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# FORMULATION OF SHAANXI PROVINCE INDUSTRIAL DEVELOPMENT STRATEGY

US/CPR/93/044

PEOPLE'S REPUBLIC OF CHINA

**Terminal report***

Prepared for the Government of China
by the United Nations Industrial Development Organization

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Investment Services

* This document has not been edited.

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# PREFACE

In response to a pertinent request from the Government of Shaanxi Province, People's Republic of China, the present report has been prepared as an input to the current provincial debate on the future direction of policies geared towards the promotion of a viable industrial sector. While the presented result is not a comprehensive, ready-to-apply industrial strategy per se, major critical elements of a conducive industrial strategy for Shaanxi Province are identified with a view to providing a framework for action by policy-makers and other agents of industrial development at provincial level.

The report was co-ordinated by the Asia and Pacific Programme, Country Strategy and Programme Development Division, of UNIDO. It is based upon the findings of field investigations in Shaanxi Province between October and December 1994. UNIDO mission members comprised the project manager, Saul Alanoca (international team leader), David Evans (consultant) and Stanislaw Pigon (consultant). Paul Hesp (consultant) assisted in the preparation of the report. A team of national experts (Li Huaizhu, Yang Yuzan, Wang Zhongmin, Zhang Baotong and Han Chongzhao) provided comprehensive background data and information prior to, during and after the field work phase. The quantitative information used is largely based on data received from/through the Shaanxi/UNIDO Project Cooperation Office set-up in Xi'an by the provincial government. Preliminary findings were presented to and discussed at a one day seminar convened in Beijing on 8 December 1994. A draft report was submitted to the field for review in early 1995. The present final report takes account of comments received in August 1995 and May 1996, respectively.

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**Executive Summary**

Part I of this document is mainly concerned with a sketch of the economy of Shaanxi Province and its development perspectives. Shaanxi is the industrial centre of the Northwest. It has a strong engineering industry and it is one of China's most important producers of defence equipment. The economy and the industrial sector have grown rapidly, but the figures are below the Chinese and especially the coastal province average. This is to a large extent the consequence of slow economic reform. The industrial sector leads Shaanxi's economy, accounting for 36 per cent of provincial GDP in 1994; it is followed by the services sector, with 35 per cent.

Shaanxi has a negative trade balance. Although international exports have grown much faster than the Chinese average, the country is heavily dependent on imports of industrial inputs from other Chinese provinces. Textiles dominate exports, but metals, chemicals, pharmaceuticals and machinery show the highest growth rates. Various trade distortions make it difficult to ascertain where the actual strengths of the province lie.

Although the trend is upward, Shaanxi accounts for only a small share in total foreign direct investment in China: 0.8 per cent in 1993. The major investors are enterprises from Hong Kong. The real estate sector and industries such as electronics, textiles, oil, chemicals and machinery account for the bulk of investments. Fully foreign-owned projects are rather uncommon, the majority of foreign investors entering into some form of cooperation with local investors.

Through the presence of a strong engineering and defence industry, the province has a large number of highly qualified technicians and scientists; the coastal provinces, however, have been offering better career opportunities in recent years, and not done enough to keep know-how up-to-date. At the other end of the educational scale, there is a backlog in basic education.

The province is relatively well endowed with agricultural resources. These are not optimally used. The abundant mineral resources also remain underexploited, and investments in mining have not always been made on economic grounds. Mining, however, does have strong linkages with Shaanxi's economy, especially with the metal-based industries, and an expansion of mining and basic metals production is foreseen. The energy resources are of national significance, but exploitation requires massive investments. Investment is also needed in technologies reducing the air pollution caused by energy generation - this is one of the major environmental problems in Shaanxi.

Physical infrastructure is not adequate to the needs of the economy, but capacities are to be expanded significantly in the coming years. To meet the huge investments needs, participation of foreign companies is sought. The most important infrastructure projects concern road and railway construction, and energy generation. The institutional infrastructure is weak, although banking reforms provide a basis for improvements in the financial sector. So far, credit has not been allocated to industries with the highest rates of return - the very dynamic town and village enterprises (TVEs), for example, are starved of capital funds.

Part I concludes with a discussion of the possible repercussions of recent changes in the world economy on trade, technology and finance in Shaanxi Province. To be internationally competitive, Shaanxi's industries must not only invest in new equipment but also in information and research and development (R&D), which have become the key elements in the development of new products and technologies. Shaanxi can benefit from the liberalisation of world trade and investment. But this means that obstacles to international trade and financial operations must be removed.

Part II first presents an overview of the industrial sector in Shaanxi. There were over 282,000 enterprises in the sector in 1994, most of them privately-owned small and medium-size enterprises (SMEs). Output however is dominated by large public enterprises, albeit with a clear downward trend of late. Total output has increased five times (in nominal terms) since 1985 and doubled since 1991, reaching 100.9 billion Yuan in 1994. The fastest growers, in spite of a modest share in total output, were the TVEs. Shaanxi only accounted for about 1.3 per cent of China's industrial output in 1994. But some of China's leading industries are located in Shaanxi, and it has the most important industrial sector in Northwest China. Machine building, electronics, textiles and transport equipment are the major industries. The first three of these are briefly reviewed.

In recent years the number of government-owned enterprises showing a deficit has increased alarmingly. They have problems at various levels: technology, management, staff qualifications and product quality. If the present system of public-sector management did not protect these enterprises, many of them would face bankruptcy. TVEs are proving very dynamic, but the development of non-government enterprises is still rather slow. Private activity suffers from obstruction, but the basic problem could be a lack of managerial skills and business experience.

During 1990-1993 the volume of industrial investment increased by 26.8 per cent yearly. Government-owned enterprises accounted for over 75 per cent of investment. At present, the most important projects are in the fields of energy, mining, semi-conductors, fertilizer and car production. Investment in advanced industries is limited. Through large investments, the central government is trying to reduce the gap with the rest of the country, but the difference with the national investment ratio is still large. It is essential that Shaanxi is made more attractive to investors from other provinces and countries.

A discussion of factors related to competitiveness and performance shows that concentration on capital and skill intensive industries (e.g. engineering) - stimulated by various distortions - denies capital and medium skill capacity (in e.g. design) to industries like garments and the small but rapidly growing printing and wood products industries. The existing industrial structure therefore does not always reflect Shaanxi's actual comparative advantage. By industrial branch, the highest labour productivity increases in recent years were found in machinery and transport equipment, pharmaceuticals and wood processing. Net output growth largely reflects increased capacity utilisation. Higher product quality and reliability would be needed for a better performance in a competitive environment.

The intensification of linkages among industries and with the provincial resource base could provide strong economic stimuli. This was not fully appreciated in the past. Clustering of industries would depend on improvements in physical and organizational infrastructure. In-house production of components (common in large public-sector firms) is also an obstacle to the development of linkages; subcontracting would deserve more attention. To enable the industrial sector to build up networks and rely more extensively on local inputs of competitive quality, better organizational and technical skills are needed as well.

In the final sections of Part II, the measures adopted to accelerate economic development are discussed. In 1992, the 14th Party Congress decided on a greater market orientation of the economy. Special measures have been formulated to accelerate industrial development in Northwest China (loan and export quota priorities, investment stimuli, training).

While the provincial government mainly has an implementing role, the provincial authorities now have a greater role in the formulation of policies and in introducing market mechanisms for the allocation of economic resources as well as enterprise restructuring. Conversion of military industries is given special attention. The Shaanxi government has also made a range of incentives available to foreign investors. There are special conditions for development zones to attract, among others, new and high-tech industries.

The reform process has accelerated, and the role of market mechanisms has been strengthened. But the impact on the economy remains limited. Few enterprises have been restructured, production quota still exist. There is a shortage of qualified management in many firms and government institutions, and a lack of self-confidence among decision makers, a fear that reforms may fail. Better selection criteria for (foreign) investment projects are also needed, as indicated by the relatively large number of badly performing projects. The (incentives available in) development zones may also have to be rationalized.

China's New Industrial Policy, promulgated in 1994, stresses increased competition and decentralization, closer links between industrial and rural development, and promotion of industries such as engineering. In several ways the Policy would favour Shaanxi, but it would still seem strongly characterized by interventionism, where the international trend is towards a greater role of markets. An approach focusing on physical and institutional infrastructure (including education and training) would possibly be a more effective catalyst for enterprises, along with further liberalization through macro-economic reforms.

Part III begins with a brief recapitulation of the basic conditions, the strengths and weaknesses of Shaanxi's industrial sector. Major strengths include its good mineral raw material, R&D and engineering industry base as well as its favourable location; major weaknesses are the sluggishness of reforms towards a market economy, the (related) weakening of Shaanxi's position vis-à-vis the coastal provinces and the inadequate infrastructure.

This is followed by an outline of the general orientations of an industrial development strategy which would help to make the province a centre of (socio-)economic progress in

Northwest China. Briefly, the future approach should be one of openness to the challenge of competition and to the opportunities offered by new markets. To make the most of these opportunities and to meet the challenges, policies should target industries which have the greatest development potential. In cooperation with the central government, a macro-economic environment should be created which allows the realization of this potential and stimulates progress towards a socialist market economy.

Within the framework of these general orientations, the actual industrial strategy would be formulated. Major components of this strategy are discussed in the sections which follow; they include human resource development, infrastructural development, enterprise reform, measures which increase the flow of financial resources to the industrial sector as well as ensuring their effective use, and trade promotion. Again, cooperation with the central government is essential, but intensified cooperation with neighbouring provinces is also required.

Part III concludes with some suggestions for future technical assistance in the areas of market analysis, executive training, infrastructure development, military conversion and cleaner production.

# PART I. SHAANXI'S ECONOMY AND DEVELOPMENT PERSPECTIVES

The main purpose of this part is to present a sketch of the economy of Shaanxi Province and its development perspectives. First, the main characteristics of the province and its economy are briefly described. The next two sections focus on international trade and investment in Shaanxi. Finally, the possible repercussions of recent changes in the world economy on trade, technology and finance in Shaanxi Province are discussed.

## 1.1 Introduction

Shaanxi Province is an inland province in Northwest China with an area of 205,500 sq. km. (2.14 per cent of China) and a population of 34.4 million (almost 3 per cent of China). It borders on Shanxi, Henan, Hubei, Sichuan and Gansu provinces and two autonomous regions, Ningxia and Inner Mongolia. Shaanxi Province is composed of three different natural regions:

- The Northern Plateau which is rich in coal, oil and natural gas and which is also a major cereal growing area;

- The Central (Guanzhong) Plain where about 70 per cent of the population and most of the industries are found, and which is also a major grain and cotton producer and rich in mineral resources; and

- The Southern region, rich in minerals such as gold, nickel, zinc and other non-ferrous metals.

In general, Shaanxi possesses a fertile soil, a mild climate and sufficient rainfall.

Administratively, Shaanxi Province is divided into 6 prefectures and 4 prefectural cities which govern 107 counties and districts. Xi'an, the capital of Shaanxi Province, is the most important town and the largest industrial, commercial, scientific and technological centre in Northwest China.

In the 1960s and 1970 Shaanxi became an important area for the central government defence strategy. A great number of factories and research institutions were moved from the Northeast and Coastal Regions to Shaanxi and located around Xi'an and further extended to the central and southern part of Shaanxi.

Since the 1980's there has been some industrial diversification, but investment and development slowed down as the central government gave priority to the coastal provinces. As a result, the level of development is lower than the national average in many respects. At the end of the 1970s, Shaanxi accounted for about 2.3 per cent of national industrial output; now, the figure stands at 1.6 per cent. In many industries, especially light industry, the level of fixed assets and technologies is far behind that of the coastal provinces.

Although the scientific and technological base was neglected in the 1980s it still has a big potential. The new development strategy of China calls for more harmonious and simultaneous development of all provinces; this has created new opportunities for Shaanxi. However, more favourable conditions and structural change are necessary. High-tech industries are expected to accelerate industrial development in the province, but there is a serious lack of capital. It may also be questioned whether the potential for less advanced industries using (semi-)skilled labour is fully utilized.

Shaanxi Province is favourably situated to serve as a communications and commercial centre between coastal and the other northwestern provinces of China as well as between China and the CIS countries. Economic cooperation with neighbouring provinces could be increased, especially in the industrial field.

## 1.2 Macroeconomic situation

Between 1980 and 1994 the real provincial GNP of Shaanxi increased at an annual average of some 9.7 per cent, its industrial output by about 13 per cent per year. With an annual average of less than 7 per cent agricultural production exhibited the lowest growth during that period. These may seem high growth rates, but compared to overall China the increases are below average, especially during the last few years. As a result, the gap between the national economic development and the provincial development is widening. Figure 1.1 illustrates the latter by comparing recent growth of GNP and industrial output of Shaanxi and China, respectively.

The gap with other provinces is also growing (table 1.1): in 1989 Shaanxi's growth rate was higher than that of Jiangsu, three years later Jiangsu's growth rate surpassed that of Shaanxi three times and was still almost double in 1994. The gap with Henan and Guangdong is also marked. This gap is due to factors such as the more favourable conditions of investment in the coastal provinces, their geographical situation close to potential markets, dynamism and entrepreneurial initiative, and the reduction of central government investments in provinces like Shaanxi.

Table 1.1 GDP growth in China and selected provinces, 1989-1994 (per cent, constant prices)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|---|
| China | 4.1 | 3.8 | 9.3 | 14.2 | 13.5 | 11.8 |
| Shaanxi | 3.3 | 4.3 | 8.1 | 8.2 | 13.3 | 8.6 |
| Shanxi | 4.8 | 5.1 | 4.2 | 13.8 | 12.2 | 9.1 |
| Henan | 4.4 | 4.5 | 6.9 | 13.7 | 15.8 | 13.8 |
| Jiangsu | 2.1 | 4.4 | 12.5 | 26.0 | 20.7 | 16.5 |
| Guandong | 7.0 | 11.3 | 17.3 | 22.0 | 22.3 | 19.0 |
| Gansu | 8.7 | 5.5 | 6.6 | 9.9 | 11.6 | 10.4 |

Source: Statistical Yearbook of Shaanxi 1995; China Statistical Yearbook 1995.

Figure 1.1 Growth of GDP and industrial output (IO) in Shaanxi and overall China, 1989-1994 (based on constant prices, per cent)

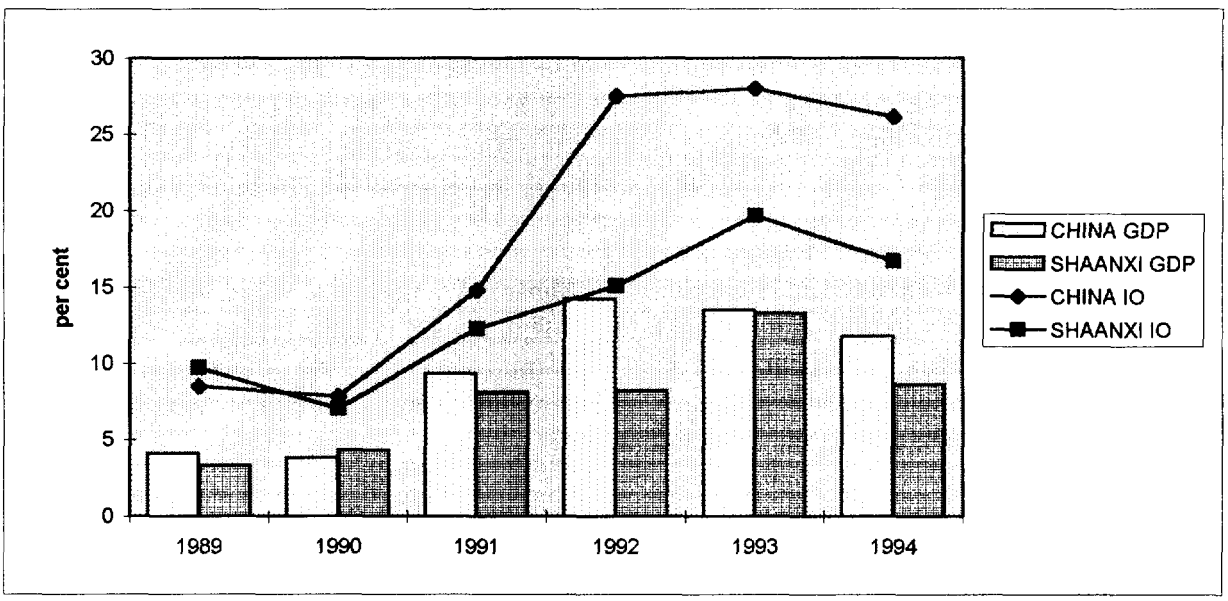
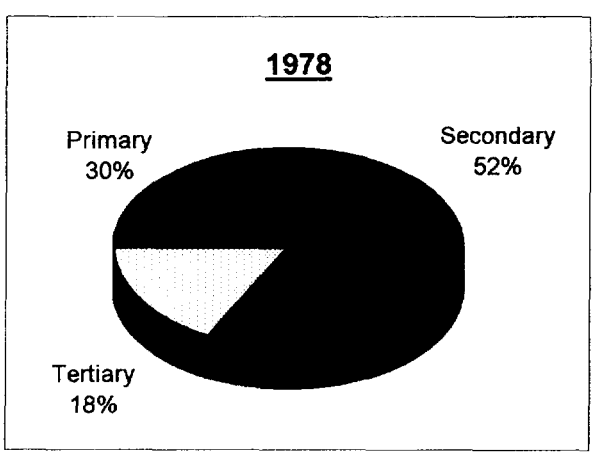
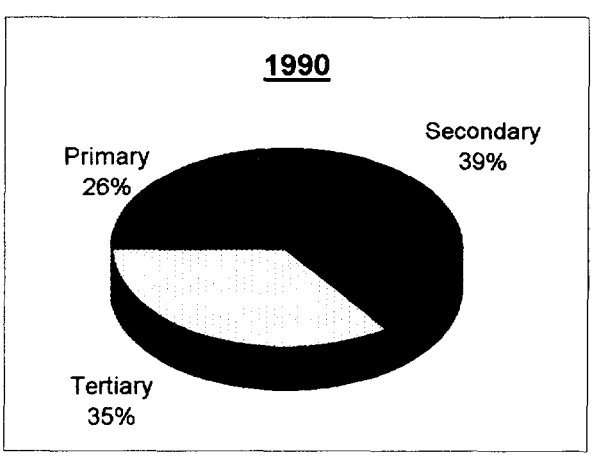
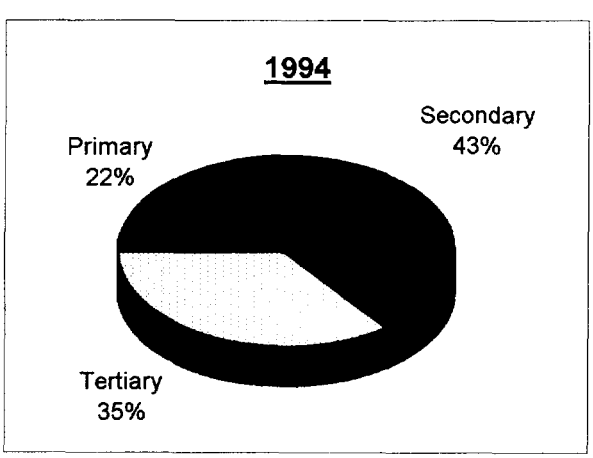



Figure 1.2 Structure of GDP of Shaanxi Province over time (per cent, based on current prices)



The role of the secondary sector (encompassing industry and construction) in the provincial economy expanded strongly until 1978, when it accounted for 52 per cent of provincial GDP. Decreasing to a 39 per cent share by 1990, the sector has again gained in importance since and continues to dominate the economy, largely driven by industry which accounted for over 36 per cent of provincial GDP in 1994 alone. The tertiary sector has shown moderate growth in the 1990s, contributing some 35 per cent to provincial GDP at present, but is likely to expand in the near future. Nowadays, the share of the secondary and tertiary sectors combined is over 78 per cent of regional GDP and by the end of the century it is expected to reach 84 per cent (see Figure 1.2).

Among the services, tourism is a priority in Shaanxi by reason of its varied topography and climate, and especially its rich culture and history. This market is estimated at nearly 500,000 tourists per year, generating an income of over 500 million Yuan. The tourist infrastructure however needs improvement. Growing tourism offers opportunities for the province's industries, such as building materials, processed food and crafts.

## 1.3 Trade

### 1.3.1 International exports

Between 1984 and 1993 Shaanxi enterprises and products increasingly penetrated foreign markets. Shaanxi's average export growth is twice that of China: 30 per cent per year as against 15 per cent for China. But the growth of imports has increased even faster, being more than seven times the average of China. In value terms, however, imports are some 50 per cent below exports so that the province shows a positive international trade balance of goods and non-financial services. Figure 1.3 shows the trend of exports and imports. Among the export products, metals, chemicals, pharmaceuticals and machinery show the highest export growth rates (45-48 per cent annually between 1989 and 1992), while textile and coal exports increased by almost 18 per cent per year. In all cases the figure is higher than the country average. Exports now account for almost 9 per cent of provincial GDP, as against 4 per cent in 1989.

The major export products are textiles (including clothes and silk) with some 29 per cent of the total, followed by machinery and equipment, and non-ferrous metals. Together these three categories of products, as Figure 1.4 shows, account for almost 60 per cent of total exports. Among the products with a high value added, special rolling gears, oxidized molybdenum, magnesium alloys, electronic products and measure instruments stand out. But their volume does not seem very significant in international exports as a whole.

### 1.3.2 International imports

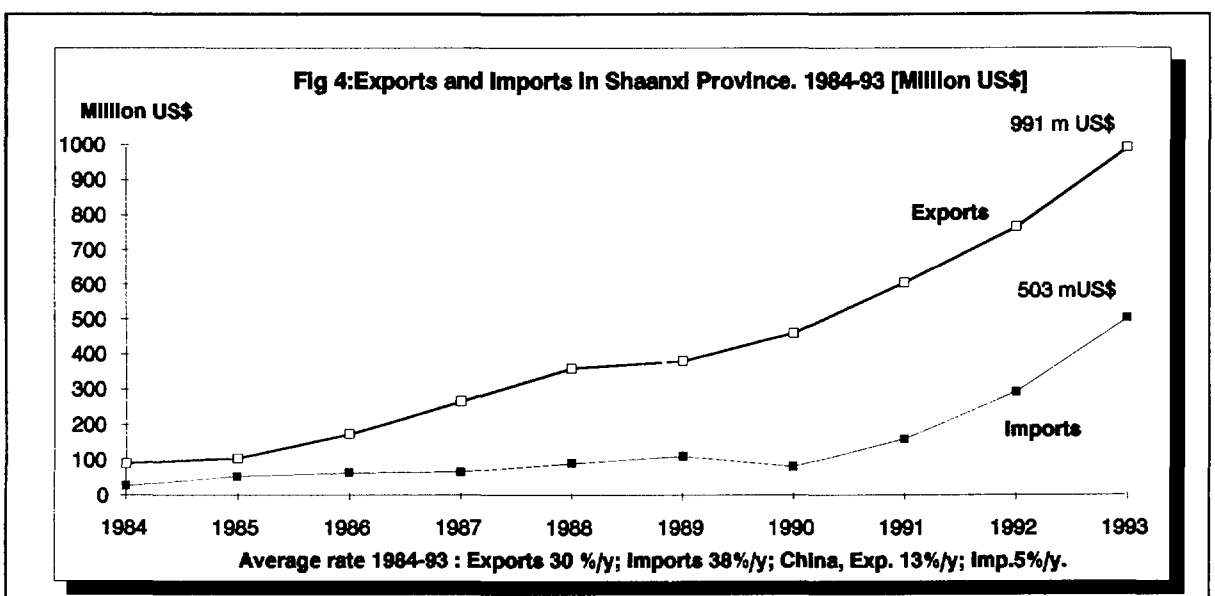
Total 1993 imports amounted to US$ 502.5 million. Most of the imports are high value added products, such as electronic and telecommunication equipment, optical instruments, automobiles and special spare parts. There are also products which could be profitably produced in Shaanxi Province, like aluminum, copper cathodes and wire bars, rolled and waste steel,

synthetic fabrics and cotton. Many of these are provided by producers elsewhere in China, as will be discussed in the next section.

### 1.3.3 Domestic trade

The food, energy and construction materials industries largely rely on local raw material supplies. However, other industries in the province are highly dependent on inputs from elsewhere in China. Exports to other provinces are dominated by manufactures. The main manufactured exports to other provinces include textiles, knitwear and a wide variety of equipment and machinery. In the latter category, Shaanxi has a large trade surplus with other parts of China. Nevertheless, Shaanxi has a trade deficit at the national level which was estimated at 3.4 billion Yuan in 1992. The main item responsible for the deficit was industrial raw materials, followed by chemical products and energy imports. Consumer products such as processed food, cotton, sugar, salt and vegetables also constitute important items.

Figure 1.3 Exports and imports of Shaanxi Province, 1984-1993 (US$ million)




Source: The 1993 Almanac of Shaanxi Statistics (TASS), Xi'an 1994; World Bank Tables, Washington 1994.

Figure 1.4 Shaanxi - Exports of major industrial products, 1993 (per cent)

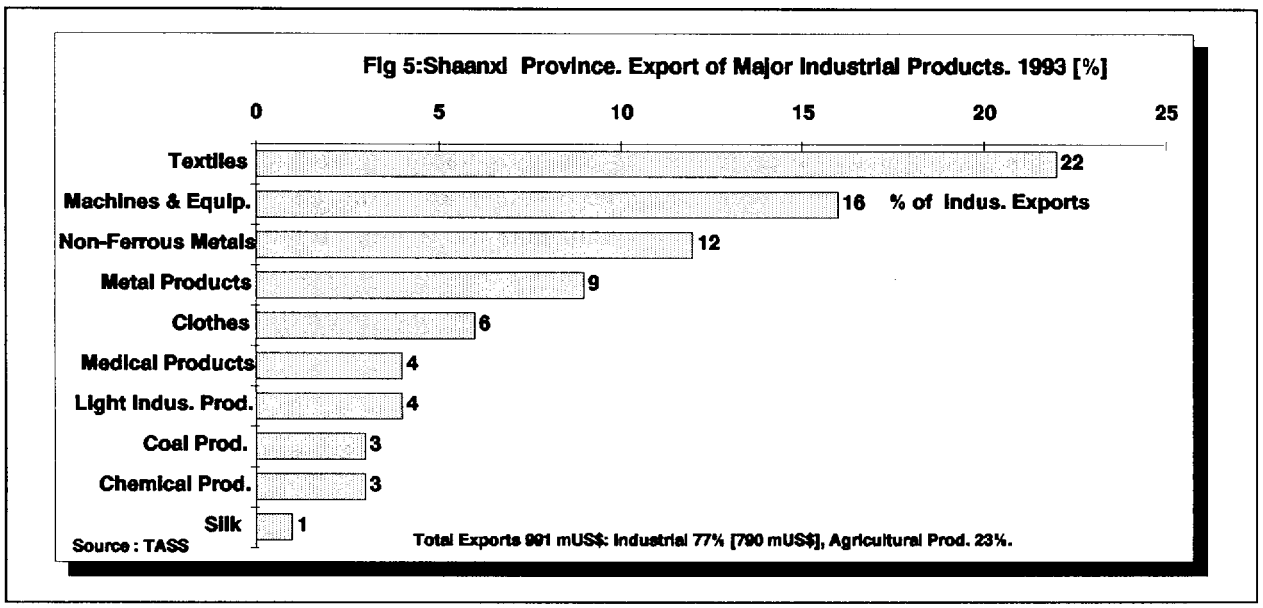
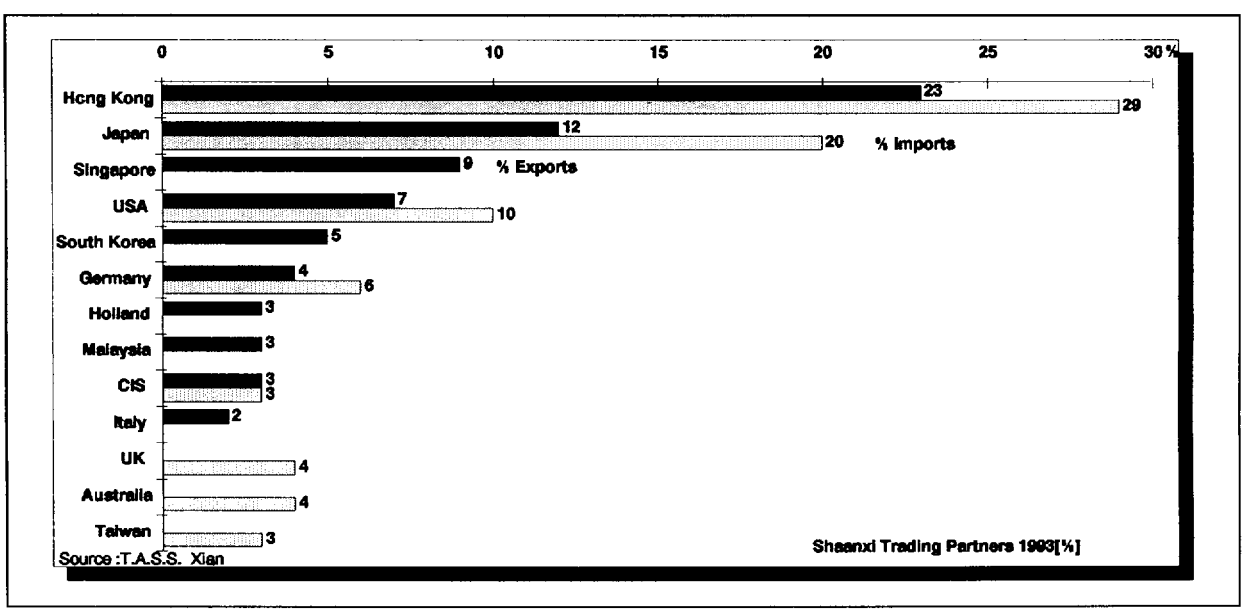



Figure 1.5 Shaanxi's major international trading partners, 1993 (per cent)



### 1.3.4 Trade distortions

In a period when commodity markets are changing rapidly, it is difficult to make generalisations about distortions in commodity markets. Some of these distortions are caused by the existence of a large number of special economic zones; others arise from interventions and regulations of the provincial government or from the foreign trade regime of the central government (export quotas, import restrictions, bureaucratic obstacles). Since the expansion of the role of foreign trade is widely accepted as a goal for Shaanxi, and a sectoral breakdown of the effects of the main foreign trade interventions is available, attention will be focused on these.

The average tariff for manufactures in China is about 32 per cent, and roughly 51 per cent of imports are subject to non-tariff barriers. Behind this average lies a considerable degree of inter-sectoral variation, as Table 1.2 shows.

It is not possible to estimate the relationship between Shaanxi prices and world prices for locally-produced manufactured goods. For some of the industries in which Shaanxi is a strong exporter, for example machinery and textiles, the loss of value added with a move to world prices would be over 100 per cent - if the large aggregate sectors shown in Table 1.2 reflect the same industrial composition in Shaanxi. Also, the province has considerable but unknown levels of natural protection because of transport costs from the coast. Finally, there is evidence of continued inter-provincial protection in commodity markets which has adverse consequences for the efficient distribution of production of commodities.

Meanwhile, a reform process has begun in energy, which implies a very large increase in the price of energy to domestic users. In the case of the main agricultural crops, the reform process aims to achieve internal freedom of trade over the 1990s. This is most important for grain, where the relationship between the internal grain prices and world prices remains uncertain; there are two opposing forces in the Central Government policy debate, one arguing for grain prices to be based on world prices, with the other arguing for continued protection of grain. The outcome of this policy struggle will have important implications for the price of grain received by the province's farmers. Raw material prices which move to levels established in world markets will also have important implications for the province's processing industries.

Table 1.2: Effects of protection on Chinese industry (1991)

| | Nominal Distortion % | Value added Distorted Prices | Value added World Prices | % Change VA Distorted to World Prices |
|---|---|---|---|---|
| Crops | -40 | 247 | 437 | 77 |
| Animal husbandry | -30 | 21 | 21 | 3 |
| Metals | -40 | 30 | 49 | 62 |
| Electricity | 0 | 6 | -34 | -710 |
| Coal | -82 | 14 | 120 | 782 |
| Petroleum Mining | -85 | 44 | 320 | 623 |
| Petroleum Refining | -18 | 10 | -167 | -1710 |
| Chemicals | 0 | 56 | 26 | -53 |
| Machinery | 47 | 52 | -18 | -135 |
| Bldg. Materials | 31 | 16 | -5 | -135 |
| Wood and Pulp | 31 | 7 | -0 | -104 |
| Food Processing | 59 | 15 | -64 | -529 |
| Textiles | 55 | 28 | -18 | -163 |
| Apparel | 90 | 6 | -4 | -165 |
| Paper | 38 | 3 | -5 | -260 |
| Misc. Manufacturing | 45 | 7 | -6 | -194 |
| All Manufacturing | | | | |
| Average tariff | 32 | | | |
| Incidence non-tariff barriers | 51 | | | |

Source: World Bank, China: Foreign Trade Reform, World Bank Country Study, Washington 1994, p. 74.

Note: Normally, effective protection calculations place value added (VA) at world prices in the denominator so that the measure of effective protection is ill conditioned. The measure of the effects of protection used here has VA at distorted prices in the denominator so this problem does not arise. The change in VA shows the per cent change in domestic value added should tariffs be removed.

## 1.4 Foreign direct investment

Foreign direct investment (FDI) approvals have increased enormously during the last few years, jumping from US$ 31 million to US$ 922 million between 1989 and 1993. In total, some US$ 2.49 billion and 1,440 projects were approved during 1983-1993 (see Table 1.3). Of the total amount of signed and approved projects, only a small part has been implemented so far: the total stood at US$ 679 million at the end of 1993. The major investors are enterprises from Hong Kong (70 per cent of total FDI). Other important investors are Taiwan Province of China, the USA (with 7 per cent each) and Japan (6 per cent). Most of the projects are concentrated in the capital of Xi'an; it also accounts for about 40 per cent of the amount of approved investment. The real estate sector and industries such as electronics, textiles, oil, chemicals and machinery account for the bulk of investments. Fully foreign-owned projects are rather uncommon, the majority of foreign investors entering into some form of cooperation with local investors. Although the trend is upward, Shaanxi accounts for only a small share in total FDI in China: 0.4 per cent in 1992 and 0.8 per cent in 1993.

Table 1.3 Foreign direct investment in Shaanxi, 1983-1993 (US$ million)

| Type of Foreign Investment | No. of FDI Approvals | Total Investment | Foreign Investment Component | Actual Foreign Investment Inflows |
|---|---|---|---|---|
| 1. FDI in Shaanxi | 706 | 2,107.9 | 1,286.9 | 369.2 |
| (1) Equity joint ventures | 569 | 1,348.3 | 562.9 | |
| (2) Contractual joint ventures | 78 | 697.7 | 662.1 | |
| (3) Wholly foreign-owned enterprises | 59 | 61.9 | 61.9 | |
| 2. FDI in Xi'an | 734 | 1,895.7 | 1,202.1 | 309.4 |
| (1) Equity joint ventures | 556 | 1,192.9 | 607.0 | |
| (2) Contractual joint ventures | 99 | 598.2 | 490.5 | |
| (3) Wholly foreign-owned enterprises | 79 | 104.6 | 104.6 | |
| 3. Total | 1,440 | 4,003.4 | 2,488.9 | 678.5 |

Source: Shaanxi/UNIDO Project Cooperation Office, Xi'an.

It is estimated that FDI represented close to 10 per cent of GNP of Shaanxi in 1993. All types of FDI together (sino-foreign contractual joint ventures, sino-foreign equity joint ventures, wholly foreign enterprises) account for some 2.4 per cent of industrial output and their exports account for over 4 per cent of the export revenue of the province. A study of a sample of 100 joint ventures showed that 38 per cent are performing well. Most of the badly performing joint

ventures are in the hotel sector. Successful joint ventures which have continuously increased their shares in national as well as international markets include Janssen Pharmaceutical (Belgium) and Xi'an Control Systems (Japan). Although joint ventures only constitute a small part of the enterprises in the province so far, they already have a major impact in the economy through among others the transfer of technology, management methods, information and know how. Industrial investment will be discussed in more detail in Part II.

## 1.5 Cooperation with neighbouring provinces

Various forms of economic cooperation have been established between Shaanxi and other provinces in the region as well as with coastal provinces and cities. In 1988, an economic cooperation committee of the provinces and autonomous regions through which the Huanghe (Yellow River) flows was formally established, the Huanghe Economic Coordination Region. On this committee, apart from Shaanxi, Shandong, Henan, Shanxi, Gansu, Ningxia, Qinghai, Inner Mongolia and Xingjian are represented. Joint committees were set up for a wide variety of industries and five-year and ten-year cooperation plans were drafted. The present status of these plans is not clear. In September 1992, UNIDO sponsored an Investment and Business Forum for Northwest China in Xi'an.

A joint committee involving Shaanxi, Gansu, Ningxia, Qinghai and Xingjiang was set up as well, which among others is exploring the possibilities of enhancing the regional energy-generating and industrial base, of promoting industries based on products which are specific to the region, and of creating industry groups which are based on the region's major enterprises. Such coordination is also taking place among individual areas and cities of the provinces in the region. There were no details on these and the other regional cooperation schemes and therefore it cannot be ascertained whether they are complementary. Finally, the central government is handling a number of infrastructural issues, such as power generation, at the regional level. Details were not available at the time of writing.

## 1.6 The resource base

### 1.6.1 Human resources

Shaanxi has a high percentage of scientists and technicians in its labour force, exceeding the Chinese average by almost 12 per cent (see Table 1.4). However, adult literacy and mean years of schooling are well below the figures for China as a whole, and there is a serious deficit in lower and middle levels of skills. The relatively high percentage of unskilled workers reflects the large agricultural population. Deficient primary education means that a significant part of the labour force is not readily employable in the industrial (or modern services) sector, and this is an obstacle to attempts by policy makers to create new jobs outside agriculture. Modern management and administrative skills are likely to be in short supply as well, although no data on this issue were available. On the positive side, wage levels are only one-fourth to one-half of those in some coastal areas, making Shaanxi attractive for labour-intensive activities.

Data from other developing countries show that good primary and secondary education are key factors of long-term growth. This phenomenon is reflected in higher returns to investment for these levels of education than for tertiary education in developing countries. Thus, neglecting basic skills and literacy puts a brake on long-run growth. In the Ninth Five-Year Plan, graduate education is expected to grow at 4.14 per cent yearly to 2010, only slightly lower than the 4.56 per cent yearly for secondary technical education. This means that there will be a gap between middle and high skill levels well into the next century.

In spite of labour market reforms, there continues to be very little real labour mobility within the province, and there are also obstacles to finding work in other provinces - although many people with good qualifications are migrating to coastal regions (see Section 1.9.2). Labour force reductions in the context of restructuring programmes have so far only affected a fraction of the workforce. Residence transfer remains difficult for "illegal" migrants; skilled workers have difficulty in transferring their dossiers from one official agency to another. There are some public enterprises which force workers who leave their jobs to renounce their houses and pension rights. A balance needs to be struck between the social cost of unemployment and redundancy and the efficiency requirements of enterprises.

Table 1.4 Shaanxi Province - human resources

| 1990 | Shaanxi Province | Deviation from all China (in %) |
|---|---|---|
| Adult literacy ratio, above age of 15 (%) | | |
| Male | 83.2 | -4.1 |
| Female | 65.3 | -3.9 |
| Total | 74.7 | -4.0 |
| Mean Years School | 4.4 | -26.2 |
| Scientists and technicians per 1,000 population | 19.7 | 11.6 |

Source: Statistical Yearbook of Shaanxi Province and China Statistical Yearbook, various issues; Shaanxi Province Statistics Office.

### 1.6.2. Natural resources

#### Agriculture

Although the importance of the primary sector has decreased during the past two decades, it still employs about 60 per cent of the labour force in the province, mainly in agriculture. Shaanxi is rich in agricultural resources: the available surface of arable land per capita is 25 per cent above the Chinese average. But land is not optimally exploited. Figures for output per hectare, fixed assets per farming unit and average rural incomes tend to be below the Chinese

average. A better exploitation of the agricultural potential in the future can help to accelerate the industrial development. Total agricultural production was estimated at 12.7 billion Yuan in 1992. Grain, oil, cotton, tobacco, fruit and goat milk are the major products. Shaanxi is also among the more important producers of high-value raw materials like raw silk, cashmere wool and tung oil.

The rural sector has a large number of town and village enterprises (TVEs). The total is estimated at 700,000, and they employ nearly 3 million people (25 per cent of the rural labour force). TVEs generated a net income of nearly 3 billion Yuan in 1993, on total sales of 37 billion Yuan. TVEs are not only involved in trading or processing agricultural products but also in other industries and commercial activities, transport and construction. They are growing faster than the agricultural sector as such and the provincial economy as a whole. TVEs have shown a strong dynamism in many Chinese provinces and have expanded into international markets. In Shaanxi their role deserves to be strengthened further, as will be discussed in Parts II and III.

Mineral resources

Shaanxi disposes of very rich mineral deposits. The deposits of 28 kinds of minerals are among the top three in the country and 57 are among the top 10. The reserves are very widely scattered. The major deposits include: molybdenum, antimony (stibium), iron, manganese, chromium, nickel, cobalt, copper, lead, zinc, rhenium, gold, silver, vanadium and titanium. The reserves of rhenium are the largest in the country and those of molybdenum and mercury rank second, while gold ranks fifth. Of the 45 minerals classified as key for the industrial development of China, 37 have been found in Shaanxi. There are also large fossil energy resources - these will be discussed in Section 1.8.2 on energy supply.

Figure 1.6 presents a broad estimate of reserves of selected metallic minerals. Iron and manganese are not shown, but the reserves are estimated to be several times higher than zinc. Shaanxi also has important reserves of other industrial minerals, such as sulphur, phosphorus, barite, fluorine, talcum, asbestos, graphite, silicon, turquoise, limestone. Of these, 74 are large and medium size deposits. The reserves of asbestos and barite rank among the top three in China (see Figure 1.7).

The value of the reserves is estimated at 10-30,000 billion Yuan. Not all of these reserves can be exploited economically, but in many cases they remained unexploited for strategic reasons. The country therefore imports raw materials, also because the prices in the international market are lower than the production costs in China. High production costs are often the result of mining investment decisions based on geopolitical rather than economic considerations. Thus, there are provinces with a developed metallurgical infrastructure but with no minerals, and with high transport and energy costs. This has increased the prices of semi-manufactures (reducing their competitiveness) and of the final product, and it is a burden on the central government budget.

With the ongoing economic reform in the country, this situation is changing progressively and a better allocation of investment resources is taking place. The mining industry has strong linkages with the Shaanxi economy, especially with the large metal-based industry. Recent

changes in industrial policy among others encourage the establishment of joint ventures and of mining operations which are large enough to reap the benefits of economies of scale, and cooperation between local governments and enterprises in setting up limited liability or stock companies.

In the near future, four mining areas are expected to start producing:

- Fengxian: lead and zinc;
- Jianchaling: nickel and gold;
- Mianluening: copper;
- Xunyang: mercury, stibium.

In the Northwest, a large titanium-A R&D and production centre is to expand; a major semi-conductive silicon R&D and production centre will also expand. Baoji Electronic Zinc is to increase its capacity to over 100,000 tons per year, and Tongchuan electronic aluminum to 170,000 tons per year.

There could be a considerable potential for other mineral processing activities. The large coal reserves of the province, for example, provide a good raw material base for a coal-based chemical industry. An assessment of other reserves suitable for economically justifiable exploitation (i.e. taking account of costs, demand and competition) should be made, as well as of financial implications and regional and social impacts. Where exploitation is likely to be capital intensive, preference should be given to private enterprises, and generous investment incentives should be made available.

In future exploitation, the involvement of foreign investors is probably important, but involving local communities is also essential. The removal of resources from an area and the threat of environmental damage often result in justifiable local opposition. Long term loans should be made available to involve local communities in the exploitation. Profits and taxes from exploitation should largely be used for further development of the area and be distributed according to the financial participation of the county or region.

### 1.7 Environmental issues

Industry and transport combined are estimated to account for about 70 per cent of all pollution in China. The industrial sector is a large and inefficient user of non-renewable raw materials and an inefficient user of energy: the amount of energy used per unit of output (major products) is about 40 per cent higher than in developed countries. China's Environmental Action Plan for the present decade foresees considerable improvements in waste and effluent treatment as well as recycling.

In Shaanxi, the major environmental problems are related to the exploitation of energy resources, air pollution in the major cities, hazardous industrial waste, river pollution and the

Figure 1.6 Estimated non-ferrous metals reserves in Shaanxi, 1992 (million tons)

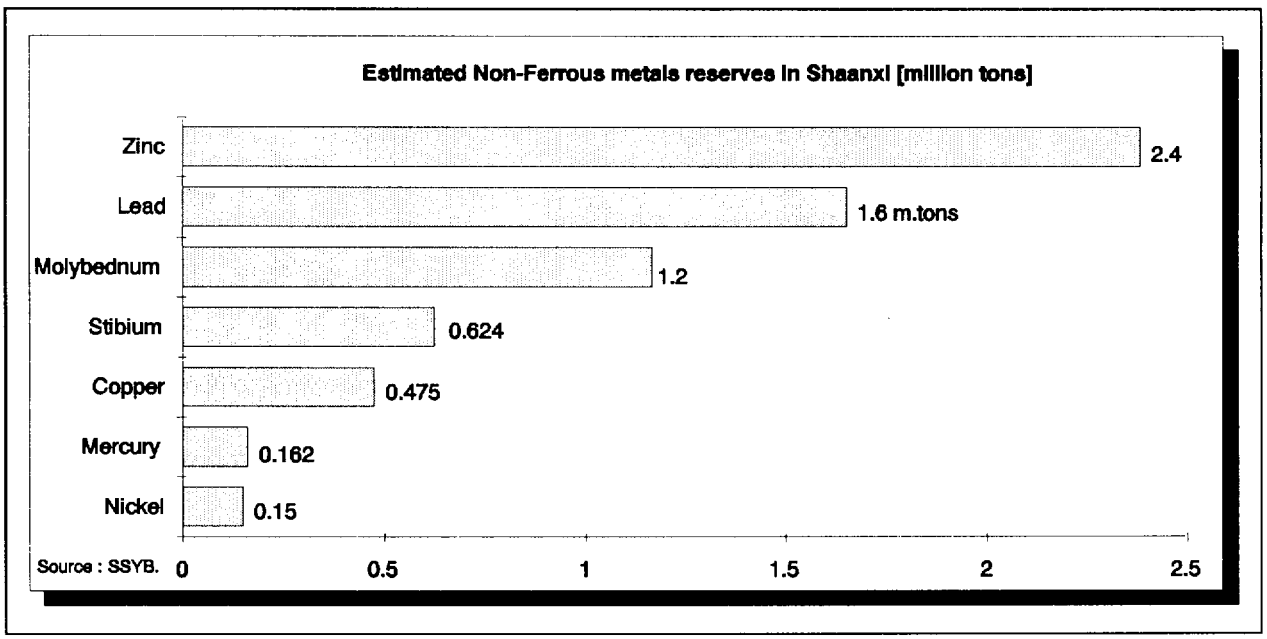
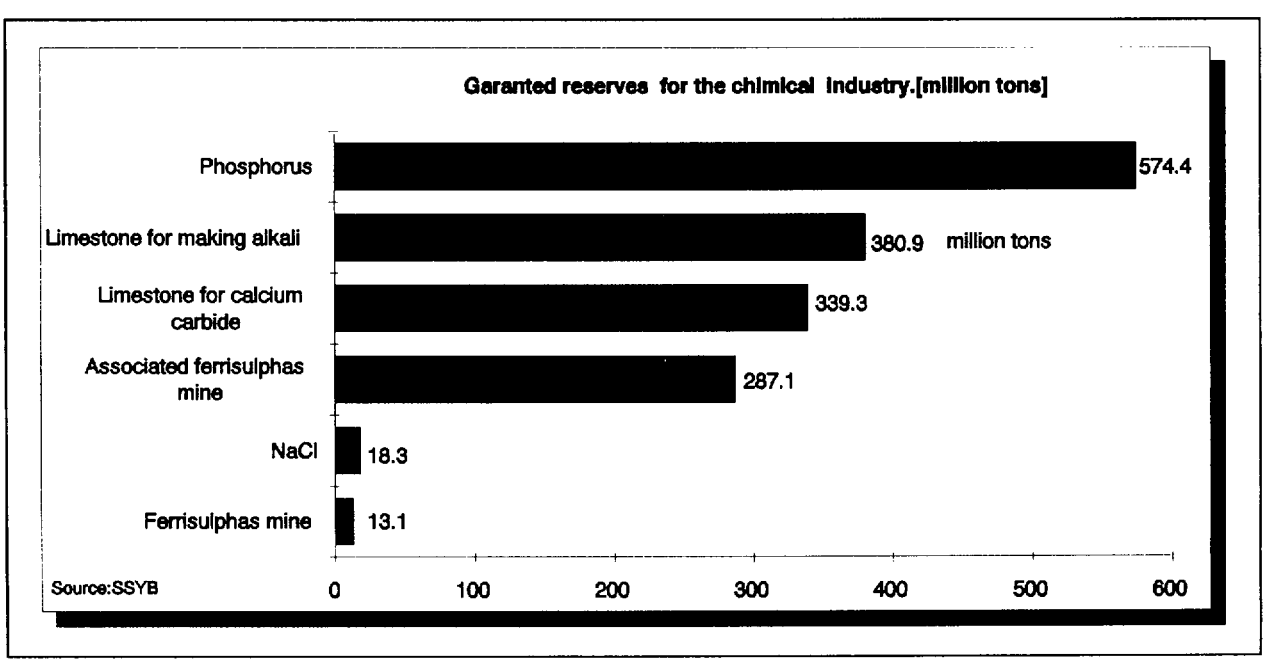



Figure 1.7 Guaranteed reserves of resources for the chemical industry (million tons)



declining biodiversity. Soil protection and the reduction of water and air pollution are environmental policy priorities. For the 1994-1996 period, 15 environmental projects were formulated on the basis of these priorities, which return in 20 mid- and long-term environmental projects, with the preservation of biodiversity as an additional objective.

The present status of these projects is not known, but the available figures suggest that during the past decade the treatment of solid waste, effluents and gases produced by the industrial sector has increased considerably, and that re-use of waste products is profitable. However, environmental protection measures do not seem to be keeping pace with industrial growth. The presence of many heavy industries is likely to compound the seriousness of environmental problems.

Data are available on the most important airborne emissions in Shaanxi; these are presented in Table 1.5. Where possible the amount of the emission is shown as a percentage deviation from the national average or from some standard level of emission. In terms of total suspended substances, the whole of the province is well below all-China levels. However, there are some heavily polluted cities in the province, some of which are shown. In terms of sulphur dioxide emissions, again the provincial level is less than half of the all-China standard. As before, there is considerable deviation around this average, and some of the worst affected cities are shown in the table. For nitrite and oxide emissions, Shaanxi as a whole is well below the relevant national second-class standards.

The table only gives a general idea of the extent of air pollution, and it is not possible to measure the damage inflicted on the basis of the above data. Even the apparently comprehensive data on acid rain are of little help, since data on the damage to forests and crops by acid rain are not available.

On the basis of engineering and cost information for a power station in Sichuan, the Weihe power station near Xi'an reported that the removal of sulphur dioxide to environmentally acceptable levels would increase its capital costs by 40 per cent. This cost could be recovered by a 2 per cent increase in electricity charges. The increased user charges assumed in this case study are mainly borne by industrial sectors which are great users of electricity.

The first column of Table 1.6 shows the cost effect (based on 1987 input/output figures) to electricity users of a 2 per cent increase; the second column ranks the users from high to low cost impact. The figures may not be up-to-date, but they provide an illustration of cost increases. The table reveals that heavy industrial users of electricity such as non-ferrous mining, smelting and processing and chemical fibres would bear the brunt of increased electricity charges. These industries would try to pass on the cost increases to purchasers of their products. As a consequence of capital market distortions (see Section 1.9.1) and politically determined investment priorities, it is unlikely that the industries would invest in pollution abatement. Thus, concentrated producer interest may downplay the importance of clean air, whilst less concentrated individual citizen interest in environmental clean-up may have difficulty in winning the struggle for resources for environmental investments.

Table 1.5 Air quality, Shaanxi Province

| Pollutants | Quantity | Deviation from all-China Average |
|---|---|---|
| Total Suspended Substances | | |
| All China (Second Class Standard) | .3 mg/m$^3$ per day | - |
| All Shaanxi | | |
| Tongchuan | .516 mg/m$^3$ p./d. | + 72% |
| Anking | .961 mg/m$^3$ p./d. | + 220% |
| Yulin | - | + 130% |
| | - | + 150% |
| Sulphur Dioxide (average) | | |
| All China Standard | .06 mg/m$^3$ p./d. | - |
| All Shaanxi | .084 mg/m$^3$ p./d. | + 40% |
| Tongchuan | .250 mg/m$^3$ p./d. | + 320% |
| Yulin | | |
| Ankang | | |
| Shangzhou | In rank order | |
| Yan'an | | |
| Weinan | | |
| Xi'an | | |
| Nitrite and Oxide in Cities | (All less than second class national standards) | |
| Acid Rain | | |
| Average acidity (PH value) | | 5.53 |
| Frequency of acid rain, | | |
| all Shaanxi | | 8.1% |
| Shangzhou | | 25.9% |
| Lueyang | | 21.7% |
| Tongchuan | | 14.9% |
| Xi'an | | 4.2% |
| Weinan | | 2.7% |
| Hanzhong | | 2.5% |

Source: Shaanxi/UNIDO Project Cooperation Office, Collection of Basic Data and Information for the Formulation of Shaanxi Province Industrial Strategy, October 1994.

Table 1.6 Effects of a rise in electricity prices on economic activities (based on 1987 data)

| No. | Economic Sectors/Activities | % Cost Effect [1] in case of 2% Electricity Price Rise | Rank |
|---|---|---|---|
| 1 | Crops | 0.06 | 48 |
| 2 | Forestry | 0.03 | 59 |
| 3 | Livestock Raising | 0.04 | 54 |
| 4 | Other agriculture | 0.11 | 30 |
| 5 | Fishery | 0.06 | 50 |
| 6 | Coal mining | 0.22 | 7 |
| 7 | Coal washing | 0.03 | 57 |
| 8 | Oil extraction | 0.08 | 41 |
| 9 | Natural gas extraction | 0.00 | 62 |
| 10 | Ferrous metal mining | 0.18 | 13 |
| 11 | Non-ferrous metal mining | 0.31 | 4 |
| 12 | Non-metal mining | 0.15 | 17 |
| 13 | Salt mining | 0.05 | 51 |
| 14 | Timber and bamboo | 0.04 | 55 |
| 15 | Water | 0.55 | 2 |
| 16 | Food processing | 0.09 | 39 |
| 17 | Beverages | 0.08 | 42 |
| 18 | Tobacco | 0.04 | 52 |
| 19 | Feed processing | 0.08 | 44 |
| 20 | Textiles | 0.13 | 24 |
| 21 | Sewing | 0.13 | 25 |
| 22 | Leather and fur | 0.11 | 31 |
| 23 | Timber processing | 0.15 | 18 |
| 24 | Furniture and wood products | 0.12 | 28 |
| 25 | Paper and paper products | 0.20 | 8 |
| 26 | Printing | 0.13 | 26 |
| 27 | Education and arts production | 0.10 | 34 |
| 28 | Electric power and hot water | 2.07 | 1 |
| 29 | Oil refining | 0.09 | 40 |
| 30 | Coking, gas and by-products | 0.15 | 16 |
| 31 | Chemicals | 0.28 | 5 |

| | | | |
|---|---|---|---|
| 32 | Medicine | 0.16 | 14 |
| 33 | Chemical fibres | 0.23 | 6 |
| 34 | Rubber products | 0.14 | 23 |
| 35 | Plastic products | 0.20 | 12 |
| 36 | Other non-metal products | 0.20 | 11 |
| 37 | Ferrous smelting process | 0.20 | 10 |
| 38 | Non-ferrous smelting process | 0.33 | 3 |
| 39 | Metal products | 0.16 | 15 |
| 40 | Machinery | 0.14 | 20 |
| 41 | Transport equipment | 0.14 | 22 |
| 42 | Electrical machinery | 0.14 | 19 |
| 43 | Electronic equipment | 0.12 | 29 |
| 44 | Instruments | 0.10 | 35 |
| 45 | Machinery repair | 0.14 | 21 |
| 46 | Consumer products | 0.09 | 38 |
| 47 | Construction | 0.10 | 33 |
| 48 | Vehicle transport | 0.09 | 37 |
| 49 | Communication | 0.06 | 49 |
| 50 | Domestic commerce | 0.04 | 53 |
| 51 | Foreign trade | 0.01 | 61 |
| 52 | Materials supply | 0.03 | 56 |
| 53 | Catering | 0.08 | 43 |
| 54 | Passenger transport | 0.10 | 32 |
| 55 | Real estate | 0.03 | 58 |
| 56 | Public utilities | 0.20 | 9 |
| 57 | Residents services | 0.07 | 46 |
| 58 | Health, sport, social welfare | 0.13 | 27 |
| 59 | Education, culture | 0.06 | 47 |
| 60 | Research, technical services | 0.10 | 36 |
| 61 | Finance, insurance | 0.02 | 60 |
| 62 | Administration | 0.08 | 45 |

(1) % effect of electricity price rise based on the electricity row of the Leontief inverse increased by 2 per cent.

Source: Based on Shaanxi Province Input/Output Tables 1987.

## 1.8 Physical infrastructure

### 1.8.1 Introduction

Although infrastructural capacities are to be expanded significantly in the next 5-10 years, bottlenecks will be unavoidable in Shaanxi. To meet the huge investment needs, the central government has permitted increased participation of foreign companies. It is estimated that the share of foreign investment in national infrastructure expenditure rose from 2-3 per cent in 1982 to 10-15 per cent between 1990-92. This trend is expected to continue, also in Shaanxi. Joint ventures, build-operate-transfer (BOT) schemes and subcontracting are the main forms in which foreign participation is expected to increase. Decentralisation of decision-making to the provincial level is to speed up the provision of infrastructure. Table 1.7 shows the major infrastructural investment projects. Some energy sector projects are included in Table 2.7. In late 1994, the provincial authorities announced another series of infrastructural projects, which are to be executed in cooperation with foreign investors. The most important among these were road and railway construction and energy generation projects.

Infrastructure may also include common marketing, accounting or design services of, for example, small and medium-scale enterprises (SMEs). A local or provincial government could provide minimal 'seed' money and 'seed' ideas and 'seed' organisations to help realise the economies of clustering. Firms may also do this themselves where the provision of basic infrastructure produced the clustering. In so far as this dynamic approach to the provision of infrastructure was found in Shaanxi, it tended to relate to the needs of large scale basic and "pillar" industries (these concepts will be explained in Section 2.5), and not to smaller scale non-basic industries. For example, in Xianyan, rationing of electricity during recent power cuts favoured large rather than small producers. When basic and pillar industries are economically inefficient, the tailoring of infrastructure to their needs compounds the inefficient allocation of investment resources.

### 1.8.2 Energy resources

Shaanxi is richly endowed with energy resources and their quality is very high. The total amount of reserves is estimated at 900 billion tons of coal (82 years of China's production in 1992, ranking third in the country), about 350-600 million tons of oil and 2000 billion cubic meters of natural gas (127 years of China's production, ranking second countrywide). Coal production capacity is estimated at 40 million tons and actual production at 34 million tons. The energy sector (exploitation of energy resources as well as energy generation) is composed of 860 enterprises producing nearly 9 per cent of the industrial output and employing about 250,000-270,000 people.

The prospects of the industry are favourable, due to the quality, variety and volume of the reserves. Given the potential and the expected investments, northern Shaanxi is likely to become the most important energy base in China. Investment in the Shenfu coal field - the world's largest - has so far totalled over 4 billion Yuan, and the output has reached 10 million tons a year. The

Jingbian gas field is being prepared for exploitation, and its output is estimated to be 3 billion cu.m./year for the first phase. There is a gas pipeline from Jingbian to Yulin and gas pipelines from Jingbian to Beijing, Xi'an and Yinchuan (Ningxia) are to be built in 1996-98. Oil production is expected to increase from 1.2 million tons currently to 3 million tons in the next five years. Coal production will rise from 34 million tons now to 80 million tons by the end of the decade, of which about 37 million tons will be sold outside the province. The construction of several thermal power stations and gas pipelines (as well as a large chemical plant and roads and railways) are planned in the north of the province, which is richest in energy resources.

Table 1.7 Investment in infrastructural projects, Shaanxi Province, 1994

| Project | Scale | Million Yuan |
|---|---|---|
| Xi'an-Baoji first class road | Length: 145.7 km | 1169.41 |
| Yulin-Shenmu railway | Length: 137 km | 550 |
| Baoji-Zhongwei railway | Total length: 500 km of which 115 km in Shaanxi | 4258.05 |
| Water supply for Dingbian | Flow capacity: 2 cubic m/sec. Irrigating: 69000 mu | 160.81 |
| Xi'an diversion works | Supply: 1.1 million tons/day Length of Channel: 102 km | 1530 |
| Water supply for Tongchuan city | Supply: 31000-41000 tons | 118.73 |
| Optical fibre project of Xi'an-Lanzhou (in Shaanxi Province) | Total length: 3200 km, of which 293 km in Shaanxi prov. | 92.74 |
| Optical fibre project Beijing-Taiyuan-Xi'an | Total length: 1775 km, of which 290 km in Shaanxi | 60.2 |
| Lingtong-Weinan highway | Length: 40.5 km | 50 |
| Xi'an-Ankang railway | Length: 244 km | 5100 |
| Natural gas pipeline from Jingbian to Xi'an and utilization of natural gas in Xi'an | Length: 480 km | 584.17 |
| Tongchuan-Huangling first class road | Length: 71 km | 800 |

Source: Shaanxi-UNIDO Project Cooperation Office, Xi'an.

Transport/distribution of energy (resources) is one of the major problems. Environmental considerations are nowadays affecting investment decisions in the energy sector as well. Energy demand will increase in the coming years, and Shaanxi enterprises could increase their shares in

the market if the required investments are made. The provincial government and local enterprises, however, are unable to pay for the large scale construction required and foreign investment for this purpose is low. Additional investment may come from the central government, other provinces and individuals. A more attractive investment policy could mobilize more private investment.

### 1.8.3 Transportation

The transport sector has developed strongly during the last few years, but not sufficiently to satisfy the needs of the population, enterprises, exporters and importers. Railway cargo allocations to joint ventures are too low, which discourages international trade, and there is a need to introduce more competitive and regular cargo flights from Xi'an airport to major centres of economic activity in East Asia, by-passing the congested airports of Beijing and Tianjin.

There are 11 railways in the province with a length of about 2,000 km. One of the most important is the line that crosses the province and links the east coast seaport of Lianyungang to the Northwest, the Central Asian countries, Russia and Western Europe (Rotterdam). With the development of a coal field in the north of the country, a railway will be built to link the province with the Qinhuangdao seaport in Hebei province. The Baoji-Zhongwei (500 km) railway will also be developed and will link Shaanxi to the Ningxia Hui Autonomous region.

The road network has a length of over 38,000 km of which 136 km are expressways, 1,200 km second-grade highways and 10,300 km third-grade highways. Because of the increasing use of cars and the increasing production of agricultural and mineral resources, the network is to be expanded. It is expected to reach nearly 42,000 km by the year 2000. Basically each county, town and city is to be connected by expressways and second class highways. Civil aviation, especially cargo, is also to be expanded in the coming years.

### 1.8.4 Telecommunications

The telecommunication infrastructure has improved during the last decade, and has been extended to 86 per cent of the townships and 77 counties. It is now possible to dial directly to all major and middle cities in China and to over 100 countries. In recent years, the number of subscribers has increased by 19.4 per cent annually, and long distance calls by 39 per cent annually. But the network is still below national or international standards. There are 1.2-1.5 telephone lines per 100 persons in the province as against 1.4-1.8 in all of China, 7.3 in Malaysia, 38 in Hong Kong, 45 in Japan and over 70 in Sweden. During 1996-2000 major investments will be made, with the involvement of foreign companies. The average number of telephones by 100 persons is expected to increase to 6 (almost 1 in rural areas, 20-35 in urban areas). These are ambitious targets, and much will depend on the investment conditions for foreign telecommunications companies and the investment proposals made by the Telecommunication Bank which has recently been established in the province.

## 1.9 Support services

### 1.9.1 Financial infrastructure

In August 1994, the financial infrastructure of Shaanxi was composed of 4460 banks (including branch offices) and 4997 other institutions, the vast majority of them rural credit unions. The number of foreign banks operating in China, and therefore in Shaanxi, is still limited. The main banks are the Industrial and Commercial Bank of China, whose customers, apart from enterprises, are urban residents; and the Agricultural Bank of China which serves rural areas. Total assets of all the institutions amounted to 111.3 billion Yuan; the total sum of deposits was 77.9 billion Yuan, the total of loans 86.5 billion Yuan.

A major characteristic of the present capital market is 'financial repression': excess demand for bank loans at the going rate of interest and inter-provincial taxation differences created mainly by special zones prevent the equalisation of the real returns to investment in different locations. The very limited capital market mobility does not help to improve economic efficiency. These inefficiencies are further exacerbated by the presence of non-transparent rationing arrangements for loans and multiple interest rates. For example, loans for basic and pillar industries are given at around 8-9 per cent whilst for non-priority sectors the loan rates are over 50 per cent or higher. Some evidence was found for even higher rates of interest from institutions outside the banking sector. For banking loans, borrowers enjoy substantial negative interest rates with current inflation running at over 20 per cent.

The presence of financial repression does not necessarily mean that the capital markets are developmentally inefficient. Indeed it has been argued that financial repression in a number of East Asian countries has had beneficial effects when not carried to extremes which affect the supply of savings. It is not clear to what extent this is true in Shaanxi. If, as will be argued in Section 2.5, Shaanxi's present industrial structure does not realise the comparative advantage of the province in trade, then the mechanism of credit allocation must have played a substantial role in causing this, together with the differential inter-provincial rates of taxation on profit. The evidence for Shaanxi does suggest that credit is not allocated to industries with the highest marginal rates of return - witness the starving of the town and village enterprises (TVEs) of capital funds.

In 1994 initial steps were taken to reform the banking and foreign exchange system. The People's Bank of China (PBC - the central bank) has established a credit monitoring system, and tighter supervision over the asset/debt ratios of specialized banks will put pressure on the latter to operate in an effective way. The long-term goal is to turn the specialized banks into true commercial banks. The PCB is to concern itself with monetary policy rather than with the provision of funds. Allocation of loans for political rather than sound economic reasons is to cease. The dual exchange rates of the Renminbi (Yuan) were unified and a unified inter-bank foreign exchange market was established. A number of restrictions on the use of foreign exchange by domestic enterprises were lifted; they were to be abolished altogether in 1995.

### 1.9.2 Other support services

Details on support services are very limited, but in terms of human resources the potential for R&D, consultancy services, etc., would seem to be considerable - if properly organized, Shaanxi could even export such services nationwide. Shaanxi has 47 colleges and universities and 502 research institutes, many of which have relations with industry. Fragmentation of research would seem to be a problem, with so many separate research institutes. Much of the most advanced research is connected with the defence industries. There were 24 defence technology research establishments in 1993, and 80,000 research personnel (all levels) in the industry. This research capacity is underutilized, and while it is a potentially important source of innovation for civilian products, R&D would have to be reorganized and redirected. Another problem is the growing gap of salaries between the inland and the coastal provinces, causing "brain drain" in recent years. It is estimated that between 1990 and 1993 about 40,000 professionals and technicians from the Northwest provinces moved to coastal areas. If no adequate measures are taken, this will seriously affect the competitive position of local industry.

## 1.10 International trends in Shaanxi

### 1.10.1 Technologies and information

During the last 15 years an explosion of new technologies and information flows has taken place. This is affecting methods of production, management, ways of thinking and behaviour. The life of products has become shorter and the return on investments has been accelerated by means of the economies on a scale that can be generated at the global level. To reduce the energy and raw materials cost, products have become smaller, thinner, lighter, more resistant and cheaper. In a market with high competition the enterprises are anticipating customers' needs constantly. Although prices are important, the customers give more and more priority to quality and reliability of products, especially in high tech industries. Quality, reliability and delivery, among others, are now all included in the price package.

This wave of innovation and new products has touched only a few segments of the Shaanxi industrial network, probably less than 10-20 per cent of major enterprises. Most of them are still working with equipment and machinery introduced 20-30 years ago, and some with technologies of the 1930-1950s. Thus they continue to produce outdated products with outdated production and management methods. This situation does not only affect the enterprises but also the government budget as it must cover the unsold production and the losses of government-owned firms.

To modernize, Shaanxi's industries must not only invest in new equipment but also in information and R&D, which have been the key elements in the development of new products and technologies. Investment in information is of crucial importance to keep abreast of developments in the global market. Today, enterprises in the more advanced countries are linked through on-line computer systems to all corners of the world for this purpose, allowing them to produce tailor-made products and deliver them on time. The introduction of information systems

has also facilitated the decentralisation of economic decisions of large corporations and increased the effectiveness of resource allocation, as enterprise units are now able to respond more quickly to the market. Continuous upgrading of staff skills is also essential in this context.

### 1.10.2 The globalization of economic activity

During the past decade or two economic activity and international trade have increased strongly outside traditional industrial areas and local economies have become a part of an open global market. This market favours the worldwide transfer of technologies, financial resources, information and worldwide economies of scale. It has also created the conditions for the growth of transnational enterprises. But small and medium-scale enterprises (SMEs) too have become more internationally oriented and strengthened their positions in specific market niches.

On the demand side the changes have produced an improvement in investment conditions and today most of the countries, regions or provinces are competing to attract potential foreign and national investors. As a result, investment codes have become more interesting and attractive. At the same time governments have changed their role from being active economic agents to providing guidance to and enabling economic activity and investments.

The internationalisation of economic activity has been stimulated by reductions of tariff and non-tariff barriers in most countries. In less than 20 years tariffs have decreased from 20-40 per cent in industrial countries to less than 5-10 per cent; in developing countries such as the Republic of Korea, Malaysia, Mexico, Chile, Argentina and Brazil tariffs have been lowered from 40-70 per cent to 10-20 per cent. The reductions will continue, thereby further stimulating investment and trade. According to a study by the World Bank, a reduction of 50 per cent of existing tariffs in USA, Europe and Japan, could lead to an increase of China's exports by about 38 per cent. China could also increase its income by 4 per cent if all Asian countries cut their tariffs by 50 per cent and if foreign investment rules would be non-discriminatory.

Shaanxi can reap great benefits from the liberalisation of world trade and investment. But this means that China, which has become a large exporter and importer, must abolish trade tariffs that are too high under the current market conditions. A reduction of trade tariffs and barriers will benefit national consumers paying high prices for low quality local products, will help to reduce inflation and will force local producers to become more efficient, innovative and consumer-oriented.

Current weighted tariffs are shown in Table 1.8. On average they are estimated at 30-40 per cent for industrial products, with much higher tariffs for many consumer goods (well over 100 per cent for tobacco products, for example). China has promised to cut the average tariff rate by 33 per cent in the first five years after joining GATT (the reduction for all developing countries is 50 per cent), to reduce the number of goods under non-tariff restrictions from 1,200 to 200, and to realize full conversion of its currency by the year 2000. Specific tariffs on crude and processed oil and chemical products will be cut in the near future. Tariffs on steel products have already gone down, but with 18-50 per cent remain high: Licenses and quota are being

phased out. In the near future many enterprises (for example in Shaanxi's electronics industry) will therefore face stronger competition.

In the case of Shaanxi a reduction of tariffs and barriers will probably accelerate the restructuring and conversion of loss-making enterprises and of those enjoying a quasi-monopoly. The first to be affected will probably be the 171 public enterprises that run a deficit and are a burden on the government budget, and 443 other public enterprises which are in a precarious financial situation (see Section 2.3.1). Enterprises in the agricultural sector will also be affected as some imports are allowed, and as subsidies on certain export products and other farm products are reduced.

Table 1.8: Weighted tariffs for selected products in China

| HS* | Products | Tariff (%) |
|---|---|---|
| 23 | Tobacco and manufactured substitutes | 143.4 |
| 33 | Essential oils and resinoids | 98.7 |
| 43 | Fur skin and artificial fur | 95.6 |
| 61 | Art. of apparel & clothing access. knitted/ crocheted | 93.9 |
| 62 | Art. of apparel & cloth. access. not knitted/crocheted | 81 |
| 58 | Special woven fabric, tufled textile fab. lace, tapestries | 80 |
| 63 | Other made up textile articles, sets, worn cloth, etc. | 79.5 |
| 42 | Articles of leather | 78.2 |
| 87 | Vehicles o/t railway/tramway roll stock, parts & accessories | 77.8 |
| 50 | Silk | 59 |
| 91 | Clocks and watches and parts thereof | 57.6 |
| 83 | Miscellaneous articles of base metals | 57.3 |
| 37 | Photographic and cinematographic goods | 53.2 |
| 29 | Pharmaceutical products | 41.9 |
| 80 | Tin and articles thereof | 36.6 |
| 85 | Electrical machinery equipment, parts, sound recorders | 30.6 |
| 90 | Optical, photo, cine, measurements checking, precision, etc. | 26.1 |
| 76 | Aluminium and articles thereof | 25.7 |
| 78 | Lead and articles thereof | 23.1 |
| 73 | Articles of iron and steel | 19.5 |

* Harmonized System
Source: World Bank, China: Foreign Trade Reform, Washington 1994.

The changes are of great importance for the steel and non-ferrous metal industries. Shaanxi is a net exporter of some steel products. The demand for steel in the national market is expected to reach about 12 million tons per year during 1995-2000. Producers of titanium and molybdenum super alloys could also benefit from increased demand. While this will stimulate Shaanxi enterprises, trade liberalisation will lead to increased competition from international suppliers, affecting less competitive producers in the province. The steel industry in particular must increase its productivity and reduce prices to keep or increase market shares.

### 1.10.3 Financial development and innovations

The globalization of the market has facilitated the internationalisation and innovation of financial operations. Three currencies - the US dollar, the Deutschmark and the Yen - are the most traded currencies currently and each has its own area of influence. In Asia, it is estimated that about 15-25 per cent of trade is made in Yen, against almost zero in the early 1980s. At the same time US$ reserves in the Central Banks have decreased from over 80 per cent in the late 1970s to 60 per cent today, while DM reserves have passed from about 5 per cent to nearly 18 per cent and Yen from 1 per cent to over 10 per cent.

The strengthening Yen, DM and other European currencies, together with the internationalisation of production and investment, has facilitated the emerging of new financial products for short and long term investments. These include currency swaps, caps, floors, debt-equity swaps, commodity bonds and others. Most of these products are used by blue chip companies, exporters and importers, fund management companies and commercial banks. The propriety of these products is to reduce the fluctuation of currencies, the risk of the investment and to extend the possibilities of additional profits. To our knowledge only very few of these products have been used in China and none are used in Shaanxi.

Banks, municipalities, and enterprises from developing countries are increasingly active in the financial market, particularly in equity and bond markets. The latter dispose of wide range of products to finance different types of industrial activities. Various types of bonds are used in the Asian market, and recently the China International Trust and Investment Corporation (CITIC) has issued US$ 200 million of Yankee bonds in the USA to finance the activities of the China National Offshore Oil Corporation. The Jiaotong Bank of China in Shanghai has also launched a Samurai bond (Yen denominated and floated by foreigners) in Japan to finance key projects in the region. BOT financing has also increased in the Asian market to finance infrastructure works.

Shaanxi has not yet used these instruments to finance its industrial infrastructure or energy projects. Given the development of the market, the province will have to use them sooner than later. To that end it must create appropriate conditions to attract investors and financial institutions. Huge amounts of capital are circulating and looking for promising projects. Shaanxi can attract investors by uncomplicated money transfer procedures, a sound and favourable legal and regulatory environment, transparency of business procedures and strong, reliable local partners.

## 1.11 The overall outlook for Shaanxi

The strong growth of exports, imports and foreign investments during recent years has increased optimism among industrialists and policy-makers in Shaanxi. But many problems still confront the economy. Because China's growth and inflation rates are too high, the central government may soon implement restrictive measures. Access to credit will then become more difficult, production will decrease and competition for market shares (or credit) among enterprises will increase. Shaanxi is not really ready to meet the ensuing challenges. It is safe to predict that strong competition cannot be handled, given the quality of output and the overall situation of enterprises. Therefore foreign investment is urgently needed to speed up adjustment to the new business environment and to improve national and international competitiveness.

More specific problems which Shaanxi's enterprises encounter in their endeavour to increase their share in the international markets include:

- A lack of sales/trade agents and representatives in the main potential markets;
- A lack of adequate market information, i.e. demand, prices, technical standards, environmental requirements, new market segments and niches;
- Weak producer-client relations, making it difficult to catch up with changing customer needs;
- A low degree of trade diversification (only five countries or areas account for most of Shaanxi's trade);
- Little experience in international trade and finance;
- The channelling of most trade through the Foreign Trade Corporations, which in many cases have no direct links with exporters and sell a wide range of similar, competing products from different national producers;
- Weak quality control for a number of import and export products;
- A provincial transport infrastructure which remains weak in many respects;
- Lack of long-term credit, which is largely reserved for target sectors and enterprises.

Besides these, there are administrative obstacles to more dynamic export activities. Several products are protected by high tariff barriers, as shown in Table 1.8; others are subject to quantitative restrictions or are altogether banned from being exported or imported. Foreign exchange remains strictly controlled. But the situation has improved in recent years, and there are good prospects for further improvement if China maintains good relations with ASEAN countries and the newly established World Trade Organisation. Shaanxi has a number of advantages which can be better exploited than in the past, if the right environment is created: a strategic location, a good mineral resource base, cheap labour, low-cost business premises (as compared to coastal provinces) and some advanced industries with good technical and scientific staff.

# PART II. INDUSTRIAL SITUATION, PROBLEMS AND PERSPECTIVES

This part first presents an overview of the industrial sector in Shaanxi, including a brief analysis of selected sub-sectors, the structure of ownership in the sector and investment. This is followed by a discussion of various factors related to industrial performance. A discussion of the measures adopted to accelerate economic development concludes Part II.

## 2.1 Major characteristics of the industrial sector in Shaanxi Province

The industrial sector accounted for 36 per cent of provincial GDP in 1994. In total, there were over 282,000 industrial enterprises (see Table 2.1). The great majority of these are privately-owned small rural enterprises, but industrial output is dominated by large public enterprises. Machine building, transport equipment, electronics and textiles are the major industries. Together, they accounted for over 40 per cent of the sector's total which reached almost 79 billion Yuan in 1994.

Gross industrial output has increased five times since 1985 in nominal terms and more than three times in real terms. As shown in table 2.1, the most rapid growers, in spite of their modest contribution to industrial output, were the TVEs. During the 1985-93 period, their output grew six-fold. The table further reveals that for most of the past output in large-scale and heavy industries grew more rapidly than in the smaller and light industries. However, in 1993 (and probably also since then) the small industries' growth exceeded the larger businesses' performance by a considerable margin, possibly an indication of the rising impact of TVEs on total output in this industrial segment.

A comparison of Shaanxi's industrial sector with that of China as a whole and with other provinces reveals that industrial production is heavily concentrated in the Northeast (e.g. Liaoning) and in the coastal provinces (e.g. Jiangsu, Guangdong). Shaanxi only accounted for 1.2 per cent of China's light industry output and for 1.8 per cent of heavy industry output in 1993; on the basis of its share in the Chinese population, the overall share for industry should have been about 3 per cent. In many of the coastal provinces, non-government owned enterprises now account for the larger part of industrial output; the average for China is 62.3 per cent. In Shaanxi, government-owned enterprises still accounted for nearly three-fifths of industrial output in 1994.

The modest role of Shaanxi's industrial sector in China's total industrial output notwithstanding, several of its industries are among the first in the country, as in the case of colour TV tubes (ranking no. 1), molybdenum oxides, precision machine tools, refrigerators, testing equipment, TV sets and clothes. Shaanxi also has the most important industrial sector in Northwest China. Gansu, Qinghai, Ningxia and Xinjiang combined only have a marginally higher light industry output than Shaanxi and Shaanxi accounts for 40 per cent of heavy industry output in the region. And while non-government industrial enterprise has made less progress in Shaanxi than, for example, the coastal provinces, it is far better represented in Shaanxi than in any of the other four provinces of the Northwest. The regional distribution of industrial investment within

Table 2.1 Shaanxi - number of industrial firms and gross industrial output, 1981-1994

| | 1981 | 1985 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|---|---|
| 1. Total number of industrial enterprises | 12,678 | 122,203 | 223,012 | 232,273 | 237,110 | 248,063 | 282,744 |
| (1) State-owned | 2,416 | 2,440 | 2,645 | 2,676 | 2,661 | 2,757 | 2,824 |
| (2) Collective-owned | 7,505 | 9,017 | 9,948 | 9,871 | 9,880 | 10,041 | 10,144 |
| of which township enterprises | 4,605 | 5,354 | 5,818 | 5,884 | 6,087 | 5,628 | n.a. |
| (3) Private enterprises | | 80,810 | 184,573 | 193,529 | 198,884 | 207,393 | 236,096 |
| Urban | 2,749 | 5,877 | 11,523 | 9,540 | 9,725 | 13,254 | 17,567 |
| Rural | | 74,933 | 173,050 | 183,989 | 189,159 | 194,139 | 218,529 |
| 2. Gross industrial output (billion Yuan, current prices) | 10.864 | 19.208 | 44.258 | 50.881 | 59.954 | 79.378 | 100.976 |
| (1) By type of ownership | | | | | | | |
| State-owned | 9.122 | 14.569 | 30.417 | 34.864 | 39.602 | 48.397 | 58.507 |
| Collective-owned | 1.352 | 2.749 | 6.182 | 6.933 | 8.044 | 10.687 | 13.861 |
| Township enterprises | 0.323 | 0.728 | 2.112 | 2.478 | 3.314 | 4.333 | n.a. |
| (2) By type of industry | | | | | | | |
| Light industry | 5.925 | 8.010 | 18.802 | 21.441 | 23.985 | 28.103 | 37,076 |
| Heavy industry | 4.939 | 11.108 | 25.456 | 29.440 | 35.969 | 51.275 | 63,908 |
| (3) By size of enterprises | | | | | | | |
| Large-scale | | 6.765 | 14.806 | 18.351 | 22.444 | 28.920 | n.a. |
| Medium | | 3.269 | 6.233 | 6.958 | 8.171 | 9.035 | n.a. |
| Small-scale | | 9.174 | 23.219 | 22.572 | 29.339 | 40.523 | n.a. |

Notes: 1) Industrial enterprises at township level and above only.
2) Figures do not add up to total in source.
Source: Shaanxi/UNIDO Project Cooperation Office; 1994 figures: Statistical Yearbook of Shaanxi 1995.

the province is shown in Table 2.2. The key role of Central Shaanxi, and in particular of Xi'an, is very clear. Although the region has become somewhat less important since 1989, it still accounted for almost three-fourths of invested capital in 1992. Within Central Shaanxi, the weight of Xi'an has decreased slightly: the capital accounted for 78 per cent of invested capital in 1989, and 74 per cent in 1992. Capital investment in the region grew most rapidly in Xianyang. Southern Shaanxi has in recent years expanded its share in industrial investments; that of the Northern region has fluctuated around nine per cent.

Structural change in industry is shown in Table 2.3. The data show growth in nominal terms only, and the table contains several errors. Therefore longer-term growth trends calculated on the basis of this table are only indicative. Total industrial output grew 4.5 times during 1985-1994, and displayed a doubling between 1990 and 1994. Among the largest industries, electronics and telecommunications were the fastest growing, with a more than seven-fold increase in the 1985 to 1994 period; during 1990-1994 growth was nearly 140 per cent. Transport equipment also exhibited above average growth in the 1985 to 1994 period and expanded twice as fast as

industry at large during 1990-1994. Other major industries (textiles, machinery, construction materials and chemicals) showed growth rates well below the overall average for most of the 1985 to 1994 period, although the latter two show accelerated growth in the most recent past. Still, to a large extent, the rapid growth of the sector is partly due to comparatively minor industries such as printing, breeding materials (animal feed?) and pharmaceuticals, and in recent years chemical fibres and wood products. Their position in Shaanxi's industrial structure is becoming stronger while the share of a number of traditionally important industries is declining.

Table 2.2 Geographical distribution of industrial investment in Shaanxi, 1992 (billion Yuan)

| Location | Gross Industrial Output | | Industrial Assets | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Total Shaanxi | 49.15 | 100 | 47.88 | 100 |
| Central Shaanxi | 40.21 | 81.81 | 37.03 | 77.35 |
| Xi'an | 19.05 | 38.75 | 15.12 | 31.57 |
| Tongchuan | 1.49 | 3.03 | 2.34 | 4.88 |
| Baoji | 7.64 | 15.55 | 5.99 | 12.51 |
| Xianyang | 7.35 | 14.95 | 7.36 | 15.37 |
| Weinan | 4.68 | 9.53 | 6.23 | 13.02 |
| Southern Shaanxi | 5.18 | 12.56 | 8.26 | 17.25 |
| Hanzhong | 4.38 | 8.90 | 3.98 | 8.32 |
| Ankang | 1.01 | 2.05 | 2.43 | 7.15 |
| Shangluo | 0.79 | 1.61 | 0.85 | 1.77 |
| Northern Shaanxi | 2.76 | 5.63 | 2.59 | 5.40 |
| Yan'an | 2.04 | 4.16 | 1.85 | 3.86 |
| Yulin | 0.73 | 1.47 | 0.74 | 1.54 |

Source: Shaanxi/UNIDO Project Cooperation Office, Xi'an.

## 2.2 Selected industrial sub-sectors

### 2.2.1 Machinery

The machinery industry is the most important industry in Shaanxi, with about 30 per cent of industrial output. Between 1990 and 1994 it grew by some 24 per cent annually. The industry consists of about 3,000 enterprises employing 780,000 persons. In recent years investment in the machinery industry has increased constantly, reaching nearly 1.8 billion Yuan in 1993, almost 17 per cent of industrial investments. Investment rates have been higher than the industrial average. In the coming years the industry will probably increase its share in national and international markets. Major enterprises include the Xian Electric Machine Building Corporation, the Xi'an Meter and Instrument Plant, the Baoji Non-ferrous Metal Processing Plant and the Shaanxi Aircraft Building Corporation.

Table 2.3 Gross industrial output by sub-sector, 1985-1994 (current prices, million Yuan)

| Industrial sector | 1985 | 1988 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|---|---|
| Coal mining and concentration | 618 | 567 | 874 | 982 | 1,139 | 1,418 | 1,686 |
| Oil and gas extraction | 69 | 218 | 443 | 637 | 747 | 1,160 | 561 |
| Ferrous metal mining and concentration | 7 | 19 | 33 | 101 | 161 | 175 | 193 |
| Non-ferrous metal mining and concentration | 149 | 295 | 527 | 579 | 696 | 1,200 | 1,706 |
| Building material & other non-metal mining and concentration | 39 | 74 | 107 | 123 | 135 | 251 | 315 |
| Salt extraction | 4 | 7 | 20 | 20 | 22 | 22 | 13 |
| Timber and bamboo exploitation | 33 | 50 | 66 | 76 | 82 | 120 | 153 |
| Production and supply of running water | 40 | 64 | 81 | 113 | 129 | 170 | 214 |
| Food processing | 1,098 | 1,616 | 2,137 | 2,238 | 2,348 | 2,960 | 3,577 |
| Drinking material production | 224 | 640 | 665 | 870 | 912 | 1,032 | 1,121 |
| Tobacco processing industry | 486 | 1,021 | 1,785 | 1,975 | 2,213 | 2,397 | 2,574 |
| Breeding material industry | 23 | 114 | 167 | 238 | 285 | 325 | 360 |
| Textiles industry | 2,674 | 4,108 | 5,033 | 5,400 | 5,338 | 6,501 | 7,648 |
| Sewing industry | 344 | 436 | 561 | 643 | 587 | 619 | 646 |
| Leather, fur processing and manufacturing industry | 128 | 164 | 191 | 195 | 215 | 311 | 400 |
| Timber, bamboo processing and manufacturing industry | 89 | 153 | 136 | 172 | 196 | 260 | 326 |
| Furniture manufacturing industry | 104 | 144 | 152 | 173 | 200 | 253 | 312 |
| Paper and paper product industry | 240 | 499 | 593 | 653 | 747 | 938 | 1,115 |
| Printing industry | 189 | 348 | 488 | 625 | 777 | 866 | 957 |
| Stationary and sports goods industry | 30 | 39 | 46 | 46 | 51 | 62 | 70 |
| Works of art industry | 44 | 75 | 111 | 130 | 173 | 190 | 211 |
| Electricity, steam and hot water production and supply | 860 | 1,086 | 1,503 | 1,785 | 2,103 | 2,350 | 4,377 |
| Oil processing industry | 3 | 7 | 322 | 430 | 584 | 1,075 | 1,544 |
| Coking, gas and coal products industry | 108 | 173 | 366 | 358 | 397 | 410 | 422 |
| Chemical industry | 936 | 1,637 | 2,209 | 2,373 | 2,663 | 3,145 | 3,600 |
| Medicine industry/pharmaceuticals | 250 | 499 | 793 | 1,224 | 1,569 | 1,991 | 2,430 |
| Chemical fiber industry | 46 | 34 | 62 | 60 | 106 | 200 | 290 |
| Rubber industry | 199 | 252 | 297 | 315 | 359 | 381 | 413 |
| Plastic industry | 160 | 339 | 336 | 368 | 447 | 440 | 437 |
| Construction material and other non-metal mineral industry | 886 | 1,283 | 1,728 | 1,962 | 2,211 | 2,921 | 3,780 |
| Ferrous metal smelting and rolling | 526 | 964 | 1,816 | 1,316 | 1,744 | 2,675 | 3,732 |
| Non-ferrous metal smelting and rolling | 152 | 374 | 621 | 628 | 839 | 1,085 | 1,364 |
| Metal manufacturing industry | 430 | 728 | 867 | 930 | 1,054 | 1,380 | 1,754 |
| Machinery industry | 2,651 | 3,919 | 4,084 | 4,769 | 5,831 | 7,022 | 8,231 |
| Transportation equipment industry | 1,317 | 2,100 | 2,464 | 3,026 | 4,172 | 6,102 | 7,980 |
| Electrical machines and equipment industry | 886 | 1,450 | 1,646 | 1,618 | 2,106 | 2,916 | 3,728 |
| Electronic apparatus and telecommunication equipment | 1,074 | 2,364 | 3,301 | 4,474 | 4,697 | 6,230 | 7,892 |
| Instrument, meter industry | 333 | 530 | 645 | 798 | 921 | 1,010 | 1,264 |
| Other industry | 61 | 107 | 132 | 195 | 199 | 261 | 321 |

Note: Figures include enterprises at county level and above only.
Source: Shaanxi/UNIDO Project Cooperation Office.

The machinery industry is divided in 10 branches, of which electric equipment, engineering machinery, machine tools, automobiles, instruments and meters seem to be the most profitable. The provincial authorities intend to increase investments in 10-15 product categories and to accelerate restructuring. Among the priority products are: digitally controlled precision machinery, automatic measuring instruments, ballbearing parts, automobiles, telecommunication cables, micro-motors, electric equipment and engineering machines. To increase production and to accelerate economic reform, enterprises will be grouped according to synergies and potential. Competition is to be intensified and the internationalisation of activities is to be promoted through foreign investment.

### 2.2.2 Electronics and telecommunications

The electronics and telecommunications industry (ETI) is the second most important industry in Shaanxi: its share in output is about 10 per cent. Shaanxi's ETI controls more than 5 per cent of the Chinese market. From 1990 to 1994 its output grew by 24 per cent per year and its investment in new equipment at 23.5 per cent. There are 204 enterprises and R&D institutions employing 130,000 persons. About 18 per cent are highly qualified technicians and engineers. Among the most important enterprises are the Shaanxi General Chromatron Plant (no. 1 in China) and the Lishan Microelectronics Corporation, one of the leaders in the production and development of integrated circuits. The ETI is administered by the Shaanxi Electronics Industry Bureau, which controls about 80 per cent of fixed assets; the remainder is controlled by other provincial and central government authorities.

The industry produces a wide range of products, many of which are of high quality and are sold abroad. Given the competitiveness of the industry and the growing demand its share in domestic and international markets is likely to increase. The products with the best perspectives are: satellite TV receivers, radar navigation equipment, copper-covered boards, magnetic core deflection coils, HDTV monitors, picture tubes and monitors, radio telephones, computers and software.

To improve ETI competitiveness, equipment is to be modernized, R&D expense is to be increased, joint ventures are to be established and the Caihong Group Co., the Changlin Group Co. and the TV Group Co. which have sales of over 5 billion Yuan are to absorb seven medium and small enterprise groups (with sales of about 1 billion Yuan) including the Baoguang, Fenguo and Huadian Groups. This should facilitate economies of scale, synergies and specialisation and should increase the power of the industry in the market.

### 2.2.3 Textiles

The textile industry is the third most important industry in Shaanxi. In 1993, it accounted for about ten per cent of industrial output. During 1990-1994 its growth rate was 11 per cent yearly, much lower than the average industrial growth rate. But its exports have grown at about 17 per cent annually and account for 22 per cent of total exports - close to 30 per cent if clothes and silk products are included. The textile industry employs 226,000 persons in several hundred

enterprises (the total number is uncertain). About 37 per cent of these are government-owned, and the majority are fairly small. Most of the output (63 per cent by value) is in the form of cotton textiles; the remaining output consists of printing and dyeing products (15 per cent), woollen clothing (8 per cent), silk (5 per cent), textile equipment (5 per cent) and knitted cotton goods (4 per cent).

Investment in textiles is relatively low, 6.3 per cent of total industrial investments, and the growth rate since 1990 has been modest: 3.5 per cent yearly. Increasing exports have provided funds for imports of new equipment, but an important part of the sector is still working with outdated machinery. Only 42 per cent of large and medium-size firms have automatic equipment for winding and non-knot treatment. Productivity in the textile industry is among the lowest of the major industrial sector. It is close to 27,000 Yuan/worker against 67,000 Yuan/worker in electronics and telecommunications and 142,000 Yuan/worker in tobacco processing. Besides problems of productivity, equipment and management modernisation, the textile industry is heavily dependent on imported inputs. Shaanxi imports 60 per cent of its raw cotton and man-made fibre, and 75 per cent of its wool requirements.

In the coming years, the textile industry is expected to accelerate the restructuring of loss-making enterprises, and to specialize on cotton weaving, printing and dyeing, and silk and woollen products. The former industry will apparently remain largely dependent on raw cotton imports; the man-made fibre industry is to be expanded. Foreign investment and the formation of enterprise groups are encouraged, and the export orientation of the industry is to be increased, with sales representations being planned in Northeast Asia, Europe and South America. For modernization purposes, the industry is planning to invest:

- 2 billion Yuan in six basic construction projects;
- 3.8 billion Yuan in 112 technological transformation projects;
- US$ 207 million in 29 projects financed by the government or foreign investors.

## 2.3 Ownership structure[1]

Unlike the coastal provinces where private enterprise has made quite an impact, large and medium-scale public enterprises still dominate the economy of Shaanxi. In 1993 there were about 248,000 enterprises, the majority of them small businesses subordinated to village and lower administration levels. The non-government sector's share in output is much lower than the Chinese average.

### 2.3.1 Government-owned industrial enterprises

In 1993 there were 2,757 government-owned enterprises, almost 100 more than in 1992. These included 375 large and medium-scale enterprises controlled by the central, provincial and district or city governments (27.2 per cent, 32.5 per cent and 40.3 per cent, respectively). These enterprises accounted for 76.9 per cent of total net fixed assets in all government-owned enterprises, valued at 24.7 billion Yuan, and most of the working capital.

During recent years the number of government-owned enterprises operating at a deficit has increased alarmingly - from 27.2 per cent in 1990 to 32.8 per cent in 1993, according to one estimate. The true losses of these enterprises are impossible to assess due to the lack of transparency of the Chinese accounting system. In reality, more than half of them may be running a deficit. A survey of 1372 government-owned industrial enterprises (see Table 2.4) shows that 514 of them, or 45.8 per cent, performed badly or very badly. They have problems at various levels: technology, management, staff qualifications and product quality. If the present system of public-sector management did not protect them, many of them would face bankruptcy. Most of the loss-making companies belong to textile, leather, chemical, cement and electrical machinery industries.

Bad performance was less common among large and medium-scale enterprises than among small ones - more than half the small enterprises came in the bad/very bad category. It is not

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[1] Ownership is defined as follows in Chinese statistics:

1. State owned units (including government agencies, also referred to as units owned by the whole people).
2. Collectively owned units
3. Individually owned units (owned by one or more Chinese individuals)
4. Joint ownership units:
   - State and collectives
   - State and individuals
   - Collective and individuals
   - Chinese and foreign investors
5. Foreign owned units:
   - Overseas Chinese or Chinese from Hong Kong and Macao
   - Foreign investors

Categories 4 and 5 are often combined into one category: Other ownership.

clear whether this is due to the former's stronger bargaining power and good relations with the central and provincial authorities which ensure preferential treatment and access to scarce financial resources.

Good and satisfactory performance were also measured by technology levels and product quality, management and staff qualities. In the case of enterprises which score "fairly good", management quality would need to be improved.

Instead of being declared bankrupt, badly performing enterprises are merged and reorganised, increasing rather than decreasing the number of government-owned units. Of two large former military complexes visited by UNIDO experts one was struggling to acquire the necessary financing for conversion, while the other had few problems in that respect, being able to finance the development of new product lines based on imported equipment.

Table 2.4 Selected government-owned enterprises in Shaanxi: performance by size category

| Performance category | No. of firms | Large | Medium | Small |
|---|---|---|---|---|
| I. Good | 269 | 70 | 57 | 142 |
| II. Fairly good | 489 | 60 | 88 | 341 |
| III. Bad | 443 | 21 | 62 | 360 |
| IV. Very bad | 171 | 13 | 24 | 134 |
| Total | 1,372 | 164 | 231 | 977 |

### 2.3.2 Industrial enterprises under other forms of ownership

This sector includes collectively-owned enterprises, individual and privately-owned enterprises and several types of enterprises created with the participation of foreign investors. Most of them come into the category of collectively-owned enterprises/township and village enterprises (TVEs). It has already been pointed out that - in spite of rapid growth - TVEs still play a relatively unimportant role in Shaanxi, compared with the rest of China. In China as a whole these enterprises, which operate on market-economy principles and are not subject to production quota (although they are not privately owned) are among the most dynamic and have exhibited great flexibility.

According to a study carried out by Economic Management School of Northwest University in Xi'an, the development of non-government enterprises has so far not only been comparatively slow; their internal structure is also weaker and their economic efficiency is lower than those of the other enterprises. As already explained, their position vis-à-vis the authorities is weaker and as a consequence less finance is available to them. These enterprises tend to be generally disregarded in policies and measures to stimulate industrial growth; authorities in fact often obstruct their activities. The basic problem however could be the low level of managerial

skills and business experience. Lack of entrepreneurial tradition, the long-lasting influence of the planned economy on the outlook of managers and staff as well as the growing emigration of capable people add to the problem.

## 2.4 Industrial investments

Public enterprises with comparatively low productivity continue to absorb the majority of investment. It has already been pointed out that they have better access to bank credit (both for fixed asset investment and working capital), and that investment decisions for public enterprises are not made on the basis of the financial performance. Central and provincial government continue to support loss-making enterprises. The result is delayed modernization of the industrial sector, which requires large amounts of investment: it is estimated that the share of output generated in Shaanxi through the use of new technologies is 18 per cent against 28 per cent in China as a whole.

During the 1990-1994 period the volume of industrial investments increased by 26.8 per cent annually as against 21 per cent for provincial GDP in current prices (see Table 2.5). State-owned enterprises accounted for more than 75 per cent of investment, the remainder going to collective enterprises. Investment in industrial infrastructure (new investments) totalled 21.9 billion Yuan in the 1990-94 period and investment in the modernisation of equipment and machinery reached 14.7 billion Yuan, the total representing some 12 per cent of provincial GDP. While this ratio exceeded its national equivalent by about three percentage points, on a per capita basis industrial investment in Shaanxi Province fell some ten per cent short of the all-China figure. Moreover, increases of total industrial investment for the whole of China remained above the provincial average throughout the period (by some four percentage points). This is indicative of the extent to which Shaanxi continues to lag behind in the allocation and/or attraction of investment funds.

Table 2.5 Industrial investment and GDP in Shaanxi, 1990-1994 (billion Yuan; per cent)

| | 1990 | 1991 | 1992 | 1993 | 1994 | Annual average increase 1990-94 |
|---|---|---|---|---|---|---|
| Shaanxi GDP | 40.4 | 46.7 | 54.2 | 67.1 | 86.7 | 21.0 |
| New investments | 2.7 | 3.0 | 3.5 | 5.2 | 7.5 | 29.1 |
| Renewal investments | 1.9 | 2.1 | 2.6 | 3.7 | 4.4 | 23.4 |
| Total investment | 4.6 | 5.1 | 6.1 | 8.9 | 11.9 | 26.8 |
| Ratio investment/Shaanxi GDP (per cent) | 11.4 | 10.9 | 11.3 | 13.3 | 13.7 | 4.7 |
| China's ratio investment/GDP (per cent) | 8.6 | 8.9 | 9.5 | 10.3 | 10.4 | 4.9 |

Note: According to the Statistics Bureau, GDP and GNP in Shaanxi are roughly the same.
Source: Shaanxi/UNIDO Project Cooperation Office.

Table 2.6 Investment and investment growth rates in 21 industries in Shaanxi 1990-1993 (million Yuan, per cent)

| Industries | New investment 1993 (million Yuan) | Annual average increase 1990-1993 (per cent) | Renewal investment 1993 (million Yuan) | Annual average increase 1990-1993 (per cent) |
|---|---|---|---|---|
| Total investment | 9983 | 32.3 | 5502 | 33.0 |
| Total in industry | 4066 | 14.7 | 3699 | 24.6 |
| Coal | 696 | 16.4 | 193 | 10.6 |
| Oil and gas | 380 | 42.6 | 51 | 83.0 |
| Ferrous metal mining | 12 | 49.1 | 3 | ---- |
| Non-ferrous metal mining | 114 | 9.7 | 59 | 42.9 |
| Water supply | 227 | 38.3 | 7 | 31.3 |
| Food production | 55 | 39.6 | 83 | 33.0 |
| Tobacco processing | 18 | 18.7 | 174 | 1.6 |
| Printing | 16 | 33.4 | 92 | 38.9 |
| Electricity, steam, hot water | 1852 | 25.3 | 171 | 19.1 |
| Oil processing | 84 | 86.1 | 14 | 186.6* |
| Chemical industry | 202 | 8.9 | 643 | 78.0 |
| Chemical fibres | 68 | 81.2 | ----- | ---- |
| Building materials/non -metallic mineral products | 111 | 12.0 | 125 | 2.3 |
| Ferrous metal smelting & rolling | 292 | 92.3 | 215 | 35.0 |
| Non-ferrous metals smelting & rolling | 56 | 0.6 | 40 | -21.0 |
| Metal products | 26 | 29.1 | 36 | 10.7 |
| Machinery | 567 | 33.7 | 182 | 47.5 |
| Transport equipment | 227 | 29.8 | 248 | 27.4 |
| Electrical equipment | 65 | 17.4 | 42 | 13.0 |
| Electronic & telecom. equipment | 260 | 23.5 | 56 | -34.4 |
| Instruments, meters, measuring apparatus | 99 | 68.9 | 82 | 22.8 |

* 1992-93

Notes: Numbers have been rounded. Small variations occur, depending on sources; new investments: investments in fixed assets or basic construction; growth: average investment growth rate for 1990-1993 in current prices.

Source: Statistical Yearbook of Shaanxi Province, Xi'an 1994; Shaanxi Central Planning Commission.

Table 2.6 shows that the industrial sector accounted for 40 per cent of new or basic construction investment and 67 per cent of replacement investments in 1993. Within the sector, coal, oil and gas exploration and exploitation; electricity, steam and hot water production; and machine building accounted for about 86 per cent of total basic construction investment. The

degree of concentration is less high for replacement investments, seven branches accounting for 53 per cent of investments. The chemical and transportation equipment industries are the most important.

Investments in advanced industries remain low, about 6 per cent of the total, much of it in telecommunication and electronic equipment. These have shown annual output growth rates of 20-30 per cent during 1990-1993, while industries in which heavy investments were made showed lower output growth rates: 12.3 per cent for electricity, 10.6 per cent for machinery, 8.7 per cent for chemicals. This is due to lower demand for their products and the slower effect on output of investment in basic and heavy industries - particularly in the case of energy investments. Electricity output will moreover depend on the demand and the type of equipment used by electricity consumers. Figures 2.1-2.2 illustrate the trend of investments in selected industries.

Among the ongoing projects (depicted in Table 2.7), the most important are in the fields of energy, mining, semi-conductors, fertilizer and car production. The latter is a "pillar" industry (see Section 2.5) and protected from foreign competition. During the last few years the volume of investment in this industry has more than doubled, reaching over 10 billion Yuan in 1992. This industry is expected to play a key role in the future. In 1993 China's production of vehicles reached 1.3 million; it is expected to exceed 2 million by the end of the decade. Other important projects for the coming years concern natural gas, oil, mining and chemicals.

Estimated investment needs for the projects listed in Table 2.7 are 13 to 18 billion Yuan. The amounts would be even higher if a more detailed analysis would be made. More participation of foreign investors is needed and expected. A well-coordinated promotion of project packages could increase the interest of foreign investors and produce a multiplier effect on Shaanxi's economy.

## 2.5 Comparative advantage and industrial performance

Given the pattern of resource endowments, one would expect that Shaanxi would be an exporter of agricultural products and minerals, as well as of relatively sophisticated commodities which are heavy users of scientists and technicians. To the extent that industry has access to unskilled labour and has a comparatively low endowment of capital and foreign investment, one would expect an export orientation toward unskilled-labour intensive commodities.

These general expectations of the pattern of comparative advantages can be tested by comparing the capital/labour ratios with the 1987 trade pattern, using input/output figures for that year. These data are old, but more recent data were not available for the purpose; also, comparative advantage is a concept relevant for understanding economic processes which take up to 15 years to work through. The figures are compared in Table 2.8. The second column classifies according to the 1994 Industrial Policy categorization:

Figure 2.1 Total fixed assets investment in selected industries, 1989-1993 (million yuan)

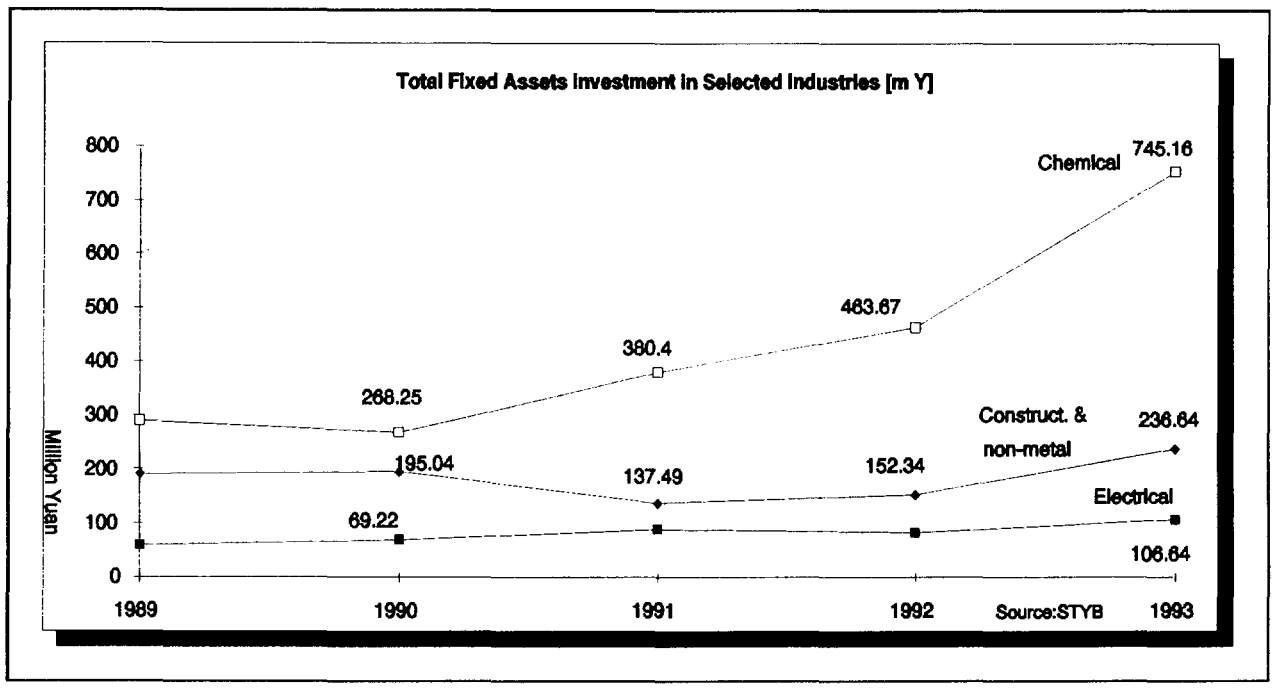
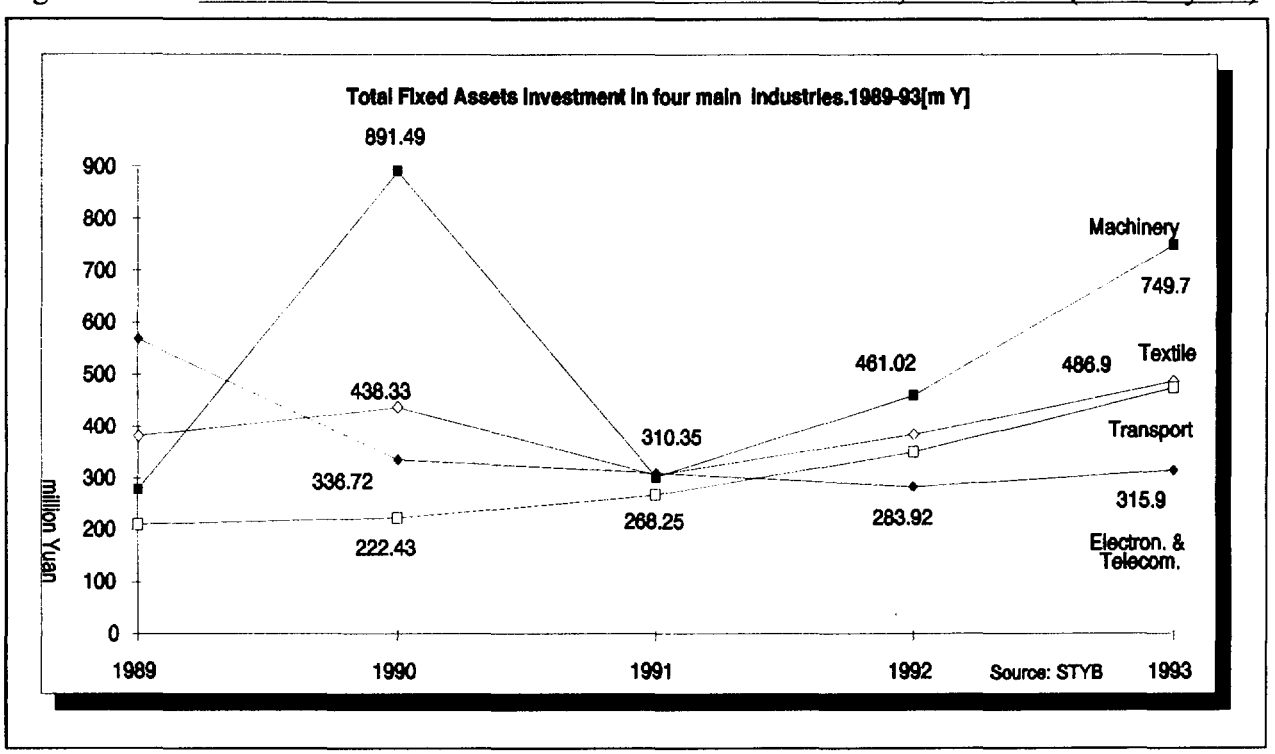



Figure 2.2 Total fixed assets investment in four main industries, 1989-1993 (million yuan)



**Basic**: minerals (including energy) and infrastructure;
**Pillar**: petro-chemicals, automobiles, advanced electronics and construction;
**Other**: the rest.

Depreciation had to be used as a proxy for the value of the capital stock, giving too heavy a weighting to plant and machinery which has a relatively short life compared with buildings. At the level of aggregation used, the error is probably not very great. Labour input was measured by total payments to labour, thus weighting employment by the wage paid. Economic activities are ranked by their trade performance. The relevant net export ratios were again calculated from the 1987 input/output table. The figures are mostly negative, reflecting the large trade deficit of Shaanxi.

A comparison of the ranking of sectors by their capital/labour ratios and by net exports shows (i) that the best export performer was machinery, which is both capital and skill intensive; (ii) that agriculture was a very weak export performer, in spite of Shaanxi's relatively high endowment with arable land; (iii) that contrary to expectations there is no correlation between the capital/labour ratios in production and net exports. Concentration on the high end of the skill range means that less capital intensive industries such as garments as well as small but rapidly growing industries like printing and woods products are denied capital and medium skill capacity (in e.g. design). Through the pattern of incentives affecting both production and trade, the province was therefore not taking advantage of the possible efficiency gains from trade.

The finding that Shaanxi Province has an inefficient industrial structure is confirmed by comparing levels of industrial sector profitability (before tax). In 1992, the return (profits including taxation) on industrial capital investments was 6.8 per cent. This does not compare favourably with the profit rates of other provinces in the region (Gansu: 8.2 per cent; Shanxi: 7.4 per cent) or with the Chinese average (9.9 per cent), and the figure is far below that for coastal provinces like Shanghai and Guangdong.

The profitability data reinforce the finding that resource allocation in industrial production in Shaanxi Province does not make full use of the opportunities for a more efficient trade regime. It might be argued that, because the US$ value of exports for Shaanxi Province increased at more than twice the rate for all China between 1984 and 1993 (see Figure 1.3, Part I), the inefficiency of the Shaanxi Province trading regime has become less. However, no such inference can be drawn from the data: rapid growth of exports to foreign destinations and persistent inefficiency of the foreign trade regime are not necessarily mutually exclusive.

Although it was impossible to match production and trade data for a single year in the 1990s, it is possible to match data for 1987 and 1992, which permits a partial analysis of structural change. This is shown in Table 2.9 (for industrial activities only). The first column shows the capital/labour ratios and their ranks from Table 2.8. The third and fourth column show the same figures for 1992. The final two columns show the capital/gross output ratios for 1992 and their rank order. The regression results confirm that the 1987 ratios are a very good predictor of the 1992 ratios.

Table 2.7 Industrial Construction Projects in Shaanxi (1994; million Yuan)

| Project | Scale | Investment (milion Yuan) |
|---|---|---|
| 1. Projects under operation | | |
| (1) Project of Huian chemical factory | Annual output: 8,000 tons | 196.51 |
| (2) No. 2 Stove of Hanijiang steel factory | Output: iron 250,000 tons/year | 79.75 |
| (3) Over-copper board production line of no. 704 factory | Output: board 1 million sqm. | 156.45 |
| (4) Production line of precision mould and precision punching mould in no. 704 factory | Output: 180 high precision moulds and 100,000 sets of cold punching moulds per year | 52.60 |
| 2. Continuous projects | | |
| (5) Second state project for weihe power station | Capacity: 2-300,000 KW | 1,051.36 |
| (6) Pucheng Power Station | Capacity: 2-330,000 KW | 1,183.80 |
| (7) No. 1 Well of Huangling Coal mining and coal-washing factory | Output: 3 million tons of coal per year | 529.24 |
| (8) Yuhua coal well of Tongchuan coal mine | Output: 1.5 million tons of coal per year | 378.64 |
| (9) Xiangshan coal will of Haicheng coal mine | Output: 1.2 million tons of coal per year | 315.30 |
| (10) Ahujiahe coal well of Pubai coal mine | Output: 0.5 million tons of coal per year | 164.24 |
| (11) Production line of auto micro car in Qingchuan machine factory | Output: 20,000 cars per year | 199.61 |
| (12) Extraction of Ansai oil field | Output: crude oil 1.15 million tons | 1,075 |
| (13) Sijia semi-conducting factory | Output: 14 tons of monocrystalline silicon | 412.70 |
| (14) Honghai bearing factory | Output: 5 million acts of bearing/year | 89.45 |
| (15) Weihe fertilizer factory | Output: 300,000 tons of synthetic ammonia and 520,000 tons of urea p.y. | 2,705 |
| (16) No. 4 branch of Huang machinery factory | Output: 200 hydro-digging machines | 26.47 |
| (17) Lead-Zinc mine in Yintongling | Output: 200 tons ore per day | 11.80 |
| (18) Bafangshan lead-zinc mine | Output: 350 tons per day | 37.75 |
| (19) Reconstruction of Yulin nitrogenous fertilizer | Output: 47,000 tons of synthetic ammonia and 130,000 tons of urea | 278.86 |
| 3. Newly started projects | | |
| (20) Xi'an instrument and meter factory | Output: 60 sets of COS and 30 sets of PLC | 68 |
| (21) No. 2 power station of Baoji | Capacity: 1-300,000 KW | |
| (22) Qiantongshan lead-zinc mine | Output: 1,200 tons per day | 190.29 |
| 4. Projects under plan | | |
| (23) Project of 30 ton steel rolling of medium thick board | Enlarging construction | |

| | | |
|---|---|---|
| (24) The development of natural gas in Northern Shaanxi province | Newly constructed | 88.63 |
| (25) Yang xian Cailun paper manufacturing farm | Output: 9,700 tons of high level paper | |
| (26) Shaanxi lead-zinc smeltery | Output: 25,000 tons zinc and 22.06 mercury per year | 280 |
| (27) Chloric alkale profect of Shaanxi chem. corp. | Output: 50,000 tons of caustic soda and 40,00 tons of PVC per year | 6,622.73 |
| (28) Jianchaling nickel mine | Output: synthetic gold 700 -900 kg and 400 tons of nickel per year | |

Source: Shaanxi-UNIDO Project Cooperation Office, Xi'an.

## Table 2.8 Shaanxi Province value added shares, capital/labour ratios and net exports, 1987

| | Classification 1994 | % Share Value Added | K/L (1) | K/L Rank | Net Exports (2) | Net Exports (Rank) |
|---|---|---|---|---|---|---|
| Agriculture, fisheries, timber and water | Other | 28.0 | 0.0 | 1 | -5.55 | 14 |
| Mining | Basic | 2.5 | 0.4 | 13 | -0.22 | 3 |
| Food, tobacco and feed | Other | 3.5 | 0.1 | 2 | -2.55 | 11 |
| Textiles | Other | 3.8 | 0.3 | 10 | -2.22 | 2 |
| Garments and leather | Other | 0.7 | 0.1 | 3 | -0.40 | 6 |
| Wood products, printing and culture | Other | 2.0 | 0.1 | 4 | -1.41 | 9 |
| Electricity | Basic | 2.5 | 1.8 | 15 | -0.37 | 5 |
| Gas and non-metal mine products | All | 5.4 | 0.2 | 8 | -4.44 | 13 |
| Smelting | Other | 1.4 | 0.2 | 9 | -5.68 | 15 |
| Metal products | Other | 1.3 | 0.2 | 7 | -0.59 | 7 |
| Machinery | Pillar | 11.7 | 0.3 | 11 | 5.25 | 1 |
| Consumer goods | Other | 0.4 | 0.1 | 6 | -0.77 | 8 |
| Construction | Pillar | 7.4 | 0.1 | 5 | -0.27 | 4 |
| Transport | Basic | 4.6 | 1.0 | 14 | -0.20 | 10 |
| Commerce and other services | Basic and other | 24.8 | 0.3 | 12 | -2.91 | 12 |

Source: Shaanxi Province Input/Output tables 1987.

Notes:

(1) Capital proxy K is the total depreciation allowance; labour proxy L is the labour force in wage units, or the total returns to labour.

(2) Net exports are given by total provincial exports less total provincial imports divided by exports plus imports, expressed as a percentage.

(3) Regression net exports = a + b (K/L) + error

Regression output:

| | | | | | |
|---|---|---|---|---|---|
| Constant | 0.38 | Std err of Y est | 0.48 | X coefficient(s) | 0.02 |
| | | R squared | 0.02 | Std err of coef. | 0.05 |
| | | No. of observations | 15.00 | | |
| | | Degrees of freedom | 13.00 | | |

Table 2.9 Comparison of capital/labour and capital/output ratios 1987 and 1992

| Sectors | K/L (1) 1987 | Rank | K/L (2) 1992 | Rank | K/X(3) 1992 | Rank |
|---|---|---|---|---|---|---|
| Mining | 0.42 | 10 | 23.36 | 9 | 2.25 | 10 |
| Food, tobacco and feed | 0.09 | 1 | 22.02 | 7 | 0.52 | 3 |
| Textiles | 0.27 | 8 | 16.18 | 5 | 0.69 | 4.5 |
| Garments | 0.1 | 2 | 7.85 | 2 | 0.45 | 2 |
| Wood, printing and culture | 0.11 | 3 | 11.52 | 3 | 0.73 | 6 |
| Electricity | 1.84 | 11 | 199.13 | 11 | 4.07 | 11 |
| Gas & non-metal mine products | 0.19 | 6 | 18.87 | 6 | 0.79 | 7 |
| Smelting | 0.21 | 7 | 31.81 | 10 | 0.80 | 8 |
| Metal products | 0.16 | 5 | 12.27 | 4 | 0.69 | 4.5 |
| Machinery | 0.31 | 9 | 22.15 | 8 | 0.91 | 9 |
| Consumer goods | 0.14 | 4 | 7.13 | 1 | 0.41 | 1 |

Notes:

(1) Calculated on the basis of the ratio between total depreciation allowances and total payments to workers.

(2) Calculated on the basis of the ratio between total fixed assets and the number of workers employed (thousands of Yuan per worker).

(3) Calculated as the ratio between total fixed assets and the value of gross output (yuan of capital per yuan of gross output)

(4) Regression of (K/L) 1992 = constant + b1 (K/L) 1987 + error

Regression Output:

| | |
|---|---|
| Constant | -3.8258367 |
| Std err of Y est | 10.28605585 |
| R squared | 0.968881118 |
| No. of observations | 11 |
| Degrees of freedom | 9 |
| X coefficient(s) | 107.9086937 |
| Std err of coef. | 6.446320956 |

Regression of (K/L) 1992 = constant + b2 (K/X) 1992 + error

Regression output:

| | |
|---|---|
| Constant | -17.44677877 |
| Std err of Y est | 24.17485018 |
| R squared | 0.828108735 |
| No. of observations | 11 |
| Degrees of freedom | 9 |
| X coefficient(s) | 45.85422451 |
| Std err of coef. | 6.963720305 |

The above data reflect static assessments of the structure of resource endowments and the static efficiency of the pattern of output and trade, saying nothing about the performance changes of industry over time. Such data as are available indicate that there was a long-run increase in labour productivity in volume terms from 1952 to 1992 of over 5 per cent yearly. There was a short-run spurt in yearly labour productivity growth of around 9 per cent over the period 1990-1992, probably reflecting improved capacity utilisation as the province experienced increased demand for its products as the all China growth rate accelerated. By industrial branch, the highest labour productivity increases were found in machinery and transport equipment, pharmaceuticals and wood processing. Labour productivity decreased in household electronics and food processing, and low growth was recorded in much of the textile and chemicals industry. The

annual growth of the labour force slowed down from around 2.5-3.0 per cent to around 1.0 per cent during 1990-1992. This could reflect increased out-migration.

The growth of net output, which increased to about 10 per cent in the early 1990s, largely reflects growing capacity utilisation, a very welcome development - the Mission saw much evidence of excess capacity on factory visits. The largest increases in productivity took place in medium-scale firms, which are relatively uncommon in Shaanxi compared with the coastal provinces. There was almost no productivity increase in small firms; this is consistent with the observation that increased capacity utilization was the basis for productivity growth. Improved capacity utilisation will have to be accompanied by improved product quality and reliability. Middle level management and product quality-related skills would therefore be an essential component of a successful industrial strategy.

## 2.6 Linkages

Information on linkages in Shaanxi is difficult to find. To give at least an impression of their intensity, another analysis of the 1987 input/output figures was made. The results are shown in Table 2.10. The measure shown is the size of (direct and indirect) linkages of a particular economic activity relative to the average linkages for 1987. The table also ranks activities in accordance with the intensity of their linkages. The strongest linkages are found in the garments industry. Other high scores were obtained by textiles as well as manufacturing branches belonging to the chemicals sub-sector (rubber, plastics, etc.). A very high score was also obtained by catering. While not a manufacturing activity, its high dependence on local inputs and its good prospects - the tourist industry is likely to continue expanding - indicates that catering is a (potentially) important customer of the food processing branch. The weakest linkages among manufacturing industries were found in the beverages and tobacco, electronics and instruments industries. The comparatively low scores of the former would be related to their relatively simple production structure, with limited opportunities for upstream and downstream linkages. The latter possibly depend on suppliers outside Shaanxi for many of their more sophisticated inputs. An alternative explanation could be a very high level of in-house production of intermediate inputs.

The potential for dynamic linkages is only a supplementary component to other indicators such as capital/labour ratios when making investment decisions for the development of dynamic comparative advantage, and the intermediate input structure may have changed a good deal since 1987, with some changes enhancing dynamic linkages, for example where large state-owned firms begin to buy in some components rather than to make them in-house.

The development of clusters of interlinked economic activities is among others stimulated by the quality of infrastructure. But education and training also play a role. One of the successful local cotton mills, for example, chose an overseas partner to help develop forward linkages into garments. The task of the overseas partner was mainly to improve design and marketing. Table 2.10 shows that the garments industry ranks highest in terms of potential for dynamic linkages; the province would also have a comparative advantage in this industry. This is an area

Table 2.10 Intensity of linkages by economic activity, 1987

| | (1) % Cost Effect; 2% Electricity Price Rise | Rank | (2) Direct and Indirect Linkages | Rank |
|---|---|---|---|---|
| 1. Crops | 0.06 | 48 | 0.77 | 51 |
| 2. Forestry | 0.03 | 59 | 0.73 | 54 |
| 3. Livestock raising | 0.04 | 54 | 0.91 | 38 |
| 4. Other agriculture | 0.11 | 30 | 0.85 | 42 |
| 5. Fishery | 0.06 | 50 | 0.73 | 55 |
| 6. Coal mining | 0.22 | 7 | 0.97 | 35 |
| 7. Coal washing | 0.03 | 57 | 0.63 | 59 |
| 8. Oil extraction | 0.08 | 41 | 0.91 | 39 |
| 9. Natural gas extraction | 0.00 | 62 | 0.48 | 62 |
| 10. Ferrous metal mining | 0.18 | 13 | 0.91 | 37 |
| 11. Non-ferrous metal mining | 0.31 | 4 | 1.16 | 18 |
| 12. Non-metal mining | 0.15 | 17 | 0.84 | 44 |
| 13. Salt mining | 0.05 | 51 | 0.74 | 53 |
| 14. Timber and bamboo | 0.04 | 55 | 0.78 | 50 |
| 15. Water | 0.55 | 2 | 0.80 | 48 |
| 16. Food processing | 0.09 | 39 | 1.26 | 9 |
| 17. Beverages | 0.08 | 42 | 1.06 | 31 |
| 18. Tobacco | 0.04 | 52 | 0.96 | 33 |
| 19. Feed processing | 0.08 | 44 | 1.19 | 15 |
| 20. Textiles | 0.13 | 24 | 1.39 | 3 |
| 21. Sewing | 0.13 | 25 | 1.40 | 1 |
| 22. Leather and fur | 0.11 | 31 | 1.22 | 11 |
| 23. Timber processing | 0.15 | 18 | 1.07 | 29 |
| 24. Furniture and wood products | 0.12 | 28 | 1.11 | 25 |
| 25. Paper and paper products | 0.20 | 8 | 1.17 | 16 |
| 26. Printing | 0.13 | 26 | 1.12 | 23 |
| 27. Education and arts products | 0.10 | 34 | 1.20 | 14 |
| 28. Electric power and hot water | 2.07 | 1 | 0.85 | 43 |
| 29. Oil refining | 0.09 | 40 | 1.09 | 27 |
| 30. Coking, gas and bye products | 0.15 | 16 | 1.09 | 27 |
| 31. Chemicals | 0.28 | 5 | 1.13 | 22 |

| | | | | |
|---|---|---|---|---|
| 32. Medicine | 0.16 | 14 | 1.28 | 6 |
| 33. Chemical fibres | 0.23 | 6 | 1.37 | 4 |
| 34. Rubber products | 0.14 | 23 | 1.29 | 5 |
| 35. Plastic products | 0.20 | 12 | 1.27 | 7 |
| 36. Other non-metal products | 0.20 | 11 | 1.10 | 26 |
| 37. Ferrous smelting process | 0.20 | 10 | 1.13 | 21 |
| 38. Non-ferrous smelting process | 0.33 | 3 | 1.26 | 8 |
| 39. Metal products | 0.16 | 15 | 1.15 | 19 |
| 40. Machinery | 0.14 | 20 | 1.16 | 17 |
| 41. Transport equipment | 0.14 | 22 | 1.23 | 10 |
| 42. Electrical machinery | 0.14 | 19 | 1.21 | 12 |
| 43. Electronic equipment | 0.12 | 29 | 1.06 | 30 |
| 44. Instruments | 0.10 | 35 | 1.05 | 32 |
| 45. Machinery repair | 0.14 | 21 | 1.20 | 13 |
| 46. Consumer products | 0.09 | 38 | 0.97 | 34 |
| 47. Construction | 0.10 | 33 | 1.13 | 20 |
| 48. Vehicle transport | 0.09 | 37 | 0.90 | 40 |
| 49. Communication | 0.06 | 49 | 0.72 | 56 |
| 50. Domestic commerce | 0.04 | 53 | 0.76 | 52 |
| 51. Foreign trade | 0.01 | 61 | 0.61 | 60 |
| 52. Materials supply | 0.03 | 56 | 0.84 | 45 |
| 53. Catering | 0.08 | 43 | 1.40 | 2 |
| 54. Passenger transport | 0.10 | 32 | 0.92 | 36 |
| 55. Real estate | 0.03 | 58 | 0.65 | 58 |
| 56. Public utilities | 0.20 | 9 | 0.83 | 46 |
| 57. Residents services | 0.07 | 46 | 0.72 | 57 |
| 58. Health, sport, social welfare | 0.13 | 27 | 1.12 | 24 |
| 59. Education, culture | 0.06 | 47 | 0.83 | 47 |
| 60. Research, technical services | 0.10 | 36 | 0.89 | 41 |
| 61. Finance, insurance | 0.02 | 60 | 0.61 | 61 |
| 62. Administration | 0.08 | 45 | 0.79 | 49 |

Source: Based on Shaanxi Province input/output tables 1987.

(1)% effect of electricity price rise based on the electricity row of the Leontief inverse increased by 2%; (2) Based on the Rasmussen method of calculating linkages within the production sector as presented in Bulmer-Thomas. The average linkage coefficient has a value of 1, and the remaining values above or below this.

where the provincial and local governments can help: by developing a medium-level design Table training facility, firms would have the option to use domestic partners, and would be able to increase the domestically retained value added from forward linkages.

## 2.7 Economic reforms and industrial policy

### 2.7.1 Recent reforms

The decisions of the 14th Party Congress in November 1992 on establishing a socialist market economy gave a new impulse to enterprise reform. A modern corporate structure is to be introduced, government ownership is to be separated from production management and equal treatment is to be given to different types of enterprises, with the particular objective of strengthening the non-government sector. The market mechanism is beginning to play a greater role in the allocation of credit.

The central government has also formulated special measures to accelerate industrial development in Northwest China. The most important are:

- Priority in the use of foreign loans to develop agriculture, non-ferrous metal smelting, transport, power stations, telecommunications, and energy-intensive industries;

- Priority in the allocation of export quotas and licenses and speeding up of export approval procedures;

- Training of personnel to be engaged in foreign trade and economic cooperation;

- Assistance to the promotion of foreign investment in the region, including sponsorship of a conference on direct investment.

Provincial policies have been following the central government guidelines. After the recent reforms, the major changes in the management of enterprises in Shaanxi have been:

- Partial transfer of investment decisions to enterprise level (for investments below 50 million Yuan in the energy and raw materials sectors and for investment below 30 million Yuan in other sectors);

- Decisions on technology imports below US$ 5 million were transferred by the provincial government to lower levels;

- Decentralized decision-making on production programmes (the number of products listed under the industrial production plan has been reduced from 107 to 5 currently; the provincial planning quota for output were abolished);

- More freedom for enterprises to allocate after-tax profits;

- Greater autonomy at the enterprise levels to decide on appointments of managers and staff; stronger reflection of skills and performance in wages and bonuses;

- Experiments with new types of enterprise management (37 existing and 16 new firms have been testing shareholding and limited liability systems, modern management, etc.);

- Structural adjustment through mergers with profitable firms, market profile changes etc., involving several hundreds of government-owned enterprises;

The reforms are presented in more detail in Box 1.

While the provincial government mainly has an implementing role in the case of macro-economic policies, it does formulate specific provincial policies in a number of areas, including labour and wages, imports and exports, technologies and investment mobilization. As economic reform accelerated, the provincial authorities started playing a stronger role in the formulation of policies, especially for infrastructure, the exploration and exploitation of natural resources, high-tech sectors, industry and commerce. The reforms also give the provincial government a more important role in introducing market mechanisms for the allocation of economic resources and enterprise restructuring.

Conversion of military industries is given special attention. With the successful example of the electronics industry - which has its beginnings in defence production - in mind, preferential loans and tax incentives are made available for conversion. Civilian high-tech spin-offs are moreover eligible for special incentives when locating in the development zones (see below). Areas on which conversion should concentrate, according to the present Eighth Five Year Plan, include airplanes, automobiles, electrical/electronic and telecommunications equipment, chemicals and advanced textile machinery. While technically conversion to such products is presumably not a serious problem, the economic viability of new highly capital-intensive industries like civil aviation and automobiles, where international competition is enormous, should be studied carefully.

The Shaanxi government has also made a range of incentives available to foreign investors. These are shown in Table 2.11. The incentives include income and other tax reductions, tax exemptions and exemptions from land use fees. There are special conditions for development zones to attract, among others, new and high-tech industries. It is not always clear, from the available information, whether certain enterprise categories do not overlap (high-tech and export orientation or material goods production, for example, are not mutually exclusive) - this could lead to confusion in applying the system. While actual land ownership is not possible, the 70-year lease period would help to ensure long-term investment.

Box 1 Recent economic reform measures in Shaanxi Province

Reform of enterprise and property rights

- Demarcation of responsibilities between government and enterprises in thirty government-owned enterprises; the latter can now make their own decisions on employment and wages;
- Acceleration of changes in the property rights system, to clarify the situation of non-government-owned enterprises and to provide additional facilities for them;
- Greater choice for existing shareholding companies, other non-government-owned firms and government-owned firms with private management in adopting organizational and shareholding forms;
- A follow-up to the pilot reform programme for 20 government-owned enterprises which will cover another 50 enterprises. Reforms include transformation into limited companies or sole proprietorships, and partial freedom in allocating profits for sector-related business activities (including mergers and the building-up of distribution networks);
- Small government-owned enterprises, especially those working at county level, will be eligible for transfer to private owners;
- The provincial production quota system was abolished, and the number of products listed in the industrial production plan was reduced from 107 to 44;
- The creation of groups of enterprises at the provincial and interprovincial level, through mergers, contracting out or shared ownership is encouraged. By early 1994, hundreds of mergers had taken place and 60 enterprise groups had been created;
- The development of chambers of commerce, industrial and agricultural associations is encouraged, although these are still in their infant stage.

Tax, finance and investment reform

- The tax system has been simplified, 18 types of tax replacing the former 35 types; in the industrial sector the number of taxes has decreased from 20 to 8. Four types of taxes - income tax, value added tax, consumption tax and resource tax - now account for 60 per cent of all taxes;
- A 33 per cent income tax has been adopted for all firms working outside the development zones;
- Twenty-two development zones have been created to attract investors and high-tech industries. All of them offer low tax (15 per cent income tax) and favourable investment conditions;
- The allocation of credit increasingly takes place through the market mechanism. Only energy, transport, high technology and export-oriented projects can obtain interest rates below the market rate;
- New financial mechanisms are expected to be introduced in the next two to three years, namely bill discount and treasury bill markets and securities exchanges. To that end a Northwest Securities Exchange Centre is to be set up;
- Authorizations for investment below a certain level were transferred from the provincial government level to lower levels. For energy and raw materials the limit is 50 million Yuan, for other sectors 30 million Yuan and for imported technologies US$ 5 million.

Table 2.11: Foreign investment incentives in Shaanxi Province

| | Type of Enterprise | New and High Technology Devt. Zones | Other Shaanxi |
|---|---|---|---|
| Enterprise income tax | | | |
| Standard rate | | 30% | 30% |
| Reduced rate | New and high-tech enterprises | 15% | 30% |
| | Export enterprises (>70% of production exported) | 10% | 15% |
| Exemptions (investment period must exceed 10 yrs.) | Material goods production | Yrs. 1+2 of profit making: 0 | Yrs. 1+2 profit making: 0 |
| | High-tech enterprises | Yrs. 1+2 of profit making: 0<br>Yrs. 3-8: 10% | Yrs. 1+2 profit making: 0<br>Yrs. 3-8: half rate |
| Local Income Tax | Outside Xi'an | exempt | |
| Real Estate Tax<br>Vehicle licence plate tax | Xi'an municipality; high-tech, export, agricultural, energy, communications and social welfare enterprises. | exempt | |
| | Other. | exempt for 60% of investment period | |
| Commercial and industrial consolidated tax | Imported building materials, transport and other equipment, office facilities related to investment; imported raw materials and vehicles for export production; exports; imported household goods and vehicles for use of foreign investors/expatriate personnel. | exempt | |
| Right of land use | Land-lease basis | Up to 70 years. | |
| Land use fee | Export, advanced technology, agricultural/animal husbandry, energy, transportation and social welfare enterprises | Exempt | |
| | Other | First half year: exempt; thereafter: half rate | |

Source: The People's Government of Shaanxi Province.

An overview of the development zones is given in Table 2.12. The high concentration of zones in the Xi'an area is evident. This area also shows the highest concentration of domestic and foreign firms. The Development Zone of Xi'an High and New Technological Industries alone has more firms than all the others combined. Xi'an City itself has been declared an "open city" where development zone conditions prevail. The second most important concentration of development zones is found around Xianyang.

Table 2.12: Overview of development zones in Shaanxi Province

| Development Zones | Location | Date of Approval | Initial Size ($km^2$) | Planned Size ($km^2$) | Domestic Firms | Foreign Firms |
|---|---|---|---|---|---|---|
| Development zone of Xi'an high & new Technological Industries | Xi'an | March 1991 | 3.20 | 22.35 | 642 | 188 |
| Xi'an economic & technological development zone | Xi'an | May 1992 | 3.42 | 10.50 | 6 | 29 |
| Chanhe comprehensive development zone, Xi'an | Xi'an | August 1993 | 1.88 | 3.86 | 9 | - |
| Qujiang tourist & trade development Zone, Xi'an | Xi'an | May 1992 | 5.70 | 15.88 | 3 | - |
| Lintong Tourist and Trade Development Zone, Xi'an | Lintong, Xi'an | August 1993 | 1.00 | 4.27 | 9 | 2 |
| Development zone of Baoji high & new technological industries | Baoji | November 1992 | 1.49 | 5.77 | 20 | 3 |
| Baoji industrial development zone | Baoji County | August 1993 | 3.50 | 5.13 | 8 | 8 |
| Industrial zone of Xianyang electronics export | Xianyang | May 1991 | 11.70 | 15.90 | 79 | 8 |
| Development zone of Yangling high & new farm tech. industries | Xianyang | May 1991 | 0.50 | 4.50 | 39 | - |
| Xianyang development zone of chemical industry | Xianyang | August 1993 | 5.00 | 20.00 | 7 | - |
| Weinan economic development zone | Weinan | August 1988 | 6.00 | 11.09 | 8 | - |
| Merchants zone of Weinan city | Weinan | August 1993 | 1.50 | 3.48 | 37 | 2 |
| Caijiapo economic development zone | Qishan county | August 1993 | 4.60 | 4.60 | 57 | 2 |
| Tangyu tourist development zone, Mixian | Mixian county | August 1993 | 0.15 | 3.50 | 14 | - |
| Tongchuan economic & technological development zone | Tongchuan | August 1993 | 5.00 | 20.00 | 17 | - |
| Merchants zone of Hancheng city | Hancheng | August 1993 | 3.11 | 3.11 | 9 | - |
| Nanzheng economic development zone | Nanzheng county | August 1993 | 1.50 | 15.00 | 21 | 7 |
| Xinyuan economic development zone, Hanzhong | Hanzhong | August 1993 | 2.00 | 8.00 | 49 | - |
| Shimen development zone, Luonan | Luonan | August 1993 | 2.00 | 7.00 | 24 | - |
| Shenfu economic development zone | Shenfu county | August 1993 | 4.00 | 10.00 | 10 | - |
| Nanjiao development zone of chemical industry, Yulin | Yulin City | August 1993 | 3.00 | 4.50 | 3 | - |
| Huangling economic development zone | Huangling county | August 1993 | 3.50 | 12.6 | 27 | - |

Source: Shaanxi/UNIDO Project Cooperation Office, Xi'an.

### 2.7.2 An interim assessment of the economic reform

The measures introduced during the last few years have accelerated the reform process and increased the role of market mechanisms in the allocation of resources. But its impact on the economy remains limited. For example, out of the thousands of enterprises subordinated to the provincial government only 24 became limited companies, 37 are testing a new management style, 16 have issued shares and 128 have been partially restructured with foreign involvement. As a number of companies have carried out a combination of these organizational innovations, the actual number of enterprises affected by reforms is even smaller. While heavily reduced, production quota continue to play a role because of formal and informal commitments by the authorities to buy output from certain enterprises. Reforms also require that greater attention be paid to training in such areas as organization and financial management as well as quality control.

Apart from a lack of qualified management in many firms (and government institutions) one major cause of the slowness of reforms is the lack of clear directives as well as of self-confidence among decision makers, a fear that reforms may lead to failure. Much importance is attached to the opinion of the central government; in many cases top officials prefer a wait-and-see or at best a step-by-step strategy. This is the result of a command economy with a strict hierarchical order which is no longer appropriate: the world economy is too complex and changes too fast for optimal allocation of economic resources by a single authority. Governments and firms worldwide have therefore decentralized decision-making to be more adaptable to market trends and requirements. One reason for the success of the TVEs is their flexibility and their understanding of specific market segments and niches. Their ability to respond rapidly to changes could serve as a model for the authorities. There are therefore good reasons to provide equal access of TVEs to investment resources, and to increase the number of such firms.

Investment decisions for public enterprises must be based on sound financial performance criteria; the limited investment funds available in the province should not be used to support loss-making enterprises. The long-term result can only be industrial stagnation. Selection criteria for foreign investment should also be improved. Shaanxi does lag in attracting foreign investment, and it does need that investment to modernize and dynamize industry and to improve its infrastructure. But the rather large number of underperforming projects (which admittedly are mainly in the services sector) indicates that the project assessment capacity of the provincial authorities may be insufficient. The large gap between approved and operational projects is also a reason for worry.

Fragmentation of efforts to attract foreign investors is visible in the proliferation of development zones. Have they been established on the basis of a proper assessment of the demand for such zones (which would include a stocktaking of zones elsewhere in the province and the region)? Are they equipped with the physical and institutional infrastructure needed to deal with a large influx of foreign investment? The impression of the UNIDO mission certainly was that many of them are not profitable. In short, a coordinated, professional and efficient approach to attracting foreign investors is needed.

2.7.3 China's New Industrial Policy

China's New Industrial Policy was promulgated on June 22, 1994. Its main provisions are:

- Industrial policy should not be pursued to the neglect of agricultural development: rural areas should be promoted by developing higher value added activities in agriculture and absorbing surplus labour into rural industry;

- Industrial policy is to support pillar industries, particularly construction, machinery, petrochemicals, automobiles, electronics. Support to pillar industries will include a standardised mechanism for loans, direct access to foreign loans for large scale enterprise groups, and limited periods of infant industry protection;

- Promotion of infrastructure and basic industries such as transport, energy and telecommunications should give full play to central and local initiative;

- Infant industry protection should not be an obstacle to the rapidly expanding role played by foreign trade in the Chinese economy;

- The rationalisation of industry is to take place through the promotion of competition;

- Procedures for the formulation and implementation of the New Industrial Policy will be the responsibility of the State Council, local governments being responsible for specific rules of implementation in each area.

A number of questions need to be answered before an assessment can be made of the likely success of the New Industrial Policy:

(i) The aim to develop both agriculture and industry is laudable; the question is how. For example, how will the Policy help to absorb surplus agricultural labour in the future? How will it help stem the rising inequalities between agriculture and industry, and within the industrial/urban sector?

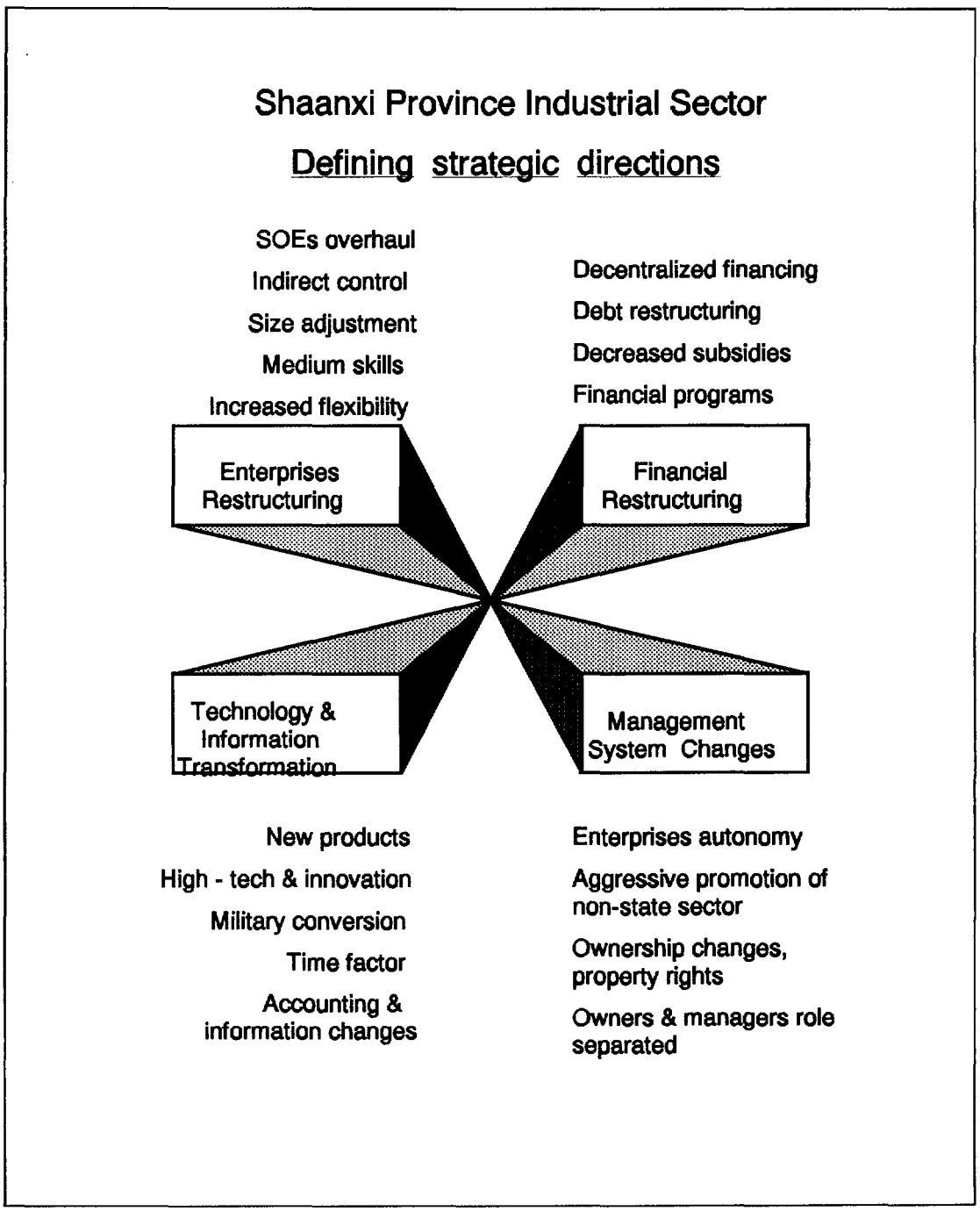
(ii) To avoid past mistakes of 'soft' loans to government-owned enterprises, a new lending institution would be needed which can efficiently administer loans to pillar industries. Will such an institution be able to insist on performance criteria being met before loans are extended or renewed?

(iii) Will it be possible to insist that export and/or productivity performance criteria are met before infant industry assistance to pillar industries is given?

(iv) Will infant industry protection be consistent with GATT/Uruguay Round obligations, if China wishes to maintain momentum in trade policy reform?

There is no easy answer to these questions, and this suggests that it will be difficult to implement the Policy successfully. Although it can be argued that sectoral intervention along the lines of the New Industrial Policy would boost activities in which Shaanxi is (potentially) strong, a functional approach - focused on improving infrastructure, human resource development (HRD) and institution building designed to help form clusters of interlinked firms - could prove more effective: such an approach could help remove some of the market imperfections which industrial policy seeks to overcome. In the context of a functional approach, the reform of the existing policy instruments, including trade policy, could first target quantitative controls, followed by rationalisation and then reduction of price interventions.

Box 2: Shaanxi Province industrial sector: Defining strategic directions



# PART III. BASIC ELEMENTS FOR THE FORMULATION OF AN INDUSTRIAL STRATEGY

Part III begins with a brief recapitulation of the basic conditions, the strengths and weaknesses of the industrial sector in Shaanxi. The major strengths include its good mineral raw material, R&D and engineering industry bases as well as its favourable location; the major weaknesses are the sluggish reforms towards a market economy, the (related) weakening of Shaanxi's position vis-à-vis the coastal provinces and the inadequate infrastructure.

This is followed by an outline of the general orientations of an industrial development strategy which would be instrumental in making the province a centre of (socio-)economic progress in Northwest China. Briefly, the future approach should be one of openness to the challenge of competition and to the opportunities offered by new markets. To make the most of these opportunities and to meet the challenges, policies should target industries which have the greatest development potential. In cooperation with the central government, a macro-economic environment should be created which stimulates progress towards a socialist market economy to allow the realization of this potential.

Within the framework of these general orientations, the actual industrial strategy would be formulated. Major components of this strategy are discussed in the sections which follow; they include human resource development, infrastructural development, enterprise reform, measures which increase the flow of financial resources to the industrial sector as well as ensuring their effective use, and trade promotion. Again, cooperation with the central government is essential, but intensified cooperation with neighbouring provinces is also required.

Part III concludes with some suggestions for future technical assistance in the areas of market analysis, executive training, infrastructure development, military conversion and cleaner production.

## 3.1 Shaanxi's industrial sector: the basic conditions

### 3.1.1 Internal qualities of the sector

Two important factors decide the internal strength of the industrial sector in Shaanxi Province. The first relates to the past industrialisation process. The government strategy to develop a "third line industry" in the Northwest has resulted in the build-up of substantial technical and technological capacities. These should be updated and exploited for industrial development. The second relates to the growing awareness of competitive challenge. Changing patterns of trade and services provide opportunities even for small industries. Small non-government-owned enterprises are proving to be more dynamic than government-owned enterprises, in spite of many obstacles. Provincial and local authorities should stimulate their growth and promote coexistence and balance between the two types of enterprises.

The main internal weakness is the continuing emphasis on public enterprises, where the habit of acting according to plan decisions still exists. Under the pressure created by the market, it is trying to adapt passively: when profits decline it does not develop new products

and invest in the future, but it cuts spending on R&D and training. The result is a downward spiral: lower sales and incomes, no replacement of equipment and technological obsolescence. Public enterprises also tend to carry a heavy social and welfare burden. Access to external financial resources is limited even for them. Working capital is a particular problem. To overcome liquidity problems many enterprises stop paying bills. As more companies adopt this short-term measure, the problem worsens: those who are not paid cannot pay their invoices. This is typical of economies in transition where no financial restructuring measures have been taken. In Shaanxi this so-called "triangular debt" problem is especially severe. Government intervention takes the form of temporary rescue of some companies at the expense of others. The "liquidity disease" thus spreads throughout the sector, and investment resources are distributed on the basis of political rather than economic criteria, which inevitably has negative longer-term consequences.

### 3.1.2 Strategic external situation

Shaanxi can become a regional communication and technology hub. In this context much depends on overall reforms by the central government, such as the proposed changes in the social security system which will free enterprises from social duties. The contribution of provincial authorities would for example include stimuli for the conversion of the defence sector: 183 military enterprises employing 330 thousand staff, to a large extent with very good qualifications. Conversion to civil production was declared a development strategy in 1978, but progress has been limited. Civil production often remains part of a military complex, and no separate records of its profitability are available. Civil products with unexplored potential which can be based on military technology include aeroplanes, textile machinery, automobiles, refrigerators, computers, chemicals and alloys. The military research institutes could be also converted, and their valuable equipment better utilised: the current utilization rate is less than 40 per cent.

The most important external threat is competition by other provinces. Shaanxi, for example, wants to develop a high-tech sector. This may seem a good strategy for industrial progress. Competition however is strong: many provinces in China want to become high-tech leaders. Some coastal provinces have successfully established modern electronic, machinery and computer industries, and are attracting qualified labour from Shaanxi - the province is actually supplying free educated human resources to other provinces. Retaining or, preferably, strengthening the human capital base will be costly in terms of incentives and educational/scientific infrastructure, for the assumption that the existing technological and scientific base is sufficient is incorrect. In reality this base - established in the previous two decades - is becoming obsolete very quickly.

A more broadly based development strategy is more likely to succeed. It would therefore make sense to look at less advanced industries in which the province has a comparative advantage, such as textiles as well. These can be modernized with relatively modest investments in equipment and human resources. Current central government policies create many opportunities for industrial development, also in these areas. The province should actively pursue these opportunities. The experiments with enterprise management allowing greater flexibility to public enterprises should be expanded to increase their impact.

The following synopsis summarizes the strengths and weaknesses of Shaanxi and its industrial sector. SWOT is an acronym of strengths, weaknesses, opportunities and threats.

Box 3 SWOT analysis of Shaanxi's industrial sector

| STRENGTHS | WEAKNESSES |
|---|---|
| - DYNAMIC NON-STATE SECTOR<br>- GOOD RESEARCH AND TECHNOLOGY BASE<br>- GROWING AWARENESS OF COMPETITIVE CHALLENGES | - DOMINATION OF LARGE STATE-OWNED ENTERPRISES<br>- LOW REINVESTMENT AND R&D SPENDING, LIMITED TRAINING<br>- LACK OF FINANCE & INADEQUATE WORKING CAPITAL<br>- SOCIAL ROLE OF ENTERPRISES<br>- WEAK HORIZONTAL AND VERTICAL LINKAGES |
| **OPPORTUNITIES** | **THREATS** |
| - LOCATION: REGIONAL TRANSFER AND DISTRIBUTION HUB, LOCAL MARKET<br>- NATURAL RESOURCES<br>- ENTERPRISE EXPERIMENTS<br>- MILITARY TO CIVIL CONVERSION<br>- SOCIAL SECURITY, LABOUR & WAGE REFORMS<br>- DEVELOPMENT ZONES FOR ADVANCED INDUSTRIES<br>- CATCHING UP WITH COASTAL PROVINCES | - INFRASTRUCTURE LAGGING BEHIND<br>- NON-COMMERCIAL FINANCING CRITERIA<br>- "SEARCHING FOR WINNERS" POLICY<br>- UNDERDEVELOPED BANKING SYSTEM<br>- WEAK INDUSTRIAL SERVICES SYSTEM<br>- MIGRATION OF QUALIFIED LABOUR<br>- COMPETITION FROM COASTAL PROVINCES |

### 3.2 Towards an open economy

**The future development strategy of Shaanxi should be outward-oriented: the strategy should not restrict itself to solving provincial problems with the means available in the province, but aim at developing synergies and dynamic linkages between economic agents within and outside Shaanxi.** Developing the province means developing Shaanxi's presence in Chinese as well as in international markets. In this way, Shaanxi could eventually become a net exporter of products, capital or services to other provinces or countries and reduce its financial dependence on the central government.

Shaanxi plays an important role in Northwest China, and accelerated growth can therefore serve as a catalyst for the region. Strengthening interprovincial links to make the most of the combined human, natural and technological resources would be beneficial to all provinces in the Northwest. The Shaanxi Provincial Government should therefore actively promote the economic integration of the region, removing interprovincial trade barriers and accelerating the introduction of market mechanisms. Cooperation with coastal provinces could result in the transfer of labour-intensive activities benefiting from lower wages in Shaanxi.

Shaanxi's landlocked location is considered a handicap by some. But there are many examples worldwide of inland regions becoming economically successful. Markets and technologies which can contribute to industrial development in Shaanxi can be found in other Chinese provinces. Entrepreneurs and investors in these provinces are also looking for partnerships or other forms of cooperation. Focusing on the domestic market has the advantage of easier access to market or market segment information; consumer preferences are easier to know; there are no language barriers; and there are fewer transport problems.

The so-called "three-circle framework" for regional development in China could help to focus efforts to strengthen the role of Shaanxi in the Chinese economy. Briefly, this approach groups provinces in three circles:

- The exterior circle consists of coastal areas and inland border areas. The conditions for economic relations with other countries are best developed in these, and are very favourable to export-oriented industries;

- The interior circle consists of areas along Longhai, Jingguang and Baocheng railways as well as the Changjiang (Yangzi) River. These are the relatively well developed inland regions. Central and southern Shaanxi are among them. The emphasis here could be on import substituting industries.

- The intermediate circle including areas along the Yellow River and the provinces of Anhui, Jiangxi, Hunan, Guizhou, Guangxi and Sichuan. These have abundant energy and mineral resources, and could become the focus of efforts to build up the basic industries. Northern Shaanxi would be part of this circle.

Regional development suggestions were presented recently by the Shaanxi Planning Commission. By increasing cooperation with the Jianghang and Chengyu regions, the Guanzhong region of central Shaanxi could, for example, become a major inland "development pole" focusing on import-substituting industries, which would be of great interest to investors. The northern area could become the locus of major energy and chemical industries. It should be emphasized that a development focus on certain activities should not mean that other activities, especially the search for overseas markets, are neglected.

The many opportunities existing for Shaanxi's industrialists within China does not diminish the significance of overseas markets; investors and sources of technology are of major importance for the future development of Shaanxi. For information systems, management and organization methods which are a crucial part of a modern market economy the province will also have to rely on sources outside China. Shaanxi is located close to the

emerging Northeast Asia Economic Zone which, apart from industrially well-developed Chinese provinces such as Liaoning, includes major and emerging industrial powers like Japan and the Republic of Korea.

To create the conditions for an open economy, a macro-economic policy framework is needed which minimizes domestic and international trade barriers and creates an attractive investment climate. This will be discussed in Section 3.3. **The creation of a dynamic modern economy in Northwest China with Shaanxi at its centre also requires:**

- **A government which guides and stimulates rather than controls economic development;**
- **A partnership between government and the business community;**
- **Further decentralization, balanced by increased cooperation between authorities at various levels within the province and at the inter-provincial level;**
- **Cooperation within the business community (through professional organizations, etc.);**
- **Flexibility and dynamism on the part of government officials and enterprise managers;**
- **Flexibility in production to react promptly to changes in markets; this again requires:**
- **Networks between enterprises (subcontracting, etc.);**
- **The introduction of environmentally sustainable industrial development (ESID) methods to ensure the long-term viability of the development strategy.**

## 3.3 Industrial targeting

In principle, market forces should shape the structure of the industrial sector. This implies that, as markets develop, the structure of the sector has to change as well. Industries on which future development in Shaanxi should focus should exhibit dynamic competitive advantages, by which is meant the capability of an industry to produce goods (or services) at lower production and distribution costs than its competitors, and to continue doing this as the economic and technological environment changes.

However, it is possible for the provincial government to guide development as the role of market forces in the economy increases. In cooperation with the business community, it can identify those industries from which the province is likely to benefit most. The industries discussed in the following paragraphs are largely identical to those recently identified by the Shaanxi Planning Commission as having major potential.

**In the present transitional period towards a socialist market economy it makes sense to rely for industrial growth in the first place on successful established industries, given the limited financial resources and know-how. These industries can also become major exporters - if design, quality and marketing of products are improved.** Emphasizing certain industries does not mean that other, new industries should be discouraged; but their contribution is probably limited in the short-to-medium term, as their potential must be explored and capacity be built up first.

Meanwhile the performance of the existing strong industries should be improved. Electronics, telecommunications and electrical equipment; textiles; machinery; transport equipment; and chemicals have sufficient potential to remain Shaanxi's core industries in the medium term, but they require restructuring and modernization. Also, their existing and potential markets should be analyzed, and efforts should be made to enter into new markets. The potential for further conversion of defence industries, which could make important contributions to the industries mentioned above, should be further exploited.

**While the technological base is good by Chinese standards, the available technological and business skills are unlikely to be sufficient to support machinery, transport equipment or electronics industries which are capable of competing with "high tech" firms in the international market. Instead, the province should try to aim at strengthening its position in industries using medium-level technologies. The comparatively low wages would also make the province attractive for assembly operations.**

**A large development potential could exist in the rapid growth of industries which are still small - pharmaceuticals (including medicinal herbs), wood processing and printing. Other potentially strong industries (because of their links with a strong local raw material base) include food products, and ferrous and non-ferrous metallurgy.** Most of these industries make modest demands on skill levels; the labour-intensive food and wood products industries moreover would benefit from the comparatively low wage levels, and it is suitable for smaller-scale operations using unsophisticated technologies. This would be a typical area of TVE development.

Among the food processing industries, cereals and fruit processing would be two possible growth industries. High-quality food processing based on typical local products could find profitable niche markets. To ensure sufficient supplies, productivity in the agricultural sector must be increased. The Shaanxi government's intention to boost farm yields and to accelerate agricultural diversification and modernization is of great importance in this context. Cooperation between processing plants and farmers could also play an important role. Agricultural modernization will also give a boost to the production of agricultural equipment and chemicals. For supplies, agro-processing industries should also look to neighbouring provinces.

**Shaanxi's large deposits of mineral resources offer a great opportunity for developing an integrated metals industry which supplies not only the Chinese but also the international market. The demand for metals will increase in China and in Asia as the demand for transport equipment, building materials and a wide range of consumer goods increases.**

Molybdenum presents an interesting case. Shaanxi ranks no. 1 in China in the production of molybdenum oxide and current domestic demand is much higher than the supply. The situation in the international market is the same, as two of the main exporters, the CIS and Mongolia, have difficulties in delivering. Prices have increased enormously. This situation will probably not change during the coming two years, giving the local industry an opportunity to reinforce its position in the national market and increase its international presence. Economies of scale could be achieved through cooperation among enterprises; this would also help to resist future competition. As a group, the molybdenum enterprises have an opportunity to acquire international importance.

Mining and metal industries are capital intensive, returns on investment are slow and the environmental problems are great. Exploitation and investment promotion therefore require serious preparation. Local community representatives should participate in establishing the conditions for exploitation. It has already been mentioned that evaluations of their competitiveness in the national and international markets must be made first. Key elements of such studies would be present and expected market shares, scale economies, growth rates, technological and financial situation, ownership issues, productivity and management quality. This sort of information is difficult to get in Shaanxi, yet it is essential for correct decisions on the allocation of investment resources. It is especially important for outside investors who are unfamiliar with the province.

**In general, thorough studies of demand and potential markets should be made before attempts are made to develop new major industries, to avoid the creation of unviable plants and excess production capacity. To prevent uneconomic production in the future, far more attention also needs to be paid to the issue of scale economies.**

### 3.4 The macro-economic framework

Much has already been done in China as a whole and in Shaanxi Province to dynamize the economy and to provide greater scope for market-oriented economic activities. The central and provincial governments should however continue to further improve the overall framework for economic development. Specific measures to stimulate Shaanxi's economy and promote its outward orientation can only be implemented successfully if such a framework is fully developed. Generally speaking, these measures should promote flexibility and decentralization in the economy, provide better conditions for investments and stimulate their efficient allocation.

Political decision makers should pay attention to the transparency and credibility of new policies and measures. They must strive for long-term economic and political stability, and ensure that government agencies are capable of effective policy implementation. Transparency has several aspects: avoidance of contradictory policies and measures, avoidance of complex regulations and simplification of procedures.

**The main macro-economic issues which require attention from policy-makers are:**

**<u>Taxation system:</u> expansion of the reforms of the tax system to establish a tax system which more closely resembles that used in market economies; further simplification of the tax structure (e.g. reducing the range of VAT rates,**

**expansion of the VAT system to replace remaining product taxes); tax incentives for new TVEs and private enterprises.**

**Financial infrastructure: real positive interest rates to attract savings and to ensure financial discipline among borrowers; increases in the scope for independent bank operations, complemented by improvements in the supervisory and regulatory capacity of the central bank; improvement of the loan appraisal capability of banks; better access to bank loans for TVEs and private enterprises.**

**Trade and price regulations: removal of national and interprovincial barriers to trade to ensure better access to supplies and markets, and to increase competitive pressure on enterprises; progressive reduction of price regulations and increases in the role of markets in determining prices.**

**Investment regulations: simplified procedures for larger-scale projects still requiring central or provincial government approval; better selection of public-sector projects to ensure that investments using scarce government resources are economically effective; further improvements in the investment code to stimulate private investment; assessment of the incentives available in special zones (even-handed treatment of investment inside and outside the zones).**

**Other market-oriented reforms: full implementation of programmes designed to separate ownership and managerial responsibility in public-sector firms; further improvements in the system of property and enterprise legislation to stimulate private enterprise and clarify government ownership issues; phasing out of subsidies to public-sector enterprises; greater scope for TVEs; removal of regulations discriminating against private enterprise.**

## 3.5 Key components of a development strategy for the manufacturing sector

The following pages present a group of key points to be taken into consideration in a medium-term development strategy for the manufacturing sector. The suggestions are partly based on the experience with development schemes implemented elsewhere in Asia and in other developing countries. The need to mobilize both internal and external resources to maximize development effects, as advocated in Section 3.1, is underlined. A number of the following suggestions were presented at the Beijing Seminar on Shaanxi's Industrial Development Strategy, held at the end of the field work on which the present document is based, and met with support from the participants in the Seminar.

### 3.5.1 Human resource development for industry

Shaanxi has a large number of high-level technicians and scientists, but their skills and know-how would in many cases have to be upgraded if they are to remain useful for advanced industries. There is competition from coastal provinces for these highly qualified human resources; therefore retaining them in Shaanxi is another problem. There is also a shortage of administrative and managerial skills. The most acute problem however is the deficit in middle and lower skill levels, and the solution of this problem must be a long-term priority.

**An expansion of basic education is needed to improve the literacy rate. More funds for secondary and middle-level technical education are also needed, and the acquisition of business administration, marketing, etc. skills must be given more attention.** In all cases, increased participation of girls and generally of people in rural areas should be ensured. For real improvements in technical education, it may be necessary to seek assistance to 'train the trainers', and technical education must be more closely matched to job requirements in sectors which employ lower to middle level skills. This again is only possible if decision-makers have a vision of the future role of industries which heavily rely on these skills. Focusing training needs will also help to save financial resources. **Technical education must be complemented by on-the-job training in the enterprises, followed by refresher courses as new production methods (technological and organizational) are adopted. Women should be fully represented on such training courses.**

**In the very short term, improving the know-how of high-level government executives and enterprise managers is an even greater priority.** These executives are well educated, but they lack international experience, knowledge on modern methods of management, new communication methods, practical knowledge of market economies, marketing, international business, trade and finance. The younger public servants (men and women) and managers who will be the decision makers of tomorrow need to be trained in these issues as well. Shandong has trained officials in Hong Kong, and Shaanxi could formulate a similar scheme for both officials and managers. Executives who are trained this way will be able to avoid mistakes during the transition to a socialist market economy and the younger generation of officials and managers will bring more dynamism to the process. If the province is to benefit fully from such training, the participants should be given increased responsibilities and promotion prospects.

**To finance HRD outside the educational budget, long term credit and tax deductions can be made available to enterprises investing in training. Enterprises should also be enabled to intensify contacts with, for example, more developed East Asian countries which are willing to provide training facilities or traineeships in factories. Assistance can also be sought from the donor community.** The question remains how the "brain drain" from Shaanxi is to be stopped. Where Shaanxi cannot provide equally attractive standards of living, other incentives, such as greater independence and responsibility on the job and more rapid promotion may help to retain highly qualified personnel in individual enterprises. Generally, a more market-oriented provincial economy (including a liberalized labour market) which increases the potential range of professional activities within the province would help to keep such people in Shaanxi. **To guarantee a sufficient supply of highly qualified technicians and scientists, however, a modernization of tertiary technical education is needed as well, including "permanent education" facilities to keep their know-how up-to-date.**

### 3.5.2 Physical infrastructure

Under the New Industrial Policy, the central government's responsibility for industrial infrastructure is to be reduced to very large projects. The provincial government is making great efforts to improve infrastructure, but the costs are enormous. **To limit the provincial government's costs for infrastructural development, it could consider one of the various**

**types of build-operate-transfer (BOT) schemes as well as foreign direct investment (in the form of, for example, equity swaps or municipal bonds).**

BOT is a technical-financial mechanism used for the development of infrastructure. It has become increasingly important since the second half of the 1980s, especially in Asia, for financing power generation plants, roads, airports, industrial parks and so on. Under a BOT arrangement, the government authorizes the investor to exploit newly built infrastructure during a certain period (usually upwards of 10 years) to cover the costs and make a profit. The infrastructure is then transferred to the government which can authorise a new period of exploitation or transfer it for operation to another private or public enterprise. The government's infrastructure expenses are thus reduced, and apart from the actual physical product - a road or telephone network - technologies, managerial and financial capabilities are transferred. As the sole operator, the investor can make a substantial profit. These factors explain the attractiveness of BOT agreements.

BOT projects cover fairly long time spans and involve a large number of participants (investors, builders, governments, etc.); therefore they require careful structuring and expert handling as well as transparent rules and political stability. Carefully used however, the different types of BOT are powerful tools to attract national and foreign investment and to pass gradually from a centrally planned economy to a decentralized one. Most BOT arrangements involve various local enterprises and a group of foreign companies. Usually both sides create a new company which actually carries out the project.

There are examples of BOT projects in China. The Fujian provincial government is promoting foreign investment in highway construction. Three types of BOT are proposed for periods of up to 30 years, with income tax at 15 per cent, tax exemption for the first five profitable years and tax reductions of 50 per cent during the next five years. A 40 per cent tax refund is possible if profits are partly reinvested in other infrastructure projects in China. Equipment is exempt from import duties if it cannot be purchased in China. Builders can also issue construction bonds through domestic and foreign banks and the income from the total investment can be remitted abroad. BOT projects are supported by the Asian Development Bank, the World Bank and several other UN organizations. UNIDO which has also built-up a BOT Programme is cooperating with the State Planning Committee in formulating regulations and establishing standard contractual provisions for BOT projects in the road and power sectors.

This example could be followed in Shaanxi. Infrastructure building can have a strong impact on the Shaanxi economy by the demand for local services and products (for example building materials; telecommunications). Promotion of infrastructure projects will also permit the development of joint ventures stimulating the transfer of technologies and management methods to the region.

The types of infrastructural projects would include:

Transport. Expansion of the modern regional road system is needed, including petrol stations, electronic control systems, restaurants and garages - not only for regional transport needs, but also to boost trade with other provinces and countries. Tolls, which can be run by private companies, would pay for the project, according to rules established by the

government. Road development will give a boost to transport, construction and electrical goods companies, cement and food producers, mechanics and unskilled employment. The various railway projects now being offered to investors could also be executed under a BOT agreement. Finally, the province would need to improve its air services for high-quality low-volume exports.

Telecommunications. A modern telecommunications network is of crucial importance for economic development, information being one of the main "raw materials" of any business activity. While much is already being done to upgrade the telecommunications system in Shaanxi, further improvements in telecommunications will be needed. This will provide new market opportunities for enterprises producing telecommunications systems, other types of electric and electronic products and measuring equipment. It could also stimulate civilian production in defence industries.

Energy. Energy infrastructure must be modernized; equipment which pollutes less is particularly needed. This will stimulate the demand for boilers, turbines, high tension cables, power equipment and all related services. Projects should be carried out and managed together with provincial enterprises. There would also be opportunities for suppliers from neighbouring provinces.

Environment. Apart from pollution-free power generation, the province also needs better waste water treatment, sewage systems, treatment of hazardous and industrial residues, waste collection and recycling systems. The introduction of new environmental management methods will reduce municipal expenses and provide opportunities for enterprises.

### 3.5.3 Enterprise reform

While Shaanxi should encourage the establishment of new industrial enterprises, the existing enterprise structure needs to be radically overhauled to make the industrial sector more productive and competitive, and to weed out unviable activities. Mergers may be needed to achieve economies of scale. One finding of the UNIDO mission is that **a provincial strategy for industrial restructuring is needed which directly addresses problems at the enterprise level, because of the large number of enterprises owned by the provincial government.** Improved performance of public sector enterprises should have beneficial effects for the manufacturing sector as a whole.

**Public enterprises should be selected for restructuring on the basis of a clear concept of the future role of the public sector, and the selection should take competitiveness, markets and profitability into account.** The amount of investment needed to create a competitive enterprise must also be considered. Audits of enterprises which have been selected for restructuring should be carried out by independent specialised firms. The audit must address technological, marketing, financial, managerial, employment and environmental issues.

Where enterprises are found viable, credit should be made available to modernize equipment, improve labour and management quality, raise productivity and establish a competitive product range. Credit, however, must no longer be regarded as a subsidy; it should only be extended to firms which can be expected to repay these credits. Debt

restructuring, especially of debt related to financing of working capital and mutual indebtedness (see above), will probably be needed in many enterprises. Better financial performance will to a large extent depend on public-sector enterprises becoming competitive after restructuring, but it is also essential to introduce sound financial management through internationally accepted accounting methods.

It has already been pointed out that the responsibilities of the owner and the management in public enterprises should be clearly separated; this was one of the issues discussed at the 14th Party Congress. **Transfers of enterprises to the non-government sector should however also be considered.** The government could retain shares in such enterprises while encouraging cooperation with local private firms, to dynamize the industries. The experience of other cities and provinces in China which have pioneered enterprise reform should be studied in this context: in Wuhan, for example, 180 shareholding companies were established in the first half of 1994; reputedly 70 per cent of these have seen their profits grow by more than 25 per cent. In the same city, large-scale "renovation" of public enterprises is under way in cooperation with foreign investors. **In order to attract foreign know-how and technologies, it is important that foreign investors are allowed to buy controlling shares in enterprises, just as domestic investors.** The widespread use of shareholding as a financial and ownership instrument, however, requires the development of financial markets and this is a medium to long-term issue.

One restructuring problem is the social responsibility that public-sector enterprises have. These **enterprises could consider introducing private pension schemes to which employees make an obligatory contribution; the money is invested in funds authorised by the government.** Such schemes are, for example, commonly used in several Latin American countries. Employees have the right to join these private schemes instead of government schemes. Competition for pension savings means that favourable conditions are offered. This has increased in-payments, which again has dynamized investments. In China, experiments with old-age pension insurance are under way as well (for example in Anshan, Liaoning); this is another experience worth studying.

**Restructuring also should look into the possibilities of separating essential and non-essential activities of large firms to increase flexibility and specialization in the industrial sector.** The firms can then concentrate efforts on core activities while independently operating subsidiaries can develop the other activities. Since 1992, however, there has been a trend in the opposite direction towards the formation of large enterprise groups. These are formed "top down" without sufficient regard for economic rationality. **Market forces can create conditions in which mergers will improve performance of industries; instead of creating enterprise groups by administrative decree, the government should create a legal framework which stimulates the voluntary creation of groups.** This process may also lead to independent spin-offs, as the new conglomerates concentrate on core tasks.

### 3.5.4 Financing industrial development

The role of government financing

**In the middle and long term the provincial government should reduce its role in the economy progressively to specific areas of public interest. Where scarce investment resources are allocated to industrial enterprises in the public sector, the duration and purpose of such credit should be well defined. Priority in allocation should be given to industries that have:**

- **A key role in the provincial/national industrial development strategy;**
- **Dynamic competitive advantage;**
- **A high potential for upstream and downstream linkages;**
- **A potential for merging with or creating larger groups at national and international level to enhance, among others, economies of scale.**

Prioritizing and limiting public investment serves several purposes: public enterprise managers will be stimulated to generate investment resources internally or to look for resources in the market; there will be more scope for private sector investors in the capital market; and the government will learn how to allocate resources effectively.

Foreign investment

**In the longer term, enterprises which require external finance for working and investment capital should basically rely on bank loans or attract Chinese or international investors. Increasing the domestic financing rate of industrial projects requires a better financial infrastructure.** It should be possible for banks to tap, for example, savings on a larger scale - for China as a whole savings were expected to increase by 500 billion Yuan in 1994. This section, however, will focus on foreign investment.

**The investment guide for Shaanxi should be formulated in such a way that no confusion can arise about the interpretation of its provisions. While temporary special incentives for foreign investors may help to catalyze the economy, the investment code should basically ensure equal treatment of domestic and foreign investors.** As Shaanxi is competing with other parts of China and locations elsewhere in Asia for investment, the code should moreover take account of incentives for investors which are available at other locations in China and other developing countries in Asia. **Special attention should be given to more rapid implementation of approved investments.** The implementation rate could be increased considerably if local partners would fulfil their contractual obligations promptly, and obstacles (slow import clearing procedures, transport problems) to the import of essential machinery, inputs, etc. were removed.

The UNIDO mission had the impression that facilities which are, for example, provided by one of the major development zones in Shaanxi are not competitive when compared with those in other regions and countries. Provincial authorities should also ask themselves whether the rapidly increasing number of development zones is beneficial. It is not clear that the need for such zones has always been carefully studied. The many zones threaten to put economic activities outside the zones at a disadvantage, and the variety of

incentives leads to confusion among investors. Moreover, across-the-board incentives may attract speculative investment as a result of which the country may lose more in tax income than it gains from new economic activities.

**Zones are important as "laboratories of reform", especially for inland areas of China which need to catch up with the rapidly developing coastal areas. But the type of investment which is wanted needs to be carefully defined, for the real proof of a successful development zone is that the experience can be transferred to the rest of the economy.**

Box 4: Debt-equity swaps and regional investment funds

**Debt-equity swaps (DES)**

The debt-equity swap (DES) is a financial mechanism which became popular in the international debt market in the 1980s. It has been used in Latin America and South-East Asia to reduce country debt while stimulating investment in industry and ecological projects at the same time. The main partners in a DES usually are a domestic or international investor, a lending bank and a debtor country. Various intermediaries provide special services.

Debtor countries have an interest in reducing debt and attracting investors. This can be done by creating special mechanisms allowing debts to be exchanged (swapped) against investments in the country. A debt with face value of, say, US$100 may be bought at US$60 and exchanged against US$85-100 in local currency, to be invested in the country. The investor benefits by buying debt at a discount with the prospect of making a profit; the creditor prevents potentially heavy losses; and the country in question benefits from investment which potentially contributes to economic growth. DES are mainly considered suitable for short-term, well-targeted, modest-size projects.

Bilateral debt conversion is a different type of DES; it is used by central banks, investment promotion organizations and environmental NGOs. The creditor organization or country exchanges (part of) the certificates of its bilateral debt against bonds with the same characteristics (maturity period, interest rates, etc.). The bonds are then deposited in a bank in the debtor country and the interest accrues to the creditor or an organization named by both sides (e.g. an environmental fund). To ensure that bilateral debt negotiations benefit a region or province, local authorities must entertain strong links with representatives of the central government in such negotiations.

**Regional Investment Fund (RIF)**

The Regional Investment Fund (RIF) is a different mechanism to attract investors. There exist many types of funds. Some commercial banks create funds covering a whole region (e.g. the South-East Asia Fund), other cover a country (e.g. Japanese and Korean funds), other cover specific sectors (e.g. industry-oriented funds). RIFs raise money in the international market when a market opportunity is identified. The portfolio is then actively managed in the emerging market and traded in the major international security markets. The main advantage of this type of fund is that it avoids the strong fluctuations of shares due to the inflow and outflow of money in relatively small stock markets. The disadvantage is that large-scale projects are required to reach a critical mass of money that will provide liquidity on the secondary market of the main stock markets. For China, it is essential to point out that an RIF (as well as a DES) requires internationally recognized accounting systems and periodical independent audits of enterprises.

Some new methods to accelerate investment - debt-equity swaps (DES) and regional investment funds (RIF) - are described in Box 4. These have been successfully applied in other developing and in industrial countries. Given the present financial structures in China, they cannot be applied outright. But the problem could be solved through cooperation with banks in financial markets such as Hong Kong, Tokyo and Singapore. **In Shaanxi, DES can be used for investments in some sectors. These would include military goods, textiles, water supply and environmental services.** The relatively limited experience and low liquidity of the regional stock market argue against an RIF in Shaanxi. **However, a Shaanxi RIF established through the Shanghai Stock Exchange could be combined with traditional venture capital financing - medium and long term equity investments which look for high returns in high-risk, high-growth markets and advanced products.** "Niche" markets are often ideally suited to venture capital financing. In the case of Shaanxi, an RIF could attract advanced industries wishing to expand in growing markets, such as telecommunications equipment.

It should be noted that an RIF demands strong commitment for regional public authorities which must promote and sell it to the central government and to lenders and investors. The provincial government should join forces with provincial support institutions (such as the Chambers of Commerce), enterprises and the banking sector. International sources of investment could include the World Bank, the Asian Development Bank, the European Union, etc. Lobbying for a Shaanxi RIF with these should involve the Commercial Attachés of the Chinese embassies.

### 3.5.5 Institutional infrastructure for trade and investment promotion

Although trade is expanding, exporters in Shaanxi still face serious problems in areas like market information, distribution networks, quality control, standards, export financing, insurance and transport. **Joint ventures in the transport business should be strongly promoted. The provincial authorities should also encourage the creation of diversified groups of large and small exporting-importing companies.** The experience of the Sogo Soshas of Japan and/or Chaebols of the Republic of Korea could be studied. The former are adapted to trade in a wide range of industrial products and systems, the latter are more flexible and adapted to promote light industrial products.

**Agricultural and industrial enterprises should also be allowed to trade directly.** This will intensify contacts and therefore stimulate links with foreign customers and potential partners. **Assistance (information, training and credit lines) will initially be necessary to enterprises to allow them to build up trading capabilities. Government trading organizations and new trading firms or direct exporters should receive equal treatment, as already suggested for enterprises in general. More competition for export quotas should be introduced and administrative and other barriers to foreign and interprovincial trade should be removed. As long as MOFTEC still allocates overall export quota, Shaanxi should try to increase its quota for goods in which the province has a comparative advantage.**

**To become internationally competitive and to compete with imported products in the home market, the quality of products should be improved and international**

**standards must be introduced. Shaanxi should also consider introducing an official quality mark** for products which meet high standards and promote the sale of such products in the domestic and international markets. Both the tests and the promotion can be paid out of fees from enterprises who wish to obtain the mark. Small enterprises and new exporters can be temporarily exempted from fees, if their goods pass the tests.

Trade promotion could be one task of a Trade and Investment Centre. This centre could also be the focal point for information on international standards.

The Shaanxi Trade and Investment Promotion Centre

**To simplify investment procedures and to provide investment information, the creation of a privately-owned centre promoting investment is recommended. Such a promotion centre, preferably a joint venture with a foreign firm, should be established at fairly short notice. It could also take the responsibility for trade promotion.** The Centre should have close connections with potential investors, banks and international organisations. The enterprise would actively promote Shaanxi domestically and abroad, assist in the preparation of key investment projects and facilitate their completion. It would also contact potential business partners in traditional and new markets and actively assist governmental organisations in improving their trade and investment promotion programmes. Examples of such centres can be studied in Hong Kong, the Republic of Korea and Singapore. A similar Trade and Investment Promotion Centre, possibly a joint undertaking of the provinces of the Northwest, could be set up in one of the coastal provinces.

The Centre would have:

(i) All administrative facilities for investors and traders in one place ("one stop shop" concept). This minimizes administrative costs and delays. Here, the investors and traders would also be given all relevant information on the investment legislation code and foreign trade regulations.

(ii) An on-line information centre giving access to market and technological information. Ideally, all firms and institutions needing such information should be linked by computer, including links to foreign data banks. With Internet access now possible in China, the centre would facilitate access to investment projects, procurement procedures, firm information, regulations and so on. It should basically be self-financing (fees for services, subscriptions to data banks), but MOFTEC, other provinces and trade corporations might be interested in participating and co-financing the centre. With sufficient subscribers, the information centre can considerably reduce the high costs of participating in international data bank networks. The information revolution in the world market requires that China create such centres in all the regions.

The Northwest Free Trade Area

Economic growth has strongly increased the demand for financial services in Shaanxi and other provinces in the Northwest. The growing number of projects under preparation will further increase the demand for such services. This document has made it clear that financing

the massive expansion of the Shaanxi economy cannot be the task of the provincial and central governments. **The Northwest will need to develop financial markets and boost the role of private (domestic and international) investment. For this purpose, a Northwest Free Trade Area (NFTA) could be established. A clear legal framework for all investment and financial operations would be a precondition for such a free trade area.** It should expand its activities gradually to gather experience and to test the effectiveness of its operations. Initial operations could be limited to infrastructure, metal-based industries, agricultural processing and other industries whose competitiveness is assured. The NFTA should be widely promoted to attract investors, investment groups and commercial banks; in the longer term this may allow the development of a Northwest Financial Centre (NWFC). The NWFC should facilitate the development of all financial activities and mechanisms necessary to accelerate the industrial development, such as equities, bond issues, interbank loans, treasury bills, commodity bonds, co-financing, export credit financing and so on.

Xi'an can become a strong financial centre of the northwest of China. Its infrastructure (telecommunications, banks, hotels, development zones), location, industrial base and cultural importance as the ancient capital of China should help it to become the leading centre of the Northwest. The NFTA and the NFWC will help to reduce the gap between the coast and the inland provinces, accelerating the existing relocation tendencies.

It should again be pointed out that the strongest benefits will be derived from these schemes if Shaanxi and the other northern provinces cooperate. For this purpose, the economic and social impacts of a scheme covering such a large region should be studied first. Then negotiations should take place with the neighbour provinces and with the central government to obtain preferential policies and conditions for a large free trade area. These schemes should build on the 1993 initiative of the party leaders from Shaanxi, Gansu, Ningxia, Qinghai, Xinjiang who founded a joint committee with the purpose of strengthening the Northwest Area Union and undertaking joint economic activities.

### 3.6 The role of technical cooperation

The successful implementation of the industrial strategy outlined above will largely depend on the efforts of Shaanxi Province itself (government and business community alike), on cooperation with the central government and other provinces, and on the ability of the province to attract outside investment. There are however also a number of areas where multilateral technical assistance could play a role. Possible contributions by UNIDO are outlined in the following paragraphs.

- For a successful outward-oriented strategy, Shaanxi's industries will need to acquire a deeper insight in (potential) markets and the strengths and weaknesses of their competitors. This involves training of marketing specialists and market analysts and the establishment of information bases. Technical assistance at the enterprise level, but also in the context of establishing the proposed Trade and Investment Promotion Centre could play an important role here. To be able to develop the overall strategy framework, the Shaanxi government would need assistance, in the form of market studies, as well.

- A training programme for key governmental officials would be needed to provide them with the skills for guiding the more open, dynamic provincial economy of the future. The programme would include training in management and organisation methods in industrial countries, communication and promotion tools, open macroeconomics, marketing, international business, trade and finance, economic and financial evaluation of projects, accounting, and on-line information systems. Special topics would be included as required. The programme should include visits to and possibly traineeships in the coastal provinces and developed market economies. In order to make sufficient impact, the programme would have to train 60-100 officials per year for a period of 2-3 years. Women and men should be equally represented, and participation of younger officials who will be responsible for major aspects of development strategy in the medium and long term should be emphasized.

- Shaanxi's industrial sector contributes to air and water pollution and is a hazardous source. The reduction of pollution is an environmental policy priority. While the government is implementing a number of projects in this area, the available figures suggest that environmental protection measures do not seem to be keeping pace with industrial growth. The presence of many heavy industries is likely to compound the seriousness of environmental problems. UNIDO could assist the provincial government and individual industries in introducing environmentally sustainable industrial development (ESID) concepts and, more specifically, cleaner production methods. These would not only reduce pollution, but could also result in large savings of energy and raw materials.

- UNIDO has formulated a project which would help to promote BOT projects in China. In particular, the project would evaluate BOT legislation and regulations worldwide and the actual experience with BOT projects elsewhere to enable relevant Chinese government institutions such as the State Planning Commission to define the appropriate legal, financial and operational framework for the BOT investment mode. Training and study tours for high-level Chinese officials likely to be involved would be organized as well. It is obvious that Shaanxi, where investment in infrastructure is heavily emphasized, could benefit from this type of project as well.

- Shaanxi could derive greater benefits from its defence industry capacities. Conversion to civil production has been slow and piecemeal. There appears to be overcapacity in the industry, and the sector may need restructuring. The government could be assisted in developing a systematic approach to conversion. Issues to be addressed would include an evaluation (products, markets, profitability) of existing civilian production in defence enterprises, the identification of new opportunities for civilian production, and the actual conversion of R&D and production capacity.

## 3.7 Summary of suggestions and recommendations

### 3.7.1 Creating an open economy

- Outward orientation of the future development strategy of Shaanxi: develop synergies and dynamic linkages between economic agents within and outside Shaanxi;
- Guiding/stimulating rather than controlling role of government;
- Cooperation - between government and the business community, at different government levels, between provinces and within the business community;
- Further decentralization;
- Flexibility and dynamism on the part of government officials and enterprise managers, and in production;
- Networks between enterprises (subcontracting, etc.);
- Introduction of environmentally sustainable industrial development (ESID) methods.

### 3.7.2 Industrial targeting

On the basis of thorough market assessments, focus on:

- Successful established industries (e.g. engineering);
- Small but rapidly growing industries: pharmaceuticals, wood processing, printing;
- Industries with a strong local raw material base: food products, ferrous and non-ferrous metallurgy;
- Medium-level technologies;
- Labour intensity;
- Scale economies.

### 3.7.3 Macro-economic issues

- Better adaptation of the tax system to free enterprise; simplified tax structure; incentives for new TVEs and private firms;
- Real positive interest rates; increased scope for independent banking; improvement of the loan appraisal capability of banks; better access to bank loans for TVEs and private enterprises;
- Removal of trade barriers; increased price setting by markets;
- Simplified investment procedures; better selection of public-sector investment projects; improvements in the investment code; assessment of incentives in special zones;
- Other market-oriented reforms: separation of ownership and managerial responsibility in the public sector; improvements in property and enterprise legislation; phase-out of public-sector subsidies; more scope for TVEs; end discrimination of private enterprise.

### 3.7.4 Key components of a development strategy for manufacturing

Human resource development (HRD)

- Expansion of basic education;
- More funds for secondary and middle-level technical education, more attention to the acquisition of business skills at these levels;
- Complementing technical education by on-the-job training in the enterprises and refresher courses;
- Financial incentives for HRD in enterprises;
- Upgrading the qualifications of high-level government executives and enterprise managers;
- Upgrading and updating high-level technical education;
- More international contacts, especially with East Asian countries;
- Full participation of women.

Physical infrastructure

- Improvements in transport, telecommunications, energy supply and environmental infrastructure (e.g. waste water treatment);
- Build-operate-transfer (BOT) schemes as well as foreign direct investment to finance projects.

Enterprise reform and development

- Formulation of a provincial strategy for industrial restructuring;
- Public enterprise restructuring based on future public sector role, competitiveness, markets and profitability;
- Transfers of enterprises to the non-government sector;
- Foreign investors: permission to buy controlling shares in firms;
- Study introduction of private pension schemes;
- Separate essential and non-essential activities of large firms to increase flexibility and specialization;

Financing industrial development

- Formation of enterprise groups guided by market forces;
- Long-term government role: specific areas of public interest only;
- Clear prioritization of government investment on the basis of economic criteria;
- Improved financial infrastructure to mobilize domestic investment;
- Transparent and equitable investment regulations;
- Faster implementation of approved investments.
- Development zones: "laboratories of reform" which transfer their experience to the rest of the economy;
- Mobilization of investment through debt-equity swaps and a regional investment fund.

Institutional infrastructure for trade and investment promotion

- Promotion of joint ventures in the transport business, and of a diversified trading sector, including direct trading by agricultural and industrial enterprises;
- Equal treatment of government and privately-owned trading firms;
- Assistance to enterprises building up trading capabilities;
- As long as national export quota exist: ensure larger quota for goods in which Shaanxi has a comparative advantage;
- Measures to improve export product quality, introduction of international standards and official quality marks;
- Creation of a privately-owned centre for Northwest China which promotes investment and trade;
- Establishment of a Northwest Free Trade Area to develop financial markets and to boost the role of private investment.

## REFERENCES

Shaanxi Province Statistics Office, Statistical Yearbook of Shaanxi Province, various issues, Xi'an, (in Chinese).

Shaanxi Province Statistics Office, Shaanxi Province Input/Output Tables 1987.

Shaanxi/UNIDO Cooperation Project Office, Collection of Basic Data and Information for the Formulation of Shaanxi Province Industrial Development Strategy, Xi'an, October 1994.

Shaanxi/UNIDO Cooperation Project Office, Collection of Basic Data and Information for the Formulation of Shaanxi Province Industrial Development Strategy, Supplement 1: Finance and Tax, Xi'an, October 1994.

Singh, I., China: Industrial Policies for an Economy in Transition, World Bank Discussion Papers 143, Washington 1992.

SRI International, Tianjin in Transition: Toward a more Market-Oriented Economy, Centre for Economic Competitiveness, Menlo Park 1992.

State Council, China's Industrial Policy, approved at 16th Executive Meeting of the State Council on 25 March 1994, quoted in Xinhua News Agency Domestic Service 0321, Beijing, 22 June 1994 (in Chinese).

State Statistical Bureau, People's Republic of China, China Statistical Yearbook, various issues.

UNIDO, China. Towards Sustainable Industrial Growth, Oxford/Cambridge: Blackwell, 1991.

UNIDO, Promotion of International Industrial Cooperation With the Northwest Region of China, including the China Northwest Investment and Business Forum Xi'an, Shaanxi Province, 14-20 September 1992, Terminal Report, US/INT/92/131, UT/INT/92/131, DG/CPR/91/161, Vienna, December 1993.

World Bank, China: Reform and the Role of the Plan in the 1990s, World Bank Country Study, Washington, September 1992.

World Bank, The East Asian Miracle: Economic growth and Public Policy, Washington: Oxford University Press, 1993.

World Bank, China: World Bank Economic and Sector Work Reports 1980-1994 - A Collection of Summaries and Conclusions, 2 vols., Washington, July 1994.

World Bank, China: Foreign Trade Reform, World Bank Country Study, Washington, February 1994.

World Bank, China: Internal Market Development and Regulation, Washington 1994.