

A Report on
Technology Upgradation for
Enterprises in the Unorganised Sector
Status, Constraints & Recommendations



सत्यमेव जयते

**NATIONAL COMMISSION FOR ENTERPRISES IN THE
UNORGANISED SECTOR**

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Previous reports of National Commission for Enterprises in the Unorganised Sector

1. Social Security for Unorganised Workers, May 2006
2. National policy on Urban Street Vendors, May 2006
3. Comprehensive Legislation for Minimum Conditions of Work and Social Security for Unorganised Workers, July 2007
4. Conditions of Work and Promotion of Livelihood in the Unorganised Sector, August 2007
5. Financing of Enterprises in the Unorganised Sector, November 2007
6. Creation of a National Fund for the Unorganised Sector (NAFUS), November 2007
7. Report on Definitional and Statistical Issues relating to Informal Economy, November 2008
8. A Special Programme for Marginal and Small Farmers, December 2008

Previous Working Papers of the National Commission for Enterprises in the Unorganised Sector

1. Measure of Labour Force Participation and Utilization, January 2008
2. Contribution of the Unorganised Sector to GDP Report of the Sub Committee of a NCEUS Task Force, March 2008
3. Definitional and Statistical Issues Relating to Workers in Informal Employment, January 2009.

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D.O.No.AKS/NCEUS/2009/
Dated the 24th April, 2009

Dear Prime Minister,

The NCEUS as part of its terms of reference was required to identify constraints faced by Unorganised Sector Enterprises and suggest measures to provide institutional support and linkages to facilitate easy access to credit, skill, technology, marketing, etc.

In pursuance of the above, the Commission has prepared a report on the status and constraints faced by the unorganised sector enterprises vis-a-vis technology. The Commission has noted that as per the Third All India Census of Small Scale Industries, more than 85 per cent of the total registered SSI units do not have access to technical know-how. The report spans the technological needs of Unorganised Sector Enterprises, international experiences and major initiatives of the government and makes substantive recommendations to promote innovation, dissemination, acquisition and upgradation of technology. These recommendations, if, implemented will go a long way in improving the productivity and income levels of the unorganised sector workers.

Yours sincerely,

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Seven meetings were held at Delhi, Kolkata, Chennai, Guwahati, Kanpur, Pune and Mumbai with various stakeholders, including representatives of Central and State governments, RBI, NABARD, SIDBI, and various other financial institutions and also with microenterprise associations and federations. These meetings, coordinated by Small Industries Service Institutes of the Ministry of Micro, Small and Medium Enterprises, the National Institute of Bank Management at Pune and the Tamil Nadu Association of Enterprises of Rural Industries and Microenterprises at Chennai, provided insights into the specific technological problems being faced by the microenterprise sector in India.

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Executive Summary

- 1 Liberalisation and the accompanying policy of economic reforms have created a new environment that exposes the unorganised enterprises to various vulnerabilities while at the same time providing new and greater challenges for growth and adjustment. The post-liberalisation business environment has become harsh for the unorganised sector because of increased internal and external competition. Despite the growing awareness of the impending threats, the unorganised sector is not adequately prepared for the new challenges.
- 2 While the ability of unorganised enterprises to access existing technology and adapt it to their needs is crucial, the extent to which such enterprises innovate at their own levels is also considered critical in contributing to their productivity and growth. Technology acquisition, adaptation and innovation would not only facilitate them to move up the value chain and thus prepare them to effectively meet the challenges of a competitive environment but also create conditions for overcoming the prevailing disjunction between the organised and the small and micro enterprises.
- 3 An overwhelming proportion of the enterprises and workers in India are in the unorganised sector. These enterprises are present in both the rural and urban areas but their presence is significantly more in the rural areas. The unorganised workers have lower educational levels. Female workers and workers in the rural areas are worse off than the average. They are entangled in vicious levels of poverty which reduces their productivity and income levels. Productivity of the unorganised enterprises in the rural areas is low as compared to those of the urban counterparts.
- 4 As per the Third All India Census of Small scale Industries 2001-02, 85.38 per cent of the total registered SSI units do not have any access to technical know-how. Further, the unorganised sector enterprises are hampered by obsolete technology which further reduces their productivity and income. To improve productivity in the unorganised sector, simultaneous action is required to address the twin problems of skill and technology.

Technology & Innovation in MSEs

- 5 The technology and innovation processes in small and medium enterprises (MSEs) are different from those that take place in the context of larger firms. MSEs innovate more informally than large firms without developing an explicit strategic framework for innovation, and are generally outside the framework of formal R&D projects. MSEs are seen to be more region-centred than large firms. They are more locally bounded and depend strongly on their direct institutional environment. Technology and innovation processes thus call for the integration of different technological and organisational knowledge inputs that are often derived from other firms and other regions.
- 6 Technology in the MSE sector consists of the capability to integrate various elementary techniques, which may be complementary between themselves, while focusing on specific and often very specialised and innovative applications. Given the heterogeneity of MSEs, innovation opportunities differ greatly among the various groups, some firms are ready to introduce innovations relevant for their purposes, while others are not even aware of the potential innovations.

- 7 Technology alone is not sufficient to improve productivity and efficiency of the unorganised sector. It requires the supply of other inputs as well particularly credit, raw material and skilled work force.
- 8 Only a very small percentage of MSEs have the financial and organisational capabilities to generate internal resources for innovation. This reiterates the need for strong public institutional mechanism for scientific research and creation of effective linkages with MSEs for access to knowledge generated in the public domain. Finally, technology acquisition in MSEs has to be linked to issues of skill development and employment conditions as most often the decisions to upgrade technology are dependent on the availability of suitable labour and the terms on which it can be employed.

Technological Needs of MSEs

- 9 There are micro enterprises that are active in a specific geographical area (clusters, districts). Typically these are extremely specialised in some stage of the value chain and/or in a product niche. They develop linkages with the other firms in the area and learn via informal processes, acquisition of capital goods or interactions with other companies. The technological strength for them is derived essentially from the processes of knowledge sharing and knowledge flows that take place in the areas where they are located, which in many cases are informal.
- 10 There are also enterprises based on processes of division of labour and specialised in the supply of intermediate products and components to other (often larger) enterprises. The primary source of knowledge for technology and innovations for these enterprises comes from their participation in the sub-contracting network and very often rests on the ability and willingness of the larger firms to pass on the technology to enhance the productivity of the entire value chain. The need of the enterprises is to access a variety of sources of knowledge, especially from clients and suppliers.
- 11 The commonly accepted sources of ingredients of up-gradation are both internal and external to the firm. Internal sources include formal R&D, design and tooling-up, learning-by-doing and learning-by-using, internal human resources and training and marketing. External sources include R&D performed jointly or under contract by some specialised supplier of R&D services, the acquisition of licenses and the purchase of patents and other intellectual property rights, the exploitation of scientific and technical literature, patents as well as participation in conferences and workshops, Internet resources, acquisition of machinery and equipment linked to product and process innovations, interactions with suppliers of equipment, materials, components or software, imitation of competitors including reverse engineering, from clients, through understanding of user needs, services provided by consultants, participation in exhibitions and fairs.

Case Studies

- 12 Case studies reveal that traditional industries have suffered in recent years due to change in demand, preferences and designs and the failure of these industries in changing themselves to the changed requirement. Case study on textile industry reveals that if an institution is meant for technical upgradation of both large and small enterprises, the main beneficiaries are only the large enterprises and often the conditions are so framed that keeps the small, micro and unorganised enterprises out of the purview of benefits. However, a dedicated institution conversant with ground level reality, as in the case of leather, can direct some of the advantages to the unorganised sector.

Major Initiatives

- 13 Technology support to enterprises in India is provided by a large number of organisations both at the Central and the state governments' levels as well as to some extent by institutions and agencies in the private sector and the NGOs.
- 14 Ministry of Micro, Small and Medium Enterprises (MSME) plays a key role in the development and regulation of issues relating to small scale industries and operates most of its schemes and programmes through the Development Commissioner (DC)'s office, Micro, Small and Medium Enterprises-Development Organisation (MSME-DO). With over 60 offices and 21 autonomous bodies located in different parts of the country, the MSME-DO advises the Government in policy formulation provides techno-economic and managerial consultancy, common facilities and extension services and extends facilities for technology up-gradation, modernisation, quality improvement and infrastructure. The MSME-DO maintains Tool Rooms, Technology Development Centres and Testing Centres in major centres. Credit Linked Capital Subsidy Scheme for Technology Up-gradation (CLCSS), Micro & Small Enterprises-Cluster Development Programme (MSE-CDP) and Reimbursement of Expenses for Acquiring Quality Certification, etc., are some of their major schemes.
- 15 National Small Industries Corporation (NSIC), a Government of India undertaking of the Ministry of MSME, also helps in the technology up-gradation of micro and small enterprises. NSIC offers support services through its Technical Services Centres and Extension Centres. NSIC has also set up Incubation Centres for small enterprises at its Technical Centres.
- 16 Ministry of MSME helps in technological up-gradation of Khadi and village industries through KVIC and of coir industry through Coir Board. Notable schemes in this regard are the Scheme of Fund for Regeneration of Traditional Industries (SFURTI), Prime Minister's Employment Generation Programmes (PMEGP), Khadi & Village Industries (S&T Scheme), Product Development, Design Intervention & Packaging (PRODIP), Rural Industries Service Centres (RISC), MOUs with Technical Interface Institutes, and Scheme for Enhancing Productivity & Competitiveness of Artisans & Khadi Industry, operated through Khadi & Village Industries Commission. Mahatma Gandhi Institute for Rural Industrialisation (MGIRI) is an autonomous organisation under Ministry of MSME. Coir Board extends technology support through Science & Technology Up-gradation scheme for the Coir Sector, Scheme to Rejuvenate, Modernise & Technologically Upgrade the Spinners & Tiny Household Sector. Central Coir Research Institute (CCRI) Kalavoor (Alleppey) & the Central Institute of Coir Technology, Penya Industrial Area (Bangalore) also aid and advise the coir sector.
- 17 Ministry of Science & Technology's involvement in technology support to MSEs are through various scheme, programmes and institutions viz Science Technology Programme for Socio-Economic Development, Science & Technology Application for Rural Development, National Science & Technology Entrepreneurship Development Board (NSTEDB), Technology Information, Forecasting Assessment Council (TIFAC) and Technology Development & Innovation Programme. National Research Development Corporation (NRDC) also operates schemes like Invention Promotion Programme (IPP), Technology Promotion Programme (TPP), Development and Promotion of Rural Technology, Promotion of Export of Technology, Informatics for Technology Transfer, Technology Development Programme for Priority Projects and Technology Transfer Scheme.
- 18 Ministry of Textiles operates a Technology Up-gradation Fund Scheme specifically for the textile units the scope of which currently does not cover the MSEs. The Ministry has been implementing product specific

technology development programmes for traditional industries through Central Silk Board, Central Wool Development Board, Offices of the Development Commissioner (Handlooms), Development Commissioner (Handicrafts) and also the Jute Commissioner,

- 19 The schemes of the Ministry of Food Processing Industries (MFPI) relate to Setting up/Establishment/Modernisation/Technology Up-gradation of Food Processing Industries, and for Quality Assurance, Codex Standard, R&D & Other Promotional Activities.
- 20 Ministry of Rural Development promotes advancement and dissemination of rural technology through Council for Advancement of People's Action and Rural Technology (CAPART).
- 21 Small Industries Development Bank of India (SIDBI) is operating a number of schemes on behalf of various ministries such as Credit Linked Capital Subsidy Scheme (CLCSS), for MSME. Technology Up-gradation Fund Scheme (TUFS) for textiles and jute sectors, Scheme for Development of Leather Sector (IDLS), and also some independent schemes like Venture Capital Fund, Scheme of Small Enterprises Financial Centres (SEFC), Micro Venture Innovation Fund, etc.. It also runs a Centre for Innovation Incubation for Small Industries (SCII). It recently opened the Technology Bureau for Small Enterprises (TBSE) as a joint venture of SIDBI and the Asia Pacific Centre for Transfer of Technology (APCTT).
- 22 Ministry of Commerce & Industry (Department of Industrial Policy & Promotion) has under it the Central Leather Research Institute (CLRI) which provides vital technological support to the industry in such areas as leather processing technology, leather chemicals, effluent treatment, and product design and quality standardisation. Above all it supplies trained manpower for different sectors of the industry. From a technology generating institute, CLRI today has moved to public private partnerships to become the world's largest leather research institute.
- 23 The Integrated Development of Leather Sector (IDLS) focuses on technology up-gradation and modernisation in all segments of the leather industry. CLRI and Footwear Design and Development Institute (FDDI) are implementing the scheme. Central Ministry of Agriculture through the National Horticulture Mission, the Indian Council of Agriculture Research (ICAR) and NABARD are also implementing technology intervention programmes and dissemination of technology. Similarly, the Tea Board under Ministry of Commerce operates many schemes to assist research institutes for undertaking research on quality up-gradation and technology transfer for improving productivity, value addition and product diversification.
- 24 Almost all the state governments have set up institutions for technology up-gradation and dissemination which requires interventions more specific to the needs and practices of the region. Similarly, almost all Central Government ministries/ departments concerned with industry, agriculture, rural development, etc, are implementing one or the other technology related schemes. Many of these relate to micro and small enterprises, artisan based and traditional industries. Some of these schemes involve improvement of technology in the form of tool rooms, product and development centres, and design and quality development centres, incentives for adoption of improved technology, quality improvement and modernisation and also support for adoption of improved technology through credit linked programmes implemented through development financial institutions like SIDBI.

International Experiences

- 25 During the reform period in China, a number of mechanisms were evolved to effectively link academia with production to facilitate efficient measures of technology transfer. High/New Technologies Pioneer Services

Centres (PSCs) (incubators) have been established in hi-tech zones to transfer scientific research results to production centres. More than 70 technological incubators in various provinces and cities provide scientists with places to turn scientific results into technical applications. Business incubators reduce the investment cost of venture business and enhance the success rate of technology-based start-ups. China's High Technology Development Zones (HTDZ)- The Torch Programme (similar to S&T parks in developed countries)- develop new and hi-tech products in close cooperation with the universities and research institutes. A major initiative of the programme consists of linking research and industry to inspire technology and knowledge-based entrepreneurship and innovation in SMEs. Strong policy back-up from the Government and diversified business incubators has led to significant increase in the number of Business Incubators in China, accounting for close to 600 in 2007. The Spark Programme aims at promoting the application of appropriate technologies in Village & Township Enterprises (VTEs). Spark projects import, digest and spread technologies to promote commercialisation of scientific achievements. There are more than 1 lakh S&T demonstration projects being carried out in 85 per cent of the rural areas in China.

- 26 The Ministry of Science and Technology (MOST) of the Republic of Korea devised schemes and incentives in 1980s to promote cooperative R&D between private firms and government sponsored research institutes (GRIs). MOST has put in place a joint research system through which industries can participate in the projects formulated by them with GRIs. The Government has also extended R&D subsidies and conducted research jointly with private firms, the results of which are commercialised by the participating enterprises. The Government created the SME Technology Development Programme to assist SMEs suffering from technological backwardness.
- 27 Japanese efforts to promote collaborative research are mainly through funding of specific programmes and establishment of institutes that work in close cooperation with universities and industry. The Government funds large, risky projects such as development of high-performance computers and power generators through research associations. The Bio-oriented Technology Research Advancement Institute was set up to promote basic R&D in bio-technology. Ministry of International Trade and Industry (MITI) established the Research and Development Programme on Basic Technologies for Future Industries, administrated by the Japan Key Technology Centre. The New Energy and Industrial Technology Development Organisation, (NEDO), a public organisation pursuing basic and advanced R&D in industrial technology, has built up large-scale facilities with the private sector and conducts international joint research. In Japan, many technology incubators and enterprise start up programmes have been established and parallel policies have been put into place to promote industrial agglomeration and clusters of SMEs and to improve access to finance. Public universities have been denationalised and encouraged to become active in spinning out entrepreneurial start ups and transferring new technologies to SMEs.
- 28 In Australia, Cooperative Research Centres (CRCs) are being established as companies to forge effective linkages between universities, public sector R&D institutions and the industry to capture the benefits of research and to strengthen the links between research and production.
- 29 In Sri Lanka, Ceylon Institute of Scientific and Industrial Research (CISIR), provides S&T expertise and services for the development of industrial processes/testing services, utilisation of natural resources, training of research workers, etc, and extension services in several industrial sectors. Sri Lanka has recently launched an integrated programme to promote Micro, Small and Medium Enterprises to meet the competitive demands of globalisation and termination of the Multi-Fibre Agreement in 2005.

- 30 A major concern in Malaysia is the public sector R&D to become commercially more relevant and to contribute towards the economic development of the country. Public sector research institutes are being encouraged to undertake applied research to solve product and process-related problems of the industry. Malaysia has a very distinct strategy to encourage SMEs to become part of the global supply chain and to achieve sustained high growth. By adopting a liberal investment regime, it has stimulated technology spillovers from MNCs to local SMEs, through the introduction of the Industrial Linkage Programme (ILP) and the Global Supplier Programme (GSP).
- 31 Across the world there have been interventions by the governments to resolve the issues relating to technology up-gradation in the micro and small enterprises. To address appropriately the technology related aspects of the micro enterprises, it is important to develop links between the industry/enterprises on the one hand and research & development laboratories/academia on the other. This is important for the dissemination and transfer of the existing set of technologies for its appropriate commercialisation. Those countries which have successfully implemented this strategy have succeeded in improving the productivity of their micro and small enterprises and ensured adequate supply of credit at a reasonable cost to both the technical institutions and the entrepreneurs.

Barriers in Technology Adoption

- 32 The most formidable problem faced by the SMEs in India has been in accessing technology and maintaining competitiveness. The reasons are:
- Poor financial situation and low levels of R&D
 - Poor adaptability to changing trade trends
 - Desire to avoid risk
 - Non-availability of technically trained human resources
 - Emphasis on production and not on production costs
 - Lack of management skills
 - Lack of access to technological information and consultancy services
 - Isolation from technology hubs
- 33 The most important barrier in the adoption of improved technology is the lack of financial resources to the unit. In several instances, the cost of technology makes it difficult to be adopted. A large number of SSI units reported difficulty in obtaining sufficient funds from banks and financial institutions. There was also the lack of awareness about the credit guarantee scheme. Other barriers observed are lack of awareness and information about the availability of requisite technology, desire to avoid risk of adoption of improved technology, low level of indigenous R&D, inadequate management skills and non-availability of technically qualified persons to operate the new technology.

Issues & Concerns

- 34 *Inadequate Attention to Rural Technology:* Experience with most of the past technology transfers has shown that often technologies developed in laboratories but not tested and proven under field conditions were disseminated on a large scale with poor results, non-acceptance by intended beneficiaries, under-performance and unsuitability for rural conditions. Experiences of successes, and more importantly of failures, have been poorly documented and inadequately shared among the stakeholders.

- 35 *Lack of Grass-root Contact:* Technology institutions and research laboratories have expertise in technology development but have almost no grass-root level outreach/contacts. The Voluntary Organisations on the other hand have limited technological expertise but have excellent field presence.
- 36 *Poor Technology Delivery:* Technology transfer is a specialised task with its own requirements of expertise and experience, and cannot simply be left either to the technology developer or the user. The challenge is to establish synergy among S&T NGOs, government agencies, district administration and the industry. One of the key areas of concerns remains the lack of extension and dissemination of existing technologies and their adaptation by micro enterprises despite the presence of various organisations/institutions.
- 37 *Poor Technology Dissemination:* In the case of rural development programmes, research and development managers did not configure projects to ensure that the technologies being developed met the real world needs and could be fitted into the industrial and social infrastructure. The interaction of R & D agencies with the users has been weak. There has been no attempt to match the mechanisms of technology transfer to technical and user conditions. A Central agency is needed with network at local levels which first identifies the technological needs of the enterprises in the local area, co-ordinates with the R&D institutions in the area and displays the appropriate state-of- the- art technology.
- 38 *Problem of Affordability:* The inability of the enterprises in the unorganised sector to afford the available technology has hampered their productivity and growth. These enterprises have not been able to avail the existing technologies because of their low incomes and poor resources.
- 39 *Inability to Achieve Economies of Scale:* A cluster-based approach has the maximum demonstrative effect and the technology up-gradation of even one unit will have its impact on the whole cluster and others do not shy away from adopting the new technology as it has already been commercially proven.
- 40 *Lack of Co-ordination:* There are a large number of agencies which carryout one or the other technology promotion schemes but often without coordination resulting in thin spread of valuable resources. The industry service institutions of the Ministry of MSME and other ministries need to expand their activities.
- 41 *Poor Financial Condition of NGOs & Lack of Technology Orientation:* Voluntary organisations spread across the country are not S&T oriented and those which work for technology up-gradation suffer from lack of resources.
- 42 *Poor Data Base:* There are two inter-related issues here. First, most compendia are mere listing of possibilities with little or no reference to field-testing, sustainability or ground realities rendering their direct utilisation by the end-users highly problematic. Second, rural technologies must be need-based, holistic packages and accompanied by field models with a system design comprising processes, equipment/ machinery, organisational structures, product-market linkages, etc.
- 43 *Lack of Appreciation of Changed Environment:* Vast majority of the units continue to use obsolete production processes and outdated technologies. The vulnerability of these enterprises in the WTO regime could be summarised as follows:
- Loss of protected environment
 - Greater competition from imports
 - Reduction in conventional subsidy (many subsidies are contestable)
 - Technology gap
 - Quality and standards gap.

- Environmental regulation.
 - Sanitary conditions.
 - Non-Adherence to Intellectual Property Rights
 - Penalty on Reverse Engineering
- 44 *Inadequate Patenting Facility:* Government will have to subsidise the cost of patenting by the micro and small enterprises and help in accessing the patented technology at cheaper rates.
- 45 *Lack of Linkage between Large Enterprises & Unorganised Enterprises:* Ancillarization has suffered in India in the post reform period due to non-enforcement of guidelines. Instead of directives, the Government should consider incentivising close linkage between the large and small enterprises.

Recommendations

The Commission makes the following recommendations to promote innovation, dissemination, acquisition and up-gradation of technology in the unorganised sector enterprises:

- 46 Constitute a focal point/apex institution for the promotion of livelihoods and improvement in productivity and competitiveness of the enterprises in the unorganised sector. This apex body could be either in the form of an independent Ministry for Unorganised Sector Enterprises or a dedicated Institution devoted to the development of the unorganised sector exclusively. Similar focal points may be created at the state level.
- 47 Creation of National Council for guidance and assisting in policy formulation for the Technological Up-gradation of the Unorganised Sector under the Chairmanship of the Prime Minister with State/UT Chief ministers as members on the pattern on National Council on Skill Development set up recently.
- 48 Adoption of Mission mode approach for promotion of technology in the unorganised sector through CSIR
- 49 Mahatma Gandhi Institute for Rural Industrialisation (Wardha) should be strengthened to make it the Apex Rural Technology Promotion Centre. All products specific R&D Centres of the KVIC and other All India Boards catering to other traditional industries should work under the supervision of the Wardha Institute.
- 50 Technological Innovations and Dissemination Centres (TIDCs) be set up in each State/UT with following details:
- TIDC to be developed as a standard IIT-CSIR venture.
 - TIDC to undertake showcasing of technological advancement for creating awareness.
 - Undertaking contract research with individuals and enterprises in their region
 - Each TIDC to work as a technological hub for technological up-gradation and awareness creation in their regions
 - Maintain a panel of consultants in respect of important products from the unorganised sector enterprises.
- 51 District Industries Centres to be the district level nodal agency for technology dissemination.
- 52 Strengthening Polytechnics & ITIs for rural/small town areas for linking technology with skill.
- 53 Countrywide programmes on entrepreneurship and innovation must be launched as a national movement by the MSME Development Institutes. Entrepreneurship should be promoted as a preferred career and not

as an alternate career.

- 54 Every engineering university and technical colleges in the country must be encouraged to interact with MSEs in the neighbourhood.
- 55 There is a strong need for spreading awareness of IPR amongst the MSEs. Patenting should be encouraged by offering financial support/subsidies. Likewise, quality assurance, eco-labelling, bar-coding, etc., of products should be encouraged in a big way.
- 56 There is a need to revise Technology Up-gradation Fund Scheme of the Ministry of Textiles to make it accessible to handloom & handicrafts sectors without conditionalities of minimum amount of loan & submission of balance sheet.
- 57 Credit Linked Capital Subsidy Scheme (CLCSS) for Technology Up-gradation of Micro & Small Enterprises should be broad-based.
- 58 Mini Tool Room-cum-Testing Centres should be set up in all MSME Development Institutes by revamping the existing workshops.
- 59 Growth Pole should be adopted as the strategy for unorganised enterprises development. Growth Pole is a 'cluster of clusters' and links the clusters in the area and also the potential growth points and promotes interdependence which allows them to enjoy external economies of scale from their simultaneous and complimentary functioning.
- 60 Closer co-operation of large and medium enterprises with micro and small enterprises is highly desirable to foster the growth of unorganised enterprises as ancillaries to large and medium units.
- 61 In order to ensure adequate and timely supply of credit at reasonable cost, as already recommended by NCEUS in its Report on Financing, the Commission reiterates the following:
 - There is an urgent need for revision of the Priority Sector lending policy of banks by reserving 12 per cent of Adjusted Net Bank Credit for Micro Enterprises and other credit linked schemes of self-employment.
 - National Fund for Unorganised Sector (NAFUS) be set up for meeting their financial and developmental needs.
 - Suitable changes in Credit Guarantee Scheme be made and availing of this scheme by banks should be made mandatory for loans up to Rs. 5 lakh.

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1

Introduction

Background

1.1 In pursuance to the announcement made in the National Common Minimum Programme (NCMP) of the UPA Government, the Government of India, vide their resolution dated 20th September 2004, constituted the National Commission for Enterprises in the Unorganised Sector (NCEUS) as a watchdog for the informal/unorganised sector. The Commission was mandated to recommend measures considered necessary for bringing about improvement in the productivity of informal/unorganised sector enterprises, generation of large scale employment opportunities on a sustainable basis, particularly in the rural areas, enhancing the competitiveness of the sector in the emerging global environment, linkage of the sector with the institutional framework in areas such as credit, raw material, infrastructure, technology up-gradation, marketing and formulation of suitable arrangements for skill development.

1.2 The Terms of Reference of the Commission, inter-alia, include:

- “Review of the status of unorganised/informal sector in India including the nature of enterprises, their size, spread and scope, and magnitude of employment”.
- “Identify constraints faced by small enterprises with regard to freedom of carrying out enterprise, access to raw materials, finance, skills, entrepreneurship

development, infrastructure, technology and markets and suggest measures to provide institutional support and linkages to facilitate easy access to them”.

- “Suggest legal and policy environment that should govern the informal/unorganised sector for growth, employment, exports and promotion”.

The detailed Terms of Reference (TOR) of the Commission is given in the **Annexure**.

1.3 In consideration of the above, the present report of the Commission seeks to address the technological needs of the unorganised sector and makes suitable recommendations with a view to increasing the productivity, earnings and employment of the unorganised sector enterprises and unorganised workers.

Framework of the Report

1.4 The report has been framed in seven chapters. Chapter 2 presents, along with a conceptual framework for looking at innovation, technology acquisition and upgradation issues in the unorganised sector, an overview of the unorganised sector enterprises in the country, the use of technology by these enterprises and the skill levels of the workforce. Chapter 3 contains case studies of some prominent industries in the unorganised sector covering textiles, leather, metal and engineering and traditional industries in order to assess the status of technology in actual operation and the impact of interventions made by

technology oriented institutions. Chapter 4 examines the current technology intervention programmes and policies available to these enterprises. Chapter 5 documents the experiences of some countries vis-a-vis technology interventions. Chapter 6 brings out the issues that face

Indian micro enterprises with respect to technology upgradation and innovation. Finally, Chapter 7 presents recommendations on possible technology initiatives for the unorganised sector enterprises.

2 Technology Status of the Unorganised Sector Enterprises: Conceptual Issues and An Overview for India

Unorganised Sector Definition

2.1 The Commission defines unorganised/informal sector as consisting of all unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services operated on a proprietary or partnership basis and with less than ten total workers. (NCEUS 2008: Para 2.5.7)

2.2 This definition of the unorganised sector applies equally to all the sectors of the economy including agriculture but excluding the plantation sector and other types of organised agriculture. The Commission considers all agricultural activities undertaken on agricultural holdings, either individually or in partnership, as being in the unorganised sector.

Size of the Non-Farm Unorganised Enterprises

2.3 A number of surveys done by the National Sample Survey Organisation, the Economic Census and the Census of Small Scale Industries indicate that an overwhelming majority (more than 94%) of enterprises in India come

under the category of unorganised sector as per the definition of unorganised sector of the Commission. .

2.4 The Commission's report on "Financing of Enterprises in the Unorganised Sector & Creation of a National Fund for the Unorganised Sector (NAFUS)", (NCEUS 2007 (b) and (c)) examined the size and spread of the unorganised enterprises based on various NSS Rounds and the Third Census of SSI. The report estimated that in the year 2006-07, there were about 58 million unorganised non-farm sector enterprises in the country providing employment to 104 million workers of which, 94 percent have investment in plant and machinery of less than Rs. 5 lakhs. These enterprises contribute to over 31 percent of the GDP and are spread over vast tracts of rural India as micro industries, khadi and village industries, handloom, handicrafts, coir, leather, apparel, food processing, retail trade and business, etc. The number of non-farm unorganised enterprises is estimated to go up to 71 million by the end of the Eleventh Five Year Plan. The activity/sector-wise break up of these enterprises is given in table 2.1.

Table 2.1 Activity/Sector-wise Break Up of Non- Farm Unorganised Enterprises (2006-07)

Sectors	(million)
Micro Enterprises under DC-MSME	12.6
PMRY	2.8
SGSY	7.5
KVI/REGP	0.5
SJSSY	0.6
Agro-related	8.2
Handloom	6.5
Residuary including Handicraft, Sericulture, Coir, Wool Manufacturing Retail Trade, Small Business etc.	19.3
Total	58.00

DC-MSME: Development Commissioner, Micro, Small and Medium Enterprises.

PMRY: Primeminister's Rojgar Yojana

SGSY: Swarnjayanti Gram Swarajgar Yojana

SJSSY: Swarnjayanti Sahari Swarajgar Yojana

2.5 Table 2.2 provides some macro level characteristics of the non-farm unorganised sector enterprises in the country for the year 1999-2000.

Table 2.2: Characteristics of Non-Farm Unorganised Sector Enterprises 1999-2000

Broad Industry Group	Enterprises (million)	Employment (percent)	Gross Value Added (percent)	Plant & Machinery (percent)	GVA Per Enterprise (Rs)	GVA Per Worker (Rs)	Plant and Machinery Per Enterprise (Rs)
Manu- facturing	14.0	36.16	25.13	57.99	30,921	15,995	17759
Construction	1.8	3.19	3.67	1.49	34,513	26,515	34301
Trade & Repair Services	17.4	37.12	46.79	8.79	46,525	29,013	10364
Hostels and Restaurants	1.8	5.18	5.03	0.95	49,521	22,384	4994
Transport, Storage, Commu- nication	3.9	6.72	8.08	6.22	35,813	27,687	36314
Other Services	5.2	11.63	11.3	24.56	37,429	22,356	58359
Total	44.1	100	100	100	39,157	23,019	20245

Source: NSS 55th Round 1999-2000, Informal Non-agricultural Enterprises, quoted in NCEUS (2007).

2.6 As per the NSS 55th Round (1999-2000) Survey, there were about 44.1 million unorganised sector enterprises in 1999-2000 in India. Trade and Repair Services is an important industrial group in the unorganised sector. Approximately 39.45 percent of the non-farm unorganised sector enterprises are in “Trade and Repair services”. They have the largest share in enterprises, employment and contribution to Gross Value Added (GVA). Their GVA per worker is also the highest across all the sectors and GVA per enterprise is next only to Hotel and Restaurants across all the industry groups. Another prominent group is manufacturing. Around 31.74 percent of the non-farm unorganised sector enterprises are engaged in manufacturing, employing about 36.16 percent of the people and having a share of about 58 percent in the value of plant and machinery.

Clusters in the Unorganised Sector

2.7 A large number of unorganised enterprises¹ exist in clusters, which, at least partially, provides them the benefits of economies of scale and linkages. There are estimates of about 6400 clusters of micro and small enterprises in the country. The Third Census of SSI (2001-02) has identified 2042 clusters in the registered and unregistered sectors of micro and small enterprises. Also there are estimates of 3332 artisan clusters in the country which include 903 craft clusters and 44 silk and sericulture related clusters. These artisan based clusters include those reported by Khadi and Village Industries Commission (KVIC) and Coir Board. In addition, there are 372 handloom clusters. The existence of such a large number of clusters indicate good scope for economies of scale in technology application in the unorganised sector of the country.

Nature of Micro & Small Enterprises (MSEs)

2.8 Policy makers and scholars worldwide increasingly accept the position that micro and small enterprises (MSEs) are as much the agents and engines of economic growth and of equitable development as the

more established larger enterprises. The perception that, being at the bottom of the pyramid, they are essentially consuming units and transitory, is giving way to the notion that they are as much the wealth creators as their large counterparts².

2.9 Liberalisation and the accompanying policy of economic reforms have created a new environment that exposes the vulnerability of these enterprises while at the same time provides new and greater challenges for growth and adjustment. The post-liberalisation business environment has become difficult for the Micro & Small Enterprises (MSE) sector because of increased internal and external competition. But, despite the growing awareness of the impending threats, the SSI sector does not appear to be adequately prepared for the new challenges.

2.10 A crucial aspect of MSEs being able to be effective wealth creators and to enhance the productivity is the extent of modernisation and technological up-gradation that take place in their production systems. While their ability to access the existing technology and adapt it to their needs is crucial, the extent to which such enterprises innovate at their own levels is also considered critical to their productivity and growth. These processes of technology acquisition, adaptation and innovation would not only facilitate their moving up the value chain and thus prepare them to effectively meet the challenges of a competitive environment but also create conditions for overcoming the prevailing disjunction between the organised and the small and micro enterprises. To this end, understanding these processes in MSEs assumes significance.

Innovation, Technology Acquisition & Up-gradation (TAU) in MSEs: A Conceptual Framework

2.11 The processes to do with technology and innovation in MSEs are different from those that take place in the larger firm contexts. First, MSEs innovate

1 Most of the unorganised sector enterprises consist of micro and small enterprises. The Micro, Small and Medium Enterprises Act 2006 defines each of these enterprises in terms of investment in Plant & Machinery and (cover both modern and traditional enterprises including artisan based units).

2 This is also evident from previous paragraphs 2.4-2.6

more informally than large firms, that is, without developing an explicit strategic framework for innovation, and outside the framework of formal R&D projects (Cappellin 1998). Knowledge accumulation and learning within MSEs is of a distributed nature: rather than being the outcome of a well-specified and pre-organised 'project', it emerges from the interactions of loosely connected agents and from the accumulation of minor improvements, leading to unexpected results in productivity. This characteristic of innovations in products or processes, contributing, however, to spurts in productivity, has been found to be very significant in contexts where MSEs function as a cluster or in a group. In such clusters or groups, it is found internationally that interactions between entrepreneurs, the sharing of traditional and acquired knowledge, the movement of skilled and experienced workers between enterprises in the same area can result in the creation of an 'industrial atmosphere' that results in creating the conditions for co-operation between agents that can result in the creation of better processes.

2.12 Second, MSEs are seen to be more region-centred than large firms. They are more locally bounded and depend strongly on their direct institutional environment. Once again, this is an experience that has been borne out in contexts where firms tend to cluster together. Technology and innovation processes thus calls for the integration of various different technological and organisational knowledge inputs that often are derived from firms belonging to other sectors and also to other regions (Cappellin 1998). Technological initiatives for the small scale or MSE sector need to be more region focussed than that for large firms.

2.13 Third, technology in the MSE sector has an increasingly 'complex' or a 'combinative' character. It consists of the capability to integrate various elementary technologies, which may be complementary between themselves, while focusing on a specific and often very specialised and innovative field of application. Moreover, the process of learning does not occur through knowledge accumulation within the firm in isolation. On the contrary, innovation processes in MSEs are tightly related to various forms of co-operation within a network of firms and other local actors. Thus, innovation process may be conceived

as an 'interactive learning process', since it is based on the capability to combine the internally cumulated competencies within the firms, with the needs of the clients, the networks of specialised suppliers, other complementary firms and various other intermediate institutions and organisations. This, again, brings out the need for technology initiatives to be decentralised and based on interactions between different agents in the production process or chains.

2.14 Fourth, given the heterogeneity of MSEs, innovation opportunities differ greatly among the various groups and this has implications for the firms' needs. Some firms are ready to introduce innovations relevant for their purposes, while others are unaware of the potential innovations. Small enterprises have a greater difficulty to have an innovation routine.

2.15 Fifth, very crucially, only a very small percentage of MSEs have the financial and organisational capabilities to generate internal resources for innovation. This reiterates the need for strong public scientific research as some units rely more on interconnections with the knowledge generated in the public domain as small firms on the whole are less able to take advantage of a good network of public science even though some of the small firms in science-based sectors have more interactions with public scientific research than large firms. Further, very often, despite the willingness to undertake technology up-gradation, MSEs are not in a position to access finance due to unreasonable terms that they are confronted with.

2.16 Finally, the issue of technology acquisition, especially in MSEs, has to be linked to issues of skill development and employment conditions as most often the decisions to upgrade technology are dependent on the availability of suitable labour and the terms on which it can be employed.

2.17 Having outlined the salient considerations in the processes of technology acquisition and innovation in MSEs, we can distinguish between different types of MSEs and their technological needs. One type of enterprise consists of micro enterprises that are active in a specific geographical area (clusters, districts). These are typically extremely specialised in some stage of the value chain and/or in a product niche. They develop

linkages with the other firms in the area and learn via informal processes, acquisition of capital goods or interactions with other companies. The technological strength for them is derived essentially from the processes of knowledge sharing and knowledge flows that take place in the geographical area where they are located, which in many cases are informal. In a survey that was commissioned for the Commission (Case studies by Suresh Babu), conducted in the auto components and machine tools sectors in Bangalore, it was found that MSEs were very often set up by former workers or employees in larger enterprises. Since they start off as unregistered units, they do not have the advantage of technology related advisory services from any official agency. More so, because these workers-turned employees did not have adequate assets to produce collaterals, and thus faced difficulties while availing loans for the first time from banks. But the advantage that such entrepreneurs have was the contacts, developed in their previous employment, which enabled them to acquire job orders as they commenced the new business. This highlights the fact that the background of the entrepreneurs is crucial in determining the extent of interest in technology acquisition and also in providing informal information.

2.18 Other types of enterprises are those which are based on processes of division of labour and specialise in the supply of intermediate products and components to other (often larger) enterprises. They work on the basis of organised sub-contracting relations and hierarchies. The primary source of knowledge for technology and innovations for these enterprises come from their participation in the network of sub-contracting which very often rest on the ability and willingness of the larger firms to pass on the technology to enhance the productivity of the entire value chain. In the survey mentioned above, it was found that even with subcontracting relationships, the nature of the job done was not always the same, making the issue of technology acquisition complicated. In the survey, it was found that MSEs did not consciously make any distinction between machine tools and auto components. Depending upon the nature of the orders, they execute jobs. During the field work, it was found that a unit was executing job orders given by a leading hardware-selling multinational corporation, although that

unit was also accepting orders for auto component machining with the implication that enterprises often try to optimise the operation by engaging in production of multiple items, which at times could be unrelated products as well.

2.19 The need of the first and second kinds of enterprises is to access a variety of sources of knowledge, especially from clients and suppliers. While the second category enterprises need a stronger, independent knowledge base which warrants the facilitation of communication with the clients and get access to external knowledge, the first kind of enterprises rely more on informal, local knowledge flows located in the network of firms. Not only is it necessary to have technology related services available to manufacturers, it is also essential for this information to be disseminated adequately.

2.20 Given the above characteristics of the process of innovation and technology acquisition in micro-firm contexts, the commonly accepted sources of ingredients of up-gradation are both internal and external to the firm. Internal sources include formal R&D, design and tooling-up, learning-by-doing and learning-by-using, internal human resources and training and marketing. External sources include R&D performed jointly or under contract by some specialised supplier of R&D services, the acquisition of licenses and the purchase of patents and other intellectual property rights, the exploitation of scientific and technical literature, patents as well as participation in conferences and workshops, Internet resources, acquisition of machinery and equipment linked to product and process innovations, knowledge acquired through interactions with suppliers of equipment, materials, components or software, imitation of competitors including reverse engineering, knowledge acquired from clients, through an improved understanding of user needs, services provided by consultants, participation in exhibitions and fairs (OECD 1992). These sources are common across different sizes of firms, but the micro-firm contexts generate the need to go beyond individual firms, to focus on groups of firms, to abandon 'across-the-board' policy interventions and move towards targeted or sector specific policy instruments. Further, especially in small and micro-firm contexts, the need for public institutions to facilitate the processes for such

modernisation becomes crucial. This allows technology providers to reach out to individual firms or groups of firms and these firms too in turn approach these 'intermediary' institutions to access technology that is available.

2.21 We have outlined the features of as well the constraints to technology upgradation processes in MSEs at a conceptual level. The next section examines the actual situation in the large MSE sector in India.

Access to Technological Know-How in the Unorganised Sector

2.22 Productivity of an enterprise, whether organised or unorganised, is a function of technology, among other things. Similarly, the sustainability of an enterprise is a function of competitiveness. Increasing productivity is

thus essential for the promotion of competitiveness. As per the Third All India Census of Small Scale Industries (SSI) 2001-2002, 85.38 per cent of the total registered SSI units do not have any access to technical know-how. While 0.97 per cent of the registered SSI units source their technical know-how from abroad, 7.54 per cent from domestic collaborating units/companies and 6.11 per cent from domestic R&D institutions/special agencies/organisations. Since unorganised sector enterprises are largely unregistered enterprises, they can very well be considered to be at a disadvantage in comparison to the registered enterprises in the SSI sector so far as the access to technological know-how is concerned. The Census revealed that 66 per cent of enterprises which were sick faced the problem of lack of demand and 11 per cent faced equipment problem. Third Census of SSI (2001-02) revealed the following status of investment, output and employment in the SSI sector.

Table 2.3: Productivity in SSI Sector

Type of unit	Per unit Fixed Investment (Rs lakhs)	Per unit output (Rs lakhs)	Per unit employment	Employment per Rs 1 lakh of Investment
Registered SSI sector	6.68	14.78	4.48	0.67
Unregistered SSI sector	0.68	0.86	2.05	3.00
Total SSI sector	1.47	2.68	2.37	1.62

Source-Third Census of Small Scale Industries, 2001-02, DCSSI, New Delhi

2.23 Productivity (investment-output) relationship is 2.21 in the case of registered SSI units and 1.26 in the case of unregistered units. While 99 per cent of the SSI units exist as micro enterprises, those registered (with DIC) stand on a high pedestal in the use of technology, almost ten times bigger than those by the unregistered units. The Third Census of SSI found that 86.6 per cent of the SSI units were unregistered. The entire unregistered units represent the unorganised enterprises sector of the country. Part of the registered units exist as factory units as well. Employment per Rs.1 lakh of investment was 4.47 times larger in unregistered units. An unregistered unit provides employment to 3 persons per Rs. one lakh of investment per worker. Output too is very low, Rs 41951 against Rs 3.30 lakhs in the registered SSI units. This difference in output could be attributed to the level of skill and technology in use by the unregistered units which are synonymous to unorganised enterprises in the country.

2.24 A study conducted for the Planning Commission by the Society for Economic and Social Transition on the basis of a survey of 500 SSI units registered up to 2002-03 spread in 4 states, namely, Maharashtra, Delhi, Haryana and Rajasthan found the overall output per worker as Rs 4.6 lakhs in the SSI units; Rs 5 lakhs in units using improved technology and Rs 3.2 lakhs in units without improved technology indicating the beneficial impact of technology on output. The analysis indicated that in all the four states together, more than 70 per cent of SSI units using improved technology showed substantial quality improvement, 46 per cent indicated reduction in cost of production and more than 20 per cent indicated the achievement of competitiveness in domestic and international markets through adoption of improved technology. A similar trend was observed in Maharashtra. In Haryana, out of the 100 units using improved technology, 51 have indicated quality

improvement, 47 have indicated increase in quantity produced and 31 have indicated reduction in cost of production. Only 2 units have indicated achievement of competitiveness in domestic market. In Delhi more than 85 per cent of the SSI units using improved technology indicated quality improvement and more than 75 per cent indicated increase in quantity produced whereas increase in efficiency and better capacity utilisation have been indicated by more than 50 per cent. In Rajasthan only 35 per cent of the units using improved technology have indicated quality improvement and 17 per cent units have mentioned increase in the quantity produced. Better capacity utilisation and reduction in cost of production have been mentioned by 14 percent units whereas 8 per cent units have reported increase in efficiency.

2.25 The working capital on an average for the SSI units using improved technology in all the four states together is Rs. 45.3 lakhs and Rs. 20.4 lakhs for units not using improved technology, indicating higher working capital requirements for units using improved technology.

2.26 Though micro and small enterprises and traditional industries account for about 55 per cent of national exports, India's share in world export was just about 1.1 per cent in 2006. This indicates the lack of competitiveness of Indian manufacturing goods in international market, most of which emerge from unorganised enterprises. According to Economic survey 2007-08 and the Annual Report of the Ministry of Micro Small and Medium Enterprises the total export is Rs. 456418 crores in 2005-06. The contribution of Micro, Small and Medium Enterprises was Rs. 150242 crores and that of handicrafts including germs and jewellery was

Rs. 74435 crores, thus contributing 49.1 per cent to the total exports. However, in the total production of Rs. 487842 crores in the MSE sector export accounted for 30.1 per cent of total production. According to Third Census of SSI 2001-02, micro enterprises account for over 99 per cent of small enterprises in the country but their share in small enterprises output was only 61.3 per cent. They export only 41.7 per cent. Going by the above analogy the share of micro enterprises in total MSE export in term of value was Rs. 62651 crores and total output was Rs. 305177 crores. Thus the share of micro enterprise in MSE's output was 20.5 per cent. This indicates that about 80 per cent of micro enterprise output is meant for domestic or niche market. The inability of these enterprises to compete in international market could be partly due to the use of inefficient technology and partly due to other factors which make the products uncompetitive such as costly and inadequate credit, costly raw material, lack of skill, etc.

Skill- A Prerequisite for Technology Adoption

2.27 Skill is an important requirement for technological interventions. However, one of the characteristic features of the unorganised sector workers is their low level of skills, knowledge, awareness and education. This makes the absorption of new and existing technologies difficult in the production system. As per the NSSO 61st Round (2004-05) Employment-Unemployment Survey, the years of schooling attained by an average unorganised sector worker was significantly lower than of the organised sector workers. Also as compared to the organised sector workers, a large proportion of unorganised sector workers are illiterate or below primary level of education as could be seen from tables 2.4 and 2.5.

Table 2.4: Mean Years of Schooling of Non-agricultural Workers by Employment Status, Sector, Sex & Sector of Occupation (2004-2005)

Sector	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Unorganised Sector	5.1	2.9	4.6	7.0	4.7	6.6	6.1	3.7	5.6
Organised Sector	7.6	5.7	7.2	10.1	10.1	10.1	9.1	8.1	9.0
All Workers	5.7	3.6	5.2	8.1	6.3	7.7	6.9	4.9	6.5

Note: To compute the mean years of schooling the following years of schooling have been considered: Illiterate-0, literate below primary-1, primary-4, middle-8, and secondary-10, higher secondary-12, diploma/certificate course - 14, graduate-15, postgraduate and above-17.
Source: NSS 61st Round 2004-2005, Employment-Unemployment Survey, quoted in, a NCEUS Report (2007)

2.28 Non-agricultural workers in the organised sector have higher educational attainment levels as compared to their counterparts in the unorganised sector. Similarly males enjoy higher education levels in comparison to females. In the rural areas they have larger share of illiterate and below primary level and significantly less share of Higher Secondary (HS) and above as compared to their urban counterparts.

Table 2.5: Percentage of Non-agricultural Workers according to Educational Attainment Levels, Sex & Sector (2004-2005)

Educational Level	Illiterate and Below Primary	Primary	Middle	Secondary	HS& Above	Total
Total Male						
US	32.3	16.9	21.4	13.2	16.1	100.00
OS	17.9	10.9	15.9	13.9	41.4	100.00
All workers	28.1	15.2	19.8	13.4	23.4	100.00
Total Female						
US	56.8	14.0	13.3	6.0	9.9	100.00
OS	31.7	8.5	8.7	10.2	40.9	100.00
All workers	50.0	12.5	12.1	7.2	18.2	100.00
Total						
US	37.4	16.3	19.7	11.7	14.8	100.00
OS	20.5	10.4	14.5	13.2	41.3	100.00
All workers	32.6	14.6	18.3	12.2	22.4	100.00
Rural						
US	44.8	16.9	19.5	9.5	9.3	100.00
OS	30.7	11.6	15.4	13.5	28.8	100.00
All workers	41.4	15.6	18.5	10.5	14.0	100.00
Urban						
US	29.9	15.7	20.0	14.0	20.4	100.00
OS	13.7	9.7	13.9	13.1	49.6	100.00
All workers	24.6	13.8	18.0	13.7	29.9	100.00

US: Unorganised Sector.

OS: Organised Sector.

HS: Higher Secondary.

Source: *ibid*

2.29 NSS 61st Round (2004-05), collected information about the skill profile of the youth (15-29 years) population, along with whether they had undergone or were undergoing non-formal³ or formal training⁴. It is estimated that, on the whole, only 11.5 per cent of those in the age group 15-29 years have

received (or were receiving) any training, whether formal or informal of whom, 33 per cent (11 million) have received or were receiving formal training. A total of 3.9 million persons in this age group (about 1 per cent of the total) were receiving formal vocational training while about 2 per cent reported to have received formal

3 Non-formal training includes those from both hereditary and other sources.

4 Formal vocational training is what that take place in educational and training institutions and which follow a structured training programme and lead to recognised certificates, diplomas or degrees.

vocational training, constituting about 3.8 per cent of the population with formal training.

2.30 Among the 5.4 million workers who received formal training in the age group 15-29 years, 3.4 million workers, accounting for 63 per cent of total trained people, belonged to the unorganised sector. This shows that the organised sector is, for some reason, unable to absorb the majority of the formally trained youth who find a place in the unorganised sector. Given their characteristics, the formally trained undoubtedly form an upper segment of the unorganised workforce. Among the informally trained, 17 million were in the unorganised sector, compared to the 1.9 million in the organised sector. Only 2.5 per cent of total unorganised sector workforce had any formal training and another 10.4 per cent had informal training. It appears that a range of formal skills can be absorbed both in the upper segment of the unorganised sector as well as the organised sector, and due to various reasons, a majority of such workers are absorbed in the unorganised sector.

2.31 Lack of adequate skill and knowledge leads to lack of right attitudes. The unorganised sector enterprises and the entrepreneurs therein fail to adopt a professional approach to achieve high standards in quality, reliability, aesthetics, finish and performance of their products. The published specifications often do not match the end-product and they often fail to meet the after-sales service requirements. For adoption of improved technology the requirements are three fold: (i) higher level of general education to understand the need for and the nuances of technology up-gradation, (ii) technological knowledge to appreciate the intricacies of technology and (iii) skills to run the technology. Hence attention needs to be paid on these three issues in order to promote the level of technology adoption in the unorganised sector.

Conclusion

2.32 It has been pointed out in this chapter that the conditions faced by and the possibilities for innovation, technology acquisition and upgradation in the MSE

sector are different from large firm contexts. It has also been pointed out that actual technology upgradation possibilities for MSEs are likely to be higher in decentralised and group contexts and might also need to be strongly supported by public institutions. These aspects have to be taken seriously if interventions have to yield results that are qualitatively and quantitatively different from what has been achieved in the Indian context.

2.33 As is evident from the various NSS surveys and other reports, a very large proportion of the enterprises and workers in India are in the unorganised sector. The service sector's share in the unorganised sector's contribution to the GDP is considerably more than the share of manufacturing and agricultural sectors. These enterprises are present in both the rural and urban areas but their presence is significantly more in the rural areas. The unorganised workers have shown lower educational levels. In particular, female workers and workers in the rural areas are worse off than the average. They are entangled in vicious levels of poverty which reduces their productivity and income levels. As a result, the productivity of the unorganised enterprises in the rural areas is low as compared to the productivity of the counterparts in the urban areas. The productivity of the unorganised sector workers is low as compared to those in the enterprises in the organised sector. As per the Third All India Census of Small scale Industries 2001-02, 85.38 per cent of the total registered SSI units do not have any access to technical know-how. Evidence suggests that unorganised sector enterprises need technological know-how as they hardly have any access to technical know-how. Further the unorganised sector enterprises are hampered by obsolete technology which further reduces their productivity and income. To improve the productivity in the unorganised sector, simultaneous action is required to address the twin problems of skill and technology. Case studies in the next chapter reveal that the scope for successful technology adoption and up-gradation are more in the case of clusters than the isolated units in the Unorganised Sector.

3

Case Studies on Technological Status & Intervention

3.1 Since there is no specific survey data indicating the technology status of the unorganised sector enterprises, the Commission undertook case studies of some clusters and has also utilised the studies made by Entrepreneurship Development Institute, Ahmedabad and other organisations in order to supplement the findings of the various census/surveys quoted earlier and also to identify the technology needs and other general issues of the unorganised sector enterprises. Here we broadly divide them into two categories, modern and traditional, primarily with reference to technological needs. The modern sector cases considered are textiles, leather, brassware and metal products and traditional sector covers activities like handlooms, handicrafts etc.

I. The Modern Sector

I. 1. Textile Industry

3.2 Textile industry as a whole has a special place in the Indian economy, with 4 per cent contribution to GDP, 14 per cent to total industrial production, employing about 20 per cent of the workforce in the organised sector and has a 17 per cent share in gross export earnings. Indian textile industry contributes to 12 per cent of world textile production. It is the third largest producer of cotton textiles in the world.

3.3 Tamil Nadu has been an important player in textiles, particularly in respect of cotton spinning and weaving. By the end of 2005-06, there were as many as 909 spinning mills falling under Small Scale Industries (SSI) segment and 815 non-SSI spinning mills. The SSI spinning mills employed nearly 32 thousand workers, which is a little over one sixth of the total workers employed in the textile industry within the state. Thus, the industry has the presence of both large and small units. Moreover, there are mills exclusively for spinning or weaving, as well as the composite units. Within Tamil Nadu, Coimbatore has the largest numbers of spinning mills.

3.4 In the cotton textile industry (Case study Suresh Babu), there are four major activities, namely, ginning, spinning weaving and making garments and apparels. The case study presented here is based on the data collected from enabling institutions and industry associations as well as the owners of selected MSE units. Information was collected from Coimbatore based small mills as well as the agencies which enabled technology acquisition and up-gradation (TAU) process amongst the small players.

3.5 A major advantage of being small is flexi-labour in the sense of having the possibility of shifting labour from one process to another.

Smaller units undertake specific jobs depending upon the specialisation as well as availability of labour. These units often get some process outsourced by larger units. For instance, larger units had the obligation of making hank yarn for handloom weaving sector, but they had facilities for making cone yarn, which is different from the one required for making hank yarn.

3.6 The TAU process amongst smaller units needs to be viewed from the need to replace the existing machinery, which are second hand, bought at the time of commencing business and/ or to expand the scale of operations. Most of the units do not plan to replace their existing machinery but have the desire to expand the scale of operations. Thus, TAU amongst the smaller units can be largely attributed to their expansion activities. While this has the potential to create employment, it has certain attendant problems too. More importantly, reliance on second hand machines has led them to produce low quality fibre, besides creating excess supply of yarn in relation to the demand arising from weaving segments.

3.7 The TAU process has been obstructed by several factors. More notably, the smaller units pointed out that lack of funds, whether from internal or external sources, was the major factor for slow technological up-gradation. These units normally operate with a squeezed margin of 5-10%. Most of their funds often get locked up in working capital, thus reducing availability of internal funds to finance TAU. As far as the external funds are concerned, they admit that government schemes are available; but as the coverage of such schemes tends to exclude them, they are not able to enjoy the benefits under these schemes. They can avail term loans from the commercial banks; however, collateral requirements by the banks pose the problem, though their proximity to bankers had enabled them to avail loans easily.

3.8 Most of the units do not have product orientation. Although they are aware of export possibilities, small units do not export. They are part of the value chain rather than focusing on value addition until the stages of garments making. Spinners are not

weavers and weavers do not make garments, and so on. As the small units do not enjoy benefits of completing value addition, they do not enjoy sufficient margin. As a result, TAU is not perceived to be an attractive proposition for the small units.

3.9 An important problem faced by small spinners is the power shortage. As there is no cluster formed for spinning activities, small spinners are spread across in areas not notified as industrial area/estate. They overcome power shortage problem by having captive power generation, but at a higher cost that further reduces their margin.

3.10 Role of middlemen is very important for the smaller units and their presence indirectly affects TAU for smaller units. To procure raw cotton, they rely on middlemen. To sell yarn too, they rely on middlemen. This problem is compounded by the recent spurt in export of raw materials. Many units complained that middlemen have hoarded raw materials in the wake of unprecedented rise in exports of raw cotton to countries like China and Pakistan. Anticipating higher price due to shortage of raw materials in domestic market, hoarding now features the supply scene. In recent times, these units could buy a bale of cotton (consisting of 170 kgs) at the rate of Rs. 28,000, which was costing Rs. 15,000 a few months back. High cost of input has reduced their margin and consequently internal accretion of funds.

3.11 Procurement of raw cotton and sale of yarn are so intertwined that it is difficult for small units to avoid middlemen. For instance, middlemen supply raw cotton on credit basis on the condition that these small units sell the yarn to them only. Due to the insufficiency of own funds to finance inventory holdings, small units tend to accept such obligations. As survival of these units largely depended on the middlemen, their economic viability, including TAU, get influenced by their presence.

TAU Enabling Agencies: SITRA & SVPITM

3.12 There are two major agencies in Coimbatore, mandated to facilitate TAU: The South India Textile Research Association (SITRA),⁵ and Sardar Vallabhbhai

5 SITRA is a link in the chain of government sponsored national laboratories, aimed to help the textile industry to apply science to solve their specific problems. SITRA is supported by Ministry of Textiles, Government of India. For more details see, SITRA (2007),

6 This is an autonomous institute under the Ministry of Textiles, Government of India.

Patel Institute of Textile Management (SVPITM).⁶ While SITRA provides technology related advice, the SVPITM provides management related advisory services including techno-economic services pertaining to a project. SITRA has the membership, whereas SVPITM operate on a model of sectoral management institute with a focus on developing management skills necessary for textiles and clothing industry. Considering their activities, it could be seen that the role of SITRA has a direct bearing on the TAU process, but that of the SVPITM has an indirect impact. SITRA has several in-house efforts to facilitate TAU other than sponsored activities, while SVPITM is largely confined to sponsored projects.

3.13 SITRA's R&D related services to its members are extended in the form of either in-house initiatives or consultancy services, sponsored by the members. As for in-house initiatives are concerned, SITRA provides training with a focus on improving productivity and managing layout so as to reduce productivity loss, and conducts conferences and seminars on the themes relevant for textile units. They also undertake consultancy projects to solve particular or day to day problems faced by the sponsoring units. Implementation of stipulated quality control system within the mills has been an important consultancy service provided by SITRA. They also advise on starting new units and modernization, and undertake techno-economic viability studies of scrapping of existing machineries and new projects, and diagnostic studies on what ails a mill so as to identify areas for improvement. They also advise units on how to scientifically organise mills such as optimum number of workers for various processes and frames.

3.14 SITRA surveys the productivity of firms once in 2 years and develops benchmarks for judging productivity of machines and labour. These reports also enable textile units to identify areas, departments, and operative categories that require attention for improving productivity. SITRA disseminates findings of such surveys to the participating units pointing to the areas of deficiencies; publish them in a report format, and, of late, in CD-ROM with interactive features. SITRA also periodically studies the financial performance of firms and analyze the inter-firm differences and the contributing factors. It has developed software packages that provide

solutions to improve productivity. Its other reports and publications provide useful information on the quality of yarn produced by firms of different size classes and suggestions to improve quality, and optimally utilise materials, machines and manpower.

3.15 SITRA has the state-of-art lab facilities to test quality of cotton, fibre, yarn, and fabric. They have calibration instruments that improve quality of yarn too. They have a pilot mill with modern machines. Using this, they provide training to new workers, often at the instance of member units. To facilitate technology adoption by the weaving and knitting segments, SITRA had established a 'Weaving Training Centre' in 2003. This centre houses two Rapier Looms; one imported and the other developed by SITRA and provides training to operate and maintain the loom, R&D and sample development, and assessing performance of yarns in high speed weaving, besides studying techno-economic viability of a project. It provides a range of services to decentralized power loom sector. To this end, it first started a 'Power loom Service Centre' in 1974. At present, it helps the sector through government-sponsored centres spread across 16 regions. For designing, SITRA started a CAD centre in 1995. It now has four CAD centres for design development, reproduction of design, fabric simulations, and training in designing. In order to help knitwear manufacturing units, SITRA started Knitting Division in 1976, and established a 'Knitwear Service Centre' in Tirupur in 1991. Through this centre, it helps units test quality of knitted fabrics and garments, analyze fabric faults, assess performance of hosiery yarns, and conduct training program on technical problems.

3.16 While SITRA has a vital role in the TAU amongst textile units as a whole, it has an inherent disadvantage that hinders small firms from enjoying its services because seeking SITRA membership requires a minimum number of 6000 spindles (earlier this was 8000 spindles). As its services are mostly members-centric, it automatically keeps out small units. SITRA has the practice of charging more for the services rendered to non-members including small units. This has deterred small units from seeking SITRA's services. It extends services to small units, provided they are Technical Services Card Holders, which are issued to small units

upon payment of an annual membership fees. There are about 100 card holders on an annual basis. These Technical Services Card Holders are entitled to enjoy SITRA facilities for testing yarn, fibre and fabric, but do not enjoy its consultancy services on a priority basis.

3.17 Despite these efforts, one cannot say that SITRA has made significant contribution to TAU amongst small units because such units did not appear to have opted for its services because of the prevailing perception that only member units could avail them. Facilities and services of SITRA could potentially reduce cost of operation for small units. This is an area that needs to be addressed immediately. The case study reveals that the mere existence of an institution is no guarantee of benefits to all in the target group. If the institution is meant for both large and small enterprises, the chances are that maximum benefits will flow to large enterprises. The rules and regulations would be so framed that the weaker segment of the targeted group is virtually excluded from availing the benefits. This is what is happening with SITRA where the conditions do not favour small, micro and unorganised enterprises.

I. 2 Leather Industry

3.18 The leather industry occupies a prominent place in the Indian economy in terms of export earnings and employment. The sector is estimated to provide employment to over 2.5 million people, of whom 30 percent are said to be women. Around 10 percent of the global leather requirements are processed in India. According to the National Manufacturing Competitiveness Council the leather industry output is valued at Rs 250 billion. Leather exports stood at US\$ 3 billion in 2007, representing 2.3 percent of India's total exports. Transition of Indian leather industry from an exporter of raw and tanned hides and skin to a major source for a range of value added leather products is a remarkable story of adaptation to market requirements as well as of overcoming technological barriers. Even as late as 1990, 80 per cent of the leather industry exports consisted of finished leather. Leather footwear industry is seen as one of the major growth drivers of the leather industry.

3.19 Leather sector comprises a complex grid encompassing artisans, tiny, cottage, small, medium and

large enterprises. A substantial proportion of the workforce in the sector is engaged either in the decentralized primary industrial segment or in the micro and small enterprises.

3.20 Leather value chain subsumes three distinct processing stages, each with varying requirements of material, capital and labour inputs. These range from the recovery of the basic raw material namely raw hides and skins to the slightly more capital intensive operation of tanning and finishing of the hides to the final stage of production of leather goods which is relatively a labour intensive process. While in some regions and in certain clusters the small and micro units are linked to the large organized units through outsourcing and have had the benefit of accessing new technology, elsewhere there is no such linkage with the small scale sector. The latter along with the artisan sector continues to operate along traditional lines and cater to the segmented domestic market. There are the very distinct and segmented export markets at one end of the spectrum and the segmented domestic market catering to the needs of the differing socio-economic classes at the other. The export market is almost entirely dominated by the organised large and medium scale units along with a section of the small scale units. Of the total production valued at over Rs. 25000 crores, about 56 per cent of leather products valued at Rs.14000 crores are exported. The small and micro artisan units in fact account for close to 75 per cent of the total leather production in India. However, they are unable to realize their full potential owing to a variety of factors ranging from such constraints as finance, sourcing adequate and quality hides and above all lack of access to appropriate modern technology, among others.

3.21 Liberalisation and trade reforms and the resultant lowering of tariffs and the removal of import restrictions have impacted the small scale and the unorganised sector more adversely than the larger organised units. The latter had made the necessary technological adjustments even prior to liberalisation and were therefore able to successfully achieve significant growth by catering to the growing export market. On the other hand, the small-scale production units, geared as they are primarily to the domestic market, have had to face severe hardships as a result of tariff liberalisation following which the Indian

market was flooded with the cheaper Chinese shoes. Imports of ready-made sports shoes from China increased from 468,000 pairs in March 1999 to 570,000 pairs in October 2000, and as a consequence, production levels in the domestic shoe industry fell by 11.24 per cent.

3.22 Another major problem faced by the micro and small scale shoe manufacturers was the growing scarcity coupled with the high prices of raw materials. Changes in trade policy were also instrumental in compounding the crisis and thus threatening the very existence of the micro and small scale sector. The dilution of the restrictions on the export of finished leather hides following the pressure from EU, especially from 2000 onwards, is a reflection of this crisis. It was thus estimated that the exports of leather hides increased 147 per cent between 1999 and 2005. In fact in 2007 finished leather accounted only for 30 per cent of the total leather exports from India. The flooding of cheaper imports along with the severe shortage of tanned hides and skins has threatened the very existence of the small scale sector in many clusters. Particularly hard hit has been the Agra footwear cluster.

3.23 India's failure to make the most of the opportunities in the global leather trade could be attributed to the use of sub-optimal technology practices in the manufacturing chain. There is a pressing need to enhance the level of technology practices within the manufacturing chain in order to narrow the mismatch between its potential and actual shares in global leather trade. There is a growing realisation of the need to bridge the gap within the manufacturing chain between the organised and the unorganised sectors with respect to access to the requisite level of technology culture. Given the importance of the leather sector in the Indian economy because of its potential to generate employment, additional income and savings, export and foreign exchange, the Government felt it necessary to address some of the basic structural constraints of this industry so as to promote greater inclusive growth of the sector.

3.24 The sourcing and collection of primary raw material namely raw hides and skins is almost entirely a decentralised activity. One of the major problems faced by the leather industry is the inadequate supply of hides.

Though India accounts for the largest livestock population, the Indian leather goods industry has barely 3 percent of the global market share. Raw material crunch or the insufficiency of quality hides and skin is among the factors in the slow growth of this sector. The raw material insufficiency is not unrelated to a combination of conditions ranging from cultural factors that discourage displacement by slaughter of large animals such as cattle and buffalo to the timely non-recovery of the fallen animals, improper flaying techniques and transportation of raw hides to tanning centres. Following a survey based study conducted by the Central Leather Research Institute (CLRI) it was observed that owing to the non-recovery of hides and skins from fallen animals and underutilisation of the by-products across India, the resultant estimated annual loss was approximately to the tune of Rs. 600 crores. This study also revealed that roughly about 9 million fallen animals were not collected at all.

3.25 A significant displacement of the bovine population is through natural mortality. According to a recent study by the CLRI it is estimated that roughly 18 million animal carcasses of cattle and buffalo are obtained in this manner. Given the estimates of the bovine population of over 300 million as per the latest livestock census and on the basis of the death rates which are estimated at 8.6 per cent and 13.4 per cent for cattle and buffalo respectively, the estimates for the total number of fallen animals, especially cattle and buffalo, recovered should have been much higher than the CLRI estimate viz. 18 million. This would suggest that non-recovery of fallen animal is much higher than the 1987 estimate of 9 million. This gains further credence by the fact that the annual displacement rate for both cattle and buffalo (14 percent and 20 per cent respectively) is higher than the death rate which also suggests that in some regions large numbers of animals are in fact slaughtered.

3.26 About 8 lakhs persons or 1/3rd of the aggregate workforce in the leather sector as a whole, are associated/involved with primary activities namely the management of dead animals, flaying, collection of hides and skins and preservation. A recent study by a group of scientists from CLRI suggests that, even if 50 per cent of or 4.5 million of the 9 million fallen animals presently not recovered or utilized, are recovered and utilised to the

full it can provide additional employment to 45000 people apart from the potential of enabling them to secure higher earnings.

3.27 Flaying of dead animals or carcasses has traditionally been an occupation carried out by the most marginalised sections of the society usually the various sub-castes of the dalit community. In a situation characterised by the absence of flayers the fallen animal was often thrown into some remote corner of the rural settlement and allowed to rot. This was a dead loss. Even when recovered the dead animal was often dragged before it was flayed. This together with improper defective flay cuts on the carcass seriously affected the quality of the raw hides produced. This situation warranted a serious technological intervention.

Carcass Utilization Centres

3.28 To address this problem and as part of National Leather Development Programme (NLDP), CLRI had, even as early as 1992, begun working on an appropriate technological package for the recovery and utilisation of the fallen carcass. Given the dispersed nature of the animal holdings arranging for dead animals to be transported to any centralised location for appropriate utilisation of the carcass was clearly not a feasible proposition. The technology had to be sufficiently downsized for it to be suitable and acceptable for the rural needs. By the time the Leather Technology Mission (LTM) was launched by the Government of India in 1995 under the overall coordination of CLRI, a complete downsized technology package for the recovery and subsequent utilisation of the carcass by-products was in place. Between 1995 and 1997 CLRI, as part of the LTM, set up 15 carcass utilisation centres all across the country. These centres were identified and selected on the basis of such objective criteria as the animal density in the region, natural mortality rates, motorable roads or access to carcasses, artisan population, poultry and piggery population and market outreach, among others. To sensitise the flayers and other stakeholders about the inherent advantages of this new technology the first demonstration centre was set up at Bakshi-ka talab near Lucknow. The initial diffidence and reluctance on the part of the flayers gave way once they saw for themselves the positive advantages

of these new developments. Scientists also gained by their interaction with the potential users which in turn helped them to adapt the technology to meet the specific needs of the local users. Between 2004 and 2007, 16 additional centres were set up as part of the HRD mission on leather. Thus, presently there are 31 such carcass utilisation centres. The major concentration of these centres is in the northern Indian regions with relatively high density of bovine population. It has been claimed that, of the 31 units, about 60 per cent of the units are running fairly successfully.

3.29 In 1997-98 the initial investment for setting up a carcass recovery and utilisation centre was Rs. 9 lakhs. This has since gone up to an amount ranging between Rs 12 and Rs. 15 lakhs per centre. In addition real time data was collected after working with four to six animals per day. It was found that a minimum of 4 animals per day would be required for each unit or centre for the project to be bankable or economically viable. It was estimated that with six animals per day, the pay back period would be not more than three and half years. According to one of the senior scientists of the CLRI who was associated with this project, the market value of the various products including the hides from the animals was close to Rs 1000. With a minimum of 4 animals it was possible for a unit to obtain a gross income of approximately Rs.4000 per day. The running costs were roughly 50 percent of the gross income. Further, it was claimed, on an average each unit could provide employment to about 20 persons.

3.30 In an attempt to widen and broad base the reach of this technological intervention, CLRI also came up with an innovative district-based technology delivery system through a network of fallen carcass recovery centres. The first such centre was located in Raigarh in Madhya Pradesh. Designated as "SECURE" (Strategic Expansion of Carcass Utilisation for Rural Employment) this project was funded by Ministry of Rural Development. It involved the setting up of a mother unit to which were linked several satellite units across the district, the latter feeding the former with the raw material after preliminary processing. Thus, flaying was done at the satellite centres while all other processing was done at the mother unit.

3.31 Very recently Government of India has sanctioned the necessary grants for the location of a second district-based carcass recovery centre in Rae Bareilly of U.P. The state government has already allotted the required land for setting up 15 satellite units and three mother units. UP Khadi and Village Industries Board will provide the administrative and managerial support, while CLRI will provide the technical support and help run the project.

Other Critical Issues of Leather Industry

3.32 Since most flayers belonged to the socially and economically disadvantaged groups, usually from the BPL category, they were initially in no position to either raise the necessary capital required for these units or even to manage the running of these units. The question of management of the assets and the marketing of carcass by-products thus, was of critical importance. In fact CLRI had evolved various viable models of management suitable for the specific rural conditions. These included (a) local enterprises managed by cooperatives of flayers and artisans, (b) rural enterprises managed by state agencies (such as KVIB) or NGOs, (c) district networked recovery centres managed by professional NGOs and (d) network of fallen carcass recovery units managed by private sector or corporate houses. Presently most of the operational centres fall under category 'a' or 'b'. One of the critical lessons learnt from this experience by CLRI is the importance of professional management especially in the initial or formative phase of learning and consolidation. A well streamlined system of networking for sourcing carcasses and an appropriate marketing outreach system are indispensable for ensuring the viability of this experiment. The Kalyani Carcass Recovery Centre (West Bengal), appeared to have done exceptionally well attaining a production target at one stage of as many as 15 carcasses per day. This was largely because of the initiative and drive of the then manager of the unit. This unit is being managed by KVIC. Since his departure there is apparently a distinct slackening in the performance level of this unit.

3.33 The case of the Masvanpur (Uttar Pradesh) unit also needs special mention. This is clearly one of the

better performing units and is often upheld by CLRI as a role model for other carcass utilisation centres. This is, to a large extent, the outcome of the exceptional initiative and entrepreneurial ability of Mr. Mohanlal. As one who also belonged to the traditional community of flayers, he was able to network successfully to take advantage of the economic opportunities that the scheme provided. He managed to set up a cooperative society of flayers and artisans with 51 members to oversee the management of the unit. Through a unique incentive driven information system of fallen animals based on a network of agents and informers he was able to optimise sourcing of carcasses for the utilisation centre. He is presently in the process of expanding and diversifying his activities to other leather related activities. CLRI is seriously contemplating to involve Mohanlal in setting up a large district-based networked carcass recovery and utilisation centre.

3.34 The next major problem that has confronted most carcass utilisation units and which affects the viability of these units is the issue of collection rights of dead animals or carcasses. There is presently considerable inter state variation with regard to the legal position on this matter. In some states the rights have been vested with the traditional community of flayers while in others the right vests with the state or quasi government bodies like the municipalities or the zilla parishads. The latter in turn auctions the collection rights to the highest bidder. This system encouraged middlemen traders and contractors at the cost of the flayers. Keen competition among the middlemen to secure the license also had the effect of pushing up the license fee, thus effectively shutting out the flayers from this enterprise. Many of them had no option but to work for a pittance for the licensee. There is an urgent need for intervention and ensure uniformity across states in so far as rights of collection of dead animals are concerned. These rights need to be vested with the cooperatives of genuine flayers. The Raigarh experiment in M.P., the first district-based network initiative for carcass utilization, also faced major obstacles at least initially because of the resistance from powerful private interests. The problem was mitigated only following the cooperation of some of the dominant commercial interests in the hides trade into the model.

The Kolhapuri or Athani Experiment

3.35 This is a remarkable story of how modern technology has helped traditional skills gain a new lease of life and usher in a major socio-economic transformation. CLRI's initiative in this direction is noteworthy. Thani, about 200 kilometers from Kolhapur in western Karnataka is home to the renowned skilled artisans of the famed 'Kolhapuri' sandals/footwear. There are about 1200 families belonging to the socially disadvantaged samara caste pursuing this traditional craft for centuries. The elegantly crafted footwear they manufactured slowly found a niche market in major metropolitan centres thanks to the efforts of some enterprising Kolhapur based entrepreneurs. However, poor quality of the leather and lack of standardisation adversely affected the sales of their products. Rejection of large consignments of orders from Europe owing to the poor quality spawned a major crisis in this artisan trade leading to the impoverishment of hundreds of families.

3.36 It was at this stage that CLRI stepped in 1995 to sensitise the local artisans to modern and scientific methods of production ranging from tanning of leather to the various processes in footwear making, including designing. It required a lot of perseverance and effort on the part of the CLRI technical staff to overcome the proverbial distrust and scepticism of the artisans towards change. Through sheer demonstration the scientists were able to win the artisans over to the need for change. Thus, the process time for tanning was reduced from 35 days to 15 days and the yield was raised by 40 per cent. The quality of the leather so produced was distinctly superior. Following the success of their intervention in tanning, the CLRI team moved to provide the necessary support for upgrading the skills of the local artisans in various processes involved in footwear making. A common facility centre with essential modern machines was set up to enable the artisans to access modern technology. The artisans were also exposed to design innovation and standardized patterns with the help of quality lasts and templates etc. The outcome of these changes, willingly accepted by the local artisans, has enormously improved the productivity, quality of the

products and alongside the market value of the 'Kolhapuri' brand of footwear. CLRI in association with ASCENT (Asian Centre for Entrepreneurial Initiative), a Bangalore based NGO, has also helped the local artisans in providing the much needed market linkages. In order to enhance the marketing potential, ASCENT helped the artisans to go in for branding of their products. "Toehold" was the brand name chosen for a range of hand-crafted footwear from Athani. They have also developed a website featuring the entire range of footwear products for sale, enabling customers to place orders online. ASCENT has also helped the women artisans in Athani to form into an SHG (Self Help Group) with a view to encourage savings and also to overcome the problem of capital required for consumption and production. This intervention by CLRI along with ASCENT in Athani has been largely successful precisely because of its integrated and broad based approach to the problems of the artisan sector and deserves replication in other clusters across the country.

Cleaner & Eco-Friendly Technology for Tanning

3.37 There were in all 2091 tanneries in India in 2006-07, of which 1831 were operational. About 38 per cent of these are located in Tamil Nadu. Bengal and UP are the two other major tanning centres. About 100 tanning units are in the medium and large-scale categories. A large majority of the tanneries are small scale enterprises. Environmental degradation, consequent upon the discharge of effluents, became a major issue especially after the Supreme Court came down heavily on the polluting tanneries by ordering their closure. CLRI came to the rescue of the industry and in association with an environmental institute evolved a basket of technologies in a record 12 months to ensure reduction of contaminated effluent discharge. CLRI followed up this by providing the necessary technical support for the setting up of a number of CETPs (Common Effluent Treatment Plants) and ETPs in tanning clusters. The costs of these plants were borne by the larger tanneries. This was possible because of the linkage between the large and small units. Currently almost all the tanneries in Tamil Nadu

are linked to effluent treatment plants. Alongside, in the face of stringent international standards for cleaner finished leather, CLRI has developed a whole range of eco-friendly green technologies for use by the industry. The adoption of cleaner process technologies has implied enormous gains in terms of cost reduction in treating effluents as well, savings in chemicals apart from significantly enhancing the quality of the leather. This technology is also being extended to Bengal and Punjab, the two other major tanning clusters. This is a good example of equitable distribution of the benefits of cleaner modern technologies.

Skill Up-gradation Programmes

3.38 As a part of the Leather Technology Mission and later HRD Mission, various programmes to impart training to leather artisans have been initiated in various parts of the country. Many of these programmes, though overseen by CLRI, are administered by other specialized agencies like FDDI (Footwear Design and Development Institute, Noida), CFTI (Central Footwear Training Institute) etc. Thus, as a part of the cluster development programme, training in new methods and techniques was imparted to 4000 leather artisans in Jodhpur, Jalore and Barmer. This programme was administered by FDDI in association with RUDA (Rural Non-Farm Development Agency), Jaipur. A similar programme was conducted by CLRI for targeting 4500 artisans in Abohar, Malot Muktsar and Patiala in Punjab. CLRI also initiated skill improvement programmes especially for women artisans. Thus, 200 women in Kundrankudi in Tamil Nadu were trained in leather goods manufacturing. Similar programmes were conducted in Vijayawada, Kurnool and Guntur. With the help of the local NGOs, SHGs of these women artisans were formed. CLRI also helped establish 7 mini CFCs (Common Facility Centres) to enable the women artisans to access modern technology at these centres. NID (National Institute of Design) also stepped in to sensitize these women to innovative designing methods. So far about 2500 women have been trained in product making and many of them have since turned entrepreneurs.

Skill Up-gradation for Footwear Artisans in Tamil Nadu

3.39 CFTI, Chennai was the implementing agency for this programme. It was a one-year programme which commenced in August 2006 and was wound up in November 2007. The first four months were for the identification of the unorganized leather clusters across Tamil Nadu. The total number of artisans who were provided exposure to modern methods of footwear making was 14400. Almost 50 percent of them were from Vellore district. CFTI was provided financial assistance by the HRD Mission for this programme to the tune of Rs 400 per trainee. CFTI was expected to provide certain basic tools to enable the artisans to improve their manufacturing skills.

3.40 During the short training session the trainers sought to impart new methods of production and make the trainees aware of the need to rectify faulty methods. In the course of their interaction with the rural and urban artisans in these unorganised clusters the CFTI technical staff identified the very individual or home-based nature of the production as one of the major problems. Among the major demands of the artisans across all major clusters following the skill up-gradation programme were the following:

- 1) A common facility centre equipped with the necessary machinery for chappal and shoe making which could be accessed by all artisans.
- 2) A longer term training programme than the present one with periodic follow up programmes.
- 3) A raw material depot in the vicinity of their cluster to enable them to access quality raw material at reasonable prices.
- 4) A marketing consortia or a cooperative which can take care of the marketing of their products and thus enable them to secure better margins.

3.41 CFTI officials and trainers also identified several of what they categorise as good clusters where the artisans were full time workers in the leather trade. They also came across other clusters where the artisans had turned

into part time workers owing to various constraints. This was at one level a reflection of the crisis in the unorganised sector and underscores the need for sustainable intervention in the area of skill up-gradation along with support for marketing of their products.

CLRI Intervention in Agra Shoe Cluster

3.42 Agra is the largest cluster of leather artisans where approximately two lakhs artisans are engaged in shoe making in the unorganised sector. Realising the importance of intervention here, given the sheer scale of production much of it for the domestic market, CLRI had drawn up an ambitious plan for technological and skill up-gradation. Phase I of this plan was launched in December 2005 with the setting up of a field office. In this initial phase about 60000 shoe makers have been enrolled and sensitised to the Mission objectives. As part of this phase detailed skill mapping of the 60000 artisans has been completed. About 210 trainers were provided intensive training by CLRI on quality production of footwear.

3.43 Structured training programmes for various skill sets in Phase II have been drawn up. CLRI is awaiting sanction of funds for carrying out this programme. In Phase II of this programme there is provision for setting up of state-of-the-art common facility centres which could be accessed by artisans in batches. These CFC's would also serve as training centres where the artisans would be exposed to modern methods of shoe making. In the light of increased competition from cheaper imports and the scarcity of raw materials and the distinct possibility of exports of finished leather, there is the urgency of a sustained intervention in unorganised sector with respect to TAU.

1.3 Brass Cluster of Jamnagar-Cluster Intervention by EDI, Ahemdabad

3.44 The city of Jamnagar (Gujarat) in India is a hub of manufacturing different kinds of brass components. About 4000 enterprises in this cluster are involved in manufacturing cycle and automobile tube valves, electrical items, building hardware, fasteners, sanitary fittings and precision machined components, employing about 50,000

workers with a turnover of about Rs. 260 crores in 2000-01. The cluster meets about 80 per cent brass parts and components requirements of the country. Products emanating from the cluster were being exported to a large number of developed and developing countries. However, it was observed that the cluster was gradually losing its share in the domestic and international markets. Quality based competition had given way to price based competition. To overcome these problems, a cluster Development Project (CDP) was launched by EDI, in Jamnagar, with the support of the Government of Gujarat.

3.45 A diagnostic study conducted by EDI, as part of CDP (Cluster Development Programme) interventions, revealed that the technology in use for manufacturing brass parts had not changed over the last 40 years. Outdated machines, plants and equipments were still in vogue and to top it all, entrepreneurs hardly had any awareness about the availability of better technologies. This technological backwardness was manifested in the low quality of fine products.

3.46 In order to address this problem a technology up-gradation drive was launched. A number of awareness workshops were organised to familiarise entrepreneurs with the problems in the existing technology, advantages of the latest technology and the ways and means to adopt them. This was followed by vocational and technical training workshops for the workforce. A series of training programmes for the workers and supervisors was organised wherein they were trained and groomed to handle modern machines and technologies with ease and élan. Training programmes were conducted on electro polishing, barrelling, brazing, plating etc., to name a few. Besides imparting theoretical inputs in the class room, the programmes were also conducted in plant so that the workers could get practical hands-on learning. A visit to the brass parts making cluster in Yuhuan, China was also organised for 15 local entrepreneurs to expose them to the manufacturing and marketing practices by Chinese firms.

3.47 The technology up-gradation and technical training of the workforce has helped the cluster in improving quality and enhancing productivity. Table 3.1 provides a bird's eye view of the achievements by the CDP.

Table 3.1: Impact of CDP Intervention on Jamnagar Brass Parts Cluster

Sl. No.	Parameter	Pre-CDP	Post-CDP
1.	Improvement in Quality and Productivity	-	About 25%
2.	Average Rejection Rate	20%	2%
3.	New Technology Adoption	Nil	15 firms
4.	ISO 9000 Certified Firms	10	10
5.	Turnover	260 crores	480 crores
6.	Exports	120 crores	200 crores

Source: EDI, Ahmedabad-Case s=Study on CDP Intervention

3.48 EDI’s intervention and innovation efforts in Jamnagar follows a model which encompasses those policy instruments, which are supported by public resources, but have been clearly created by a bottom-up initiative of private actors/ groups. A crucial role in this case is played by the co-operation between enterprises and independent foundations or research institutions. Stakeholders were grouped together around an industry association and regional development agencies were helpful instruments in promoting local co-operation. This approach, has some similarities with the experience in European countries in terms of such innovative instruments as Regional Development Strategies and the adoption of modern “knowledge management” methods within territorial networks, in order to facilitate the relationship among the local firms.

3.49 The case studies on metal and engineering industries reveal that the chance of success is more when technological and other interventions are made at cluster level as it has the advantage of economies of scale and possibility of meeting all individual and common requirements at one place.

1.4 Engineering Cluster, Rajkot

3.50 Rajkot is a good base of enterprises involved in manufacturing engineering products like diesel engines, machine tools, bearing, auto parts, agricultural implements etc. There are around 6000 enterprises in the cluster. Presently the total turnover of the cluster is about Rs. 3000 crores. 70 per cent of the products manufactured in the cluster are consumed in the domestic market and 30 per cent are destined for exports. The cluster generated about 2 lakhs direct employment and 50 thousand indirect employments.

3.51 At present, there are about 70 diesel engine assembling units in Rajkot. These are ably supported by spare parts manufacturing units. On an average, about 3 lakhs pieces of diesel engines are manufactured annually in this cluster. The majority of the enterprises in the cluster are micro and small enterprises with investments ranging from Rs. 0.50 lakhs to Rs 1.5 crores.

3.52 Technology was one of the important factors which impeded the growth of the enterprises in the cluster. During the course of the diagnostic study by EDI (Ahmedabad) it was observed that the technology of manufacturing, quality control, plating etc. did not change over the years. Some of the technological problems identified in the foundries were lack of standardisation of surface finish of casting, no means to measure the internal stress of the casting, limited awareness to check the hardness of the cast components, limited knowledge of open tolerance of the casting, limited awareness for checking microstructure, problems of blow holes, pin holes, chilling, no pre-heating systems in no-ferrous foundries, limited knowledge of the die material in permanent mould casting etc. Similarly, in the machine tool units, the design manufacturing process, quality of casting and fabrication etc were not in tune with the international requirements. Quality of basic raw materials were not checked for chemical composition and mechanical properties, surface defects etc., no casting and fabrication were stress relieved, limited knowledge of tolerance analysis, poor knowledge of metallurgy and heat treatment etc. In the diesel engine products sector the quality of the piston rings for improving the anti-galling properties was totally missing. There was no catalytic converter; there were problems of brittle fracture on the cranks shaft.

3.53 EDI carried out cluster development programme with the focus on improvements in technology as a result of which the technological awareness of the entrepreneurs has improved substantially. The rejection rate has come down drastically. Enterprises have diversified product lines which offer better marketing prospects and have established direct export market linkages. They have become quality conscious and have started targeting high end of the market. Some of the pro-active entrepreneurs have started benchmarking their products as per the world's best manufacturer in that particular product segment.

II Traditional & Cottage Industries

3.54 Textiles, Leather, Metal and Engineering are among the prominent modern industries being practiced in the micro and small enterprises sector. Similarly Handloom, Handicrafts, Wood carving, etc. are among the prominent traditional, cottage and artisan based activities in the unorganised sector. Fortunately concrete efforts have been made by the Government to improve the level of productivity and competitiveness through creation of institutions for the technological up-gradation in these industries. Recently some interventions have been made at cluster level also. An attempt has been made in this chapter to capture the status of technology and the impact of the institutional interventions in these modern and traditional industries, through the case studies conducted by the NCEUS.⁷

II.1 *Terracotta Master Craftsman near Baruipur (Sashan village), West Bengal.*

3.55 There are about sixty potter families in this village and amidst them lives a master craftsman. The difficulties faced by the master craftsman reflect the overall problems of this sector. He has a pucca house and a work shed and furnace opposite his house. He has been in this business for sometime and has made many innovations in the tradition of terracotta products from the region. Many samples of furniture made with terracotta as well as wall plaques and object d'art are displayed on the walls of his living room. He is a good sculptor and has many designs that have been carved in

relief with a chisel/knife and then baked in a furnace. Some products are from the mould design and finished by hand. He has a furnace but according to him it is not very efficient and not big enough. He needs a bigger furnace because he has many big projects at hand and the capacity of the furnace is severely limited. He expressed difficulties in procurement of raw material because it is not locally available and that the same has to be brought from some distance. The local potters work for him and he draws his inspiration from various books he possesses. He has no problem in selling directly to clients and has many big orders in hand. The demand is good. He is making a good living and is able to give jobs to local potters. An efficient furnace would have enhanced his productivity and income considerably.

II.2 *Bell Metal Vessels of Bishnupur, West Bengal*

3.56 One of the traditional cottage industries in Bishnupur is manufacturing of bell metal vessels. It is dying because 'kansa' vessels that were mandatory for every Hindu wedding, are not much in demand in recent years. They have been more or less replaced by stainless steel vessels. Scrap metal used in this craft and which the craftsmen used to collect from industry, is also getting difficult to find. These artisans expressed the need for new designs for their traditional products and also product diversification with appropriate technology.

II.3 *Biabnan Chicken Kari Cluster, Hoogly, West Bengal*

3.57 A few units in this cluster were visited because of the nature of products manufactured, production methods used and the working conditions. There are about 10,000 artisans in the cluster, engaged in chicken kari handiwork and producing bed covers, sarees, salwar suits, and other dress materials. These artisans are organised broadly in nine units and are partly or fully working for them. On an average 4,80,000 pieces are produced per year with an average turnover of Rs.2 lakhs per unit. Depending on the skill the workmen are able to get up to Rs.1200-1500 per piece, i.e. an average of Rs.50-55 per day. It was reported by some of the units that there was a Craft Development Centre established

7 The in house studies on traditional industries were conducted by Shri R.L. Garg and Shri Ravi Kapoor consultants, NCEUS in 2007.

by Development Commissioner (Handloom) for assisting the units. However, the same was subsequently closed down. Many of the units felt that the same, if restarted, could be of great help to them. It was reported that there is no difficulty in the procurement of the input materials such as fabric, threads and other items which are readily available in the market. The assistance needed is for introducing new designs and suggesting colour combinations suited to the requirements of changing urban markets.

II.4 Dhanekhali Weavers Cluster, Hoogly, West Bengal.

3.58 This cluster is around 350 years old and is engaged in producing sarees and dress materials. Visits were made to two societies namely: Samasur Union Co-operative Weavers Society and Dhankhali Union Tant Silpi Samabay Samiti. The total production is about 2000-2500 pieces per month with approximately Rs. 1 crore/month turnover per society. There are 300 weavers with the Samasur Union Co-operative Weavers Society and 784 weavers with Dhankhali Union Tant Silpi Samabay Samiti. The weavers usually engage themselves to the extent of 60 per cent of their working time to the weaving activity while the remaining 40 per cent to agriculture. A weaver usually produces 3 Baluchari sarees per week and 4 ordinary sarees per week and is paid @ Rs. 450 per Baluchari saree and Rs. 45 per ordinary saree. The weavers are not satisfied with the wages and desired higher payments per saree. The societies indicated that the margins per saree are very low and increasing the weavers' wages shall make it unprofitable as the market rates are pre-determined. It was also informed that there is a good market for these products, provided they are able to improve the quality of their products and design. The weavers/societies sought the assistance of a designer and also improved dyeing facilities for enhanced quality and marketability of their products.

II. Blacksmith Artisans Cluster, Myllem, Meghalaya

3.59 A cluster of blacksmith artisans exists in and around Myllem village. There are around 96 registered units and almost same number of unregistered units operating in the cluster engaging 500-600 artisans. These

units manufacture spades, jumpers, axes, knives, cutters, smoking pipes, and other similar articles, catering to the local demand. The steel scrap, being used as the raw material for their production, is procured through the dealers and it is reported that the same is available as per their demand. The cost of the raw material is around Rs.35, 500 per ton. One unit is in a position to manufacture 20-25 pieces of spades or other similar products in a day which are sold at prices varying from Rs. 160 to Rs. 240 per piece. The artisans involved are being paid at the rate of Rs. 100 -150 per day depending on the skill. A mechanical hammer, supplied under a scheme, was lying idle as the unit could not use it. Issues relating to non-availability of credit, marketing and technological inputs for improving the production and quality of the products were brought to focus during discussions with the artisans.

II.6 Wood Carving Cluster, Mawblang Village, Meghalaya

3.60 A cluster of 20-25 families is working at Mawblang village, engaged in wood carving activities manufacturing various types of wooden spoons, forks and other similar items used in the households. The wood required for manufacturing of these articles is available in the nearby forest. The artisans cut the required wood to meet their requirements. The market for these products is available. One of the artisans regularly visits the urban markets and delivers the products to the shops for sale. On an average the price realised is Rs. 10 per piece and each family is able to earn Rs. 1500-2000 per month. Since a lot of wastage of wood is taking place in the manufacturing there is the need to provide them simple wood cutting machines and tools to reduce the wastages and increase the production.

Conclusion

3.61 Case studies of traditional industries on handloom and handicrafts reveal that the major problem faced by them relates to their failure to adapt themselves to the changing requirements, whether it is in design as in the case of Chikankari cluster and Dhankhali weaver clusters of Hoogly or products losing relevance in modern times as in the case of Bell metal vessels of Bishanpur.

3.62 Secondly, even though enterprises might be existing in clusters unless an agency comes forward for intervention things do not change. Hence, Cluster Development Programme is needed to address all the problems of the clusters.

3.63 Thirdly, mere provision of better technology does not ensure improved production and productivity unless related requirements such as skill, credit, raw material and markets are also addressed simultaneously.

3.64 The case study of textile industry with regard to the role of SITRA and analysis of the working of Technology Up-gradation Fund Scheme (next chapter) reveals that the institutions or the schemes are not tailored to meet the needs of the small units. Thus unorganised enterprises are not able to benefit from the existence of the institutions and the scheme.

3.65 Technology is no doubt one of the important inputs, affecting productivity, but availability of other inputs like credit and raw material are equally important. Production process is often disturbed due to inadequacy of credit and raw material, despite the existence of the state-of-the-art technology. Hence the development of unorganised sector enterprises need to be considered in an integrated manner. The case study on leather industry reveals that small units are unable to realise their full potential owing to a variety of factors ranging from such

constraints as finance, sourcing adequate and quality hides and above all access to modern technology among others.

3.66 Case studies on Brass and engines goods reveal that it is relatively easier to derive good results if the enterprises exist as clusters. Clusters have the advantage of economies of scale in terms of provision of infrastructure, skill development, locating common facility centres addressing environmental concerns. The most important advantage however lies in the field of market, raw material and technology including location of testing facilities. Technology up-gradation of unorganised sector enterprises has assumed greater importance in the context of the opening of the economy, WTO conditionalities and to face globalisation, particularly the competition from china.

3.67 Case studies on traditional industries such as handicrafts and handloom reveal that inability of these industries to change with change in demand and design has affected their survival. In general the proposition of technological up-gradation is unwelcome by the enterprises and artisans for various reasons particularly because of the problem of dislocation, disruption of production cycle and also the high cost of new technology.

3.68 Almost all case studies confirm that the issue of technology is linked to the level of skill. Higher the level of skill higher is the scope for technology adoption.

4

Institutional Arrangements for Technology Support to Unorganised Sector Enterprises

Introduction

4.1 Ever since Independence, a sustained effort has been made to develop the country's science and technology capabilities. Government of India's Scientific Policy Resolution (SPR) dated 4th March 1958 clearly stated that the key to national prosperity, apart from the spirit of the people, lies in the effective coordination of three factors, technology, raw materials and capital. The aim of SPR 1958 was to foster, promote and sustain the cultivation of science and scientific research in the country and to secure for the people all the benefits that can accrue from the acquisition and application of scientific knowledge. Various policy pronouncements of the Government have since emphasised the role of mounting a direct and sustained effort on alleviation of poverty, enhancing livelihood security, removal of hunger and malnutrition, reduction of drudgery and regional imbalances, both rural and urban, and generation of employment, by using scientific and technological capabilities along with our traditional knowledge pool.

4.2 A number of ministries, departments, R&D laboratories and other institutions and agencies have been established in India specifically to meet the aforesaid objectives. The effort of the Government in the last several decades has resulted in a broad based and extensive S&T network, besides the development of a substantial number of trained and competent S&T manpower and S&T infrastructure working in areas as diverse as agriculture and healthcare on the one hand and nuclear and space research on the other.

4.3 Technology support to enterprises in India is provided by a large number of organisations at both the Central and the state governments' levels as well as by institutions and agencies in the private sector and the NGOs. This chapter accordingly provides a brief overview of the ministries, departments and agencies engaged in promoting technology for enterprise development, etc.

Central Government Initiatives:

Ministry of Micro, Small & Medium Enterprises (MSME)

4.4 Ministry of Micro, Small and Medium Enterprises (MSME) with its field network plays a key role⁸ in the development and regulation of small scale industries. The MSME operates most of its schemes and programmes for the promotion of micro and small enterprises through the Development Commissioner (DC)'s office, Micro, Small and Medium Enterprises-Development Organisation (MSME-DO). Under its umbrella, with over 60 offices and 21 autonomous bodies located in different parts of the country the MSME-DO is engaged in advising the Government in policy formulation for promotion and sustained development of MSME sector, providing techno-economic and managerial consultancy, common facilities and extension services and extending facilities for technology up-gradation, modernisation, quality improvement and infrastructure. The MSME-DO has been allocated Rs. 540.00 crores under the Plan Budget Outlay of 2008-09 for implementation of various schemes under it. The schemes being implemented by MSME-DO relating to technological support to the enterprises in the MSME sector are described below:

MSME Tool Rooms

4.5 The MSME-DO has till date established nine tool rooms in different parts of the country namely in Ludhiana, Ahmedabad, Indore, Aurangabad, Kolkata, Bhubaneswar, Jamshedpur, Jalandhar and Guwahati with Indo-German and Indo-Danish collaborations. They assist MSEs in technology up-gradation, provide good quality tooling by designing and producing tools, moulds, jigs and fixtures, components, calibration of machine tools including laser calibration etc. They also provide training and consultancy for tool and die makers. The Plan outlay for these tool rooms during 2008-09 is Rs. 32.00 crores and it is expected that during this period 16,000 persons would be trained and 5000 units assisted. Further, these tool rooms are expected to acquire 70 new machines to upgrade and diversify the existing activities during 2008-

09. The major problem with this scheme is their limited number. More and more area specific tool rooms need to be set up in all parts of the country, particularly in the clusters.

MSME Technology Development Centres (MSME-TDCs)

4.6 These are centres to look into the product-specific problems and render technical services, develop and upgrade technologies, assist in appropriate technology transfer and develop trained manpower in the specific product groups. These institutes are also running training courses on repair and maintenance of CNC machines, addition of fibre optics testing facilities and tailor made training modules designed as per the needs of the industry with emphasis on hands on training. The overall outlay for these TDCs for the year 2008-09 is Rs. 18 crores and it is expected that 12000 persons would be trained and about 6500 units assisted during the period 2008-09. In the case of TDC also, the major limitation is their small number. More and more product specific process and product development need to be set up.

MSME Testing Centres/ MSME Testing Stations

4.7 MSME-DO operates four MSME Testing Centres at Chennai, Kolkata, Delhi and Mumbai for quality up-gradation, training/consultancy in testing, quality control, quality management, process quality control systems, etc., in the disciplines of Chemical, Mechanical, Metallurgical and Electrical Engineering. These Centres, accredited by internationally recognized National Accreditation Board of Testing & Calibration Laboratories (NABL) Certification as per ISO (17025), are equipped with state-of-the-art indigenous and imported equipments to undertake Performance Test, Type Test and Acceptance Test of semi-finished/ finished products, etc., Rs. 3.00 crores has been provided for this component during 2008-09 and about 160 new machines are expected to be installed. It is also expected that 36,600 testing jobs will be generated under this scheme during 2008-09. Existence of just 4 testing centres in a country of India size is a major limitation. More product specific and area based testing centres need to be set up.

8 dcmsme : <http://www.smallindustryindia.com>

Credit Linked Capital Subsidy Scheme for Technology Up-gradation (CLCSS)

4.8 The CLCSS scheme launched during 2000-01 aims at facilitating technology up-gradation by providing capital subsidy to MSE units, including tiny, khadi, village and coir industrial units, based on institutional finance availed by them for modernisation of their production equipment and techniques in specified sub-sectors/products approved under the Scheme. The ceiling for eligibility of loans under this scheme is Rs. 1 crore and the rate of subsidy is 15 per cent. An amount of Rs. 120 crores has been kept under BE 2008-09 and about 2000 units are expected to be covered under this scheme during the year 2008-09. Since its inception in August 2000 and till the end of 2007, this scheme has been availed by 3329 micro and small enterprises and a sum of Rs 103 crores has been disbursed by way of subsidy. It may be mentioned that total outlay of this scheme for the first five years was Rs 600 crores. The performance of this scheme was sluggish in the initial years due to procedural and organisational constraints. However, after the revision of guidelines, the scheme has been showing improved performance.

Micro & Small Enterprises-Cluster Development Programme (MSE-CDP)

4.9 The scheme launched during the year 2003 envisages a holistic pattern of development of clusters encompassing marketing, exports, skill development, setting up of common facility centres, etc, including technology up-gradation of enterprises in the clusters. Government of India's assistance under the scheme has since been enhanced up to Rs. 8 crores to support soft as well as hard interventions including setting up of common facility centres. An amount of Rs. 37 crores has been provided for the scheme during 2008-09. This programme has started showing good results and needs to be widened for covering more and more clusters.

Reimbursement of Expenses for Acquiring Quality Certification

4.10 The scheme is meant to create awareness about the importance of the quality management system like

ISO-9000, ISO-14001 and HACCP and commitment towards quality product manufacturing amongst the micro and the small scale units. The scheme envisages reimbursement of charges for acquiring the relevant Certifications to the extent of 75 per cent of the expenditure subject to a maximum of Rs. 75,000 to any one Micro or Small Scale Enterprise. A total of Rs. 80.32 crores has been reimbursed to 15807 units up to 31st December 2007 since inception of the scheme in 1994. For the period 2008-09, Rs. 15.00 crores has been earmarked and 3125 units are expected to be benefited. This scheme has made excellent progress during last 5-6 years and enhanced awareness on technology up-gradation and maintenance of quality on sustainable basis.

Khadi & Village Industries Commission (KVIC)⁹

4.11 The KVIC is entrusted with the planning, promotion, organisation and implementation of programmes for the development of Khadi and other village industries in the rural areas in co-ordination with other agencies. KVIC provides assistance to institutions and individuals for promotion and development of Khadi and village industries, and guiding them through supply of designs, prototypes and other technical information, encouraging and promoting research in the production techniques and equipment employed by the Khadi and Village Industries (KVI) sector. KVIC is implementing several schemes with average annual outlay of more than Rs. 1000 crores in Eleventh Plan period (Rs.1128 crores for 2008-09). Various schemes being implemented by the KVIC for technological support to KVI enterprises are given below.

4.12 *Prime Minister's Employment Generation Programmes (PMEGP)*: The two credit linked capital subsidy schemes, namely the Prime Minister's Rojgar Yojana (PMRY) and the Rural Employment Generation Programme (REGP), being implemented in Tenth Plan, have now been merged under a new scheme called PMEGP for providing capital subsidy Rs. 25 lakh to entrepreneurs to set up micro and small enterprises. During the year 2008-09, the PMEGP has been allocated Rs. 823.00 crores and it is expected that during this period

9 <http://www.kvic.org.in/V4/OVERVIEW.ASP>

around 1 lakh micro and small enterprises would be set up with an additional employment generation for 6 lakhs people. A brief programme is organised for entrepreneurs prior to the disbursement of the loan to make the entrepreneurs aware of the new technologies and management practices.

4.13 *Khadi & Village Industries (S&T)*: KVIC supports institutions and individuals in their R&D efforts for improving the quality of KVI products and the equipments being used by them through grants from the budgetary allocation available under this scheme. The scheme is expected to introduce newer technology in the KVI sector and help in reducing drudgery in work. Rs 2 crores each for Khadi and VI sector have been provided in the B.E. 2008-09.

4.14 *Product Development, Design Intervention & Packaging (PRODIP) Scheme* was launched in November 2002 as a small intervention with a view to selectively improving the quality of khadi products and also to diversify into new products. The scheme envisages improvement in product quality, introduction of new designs and better packaging of products. It also seeks to improve the marketability of khadi by enlisting the support of professional designers approved by the National Institute of Design (NID).

4.15 *Rural Industries Service Centres (RISC) Scheme* of KVIC provides infrastructural support and services to select units to upgrade their production capacity, skills and market promotion. RISC, inter alia, provides testing facilities by establishing laboratory to ensure quality of products, improved machinery/equipment to be utilised as common utility services by nearby units/artisans to enhance production capacity or value addition of the products, attractive and appropriate packaging facilities and better marketing of their products, training facilities to upgrade artisans' skills in order to increase their earnings and new designs or new products and diversified products in consultation with experts/agencies for value addition by rural manufacturing units.

4.16 *MOU with Technical Interface Institutes*: KVIC has taken the initiative of building up a network of technical institutions for technology support to rural/cottage industrial units producing a wide range of goods and articles. Under this initiative of KVIC, technical institutions are expected to support rural enterprises in making the products more marketable, either through technology upgradation or design interventions or through quality assurance system.

4.17 *Scheme for Enhancing Productivity & Competitiveness of Artisans & Khadi Industry* aims to provide financial assistance to 200 of the 'A plus' and 'A' category khadi institutions of which 50 institutions would be those which are managed exclusively by beneficiaries belonging to the Scheduled Castes (SCs)/ Scheduled Tribes (STs) in a public private partnership mode to replace old/obsolete charkhas and looms with new charkhas/looms so as to realise increased value addition for khadi products, readymade garments, muslin khadi, setting up common facility centres, need based dyeing and printing facilities besides ensuring better wages to artisans along with skill up-gradation. The scheme is expected to be fully operationalised in 2008-09. An outlay of Rs. 10 crores has been kept in the BEs 2008-09.

4.18 *Mahatma Gandhi Institute for Rural Industrialisation (MGIRI)*¹⁰ set up in December 2006 is an autonomous body registered under Societies Registration Act. Its objective is to undertake R& D, extension, training and education in the area of rural industrialisation, to focus on the technology needs of artisans engaged in KVIC sector and to upgrade their technology. It is likely to start functioning in a regular mode during the year 2009-10. MGIRI is expected to act as a nodal agency for monitoring and coordinating with national level institutes viz., IITs and NITs to function as Technical Interfaces for KVIC, for undertaking R&D projects in the KVI sector, besides dissemination of technology developed by it as well as Technical Interface institutes. An amount of Rs. 16.35 crores has been earmarked for MGIRI during the Eleventh Plan with an outlay of Rs. 3 crores for 2008-09.

10 <http://www.kvic.org.in/>

Coir Board¹¹

4.19 The Coir Board is a statutory body established under the Coir Industry Act, 1953 for promoting the overall development of the coir industry and uplifting the living conditions of workers engaged in this traditional industry. It has research centres in Alleppey (Kerala) and Bangalore besides having regional offices at Bangalore, Vishakapatnam and Pollachi (Tamil Nadu) and a National Level Training Centre at Kalavoor (Kerala). The functions of the Board are to undertake R&D for technological & economic development of the coir sector, domestic market promotion, development of new products and designs, to provide training to the coir workers and their welfare, promotion of exports, etc. It is also entrusted with the responsibility of modernising production infrastructure, supporting entrepreneurs and exporters, in their effort to increase production of quality coir products through various schemes, etc., besides monitoring and reviewing export performance of the sector. An outlay of Rs. 55 crores has been kept for 2008-09. Various schemes being implemented by the Coir Board for technological support to coir enterprises are given below.

4.20 *Science & Technology Scheme for Up-gradation of the Coir Sector & support to the Coir Sector:* Under this scheme, the Coir Board undertakes various S&T related activities related for modernisation of extraction and processing of coir fibre, development of coir machinery, product development and diversification, development of environment friendly technologies, technology transfer, incubation, testing and service facilities, etc. The focus of these activities is to augment utilisation of coir in the country for industrial purpose, facilitate production of new coir products and their testing, and develop new coir machinery. Rs. 7 crores has been provided in 2008-09 for these research activities and for undertaking above S&T related activities.

4.21 *Scheme to Rejuvenate, Modernize & Upgrade the Spinners & Tiny Household Sector;* expected to be fully operationalised in 2009-10, is the first phase of a major initiative to modernise and technologically upgrade the Coir Industry. Under this scheme, outdated ratts/looms would be replaced and work sheds would be provided to

spinners and tiny household units resulting in an increase in the production and earning of workers. Around 1000 spinning units and 800 tiny household units would be set up during 2008-09 leading to the generation of estimated 9500 additional employment opportunities. An amount of Rs. 25 crores has been earmarked for this scheme during 2008-09.

4.22 *Central Coir Research Institute (CCRI) Kalavoor (Alleppey) & the Central Institute of Coir Technology, Penya Industrial Area (Bangalore)* are the research institutes of Coir Board for conducting studies related to problems in extraction and further processing of coir fibre into yarn and their products, and for undertaking various activities indicated above. Some of the important technological innovations of these research institutes include the development of efficient retting process of coir in a more environment friendly manner, developing a process to make fibre amenable to spinning and convenient to process, developing a motorised charkha which makes the process of yarn spinning comfortable and more productive, development of blended yarn of coir & sisal fibre, manufacturing of coir structural components like doorframe & other moulded items and the development of suitable machinery for it.

Scheme of Fund for Regeneration of Traditional Industries (SFURTI)

4.23 The scheme was launched during the year 2005-06 for development of around 100 clusters in khadi, village and coir sectors at a total cost of Rs.97.25 crores over a period of 5 years to make these clusters more productive and competitive and to increase the employment opportunities in both the rural and semi-urban areas of the country. KVIC and Coir Board are the nodal agencies for implementation of the scheme. The scheme seeks to regenerate traditional industries through a holistic, sustainable and replicable model of integrated cluster-based development and is expected to cover an estimated 50,000 beneficiary families. An outlay of Rs. 21 crores has been kept in BE 2008-09. The Scheme Steering Committee of SFURTI has approved 118 clusters (32 khadi clusters, 26 coir clusters and 60 village industry clusters) by the end of 2008. To provide technical support

11 Schemes and Service Facilities available with Coir Board.

for the development of clusters under SFURTI, 17 technical agencies have been identified. The other cluster development activities like appointment of Cluster Development Executives (CDE), training to NAs, TAs, CDEs, etc. in most of the cases have been completed. 25 (14 Khadi, 11-VI) clusters have been launched so far.

National Small Industries Corporation

4.24 NSIC was established to promote and foster the growth of small enterprises in the country. NSIC offers micro, small and medium enterprises support services through its Technical Services Centres and Extension Centres. These support services are: material testing facilities through accredited laboratories; product designing including CAD; common facility support in machining, EDM, CNC, etc.; energy and environment services at selected centres and practical training for skill up-gradation. Incubator as a tool is used to achieve the necessary facilities for prospective/potential entrepreneurs and start up companies to learn product manufacturing processes coupled with technology development under one roof. NSIC has set up Incubation Centres for small enterprise establishment at its Technical Centres, wherein low cost projects depicting appropriate technologies are displayed in working conditions. These incubation centres provide comprehensive package of services including on-the-job training and other support services to establish own enterprises. The plan outlay of NSIC during the year 2008-09 is Rs. 23.00 crores.

4.25 From the above it emerges that under the Ministry of MSME, there are broadly four types of institutions engaged in technological up-gradation of micro and small enterprises and traditional industries like Khadi and village industries and coir. There are over 6000 products in the micro and small enterprise sector and over 100 products in village industries. There seems to be some duplication of effort in the case of MSME-DO and NSIC so far as micro and small enterprises are concerned and similarly between KVIC and MSME-DO so far as micro enterprises and village and cottage industries are concerned. There is need for avoidance of duplication of efforts and better coordination among

various agencies within the Ministry of Micro Small and Medium Enterprises.

Ministry of Science & Technology

Department of Science & Technology (DST)¹²

4.26 DST endeavours to promote new areas of S & T and plays the role of a nodal department for organising, coordinating and promoting S&T activities in the country. It is entrusted with the responsibility of promotion of science and technology through various institutions and agencies. Some of its objectives are dealing with matters concerning domestic technology involving the commercialisation of technology, promotion of S&T at state, district and village levels and application of S&T for weaker sections, women and other disadvantaged sections of society.

Science Technology Programme for Socio-Economic Development

4.27 The Societal Programme plays a vital role in the development strategy of various sections of the society, which provides opportunities to motivated scientists, engineers and field level workers to take-up time bound development projects with inputs of science & technology for the benefit of disadvantaged sections of the society. The programmes are being implemented through S&T institutions, universities and S&T based voluntary organisations under various schemes. For this programme a budget allocation of Rs. 95.00 crores has been made for the year 2008-09. Some of the schemes under this programme have been highlighted below.

4.28 *Science & Technology Application for Rural Development:* Under this scheme scientific and technological application for rural development through core support is extended to eleven sciences based voluntary organisations working in different parts of rural India. Through Technology Intervention in Mountain Ecosystems (TIME) Programme efforts have been made to support need based projects at the grass root level in mountain areas to enhance rural livelihoods with networking approach. Further the Coordinated Research

¹² http://dst.gov.in/about_us/intro_DST.htm

Programme on Biological Integration of Farming Activities & Resource Management (BIOFARM) for poor and small farmers is being implemented at 17 locations spread across different agro-ecological regions of the country. Under the programme of Mission Mode Network, various projects have been supported for fine tuning of the existing technology models to develop effective business models suitable for different rural settings. Besides, various new initiatives and individual projects relating to technological up-gradation of the enterprises and workers in the rural areas were supported. Under the scheme of Science & Technology Application for the Weaker Sections' (STAWS) the thrust is on evolving and demonstrating replicable technology models for the benefit of the weaker sections. Wherever, possible and feasible, establishment of micro-enterprises for improved livelihood is advised as a project deliverable.

4.29 *National Science & Technology Entrepreneurship Development Board (NSTEDB)* aims to foster technology based and knowledge driven entrepreneurship among S&T persons through its programmes and activities. The projects implemented by the Board aim at creation of techno-entrepreneurs among the S&T persons through structured training programmes and other facilitating mechanisms. The purpose is to create additional employment through technology based entrepreneurship and application of S&T tools and methods. Technology Business Incubators aim to catalyse development and growth of technology-led enterprises and creating value added jobs and services besides developing new tools of technology transfer for fostering entrepreneurial spirit in the academic and R&D institutions. S&T Entrepreneurship Development (STED) scheme, launched in 1985, has been to cater to the people in rural and semi-urban areas and provides an opportunity to earn livelihood by enhancing their self-employability. The scheme to promote micro enterprises is being implemented through NGOs, and technical consultancy organisations. Under the scheme techno-economic surveys of the areas are conducted. Potential entrepreneurs are identified and technologies suitable to them are provided. Thereafter, the entrepreneurs are trained and

project profiles are prepared. Skill Development through S & T (SDST) aims at demonstrating the effectiveness of short term market-oriented technical skill training in empowering the unemployed youth to earn a sustainable livelihood. The programme is implemented through a network of institutions comprising educational or research institutions and professional bodies.

4.30 *Technology Information, Forecasting Assessment Council (TIFAC)*¹³ is a registered society under the Department of Science & Technology the objectives of which include generation of Technology Forecasting/ Technology Assessment/ Techno-Market Survey documents, developing on-line nationally accessible information system, promotion of technologies and evolving suitable mechanism for testing of technology and enabling technology transfer as well as commercialisation. TIFAC has so far produced more than 200 reports including the 25 document series on Technology Vision up to 2020 and 16 document series on S&T in different sectors. The aim of the current series of TMS reports is to target technology linked business opportunities for products, processes etc. for which earlier TMS Reports projected very high demand. The Programme for Technology Up-gradation of Selected SME Clusters, towards making them globally competitive being implemented by TIFAC is for carrying out in-depth technology assessment studies to bring out the technology gaps in the context of current global standards. The studies include status of technology (Product & Process) in the clusters, identify gaps in terms of competition and market requirements, and suggest scenario for possible technological interventions preferably through involvement of nearby academia or R&D partner institutions. The programme is being funded by an Apex Committee, which also includes representatives of Ministry of MSME and UNIDO. Various sectors have been identified under the scheme and others are under consideration.

Department of Scientific & Industrial Research (DSIR)¹⁴

4.31 The Department of Scientific and Industrial Research (DSIR) under Ministry of Science and

13 <http://dst.gov.in/autonomous/tifac.htm>

14 www.dsir.nic.in

Technology has a mandate to carry out the activities relating to indigenous technology promotion, development, utilisation and transfer. The primary endeavour of DSIR is to promote R&D by the industries, support a larger cross-section of small and medium industrial units to develop state-of-the-art, globally competitive technologies of high commercial potential, catalyse faster commercialisation of lab-scale R&D, strengthen industrial consultancy & technology management capabilities and establish user friendly information network to facilitate scientific and industrial research in the country. It also provides a link between scientific laboratories and industrial establishments for transfer of technologies through National Research Development Corporation (NRDC). For the fiscal 2008-09, the budgetary allocation to DSIR under the Plan and non-Plan categories is Rs.1200 crores and Rs.878.00 crores respectively.

4.32 *Technology Development & Innovation Programme* has a budget allocation of Rs. 26.00 crores in the year 2008-09. The programme has four components, of which two are of interest to us. Technology Development and Demonstration Programme (TDDP) is a Plan scheme of DSIR to promote industry's (with focus on SMEs) efforts in the development and demonstration of indigenous technologies, development of capital goods and absorption of imported technologies. Another component called Techno-preneur Promotion Programme (TePP), launched in 1998, is meant to tap the vast innovative potential of the citizens of India. TePP is a crucible to promote individual innovators to become technology based entrepreneurs (Techno-preneurs). The proposals from individual innovators to convert an original idea/invention/know-how into working prototype/processes are considered under the scheme. The proposals which have possible commercial potential are considered. DSIR & TIFAC and Department of Science and Technology (DST) are the implementing agencies.

National Research Development Corporation (NRDC)¹⁵

4.33 NRDC was established in 1953 to develop and arrange to exploit indigenous know-how, inventions,

patents and processes emanating from all types of research institutions in the country. It comes under the Ministry of Science and Technology. The objectives of NRDC are to identify the S&T needs of the people in relation to the satisfaction of basic needs, local resource development, social development, cultural development, human resources development simultaneously blending harmoniously with the environments. The Plan budget allocation to NRDC for the year 2008-09 has been Rs. 10.00 crores. Some of the schemes being implemented by NRDC are as below:

4.34 *Invention Promotion Programme (IPP)* was launched during the year 1973. The focus of the scheme is to stimulate the spirit of inventiveness and innovation not only among scientific and technical personnel and industrial workers but also amongst craftsmen, artisans and the youth in the community to harness their creative talent for the benefit of the society. NRDC is the implementing agency of the scheme. The awarded inventions have been commercialised and have generated employment for 9,600 persons. The regular magazines published by NRDC have guided the budding inventors for developing inventions/technologies and encouraged new entrepreneurs for setting up industries. The Plan budget allocation to Invention Promotion Programme for the year 2008-09 is Rs. 9.00 crores.

4.35 *Technology Promotion Programme (TPP)* was launched during the year 1977. The budgetary outlay for it in the year 2008-09 is Rs. 5.00 crores. Supported by DSIR as grants-in-aid, NRDC runs the following four programmes:

- (i) **Development & Promotion of Rural Technology:** The programme envisages the benefits of modern science and technology to: (a) Improve the living conditions of rural people, (b) Increase employment potential through the application of suitable rural technologies utilizing local resources, (c) Upgrade traditional skills, (d) Improve rural sanitation and health care. The programme of Development and Promotion of Rural Technology has provided direct employment to more than 4 lakhs persons and indirect employment to more

15 "Reaching Out", NRDC takes Technology to Villages, published in January 1991

than 8 lakhs persons.

- (ii) **Promotion of Export of Technology:** Under this programme efforts are made to export Indian technologies and services to entrepreneurs both in the developed as well as developing countries.
- (iii) **Informatics for Technology Transfer:** Major activities undertaken in this scheme relate to preparation and updating of project reports/profiles on indigenous technologies, training programmes for entrepreneurs on technology transfer and patent system; “On-line Patent Search” to R & D institutes and industries and exhibitions, workshops and get-togethers and publication of informative brochures, technology profiles etc. to promote indigenous technologies.
- (iv) **Technology Development Programme for Priority Projects** focuses on the promotion of technologies for transfer to rural people, export of Indian technologies to developed and developing countries, preparation and up-gradation of project reports.

4.36 **Technology Transfer** scheme, launched in 1953 aims to promote, develop and commercialise technologies (know how/inventions/patents/processes emanating from various national R&D institutions). The major commercial objectives of the scheme are to participate in the equity to facilitate the formation of new ventures using NRDC technology; Intellectual Property Rights (IPR) consultancy to R & D institutes/industries; export Indian Technologies/know-how; execute turnkey projects abroad based on indigenous technologies. The activity focus is on the promotion, development and commercialisation of the technologies/knows-how/inventions/patents/processes emanating from various national R & D institutions. NRDC is implementing agency of the activity.

4.37 From the list of the schemes it emerges that NRDC exports technology under three schemes, which indicates both duplication of efforts and lack of coordination among the implementing wings within the same organisation.

4.38 So far as rural industries are concerned, here again there is scope for united intervention among the KVIC, the Department of Science and Technology and

the NRDC as they are having the same target group. While there are 3 agencies working for rural industries currently, there is no single data bank on rural industries. This task appropriately may be taken up by the newly created Mahatma Gandhi Institute for Rural Industrialisation.

Council of Scientific & Industrial Research (CSIR)

4.39 CSIR is an autonomous body constituted in 1942 by a resolution of the Central Legislative Assembly. Its mission is to provide scientific and industrial R&D that maximises the economic, environmental and societal benefits for the people of India. Some of the functions assigned to the council are as follows:

- i. Promotion, guidance and co-ordination of scientific and industrial research in India, including the institution and financing of specific researches.
- ii. Collection and dissemination of information in regard not only to research but also to industrial matters generally.
- iii. Establishment or development and assistance to special institutions or departments of existing institutions for scientific study of the problems affecting particular industry and trade.

For the year 2008-09 the estimated plan and non-plan budgetary allocation to CSIR is Rs. 1155.00 crores and Rs. 873.00 crores respectively.

Ministry of Textiles

Technology Up-gradation Fund Scheme

4.40 Since 1999, textile units have been provided with a technology fund, known as the Technology Up-gradation Fund Scheme (TUFS), with the following three-pronged government incentives:

- Reimbursement up to 5 per cent of the interest charged by lending agency on the project involving technology up-gradation.
- For SSI units, 15 per cent capital subsidy under the scheme known as Credit Linked Capital Subsidy (CLCS). This was increased from 12 per cent with effect from 13 January 2005.

Units can enjoy any of the above two from January 1, 2002. In lieu of the above two, with effect from 6th November 2003, units could enjoy:

- 20 per cent capital subsidy subject to the maximum of Rs. 12 lakhs and a capital ceiling of Rs. 60 lakhs. The ceiling was raised to Rs. 20 lakhs and Rs. 1 crore respectively with effect from 13 January 2005.

For certain textile processing machineries, additional incentives were available to the tune of 10 per cent capital subsidy over and above the 5 per cent interest subsidy. The TUFS covered projects involving purchase of new machinery by a new or the existing unit. This was not extended to second hand machines bought from the domestic market. However, certain relaxation was made in respect of imported second hand machines. Although originally earmarked for facilitating TAU, TUFS has not been very effective from the point view of small units. In cotton ring spinning system, for instance, TUFS covered units having minimum economic size of 25,000 spindles. This cut off was relaxed to include up to 12,000 spindles, depending upon their performance record as well as management. Minimum economic size for applying for TUFS was subsequently reduced to 8000 spindles with effect from October 15, 2004. While the reduction in minimum economic size is commendable, as it has facilitated more units to enjoy TUFS benefits, still it has not found favour amongst the small units. A typical small firm would normally have 2000 spindles, that too mostly second hand. Such size class falls outside the scope of TUFS. Therefore smaller units could not avail its benefits. Furthermore, insistence on collateral by lending agencies had generally favoured already well off units and not the small units. Entrepreneurs of small units, but not having required collateral, could not opt for loan facilities available under TUFS, although they had genuine desire for TAU. The scheme has been so tailored that it has benefited mostly the large textile mills or those whose loan requirement is more than Rs 10 lakhs. Most of the units in handloom sector find it difficult to avail the scheme in the absence of balance sheets. The budgetary allocation to this scheme for the year 2008-09 is Rs. 1140 crores.

Other Agencies of Ministry of Textiles

4.41 Besides, the TUFS, Ministry of Textiles has been implementing a large number of products specific technology development programmes for traditional industries through various Development Commissioners' Offices and Boards constituted for the purpose. Notable among them are as under:

4.42 **Office of Jute Commissioner:** Jute Technology Mission (2006) – Development of market yard. Construction of Retting Tanks, Demonstration of Retting Technology, Development of Ribboners, Training of Workers and Supervisors, Machinery Development, Jute Diversification, etc.

4.43 **Central Silk Board:** Budget (Rs 110 crores Plan + Rs 108 crores in non-Plan in 2007-08). Research Development Institutes in silk producing states provide R&D and training support for development of sericulture. Several technology trials being undertaken include: testing of new productive Bivoltine hybrids, new bed disinfectant formulation, plant product formulation, improved tillage method (mulberry, Tussar), new montages, Chowki rearing practices, mulberry package for seed cocoon crop, silk worm rearing, post-cocoon technology demonstration-cum technical service centres, etc.

4.44 **Central Wool Development Board:** Decentralised activities include hosiery and knitting units, power loom units and handmade carpets, dyeing and processing house. Integrated Wool Development Programme covers sheep and wool improvement scheme, Angora wool development, Pashmina development, setting of common facility centres, finishing centres, quality processing units.

4.45 **Office of the Development Commissioner (Handlooms):** Important institutions/ Schemes for technology up-gradation are: Diversified Handloom Development Scheme, Weavers Service Centres, Indian Institute of Handloom Technology, Design Exhibition-Cum Dyeing Shop, R&D Promotion aimed at production of high value niche products through modernization of looms, craftsmanship with unique and intricate designs.

4.46 Office of the Development Commissioner (Handicrafts): The office is implementing a large number of technological interventions aimed at development and supply of improved modern tools, design and technical development, training of artisans, technological status and need based studies in various handicraft activities, These also cover cluster specific interventions through the establishment of E-Kiosks, creation of raw material bank, setting up common facility centres and technological facility centres for exporters.

4.47 From the above it emerges that while the main product is textiles, various departmental agencies are catering to product specific requirement of technology. Such specific product wise intervention is highly desirable since there is overall guidance and supervision of a single Ministry of Textiles.

Ministry of Food Processing Industries

4.48 The Ministry of Food Processing Industries (MFPI) is concerned with formulation and implementation of the policies and programmes for the food processing industries within the national priorities and objectives. The schemes in progress under the Ministry of Food Processing Industries are given below:

4.49 *Scheme for Setting up/Establishment/Modernisation/Technology Up-gradation of Food Processing Industries* was launched in 2002-03. The scheme provides grants to units for setting up of new food processing industries as well as for technology up-gradation and modernisation of the existing units. The rate of assistance is 25 per cent of the cost of plant and machinery and technical civil works, subject to a maximum of Rs 50.0 lakhs in general areas and 33.33 per cent subject to a maximum of Rs. 75 lakhs in difficult areas such as Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and North Eastern states, A & N Islands, Lakshadweep, etc. The Plan budget outlay (tentative) for this scheme during the year 2008-09 is Rs. 100 crores. An additional Rs. 10 crores has been earmarked for the North-Eastern states.

4.50 **Scheme for Quality Assurance, Codex Standard, R&D & Other Promotional Activities** aims to motivate the food processing units for adoption of food safety and

quality assurance mechanisms such as Total Quality Management (TQM) including ISO-9000, ISO-14000 and keeping the industry technologically abreast of international best practices. The budgetary allocation under this scheme is Rs 20 crores for the year 2008-09.

Ministry of Rural Development

4.51 An important objective of the Ministry of Rural Development is to alleviate rural poverty and ensure improved quality of life for the rural population, especially those below the poverty line. The Ministry consists of three departments: Rural Development, Land Resources and Drinking Water Supply. The Department of Rural Development promotes voluntary schemes and Social Action Programme, organization of beneficiaries, advancement and dissemination of rural technology through CAPART.

4.52 **Council for Advancement of People's Action and Rural Technology (CAPART)**¹⁶ was established in 1986 as an autonomous organisation under the Ministry of Rural Development to promote voluntary action towards implementation of projects for the enhancement of rural prosperity and to act as the catalyst for development of technologies appropriate for the rural areas. CAPART provides funds for projects under the following schemes:-

(i) **Public Cooperation (PC)** aims at skill up-gradation, awareness generation, capacity building and income generation activities. It also envisages assistance to the people affected by flood, drought, earthquake, etc. for disaster mitigation.

(ii) **Organisation of Beneficiaries (OB)** is meant for providing support to community/ groups of the rural poor who wish to organise themselves for betterment of their economic status and social empowerment.

(iii) **Advancement of Rural Technology Scheme (ARTS)** is to promote innovative rural technologies in the villages and support projects for conducting need-based studies, surveys, up-gradation of the technical and production skills of village youth, artisans, women and strengthening of existing technological institutes. As a part of the new

initiatives, an MOU has been signed with Indian Institute of Science, Bangalore to provide technical support to CAPART for the establishment and functioning of a knowledge portal and research & documentation wing to collect, collate, digitise and disseminate information appropriate to rural technology and other information related to rural development.

Small Industries Development Bank of India (SIDBI)¹⁷

4.53 The SIDBI Act, 1989 envisaged SIDBI to be “the principal financial institution for the promotion, financing and development of industry in the small scale sector and to co-ordinate the functions of the institutions engaged in the promotion and financing or developing industry in the small scale sector and for matters connected therewith or incidental there to”. SIDBI adopts a proactive approach to the technology up-gradation of the micro and small enterprises by way of financial assistance and promotion and development support. SIDBI is operating a number of schemes on behalf of various ministries such as Credit Linked Capital Subsidy Scheme (CLCSS), Technology Up-gradation Fund Scheme (TUFS) for textiles and jute sectors, Scheme for Development of Leather Sector Scheme (IDLS), and some independent schemes such as Venture Capital Fund, Scheme of Small Enterprises Financial Centres (SEFC), Micro Venture Innovation Fund (MVIF). SIDBI is also running a Centre for Innovation Incubation for Small Industries (SCII) and has recently opened the Technology Bureau for Small Enterprises (TBSE) as a joint venture of SIDBI and the Asian Pacific Centre for Transfer of Technology (APCTT).

Ministry of Commerce & Industry- Department of Industrial Policy & Promotion

Central Leather Research Institute (CLRI)

4.54 The CLRI was set up in 1948, at a time when export basket of the country was dominated by raw hides and skins, to add technology to the manufacturing base of Indian leather. The institution is perhaps one of the earliest attempts to link technology system with academia and industry. As a constituent laboratory and an R&D

centre of CSIR, CLRI was established in the then city of Madras (now Chennai). From the very outset, CLRI has had very close links with the industry especially the organised sector and has played a pioneering role in promoting and fostering modern technology in the leather sector.

4.55 Since the early 1990s CLRI has made a conscious effort to direct its research activities to the unorganised sector in response to the crisis in the sector as reflected in the imbalance between the organised and the unorganised segments as well as to the need for a balanced and sustainable development of the sector in the context of the emerging competitive environment. This was first outlined in 1992 in the UNDP assisted National Leather Development Programme and was carried forward by the Leather Technology Mission in 1994-95 and most recently in 2004 by the HRD Mission for Leather. The primary objective of these missions was one of promoting and sustaining a technology culture in the workforce in order to optimise the value realisation from Indian raw hides and skins. In so far as the unorganised sector was concerned it adopted a grass roots approach or as the HRD Mission statement puts it succinctly “reaching the un-reached”. More specifically, it involved correcting local deficiencies by means of exposure to scientific methods of production through modern technology wherever possible so as to enable the artisan and small scale sector to cope with technological change and pave the way for a better integration of the segments within the sector.

4.56 The institute’s focus in the early stages was to generate, assimilate and innovate technology for an industry which was mainly decentralised and unorganised. Overtime CLRI has assumed new roles with a profound influence in shaping the landscape of India’s leather industry. From a technology generating institute, CLRI today has moved more towards public private partnerships to become the world’s largest leather research institute.

4.57 **Integrated Development of Leather Sector (IDLS) (a sub scheme under Indian Leather Development Programme (ILDLP):** The focus of the scheme, launched in 2005, is on technology up-gradation

17 <http://www.sidbi.in/history.asp>

and modernisation in all segments of the leather industry, namely, tanneries, footwear components, saddlery, leather goods and garments. Central Leather Research Institute (CLRI), Chennai and Footwear Design and Development Institute, (FDDI), Noida are implementing the scheme. The nodal agency for release of assistance, monitoring and interface and coordination with financial institutions/banks and the Govt. is SIDBI. The Plan budget allocation to ILDS for the year 2008-09 has been Rs. 50.00 crores.

Other Institutions at Central & State Government Levels.

4.58 In so far as the farm sector enterprises are concerned, the Central Ministry of Agriculture through the National Horticulture Mission, the Indian Council of Agriculture Research and NABARD ensures technology intervention programmes and dissemination of technologies to generate additional employment and income. Similarly, the Tea Board under the Ministry of Commerce operates many schemes to assist research institutes for undertaking research on quality up-gradation, technology transfer for improving productivity, value addition and product diversification. In order to supplement efforts of the Central Government, almost all the state governments have set up institutions for technology up-gradation and dissemination which requires interventions more specific to the needs and practices of the region.

4.59 From the above it emerges that almost all the ministries at Central Government and institutions working under them have technology development programmes resulting into diffusion of initiatives (as between MSME-DO and NSIC, and duplication of efforts, as between

KVIC, NRDC and DST, between KVIC and CLRI so far as leather industry is concerned) between KVIC and Textile Ministry (so far as cotton cloth is concerned). There is a definite case for preventing the thinner spread of resources and duplication of efforts. This calls for the creation for a nodal agency for the holistic development of the unorganised sector enterprises of the country.

Conclusion

4.60 Almost all Central Government ministries/departments concerned with industry, agriculture, rural development are implementing one or the other technology related schemes. Many of these relate to micro and small enterprises, artisan based and traditional industries. Some of these schemes involve improvement of technology in the form of tool rooms, product and development centres, design and quality improvement centres, incentives for adoption of improved technology and modernisation and also support for adoption of improved technology through credit linked programmes implemented through development financial institutions like SIDBI and NABARD. Many state governments have also played a lead role in technology up-gradation. The main feature of these programmes is that most of them are public sector sponsored. A disturbing feature, however is the lack of coordination among various ministries/departments and agencies. This is something that needs to be highlighted as this is true about other initiatives as well undertaken by the government, such as those related to skill. The Commission has pointed it out in its report on skill upgradation for the unorganised sector and suggested a dovetailing of schemes at appropriate levels and an expansion in order to achieve results involving large number of people.

5

Technology Support to Micro & Small Enterprises: Some International Experiences

5.1 Micro and small enterprises (MSEs) occupy an important and strategic place in the economic growth and equitable development in all countries. Constituting as high as 90 per cent of enterprises worldwide, MSEs are the driving force behind a large number of innovations and contribute to the growth of the national economy through employment creation, investments and exports. Their contribution to poverty reduction and wider distribution of wealth in developing economies cannot be underrated (Planning Commission Working Group Report 2007-2012)

5.2 However, the potential of MSEs is often not realised because of problems normally related to size, isolation, market opportunities, supply chains, logistics, standards/ quality, and technology in use. Many MSEs also face difficulties arising from liberalisation-induced adjustments. In order to enable MSEs tide over the problems of technological backwardness and enhance their access to new technologies, it is imperative to offer them a conducive environment, which, in the present globalisation context, calls for an approach with knowledge playing a predominant role. It is essential to look into technology initiatives of other countries for the promotion of micro, small and other unorganised enterprises, to see if these could be of relevance for the technological up-gradation of such enterprises in India.

The Chinese Experience

5.3 In China up to 1985, closer R&D community-industry interactions were almost non-existent. However, during the reform period, a number of mechanisms were evolved to effectively link academia with production to facilitate efficient measures of technology transfer. Some of the measures adopted in China for the MSE sector over the years are described below:

5.4 **High/New Technologies Pioneer Services Centres (PSCs).** The PSCs (also known as incubators) have been established in hi-tech zones to transfer scientific research results to production centres. First such centre was established in Wuhan province in Central China in 1987. Since then more than 70 incubators have been established in various provinces and cities. These centres provide scientists with a place to turn scientific results into technical applications. These, thus act as “incubators” for the research institutes and enterprises. Firms and research institutes need only pay low rents to develop their products. The Shanghai Scientific and Technical Innovation Centre has set up a “Pioneer Village” where all institutions of higher education and research are entitled to enjoy preferential policies granted by the state besides services such as industrial and commercial registration for

enterprises, housing lease and facilities for loans. The concept of a business incubator is to reduce the investment cost of venture business and to enhance the success rate of technology-based start-ups since most technology-based venture businesses bear a great deal of risk and large investment in the early stage of establishment.

5.5 High Technology Development Zones (HTDZ) – The Torch Programme in China (similar to S&T parks in developed countries) are being promoted through the Torch Programme, initiated by the State Science and Technology Commission (SSTC) (now called Ministry of Science and Technology-MOST) in August 1988, with the objective of developing new and hi-Tech products in close cooperation with the universities and research institutes. One of the major initiatives of Torch Programme is the development of business incubators in China, adopted as a strategy to promote SMEs. The approach consists of linking research and industry to inspire technology and knowledge-based entrepreneurship and innovation in SMEs. Strong policy back-up from the Government and diversified business incubators types have led to significant increase in the number of Business Incubators (BIs) in China, accounting for close to 600 in 2007, which is next to the USA. The policy of promoting business incubators has contributed a great deal in infusing innovations and cutting edge technologies in SME sector in China. As of today, the Torch Programme has had great success in China. There are 53 National Science and Technology Industrial Parks (STIPs), which generated over 3.5 million jobs and \$200 billion (18 per cent of Chinese GDP) in 2008 with sustainable development.

5.6 The Spark Programme initiated in 1986 is aimed at promoting the application of appropriate technologies in the Village & Township Enterprises (VTEs.) It is the first strategic programme in China to promote development of the rural economy through popularisation and application of science and technology in village farms. Through the organization and implementation of Spark projects, China imports, digests and spreads technologies in the hope of promoting commercialisation of scientific achievements. By introducing advanced appropriate technologies in the VTEs, it makes in-depth development

and full use of the resources of rural areas, gradually forming backbone industries to urge development of other economic sectors, thus promoting regional economic development of rural areas. From the point of view of technological innovation, the Spark Programme is a rural regional activity organised by the Government with participation from VTEs and farmers. As part of the Government reform, the Spark Programme has made bold experiments in the transition from a mandatory planning system towards mutual coordination of the administrative plans and market orientation, and has made significant achievements. The Spark Programme concentrates mainly on project application and approval, programme formulation, supervision of implementation, management of funds and final examination of projects. The authority in charge of the Spark Programme is the Science and Technology Commission at all levels including the field level.

5.7 Funds for the Spark Programme consist of government allocations, bank loans, enterprise-raised funds, foreign investments and socially collected funds and of these, bank loans and enterprise-raised funds form the major share. The government allocations are mainly used to support the implementation of Spark projects, personnel training and commercialisation of technologies. The bank loans are used for technological development of Spark projects and for basic construction. Funds allocated by SSTC are to be returned, except the money spent on training and commercialisation of technologies. Implementation of the local Spark projects is organised by the respective local S&T commissions which also supervise and follow up the implementation.

5.8 Today, there are more than 1 lakh scientific and technological demonstration projects being carried out in 85 per cent of the rural areas throughout China. Numerous success stories reveal how a farmer can drive a Mercedes today after working at the rice fields yesterday. Because of the technological improvements in the SME sector, China has become a manufacturing hub for the rest of the world in low end labour intensive goods and the rest of the world is becoming a manufacturing hub for China in high end, capital goods. China has excelled in the production of electronics, electrical and light engineering goods.

The Korean Experience

5.9 Recognizing the effectiveness of cooperative R&D for the rapid utilisation of research results in government sponsored research institutes (GRIs), the Ministry of Science and Technology (MOST) of the Republic of Korea devised schemes and incentives in the 1980s to promote cooperative programmes between GRIs and private enterprises. Cooperative R&D between private firms and GRIs is classified as vertical cooperative R&D as there is an implicitly assumed division of labour in the two sectors of the society. Consequently, new technologies were acquired by private firms in collaboration with the GRIs. The major concern of the participant firms in vertical cooperative R&D with the GRIs was acquiring technological capability and access to markets with combined efforts. MOST has put in place a joint research system through which industries can participate in the projects formulated by them with GRIs. The Government has also extended R&D subsidies and conducted research jointly with private firms, the results of which are commercialised by the participating enterprises. However, not all cooperative R&D results have been successfully commercialised. A survey indicates that only 45.6 per cent of the 162 cooperative projects have been successfully utilised commercially.

5.10 In 1997, the Government created the SME Technology Development Programme with a budget of 30 billion (Korean currency) to assist SMEs suffering from technological development. The support made available is for innovation and product development. The Government receives back 30 per cent of the contribution as technology fees in instalments for 5 years when development task is successful. The SME Technology Innovation Programme has been an outstanding success as only 10 per cent of the 2002 projects had failed by 2004. Technological independence of SMEs participating in the 2002 project improved to 92 per cent in 2004 from 61 per cent in 2002. As of 2005, a sum of Korean 735.5 billion was given to 11,425 SMEs under the Innovation Development Programme of 1997.

The Japanese Experience

5.11 In the Asian region, Japan is an excellent example of promoting strong cooperative linkage between

technical institutions and industrial enterprises contributing to technological capability. Japanese efforts to promote collaborative research are mainly through funding of specific programmes and establishment of institutes in specific disciplines that work in close cooperation with universities and industry. The Government funds large, risky projects such as development of high-performance computers and power generators through research associations.

5.12 The Bio-oriented Technology Research Advancement Institute was set up to promote basic R&D in bio-technology. In the 1980s, the Ministry of International Trade and Industry (MITI) established the Research and Development Programme on Basic Technologies for Future Industries, administered by the Japan Key Technology Centre, which partially financed government/business/academic cooperation. There are 16 national technical institutions, administered by the Agency of Industrial Science and Technology (AIST) under MITI. They engage in R&D, promote joint R&D with universities and private firms, and often organise technology research associations. MITI has also identified about fifty locations for the development of techno-parks for future industries. The New Energy and Industrial Technology Development Organisation, (NEDO), a public organisation pursuing basic and advanced R&D in industrial technology, has built up large-scale facilities with the private sector and conducts international joint research.

5.13 In recent years Japanese rate of growth of SMEs has declined from 444000 in 1982 to 286,000 manufacturing SMEs in 2002, resulting into job losses due to stagnation in demand as a result of the ongoing restructuring and internationalisation of the Japanese economy with large firms moving operations overseas and cutting domestic SMEs out of the supply chain. To enhance the competitiveness of SMEs, new policies have been introduced to stimulate high technology. In Japan, many technology incubators and enterprise start up programmes have been established and parallel policies have been put into place to promote industrial agglomeration and clusters of SMEs and to improve access to finance. Public universities have been denationalised and encouraged to become active in

spinning out entrepreneurial start ups and transferring new technologies to SMEs.

Experiences of Other Countries of the Asia Pacific Region

5.14 In Australia, Cooperative Research Centres (CRCs) are being established as companies to forge effective linkages between universities, public sector R&D institutions and the industry. One of the main objectives of these CRCs is to capture the benefits of research and to strengthen the links between research and production. Currently there are 61 CRCs across the country in six designated industrial sectors including in manufacturing technology, information and communication, mining and energy, agriculture and rural based manufacturing, environment, and medical science and technology. The obvious feature of CRCs is that they involve collaboration between research groups and the users of research. The involvement of a university is mandatory in order to provide the formal framework for the educational programmes of the CRC. The Government provides seed funding to the CRCs for an initial period of two years through its Department of Industry & Science and Technology.

5.15 In most of the other Asian countries like Bangladesh, Nepal, Pakistan, Sri Lanka, etc. coordination and linkages among R&D organisations and user agencies are extremely weak. Efforts made in this direction are still highly inadequate to be of any significant impact. Large private and public sector industries prefer imported technologies, while small companies do not have the finances to risk on technologies or products emanating from the indigenous R&D. Some of the constraints experienced are: thin spread of limited available resources resulting in sub-optimal efforts; isolation of the system from economic and development planning; poor quality of science education in schools and universities; industry's preference for foreign sources of technology and expertise.

5.16 In Sri Lanka, research in industrial activities is carried out by various institutions under the Ministry of Science and Technology namely the Ceylon Institute of Scientific and Industrial Research (CISIR), National Engineering and Development Centre (NEDC), Geological Survey Department, Atomic Energy

Authority, etc. CISIR is the largest industrial research organization in the country set up in 1955 to provide inter alia S&T expertise and services for the development of industrial processes/testing services, utilisation of natural resources, training of research workers, etc. Through contract research, consultancy, etc. CISIR provides extension services in several industrial sectors such as agrochemicals, agro-based consumer products, building materials, food, industrial chemicals and products, industrial plant and machinery, industrial waste management, paper and pulp and plastics. The institute's mission is to promote technological and industrial growth through demand driven R&D and internationally competitive technical services leading Sri Lanka to NIC status. Sri Lanka has recently launched an integrated programme to promote Micro, Small and Medium Enterprises to meet the competitive demands of globalisation and termination of the Multi-Fibre Agreement in 2005. The programme proposed capacity building and technological up-gradation of apparel/textile and leather/footwear industries through improvement of design, quality and strengthens environmental management system and meeting capabilities. The focus is on pollution control and tannery waste for leather, setting up National Cleaner Production Centre and improving technological capabilities of micro and small enterprises through business incubators.

5.17 In 1993, Indonesia also took some major initiatives for technological up-gradation of the SME sector. Conscious steps to promote cooperation between industrial enterprises and R&D community have been taken up. The building of linkage between industrial and R&D systems is an integrated programme covering not only the demand and supply sides but also technology support facilities and the national technology climate. Effective linkages between enterprises and R&D organisations and several specialised support facilities such as financial and venture capital institutions, engineering (design, workshops, and construction), meteorology, measurement and testing, and S&T information are now being promoted.

5.18 In Malaysia, the National Council for Scientific Research Development is responsible for promoting the use of science and technology and for establishing a sound

technological base for industrialisation. A major concern in Malaysia is that the public sector R&D needs to become more commercially relevant and contribute towards the economic development of the country. In this regard, public sector research institutes are being encouraged to undertake applied research to solve product and process-related problems of the industry. They also continue to undertake government-funded strategic industrial and non-industrial research. SME Development Corporation, set up in 1996, pursues programmes of industrial linkages, expert and advisory panel, skill up-gradation, infrastructure development and enterprise development. Among all the Asia Pacific countries, Malaysia has a very distinct strategy to encourage SMEs to become part of the global supply chain to achieve sustained high growth. By adopting a liberal investment regime, it has stimulated technology spillovers from MNCs to local SMEs. It has been achieved by introducing the Industrial Linkage Programme (ILP) and the Global Supplier Programme (GSP). This is envisaged to boost innovation, placing SMEs on a high growth trajectory. GSP is a skill development programme as technology and skill are linked issues. Malaysian Government allows tax incentives for both MNCs and SMEs under ILP to encourage innovation and technology up-gradation.

5.19 Taiwan has been among the leading technologically developed countries till recently and ranked 3rd in World Economic Forum's Technology Index ranking (2004). Though has been conceived as a small firm economy, with focus on labour intensive activities in the technology intensive sector, Taiwan is also experiencing a down turn in SME sector due to increasing role of large firms in the domestic and offshore operations. Taiwan's existing SME base and its well developed entrepreneurial culture may provide a fertile ground for SME promotion efforts to take-off although Taiwan's relationship with China adds an element of uncertainty. Taiwan has also expanded measures to promote SME linkages with the universities and R&D institutions, business start up and incubation support efforts have been made to link technology promotion with adequate supply of credit.

Regional Co-operation

5.20 Countries like China, India, Indonesia, Malaysia, Philippines and Thailand have already been able to establish a broad based manufacturing base. In order to utilise the full potential of technological cooperation, developing countries shall have to study more thoroughly the sectoral specialisation of investing enterprises. This would call for more cooperation and exchange of information between the investing and recipient countries, requiring region-wide coordination of industrial restructuring measures.

5.21 The South Asian Association for Regional Cooperation (SAARC), although launched in 1985, has not met with much success in regional initiatives. Little progress has been made on economic issues. A South Asian Preferential Tariff Agreement (SAPTA) was signed in 1993 and was to be implemented by the end of 1995. SAPTA is limited to provision of preferential tariffs on an agreed upon range of goods. There is potential for utilising the rich natural and human resources jointly through technical cooperation within the member countries but conditions are still not very conducive for the use of complementarities on a large scale.

5.22 The sub- regional economic cooperation grouping involving countries around the Bay of Bengal, BIMST-EC (Bangladesh-India-Myanmar-Sri Lanka-Thailand Economic Cooperation) which brings together countries of SAARC and ASEAN, has identified eight priority sectors for cooperation: Trade, Investment and Industry, Technology, Infrastructure and Transportation, Tourism, Energy, Agriculture and Human Resource Development. This will provide a range of opportunities for the countries of the sub regional grouping to utilise complementarities towards mutual benefits.

5.23 As competition intensifies, many countries of the region are looking for ways to move away from resource-based manufacturing production processes to natural resources and labour-intensive processes. Demand for multi-skilled managers and a multi-skilled workforce to run competitive industrial enterprises is sharply increasing. Many developing countries lack the resources to develop such skills. In that context, the potential offered by trans-

national corporations in improving and upgrading the technological level and composition of industrial skills deserves more attention, particularly, as countries of the region become more integrated with the global production networks.

Borderless Production

5.24 The world economy has witnessed an unprecedented surge in FDI flows. A strong nexus has developed between FDI, manufacturing production, international trade and technological innovations. This nexus is beginning to shape the industrial scene of the region and extending itself beyond the traditional triangle linking the United States, Japan and the European Community to include the NIEs. This trend has reinforced incentives for industrial restructuring in other developing countries of the region so that they can also benefit from this nexus.

5.25 Centred around FDI, this emerging nexus has enabled enterprises based in the developed countries to use overseas investments as a vehicle for rationalising and restructuring their own industries in line with their changing competitive advantage. FDI-related relocation and industrial complementation could serve to reduce significantly the trade friction between the developed and developing countries.

5.26 Segmentation of production processes has also brightened the prospects for charting out a new pattern of specialisation in the region. The ability to separate out some key manufacturing products/processes according to their factor intensity and base those products/processes in different countries has already set in motion a new pattern of borderless production which could be further strengthened. For instance, enterprises based in developed countries have separated out the production of labour-intensive products/processes to labour-abundant countries. Further, some industrial enterprises (for instance, Hong Kong, China, Japan, the Republic of Korea and Taiwan, particularly from the small and medium scale category which are labour-intensive and highly sensitive to price changes, have tried to avoid the loss of their international competitiveness by relocating production abroad.

Joint Ventures & Strategic Alliances

5.27 Joint ventures and strategic alliance to pool resources among producer enterprises are not a new idea. Equity joint ventures can help minimize constraints stemming from lack of financial resources and production know-how. However, neither the green-field joint ventures nor mergers and acquisitions are a frequent cross-border activity in the south. There is need to enhance strategic alliance or non-incorporated joint ventures to pool resources in design and R&D efforts in the Asia Pacific region.

Growth Triangles

5.28 Complementing a regional or continent-wide growth cooperation strategy, these are policies for stimulating growth in certain sub-regions encompassing two or more countries. In this concept of growth triangles, economies of scale can be achieved in the use of skills, resources, finance, physical infrastructure and economic space. One outstanding example is the Indonesia-Malaysia-Singapore Growth Triangle (IMS-GT) launched in 1990, which encompasses the Indonesian Riau islands, the Malaysian State of Johor and Singapore. An interesting proposal is the Tumen River Triangle, encompassing border areas of the Democratic People's Republic of Korea, China and the Russian Federation.

Technology Partnerships (TPs)

5.29 Technology Partnerships can occur at various points in the value chain, and have become increasingly popular in recent years. For example, IBM, Toshiba and Siemens signed an agreement to develop a 256-megabyte chip, which was delivered to the market in June 1995. In October 1995 the agreement was enlarged to include Motorola and the firms began to develop a 1-gigabyte Dram (dynamic random access memory). NEC has entered into a similar agreement with AT&T and with Samsung from the Republic of Korea.

5.30 A frequent source of inter-firm technology agreements is the overall strategy of transnational corporations (TNCs) which find it convenient to move part of their technological activities elsewhere. Japanese companies have set up their R&D centres in Asian

countries to design new integrated circuits. Toshiba is transferring all design and production of low-end video cassette recorders to Samsung Electronics in the Republic of Korea.

5.31 Similar agreements also involve foreign direct investment (FDI) by TNCs in order to shift part of their R&D or strategic management divisions to developing countries, with a view to reducing costs. For example, IBM set up a US\$ 33 million joint venture with Tata Group of India to manufacture high-end personal computers, and Nestle located two of its development centres in Singapore and Ecuador, and is opening a third one in Cote d'Ivoire..

5.32 The reason for such alliance with partners from East Asia are largely based on the TNCs' reassessment of the strengths of Asian partners, which are deemed to have the technical cooperation needed for undertaking joint R&D geared to the final markets. Another reason is the proximity to manufacturers of final products. Decisions to move part of their operations to firms abroad provide TNCs with access to financial resources and talent, and enable them to transfer resources at home to more sophisticated activities.

Involvement of Academic Institutions & Adequate Supply of Credit

5.33 The strategy of almost all leading countries in the field of technology suggests that the success of technology promotion in micro and small enterprises rests on the linking of technology institutions with academic institutions. Further, all the programmes emphasise on adequate supply of credit to sustain the technology up-gradation.

Conclusion

5.34 Across the world there have been interventions by the government to resolve the issues relating to

technology up-gradation in the micro and small enterprises. This is because it has been seen that the role of technology up-gradation is critical for the improvement of productivity and competitiveness of these enterprises. The need for technology up-gradation of such enterprises becomes even more critical in the face of stiff competition due to globalisation which is now an irreversible phenomenon. The problem is more serious for micro enterprises which have poor capital base and so far been operating mostly in the local/domestic markets as compared to medium and large enterprises which are more competitive because of their scale of production. To address appropriately the technology related aspects of the micro enterprises, it is important to develop links between the industry/enterprises on one hand (Micro enterprises with Small, Medium and Large Enterprises) and research & development laboratories/academia on the other. This is important for the dissemination and transfer of the existing set of technologies for its appropriate commercialization. It has been observed that those countries which have successfully implemented this strategy have succeeded in improving the productivity of their micro and small enterprises and ensured adequate supply of credit at a reasonable cost to both the technical institutions and the entrepreneurs. This aspect, of being effectively able to forge linkages between large and small firms, with the larger firms committing to transfer of technology to smaller firms with institutional support being provided by public institutions, has been seen to be tremendously successful in the East Asian economies, as the country experiences delineated in this chapter show. This is an aspect that has been emphasised in work done by the Commission on enterprise development as well. In India, where there is evidence of growing linkages between large and small enterprises, the specific institutional arrangements that permit such transfer and upgradation need to be emphasised and examined.

6

Issues & Concerns

Review of Status

6.1 An analysis of information contained in chapters 2- 4 reveals the following:

- (i) A large number of technology related schemes are being implemented by various Central ministries, departments and agencies. Many of these schemes are meant for micro and small enterprises, artisan-based activities and traditional industries. Similarly a large number of institutions for technology up-gradation have been created both by the Central ministries concerned with specific sectors and also by the ministries and departments created exclusively for science and technology. There is often lack of co-ordination among various ministries/departments/agencies resulting into thin spread of valuable resources and little impact.
- (ii) Most of the programmes are public sector sponsored. Private agencies and NGOs have only a negligible role in technology up-gradation. There seems to be little public-private partnership in this field.
- (iii) Considering the size of the country and the number of unorganised sector enterprises in the country (58 million) and their contribution in terms of output and employment and the number of products being manufactured by these enterprises (over 6000 covering both modern and traditional), the institutions created and the interventions made are inadequate. In a country of the size of India, the existence of just 9 tool rooms, 4 regional testing centres and 8 or 10 products-cum-processing development centres explains the current inadequacies.
- (iv) While institutions and schemes may exist, it is not certain whether unorganised enterprises will benefit, unless the institutions and schemes are especially tailored to meet the requirements of unorganised enterprises. This is evident from the case study of SITRA the rules and regulations of which are so framed that it excludes the unorganised enterprises from availing the facilities.
- (v) TUFS of the Ministry of Textiles, termed as flagship scheme, does not cover unorganised handloom sector since the sector is unable to fulfil the conditionalities. Similarly the Credit Linked Capital Subsidy Scheme of the Ministry of MSME has succeeded in assisting only 3329 units between 2001 and 2007, disbursing Rs 103 crores as subsidy against the provision of Rs 600 crores. In the context of over 13 million micro and small enterprises under the charge of DC (MSME) this number is very low.

- (vi) Unlike China and most of the developed countries which have succeeded in achieving technological excellence, universities and technical institutions like the IITs or the engineering colleges do not play any significant role in technology development and dissemination in India for the benefit of enterprises, specially the micro and small enterprises.
- (vii) Agencies like SAARC and SAPTA (Regional Co-operation Agencies) have not yet taken up the role of technology transfer and improving competitiveness of the industries within the region.
- (viii) Though there is no dearth of institutions and programmes there is absolute lack of data, feedback and evaluation studies on the impacts of the initiatives. Since improvement in productivity and competitiveness is an indicator of technology up-gradation, the same is not visible in the field of exports. Micro and Small Enterprises and Handicrafts taken together accounted for 49 per cent of the national exports in 2005-06, and India's share in world total export was a low 1.1 per cent. This low share of India's manufactured goods in world trade indicated the lack of competitiveness of Indian enterprises. Use of less efficient technology could be one of the factors contributing to lower competitiveness. Since the major exports are from the unorganised sector it indicates the state of affairs with regard to use of technology in this sector.
- (ix) The level of technology adoption in the micro and small enterprises sector is very low. The Third Census of SSI (2001-02) revealed that 85.38 per cent of the registered SSI units did not take any initiative to upgrade technology which means they depended on traditional technology. If that has been the case with the registered SSI units, it is evident that almost all unregistered micro units (unorganised units) worked on traditional technology. The question is: why they did not go for technology up-gradation in spite of the financial incentives available under various schemes particularly CLCSS. The answer perhaps is that technology up-gradation involves high cost which is beyond their means and that they are unwelcome categories for the banks.
- (x) A major factor behind the continued use of traditional or inappropriate technology is the lack of knowledge due to poor dissemination of innovations. There is lack of information even about the existence of appropriate technology. From the review of institutional arrangements described in chapter 4 earlier, it emerges that practically there is no institution available/engaged in the task of technology dissemination in the unorganised sector. Such a situation cannot continue long in the era of globalisation, WTO, and dismantling of quota and reservation regime. The survival of the unorganised enterprise is thus, at stake.
- (xi) There is the lack of a single nodal agency which can take an overall view of technological gaps in various product lines in the unorganised sector and then workout in liaison with the existing as well as emerging R&D organisations to fill in the technological gaps. District Industries Centres, created in the seventies to work as a single window for the micro and small enterprises is lying virtually defunct after their transfer to the states from the Centrally Sponsored Scheme in the nineties. Thus, an institution which could have been utilised for technology dissemination has been ignored.

6.2 A very large proportion of the enterprises and workers in India which come under the category of the unorganised sector as defined by the NCEUS. The unorganised sector contributes a significant proportion of the GDP although this is lower in proportion to its size and employment. One of the major factors responsible for such a scenario is the low productivity levels of the unorganised sector enterprises and the lower average value addition per employee associated with such enterprises. These enterprises hardly have any access to technological know how and suffer from technological obsolescence. Further lower income creates problem in accessing efficient technology. It results in lower efficiency and lower productivity levels which make them uncompetitive as compared to the enterprises in the organised sector.

6.3 Given the share of unorganised sector enterprises in the total employment in the country, it is essential to take appropriate measures to address their low technology and productivity concerns. Government of India has recognised the issues and concerns faced by the enterprises and have made several efforts to address them. However, in spite of these efforts, there has not been a significant change in the status of the unorganised sector enterprises as reflected through their share in global export, level of earnings and productivity.

Barriers in Technology Adoption

6.4 The Working Group on Science and Technology for SMEs for the XIth Plan has observed that the most formidable problem faced by the SMEs has been in accessing technology and maintaining competitiveness. The reasons for this inability are:

- Poor financial situation and low levels of R&D
- Poor adaptability to changing trade trends
- Desire to avoid risk
- Non-availability of technically trained human resources
- Emphasis on production and not on production costs
- Lack of management skills
- Lack of access to technological information and consultancy services
- Isolation from technology hubs

Since over 99 per cent of small enterprises exist as micro enterprises (with investment in plant and machinery upto Rs. 25 lakhs), what is true for SME sector is also true for micro, traditional and artisan based enterprises.

6.5 As per the Report on Socio-Economic Barriers in Adoption of Improved Technology in the SSI sector based on sample survey of 500 units covering 4 states conducted by the Society for Economic and Social Transition, New-Delhi on behalf of the Planning Commission (2004), the major barriers in the way of adoption of improved technology are as under:

1. The unit lack financial resources. In several instances, the cost of technology makes it difficult for being adopted by the financially weak small entrepreneurs.
2. A large number of SSI units reported difficulty in obtaining sufficient funds from banks and financial institutions. There was the lack of awareness about the credit guarantee scheme.
3. The other barriers observed are lack of awareness and information about the availability of requisite technology, desire to avoid risk of adoption of improved technology, low level of indigenous R&D, inadequate management skills and non-availability of technically qualified persons to operate the new technology.

Issues & Concerns

6.6 ***Inadequate attention to Rural Technology:*** The absence of an effective rural technology delivery system has been widely discussed over the years and at various levels in the Government, research institutions, universities, and also among voluntary organisations. Other important issues that closely relate to the problems of technology transfer in rural areas such as lack of field-tested and validated models, inadequate institutional support both for technology development and transfer; lack of flexibility in governmental mechanism, etc., have also been discussed and documented. Experience with most of the past technology transfers has shown that often technologies developed in laboratories but not tested and proven under field conditions were disseminated on a large scale with naturally poor results, non-acceptance by the intended beneficiaries, under-performance and unsuitability for rural conditions. Experiences of successes, and more importantly of failures, have been poorly documented and inadequately shared among stakeholders leading to avoidable repetition, in-fructuous expenditure and considerable de-motivation among both technology providers and users.

6.7 ***Lack of emphasis on Rural Industries:*** It has been widely noted that the rural non-farm sector, i.e. rural industries and a variety of related and other services, is vital for the creation of employment in rural areas at a juncture when agricultural employment has little scope

for expansion and employment in urban areas is also not likely to expand so greatly as to absorb people from rural areas, more so when newer and more modern industries tend to be less employment intensive. Technologies relevant for unorganised enterprises in particular and rural development in general require to be competitive, have high productivity, produce quality products, reduce or eliminate drudgery, and yet generate maximum possible employment. These goals are not mutually incompatible but represent the real challenge to R&D for rural applications. It is also important that technologies introduced should be such as could be scaled up and down, upgraded without much difficulty, and should take into account the technology scenarios 10-20 years later. Rural industries cannot be subject to obsolescence within a few years, leaving the target population to face the same situation they faced prior to the introduction of the new technologies, and cannot afford expensive retrofitting every few years. Technologies offered for replication also should be accompanied by all necessary support services such as assistance in sourcing and procurement of equipment and machinery, installation/commissioning and after sales service and maintenance of the same, training of project personnel, transfer of know-how, trouble shooting and hand holding services. Many a technology transfer effort has floundered because all these aspects have not been tied-up with the technology and the local beneficiary group has been left to its own devices after some initial assistance.

6.8 ***Lack of Grass-root Contact:*** The technology institutions and research laboratories have expertise in technology development but have almost no grass-root level outreach/contacts. The voluntary organisations (VOs) on the other hand have limited technological expertise but have excellent field presence. In many instances, VOs with S&T capability have worked on improvements/up-gradation of some demand-driven technologies up to a point but are not competent to take it beyond this level to a possible state-of-the-art. It is here that the specialised institutions can help and use their expertise to improve the technology further and also assist the VOs for transfer of improved technology to rural areas. Also, the S&T institutions in general have no interaction with the VOs. The VOs are looking for

support and do not know which best institution is where for technology support. They are also not very confident of approaching such institutions because of an inherent feeling that they will not be received well.

6.9 ***Poor Technology Delivery:*** “Technology delivery” or dissemination is a complex process. It is not merely “delivering” of some item, say hardware, from one point to another as may be conveyed by terms such as “technology delivery” or “lab-to-land” transfer. “Rural Technology” is itself a complex set of entities and systems requiring a process of adaptation, absorption and, most importantly, hand-holding. It is not often appreciated that such “technology transfer” is a specialised task with its own requirements of expertise and experience, and cannot simply be left either to the technology developer or the user, at least in the initial period before the technology itself becomes much better known. S&T NGOs, government agencies, district level-administration and initiatives from the industry have been successful in disseminating rural development technologies up to a point. The challenge is to establish synergy among all these efforts, which are often fragmented and needlessly duplicated, in order to nucleate new initiatives and to strengthen the existing ones.

6.10 ***Poor Technology Dissemination:*** Research is the creation of new knowledge, and dissemination is about communicating and sharing this knowledge. However, new knowledge is not simply transferred from one person to another, but instead forms part of a complex process of learning; a person’s experiences, attitudes, skills, beliefs, and level of understanding all help to shape the adoption of new knowledge. People do not simply acquire knowledge, but filter, adapt, and accept it in a range of different ways. Furthermore, the very process of acquiring knowledge can change a person’s perspective, even alter their attitudes, practices, and beliefs. Thus when we learn we do not simply add more to our existing knowledge base, but instead we are continually reconstructing what we know and believe over and over again (Cristopher Barnett 2004).

6.11 One of the key areas of concerns remains the lack of extension and dissemination of the existing technologies and their adaptation by micro enterprises

despite the presence of various organisations/institutions which are working for the development of suitable technologies for the unorganised sector.

6.12 Studies point out that in the case of rural development programmes, research and development managers did not configure projects to ensure that the technologies being developed met the real world needs and could be fitted into the industrial and social infrastructure. The interaction of R & D agencies with the users has been weak. The process of technology transfer has been undertaken by pushing the available solutions without the adaptation efforts required to fit the technology to the needs/contexts of users. There has been no attempt to match the mechanisms of technology transfer to technical and user conditions, to understand the users as systems and to manage technology transfer as an iterative/interactive process (Lalsiemlien Pulamte & Dinesh Abrol 2003). For the Karimnagar programme of CSIR, the evaluation committee reported, "The CSIR's ...own internal assessment of the project ...appeared to be general in nature. The assessment was not very sharp, well exposed, and objective. No definite programme was worked out to implement the project and decide (on) which area was having the gap, what technology could bridge the gap, how many demonstrations were required to establish the innovation, who will do extension work and serve the related needs and demands" (CSIR 1978).

6.13 For effective delivery and propagation of appropriate technologies for rural development, the Eleventh Five Year Plan has suggested that CAPART should become an effective link between the technology generation centres and the line departments such as the ministries of Rural Development (MoRD), Agro and Rural Industries, Welfare, Tribal Affairs and Human Resource Development, for dissemination and propagation of technology packages through schemes for income/employment generation and capacity building. The Plan has called for strengthening of science and technology intervention in all spheres of rural life and to develop cost-effective rural technologies for non-farm rural enterprises, since non-farm rural employment assumes increasing importance due to low employment elasticity of the farm sector. But CAPART works on a top-down approach. It follows a supply-side one-off approach in

regard to the dissemination of technology and requires the NGOs to act as representatives of the enterprises seeking technological up-gradation. But the model has not worked so far because technological up-gradation of the unorganised sector enterprises requires a continuous and reliable process whereby the enterprises can be made to adopt and adapt to new technological solutions.

6.14 A Central agency is needed with network at local levels which first identifies the technological needs of the enterprises in the local area, co-ordinates with the R&D institutions in the area, displays the state-of-the-art technology and produces literature in local language giving the details of the technology, enhances awareness on competitive technologies, distributes literature in local language, receives the feed back on technological requirements of the area.

6.15 ***Problem of Affordability:*** Another crucial factor which needs attention in the quest to overcome the technological backwardness of micro enterprises is the cost of technology adoption both in terms of cost of machinery and the cost of dislocation/disruption of production. The inability of the enterprises in the unorganised sector to afford the available technology has hampered their productivity and growth. These enterprises have not been able to avail the existing technologies because of their low incomes and poor resources. As per the NSSO 61st Round (2004-2005), Employment-Unemployment Survey, 78.7 per cent of the unorganised sector workers are in the "poor and vulnerable category." In addition about 57 percent of the enterprises in the unorganised sector are owned and operated at lower scale of operations. This makes the adoption and adaptation of the new technologies more difficult. Further, as revealed in the NAFUS Report (NCEUS (b) 2007) only about 4 -5 per cent of the unorganised enterprises have access to institutional credit. The Third Census of SSI found the average investment in plant and machinery of a SSI unit of the order of Rs 1.47 lakhs. For a unit set up about ten years ago at a cost of Rs 2 lakhs, the cost of technology up-gradation has been found to be over Rs 10 lakhs. The cost of technology adoption is at times beyond the financial reach of a non-farm entrepreneur. The solution perhaps lies in acquiring technology on a group basis, particularly the common facility services. In

such a situation the promotion of enterprises as clusters in Growth Poles acquires significance. Since Growth Pole is a 'cluster of clusters' and is capable of bridging the gaps which currently exist in clusters, it is suggested that "Growth Pole" be adopted as the strategy for sustainable and efficient development of unorganised sector. Secondly, the technology could be made affordable in the unorganised sector by the development and propagation. Thirdly, the financial institutions have to evolve convenient financial packages at easy terms for the unorganised sector.

6.16 *Inability to Achieve Economies of Scale:* Abid Hussain Committee on SSI (1997) set up to suggest measures to improve the Indian small scale sector had recommended a cluster-based developmental approach, which would enable technical support services at the industrial clusters. This approach has the maximum demonstrative effect and the technology up-gradation of even one unit will have its impact on the whole cluster and others do not shy away from adopting the new technology as it has already been commercially proven. Similarly, the Product-cum-Process Development Centres (PPDC) of the Ministry of MSME which are based on such an approach have proved to be quite useful. To quote one example, the Fragrance and Flavour Development Centre (FFDC) located in the cluster for fragrances and flavours at Kannauj has developed and commercialised at least 10 processes of essential oil and raisin extraction and 8 different fragrances. It has also developed a process to recover raisinoids out of sandalwood waste. This process is particularly remarkable, for the waste which could not be sold even at Rs 3000 per ton today yields a return of Rs 15000 per ton. Contribution of work done by this Centre in the field of technology can be noted from the fact that India today ranks first in the world in so far as products of Mint is concerned. Similarly, the PPDC for Sports Goods at Meerut has, for the first time, designed and developed machinery for making cricket balls, enabling the smallest of the units to manufacture world class cricket balls. The demonstrative effects of such efforts have been quite remarkable and encouraged even new entrepreneurs to enter the activity of production of various items.

6.17 *Lack of Co-ordination:* Even in the unorganised sector and rural areas there are a large number of agencies which carry out one or the other technology promotion but often without coordination resulting in thin spread of the resources. Similarly, the industry service institutions of the Ministry of MSME and other ministries would be required to expand their activities. They will have to not only increase their area of coverage but also always be on a look out for newer technologies and techniques of production and inform the industry about it in time. In the process, the technology and service institutions have to continuously upgrade themselves. Increasing the activities of these institutions will require additional resource allocations by the Government which would also imply additional recurring costs. With increasing demand on Government resources from various quarters, it is worthwhile to examine the possibility of making one time expenditure on such facilities, which may be looked after by the industry associations or other NGOs formed for this purpose. A central agency is required to bring out the needed coordination in so far as the action oriented research, its commercial viability and tie ups between the academia, the laboratories and the industry is concerned. The relationship among them apparently seems fairly straightforward. In reality, however, this relationship is non-linear. The approach of each category of institutions varies with their priorities lying in different places. Research is carried out without any apriori identification of the technology needs and hence is a waste, unless the demand for and supply of technology is properly matched. To achieve the best results in terms of the cost and output, a mission mode bottom up approach towards technology development of unorganised sector is called for. The task should be assigned to only one nodal ministry which could be either the Ministry of Science and Technology or the Ministry of Micro, Small And Medium Enterprises.

6.18 *Poor Financial Condition of NGOs & Lack of Technology Orientation* Voluntary organisations are spread across the country but most of them are not S&T oriented and those which work for technology up-gradation suffer from lack of resources. Many of the voluntary organisations are engaged in the task of skill development which is definitely a step towards technology up-

gradation. The NGOs and the industry associations do not seem to be prepared to take up technology upgradation on a large scale because of lack of resources. Most of the industry typically favours an established technology which can be bought off the shelf within the limited financial resources available. The sector is also willing to go for process improvement which need not entail a substantial expenditure. The approach of the associations is not much different from its constituents. The scenario, however, may change given the forces of globalisation. For skills development, the NGOs are being strengthened in India. Such strengths have normally come through training of the entrepreneurs and workers in government sponsored programmes. Hence, it is not necessarily the government grants which has enabled them in acquiring these capabilities but basically a small amount of money and an opportunity to perform, which spurred them into the activity and become strong. The realisation for the need for technology up-gradation is likely to create substantial demand for the micro and small industries, which may encourage NGOs and associations to take up this job. A demand-driven project is more likely to succeed than a supply-driven operation. Under such circumstances, a one time grant for setting up the requisite mechanism would be sufficient, for which a national fund could be utilised.

6.19 *Poor Data Base:* Another area of major concern in technology promotion in the unorganised sector is the absence of required data and information. Whatever exists currently is inadequate. There are two inter-related issues here. First, most compendia are mere listing of possibilities with little or no reference to field-testing, sustainability or ground truths rendering their direct utilisation by the end-users highly problematic. Second, most “rural technologies” cannot be reduced to pieces of hardware or process descriptions: in order to be viable and sustainable, successful rural technologies must be need-based, holistic “packages” and accompanied by field models with a “system design” comprising processes, equipment/machinery, organisational structures, product-market linkages, etc. While generic field models are undoubtedly required and can be effectively described, actual field projects are necessarily context-sensitive and location-specific with variations that are difficult to

capture in the compendia/directories. Nevertheless, meaningful compilations of generic project profiles detailing the technologies can be prepared in local languages based on field-tested and proven field models embodying appropriate technologies, clearly delineating applicable boundary conditions, major context-related variations, economies, etc. with periodic updating being done both electronically (on website) and in print form. It must be emphasized that such compilations require field-based validation and inquiry by the compiling party. Necessary data bank may be created at DIC level under the overall supervision of a national body.

6.20 *Lack of Appreciation of Changed Environment:* In the rapidly changing scenario today, technology is the key for industrial growth. The experiences of developed economies of USA, Europe and Japan have conclusively proved that technology plays a vital role to bring about rapid economic and social developments. It is technology alone that adds to the national output level, increases GDP and per-capita income and raises the standards of living of people and ultimately the nation's stature in international community. A vast majority of the units continue to use obsolete production processes and outdated technologies. This underlies the fact that our country can grow faster if newer technology is adopted to by our small industries and small enterprises. The necessity for technology up-gradation becomes more pronounced in view of the implementation of WTO conditionalities. The vulnerability of these enterprises under the WTO regime could be summarised as follows:

- Loss of protected environment
- Greater competition from imports
- Reduction in conventional subsidy (many subsidies are contestable)
- Technology gap
- Quality and standards gap.
- Environmental regulation.
- Sanitary conditions.
- Adherence to Intellectual Property Rights
- Penalty on Reverse Engineering

This underscores the importance of technology up-gradation by the micro and small enterprises and hence urgent steps are required to facilitate them to adopt new and emerging technologies to remain competitive in the world market.

6.21 *Inadequate Patenting Facility:* A patent is an intellectual property right issued by authorised bodies that gives owner the legal right to prevent others from using manufacturing, selling, importing in the country for 20 years. Patents have close links to inventions. Number of patents in the name of a country, an industry or a sector indicates the level of innovations in the field of technology aimed at improvement in productivity. Patent based statistics reflect inventive performance of countries, regions and firms as well as aspects of the dynamics of innovation process which plays a major role in supporting economic growth. “The Compendium of Patent Statistics” (2008) prepared by OECD reveals trends in patents in various countries and reflects, to some extent, the attractiveness of the countries in this direction. The United States, Japan and European Union account for almost 90 per cent of patents. Most countries’ propensity to patent has increased since 1995. By size, China and India have the lowest patenting propensity with fewer than 0.3 triadic patent families per million populations. However, according to the OECD report, this trend is increasing rapidly. In the list of 35 triadic patent nations, India ranks at 34th place.

6.22 Notwithstanding, the encouraging performance of the unorganised sector as an employment avenue in India, an issue of concern has been the perpetuation of abysmally low levels of productivity. Studies have identified various factors that perpetuate the low levels of productivity and they include technology-in-use, limited access to inputs and credit and unfavourable market environment. Micro and small enterprises’ ingenuity helps them as a survival technique, but does not form a source for technical and product innovation. This is despite the fact that India has a long history of state-led policies and programmes to support and promote the small enterprises sector. Government will have to subsidise the cost of patenting by the micro and small

enterprises and help in accessing the patented technology at cheaper rates.

6.23 *Lack of Linkage between Large Enterprises & Unorganised Enterprises:* A major weakness of development of small manufacturing sector in India has been the lack of a strong complementary relationship between the large and small firms. In the recent past, however, subcontracting, ancillarisation and out-sourcing have emerged as important forms of industrial organisations linking small and micro enterprises with large industrial units. A long-term and stable subcontracting relationship between the large/formal enterprises with smaller unorganised sector enterprises could have benefits for both. On the one hand, small and unorganised sector enterprises offer lower cost of production for the larger enterprises; while transfer of technology and skills could lead to higher levels of productivity in the smaller enterprises on the other. Assured markets provided by the larger firm could lead to financial stability of the unorganised sector enterprises. This stability also helps in better investment planning. In certain situations, the subcontracting relationship could involve access to affordable and timely credit and investment for the smaller enterprise. This symbiotic relationship has been long recognised. In several countries including India, industrial policy has incorporated elements that promoted subcontracting between large and small enterprises. In fact measures were initiated by Government in India during seventies and eighties by issuance of instructions to public sector or undertakings. The Government has initiated measures such as ancillarisation, vendor development programmes and subcontracting exchanges.¹⁸ There are a large number of similar efforts in Japan, Italy, and Spain and elsewhere where governments, national and local, undertook measures not only to promote small and medium enterprises, but these promotional measures had an active component of linking small enterprises with the larger ones. The linkages between large and the small enterprises have implications for the growth of the small enterprises. Micro and small enterprises have demonstrated their limited use of capital and have favoured labour intensive production techniques.

¹⁸ It is another matter that studies evaluating these promotional measures in India have questioned the success of these programmes in terms of benefits to small enterprises.

Thus, a focus on links between small and large enterprises could imply promoting employment generation. The links between large and small firms discussed extensively in the literature on industrial clusters, industrial districts and industrial geography show that inter-firm links and the development of clusters or districts could provide means of planning regional distribution of industrialisation. However, ancillarisation has suffered in India in the post reform period due to non-enforcement of guidelines. Instead of directives, Government should consider incentivising close linkages between the large and small enterprises through appropriate policy measures. It has been found that ancillarisation has suffered in past due to factors like:

- Delayed payments by large units.
- Failure to upgrade technology of small ancillary units by larger units.
- Inadequate arrangement for supply of quality raw materials, arranging working capital, training of the workers.
- Lack of interest in the health of ancillary units.
- Inability of the industry association to promote ancillarisation due to their own financial condition.

During the seventies it was mandatory for the public sector undertaking to procure some minimum requirement from the ancillary units. It was found that when the public sector undertaking or large enterprise changes their technology in order to improve their productivity and efficiency, they do not help the ancillaries to upgrade their technology. Instead they find out new suppliers, leaving the ancillary units to meet their untimely death. The same is true with skill when the PSUs upgrade the skill of their workers without including the workers of ancillaries to upgrade their skill as well. Delayed payments on supplies are another serious problem. The ancillary units being weak in terms resources and capability are in no position to take legal action against the purchaser. If they do so, the mother unit stops placing orders on the ancillaries and the result is the same i.e. the closure of the ancillary units. While considering the issue of linkages between the large and unorganized enterprises efforts should be made to address to above problems as well.

Conclusion

6.24 The chapters until now reinforce one of the major arguments that the Commission has been making in its various reports: that in spite of a disproportionately large and growing unorganised sector in India, there has been little explicit recognition of the need for an exclusive or at least high priority focus on this sector. The Commission has in various instances pointed out that such a focus is required not only from a livelihood perspective for the large number of people engaged in the sector, but also from the point of view of enhancing productivity in the economy as a whole. Like in the case of credit and skills that have been flagged off by the work of the Commission, technological factors are highlighted in this report and the same issues have come up such as too many small and dispersed schemes, a lack of understanding of the organisational issues in the MSE sector and in general the unorganised sector being treated only as a residual. More specifically, while some small units have been experimenting with technological innovations either by observing others who have benefited by such changes or on the advice of someone with whom they have been associated with, but technology upgradation is not one of the policies of the micro and small enterprises in the country so far. The innovations and modifications, often minor, have come about because of the felt need and inability to import the requisite technology from abroad due to weak financial position of the micro and small enterprises. Such possibilities of technological changes have been explored mostly in machinery, chemicals, electronics, and bio-chemical sectors. As they represent a forward movement in the quest of an enterprise to bring about sustainable, cost effective, affordable improvements in the production process and the quality of its products, there is the need to catalogue such innovations and spread awareness about them. It would, however, need a patents law to protect and evoke the interest of the innovator in sharing widely the secrets of change. Most of the small enterprises are not in a position to afford the cost of technology importation. Hence, the Science and Technology Policy requires: a) stock taking of the innovations being applied in a scattered manner; b) technology development, transfer and diffusion; and c) promotion of innovation. The policy

priority is on the development of technologies, which address the basic needs of the population. Policies have to recognise the global reality that without technological change, cheap labour alone cannot ensure that an enterprise or an industry would survive national or international competition. The unorganised enterprises therefore have to become technologically efficient and competitive. The concerns spelt out in this chapter, therefore, need to be addressed and the next chapter makes concrete recommendations in this regard.

7

Recommendations

Introduction

7.1 This report has attempted to cover briefly, the role and status of technology in Chapter 2. It is obvious that technology *per se* is not by itself a panacea for all the ills afflicting the lot of the micro enterprises, there have other problems too. These entrepreneurs do not have adequate knowledge of the market, lack adequate assess to credit, raw material supplies and above all, the basic skills to run the enterprise. In the absence of these pre-requisites the micro entrepreneur will not be able to adopt the technology and realise the optimal results in terms of improved productivity, efficiency and enhanced competitiveness.

7.2 The constraints of credit, skill, raw materials, marketing etc. have been discussed separately along with the recommendations by the Commission (NCEUS 2007 (a), 2007 (b), 2007 (c), 2009). In the case of technology, apart from its own consultations and studies, the Commission have had the benefits of studying the following two reports:

- (i) Report of the Inter-Ministry Task Force (IMTF) on Technological, Investment and Marketing Support for Household and Artisanal Manufacturing constituted by the Planning Commission (2005).
- (ii) Report of the Working Group on Science and Technology for Small Scale and Medium Enterprises for the 11th Five Year Plan (2007-12) (Planning Commission)

7.3 The Inter Ministry Task Force, formed by the Planning Commission as per the decision taken by the Prime Minister, was required to consider action needed for those areas of the National Minimum Programme where the agenda is cross-sectoral and required action encompassing a number of ministries, and departments. It was found that the issue of technology for household and artisan manufacturing covered ministries like Small Scale Industries (now Micro, Small and Medium Enterprises), Agro and Rural Industries, Food Processing, Textiles, Rural Development, Science and Technology, Finance, Industry and Commerce, etc. The IMTF Report has taken a holistic view of the unorganised sector enterprises and has more deeply looked into the technological constraints and needs of handlooms, handicrafts, sericulture, village and small enterprises and food processing industries which are integral parts of the unorganised sector enterprises. The major recommendations of the IMTF in so far as technology development and dissemination are concerned are briefly given below.

- (i) A new Ministry for Artisan and Household Manufacturing may be carved out, by consolidating all activities of different departments pertaining to this sector. The report observes that multiplicity of organisations dealing with this sector does not permit a coherent response to the difficult challenges faced by this sector.

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- (ii) A National Council of Artisans could be set up under the Prime Minister, with Chief Ministers and relevant Central departments as members.
- (iii) Establishment of a Technology Mission to promote the introduction of new and emerging technologies for the household manufacturing and artisan units to finalise craft-wise technology packing, to set up Rural Functional Industrial Estates/ Integrated Resource Centre, Technology Banks, encourage R&D, create incubator infrastructure, organise awareness campaigns, coordinate efforts of various agencies, technical centres etc.
- (iv) A coordinated exercise to identify technology packages for each craft, resulting in a shared technology bank should be undertaken.
- (v) Rural Functional Industrial Estates (RFIE) should be set up for each craft and should be located in specifically identified clusters within the relevant group.
- (vi) Household Manufacturing and Artisan Cluster Development Scheme should be implemented exclusively for the identified clusters on the pattern of existing Small Industry Cluster Development Scheme.
- (vii) Undertake programmes for support of product development in highly potential clusters having access to export markets.
- (viii) A well-knit arrangement for financial support for technology up-gradation should be provided.
- 7.4 Report of the Working Group on Science and Technology for Small Scale and Medium Enterprises for the 11th Five Year Plan (2007-12) Planning Commission has made many recommendations, some of which are as under:
1. Special efforts are needed to increase the level of awareness about government schemes/ programs for benefit of SMEs.
 2. There are about 20 incubators in India today as against over 1000 plus in US, 300 in Korea 100 in Finland. Technology Business Incubators (TBIs) must be promoted in a big way not only in terms of numbers but also their size. Universities, engineering colleges and business schools should be the preferred sites for these TBIs.
 3. Innovation and entrepreneurship hold the key to enhancing the role of SMEs in improving the Indian economy. As their importance is not well realised, countrywide programmes on entrepreneurship and innovation must be launched in the shape of a national movement.
 4. It is understood that there are plans to launch schemes for revamping and modernising polytechnics and ITIs in the 11th Plan. When these investments are made, the special role that they can play for SMEs should be taken in to account. The Working Group strongly recommends that polytechnics and industrial training institutes should be encouraged to organise short-term programs for vocational training of school drop-outs in a variety of multi-skilled job positions that would be available in SMEs.
 5. The importance of S&T interventions in SMEs on a cluster basis is today well appreciated internationally. There have been many attempts for technology up-gradation of clusters of SMEs in India by the Ministry of MSME. A Mission mode approach for technology intervention in the 11th Plan to help increase their productivity and exports significantly is recommended.
 6. A strong need for preparing sectoral technology profiles of the SMEs has been felt. These technology profiles will help in critically examining and addressing technology needs in line with the business requirements of the respective sectors. To begin with, 10 SME sectors viz. Food and allied industries, Wood and wood products, Paper products, Leather and leather products including footwear, Rubber products, Plastic products, Glass and ceramics, Electrical machines, appliances and apparatus, Bicycle parts, tricycles & perambulators and Sports goods can be taken up for technology profiling.
 7. Awareness about safety, health, occupational hazards and environmental issues needs high

priority and must go along with schemes and not separately.

8. It is felt that the productivity of SMEs can be improved significantly by making available to them Special Purpose Machines (SPM). A national level Committee / Group should be assigned the task of identifying such machines and also suggesting if they should be developed indigenously or imported for these SMEs.
9. There is a strong need for spreading awareness of IPR amongst the SMEs. Patenting should be encouraged by offering financial support/ subsidies. Likewise, quality assurance, eco-labelling, bar coding etc. of products should be encouraged in a big way.
10. Every engineering college in the country will be encouraged to interact with as many SMEs in its neighbourhood as possible.

Recommendations

7.5 The Commission, by and large, endorses the recommendations made by the Inter-Ministry Task Force and the Working Group for the XIth Plan in their reports as above but would like to enlarge the scope to the overall unorganised sector instead of limiting to artisanal and household manufacturing. The focus of the two reports is on the creation of appropriate institutions and infrastructure, including the setting up of incubators, enhancing awareness, skill development, and promoting technological up-gradation through cluster development.

7.6 In the light of present study and, keeping in view the special requirements of the unorganised sector, the Commission makes the following recommendations to promote innovation, dissemination, acquisition and up-gradation of technology in the unorganised sector enterprises:

I. Institutional

(i) *Creation of a Focal Point/Apex Institution for the Unorganised Sector*

The Commission in its report on “Conditions of Work and Promotion of Livelihoods in the Unorganised Sector” (August 2007) has observed that at present there is no

apex institution or focal point in the country or in the states, which can take a holistic view of the developments related to the informal/unorganised sector of the economy. The Commission’s finding is also that there is a lack of coordination between different agencies responsible for intervention to promote livelihood for the unorganised sector. In view of the above, the Commission recommends the creation of a focal point/apex institution for the promotion of livelihoods and improvement in productivity and competitiveness of the enterprises in the unorganised sector. This apex body could be either an independent Ministry for Unorganised Sector Enterprises or an institution devoted to the development of the unorganised sector exclusively. Similar focal points may be created at the state level as well. The focal points both at the Centre and in the states/UTs will have the following functions:

- Review the existing policies and programmes that have an impact on the unorganised sector with a view to ensure that such policies factor in the livelihood concerns of the workers and sustainable development of the enterprises in the unorganised sector.
 - Identification of the programmes and measures for livelihood promotion and growth of unorganised sector enterprises including technology up-gradation, skill development, marketing support, organisational support, credit support, technology support etc.
 - Ensuring better coordination between different ministries, departments and agencies including the proposed National Fund for the Unorganised Sector (NAFUS) (recommended by the Commission separately as an exclusive Developmental Financial Institution (DFI) for the unorganised sector).
 - Adopt advocacy role for the unorganised sector
- (ii) *Creation of National Council for Technological Up-gradation of the Unorganised Sector under the Chairmanship of the Prime Minister with State/ UT Chief ministers as members on the pattern on National Council on Skill Development set up recently.*

(iii) Adoption of a Mission mode for promotion of technology in the unorganised sector through CSIR

The task of promotion of technology in the unorganised sector, particularly in the rural areas may be taken up through the Mission mode covering the following aspects:

- To promote introduction of new and emerging technologies for important products in the micro enterprise sector, household manufacturing and artisan units.
- To finalise product craft-wise technology package for implementation
- To set up Technology, Innovation and Dissemination Centres in each state and UTs for unorganized sector enterprises.
- To set up Functional Industrial Estates/Integrated Resource Centres in identified clusters.
- To set up a Technology Bank for sourcing technology from India and abroad and facilitate technology transfer.
- Co-ordination with the existing R&D institutions and encourage R&D of indigenous technologies.
- To promote dissemination of technology at local level through the District Industries Centres (DICs) and other technology centres engaged in promotion of unorganized sector.
- To create innovation incubators and business incubators.
- To provide hand-holding facility to unorganized entrepreneurs in accessing technology.
- To stimulate and promote technology audits and address the environmental, safety and health concerns.
- To organize awareness campaigns pertaining to quality, standardization and customer satisfaction.

These tasks have to be integrated at the following 5 levels:

- 1) National level-through the Focal Point/Apex Institution and National Fund for Unorganised Sector.
- 2) State/Regional level-through Technological Innovations and Dissemination Centres
- 3) District level-through District Industries Centres (DIC)
- 4) At cluster level through identified clusters
- 5) R&D institution level- through respective R&D institutions and the institutions engaged in the task of promotion of micro, household and artisan enterprises.

(iv) Strengthen Wardha Institute

Mahatma Gandhi Institute for Rural Industrialisation (Wardha) should be strengthened to make it the Apex Rural Technology Promotion Centre. All products specific R&D Centres of the KVIC and other All India Boards catering to other traditional industries, should work under the supervision of the Wardha Institute.

II Dissemination/Awareness

(i) Setting up Technological Innovations & Dissemination Centres in states & UTs

Nearly 77 per cent of Indian population is living on an income of Rs.20 per day or less. This implies low economic level, low educational level and low level of productivity. All these facts indicate low technology level as well as low absorption of technology in unorganised sector enterprises. The large size of the country and wide linguistic and regional variations are the other reasons for low technological status of unorganised sector enterprises and unorganised sector workers. This also results into thin spreading of the resources with little impact. Hence, a qualitative shift in the technological status across the country is a must to ensure inclusive growth. Based on the above and also the international experiences in S&T promotion efforts, it is felt that Technological Innovations and Dissemination Centres (TIDCs) be set up with following details:

- At least one TIDC in each state and UTs. This will ensure wide geographical spread of standard technological initiatives cutting across the regional and linguistic barriers.
- TIDC to be developed as a standard IIT-CSIR NRDC venture. The advantage of placing such an organisation under an academic environment is that it will be able to upgrade itself to the

emerging technological standards in future also, as the obsolescence rate in technology related fields is quite high.

- TIDC to undertake following activities:
 - Showcasing of technological advancement (some sort of science museum) for creating awareness and interest in S&T in the minds of general public
 - Dissemination of technology developed by CSIR and other government labs in various languages including being in their respective States/regions
 - Interact with technology development institutions within and outside the state and outside the country
 - Taking up of the technological innovations and incremental technological development of prevailing technologies in their regions for improved productivity and standardization and further dissemination of such standardized technologies
 - * Organising technology awareness camps, etc., besides undertaking handholding activities in close co-ordination with the DICs in their region
 - * Undertaking contract research with individuals and enterprises in their region for better productivity and adoption/development of new technologies
 - * Each TIDC to work as a technological hub for technological up-gradation and awareness creation in their respective States/regions
 - * Maintain a panel of consultants in respect of important products from the unorganised sector enterprises.

(ii) District Industries Centres to be Nodal Agency at District Level for Technology Dissemination

There is no dearth of institutions and technologies. However, the major problem is inadequate dissemination

resulting into lack of knowledge about the technology which can make them competitive. Currently, the efforts by the technical institutions are piecemeal, inadequate and outdated. A bold programme of extending the knowledge and information to the existing and potential entrepreneurs is needed. Special efforts are also needed to increase the level of awareness about R&D related to various product lines in the unorganised sector and the government schemes/programmes for the benefit of the non-farm unorganised enterprises.

District Industries Centres were established in late seventies as a single window agency to promote SSI and cottage industries beyond big cities and to generate employment opportunities among rural and backward areas. Presently DICs, operating under respective state budgetary provisions, extend the following services:

- a) Surveys to know industrial potential of a district keeping in view the availability of raw material, human skills, infrastructure, demand, etc.
- b) Preparation of action plans for industrial development
- c) Appraisal of various investment proposals received from entrepreneurs
- d) Guide and assist entrepreneurs in buying appropriate machinery and equipment and raw material
- e) Suggest appropriate marketing strategies to entrepreneurs
- f) Maintains links with research and development institutions for up-gradation of technology, quality improvement, industrial training etc.
- g) Conduct artisans training programmes.
- h) Registration of micro and small enterprises
- i) DICs are also assigned operational responsibility for special schemes to provide self-employment to educated unemployed youths under PMEGP.

Initially a centrally sponsored scheme, it was visualised as a single window for micro and cottage industries with the managers (credit, raw materials, skill, technology, marketing, etc.) and one general manager. However, after

the transfer of these DICs to the states in the late nineties, number of staff was reduced by many state governments. A well-known institution already exists in all the districts of the country. This needs to be reactivated. It is essential to revive them since they exist even now and have adequate infrastructure in terms of land and building, staff and are among the well-known institutions in any district. There are currently about 600 DICs covering all the districts in the country. The task of technology dissemination can be performed only by an institution which is well-known and accessible to the entrepreneurs. The Commission feels that the task can be entrusted to District Industries Centres since they exist in almost all districts of the country. The main task of the Technology Centre within the DIC will be following:

- To coordinate with all the existing R&D centres, technology centres run by various organisations such as MSME-DO, DC Handlooms, DC Handicrafts, KVIC, KVIB, Coir Board, Central Silk Board, R&D Centres of the Ministry of S&T, CSIR, Ministry of Food Processing etc. and those run by the state governments and the NGOs. To gather information on R&D initiatives relevant for local areas and publish them in the local language for the benefit of the prospective and existing proposed entrepreneurs in the non-farm unorganised sector.
- To be in constant touch with the state/regional technology centres & TIDCs/ universities in the district, if any, and technical institutions.
- Display the technologies developed for the product lines being practiced in the district and also having potential.
- Print out handbooks on incentives made available under various Central and state Schemes both financial and physical and publicise.
- Maintain data bank on technologies.
- Link the entrepreneurs with the banks.
- Spreading awareness about the importance of technology up-gradation in the district.
- Provide guidance, hand-holding and arrange mentoring services within the district.

Thus the DICs will be a link between the Central Government, regional technology promotion centre TIDCs and the R&D institutions. For this, the Ministry of MSME in co-ordination with the Ministry of Textiles, Food Processing and Rural Development should formulate a Central Scheme of Technology Dissemination to be implemented through the DICs working as centre for display and dissemination of technology. In view of the above, the DICs need to be restructured by augmenting resources covering both capital & human.

III Skill & Entrepreneurship Development

(i) Strengthening Polytechnics & ITIs for Rural /Small Town Areas for Linking Technology with Skill

One of the impediments in the way of technology adoption and adaptation in the unorganised sector is the lack of skill. Over 92 per cent of the workforce is in unorganised sector. Most of them lack any skill. The status of technical education and training in India is lopsided in the sense that while the intake into engineering colleges for an undergraduate degree is about 400,000 in about 1200 colleges, the intake for diploma education in engineering in about 1200 polytechnics is only about 250,000. The number of technicians formally trained in the country is about 600,000 through 6000 Industrial Training Institutes/ Industrial Training Centres and another 600,000 through various apprenticeship schemes. Ideally, in a technologically advanced country, the ratio of graduate engineers to diploma engineers to technicians should be 1:3:15. There is a need to correct the situation by making education in polytechnics and vocational training more attractive and rewarding. Further, these institutions have a crucial role for generating human resources and providing training programs for skills and techniques for MSEs. The important role that these institutions can play in science and technology intervention for MSEs, particularly those in rural areas was recognized as early as 1978. Studies have revealed several gaps in the existing skill development programmes through ITIs and polytechnics. They suffer from obsolete and outdated trades. Polytechnics as a whole should raise the S&T level of their own staff and students, by solving live rural problems. There are plans to launch schemes for revamping and modernizing polytechnics and ITIs in

the 11th Plan. The Commission strongly recommends that Polytechnics and Industrial Training Institutes should be encouraged to organize short-term programs for vocational training of school dropouts in a variety of multi-skilled job positions that would be available in MSEs. In evolving these training programs industry involvement should be mandatory and employer-based training programs should be encouraged. There should be a special initiative to ensure proper training to the trainers engaged in conducting such courses. The resource persons should be offered attractive remuneration to make the programmes interesting and useful. The Commission has proposed/targeted that atleast 50% of the labour force be formally trained by 2022 which will significantly improve the ability of absorption of technology by the entrepreneurs.

(ii) Creating a Climate for Entrepreneurship

The entrepreneur is typically an innovator who formulates new solutions to existing problems, mobilizes resources and stimulates others to participate in the team. As their importance is not well realized, countrywide programmes on entrepreneurship and innovation must be launched as a national movement by the MSME Development Institutes. Entrepreneurship should be promoted as a preferred career and not as an alternate career. Entrepreneurship incubation should be a part of the engineering curriculum. Towards this, among other things, the training of teachers/ trainers is necessary and special steps should be taken in this direction. Recognition/incentives for innovation and entrepreneurship in the clusters and educational institutes must be introduced. Suitable enhancement in the budgets in all the schemes promoting innovation and entrepreneurship is recommended.

(iii) Adoption of Unorganised Enterprises by Technical Colleges

Adoption of MSEs by Technical Colleges for Promoting Academia-MSE interaction for Innovation and Science and Technology will become more and more important for the entire MSE (Micro & Small Enterprises) spectrum. For small-scale industries, technology is a

crucial factor for productivity and quality, whereas for medium scale industries, technology is a crucial factor for growth and competitiveness. MSEs by themselves are a big laboratory for innovation. They do innovate a lot and also share these innovations with their higher ups in the value chain, but due to the lack of a systematic approach for managing innovations within most of the MSEs, the benefits (due to these innovations) are only short term. Every engineering university and the technical colleges in the country must be encouraged to interact with the MSEs in the neighbourhood. Such interactions should necessarily involve the whole spectrum of MSEs. It may be stipulated that a minimum of 20 micro and small enterprises be taken up by each technical college in the university for the following interactions:

- Specific research, development, design and engineering programs for technology inputs and up-gradation
- Summer vacation internship (in-plant training) for undergraduate students
- Consultancy and visits by faculty to MSEs
- Seminars and workshops, discussion meetings etc at locations close to SME clusters to discuss specific science and technology advancements in the respective areas
- Continuing education programmes aimed at MSEs at levels of technicians, supervisors, engineers and entrepreneurs.
- Discussions to improve productivity.
- Suggest adoption of appropriate technology to the unit.
- Train the entrepreneurs for up-gradation of skills and technology.

(iv) IPR & Related Matters

There is a strong need for spreading awareness of IPR amongst the MSEs. Patenting should be encouraged by offering financial support/subsidies. Likewise, quality assurance, eco-labelling, bar-coding etc. of products should be encouraged in a big way.

IV Rationalising, Simplifying & Expanding Schemes

(i) *Revise Technology Up-gradation Fund Scheme of the Ministry of Textiles to make it accessible to Handloom & Handicrafts Sectors without Conditionalities of Minimum Amount of Loan & Submission of Balance Sheet*

Technology Up-gradation Fund Scheme of the Ministry of Textiles is termed as a flagship scheme, with bold outlays and visible impacts in the textiles sector. However, due to some of the conditions of this scheme, unorganised handloom and power loom units are not in a position to benefit from this scheme. The scheme is available in the form of both interest subsidy (5 per cent) and capital subsidy (20 per cent). It is for the beneficiary to choose between the two alternatives. The main difficulty faced by the unorganised units in availing this scheme is mainly due to the units' inability to maintain accounts and other documents acceptable by the banks as units with less than 10 looms are not considered as viable enterprises. Thus the scheme leaves out the unorganised handloom and power loom units from the ambit of the scheme. There is the need to revise this scheme in favour of the unorganised enterprises. The rate of capital subsidy should also be raised to 25 per cent for the handloom enterprises with loan requirement up to Rs 15 lakhs.

(ii) *Broad Base Credit Linked Capital Subsidy Scheme (CLCSS) for Technology Up-gradation of Micro & Small Enterprises*

Credit Linked Capital Subsidy Scheme for Technology Up-gradation of Micro and Small Enterprises (CLCSS) launched in 2000 has made good progress in recent years. The scheme needs to be made attractive and popular. It would be appropriate to raise the rate of subsidy to 25 per cent under CLCSS in enterprises with investment in plant and machinery less than Rs 5 lakhs for loan requirements of Rs 15 lakhs for technology up-gradation.

(iii) *Set up Mini Tool Rooms-cum-Testing Centres*

So far 9 Tool Rooms and 4 Regional Testing Centres have been set up by the Ministry of MSME. In a

country of India's size, the existing facilities are grossly inadequate. It is recommended that Mini Tool Room cum Testing Centres be set up in all MSME Development Institutes by revamping the existing workshops. There are 58 such institutes under Ministry of MSME. The testing centres should cover testing facilities for important product lines falling within the reach of the Development Institutes and Branch Institutes.

V Providing Better Linkage

(i) *Adopt Growth Pole as the strategy for Unorganised Enterprise Development*

The Commission's case studies have revealed that better results have been realised in technology up-gradation where enterprises exist in the form of clusters. The Commission takes the concept of cluster development one step further and recommends the adoption of Growth Pole as the strategy for unorganised enterprises development (NCEUS, 2009(a)). Growth Pole is a 'cluster of clusters' and links the clusters in the area and also the potential growth points and promotes interdependence which allows them to enjoy external economies of scale and scope from their simultaneous and complimentary functioning. Such positive externalities are derived from:

- a) Forward and backward linkages in productive activities, such as units using each other's demands for inputs and production of output, both within and outside the area.
- b) Use of common facilities for social overhead capital like roads, other forms of transport, communication and marketing connections, both within the country and for exports.
- c) Utilising common services of education, health, sanitation, housing, water, power etc.
- d) Allowing inter-linkages of different services to develop a network with the clusters of activities.

The unorganised sector in India has had no such enabling environment so far. Various studies have shown productivity levels in the unorganised sector to be far from optimal, with the rural-based enterprises being

worse off than the urban counterparts. Even in manufacturing enterprises in the rural areas that account for a large share of employment, labour productivity is declining. From the labour's point of view, the conditions in the unorganized sector leave much to be desired. The Growth Pole can provide the right ambience to implement best workplace practices, and also become the laboratory for entrepreneurs and start-ups. The Growth Pole Project is a new initiative being advanced primarily to expand production and employment in the unorganized enterprises around the existing clusters of industrial activities and services as well as induce the new clusters.

(ii) Incentive for Linkage between Large & Unorganised Enterprises

It has been argued by many that integrated production leads to technological efficiency. It is argued that mass production with synchronised technological and organisation features that integrate several stages of production in a single industrial establishment lead to better co-ordination of different operations in vertically integrated units. When the production is integrated, machines and process are arranged in such a manner that facilitates the optimal efficiency in the utilisation of space and time. This also reduces costs of storage of intermediate goods and delays in the movement of intermediate goods from one process to another. On the other hand, the division of the production process into two or more sub-processes, each to be handled by independent small or large subcontractors, would raise costs of production due to additional costs of co-ordination. Further, backward and forward integration reduce transactions costs. Market arrangements and subcontracting often involve excessive transaction costs.

A vast majority of MSEs remain de-linked from the bigger enterprises, thus missing the potential opportunities for marketing of their products and growth. Normally local sourcing is preferred by the big firms especially the MNCs due to lower costs, greater flexibility in changing specifications and developing new inputs. In reality however, big firms and MNCs try to forge links with even bigger global players and in the case of MNCs with their home country suppliers, raising barriers to entry for the local MSEs. The standard argument for this is the lack of suitable local MSE partners which would

meet the big firms' standards/norms of production. The challenge here is to ensure linkages that contribute to the growth and competitiveness of MSEs. These linkages could be in four forms:

- (i) Backward linkages with suppliers,
- (ii) Linkages with technology partners,
- (iii) Forward linkages with customers and adoption of high skill programme, etc.
- (iv) Other spillover effects such as demonstration effects.

Closer co-operation of large and medium enterprises with micro and small enterprises is highly desirable to foster the growth of unorganised enterprises as ancillaries to large and medium units. Industry associations of both larger and smaller units should play a vital role in the creation of such tie-ups. This will be beneficial to both the segments. Such a linkage can be promoted through statutory provision of procurement of a minimum percentage of total requirements from micro and small enterprises, as it exists in USA under Business Administration Act. Further, fiscal and physical incentives could also be considered to promote the needed linkages.

VI Providing Adequate Credit

(i) Addressing the Problem of Credit for Technological Up-gradation

Inadequacy of institutional credit is one of the major factors affecting modernization and technology up-gradation of the unorganised enterprises. The issue of credit constraints to unorganised enterprises, particularly with investment limit of Rs 5 lakhs in plant and machinery and those between Rs 5 lakhs and Rs 25 lakhs has been discussed in detail in NCEUS Reports on "Financing of Unorganised Enterprises" and "Creation of National Fund for Unorganised Enterprises". These reports have also gone into the credit linked schemes for technology up-gradation. The Commission reiterates its observations and recommendations, in particular the following:

- (i) Urgent need for revision of the Priority Sector lending policy of banks by reserving 12 per cent of Adjusted Net Bank Credit for Micro Enterprises and other Credit Linked Schemes of self-employment. The Commission has specially

recommended that 5 per cent of ANBC be reserved for micro enterprises with investment up to Rs 5 lakhs and 8 per cent for micro enterprises with investment up to Rs 25 lakhs.

- (ii) National Fund for Unorganised Enterprises be set up for meeting their financial and developmental needs.
- (iii) Suitable changes in Credit Guarantee Scheme be made and availing of this scheme by banks should be made mandatory for loans up to Rs 5 lakhs.

It is recommended that in addition to the above, loans up to Rs 5 lakhs for technology up-gradation by the unorganised enterprises should necessarily be covered under the Credit Guarantee Scheme and without collateral. The guarantee cover should be raised to 90 per cent for micro enterprises, artisan enterprises and traditional industries for loans up to Rs 15 lakhs for technology up-gradation. This is on the assumption that cost of technology up-gradation is relatively high.

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Abbreviations

AIST	Agency of Industrial Science & Technology
APCTT	Asia Pacific Centre for Transfer of Technology
A&N	Andaman and Nicobar
ARTS	Advancement of Rural Technology Scheme
ASCENT	Asian Centre for Entrepreneurial Initiative
ASEAN	Asian Economic Association
BE	Budget Estimate
BI	Business Incubators
BIOFARM	Biological Integration of Farming Activities and Resource Management
BIMSTEC	Bangladesh-India-Myanmar-Srilanka -Thailand Economic Cooperation
CAD	Computer Aided Design
CAPART	Council for Advancement of People's Action and Rural Technology
CCRI	Central Coir Research Institute
CDE	Cluster Development Executives
CDP	Cluster Development Programme
CISIR	Ceylon Institute of Scientific and Industrial Research
CFTI	Central Footwear Training Institute
CFC	Common Facility Centre
CLCSS	Credit Linked Capital Subsidy Scheme
CLRI	Central Leather Research Institute
CRCs	Cooperative Research Centres
CSIR	Council of Scientific and Industrial Research
DCMSME	Development Commissioner Micro, Small and Medium Enterprises
DICs	District Industries Centres
DSIR	Department of Scientific and Industrial Research
DST	Department of Science and Technology
EU	European Union
FDI	Foreign Direct Investment
FDDI	Footwear Design and Development Institute
FFDC	Fragrance and Flavour Development Centre

GDP	Gross Domestic Product
GRIs	Government Sponsored Research Institute
GSP	Global Supplier Programme
GVA	Gross Value Added
HRD	Human Resource Development
HTDZs	High Technology Development Zones
IDLS	Integrated Development of Leather Sector
IGNOU	Indira Gandhi National Open University
IPP	Invention Promotion Programme
IPR	Intellectual Property Rights
ISO	International Standards Organisation
IITs	Indian Institutes of Technology
ILP	Industrial Linkage Programme
IMG	Inter Ministerial Group
IMTF	Inter Ministry Task Force
ITIs	Industrial Training Institute
KVIC	Khadi and Village Industries Commissioner
KVI	Khadi and Village Industries
KVIB	Khadi and Village Industries Board
LTM	Leather Technology Mission
MFPI	Ministry of Food Processing Industries
MGIRI	Mahatma Gandhi Institute for Rural Industrialization
MITI	Ministry of International Trade and Industry
MNC	Multi-National Companies
MoRD	Ministries of Rural Development
MoU	Memorandum of Understanding
MOST	Ministry of Science and Technology
MSE	Micro and Small Enterprises
MSME	Micro, Small and Medium Enterprises
MSMEDO	Micro, Small and Medium Enterprises Development Organisation
MVIF	Micro Venture Innovation Fund
NABL	National Accreditation Board of Testing & Calibration Laboratories

NAFUS	National Fund for the Unorganised Sector
NABARD	National Bank for Agriculture and Rural Development
NCEUS	National Commission for Enterprises in the Unorganized Sector
NCMP	National Common Minimum Programme
NEDC	National Engineering and Development Centre
NGOs	Non-government Organizations
NIC	Newly Industrialized Countries
NID	National Institute of Design
NIT	National Institute of Technology
NLDP	National Leather Development Programme
NRDC	National Research Development Corporation
NSIC	National Small Industries Corporation
NSTEDP	National Science & Technology Entrepreneurship
NSSO	National Sample Survey organisation
OB	Organisation of Beneficiaries
OECD	Organisation for Economic Cooperation and Development
PC	Public Cooperation
PMEGP	Prime Minister's Employment Generation Programmes
PMRY	Prime Minister's Rojgar Yojana
PPDC	Process and Product Development Centre
PRODIP	Product Development, Design Intervention and Packaging
PSCs	Pioneer Services Centres
R&D	Research and Development
REGP	Rural Employment Generation Programme
RIN	Rural Innovations Network
RISC	Rural Industries Service Centres
RUDA	Rural Non Farm Development Agency
SAARC	South Asian Association for Regional Cooperation
SAPTA	South Asian Preferential Tariff Agreement
S&T	Science and Technology
SC	Scheduled Caste
SDSL	Scheme for Development of Leather Industry

SECURE	Strategic Expansion of Carcass Utilization for Rural Employment
SEFC	Small Enterprises Financial Centres
SFURTI	Scheme of Fund for Regeneration of Traditional Industries
SGSY	Swarnjyanti Gram Swarojgar Yojana
SHG	Self Help Group
SIDBI	Small Industries Development Bank of India
SITARA	South India Textile Research Association
SJSSY	Swarnjyanti Sahari Swarojgar Yojana
SKST	Skill Development through Science and Technology
SME	Small and Medium Enterprises
SSI	Small Scale Industry
SSTC	State Science and Technology Commission
ST	Scheduled tribes
STAWS	Science & Technology Application for the Weaker Sections
STIPs	Science and Technology industrial Parks
SVPITM	Sardar Vallabhbhai Patel Institute of Textile Management
TAU	Technology Acquisition and Upgradation
TBI	Technological and Business Incubators
TBSE	Technology Bureau for Small Enterprises
TDC	Technology Development Centres
TePP	Techno-preneur Promotion Programme
TIDC	Technological Innovations and Dissemination Centres
TIFAC	Technology Information, Forecasting and Assessment Council
TIME	Technology Intervention in Mountain Eco-System
TMS	Technology Market Survey
TNC	Transnational Corporations
TOR	Terms of Reference
TP	Technology Partnership
TPP	Technology Promotion Programme
TQM	Total Quality Management
TUFS	Technology Upgradation Fund Scheme
UNCTAD	United Nations Committee for Trade & Development

UNIDO	United Nations Industrial Development Organisation
UNDP	United Nations Development Programme
UP	Uttar Pradesh
UPA	United Progressive Alliance
USA	United States of America
UT	Union Territories
VI	Village Industries
VTE	Village and Town Enterprises
WTO	World Trade Organisation

Annexure

Terms of Reference of the Commission

The Government of India, constituted the National Commission for Enterprises in the Unorganised Sector (NCEUS) on 20th September, 2004, under the Chairmanship of Professor Arjun Sengupta. The Terms of Reference of the Commission are as follows:

- i. Review the status of unorganised/informal sector in India including the nature of enterprises, their size, spread and scope, and magnitude of employment;
- ii. Identify constraints faced by small enterprises with regard to freedom of carrying out the enterprise, access to raw materials, finance, skills, entrepreneurship development, infrastructure, technology and markets and suggest measures to provide institutional support and linkages to facilitate easy access to them;
- iii. Suggest the legal and policy environment that should govern the informal/unorganised sector for growth, employment, exports and promotion;
- iv. Examine the range of existing programmes that relate to employment generation in the informal/unorganised sector and suggest improvement for their redesign;
- v. Identify innovative legal and financing instruments to promote the growth of the informal sector;
- vi. Review the existing arrangements for estimating employment and unemployment in the informal sector, and examine why the rate of growth in employment has stagnated in the 1990s;
- vii. Suggest elements of an employment strategy focusing on the informal sector;
- viii. Review Indian labour laws, consistent with labour rights, and with the requirements of expanding growth of industry and services, particularly in the informal sector, and improving productivity and competitiveness; and
- ix. Review the social security system available for labour in the informal sector, and make recommendations for expanding their coverage.

The current composition of the Commission is as follows:

1. Professor Arjun Sengupta - Chairman
2. Professor KP Kannan - Member
3. Professor R.S Srivastava - Member
4. Shri V.K Malhotra - Member Secretary
5. Shri BN.Yugandhar - Part time Member
6. Shri T.S Papola - Part time Member