

Investment in agricultural mechanization in Africa

Conclusions and recommendations
of a Round Table Meeting of Experts



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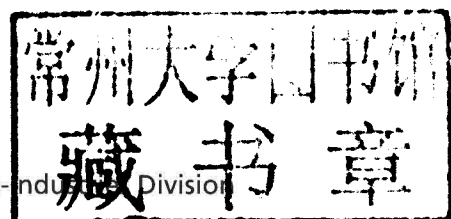
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Preface

Many African countries have economies strongly dominated by the agricultural sector. In some countries, agriculture generates a significant proportion of the gross domestic product (GDP), and contributes over 80 percent of trade in value and more than 50 percent of raw materials to industries. It provides employment for the majority of Africa's people, but despite this domination investment in the sector is still low. Yields of maize and other staple cereals have typically remained at about one tonne per hectare, which is about a third of the average achieved in Asia and Latin America. But this is not the only problem; the population is increasing in most African countries and this is accompanied by a rural to urban migration such that in the course of the next 2 to 3 decades there will be more urban dwellers than rural. Ensuring food security for the entire population is critical. But feeding the increasing urban population cannot be assured by an agricultural system that relies almost entirely on human muscle power.

One of the keys to the success in Asia and Latin America has been mechanization. By contrast, the use of tractors in sub-Saharan Africa (SSA) has actually declined over the past 40 years and, compared with other world regions, their use in SSA today remains very limited. Tractor use over the same period in Asia has increased tenfold. The situation in SSA can be illustrated by the extremely low numbers of tractors per 1 000 ha of arable land; in 1980 there were 2 and by 2003 this had sunk to 1.3. By comparison in the Asia and Pacific region, in 1980 there were 7.8 tractors per 1 000 ha and this had risen to 14.9 by 2003. In 1960, Kenya, Uganda and Tanzania alone had more tractors in use than India. But by 2005, India had 100 times more tractors in use than the total number in use in these three countries.

Even though SSA started at a very low base, the trend over the past three decades has become even worse. SSA is also the only developing region where the number of agricultural workers per hectare is no more than half of the average for all developing regions, a situation even more dramatic because the number of tractors in use is also very low.

The greatest source of power for land preparation remains human muscle power. In Central Africa an estimated 80 percent of cultivated land is worked manually. In eastern and southern Africa the figure is about 50 percent. Because of this not only does sub-Saharan Africa have an acute lack of human resources available for agricultural production, but also it cannot compensate for this shortage by resorting to tractors as there are not sufficient numbers available.

Over the past few decades the failure of the public sector tractor hire schemes led to many development practitioners moving away from conventional motorized mechanization approaches, even though the true reasons for these failures were never carefully analysed. Some suggested, probably quite mistakenly, that such a mechanization approach could never be economic, and attention turned to better exploiting the use of draught animals as a source of farm power. Although some progress was made, this too was found not to be an approach that could offer a significant improvement to the situation.

It is now clear that unless some positive remedial action is taken, the situation can only worsen. In most African countries there will be more urban dwellers than rural ones in the course of the next two to three decades. It is critical to ensure food security for the entire population but feeding the increasing urban population cannot be assured by an agricultural system that is largely dominated by the centuries old hand tool technology. In order to redress the situation, FAO and UNIDO together with many African experts are convinced that, just as has happened in Asian and South American countries, support is urgently needed for renewed investment in mechanization. Furthermore, mechanization is inextricably linked with agro-industrialization, and there is a need to clarify the priorities for supporting this investment in the context of a broader agro-industrial development strategy. This must, however, be done in the right way, taking into account critical factors for success and sustainability.

How can governments and the public sector set about ensuring an increase in investment in mechanization without encountering blockages similar to those experienced previously in the 1960s and 1970s? This issue and others were addressed at a three-day Round Table Meeting of experts that was convened in Arusha, Tanzania, in June 2009 with the intention of providing guidance on the key strategies and good practices for maximizing the benefits and sustainability of investments in agricultural mechanization in Africa. This report summarizes the deliberations of this Round Table Meeting.

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Acknowledgements

The editors would like to acknowledge the contribution of the numerous persons who ensured that this Round Table Meeting could be held. The event constituted a direct follow-up to the Meeting convened by UNIDO in Vienna in December 2007 on *Agricultural Mechanization in Africa* and at which time a subsequent meeting in Africa was proposed. We are grateful that the Centre for Agricultural Mechanization and Rural Technologies (CAMARTEC) agreed to host the Round Table in Arusha, Tanzania. Special thanks go to the local organizing team that provided an excellent venue for the two days of deliberations. The technical and continued financial support of UNIDO is acknowledged.

The meeting was enriched by the active participation and valuable inputs and ideas from the many experts in mechanization and the financial sector who came from a number of African countries (Cameroon, Ghana, Kenya, Morocco, Niger, Sierra Leone, South Africa, Tanzania and Zimbabwe) together with resource persons from Europe and India. Special thanks are extended to the President of Club of Bologna for his attendance. The outcome of the Round table has already made this topic more visible at policy and donor level and it is hoped that this will lead to more sustainable approaches to agricultural development in the African region.

The first draft version of this document was put together by Lawrence Clark. Special thanks are made to Larissa D'Aquilio (FAO) for leading the publication process, to Madeline Grimoldi for English editing and to Fabio Ricci for the desktop publishing.

Acronyms

ACT	African Conservation Tillage Network (Kenya)
IFC	International Finance Corporation
AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
AICRP	All India Coordinated Research Projects
AMDTF	Agricultural Machinery Development Trust Fund
AMIS	Agricultural Machinery Industrial Sector
AMS	Agricultural Mechanization Strategy (Kenya)
CA	conservation agriculture
CAMARTEC	Centre for Agricultural Mechanization and Rural Technologies (Tanzania)
cc	cubic centimetres
CENEEMA	Centre National d'Etudes et d'Expérimentation du Machinisme Agricole (Cameroon)
CMDT	Compagnie Malienne des Textiles, parastatal organization, Mali
COMESA	Common Market for Eastern and Southern Africa
DAP	draught animal power
EAC	East African Community
ECCAS	Economic Community of Central African States
ECOWAS	African Community of West African States
FAO	Food and Agriculture Organization of the United Nations
FIs	Financial institutions
FSDT	Financial Sector Deepening Trust (Tanzania)
GDP	gross domestic product
GPRS	Growth and Poverty Reduction Strategy (Ghana)
GTZ	German agency for technical cooperation
ha	hectare
h.p.	horsepower
HIV/AIDS	human immunodeficiency virus/acquired immune deficiency syndrome
HYV	high-yielding variety
ICAR	Indian Council of Agricultural Research
IFC	International Finance Corporation
ILO	International Labour Organization
KENDAT	Kenya Network for Dissemination of Agricultural Technologies
mm	millimetre
MSP	minimum support price

NAMS	national agricultural mechanization strategy
NCAM	National Committees on Agricultural Mechanization
NGO	non-governmental organization
PPP	Public-Private Partnership
Pt-O	power take-off
R&D	research and development
REC	regional economic community
SAU	state agricultural universities
SME	small- and medium-scale enterprise
SSA	sub-Saharan Africa
SWOT	a planning method used to determine strengths, weaknesses, opportunities and threats
UNIDO	United Nations Industrial Development Organization
VAT	value-added tax
WRS	warehouse receipt scheme

Executive summary

OVERVIEW

The specific objectives of the Round Table were to make recommendations on three sets of interrelated issues:

- Definition of the specific areas of action needed to increase the availability of mechanization inputs.
- Identification of the components of a programme to increase investments in mechanization.
- Identification of the potential roles and responsibilities of FAO, UNIDO and other development partners in supporting investment in mechanization in Africa.

MAIN POLICY AND STRATEGY ISSUES CONSIDERED AT THE MEETING

The Round Table Meeting focused on a number of policy and strategy issues for which background papers were presented to promote discussions in the working groups and during plenary sessions. They may be summarized as follows:

1. Public sector mechanization strategy development and investment priorities, including the following topics:
 - Agricultural mechanization strategies – recent experiences
 - Best practices and examples of investment priorities from Asia
 - Purchasing strategies and programmes – tendering for mechanization inputs
 - Cost of doing business and risk management
 - Creation of effective demand
2. Public-private sector models in support of mechanization, including the following topics:
 - Possible codes of practice for the private sector stakeholders – roles and responsibilities of those concerned
 - Responsive business systems for sustained mechanization inputs
 - Criteria for appraising, designing and targeting investment programmes
3. Networking and south-south linkages, including the following topics:
 - South-south technology supply and transfer
 - Global and regional networking among machinery suppliers
4. Financial-sector requirements, including the following topics:
 - Bringing the financial sector on board
 - Innovative funds, facilities and mechanisms such as leasing or contracting

CONCLUSIONS

The Working Groups and discussions during the plenary sessions allowed the following conclusions to be identified:

- Mechanization is not just a question of supplying farmers with tractors and machinery or of making mechanization services available to them through the public sector. The utilization of mechanized inputs must be profitable to all parties concerned.
- The best way to mechanize is for farmers to own their machines or for them to hire services from other farmers. For a better chance of profitability, off-farm use of the tractors (for example) should be considered.
- Tractors need to be serviced, repaired and have available the necessary spare parts. A tractor or machine without these is more of a liability than an asset. Support infrastructure is therefore vital.
- The best way to supply machinery is through the private sector, although this does not necessarily preclude public sector participation. However, this must be done in such a manner as to support the private sector.
- In many Asian countries where mechanization has expanded so significantly, agricultural pricing policy has been used as an instrument to support this.
- In many African countries, most farmers still cannot afford mechanization. This situation depends to a large extent on farmgate prices, which in many countries are volatile and often too low.
- Lack of finance is the overwhelming reason why farmers cannot purchase machinery. Commercial banks are generally not interested in lending to farmers, and their interest rates are far too high for farmers to use loans effectively. Problems related to landownership and registration often lead to farmers lacking sufficient collateral to qualify for loans.
- Local manufacturers often lack skills and sufficient investment funds. Other difficulties often include high tariffs on imported steel and components, and the cost of doing business is frequently quite high.
- There are often inadequate training facilities making it difficult to upgrade the skills of human resources.
- Although off-farm use of tractors may be encouraged to increase profitability of their operation, government and other regulations may stifle such efforts.
- Further efforts are required to convince development agencies and financial institutions that increased investment in agricultural mechanization is required.
- There is often a poorly coordinated approach to mechanization. Mechanization issues are not a concern of agriculture ministries alone, and the ministries of industry, finance, education and others should also be involved.
- There is too little networking activity among interested parties at both national and interregional levels concerning agricultural mechanization.

MAIN POLICY ISSUES

The following key questions were identified as requiring a response regarding policy issues:

- Although government policy will aim to increase agricultural production, is increased mechanization adequately recognized as an essential means to achieve this?
- What should be the role of the public sector in promoting agricultural mechanization?
- Subsidies – should mechanization and/or the manufacture/importation of machinery be subsidized and, if so, how?

- Should the pricing of farm products be used as an instrument to increase investment in agriculture and, if so, what mechanisms are needed?
- Finance – how can this best be made accessible to the private sector so that SMEs can be established so as to offer mechanization services in particular to the small-scale farmers?
- How can the assistance offered by donors who wish to use “aid in kind” (e.g. the supply of tractors) best be accommodated within national development programmes?
- What is the policy regarding protection of farmers against bad commercial and/or financial practices?
- Can land ownership and registration policies be improved so as to improve the possibilities of farmers using their land as collateral?

RECOMMENDATIONS

The following recommendations that emerged from the Meeting are intended to facilitate support of both public- and private sector investment flows into the development of agricultural mechanization in Africa. One of the main objectives is to reduce primary land preparation carried out by hand-tool technology from the current 80 to 40 percent by the year 2030, and to 20 percent by 2050. Increasingly, land should be prepared using a combination of draught animal power (DAP) technologies and tractors.

ESTABLISH NATIONAL COMMITTEES ON AGRICULTURAL MECHANIZATION (NCAM)

The national committees would comprise representatives of all major stakeholders, such as agriculture, finance, industry, trade and other ministries, farmers, together with the financial, private sector, and research and development institutions. The main functions of the committees would be to:

- Assist the national government in reviewing national policy to include a strategy dealing with mechanization.
- Develop and update the national agricultural mechanization strategy (NAMS), including regional strategies, an area where FAO and UNIDO can assist.
- Coordinate efforts between different ministries and institutions.
- Develop more efficient procurement systems, an area where FAO, UNIDO and World Bank can assist.
- Ascertain compatibility of donations with national standards and plans.
- Prepare action plans for capacity building through formal education, research, extension and vocational training.

CREATE AN ENABLING ENVIRONMENT TO INCREASE THE UTILIZATION OF TRACTORS AND OTHER FARM EQUIPMENT

- Increase on-farm use of tractors and machinery by promoting neighbourhood contracting.
- Review existing regulations on the use of agricultural tractors for off-farm applications such as transport of materials, construction of rural infrastructure (roads, irrigation works, etc.) and land clearing.
- Intensify agriculture, including livestock production, by increasing irrigation.
- Facilitate cross-border use of farm equipment.
- Develop an enabling environment for a demand-driven mechanization process by developing agro-processing industries.

INCREASE INVESTMENT IN AGRICULTURAL MECHANIZATION (BOTH PRIVATE AND PUBLIC SECTORS), DRAWING FROM ASPECTS OF THE EXPERIENCE OF INDIA PRESENTED DURING THE MEETING

- Explore the possibility of central banks providing direct support to commercial banks for on-lending to farmers/entrepreneurs and to prescribe a minimum percentage allocation of bank lending to the agriculture sector.
- Explore ways to facilitate long-term financing needed for agricultural mechanization. This could involve facilitation and access to long-term sources of finance such as bond funds, refinancing lines of credit or development trust funds.
- Establish or strengthen rural banking facilities to provide financial services to the agriculture sector.
- Ensure that financial service providers to the agriculture sector are consistently made aware of current best practices in the technical and economic use of agricultural mechanization technologies.

CAPACITY BUILDING

- Assess the current situation and identify the availability of centres offering education, research and extension services focusing on farm mechanization in Africa.
- Estimate the requirements for such centres, including the identification of their geographical locations and, based on the regional strengths of key centres, develop them as centres of excellence.
- Develop in each centre programmes of formal education, research and extension in agricultural mechanization. Explore possibilities for regional training, as not all countries have the capacity to establish training centres.
- Implement short-term training programmes for mechanics in the operation, maintenance and repair of agricultural machinery and processing equipment.
- Extend the training curriculum for motor vehicle mechanics to cover tractors and other agricultural machinery.
- Promote educational outreach programmes to create awareness on how to use mechanized equipment for other off-farm applications in order to increase utilization and effective demand for mechanization.
- Implement short-term training programmes promoting farming as a business, by means of training in farm management, entrepreneurship, business management and agro-processing.
- Establish and strengthen associations of contractors, manufacturers, processors, traders and others at local, regional and national levels.

AGREE ON A CODE OF PRACTICE FOR AGRICULTURAL MACHINERY SUPPLIERS

At international level, under the lead of FAO and UNIDO, develop and agree on a code of practice for agricultural machinery suppliers. This code should strengthen the role of the private agricultural machinery sector in supplying machinery, providing after-sales repair and maintenance services, and building the capacity of machinery owners as part of their role.

CREATE REGIONAL AGRICULTURAL MECHANIZATION NETWORKS IN AFRICA

Membership should be encouraged from research and development institutions, professional organizations, manufacturers and distributors, with assistance from FAO and/or UNIDO if requested. This network will link up with existing thematic networks related to mechanization, including DAP and conservation tillage.

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PART I

Summary

