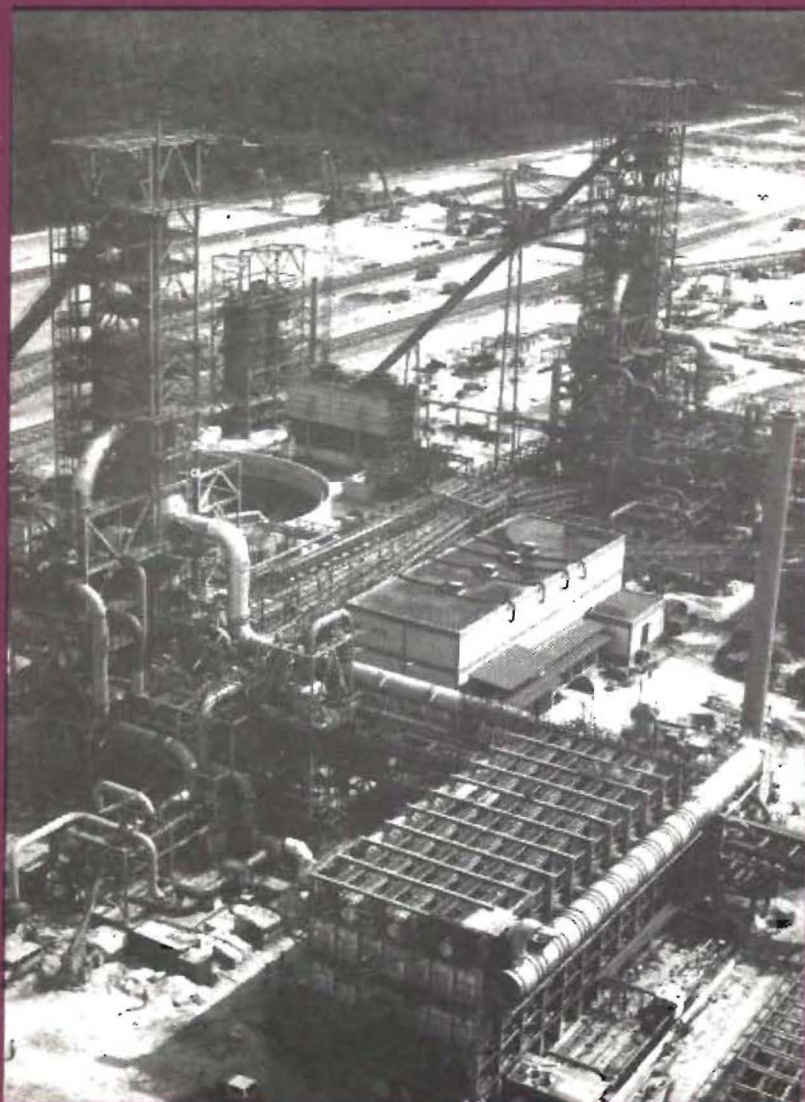


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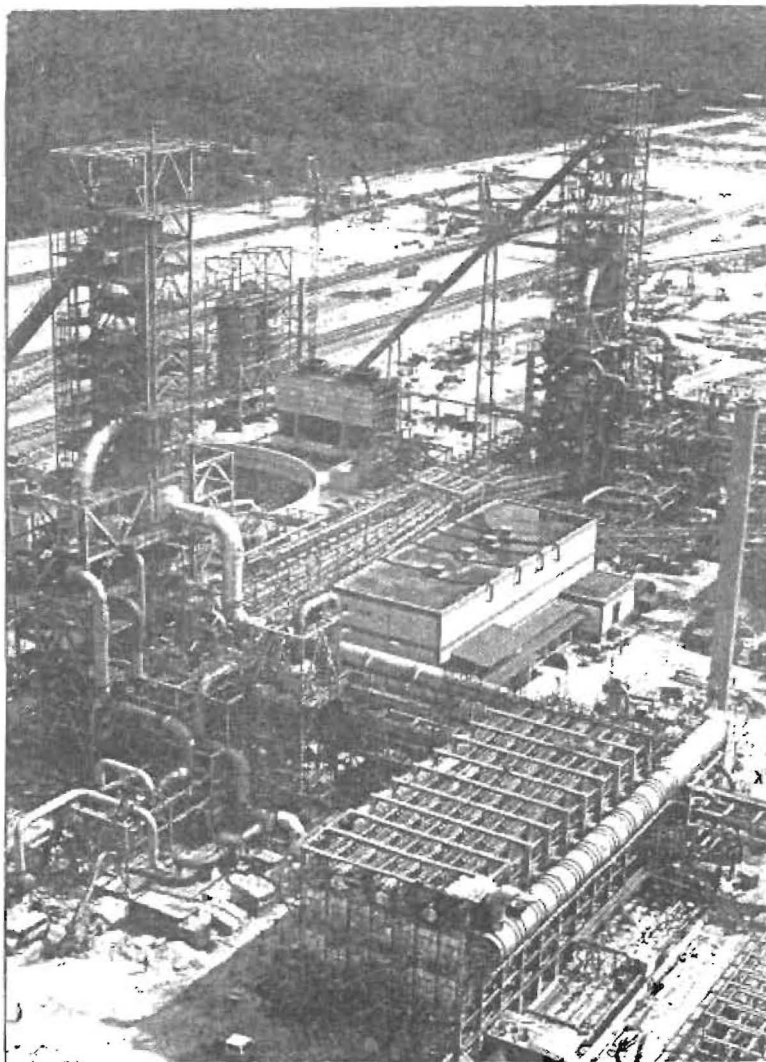


**UNITED NATIONS
ECONOMIC COMMISSION FOR AFRICA**

Volume II No.1

June 1988

FOCUS ON AFRICAN INDUSTRY



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ECONOMIC COMMISSION FOR AFRICA**

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ARTICLES

1. Articles may be quoted, provided acknowledgement is given of the source (Industry and Human Settlements Division, ECA, Addis Ababa).
2. Articles may be sent for publication in FOCUS ON AFRICAN INDUSTRY in either English or French languages. They should be brief and may be accompanied by drawings, photographs (black), slides and transparencies.

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FRONT COVER

Warri Steel Plant, Nigeria

EDITORIAL

The realization of the objectives of economic recovery and development depend on how effectively the industrial sector is restructured and prioritized so as to play a central role in the economies of Africa not only as an engine of growth but also as a means of bringing about the structural transformation that is characteristic of a self-sustaining economy. With industrial establishments concentrated in a few African countries, and the contribution of the sector to the region's total gross domestic product averaging presently 10 per cent of gross domestic product, and much of the manufacturing concentrating in light industries, the sector remains small, enclaved and ill-equipped to make an immediate impact to recovery and development. Yet with the region's immense endowments in natural and human resources, and with a significant number of industrial establishments operating at 10-20 per cent capacity which can be immediately raised substantially, the pressures imposed on the continent by the present crisis can be overcome. The potential for significant and rapid industrialization exists and the ability and capacities can be marshalled towards this end, if the determination shown by Africa since the adoption of the United Nations Programme of Action for African Economic Recovery and Development (UN-PAAERD) is sustained.

It must be recalled that, the intensity of the African economic crisis has forced not only the African leadership, but the international community at large to take a fresh look at the extent and

causes of crisis and to devise measures aimed at relieving, rehabilitating and developing African economies. It is thus worth noting, in this regard that, in recent years, the summits of the Organization of African Unity have been mostly devoted to economic matters leading, inter alia, to the formulation of Africa's Priority Programme for Economic Recovery which served as the background to the UN-PAAERD.

The present issue of Focus on African Industry is mainly devoted to the role of industry and current efforts in economic recovery and development. It reviews the industrialization policies in the light of the economic crisis and the United Nations Programme of Action for African Economic Recovery and Development (UN-PAAERD). To a significant degree, it outlines the main policies which have shaped the industrialization course in Africa and the strength and weaknesses that have characterized the performance of the industrial sector. Then the main course of action, strategy and, most importantly, the implementation and political support required for the realization of positive results, are proposed.

In the development process, it is widely recognized today that small-scale industries (SSI) can make a major contribution to the industrialization strategy of Africa. In this respect, an analysis is provided on some of the problems of the SSI and suggestions made on how to promote them and improve their operational environment. This issue also contains an assessment of the impact of

biotechnology on African development and highlights the potential benefits Africa should anticipate from this frontier area, while at the same time making sure to avoid future disasters which might result from a misuse of such technology.

Industrial co-operation in Africa is an important pre-occupation of many

countries and organizations as well as being a prerequisite for the industrialization process. Hence, an assessment is made of some recent developments in the continent. Finally a presentation is made on a manual oil press as part of the efforts underway in promoting food processing industries and alleviating harsh conditions of life in the rural areas.

AN INTRODUCTORY NOTE ON OUR NEW BULLETIN "FOCUS ON AFRICAN INDUSTRY"

There has been, as far back as the early 1970s, and on a regular basis, a publication on industrial matters in Africa with the objectives of stimulating foreign investment into Africa and to supporting efforts towards industrialization in the continent. This was entitled "INVESTMENT AFRICA". It had the following main areas of focus:

(a) publicizing viable projects that had been identified by the ECA and other UN bodies which could be implemented and operated in African countries;

(b) publicizing investment codes in practice in each African country in order to promote investment;

(c) reporting detailed industrial events on the African scene with a view to facilitating dissemination of information; and

(d) giving prominence to project notices from Fact Sheet Data.

The above objectives of INVESTMENT AFRICA were deemed proper and relevant to industrial issues as perceived in the 1970s. However, after more than a decade and half since the regular publication of INVESTMENT AFRICA, the nature and magnitude of industrial problems have changed, the strategic approach towards industrial development in Africa has also changed and so has the presumed role of industry in the overall economic development and social progress. It

has therefore been found pertinent to recast the objectives of the publication so that it deals with the industrial development issues as spelled out in the Lagos Plan of Action. The broad objective of the new publication, i.e. FOCUS ON AFRICAN INDUSTRY, will be to facilitate industrial development in African countries by:

(a) monitoring the industrial development in Africa and disseminating information thereon, including salient features of African industries at national, sub-regional and regional levels;

(b) providing guidelines for the formulation of strategies and modalities for the implementation of selected industrial projects at the national and subregional levels;

(c) facilitating and promoting the development of technological, training and financial institutions for industrial development;

(d) providing technical data with a view to stimulating the mobilization of resources (domestic and external) and to promoting entrepreneurial capabilities which would facilitate the acceleration of investment in the industrial sector; and

(e) reviewing and assessing developments in countries outside the African region particularly those aspects that affect industrial development in Africa.

REVIEW OF INDUSTRIALIZATION POLICIES IN AFRICA IN THE LIGHT OF THE ECONOMIC CRISIS AND THE UNITED NATIONS PROGRAMME OF ACTION FOR AFRICAN ECONOMIC RECOVERY AND DEVELOPMENT

There is now consensus that the African economic crisis has some of its deep-rooted causes in the inadequacy of structural transformation and the practically non-diversification of the economies since the 1960s the time of political independence. Structural changes and economic diversification would have been crucial in moving the continent away from inherited colonial economic production, poor economic and social infrastructures, in particular the quasi-absence of a significant industrial base, industrial research capabilities, technological know-how and skilled human resources that are indispensable to an integrated and dynamic economy.

After almost thirty years of political independence and in spite of all efforts made to sustain a truly independent economic development course, the basic economic structures of most African countries remained fundamentally unchanged. Most countries continue to depend heavily on the export of one or two primary agricultural products or minerals whose prices have fluctuated unfavourably in world markets. As a result, foreign exchange earning capacity has been reducing substantially. This situation has naturally diminished the import capability of African countries and adversely affected the whole set up of national development.

In spite of recent shifts to increased agricultural production and creation of supporting infrastructures, linkages among the economic, social, technological and research sectors are still so weak that many African countries are far from creating mutually supportive intra- and inter-sectoral linkages which are essential for building self-reliant and

self-sustaining economies. Moreover, the predominance of the subsistence agricultural sector which still accounts for 60 to 80 per cent of gross domestic product makes the African economies highly vulnerable to external shocks.

Notwithstanding the shift of emphasis in favour of food production, the agricultural sector has been performing poorly mostly due to overdependence on rain-fed agriculture, inadequate agricultural tools and equipment, poor incentives to farmer, inadequate application of science and technology results absence of efficient pricing system and institutional constraints. Add to the above constraints, continuous misdirection of human and financial resources, inappropriate economic strategies and policies, poor economic management and political instability.

In order to arrest the continuous economic and social crisis, the United Nations General Assembly adopted in June 1986, the United Nations Programme of Action for African Economic Recovery and Development 1986-1990 (UN-PAAERD), a programme of action to counter the continent's continuing economic deterioration. In this programme, agriculture is made the core of recovery in African economies. Notwithstanding the priority given to the agricultural sector, it was agreed that a sustained growth of agriculture would depend on a consolidated and parallel development of other sectors which directly support agricultural activities, in particular the industrial sector.

With respect to industry and in order to develop Africa's capacity to increase food production and attain a satisfactory level of self-sufficiency, the measures

contained in UN-PAAERD include, inter alia:

- the development of industries producing agricultural tools, implements and equipment, small-scale irrigation equipment and agricultural inputs;
- the processing of raw materials and intermediate inputs;
- the rehabilitation and upgrading of existing plants;
- the development of capacity for utilization of renewable sources of energy, especially bio-mass and solar energy;
- the establishment of engineering capacity for the production of spare parts and components; and
- the provision of training in the above areas and the development of local capacity for project design and preparation.

UN-PAAERD called for fundamental policy changes and readjustment of industrial policies and programmes with the view to initiating a process of internally-generated and self-sustaining growth and development, minimizing the economic crisis and laying a foundation for durable growth, improving productivity, ensuring rapid recovery of African economies and enhancing long-term development prospects. Furthermore, the Conference of African Ministers of Industry at its special meeting held from 15 to 17 October 1987 in Addis Ababa adopted a Memorandum on Industrialization in Africa which highlighted burning issues of development in Africa and actions to be taken at national and regional levels as follows:

At national level

African countries should:

- (i) give priority to the rehabilitation, restructuring and expansion of

existing industrial establishments related to the satisfaction of basic needs of the majority of the population, in particular food, shelter, health, education, communication and transport;

- (ii) give priority to the manufacture of low-cost transport equipment, to an increased transformation of agricultural produce and a better distribution of industrial products, specially in rural areas;
- (iii) in the process of rehabilitation and restructuring of existing industries and in the establishment of new ones, put particular emphasis on the promotion of small-scale industries through the creation and strengthening of support institutions, financial institutions, training centres in industrial planning and management and technological development;
- (iv) rationalize existing industries with limited markets through pooling in procurement of raw materials and spare parts, maintenance, marketing and acquisition of other development inputs.

At subregional and regional levels

In view of limited investment capacities of most African countries, more efforts towards subregional and regional industrial co-operation should be made. Hence industrial policies should aim at:

- (i) giving impetus to the creation of multinational or subregional basic industries producing factor inputs and capital goods;
- (ii) establishing collective structures for the manufacture of spare parts and replacement equipment for both national and multinational industries;
- (iii) involving more and more regional financial and banking institutions,

especially the African Development Bank in industrial rehabilitation and restructuring programmes, in financing national and multinational basic industries producing basic factor inputs and capital equipment;

- (iv) making better use of regional development institutions of engineering and technology development by involving them increasingly in industrial activities at all levels.

Measures contained in UN-PAAERD and the African Memorandum are mainly designed to support the social and technological transformation of the rural areas which constitute the main sources of livelihood of the majority of the people

and of government revenue. Hence priority should be given to the production of factor inputs for agriculture to enhance productivity through local production and supply of agricultural machinery and equipment, fertilizers, pesticides, etc.

By increasing the provision of factor inputs from within, by changing the industrial policies to cover the types of goods and services necessary to meet the basic needs of the majority of the population and by enhancing industrial subregional and regional co-operation, African countries would be in better position to establish dynamic, self-reliant and self-sustaining economies dependent mostly on internal demand stimuli.

NOUVEAUX DEVELOPPEMENTS DANS LA COOPERATION INDUSTRIELLE EN AFRIQUE

En adoptant le Plan d'Action de Lagos (PAL) et l'Acte Final de Lagos pour le développement économique de l'Afrique, les Chefs d'Etat et de gouvernement se sont engagés, entre autres, à renforcer l'intégration sectorielle aux niveaux sous-régional et régional, en particulier dans les domaines de l'agriculture et de l'alimentation, du transport et des communications, de l'industrie et de l'énergie. La proclamation de la Décennie du Développement Industriel de l'Afrique (DDIA 1980-1990) est une mesure pratique destinée à réaliser les objectifs du chapitre industriel du Plan d'Action de Lagos.

En vue de traduire ces aspirations en des termes concrets, les Ministres africains de l'industrie ont adopté au cours de la sixième réunion de leur conférence, tenue à Addis Abéba en Novembre 1981, un programme de la Décennie comprenant un grand nombre de sous secteurs industriels tels que les agro-industries, les industries métallurgiques, chimiques et mécaniques ainsi que les industries de matériaux de construction et les petites industries. Compte tenu du fait qu'aucun pays africain ne dispose de ressources naturelles, humaines et financières suffisantes et nécessaires à son industrialisation, le programme préconise le renforcement de la coopération industrielle intra-africaine par l'identification, la préparation et la réalisation de projets industriels sous-régionaux qui mettent en présence deux ou plusieurs pays partenaires. C'est donc dans ce cadre que des réunions sous-régionales ont été organi-

sées entre 1983 et 1984 en Afrique centrale, Afrique de l'Est et Australe, Afrique du Nord et Afrique de l'Ouest en vue d'approuver des projets multinationaux et préparer des programmes initiaux intégrés de promotion industrielle sous-régionale.

Réalisation des projets industriels sous-régionaux et multinationaux viables

Malgré les efforts entrepris par les pays africains aux niveaux sous régional et régional en vue de jeter des bases solides pour une industrialisation autonome et autosoutenue, le secteur industriel connaît encore les mêmes problèmes que dans les années 1960 et 1970. Quel que soit l'indicateur socio-économique utilisé (revenu par habitant, part des produits manufacturés dans les importations totales, part de l'industrie manufacturière dans le PNB, niveau de la productivité industrielle, taux de croissance moyen, taux de scolarisation, accès à l'eau potable, etc.), la plupart des pays africains restent en dessous des normes en comparaison aux autres pays en développement. Cette situation a été empirée par la crise socio-économique qui a secoué toute la région depuis le début des années 1980.

En conséquence la mise en œuvre des programmes initiaux intégrés de promotion industrielle sous-régionale n'a pas connu le succès attendu. Le progrès réalisé est très négligeable dans la plupart des cas. Les projets adoptés sont encore au stade de conception. Toutefois, des consultations et négociations

ont été amorcées au niveau de certaines sous-régions en vue de mettre en place des mécanismes permettant la réalisation de projets industriels multinationaux.

Par exemple, dans la sous-région de la Zone d'Echanges Préférentiels de l'Afrique orientale et australe (ZEP), la septième réunion du Comité de Coopération Industrielle qui s'était tenue à Lusaka (Zambia) du 26 au 28 octobre 1987 avait adopté le projet de statuts des entreprises industrielles multinationales en vue d'encourager leur création par les Etats membres, les organisations intergouvernementales ou les nationaux dans les sous-secteurs prioritaires du secteur industriel. La réunion avait également examiné et approuvé des recommandations en vue de la rationalisation et l'harmonisation des codes d'investissement des pays membres de la ZEP.

En Afrique du Nord, la réunion sous-régionale de suivi sur la promotion de la coopération industrielle intra-africaine dans le cadre de la DDIA qui s'était tenue à Tanger (Maroc) du 20 mai au 3 juin 1988 avait permis de constater que sur les 19 projets d'investissement du programme initial intégré de promotion industrielle élaboré à Tunis en mars 1984, quatre ont été menés à bien, un en cours d'exécution, six encore à l'étude, six suspendus et deux abandonnés. Parmi les projets réalisés on peut citer notamment:

- (i) une usine de moteurs diesel, située à Saquiat Sidi Youssef en Tunisie qui a été créée en collaboration avec le gouvernement algérien. L'usine est entrée en service en décembre 1987;
- (ii) Une unité de fabrication de tours à métaux et de fraiseuses à Fés au Maroc réalisée avec la participation de la Tunisie est en service depuis et l'on pense déjà à l'élargissement de la gamme des produits;
- (iii) une usine de fabrication de machines à travailler le bois, créée avec

la participation du Maroc, entrée en opération en juin/juillet 1985 à Grumbalia en Tunisie;

- (iv) une usine de ciment blanc en Tunisie créée par la Tunisie et l'Algérie, est devenue opérationnelle en novembre 1987.

Quant à l'Afrique de l'Ouest, les "Industries Chimiques du Sénégal (ICS)" constituent un exemple de coopération qui mérite une attention toute particulière. En effet, l'idée de créer une entreprise industrielle pour la production d'engrais au Sénégal remonte à 1976 lorsque la Société d'études "Industries Chimiques du Sénégal" avait été créée en vue d'étudier la viabilité du projet par la mise au point: d'un dossier technique précis, un dossier économique et un dossier financier.

En juin 1978, l'étude finale a été remise aux autorités sénégalaises en soulignant le choix technique à faire et plein pouvoir avait été donné au Président de la Société d'études pour entreprendre des consultations, négociations avec des partenaires potentiels et rechercher de débouchés. A la suite de négociations fructueuses, les "Industries Chimiques du Sénégal" ont été créées en novembre 1980 par la transformation de la Société d'études des ICS en société d'exploitation dont le capital fixé à 24,4 milliards de FCFA a été réparti entre les actionnaires de la façon suivante: Sénégal (33,76 p. cent), Côte d'Ivoire (9,44 p. cent), Nigérie (9,44 p. cent), Cameroun (9,43 p. cent) et le groupe "Entreprise Minière et Chimique (EMC)" (9,63 p. cent). En plus de la participation des différents actionnaires à la formation du capital les ICS ont reçu de la part de quelques organismes de financement des crédits à long terme, à savoir, la Société Financière Internationale (25 millions de dollars), la Banque Internationale pour la Reconstruction et le Développement (19,3 millions de dollars), la Banque

Africaine de Développement (13 millions U.C.), la Banque Arabe pour le Développement Economique en Afrique (10 millions de dollars), le Fonds de l'OPEP (14 millions de dollars), le Fonds Koweïtien pour le Développement Economique Arabe (6 millions de Dinars Koweïtien), la Caisse Centrale de Coopération Economique (120 millions de FF) et la Banque Européenne d'Investissement (20 millions d'Ecu). Il y a eu également un crédit acheteur français de 212 millions de FF et un prêt CEE dans le cadre du 5ème FED de 10 millions d'ECU. Le prêt CEE a été accordé à la fois au Sénégal et à la Côte d'Ivoire, au Cameroun et au Nigéria pour financer la composante alimentation en eau du projet.

Une fois les fonds réunis, la construction des ICS a commencé en avril 1981 avec la pose de la première pierre et en avril 1984, l'entreprise a été réceptionnée sans retard et sans dépassement des coûts. Cette performance dans la mise en œuvre de ce projet est liée d'une part à la volonté politique des autorités sénégalaises qui n'ont épargné aucun effort pour développer et promouvoir la production des engrais et pesticides comme intrants à l'agriculture qui est la priorité des priorités dans le Programme d'Action des Nations Unies pour le Redressement Economique et le Développement de l'Afrique (1986-1990) et d'autre part à l'efficacité et à la disponibilité des partenaires ainsi qu'à la qualité et à la compétence de tous ceux qui de loin ou de près ont pris une part active à la gestation et à la réalisation des ICS.

Toutefois, les ICS ont un autre défi à relever qui est celui de la commercialisation et de la distribution de leurs produits. La consommation des engrais du Sénégal sur le marché local est tombée de 85 000 tonnes d'engrais par an entre 1978 et 1980 à 12.000 et 16.000 tonnes en 1981/82 et 1982/83 respectivement. Cette baisse est due au retrait de la subvention annuelle de 2 milliards de

francs CFA qu'accordait le Gouvernement Sénégalais. Face à cette situation, le Gouvernement a décidé de nouveau d'accorder une nouvelle subvention, ce qui a permis d'augmenter la consommation à 24,000 tonnes en 1983/84, 39.000 tonnes en 1984/85 et 41,000 tonnes en 1985/86.

Sur le marché extérieur, il n'y a que l'Inde, un partenaire dans les ICS, qui absorbe plus de la moitié de la production de l'unité d'acide phosphorique c'est-à-dire son quota. Quant aux partenaires africains et aux autres pays de l'Afrique de l'Ouest, la quantité d'engrais vendue par les ICS sur leur marché est très négligeable, environ 60 000 tonnes par an alors que la capacité installée de l'unité d'acide phosphorique est de 476.000 tonnes par an et que celle de l'unité de production l'engrais granulés de 250.000 tonnes par an. Il est donc évident que la capacité du complexe des engrais du Sénégal dont la production totale annuelle avoisine 240.000 tonnes d'anhydride phosphorique et 220.000 tonnes d'engrais simples est sous utilisée à cause du problème de marché. Les partenaires africains n'ont pas respecté leurs engagements en ce qui concerne l'achat des produits des ICS. Une grande partie de leur consommation provient des firmes européennes qui pratiquent des prix de dumping rendant ainsi les produits des ICS peu compétitifs.

Afin de faire face à cette situation qui freine la rentabilité du complexe d'engrais du Sénégal, une action concertée au niveau des partenaires, aux niveaux national et sous-régional est nécessaire. Il faut un engagement de rigueur de la part des pays africains.

Quelques contraintes entravant de façon générale le développement des projets multinationaux

Parmi les contraintes qui entravent la réalisation des projets multinationaux adoptés au cours des réunions sur la promotion de la coopération industrielle intra-africaine, l'on peut citer notamment:

- (i) le manque de rigueur politique et le non respect des contrats signés par différents partenaires surtout en ce qui concerne les clauses de vente et d'achat de produits finis;
- (ii) le manque d'uniformité des directives contenues dans les plans de développement et l'absence de coordination des politiques et stratégies de développement économique des pays membres;
- (iii) la rigidité des procédures douanières, financières et commerciales;
- (iv) les problèmes liés à la balance des paiements qui ont entraîné des pénuries aigus de presque tous les intrants industriels importés;
- (v) l'étroitesse des marchés et l'insuffisance des débouchés, l'impossibilité pour les produits industriels à soutenir la concurrence sur les marchés extérieurs en raison des coûts élevés, des normes de qualité et des prix de dumping pratiqués par les firmes transnationales; et
- (vi) l'insuffisance de main d'œuvre qualifiée pour entreprendre des études, préparer des dossiers bancables, réaliser et gérer les projets industriels.

Conclusions et recommandations

La Décennie de Développement Industriel de l'Afrique touche à sa fin et l'analyse qui vient d'être faite porte à croire que l'engagement des Etats membres à créer une base solide pour un processus d'industrialisation auto-entretenu aux niveaux sous-régional et régional tel que formulé dans le Plan d'Action de Lagos et le Programme pour la Décennie ne s'est pas matérialisé de façon satisfaisante. La plupart des projets industriels de base qui devraient être réalisés dans le cadre d'une coopération industrielle sont restés à l'état d'idée pour les raisons sus-mentionnées.

Afin de remédier à cet état de choses, il faudra avant tout une rigueur politique au plus haut niveau doublée du respect des engagements pris dans les projets industriels multinationaux surtout en ce qui concerne l'écoulement des produits manufacturés dans un des pays membres. Il faudra également plus de consultations pour une harmonisation des plans de développement et pour une coordination des politiques et stratégies de développement économique.

Les parties prenantes doivent se sentir concernées et être impliquées dans toutes les étapes du projet, de l'identification jusqu'à la réalisation et à l'exploitation. Pour ce faire des mécanismes de consultations et négociations doivent être créés. En un mot l'engagement des pays membres ne doit pas seulement être dans le verbe mais surtout dans l'action.

RAM-TYPE MANUAL OIL PRESS IN TANZANIA

Source: C. Bielenberg, A.T. International, Washington D.C.

A manually operated oil press designed for small oil seeds was developed in Tanzania by a grain equipment specialist at A.T. International. The ram-press, a low-cost alternative to batch press, had given consistent outputs of 2.5 to 3.0 litres of unrefined oil per hour or 16 litres of oil per 50 kg bag of undecorticated sunflower seeds.

The ram-press has yet to be tested using materials other than sunflower seeds. It may work satisfactorily with groundnut, copra and cottonseed, among others, with modifications, provided pre-treatment procedures are sound.

Hydraulic and screw-type batch oil expellers which usually extract over 90 per cent of the available oil are the smallest expeller extracts producing about 10 to 15 litres of oil per hour with power consumption of 3 KW. Frequent replacement of expensive internal component parts is another disadvantage in addition to the high cost (US\$4,000) of the machine unit.

The ram-press can significantly reduce the cost and simplify extraction of oil in the villages. A unit can be fabricated in Tanzania at the cost of US\$453, including the financing and depreciation of workshop equipment. If a complete pressing unit can be produced at US\$600 including scorcher and purifier, the unit could be repaid in 150 days of operation with a daily output of 15 litres of oil and US\$0.30 per litre retained for equipment financing.

Other advantages of the ram-press for village oil processing include the following:

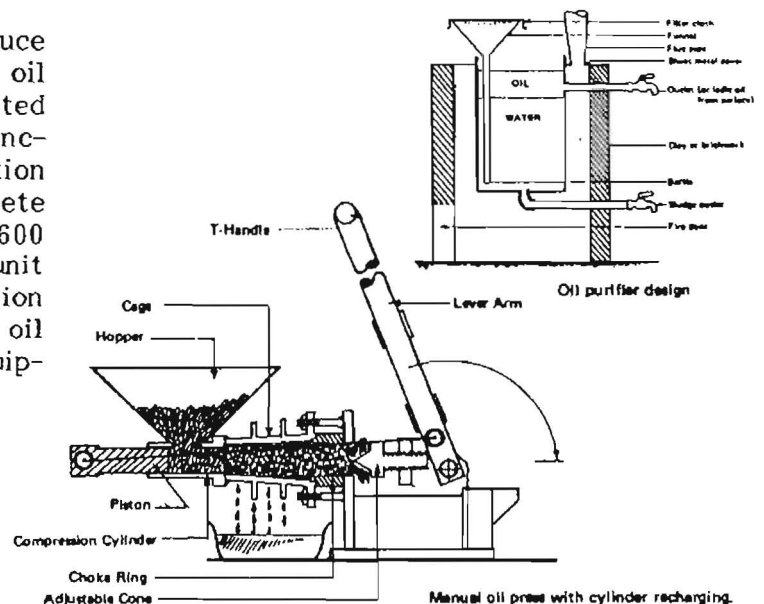
1. Its portability and ease of transport facilitate demonstration and eventual popularization of the technology, as well as its transport to places for repair;

2. Its output is compatible with the level of village demand for edible oil, so that full capacity utilization is easily achieved;

3. Its low price enables village oil processors to purchase multiple units, improving their security against mechanical problems;

4. It appears to be superior, in terms of return on investment, to any of the more expensive alternatives; and

5. Small machine shops can easily undertake its manufacture using mild steel bar of the kind commonly found in the markets of developing countries.



Reproduced from Regional Network for Agricultural Machinery
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PRESENT STATUS, DEMAND FOR STEEL AND FUTURE DEVELOPMENT OF THE IRON AND STEEL INDUSTRY BY THE YEAR 2000 IN AFRICA

At present the share of Africa in world production of steel is very low, about 3.5 million tonnes, or 0.5 per cent and consumption is about 7.9 million tonnes, or 1.1 per cent. Per capita steel consumption in Africa is 15.1 kg, the lowest in the world.

Only six out of fifty African countries namely Algeria, Egypt, Morocco, Tunisia, Nigeria and Zimbabwe have integrated iron and steel plants based on local raw materials and all with comparatively small capacities ranging between 0.5 and 1.5 million tonnes of steel per year. Even those plants with their combined capacity of about 6.0 million tonnes are currently underutilized; producing only 2.8 million tonnes of steel annually, or about 49 per cent of their installed capacity (see table 1).

The majority of these integrated plants are based on conventional blast furnace (BF) - oxygen converter (LD) route with only one unit, Delta Steel, Nigeria, recently established, based on direct reduction (DR) - electric arc furnace (EAF) route. In the entire continent only Algeria and Egypt presently produce flat and tubular rolled steel products such as plates, sheets, strips, pipes and tubes while the other plants produce only billets and long products such as bars, sections and wire rods. The majority of these steel products are manufactured from low carbon mild steels while the production of engineering grade steels such as high carbon, high tensile, wear, heat and corrosion-resistant and stainless is still very limited in the region.

Eleven African countries including Algeria, Egypt and Nigeria have small semi-integrated steel plants with a total capacity of about 2.3 million tonnes of steel per year, but their current production is only 0.68 million tonnes, or about 30 per cent of total capacity. All these mini-steel plants use electric arc furnaces for scrap melting and bar/rod rolling mills for production of narrow range of steels and rolled profiles (see table 2).

The total steel capacity of existing African metallurgical plants is about 8.3 million tonnes per year with current production of only 3.5 million tonnes, or about 43 per cent of its capacity. Because of low performance level of the local iron and steel plants, a majority of African countries meet their steel requirement by import which together averaged about 5.5 million tonnes per year during the period 1980-1985, or about 70 per cent of total steel consumption for the same period.

It is worth noting that, African countries also import large quantities of engineering products, with an average value of about US\$ 30 billion annually during the period 1980-1985. These imports could be considered as constituting an indirect steel consumption (see table 3). In terms of quantity, these products were equivalent to some 15.0 million tonnes of engineering grade steel annually, i.e. three times more than imports of semi-finished steel products.

In recent years, the shares of imported long, flat and tubular steel products

were 60, 25 and 15 per cent of total imports respectively (see table 4). A major part of imported rolled steel belongs to light sections (26.2 per cent), sheets

less than 3 mm (14.6 per cent) and tubes (14.7 per cent), for which local production is still very limited.

Table 1: Capacity and production of integrated iron and steel plants in Africa

Country	Plant	Process route	Year start	Capacity (Mt/y)	1985/87 production (Mt)	Capacity utilization (%)	Products
Algeria	BF-Madjar	BF-LD-roll.mills	1964/81	1.80	1.00	55.5	Iron, Steel, long, flat, tubular rolled products
Egypt	Hadisob	BF-LD-roll.mills	1962/80	1.50	0.65	43.3	Iron, steel, long, flat, tubular rolled products
Morocco	Nador	BF-LD-roll.mills	1985	0.42	0.10	23.8	Iron, steel, long, rolled products
Tunisia	El-Fouladh	BF-EAF-roll.mills	1966/75	0.18	0.14	77.7	Iron, steel, long, rolled products
Nigeria	Delta Steel	DR-EAF-roll.mills	1982	1.00	0.24	24.0	Sponge iron, steel, billets, long rolled products
Zimbabwe	ZISCOSTEEL	BF-LD-roll.mills	1948/77	1.00	0.70	70.0	Iron, steel, billets, long rolled products
Total	6 plants	1 plant DR route 5 plants BF route		5.9	2.83	49.0	

Table 2: Capacity and production of semi-integrated steel plants in Africa

Region	Country	Plant	Capacity (1000 t/y)	1985/87 production (1000t)	Capacity utilization (%)	Products
North Africa	Algeria	Oran	100.0	70.0	70.0	Steel, billets, rebars
		Copperworks	100.0	70.0	70.0	Steel, billets, bars, rods
	Egypt	National C ^o	125.0	90.0	72.0	Steel, billets, bars
		Delta Steel	200.0	110.0	55.0	Steel, billets, rebars
	Libya	Tripoli	20.0	12.0	60.0	Steel, bars
West Africa	Mauritania	Nouadibou	36.0	12.0	33.3	Steel, rebars
	Nigeria	7 EAF and 19 rolling mills	1.245	232.0	18.6	Steel, billets, bars, profiles, wire
Central Africa	Zaire	Maluku	250.0	0	0	Steel, billets, long, flat products
Eastern and Southern Africa	Angola	Luanda	30.0	12.0	40.0	Steel, rods, bars, profiles
	Ethiopia	Akaki	30.0	22.0	73.3	Steel, rods, bars, wires, nets, nails
		KUSCO	30.0			Steel, billets, bars, wires
		EMCO	25.0			Steel, bars
	Kenya	Steel billet casting	25.0	Total	Average	Steel, billets
		City Engineer works	9.0	37.0	35.2	Steel, bars, small profiles
	Tanzania	Rolmill Kenya	15.0			Steel, small profiles
	Uganda	Alum. Africa Jinja	18.0	8.0	44.4	Steel, billets
			25.0	4.0	10.0	Steel, bars, small profiles
Total	11 countries	23 plants	2283.0	6790.0	29.7	
		6 integrated plants	8300.0	3500.0	42.7	
		23 mini steel plants				

Table 3: Total imports of semi-finished steel products and engineering products (SITC, Rev.2, Sect.7) in Africa

Year Products	1965	1970	1975	1980	1984	1985	1986
Finished steel	2,146	3,102	4,879	6,847	5,156	4,356	3,198
Engineering products (US\$)	3,710.8	6,129.3	20,941.2	38,008.7	28,263.8	24,070.8	

Table 4: Imports of semi-finished steel products by commodity in Africa (1000 tonnes).

	Heavy sect.	Light sect.	Railway track mater.	Wire rods	Wire	Plate	Sheets less than 3 mm	Hoop and strip	Tin-plate	Tubes and fitt.	Wheels and tyres axles	Total
37.7	440.5	1675.5	218.0	160.7	131.3	224.7	696.0	51.5	223.0	692.0	5.0	5,155.9
81.5	275.2	928.6	125.0	382.0	135.0	176.3	626.0	71.4	194.0	753.9	7.4	4,356.3
81.5	275.2	928.6	125.0	382.0	135.0	176.3	626.0	71.4	194.0	753.9	7.4	4,356.3
17.4	145.8	727.0	76.0	235.5	189.9	140.0	532.4	61.8	143.3	425.3	3.4	3,197.7
612.2	287.2	1110.4	139.7	259.4	152.0	181.4	618.1	61.6	186.8	623.7	5.3	4,236.6
14.4	6.8	26.2	3.3	6.1	3.6	4.3	14.6	1.5	4.4	14.7	0.1	100
			60					25			15	100

Demand for steel in Africa is currently projected to rise at an annual average growth rate of 9 to 10 per cent. Total steel demand for the region is projected at 20.7 and 55.8 million tonnes by 1990 and 2000 respectively (see table 5). These projections are based on projected per capita steel consumption. According to UNIDO and ECA estimates, consumption of steel per head is expected to double every 10 years in the region as a whole. This would mean that the consumption per head which was 17 kg in 1980 will increase to 34 and 68 kg in 1990 and 2000 respectively.

Most African countries are endowed with ample reserves of raw materials which can sustain a thriving metal industry and a number of metallurgical projects have been identified for implementation in recent years. Table 6 shows that by the year 1990 existing steel capacities in Africa will more than double and should reach approximately 14.8 million tonnes per year. Full utilization of these capacities would cover the major part of projected steel demand for 1990 of about 15 out of 20 million tonnes, but for the year 2000 additional capacities of about 40 million tonnes for the region will be needed.

Some large-scale projects for the long-term development of the iron and steel industry are presently under consideration by governments. These projects are La Matca, Algeria (capacity 10 million tonnes); four projects with a total capacity of about 14.5 million tonnes in Egypt; Misurata, Libya (capacity 2.5 million tonnes); Ajaokuta, Nigeria (capacity 5 million tonnes). Full implementation of these projects will mean a total production of steel to be installed by the year 2000 in Africa of about 32 million tonnes per year. Once again, it is worth noting that the majority of these projects belong to the North African countries.

The projected demand gap of 8 million tonnes should be covered either by imports or by installation of additional new capacities. This is especially important and urgently needed for the countries of the West, Central and Eastern and Southern African subregions with special attention being given to the production of flat, tubular, rolled steel products and special grade engineering steel whose production at present is very limited.

Table 5: Projected demand for steel in Africa (1000 tonnes)

Subregion	Projected demand	
	<u>1990</u>	<u>2000</u>
North Africa	12,200	32,800
West Africa	4,537	11,800
Central Africa	690	1,700
East and Southern Africa	3,275	9,460
Africa Total	20,702	55,760

Table 6: Planned iron and steel capacities in Africa by the year 1990

Country	Plant	Route	Capacity (Mt/y)	Stage of implementation
Algeria	Ji jel	DR-EAF-CC-roll.mills	1.0	Site preparation started. Completion date 1995.
Egypt	El-Dekheil	DR-EAF-CC-roll.mills	0.75	Construction in final stage. Start up 1987/1988
Libya	Misurata	DR-EAF-CC-roll.mills	1.3	Construction in final stage. Start up 1987/1988.
Morocco	Nador	BF-LD-CC-roll.mills	1.0	Under construction. Start up 1987/1988.
Nigeria	Ajaekuta	BF-LD-CC-roll.mills	1.3	Construction in final stage. Start up 1989.
Zaire	Maluku	EAF-CC-hot, cold roll. mills	0.25	Initial stage of modernization. Start up 1988.
Uganda	Jinja	EAF-CC-roll.mills	0.1	Initial stage of modernization. Start up 1989.
Zimbabwe	ZISCOSTEEL	BF-LD-roll.mills for flat products	1.0	Initial stage of modernization. Start up 1990.
8 countries (4-North Africa)	6 integrated and two mini-steel plants (4-North Africa)	3 DR-route plants 3 BF-route plants 2 EAF/roll.mills	(N. Africa 6.7	Capacities should be doubled by the year 2990.

PROBLEMES DES PETITES ENTREPRISES EN AFRIQUE

"Si l'on veut un développement industriel autonome et autosuffisant, il faut des politiques et des stratégies industrielles nationales et sous-régionales dont le but sera la création d'une base industrielle solide(...). De petites industries pourraient contribuer à la création de cette base, et leur promotion et leur expansion pourraient permettre d'atteindre l'objectif de 2% de la production industrielle mondiale pour la région africaine vers l'an 2000".

Cette citation du Plan d'Action de Lagos résume l'importance des petites industries pour le développement industriel de l'Afrique. Suite à cet appel, la plupart des pays africains ont pris des mesures en faveur du développement du secteur. Mais le processus ne s'est déclenché que d'une façon limitée. Les petites industries sont souvent concentrées dans la banlieue de la capitale ou des villes principales. Leurs produits sont peu diversifiés et ils supportent mal la concurrence des produits étrangers. Le petit atelier passe difficilement à un niveau de production supérieur. Les nouvelles petites entreprises sont beaucoup plus souvent des entreprises commerciales que productives. On se demande dès lors, quels sont les facteurs qui freinent à ce point le développement des petites industries.

On serait bien tenté de répondre que l'échec des pays africains dans leurs tentatives de développement du secteur industriel est dû à l'insuffisance des ressources financières et il est vrai que, dans la plupart des pays africains, la mobilisation de l'épargne disponible à des taux d'intérêt économiques est insuffisante. Cependant, au-delà de

ce fait, l'échec du développement des petites industries peut être attribué à plusieurs autres facteurs: l'absence d'entrepreneurs, de gestionnaires et d'une main-d'oeuvre qualifiée, l'absence d'un système de garantie ainsi que d'une coordination et d'une supervision adéquates des prêts, une assistance insuffisante - voire insatisfaisante - de la part des institutions de promotion et d'assistance aux petites industries. En outre, les autorités publiques ont tendance à perdre de vue le fait que l'industrie de transformation n'est que le maillon d'une chaîne; sa viabilité dépend à la fois, en amont, des marchés des différents facteurs, et en aval, du marché de consommateurs et de la concurrence. Elle dépend, finalement, de l'équilibre que l'entreprise parvient à atteindre et à maintenir entre ces deux pôles. Il convient toutefois de remarquer que l'importance des problèmes de développement des petites industries varie selon l'attitude de différents gouvernements; aussi, les points que nous essaierons de discuter dans cet article ne s'appliquent que d'une manière générale à toute la région.

A. Capacité de gestion des entrepreneurs et formation technique

L'aptitude des entrepreneurs à faire face aux problèmes complexes de gestion est une condition nécessaire pour la réussite de leur entreprise, de même que la qualification et la spécialisation du personnel. Une telle aptitude demande une formation préalable qui n'est pas toujours à la portée des entrepreneurs africains, surtout en zone rurale. Pourtant, il existe dans la plupart des pays africains

des institutions dont la tâche est de fournir aux petites entreprises des services allant des informations sur les obligations juridiques et fiscales aux études de faisabilité et à la formation technique. Mais l'assistance de ces institutions est aussi limitée que leurs moyens et de ce fait, elles ne répondent pas toujours aux attentes. Dès lors, c'est aux gouvernements eux-mêmes que revient le devoir de fournir, par le biais de l'éducation nationale, une formation aux métiers dont le secteur industriel a besoin. Actuellement, l'insuffisance de la formation professionnelle des nationaux amène souvent les gouvernements à faire appel aux compétences techniques d'expatriés, ce qui n'aide pas à former des entrepreneurs africains et maintient inévitablement la dépendance de l'Afrique à l'égard de l'étranger.

B. Ressources financières

Le manque de financement adéquat et de facilités de crédit constitue un handicap important pour les petites industries. Aussi une grande partie des investissements est-elle souvent financée par les promoteurs eux-mêmes. Les institutions financières n'accordent généralement que des prêts à court et à moyen terme dont 85 pour cent en moyenne vont au secteur commercial. Les prêts à long terme sont presque inaccessibles à cause des difficultés que rencontrent les banques pour monter et fournir des financements à long terme à plusieurs entreprises simultanément. Au Togo, par exemple, la quasi totalité des crédits accordés aux petites et moyennes entreprises par les banques sont des crédits à court terme représentant 37 pour cent du total des prêts. 70 pour cent de ces crédits aux petites et moyennes entreprises vont aux activités commerciales. On n'est donc pas surpris que dans la plupart des pays africains, l'esprit d'entreprise se cantonne principalement au négoce et aux activités commerciales.

Parmi les différentes raisons invoquées par les institutions financières pour ne pas octroyer plus facilement de crédits aux petites industries figure l'absence de gestion comptable. Les conséquences du manque de formation des petits entrepreneurs se font donc déjà sentir avant même la création de leur entreprise puisqu'elles limitent l'accès au financement.

C. Les marchés

Quelles que soient ses capacités de gestion, certains facteurs restent hors de portée du chef d'entreprise. Dans les économies africaines en développement, c'est précisément au niveau de certains de ces facteurs que l'intervention publique peut être la plus utile pour le développement de la petite industrie nationale.

Il s'agit en premier lieu du marché des consommateurs. Dans les pays africains, ce marché est à la fois très segmenté du point de vue du pouvoir d'achat et très dispersé géographiquement. D'autre part, les petites industries ne disposent généralement pas d'un personnel suffisamment formé et des contacts nécessaires pour suivre l'évolution du marché. Aussi, pour mieux connaître son marché et pour atteindre plus facilement les consommateurs potentiels, la petite industrie a besoin d'une part, d'assistance au niveau du marketing, et d'autre part, d'une amélioration des circuits de distribution via notamment le développement du commerce de gros en dehors de la capitale. Une telle amélioration de la distribution peut faciliter l'accès de la petite industrie aux consommateurs géographiquement dispersés dans les zones rurales ou semi-rurales, et lui permettre de mieux faire face à la concurrence des grandes industries qui, grâce à leur position et à leur expérience, contrôlent les circuits de distribution.

D'un autre côté, un courant stable, fiable et régulier de matières premières

constitue une condition sine qua non de viabilité d'une industrie de transformation. De ce point de vue, les petites entreprises sont défavorisées, souvent victimes de discrimination en matière de distribution des matières premières locales - comme d'ailleurs, de devises - face aux plus grandes industries. Par manque de fonds de roulement aussi, la petite entreprise se voit souvent forcée d'acheter en petite quantité, auprès d'un intermédiaire ou éventuellement au marché parallèle, et à un prix élevé.

D. Contexte socio-culturel

Certains facteurs socio-culturels empêchent le chef d'entreprise africain d'adopter l'attitude économique et rationnelle qui correspond à sa fonction. Il s'agit notamment de contraintes sociales qui, en milieu rural surtout, obligent le chef d'entreprise d'utiliser ses avoirs à des fins privées et l'empêchent ainsi de ré-investir dans son établissement.

D'autre part, une grande partie des petits industriels africains ne prennent pas au sérieux la formation en gestion. De plus, ils considèrent la coopération entre eux avec suspicion et par conséquent, se retrouvent isolés dans leur lutte contre les hausses de prix arbitraires de la part d'intermédiaires privés et les attitudes monopolistiques de firmes importantes, nationales ou étrangères.

Conclusions

Les pays africains ont tous reconnu la nécessité de favoriser le développement des petites industries. La plupart des codes des investissements ont été révisés de façon à encourager les investissements privés en général; des organismes de promotion et de financement des petites et moyennes entreprises ont été créés dans plusieurs pays; tout ceci constitue des facteurs favorables à un développement rapide des petites industries. Favorables

mais insuffisants. Il est par conséquent essentiel que les gouvernements et les institutions financières prennent des mesures complémentaires. Ainsi, les institutions financières pourraient mieux s'équiper pour fournir des conseils financiers, réaliser des études de pré-investissement et financer des projets viables plutôt que ceux qui disposent d'une garantie. Des prêts à long terme et une supervision effective des crédits augmenteraient les chances de réussite. Les Gouvernements devraient mettre l'accent sur la formation technique, aussi bien dans le cadre de l'éducation nationale que par le biais des instituts de promotion des petites industries. Il conviendrait aussi d'augmenter les crédits alloués au secteur industriel en général, ainsi qu'aux centres de promotion et de formation technique. Les politiques nationales en faveur des petites industries devraient également comprendre des mesures d'encouragement à la production des intrants, souvent agricoles, et d'autres mesures visant à faciliter la livraison de matières premières en quantité suffisante aux industries de transformation, ce qui implique le plus souvent le regroupement de la production de nombreux petits producteurs agricoles en vue de son acheminement vers les sites de transformation.

Pour assurer une décentralisation progressive de l'industrie et une meilleure répartition des revenus, les gouvernements devraient tenir compte de la possibilité de développer les petites industries de zone semi-urbaine et même rurale.

Enfin, la difficulté d'offrir une assistance directe appropriée à chaque type de petite industrie est un argument qui joue en faveur de la prise de mesures qui améliorent le climat économique général dans lequel elles opèrent et qui, en particulier, facilitent leur fonctionnement et augmentent ainsi leurs perspectives de viabilité.

AFRICA AND BIOTECHNOLOGY: ACTION NOW TO AVOID FUTURE DISASTER^{1/}

Biotechnology constitutes techniques based on biological phenomena giving rise to a wide range of technological potential for the production of marketable products. It deals with the manipulation of cells, tissues or organs as well as genes that determine cell characteristics. R & D in this field is being enhanced by computer-aided design of molecular structures and other recently developed computer programmes, thus shortening the R & D cycle.

The impact of the development of biotechnology is likely to be greatest on agriculture, chemicals, energy, minerals and environment. These comprise the major areas on which R & D is focused. Significant development has already been made in most of these. In the agricultural sector, the objectives of R & D imparting desirable traits or innovating plants with desirable traits such as higher yields, resistance to pests, diseases and droughts, tolerance to salinity and herbicides, increased content of specific component(s), higher photo-synthesis efficiency and productivity, and genetic manipulation of micro-organism, plant and animal traits.

Examples of successes in achieving some of the above objectives include increased yield of food production,

production of oil palm plantlets (Cote d'Ivoire), hybrid rice strains, new techniques to control animal reproduction, growth hormones for chickens and bovine, single cell protein (SCP), and protein enrichment of starchy tubers. Tomato, potato and tobacco are among the plants that are being genetically engineered (altered) with a view to imparting pest and virus resistance to them. The recent report of the USA Congress' Office of Technology Assessment which states that "there is little risk to small-scale field test of genetically modified organisms during the next five years" is likely to boost activities related to biotechnology in the agricultural sector.

In the chemical process industry plant-science-based and many chemically-based industries are expected to undergo drastic changes leading to the manufacture of chemicals using non-conventional processes and technologies. A good start has already been made in the production of pharmaceuticals, agricultural chemicals and speciality chemicals. The potential for the production of some substitute products as well as new products via plant tissue culture is enormous. High-fructose corn syrup and aspartame (an artificial sweetener) are examples of successfully marketed products, both substitutes for sugar which registered 15 million tons excess over international

^{1/} This article is intended to expound on the part of biotechnology and genetic engineering under the article entitled "Technological Innovation: A Constraining Factor in African Industrial Development?" in vol. 1, No. 2 of Focus on African Industry.

sugar consumption in 1987. Biotechnology work based on sugar as raw material is being undertaken with a view to producing third- and fourth-generations of sugar derivatives.

The main thrust in the chemical field seems to be geared towards pharmaceutical and health products. Products that have successfully been commercialized include hepatitis B. vaccine, alpha-interferon, human growth hormone, blood-clotting factor, human insulin, swine vaccine, and diagnostic products. It has been reported that field trials on vaccine for leprosy were being conducted and that vaccines for sporozoites, the malaria parasite, were being developed. A genetically engineered mouse was recently patented for use in cancer research in the USA.

Numerous R & D activities are being undertaken worldwide with a view to finding vaccines, therapeutic products and diagnostic tests for AIDS. Some IDS vaccines (gp 160 and gp 120) were reported (1987) to have developed antibodies that neutralize the human immuno-deficiency virus (HIV) in chimpanzees. A drug named zidovudine (AZT) found to retard the replication of HIV was the only one approved in 1987 by the Food and Drug Administration of USA. Second generation diagnostic tests for HIV (based on antibody tests), including such names as ELISA, Western Blot and Emvacor, are in use. Development of third generation tests which will detect the virus or its fragments directly and to be used to complement antibody tests is underway.

Agro-chemicals is another branch of chemicals receiving the attention of R & D institutions. Biotechnology promises to ease the problems arising from increasing use of agro-chemicals. Many nitrogenous fertilizer factories are likely to be replaced by nitrogen-fixing bacteria, such as *Rhizobium*.

New plant strains requiring less fertilizers are being developed. These together with efficient use of nitrogenous fertilizers will minimize environmental problems arising from the application of fertilizers.

With regard to pesticides, the trend is toward integrated chemical pesticide/-biological pest control. Biotechnology is expected to make this approach a reality by producing microbial pesticides which, unlike some chemical pesticides, do not leave residues and persist, and thereby do not contaminate agricultural products and the environment. The expected result is minimal effect of pesticides on the ecosystem. Alfalfa and olive pests are already being controlled by *Bacillus thuringiensis*. A genetically engineered bacterium which inhibits ice crystal formation on plants was reported undergoing field testing in 1987.

The production of chemicals and fuels from biomass (renewable resources) is of continuing interest. Fieldstocks for this purpose comprise waste materials (agricultural, industrial and municipal), forest products, food crops and marine and aquatic plants. Developments in the improvement in the efficiency of traditional fermentation and innovations in the fermentation of agro-industrial wastes are of particular significance.

Metal recovery from ores and extremely dilute solutions, conversion of wastes into useful chemicals and degradation (treatment) of wastes including oil-spills by microorganisms will be very important contributions of biotechnology to the maintenance of sustainable ecosystem. R & D being carried out aimed at increasing the efficiency of naturally-occurring microbes and in developing specialized microbes are expected to yield more results in due course.

Many of the innovations of biotechnology are decidedly beneficial to African countries. Some of them, particularly

those related to agriculture and agro-processing, may, however, go counter to the interest of the countries. First, biotechnology has the capacity and potential to produce tropical products or their substitutes (including totally new crops and products) outside of their natural habitats and agro-based industrial products with the desired qualities tailor-made for specific applications at competitive or lower costs. They will increasingly limit and eventually halt the export of African agricultural and agro-related products, thereby reducing the foreign currency earning capacities of most African countries.

Secondly, because of multitude of constraints (manpower, financial, access to innovations, cost of acquiring technologies, etc.) African countries are likely to benefit the least. In this connection, it should be noted that the trend towards privatization of knowledge in biotechnology (increasing links between universities and businesses in industrialized countries) does not augur well for African countries. Besides, because of the preponderance of small subsistence farmers in Africa who will not be able to take advantage of the agro-related innovations, the already bad living conditions of the African farmers is likely to deteriorate.

Thirdly, the rapidly evolving innovations are likely to have adverse impact on industrial development in Africa. Many of the innovations have resulted in the production of biotechnology-based products that compete with and replace traditional products produced by conventional technologies. This shatters the hope that African countries will one day succeed in replacing the exports of their raw materials by processed products. Related to this are the difficulties that they will have

to face in deciding on the technologies for their new industries. Going conventional will, in many instances, mean technological and product obsolescence.

The above possible adverse impacts of biotechnology show how vulnerable African agricultural and industrial development policies and strategies are to the spurts of technological innovations in the industrialized countries. Because of its location in the globe stretching between 35° north and 35° south and varying topography, Africa is perhaps the most endowed continent in flora and fauna. Plants exogenous to it have successfully been introduced and the potential for repeating this with other plants is, indeed, large. Unfortunately, the advent of new technologies has been eroding this comparative advantage in plant genetic diversity. Developments in biotechnology seem poised to bring to an end such advantage and result in far-reaching economic and social repercussions.

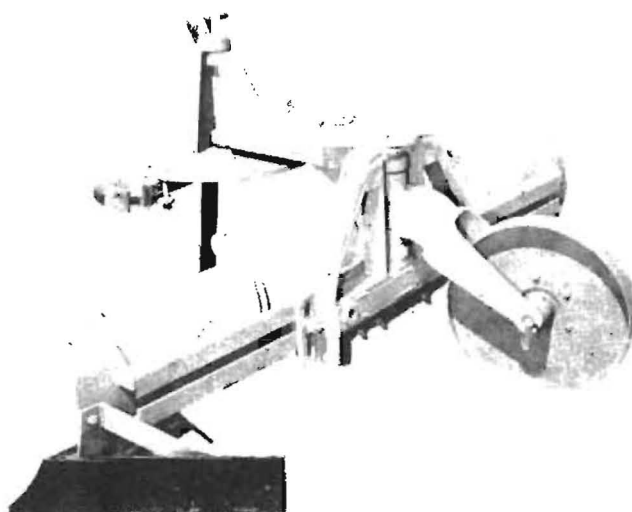
From the above it is apparent that there is an urgent need for African countries not only to minimize the adverse impacts but also to be involved in development of biotechnology, particularly in areas of special significance to African countries. This should, among other things, be done by strengthening and upgrading existing institutions engaged in biotechnology and related R & D activities, establishing new R and D and training institutions and creating mechanisms for disseminating information on and promoting the application/commercialization of R & D results from within and outside Africa, including from the International Centre for Genetic Engineering and Biotechnology (ICGEB) based in Trieste, Italy and New Delhi, India.

INDUSTRIAL NEWS

Under this section four industrial products are featured. They could be of interest to a potential small-scale entrepreneur. In addition, is a brief outline of services provided by Tanzania Industrial Studies and Consulting Organization (TISCO).

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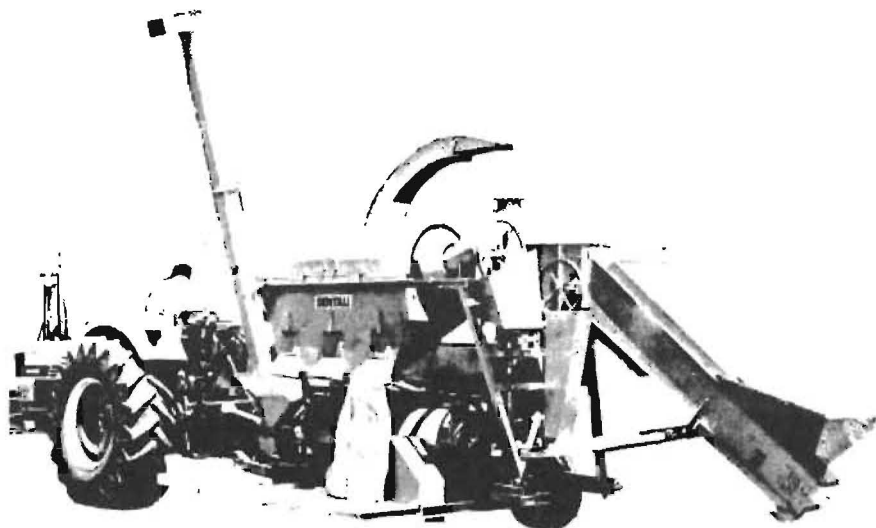
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Code	Model	Mass	Output	H.P.	kW
93-2021	Trailed	1545 kgs	6 tonnes	30	23
93-2011	Stationary		6 tonnes	30	23

MANUFACTURED BY



FOR

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77 COVENTRY ROAD
WORKINGTON HARARE
TEL 66781 TELEX 2434 ZW
TELEGRAMS "TINTO"

(b) Maize Sheller (Zimbabwe)



You should use the
**RIMA UNIVERSAL gutter and rain water
pipe forming machine**

(patented in and outside the F. R. Germany) for the production of endless guttering. This machine has interchangeable moulding tools for gutters of different widths and electric motor drive. Interchangeable tools for gutters and rainwater pipes with different square and semi-circular cross-sections. Capacity: approx. 800 m/h. This machine, which has proved successful in some 20 countries, can be used for galvanized strip as well as with zinc, aluminium and copper band. Its reliability is reflected without any shadow of doubt in the time-saving factor of up to 80 %.



Rima-Ziehtechnik

Max Maier · Wiesenstraße 60 · 7060 Schorndorf
Tel. (071 81) 62055 F. R. Germany

For further information No. 073

KLINGSPOR
90 years abrasive technology

C. KLINGSPOR GMBH
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D-6342 Haiger/Hessen
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For further information No. 074

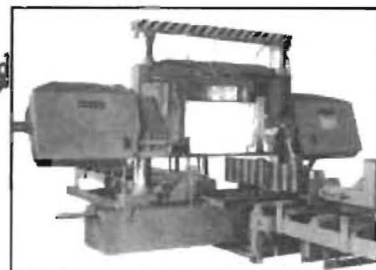
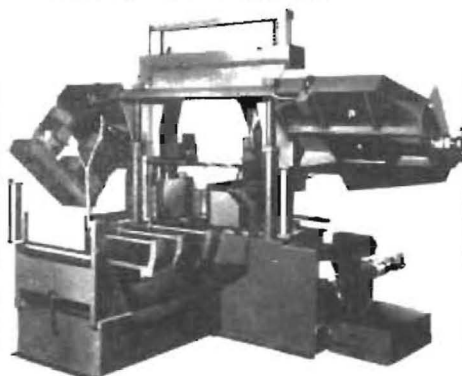
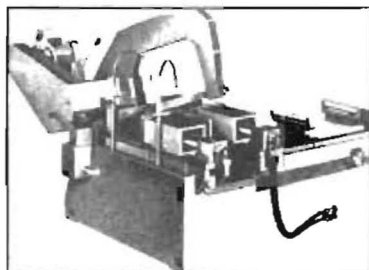


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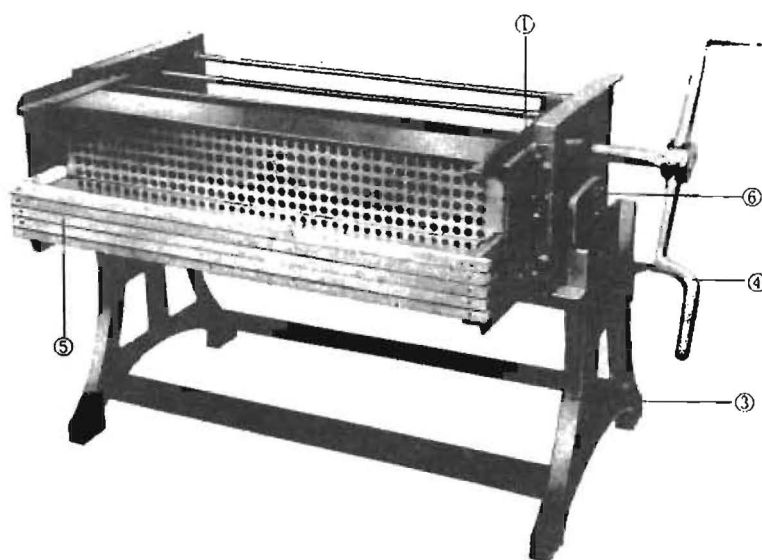
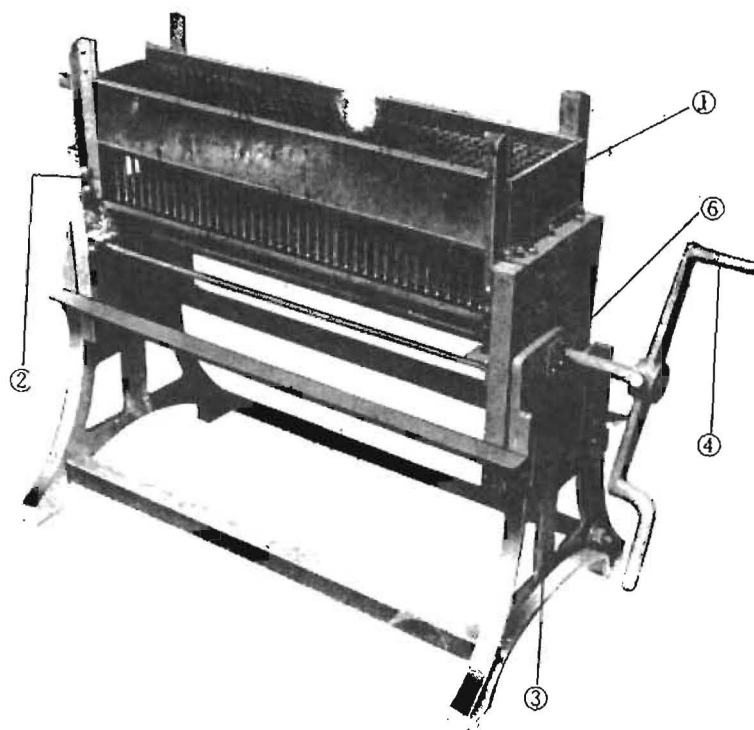
For further information No. 075

(c) Gutter and rain-water pipe forming machine

CHALK MAKING MACHINE

HAND OPERATION SYSTEM

- ① Cylinder
- ② Pistons
- ③ Base
- ④ Pushing Handle
- ⑤ Chalk Receiving Frames
- ⑥ Revolution Shaft



DIMENSIONS OF MACHINE

Width	: 54 cm
Length	: 93 cm
Height	: 90 cm
Weight	N.W. 150 kg.
	G.W. 220 kg.
Export Packing	: about 30 c. ft.

SIZE OF CHALK

Diameter of Tip	: 9 mm
Diameter of Base	: 12 mm
Length	: 78 mm
Weight	: 5.6 g approx.

(d) Chalk making machine

TISCO CONSULTING SERVICES IN VARIOUS STAGES OF THE PROJECT CYCLE

TISCO is a parastatal organization under the Ministry of Industries and Trade. It was set up in 1976 by an Act of Parliament.

TISCO is a multi-disciplinary consulting organization. Its specialized fields of activities are development of industries, promotion of modern technology and management.

TISCO has the ability to give advice and to solve problems over the entire spectrum of industrial activities.

The development of any industrial project will go through certain distinct phases. They range from the inception of an industrial project up to the stage where diversification or expansion is considered, i.e. where a new project idea is born. During this development every phase grows out of the previous and the linkage between each is organic. That is why the process is called the Project Cycle.

The work to be put into the different phases varies considerably from project to project. To a large extent this depends on the information already available and the professional experience of the people putting such information together and analysing it.

The promoter of an industrial project will normally see his own role as one of directing the undertaking once it has entered into the operative phase. Inevitably, a great deal of work and expenditure has to go into the project before the operative phase. The experience of undertaking such work is available with consulting firms, such as TISCO.

As we pass through the project cycle, we shall describe the type of services that can be performed by consultants as assistance to the project promoters.

We hope that you will obtain an idea of how TISCO can assist you in planning and implementing your industrial projects.

You are cordially invited to come and discuss your project with us.

Contact:

E.L. Kamuzora
Director General
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TANZANIA

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32981/3
TELEX: 41182
CABLES: TISCO,
DAR ES SALAAM

(e) Consulting Services

ANNOUNCEMENTS

The following ECA-sponsored meetings or seminars in the industrial sector were held or are planned:

- Consultation meeting with Zaire and neighbouring Central African countries on co-operation in the field of the iron and steel industry, Kinshasa, Zaire, 25-28 July 1988.
- Workshop on the manufacture of agricultural machinery and equipment in ECOWAS subregion, Lome, Togo, 21-26 November 1988.

Workshop on the manufacture of agricultural machinery and equipment in ECOWAS subregion,

Accra, Ghana, 27 November-1 December 1988.

- Meeting of ad-hoc experts group on the development of pharmaceutical industry based on research findings on indigenous raw materials, Addis Ababa, Ethiopia, 12-20 December 1988.
- Ninth Meeting of the Conference of African Ministers of Industry (CAMI), Harare, Zimbabwe, September 1989.
- The Intergovernmental Committee of Experts of the Whole (preparatory to CAMI), Harare, Zimbabwe, September 1989.
- Workshop on project profiles on small-scale industries, Harare, Zimbabwe, September 1989.