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Developing **A**gricultural **M**achinery **I**ndustrial **S**ector (AMIS) in Africa – UNIDO's Approach

The Coalition for African Rice Development (CARD)
Regional Workshop on Promotion of Mechanization
22–24 October 2012, Nairobi, Kenya

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Structure of the presentation:

- ✓ The need for a strategic approach to develop the AMIS
- ✓ Objectives of the study and the challenges faced
- ✓ Methodology adopted
- ✓ Development strategies



A basic sector at the interface between agriculture and industry:

Efficient local production and use of the right kind of agri-machinery are fundamental to Africa's development:

- Raise productivity of agriculture
- Increase production of food crops
- Provide better storage, transport and local processing of food products

All leading to improved living conditions for rural communities:

- Higher incomes
- Better technical skills
- Work and live in their own land



However, this sector (AMIS) is neglected or rarely recognized:

- ✓ There are less than 100 industrial or semi-industrial companies for which agri-machinery and equipment are the main products.
- ✓ These were mostly established during the period 1950-1972.
- ✓ They employ less than 1% of the total industrial labor force.
- ✓ The market represents \$1.5 Billion annually, but less than 10% is supplied by local producers.
- ✓ Exports of finished products or components are virtually unknown.
- ✓ Face small local markets whose demand limits the scale on which they can operate.



Africa depends mostly on imported materials and machinery with limited value added.



A sector in crisis:

- ✓ The use of tractors in Sub-Saharan Africa has declined by around 70% in last years.
- ✓ Basically considered as an input among many others (fertilizers, seeds, etc.) – no attention is paid to required services.
- ✓ Lack virtually all the service facilities necessary for its development: Financing, R&D support; qualified manpower; parts; etc.



Currently AMIS in Africa is in such poor shape financially and technologically that even its own survival is in doubt.



Other economic realities:

- In the long run most African countries cannot afford to import equipment in the quantities required to meet the social and economic goals of their rural areas.
- The tendency for outside suppliers is to be more interested in supplying what is convenient and profitable to them rather than what is appropriate for Africa.
- The outside suppliers will rarely identify sufficiently with the real needs of the rural market in Africa.
- The technology gap is rapidly increasing.



Fundamentally, mechanization must largely be based on the output of Africa's own AMIS



OBJECTIVES:

- Identify and analyse patterns of development in the AMIS in Africa.
- Formulate development strategies with the aim to contribute to foster the growth of AMIS and the productivity of the agricultural sector.
- Identify groups of countries with similar needs, strengths and weaknesses in order to rationalise the provision of development assistance from UNIDO or other agencies.



A key conceptual difficulty:

Any attempt to build up an indigenous AMIS is at best a medium-term solution.

Africa's problems, in contrast, are immediate:

- ✓ Food aid is needed today to feed the population.
- ✓ Short-term aid undermines, however, the incentives for local production in the long term.

Can massive injections of capital into modern farming be the solution?

- ✓ As a strategy for feeding the people in the cities, it may work.
- ✓ But leaves 95% of the population untouched.



The traditional farmers are deprived of much needed resources:

- ✓ Exacerbating their difficulties,
- ✓ emphasizing their income disadvantage,
- ✓ and leading, finally to still more migration.

The way ahead:

It would be unrealistic to expect that short-term measures be stopped.

However, what is needed:

A long-term plan to establish a strong indigenous AMIS

A system approach integrating strategies for agricultural and industrial development....linking agriculture to industry.





A broader definition of AMIS in the context of the African continent:

Industry must be understood to:

- Comprise all manufacturers (including blacksmiths and craft sector in general)
- Using whatever materials (including scarp steel)
- ✓ Using techniques or patterns of organization that are potentially able to respond to demand, and supply Africa's farmers with the products and services they need.
- ✓ The scope of the sector covers design, R&D, manufacturing, distribution and support services at the strategic interface between agriculture and industry.
- ✓ Particular attention has to be paid to the man-machine relationship as a determinant of physical as well as economic flows.



In this context,

- ✓ industry must be planned and developed to provide agriculture with equipment it needs for rural industrialization /mechanization.

In turn,

- ✓ mechanization and equipment of rural areas must be geared to the real needs of the people in those areas.



Methodology for analyzing the present situation of Africa's AMIS: Typological study

- Identify groups of countries with similar:
 - Needs.
 - Strengths.
 - Weaknesses.
- Rationalise the provision of development assistance.



Methodology – Industrial system approach:

- ✓ Analysis of AMIS and its main components.
- ✓ Identify dominant variables and indicators by using economic and technical criteria.
- ✓ Run cluster analysis with dominant variables and indicators.
- ✓ Identify the Groups of countries with similar readings in the variables and indicators that characterise components of the AMIS.
- ✓ For each cluster, describe the pattern of AMIS development.
- ✓ Use the results of clustering, correlation analysis and empirical research to identify the strengths and weaknesses of each group.
- ✓ Establish development strategies that exploit the strengths and address the weaknesses for each group of countries.



The variables used for the typology study:

- ✓ The input situation and productive capacity of the AMIS in each country (53 countries).
- ✓ The local industrial environment.
- ✓ The demand for agricultural tools and equipment arising from the AMIS in each country.
- ✓ The resources available to the system in which the AMIS operates.
- ✓ Gender issues.
- ✓ Other considerations: population growth, health issues, technological trends, agricultural commodity prices; etc.



Resource-Related Variables:

No.	Description	Unit
R1	Crop Land	ha/cap
R2	Pasture Land	ha/cap
R3	Forest Land	ha/cap
R4	Water Resources	M ³ /cap
R5	Population Density	Pop./km ²
R6	Rural Population	Rural Pop./000ha agric land
R7	Life Expectancy	Years
R8	GDP per Capita 1995	US\$ constant/cap
R9	Investment	Inward investment as % of NFF
R10	Investment	Inward: Total Investment
----	Crop Surplus	Not available
R11	Agricultural Exports	% of total merchandise exports
R12	GDP per capita	US\$ purchasing power parity



Demand-Related Variables:

No.	Description	Unit
D1	Arable Crop Land	ha/cap of the rural population
D2	Irrigated Land	% of arable land irrigated
D3	Crop Production Index	Index on base 1990
D4	Fertiliser Consumption	Gm/ha of crop land
D5	Agricultural Value Added	% of GDP from agriculture
---	Holdings	Not available
---	Holding Pattern	Not available
D6	Draft Animals	Draft animals/000ha crop land
D7	Tractors	Tractors per ha arable land
D8	Food Imports	% of total merchandise imports
D9	Calory Index	Change, base 1970 - calories/cap
D10	Calory Intake	Calories per capita
D11	Cereal Aid	000mt
D12	Cereal Aid per capita	Mt/cap



Variables Related to the Industrial Environment :

No.	Description	Unit
E1	Manufacturing Capacity	Manufacturing Value Added per capita
E2	Manufacturing contribution	Manufacturing value added % of GDP
E2a	Industry's contribution to GDP	Industrial value added % of GDP
E3	Manufactures Exported	Share of manufactures in total exports
E4	Debt: Export Ratio	External Debt Service to Export ratio
E5	Transport Capacity	Vehicles per 000cap.
E6	Secondary Education	% Enrolment in secondary education
E7	Adult Illiteracy	% Illiteracy in adults over 15 years
E8	Female Illiteracy	% Illiteracy in females over 15 years
E9	Paved Roads	Paved roads as % of all roads
E10	Agricultural Roads	Road network (km) per 000ha crop land
E11	Communications	Telephones per 000cap.
E12	Credit	Private sector credit as % of GDP



AMIS inputs:

No.	Description	Unit
I1	Labour in Agriculture	% labour force in agriculture
I2	Labour in Industry	% labour force in industry
I3	Females in Education	% females in secondary education
I4	Electricity Production	KWh per 000cap.
I5	Energy Self-Sufficiency	% of energy imported
I6	Metal Imports	Un-manufactured metals mt/000cap
I8	Fuel Imports	Fuel as % of merchandise imports
I9	Fuel Price	Price of Diesel oil US\$/litre
I10	Foreign Investment	Net foreign direct investment US\$/cap



AMIS capacity:

No.	Description	Unit
C1	Mainly a Machinery Importer	Main present source of AMIS products
C1a	Stamping Facilities	Presence of stamping/forging
C2	Machining Facilities	Presence of machining
C3	Casting Facilities	Presence of foundries
C4	Hand Tool Production	Scale of production *
C5	Animal Draft Implements	Scale of production *
C6	Powered Machines	Scale of production *
C7	Manufacturing Value Added	Metal Manufacturing MVA/000cap.
C8	MVA Growth	Index, base 1990
C9	Tractor assembly/Manufacture	Presence of assembly/manufacture

Results of the clustering process - 10 Groups of countries:

Group 1: Industrialised, High Income, Large Existing Markets	Algeria Egypt Libya Morocco South Africa Tunisia
Group 2: High income, Small Markets	Botswana Gabon Mauritius Namibia Swaziland

Results of the clustering process - 10 Groups of countries:

Group 3: Low Investment Importers; Potential Markets	Angola Burkina Faso Chad Eritrea Lesotho Mauritania Niger Sudan Togo Uganda
Group 4: Moderate Income Countries; Self-Sufficient in Simple Products	Benin Cameroon Cote d'Ivoire Mali

Results of the clustering process - 10 Groups of countries:

Group 5: Moderate Income, Dense Rural Populations	Congo Republic Guinea Madagascar Mozambique
Group 6: Densely Populated, Low income, Latent Markets	Congo Dem. Rep. Malawi Tanzania

Results of the clustering process - 10 Groups of countries:

Group 7: Large Markets, Good potential	Ethiopia Ghana Nigeria
Group 8: Semi-Industrialized, Good Markets	Kenya Senegal Zambia



Results of the clustering process - 10 Groups of countries:

Group 9: Small, Low Income, Agricultural Economies	Burundi Central African Republic Liberia Rwanda Sierra Leone Somalia
Group 10: Small Populations, Small Markets	Cape Verde Comoros Djibouti Equatorial Guinea Gambia Guinea Bissau Sao Tome & Principe Seychelles



Common development strategies:

- ✓ A suitable institution should be identified to take on the responsibility for development of the AMIS.
- ✓ Ensure that the national programme for AMIS products is aligned with both traditional and newly developing needs for tools and equipment.
- ✓ Work closely with the food industry to develop and market equipment to support the diversification of crop use and expand opportunities for industrial development.
- ✓ Foster development of the artisan producer and promote the transition from artisan to SME.
- ✓ Evaluate industrial production plans on the basis of real demand and integrate production within an existing metal-manufacture sector.
- ✓ Exploit potential for diversification in the interests of rational production economics.



Common development strategies:

- ✓ Evaluate existing distribution and service support set-up and assist where necessary to induce improvement.
- ✓ Improve communication and gain access to worldwide sources of information. It is suggested that an African AMIS Intranet is created.
- ✓ Continuously assess the policy and infrastructure in which AMIS operates, identify constraints and promote corrective measures.
- ✓ Assess the potential role of whatever regional bodies exist and explore the ways in which they might influence the development of the AMIS.
- ✓ Examine the role of women in order to research the market for equipment specifically suited to them and to plan production of such equipment.



Group-Specific Strategies:

Group 1: Industrialised, High Income, Large Existing Markets	Example of strategy pointers
Algeria, Egypt, Libya, Morocco, South Africa, Tunisia	<ul style="list-style-type: none"> ✓ Poor agricultural resources, especially water, and arable land in the case of Egypt, point to a need for higher intensity of dry-land mechanisation technology. ✓ High food imports suggest a good market for increased local production. ✓ Poor road networks indicate a need for specialised agricultural transport. ✓ Would respond to foreign investment in AMIS production. ✓ Opportunities exist for expansion of AMIS production for local consumption. ✓ Opportunities exist for specialised production for export to African countries. ✓ Tractors appropriate to other African countries could be sourced in this group.

Group-Specific Strategies:

- ✓ Develop and intensify dry-land mechanisation technology
- ✓ Develop agricultural transport systems (engine-powered and animal traction).
- ✓ Evaluate tractor manufacture for potential re-development (Existing Industry Strategy).
- ✓ Develop export markets for powered machines (including tractors).
- ✓ Explore opportunities for foreign investment in the AMIS.



Group-Specific Strategies:

Group 4: Moderate income countries; self sufficient in simple products	Example of strategy pointers
Benin Cameroon Cote d' Ivoire Mali	<ul style="list-style-type: none"> ✓ Cropland offers opportunities for agricultural expansion needing AMIS products. ✓ Animal draft mechanization expansion may be constrained. ✓ Opportunities for expanded demand for powered equipment. ✓ Poor basis for large-scale industrial development . ✓ Smaller workshops and artisans could be strengthened. ✓ Women in agriculture might benefit from appropriate AMIS actions. ✓ Possible opportunities in agro-processing subsector.

Group-Specific Strategies:

- ✓ Explore opportunities for production and marketing of engine-powered equipment.



Group-Specific Strategies:

Group 5: Moderate Income, Dense Rural Populations	Example of strategy pointers
Congo Republic Guinea Madagascar Mozambique	<ul style="list-style-type: none"> ✓ Agricultural productivity likely to be a primary objective. ✓ Opportunities for irrigated agriculture. ✓ Opportunities for expansion of engine-powered mechanization. ✓ Adequate water and grazing could enhance demand for animal traction equipment. ✓ Irrigation and fertilizer delivery equipment should offer opportunities for AMIS. ✓ Poor industrial input situation would constrain development. ✓ Strengthen artisans and small workshop production for animal traction and agro-processing. ✓ AMIS actions to address women's issues.

Group-Specific Strategies:

- ✓ Concentrate on opportunities for production of equipment to enhance agricultural productivity.



Group-Specific Strategies:

Group 6: Densely Populated, Low income, Latent Markets	Example of strategy pointers
Congo Dem. Rep. Malawi Tanzania	<ul style="list-style-type: none"> ✓ Agricultural productivity likely to be a primary objective. ✓ Opportunities for irrigated agriculture. ✓ Opportunities for expansion of engine-powered mechanization. ✓ Adequate water and grazing could enhance demand for animal traction equipment. ✓ Irrigation and fertilizer delivery equipment should offer opportunities for AMIS. ✓ Poor industrial input situation would constrain development. ✓ Strengthen artisans and small workshop production for animal traction and agro-processing. ✓ AMIS actions to address women's issues.

Group-Specific Strategies:

- ✓ Intensify efforts to enhance agricultural productivity.



Group-Specific Strategies:

Group 8: Semi-Industrialized, Good Markets	Example of strategy pointers
Kenya Senegal Zambia	<ul style="list-style-type: none"> ✓ Kenya and Senegal specially, need higher agricultural productivity. ✓ Zambia has adequate resources but in adequate income. ✓ Potential for expansion of engine-powered machanization ✓ Animal traction expansion possibilities in Zambia – possibly not in Kenya and Senegal. ✓ There is a basis for industrial development in the infrastructure . ✓ Industrial labour scarecity could be a problem. ✓ Attention to womens' concerns in agriculture offers opportunities for the AMIS ✓ Improvements to nutrition offer a challenge to the AMIS.

Group-Specific Strategies:

- ✓ Explore opportunities for foreign investments in the AMIS.

Group-Specific Strategies:

Group 10: Small Populations, Small Markets:	Example of strategy pointers
Cape Verde, Comoros, Djibouti, Equatorial Guinea, Gambia, Guinea Bissau, Sao Tome & Principe, Seychelles	<ul style="list-style-type: none"> ✓ Limited opportunities for industrial development. ✓ Potential demand for AMIS in some countries. ✓ Input situation is favourable in some countries. ✓ Indicators suggest a role for women in small industries.
<p>Group-Specific Strategies: Import most AMIS products and strengthen distribution system.</p>	

Conclusions

- There is urgent needs to develop the African AMIS, but this will require at best a medium-term solution.
- Given current global trends, Africa and its major donors must recognize two issues:
 - ✓ The importance of agricultural machinery as an essential input
 - ✓ The need to source this input largely at the local level
- International organizations, donors, and suppliers will have to play a lead role in setting AMIS into motion to contribute in achieving the MDG's.



***Thank you for your
attention.***