income:

1. Expenditure on the purchase or construction of machinery, equipment, buildings, facilities and other fixed assets;

2. Expenditure on the purchase of intangible assets;

3. Interest on capital;

4. Income tax payment and local surtax payment;

5. Penalty for illegal operations and losses in the form of confiscated property;

6. Overdue tax payment and tax penalty;

7. Losses from windstorms, floods and fire risks covered by insurance indemnity;

8. Donations and contributions other than those for public welfare and relief purposes;

9. That part of the entertainment expenses for operating purposes above the quota of three per thousand of the total sale income in the tax year or above the quota of ten per thousand of the total operational income and those entertainment expenses that are not relevant to production and operation.

Article 10

Depreciation of fixed assets in use shall be calculated on an annual basis. Fixed assets of joint ventures cover houses, buildings, machinery and other mechanical apparatus, means of transport and other equipment for the purpose of production with useful life of more than one year. But items, with a per-unit value of less than 500 yuan and a short useful life can be itemized as expenses according to the actual number in use.

Article 11

Fixed assets shall be assessed according to the original price.

For fixed assets used as investment, the original price shall be the price agreed upon by the participants at the time of investment.

For purchased fixed assets, the original price shall be the purchase price plus transport fees, installation expenses and other related expenses incurred before they are put to use.

For self-made and self-built fixed assets, the original price shall be the actual expenditures incurred in the course of manufacture or construction.

Article 12

In depreciating fixed assets, the residual value shall be assessed first and deducted from the original price, the principle being making the residual value at 10 per cent of the original price; those requiring to retain a little or no residual value, shall be submitted for approval to the local tax authorities.

The depreciation of fixed assets shall generally be computed in average by the method of straight line.

Article 13

The useful life for computing depreciation of fixed assets is as follows:

1. The minimum useful life for houses and buildings is 20 years;

2. The minimum useful life for trains, ships, machines and equipment and other facilities for the purpose of production is 10 years;

3. The minimum useful life for electronic equipment and means of transport other than trains and ships is 5 years.

For cases where the fixed assets of joint ventures, owing to special reasons, need to accelerate depreciation or where methods of depreciation need to be modified, applications shall be submitted by the said ventures to the local tax authorites for examination and then relayed level by level to the Ministry of Finance of the People's Republic of China for approval.

Article 14

Expenditures arising from the increase of value of fixed assets in use as a result of technical reform shall not be listed as expense.

The fixed assets continuing in use after full depreciation shall no longer be depreciated.

Article 15

The balance of the gain of joint ventures derived from sale of fixed assets at the current price after the net sum of non-depreciated assets or the residual value is deducted shall enter the year's loss and gain account.

Article 16

Intangible assets such as technical know-how, patent right, ownership of trade marks, copyright, ownership of sites and other royalties used as investment shall be assessed by amortization according to the sums provided in the agreements or contracts from the year they begin in use; for the intangible assets that are bought in at a fixed price, the actual payment shall be assessed from the year they are put in use.

The above-mentioned intangible assets with provision of time limit for use, shall be assessed by amortization according to the provision of time limit for use; those without the provision shall be assessed by amortization in ten years.

Article 17

Expenses arising during the period of preparation for a joint venture shall be amortized after it goes into production or business, with the amount of amortization not exceeding 20 per cent each year.

Article 18

Inventory of merchandise, raw materials, in-production products, semi-finished products, finished products and by-products shall be computed according to the cost price. For the method of computation, the joint ventures may choose one of the following: First-in first-out, shifting average and weighted average. In those cases where a change in the method of computation is neccessary, it shall be submitted for approval to the local tax authorities.

Article 19

Income tax to be paid in quarterly installments as prescribed in Article 8 of the Tax Law may be computed as one-fourth of the planned annual profit or the actual income in the preceding year.

Article 20

Joint ventures shall file their income tax returns and their final accounting statements with the local tax authorities within the prescribed period irrespective of profit or loss in the tax year and send the reports on

auditing by the chartered public accountants registered in the People's Republic of China.

The accounting statements submitted by branches of joint ventures within China to their head offices shall be submitted to the local tax authorities at the same time for reference.

Article 21

Joint ventures shall file tax returns within the time limit set by the Tax Law. In case of failure to submit the tax returns within the prescribed time limit owing to special circumstances, application should be submitted in the said time limit, and the time limit may be appropriately extended upon the approval of the local tax authorities.

The final day of the time limit for tax payment and filing tax returns may be extended if it falls upon an official holiday.

Article 22

Income of joint ventures in foreign currency shall be assessed according to the exchange rate quoted by the State General Administration of Exchange Control on the day when the tax payment certificates are made out and shall be taxed in renminbi.

Article 23

The accounting on the accrual basis shall be practised for revenue and expenditure of joint ventures. All accounting records shall be accurate and perfect and shall have lawful vouchers as the basis for entry account.

Article 24

The method of finance and accounting of joint ventures shall be submitted to local tax authorities for reference.

When the method of finance and accounting of joint ventures contradicts the provisions of the Tax Law, tax payments shall be computed according to the provisions of the Tax Law.

Article 25

Vouchers for accounting, accounting books and reports used by joint ventures shall be recorded in the Chinese language or in both Chinese and foreign language.

Accounting vouchers, accounting books and reports shall be kept for at least 15 years.

Article 26

Sales invoices and business receipts shall be submitted for approval to the local tax authorities before they are used.

Article 27

Officials sent by tax authorities shall produce identification cards when investigating the financial affairs, accounting books and tax situation of a joint venture and undertake to keep secret

Article 28

Tax authorities may impose a penalty of not more than 5,000 yuan on a joint venture which has violated the provisions of Articles 9, 11 and 12 of the Tax Law according to the seriousness of the case.

Article 29

Tax authorities may impose a penalty of not more than 5,000 yuan on a joint venture which has violated the provisions of Paragraph 2 of Article 25, and Article 26 of these detailed rules and regulations.

Article 30

Tax authorities shall serve notices on cases involving penalty in accordance with the relevant provisions of the Tax Law and these detailed rules and regulations.

Article 31

When a joint venture applies for reconsideration in accordance with the provisions of Article 15 of the Tax Law, the tax authorities concerned are required to make decisions within three months after receiving the application.

Article 32

Income tax paid abroad by joint ventures or its branches on their income earned outside China may be credited against the amount of income tax to be paid by their head offices upon presenting the foreign tax payment certificate. But the credit amount shall not exceed the payable tax on the income abroad computed according to the tax rate prescribed by China's Tax Law.

Article 33

Income tax returns and tax payment certificate used by joint ventures are to be printed by the General Tax Bureau of the Ministry of Finance of the People's Republic of China.

Article 34

The right of interpreting the provisions of these detailed rules and regulations resides in the Ministry of Finance of the People's Republic of China.

Article 35

These detailed rules and regulations come into force on the same date as the publication and enforcement of the "Income Tax Law of the People's Republic of China Concerning Joint Ventures with Chinese and Foreign Investment".

UNIDO activities

Technology Transfer Workshop in the Netherlands

A Workshop on Selection of Technology for Assembly of Electronic and Electrical Products in Developing Countries was held in Utrecht, the Netherlands, from 4 to 8 May 1981. The Workshop was jointly organized by the Industry Council for Development (ICD), Philips and the United Nations Development Programme and UNIDO. Philips hosted the workshop at their Pilot Plant Factory in Utrecht which has been set up to develop simplified and/or more labour-intensive capital equipment for electronic product assembly.

A total of 27 participants attended this Workshop, including 15 from developing countries. The participants were carefully selected to comprise specialists in electronic production as well as financial and planning experts in this field.

Philips had prepared a technical supplier's proposal for the possible establishment of a black and white television receiver assembly plant. The specialists from the developing countries were divided into three groups and examined this proposal from the point of view of either a large domestic market, a small internal market or a high volume export of electronic products.

At the final plenary sessions the workshop examined the factors or issues which required consideration for the establishment of electronic assembly plants in the developing countries. It was recommended that UNIDO should prepare guidelines for subsequent distribution in developing countries on the selection of technology for electronic assembly industries in the developing countries. A report of the workshop will be available shortly and the guidelines are currently being prepared.

Implications of Technological Development in the Machine Tool Industry for Developing Countries

As mentioned in the TIES Newsletter of March 1981, UNIDO is studying the advances in fields such as micro-electronics, tele-communications, bio-technology and genetic engineering. By doing this, UNIDO hopes to contribute to the growing awareness of the implications of such advances for the developing countries.

A sector which has been studied in detail over the past year is the Machine Tool Industry. A UNIDO Senior Consultant, Dr. S.M. Patil recently completed a study on "Technological Perspectives in the Machine Tool Industry in the Next Decade and their Implications for Developing Countries" and has submitted the draft report. The study consists of three volumes and reviews the world machine tool industry in the context of developed and developing countries, the technological trends in machine tool design and manufacture as well as production engineering. An attempt is made to assess the major implications of these trends for the developing countries. The study will eventually be published in the Development and Transfer of Technology Series of UNIDO.

Dr. Patil has had extensive experience in the machine tool industry and has dedicated most of his professional life to corporate development of the Indian State Enterprise, Hindustan Machine Tool Corporation.

The study states that the machine tool industry is characterized by continuous product improvement to satisfy the exacting requirements of the metalworking industry in the capital goods sector. As most of the world production capacity of the machine tool industry is located in 22 developed countries (92 per cent) it can be easily understood that all technological advances mostly originate from these countries. Consequently, all investigations will be focused on highly productive machine tools which will ensure the competitive advantage of the developed countries over the developing countries and will increase the already existing technological and productivity gap.

Technological trends

Technological trends observed by the author are described in detail in the study and a few are given below:

- The machine tool industry will begin using combinations of metal and non-metals to ensure conservation of non-renewable material resources, proper thermal stability and static and dynamic stiffness;

- Potential time reduction in metal cutting time of 50-70 per cent are foreseen. Depending on the application of such savings, overall output could increase by 15-30 per cent;

- Continuous development in new cutting tool materials are observed, parallel with developments in design and geometry, with the aim of higher metal removal, longer tool life and productivity gains;

- The introduction of the electronic "chip" in the machine tool industry and appropriate software systems have revolutionized the machine control by computer (CNC) systems and consequently manufacturing technologies in the metalworking industry. Control systems are built within the machine tool as an integral part and many if not all of the machining steps are numerically controlled. Quality and productivity improvements are the net benefits;

- The development of metal forming machines has become increasingly important, in particular for the automobile and aerospace industry. The reduction in machining sequences appears to be the main advantage although a high capital investment is required;

- To machine non-traditional materials like hastalloy, nitralloy, vespalloy, new machining methods have been developed such as thermal and electrothermal, and

chemical and electrochemical (electrochemical grinding) and mechanical (water jet machining).

Production aspects

The production of micro-electronics in machine tools has opened new production perspectives in the capital goods industry (of which the machine tool industry is a part). Computer aided manufacturing (CAM), flexible machining systems, fully and partially integrated manufacturing systems, automatic metrology and inspection systems and automatization in the assembly line, like Programmable Universal Machine for Assembly (PUMA) are just a few examples of the possibilities which machine tools have.

To illustrate the impact of such systems on the manufacturing of capital goods, the author devised a scenario:

1985 - assembly jobs will be integrated with other production processes, making use of computer aided manufacturing systems. At least 25 per cent of firms, representing a cross-section of advanced country industries, will apply software systems for automatization and optimization, e.g. computer aided manufacture (CAM).

1987 - Fifteen per cent of total machine tool production will constitute component blocks of flexible production systems.

1990 - Robots with human capabilities will be installed in assembly sequences.

1995 - Fifty per cent of the work in the final assembly of automobiles will be carried out by programmable automatization and robots.

The technology gap and its implications

Many developing countries, through acquiring technology mainly from transnational corporations, have developed capabilities and the production capacity to produce general purpose type machine tools. Some of those countries even compete sucessfully with the developed countries in the world export markets.

However, growing gaps in designs of machine tools, machine tool controls, cutting tool materials and manufacturing systems evolved in the advanced countries will ensure that the gain will be short-lived.

As the development of a machine tool industry is integrated with the overall industrial development, it is evident that the developing countries should adopt measures which in the end should reduce these gaps.

The author argues that since microelectronics were introduced in the manufacture of capital goods, the productivity of the metalworking and capital goods industry have increased in the developed countries. In order to increase their productivity in the metalworking and capital goods industries, the developing countries should develop and acquire as soon as possible those techniques developed in the advanced countries. An effective transfer of technology would enable the developing countries to avoid an even wider technology gap.

UNIDO's task must be to ensure such appropriate transfer of technology and to create awareness that a proper machine tool industry can be the heart of a proper industrial development strategy.

Patentability of Microorganisms and Implications for Developing Countries - II

In the TIES Newsletter issue number 10, we published extracts from a preliminary note the UNIDO Technology Programme presented at the first Exchange of Views UNIDO held with leading scientists and technologists in the field of genetic engineering on the implications of advances in genetic engineering for developing countries. In this issue, we print extracts of the report of the meeting concerning technology transfer aspects.

The report states that there is a need for developing countries to participate, on a more equitable basis, at the global level in the further development and commercialization of technology advances in this important field. This would call for an imaginative approach extending beyond the traditional modes of technology transfer. Possible avenues to be explored would include:

(a) Co-operative efforts through an international facility and transfer from such facility;

(b) Transfer from the public domain in the developed countries.

In addition to technological and business considerations there are also legal considerations, namely: regulatory, contractual and proprietary.

Any proposed plan of action relating to acquisition of genetic engineering technologies by developing nations must bear in mind the realities of world intellectual property laws and the lessons learned in prior transfers of technology.

More specifically, the existence of proprietary rights in either the developed or developing countries may have an effect, one way or the other, on the efficacy of any genetic engineering technology transfer. In this regard, two types of proprietary rights are primarily involved: trade secrets and patents.

Researchers in most private industries are restrained in the discussion of their work by corporate policies to keep developments in an area secret. The technology is often uniquely susceptible to exploitation as a trade secret, particularly where the commercially valuable commodity is a metabolic product of a modified organism (i.e. where the inventions cannot be "reverse engineered" from the product sold). While trade secrets are almost uniformly protected throughout the developed countries, encouragement of maintenance of trade secrets has the dangerous effect of suppressing dissemination of information. The

importance to the developing countries of free and widespread dissemination of genetic engineering technological information has plainly emerged from the meeting. While patent laws may enhance dissemination of information to some extent, it has been estimated that the vast majority of transferable technology and know-how is in the form of trade secrets.

The intellectual property laws of the developed countries have kept pace with developments in this area and generally now provide for patents to be issued on many genetic engineering inventions, including modified organisms themselves. The patent laws of the developed countries are said to be founded on two basic tenets, namely:

(a) that full disclosure of the invention to the public with attendant technological advancement is the price for limited private exclusivity; and

(b) that exclusivity is the best inspiration for rapid commercialization of new technology.

The disclosure of novel microorganisms has been facilitated by the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purpose of Patent Procedure (April 28, 1977). This treaty legitimizes existing national practice by providing for international recognition of a deposit of a sample of a microorganism in an acceptable depository, to be made available to the public upon the issuance of a patent, as an aid in fully disclosing a microorganism referred to in a patent application. Debate persists, however, as to whether detailed taxonomic and other written descriptive material must be included in the patent application in addition to the deposit. Indeed, whether the deposit should be required at all where the microorganism involved is either readily available to the public from other sources or can be predictably manufactured from such available organisms by specifically described recombinant DNA techniques is also being debated. Also in question is whether the starting organism or the genetically modified microorganism or both must be deposited.

The second major area of debate seems to be the scope of patent claims to be allowed in a microorganism patent. Should disclosure of one or a few strains entitle the applicant to claim the species? Should disclosure of one or a few species entitle the applicant to claim the genus? How predictable must the microorganism-modifying process be to support broad claims?

It is noted that certain developed countries have special patent or similar laws which give some degree of protection to the developers of new plants. Such laws may have some effect on the commercialization of plant-related genetic engineering developments.

Regarding legal considerations of technology transfer and ownership generally, some questions have been raised regarding the intellectual property law climate which should be provided in a developing country seeking genetic engineering expertise. It has been suggested that elimination of trade secret and patent protection in the developing country might "free-up" the technology. However, it has also been contended that, because much technology is privately owned, technology transfer to developing countries might be more likely where proprietary rights generally similar to those in developed countries exist. Moreover, it was noted that developing countries seeking to establish their own R and D capabilities may wish to accord others rights they might themselves desire in other countries.

Considerations of government versus private exploitation of new technology were also considered, with the poor record of the United States in commercializing government-owned inventions being cited for the proposition that governments may be poor entrepreneurs. Recent developments in U.S. Government Patent Policy in relation to Universities and Small Business were also cited in this regard. It was recognized, however, that governments may be the only entities capable of effecting commercialization where the market forces and demands required for private development are lacking.

With regard to technology transfer in the field of genetic engineering, the meeting made the following recommendations:

(a) Consideration should be directed towards two basic means of access to external bio-technologies:

(i) following traditional patterns (licensing and other commercial arrangements); and

(ii) through co-operative efforts through international research facilities under the auspices of UNIDO;

(b) In-depth consideration of efficient mechanisms for rapid transfer of proprietary technology to developing countries is needed, particularly in the area of know-how relating to commercial processes. Such consideration might be undertaken by UNIDO, possibly in co-operation with licensing groups from developed countries;

(c) UNIDO should explore the possibility of collecting and disseminating information on bio-technologies in, or hereafter coming into, the public domain for potential use and application in developing countries;

(d) At the national level, as well as at any international centre to be established, a concentration of efforts should be on R and D in bio-technologies, including training of personnel. Attention might be focused on possible improvements of existing technologies, which might then be available for cross-licensing, as well as on projects peculiarly within the interest of individual developing countries;

(e) Developing countries should consider developing novel incentive schemes for raising the interest of their industries in the application of bio-technologies;

(f) Consideration could be given to the introduction of certain new elements in the national patent laws in developing countries, which might facilitate faster access to proprietary bio-technologies. These might include shorter duration of patent life, full disclosure provisions extending into commercial utilization information, required domestic exploitation of the patent by the patent holders, foreign investment regulations, etc.

UNIDO news

Change at UNIDO Headquarters

For those of our readers who have had the pleasure of meeting Mr. G.S. Gouri personally and also following what he writes in the column entitled "Dear Reader", you will be glad to hear that the Executive Director of UNIDO has assigned him to the post of Director of the Division for Industrial Studies. He will continue to associate himself even more than before to the TIES programme.

Regional Centre for Small-Mini Hydro Power (MHG)

Decentralization of hydro power generation is now being generally accepted as a potential and expedient way of developing energy resources to meet integrated rural requirements as well as to support projects and programmes for rural industrialization and decentralization in the developing countries.

Most of the developing countries have rich and hitherto often not fully exploited hydrological resources in terms of scattered streams, rivulets, waterfalls etc. It is felt that resources could be profitably exploited through the establishment of decentralized Small-Mini Hydro Power Generation capacities, particularly in view of the fact that it is a renewable source of energy with a technology that has already been developed and put into application successfully.

This situation has become even more realistic realistic in view of the prevailing energy crisis putting an extreme pressure on the foreign exchange balances of many developing countries.

The First Seminar-Workshop on the Exchange of Experiences and Technology Transfer on Mini Hydro Electric Generation Units, held 10-14 September 1979 in Nepal, and organized jointly by UNIDO and ESCAP as well as the Second Seminar-Workshop/Study Tour in the Development and Application of Technology for Mini-Hydro Power Generation, held 17 October - 8 November 1980 in the People's Republic of China and the Philippines, and organized by UNIDO, strongly recommended the establishment of centres of excellence in research and development and training relevant to mini-hydro power generation (MHG). Both MHG meetings recognized that since the People's Republic of China had many years of experience in developing and operating small hydro-power generation, and had already built nearly 90,000 Mini-Hydro Power Units with a total generation capacity of 6.9 million kW, it would be appropriate to establish such a centre in China.

The Ministry of Water Conservancy of the People's Republic of China, following the recommendations of the Seminar-Workshops, decided to initiate a project for creating such a Regional Centre, with the support and co-operation of UNDP and UNIDO, and has already made budgetary allocations for the initial phase of the construction, secured the required land in Hangzhou, Zhejiang Province, selected senior and medium-level technical personnel of the Regional Centre, and initiated the building construction work. The UNDP Regional Bureau for Asia and the Pacific as well as the UNDP Field Office in Beijing, have also given their consent to the project and, as a first step, have agreed to finance the laboratory and training equipment required at the Regional Centre.

The general concept of the Regional Centre is that it would function as an umbrella set-up, based upon a network of national centres of the member countries. While stimulating national-level activities to be carried out by the national centres, the Regional Centre would:

(a) Undertake scientific research and technical development;

(b) Exchange technical information;

(c) Carry out technical training of mainly medium and higher-level personnel; and

(d) Provide technical advisory services and assistance related to the development and application of Small-Mini Hydro Power Generation.

A Needs Survey Meeting to identify priority problems and areas is planned to be organized for early 1982 inviting heads or directors of national MHG centres designated as focal points in the respective countries. The participants would be requested to prepare a country paper containing information on the priority subjects and areas of R and D, training needs, technical information and documentation and technical advisory services at the national level. A compilation of this information and the subsequent discussions at the meeting would help the Regional Centre to formulate a work programme that would meet the needs and requirements which could be tackled at the regional level of the Regional Centre.

It is also planned to organize a study tour for four or five high-level officials of the Regional Centre to visit a selected number of countries in order to enable the senior management personnel of the Regional Centre to gain insight into the concept, structure, organization, planning, programming and implementation of the work it is expected to carry out.

According to the present timetable, the first phase of the construction work of the Regional Centre is expected to be completed around October 1982. This first phase would

cover a building which would house the training, research and development, and library facilities, whereas the second building would be the dormitory for the local staff of the Regional Centre. The second phase of the construction work, expected to be completed in 1983, will include a hostel to accommodate foreign trainees, international experts and lecturers participating in the work programme. Consideration is therefore being given to organizing around that time the first training-workshop of the Regional Centre, and to selecting a suitable topic for that training-workshop that would be of interest to the member countries of the region.

The Regional Centre is expected to work closely with UNIDO, ESCAP and the ESCAP Regional Centre for Technology Transfer in Bangalore, as well as the national focal points in the member countries. Eventually, it will seek linkages and co-operative work with other international, regional and national organizations outside the ESCAP region.

Apart from such activities in the ESCAP region, similar activities have been initiated in the African region as well as in the Caribbean subregion. UNIDO is hoping to be able to contribute in a similar manner to the preparation and establishment of such regional entities.

Recent publications

ID/257 Case studies in the acquisition of technology (I). Development and transfer of technology series No. 14.

ID/262 Technological self-reliance of the developing countries: towards operational strategies. Development and transfer of technology series No. 15.

ID/WG.329/23 Small hydropower in China. Second seminar-workshop/study tour in the development and application of technology for mini-hydro power generation (MHG). Hangzhou, China, 17 October - 2 November 1980. Manila, Philippines, 3 - 8 November 1980.

ID/WG.329/24 Integration of small hydro plants of Yongchun County into the small local grid.

ID/WG.329/25 China's small hydroelectric machineries.

ID/WG.329/26 The rural electric power network planning and operation in Dayi Country, Sichuan Province.

ID/WG.329/28 Application of relief valves in small hydroelectric stations.

UNIDO/IS.222 Industrial technology in Africa. A preliminary view.

UNIDO/IS.232 Users' Guides to the International Patent Classification (IPC). II - Iron and steel.

UNIDO/IS.234 Users' Guides to the International Patent Classification (IPC). IV - Agro-Industries.

UNIDO/IS.245 Technology transfer issues - The preliminary survey of Indonesia. Mission findings and recommendations.

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