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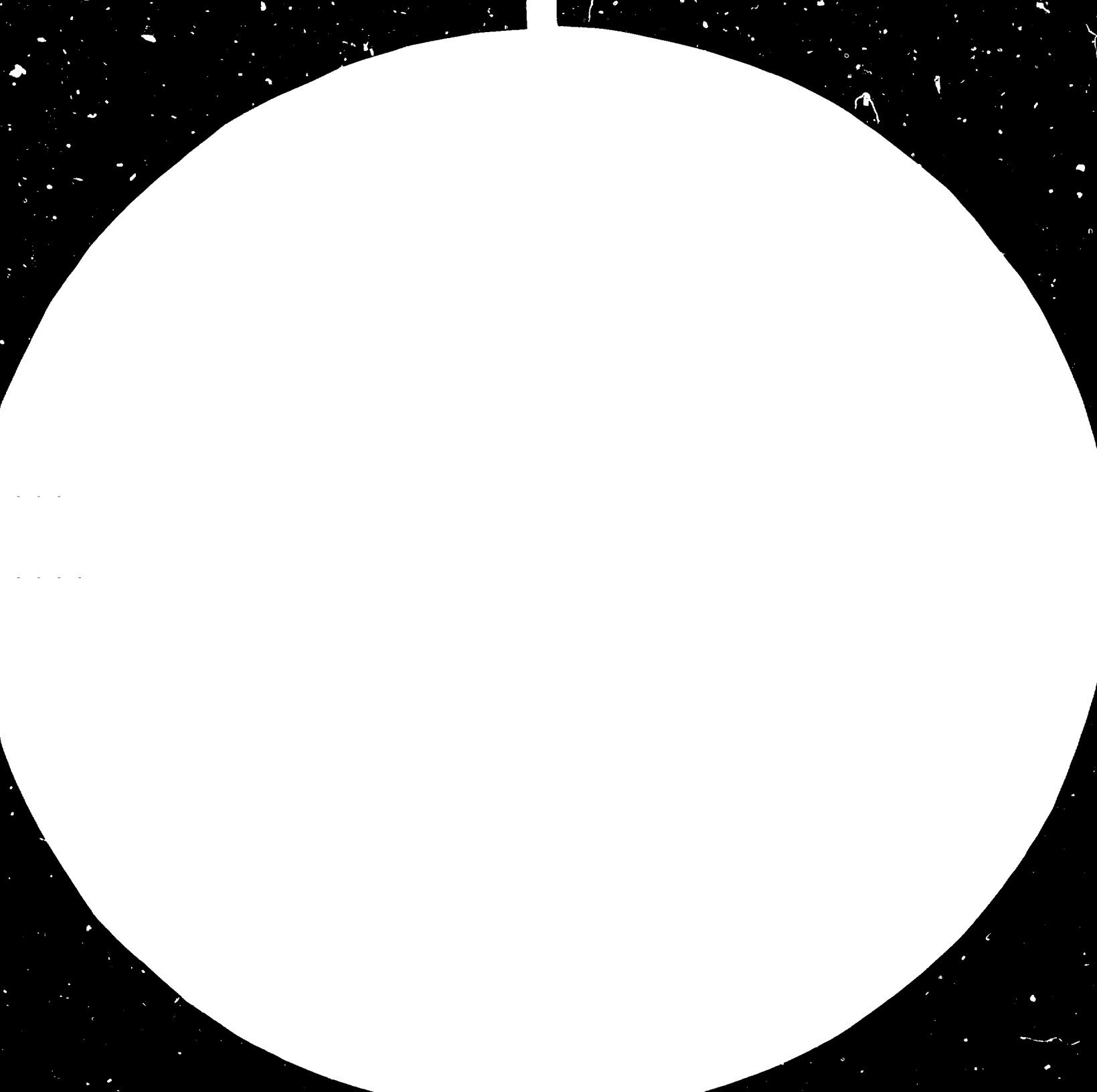
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MONITORING OF TECHNOLOGY TRANSFER AGREEMENTS BY  
REGULATORY AGENCIES - AN OVERVIEW OF POLICIES  
AND ISSUES\*

by

UNIDO Secretariat

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CONTENTS

	PAGE
INTRODUCTION	1
I. DEFINITION, OBJECTIVES AND CLASSIFICATION OF MONITORING TECHNOLOGY TRANSFER IN DEVELOPING COUNTRIES	2
1. Definition of monitoring	2
2. Objectives of monitoring	2
3. Classification of monitoring activities	3
4. The enforcement of the monitoring function	4
II. ORGANIZATIONAL ASPECTS OF MONITORING	4
1. Specific features of the monitoring function	4
2. Organization of monitoring within the registry	5
III. INFORMATION FLOWS CONNECTED WITH THE MONITORING FUNCTION	6
1. Sources and methods of collecting information for monitoring	6
2. Information storage and processing	8
3. Computerization of information system for monitoring	8
4. Dissemination of information and the follow-up actions	9
CONCLUSIONS AND RECOMMENDATIONS	9
ANNEXES	
I. Scope of information to be supplied for technology transfer contract monitoring	
II. Scope of information to be provided by the participating countries under the comparative scheme on monitoring	

## INTRODUCTION

In recent years there is a growing tendency among developing countries to evaluate the problems of technology transfer not merely as a separate issue but in a broader context of the long-term strategy of technological reconstruction, endogenous R + D activities and technological self-reliance. In addition, a shift in the attention of the policy makers might be observed: from short-term effects of technology imports (for example on the balance of payments) towards long-term implications with respect to the growth of the industrial sector based on imported technology, its innovative capacity, export performance, etc. This has resulted in the gradual shifting of the activities of the national regulatory agencies "from purely defensive and attempting to gain more equitable and just conditions for technology agreements into offensive wherein a long-term technological independence is at stake and the agencies' role is particularly important in the area of promotion of local technological capabilities in the framework of national technological policy".<sup>1/</sup>

One of the essential implications of the tendency outlined above is the growing interest in extending the activities of the national regulatory agencies to include the supervision of the implementation of approved technology agreements. In view of the above, the Seventh Meeting of Heads of Technology Transfer Registries held at New Delhi in 1982 requested the UNIDO secretariat "to undertake and present as soon as possible a study into possible ways and methods of effectively monitoring and evaluating the implementation of approved technology transfer contracts." <sup>2/</sup>

Until now relatively little attention has been given to monitoring activities in the discussions and the exchange of experience within the framework of the Technological Information Exchange System (TIES). Although several countries have already gained experience in monitoring,<sup>3/</sup> the country studies

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<sup>1/</sup> "Organization, Functions and Activities of National Technology Transfer Regulatory Agencies", UNIDC/IS.236, Vienna, 1981, p.2.

<sup>2/</sup> Report of the Seventh Meeting of Heads of Technology Transfer Registries, New Delhi, India, 7-10 December 1982. ID/WG.383/8, para 3(n).

<sup>3/</sup> Countries with at least some experience in monitoring activities are Argentina, Colombia, India, Peru, Philippines, Poland, Portugal, the Republic of Korea, Spain and Venezuela.

prepared under the auspices of UNIDO and other organizations contain little information on such activities.

Under these circumstances, the present report has to be viewed as a first step in fulfilling the recommendation of the Seventh TIES Meeting. Its major objective is to define and systematize the monitoring function and outline major policy issues and organizational alternatives especially with respect to the information requirements for effective monitoring. In addition, a scheme for a comparative study of the monitoring activities conducted by the technology transfer registries in developing countries is proposed. The final, comprehensive study on monitoring should incorporate the results of discussions and recommendations of the Eighth TIES Meeting as well as the replies of those individual member countries which agree to participate in the comparative scheme.

## I. DEFINITION, OBJECTIVES AND CLASSIFICATION OF MONITORING TECHNOLOGY IN DEVELOPING COUNTRIES

### 1. Definition of monitoring

Monitoring technology transfer contracts can be considered a function of the national government agencies dealing with the issues of technology, apart from regulatory, co-ordinating and promotional functions. It has to be pointed out however, that this function has not been precisely defined and the term "monitoring" is used differently by different authors and organizations. In UNCTAD documents and resolutions, for example, a broad interpretation of this term is usually applied as a synonym of government intervention in the process of technology transfer in general. For the sake of clarity, the monitoring function is defined in the present report as the set of measures and actions taken by respective government agency(ies) aimed at controlling and evaluating the effects of execution of approved technology transfer contracts.

### 2. Objectives of monitoring

The objectives of monitoring have to be seen within the broader context of the overall objectives of government intervention in the process of technology transfer in developing countries. Basically, it is assumed

that such intervention will ensure that technology purchases are subordinated to the meeting of the long-term development goals of a given country and technology is being acquired under fair, equitable conditions. Thus, the monitoring function should be viewed as the extension of government intervention over the most crucial sphere of technology transfer process, i.e. the absorption and mastering of acquired technologies.

The immediate objective of the monitoring function is to reinforce, if necessary, the positive effects of the applications of the technology acquired through the set of corrective measures introduced by the regulatory agency. These measures apply, in the first instance, to the execution of individual contracts and take the form of recommendations to be followed by technology suppliers and recipients. It has to be pointed out in this respect that essential deficiencies of the technology transfer process can be revealed only at the stage of the execution of the contract and therefore monitoring activities play a decisive role in reaching long-term objectives associated with technology transfer.

However, monitoring may also have a more general character. Through monitoring, the national regulatory agency acquired essential input for the evaluation of its own performance in the process of registration and approval. This, in turn may call for introducing new procedures and techniques for the evaluation of agreements submitted for approval. In addition, it may also provide background information for the general assessment of the effectiveness of the existing legal and institutional framework for technology transfer. In this case, the recommendations of the regulatory agency suggesting necessary changes in the legal and institutional framework are to be directed to the legislative bodies resolving such principal issues in a given country.

### 3. Classification of monitoring activities

When the major emphasis is placed on the implementation of contractual arrangements monitoring can be classified as micro oriented. On the other hand when individual contracts are basically monitored in order to reveal overall trends regarding the scope and effects of technology transfer these can be classified as being macro oriented. The importance of this



differentiation is related to the type of information and access to that information required to execute these activities. At the micro level of monitoring, an extensive reporting system on items such as royalty payments, training, local content (labour, raw material equipment), R + D expenditure, profits, sales, etc. for control purposes are necessary. For macro level monitoring, a more extensive information system is required, as the aggregate data collected at the micro level should be analyzed within the overall economic context.

#### 4. The enforcement of the monitoring function

If one considers monitoring as an integral part of the whole regulatory measures and procedures necessary to achieve its objectives, then this should be stipulated by the same legislative framework which provides the registry with its approval authority. Only through a legislative backing is the registry able to monitor effectively. In this connection, two important elements need to be included in the legislation, namely, (1) the access to information necessary to perform the monitoring functions, and (2) the right of the registry to intervene during the implementation stage when a deviation from the approved contract has been detected.

## II. ORGANIZATIONAL ASPECTS OF MONITORING

### 1. Specific features of the monitoring function

The monitoring function of a registry has distinctive features when compared with its other functions and briefly summarized below. Those features related to information collection and dissemination are dealt with in more detail in Chapter III.

(a) In the process of monitoring, the professional skills required for performing such functions are substantially different to those required for the approval procedures and in particular for the macro type of monitoring.

(b) The effectiveness of monitoring depends to a large extent on the access to information from outside sources. In this respect, it must be noted that the willingness of the recipient enterprise to co-operate and provide information to the registry is less in the case of monitoring compared to registration and approval.

## 2. Organization of monitoring within the registry

Bearing in mind the specific features of the monitoring activities, the establishment of a special monitoring unit within the registry may be feasible. Such a unit would have the following responsibilities:

### (a) Monitoring of implementation of agreement (micro)

Information is collected periodically on the implementation of an agreement which must be screened for validity and checked against the approval conditions. If necessary, corrective actions may be recommended. In some cases, and in particular with respect to royalty payments, this unit provides the necessary formal authorization for foreign exchange remittance. It may be necessary that for complicated and large contracts field visits are made to complete the information required for proper monitoring. This is particularly important when the country has an active technology policy which provides for incentives for technology absorption and development at the plant level.

### (b) Renewal of agreement (micro)

The monitoring unit should provide the necessary information and analysis for the proper evaluation of renewed contracts. The information related to the implementation of previous agreements can be a decisive factor for approval of the renewal.

### (c) Monitoring at the macro level (macro)

The monitoring of technology transfer trends will be much more effective if information is available on the implementation of the technology transfer agreements. As such, the monitoring unit should provide the necessary inputs based on the information received from individual contracts.

It is obvious from the above that close links with other government agencies involved in the formulation and implementation of technology policies would only enhance the work of the registry.

### III. INFORMATION FLOWS CONNECTED WITH THE MONITORING FUNCTION

The designing of the information flows is a pre-condition for the effective monitoring of technology agreements. On the other hand the availability of information constitutes a basic limitation for the monitoring actions. It is also important to note that the information requirements, methods of processing and dissemination related to the monitoring function are substantially different from those connected with the procedure of approval.

#### 1. Sources and methods of collecting information for monitoring

##### (a) Data on individual contracts

The information on the execution of individual contracts is the most essential for monitoring whether it is micro or macro-oriented. Therefore recipient enterprise of technology are principal sources of information for monitoring purposes. In order to assure the adequate inflow of information in an organized manner, the respective regulations stipulate in detail in what time intervals which kind of data should be provided by technology recipients. In practice this takes the form of questionnaires to be completed periodically by the respective companies. The scope of information collected is defined by the regulatory objectives of a given registry. For the purposes of illustration, a checklist of the type of information which can be collected is attached as Annex I.

At the stage of collecting the information the most important problem to be resolved is the quality and regularity of information provided by the firms. Notwithstanding existing regulations, much depends on the interest of a given company in co-operating with the regulatory agency in performing the monitoring function. Practical experience shows that quite often firms are not willing to provide reliable information on the implementation of the

acquired technologies. Several factors explaining such a negative attitude might be cited. First, unlike the approval procedures where a company may consider government intervention as a useful form of protection of its interest any control at the implementation stage is usually viewed as unnecessary red tape. Secondly, the monitoring actions may reveal essential shortcomings of the transfer process and the recipient might be called to undertake certain measures. It has to be borne in mind that for the company, preparations of the information set often requires a substantial amount of clerical work and the enterprises usually have to fill a number of statistical and other questionnaires requested by different government institutions.<sup>5/</sup> As a result, although in some countries firms are compelled by law to provide reliable data or the implementation of technology agreements, the quality of such information is often poor.

(b) Aggregated data

The aggregated data is necessary for analysing the effects of the technology transfer on the various sectors of the economy. It is mostly used in macro-oriented monitoring whereas for the micro-oriented monitoring, it is of lesser importance.

A substantial part of the aggregated data necessary for monitoring purposes can be derived from the registry information system itself or other generally available sources of information in a given country. The information for international comparisons, however, has to be supplemented by data from other countries or international data banks. In that respect the regional projects on information exchange on technology transfer for example, the Andean Technological Information System (SAIT) in Latin America, or international co-operative programmes for example, the UNIDO's Technological Information

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<sup>5/</sup> Therefore, an alternative way of collecting information on individual contracts is to obtain relevant data from other official sources. A substantial part of the information which can be of interest for the technology transfer registry is often collected within the central statistical system, for example, information on the volume of production, sales, employment is usually supplied by the companies on a regular basis. Thus, rather than asking the companies to provide such data again in a questionnaire, the data can be derived directly from other government data banks. However, this is only feasible when the organization of information at the national level is efficiently dealt with.

Exchange System (TIES) should be mentioned in the first instance.

## 2. Information storage and processing

The information collected from various sources has to be stored, analysed and elaborated in the required form in order to be distributed in the final version to the ultimate users. Bearing in mind that the monitoring function is usually viewed as an extension of the registration and approval procedures, principal differences of information processing between approval and monitoring functions have to be mentioned. First, the package of documents submitted for approval constitutes the principal body of the information set; other sources are usually of minor importance. On the other hand, in the case of monitoring, the comparative analysis of data on the performance in a given period with historical and/or aggregated data plays a decisive role. The approval procedure with respect to a given contract has defined time limits contrary to the periodical monitoring of indefinite duration. These and other differences would require specific arrangements with regard to the organization of monitoring activities already outlined in Chapter II.

## 3. Computerization of information system for monitoring

The issue of computerization should be viewed carefully within the context of the registry information system as a whole. It might be argued however that by adding a monitoring function to other standard functions the need to computerize the registry information system increases substantially. As was already pointed out, the scope of information flows related to monitoring is much more complex and it would in certain instances be difficult and ineffective to handle such flows with traditional methods. The comprehensive, broad monitoring would definitely require computerization. Bearing this in mind, certain preparatory measures can be undertaken at the early stages of monitoring activities. For example, well before effective computerization, documents, formats and classifications used might be as well as compatibility assured with other country data banks standardized for example, statistical systems, and/or international data systems (for example TIES, SAIT).

#### 4. Dissemination of information and the follow-up actions

With respect to the dissemination of information and the follow-up actions, major problems to be resolved are the forms of dissemination of monitoring reports, to whom such information should be addressed and the measures for effective implementation of monitoring recommendations.

Bearing in mind the basic distinction between micro and macro-oriented monitoring the information can be disseminated in the form of individual monitoring reports or aggregated reports evaluating trends in technology transfer in a given sector or in the economy as a whole. They can be issued on a regular basis or be prepared from time to time possibly upon special request. Consequently, the recipients of monitoring information can be individual firms, policy-making bodies and institutions, implementation agencies, international organizations, mass media, ecc. Obviously most important target groups are those which may undertake necessary follow-up actions, i.e. individual firms, policy-making and implementation agencies.

In view of the substantial amount of resources necessary to perform effective monitoring, the arrangements for the proper use of such efforts in the form of appropriate follow-up actions are of crucial importance. The principal shortcomings of the monitoring activities at that stage may result from (a) the lack of regulations which would make obligatory the implementation of the monitoring recommendations by the recipient, (b) lack of interest of respective policy-making bodies in introducing major changes in the legal and institutional framework for technology transfer, (c) lack of effective co-ordination and co-operation with other governmental agencies dealing with development and transfer of technology issues, etc. Therefore, in practical terms, the results of monitoring without effective measures for the implementation of monitoring recommendations can be negligible as compared to the expectations and resources invested in such operations.

## CONCLUSIONS AND RECOMMENDATIONS

The foregoing analysis underscores the importance of the monitoring function performed by a national agency for technology transfer in addition to the procedure of registration and approval. It might be argued that only by including monitoring can the regulation of technology transfer process be effective in terms of attaining the goals usually associated with such controls. On the other hand an extension of the functions performed by the registry to include monitoring might be considered an important step towards the integration of technology transfer policies and mechanisms within the broader framework of technological reconstruction in developing countries.

In view of the above it is recommended that technology transfer registries in developing countries should initiate and/or expand monitoring activities whenever feasible. However, as has been outlined in this report, monitoring is a very complicated, skilled labour-intensive and information-intensive operation.

The exchange of experience among developing countries within TIES as how to perform effectively the monitoring function would probably be the easiest way for gaining the necessary know-how. It is therefore recommended that TIES member countries participate in a comparative scheme on monitoring and provide relevant information as outlined in Annex II. The UNIDO secretariat may further elaborate on the material supplied by individual countries and prepare detailed guidelines on monitoring technology agreements. In view of the substantial amount of knowledge and skills needed for performing a monitoring function, the UNIDO secretariat might be asked to organize specialized workshops and seminars as well as provide other assistance for TIES member countries which are planning to start and/or expand monitoring activities.

ANNEX 1

Scope of information to be supplied for technology transfer contract monitoring<sup>1/</sup>

I. General data

1. Address of recipient and supplier of technology;
2. Date of implementation of the acquired technology.

II. Capital structure

1. Foreign equity (information on origin and amount of foreign capital compared with figures reported for previous years);
2. Local equity (as of end of previous and present year).

III. Products manufactured under licence

1. Local value added;
2. Domestic sales;
3. Export sales (country of destination, value, quantity);
4. Selling price (average) in domestic and export sales;
5. Inventory of finished goods;
6. Declared profit (product or company).

IV. Employment (information on real employment compared with the employment figures reported in the previous year or as compared with estimated employment)

1. Local personnel

Professionals

- a. project manager
- b. senior professional staff
- c. professional

Technicians

- senior technician (15 years experience)
- senior technician (10 years experience)
- technician (5 years experience)

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<sup>1/</sup> This is a non-exhaustive illustrative checklist of information to be supplied for monitoring purposes.



d. junior professional                      junior technical

2. Foreign personnel (for classification, see local personnel).

V. Information on the activities and services rendered by the foreign employees in the company

VI. Import data

1. Imports (country of origin, value, quantity)

- raw materials and supplies
- machinery and equipment

VII. Expenditures on the acquisition and implementation of technology

1. Fees and royalties (for detailed classification see TIES coding manual)

- lump sum
- royalties
- service fees.

2. Cost of implementation

- total cost
- capital expenditure
- import requirements.

VIII. Information on other benefits derived from the supplier of technology including new developments and improvements of technology acquired

IX. Information on training programmes conducted by the supplier of technology for the personnel of the recipient

- type of training (on the job, training centres, etc.)
- number of professionals trained                      duration
- number of technicians trained                      duration

X. Information on the measures undertaken to establish/improve research and development facilities by the recipient

ANNEX II

Scope of information to be provided by the participating countries under  
the comparative scheme on monitoring

Country:

Institution (registry):

I. Legal background for monitoring

1. Quote legislative provisions related directly or indirectly to monitoring;
2. List and enclose all internal (lower level) regulations issued by the registry or other institutions related to monitoring.

II. Types of monitoring activities performed by the registry

1. Describe in detail types of monitoring performed by the registry using whenever possible the classification applied in the study;
2. Indicate the year in which the monitoring of a given type has started.

III. Organization of monitoring activities

1. Internal organization
  - describe how monitoring is organized within the registry indicating whether a separate monitoring unit exists or not. If possible, attach an organizational chart.
2. Human resources
  - number of personnel engaged in monitoring;
  - level of qualifications.
3. Scope of co-operation with other government institutions in the process of monitoring.

IV. Information flows related to monitoring

1. Sources of information for monitoring
  - firms and recipients of technology;
  - others (specify);
  - evaluate the willingness of various suppliers to provide adequate information to the registry.
2. Forms of collecting information
  - describe all forms and questionnaires used for collecting information for monitoring purposes (enclose samples).
3. Quality of information
  - evaluate the quality of information received from various sources and list possible measures for use by the registry to improve this quality.
4. Information storage and processing
  - describe methods and techniques of the storage and processing of information for monitoring purposes.
5. Dissemination of information
  - preparation of standard outputs, forms for information dissemination to certain target groups.

V. Follow-up actions

1. Describe follow-up measures based upon recommendations included in the monitoring reports.

VI. Effects of monitoring

1. Evaluate the effects of monitoring activities quoting the examples of positive results achieved so far.

VII. Future expansion of monitoring activities by the registry

1. Evaluate future trends and directions of expansion of the monitoring activities by the registry.

VIII. Possible areas of co-operation within TIES

1. List possible areas of co-operation within TIES and forms of assistance to be provided by the UNIDO secretariat which would be most helpful to your registry in the process of starting/expanding monitoring activities.

