

“You’ve got to look at the entire value chain”

Long rejected, smallholder mechanization is now increasing yield and quality

Mechanization makes a decisive contribution to flourishing agriculture. This is also true for small-scale farming, which is why the Syngenta Foundation is getting involved. Helmut Spohn works for other organizations as an independent advisor, mainly in Ethiopia. We spoke to him about the past, the present and the future.

Syngenta Foundation: *How would you describe the developments in small farm mechanization (SFM) over the past two decades?*

Helmut Spohn: 20 years ago, many “experts” dismissed SFM as practically impossible. The costs would be too high and the areas too small; know-how and capital were not available. Efforts undertaken were mainly confined to the harnessing of animals for field work, or improvements to equipment based on European models. Success was limited. Farmers often refused to work with the new equipment. The main reasons were the insufficient pulling force of the animals, lack of technical know-how, and poor infrastructure for spare parts and repairs.

What happened next?

Attempts were later made with single-axle tractors (see photo) and small conventional tractors with between 30 and 80 hp. However, on dry ground the single-axle tractors required considerable physical effort. For families with a hectare or less, the machines were prohibitively expensive – even the cheapest Chinese models. Where people used communally-owned tractors, there was considerable potential for conflict at peak demand times.



The use of conventional tractors with disc ploughs and harrows became established in regions with large agricultural areas. This machine combination can now be found in almost all African countries. However, their quality is often poor. The users are often insufficiently trained, spare parts are in short supply, and money for better equipment is not available.

What changes have you noticed recently?

Until about ten years ago, the national agricultural ministries paid little attention to SFM, and development aid organizations did very little. NGOs even frowned on activities in this sector. One of the reasons they gave was that SFM would help private companies make profits! However, continuing to work the fields traditionally did not create the optimal conditions for seedbeds, so yields remained unnecessarily low.

Only in the past five to ten years has the necessity of smallholder farm mechanization been recognized. Taking Ethiopia as an example: Almost the entire country uses animals for field cultivation. The growing population means that feed resources are becoming increasingly scarce. The feed requirements of a pair of oxen are comparable to those of a good dairy cow. Ethiopian consumer prices for milk are similar to those in Germany. The Ministry of Agriculture has since founded a Mechanization Directorate. For example, German development aid organizations are conducting projects in cooperation with private companies in Ethiopia, Morocco and Zambia. Their main focus is on modification and demonstration of equipment, and training of operators, farm managers and contractors. New SFM projects are also being run in many other African countries by GIZ*, USAID**, etc.

Which examples do you think indicate especially positive progress in SFM?

There are several. Firstly, I am very appreciative of the initiatives undertaken by farmers, cooperatives and private individuals to invest in SFM and work as contractors. Smallholders can't afford to buy a tractor, but they can afford to use a rental service. Secondly, local agricultural ministries are becoming increasingly aware of the necessity of SFM, and are implementing advisory services. In addition, the agricultural machinery industry is discovering Africa as a future market. However, further investment is required, particularly in training and the provision of replacement parts.

The increased yields are also gratifying. In Ethiopia the ATC*** has demonstrated wheat yield increases from 2.5 t/ha to 6.5 t/ha on 0.5 to 1 ha, using modern European equipment. No farmer using this service harvested less than four tons per hectare. The national average is only 2.2 t/ha. Examples such as these increase the demand for further mechanization.

Where do you see the greatest potential in future?

Significant yield gains are possible in the cultivation of annual fruit. Mechanization is particularly important on hard ground, which is difficult to cultivate but fertile. Many thousands of hectares in Eastern Africa remain unused, as they cannot be cultivated by hand or animal-drawn equipment. In addition, modern machines have lower fuel consumption than older models.

Mechanization also creates jobs, as it requires service infrastructure. New value chains emerge, thanks to increased yields and diversified production. Young people remain in rural areas, as they see career opportunities without working in the fields. Small farms in many areas are becoming larger, due to a proportion of farmers giving up agriculture. This makes mechanization of the remaining farms an even more attractive proposition.

What are the greatest obstacles for SFM?

The negative attitudes previously described are unfortunately still widespread. That's true both in government departments and development aid organizations. A further problem is the lack of capital. Many banks, both local and international, are not flexible enough to support SFM. The third large obstacle is a lack of know-how. All the organizations involved must invest more in technical and economic training.

What are the arguments against increased mechanization?

There are effectively none. However, appropriate mechanization is important. All too often, cheap solutions are sought, which then prove to be expensive when breakdowns occur during peak demand times.

It is also important to protect smallholders land rights. The state must make more effort in this regard. Mechanization tends to encourage the merging of farm plots, which increases the danger of smallholder eviction. In Ethiopia there are clear laws enforced by the communes. In some other countries, such as South Sudan, the regulations are more ambiguous.

What else should be considered in relation to SFM?

Firstly, many things now seen as "new" actually have a long history. In Ethiopia in the 1960s, commercial farmers rented tractors to smallholder farmers in the surrounding area. Today, completely new marketing opportunities exist, for example using mobile phone applications.

In all mechanization aspects it is very important to consider the entire production process. Mechanization allows farmers to achieve higher yields with better quality, leading to a corresponding increase in the volume of produce that gets processed. This requires investment throughout the value chain and a major commitment by private companies. Banks and development organizations must encourage and support medium-sized businesses, for example with credit and guarantees.

* <https://www.giz.de/en/html/index.html>

** <https://www.usaid.gov/>

***Agricultural Training Centre, a GIZ project financed by the German government and farm machinery companies.

Helmut Spohn grew up on a part-time farm in Germany's Swabian Alps. After his first agricultural studies he worked for his country's Development Service in Ethiopia and domestically. After further studies, Spohn became a consultant for the agricultural rehabilitation of areas in north-eastern Ethiopia severely affected by the 1984-86 drought. From 1992 he worked as an independent evaluator for NGOs, GIZ and companies in Ethiopia, Kenya, Tanzania, Malawi and Zambia. He has specialized in mechanization since 2007, and grows apples, avocados and vegetables himself in Ethiopia. The views expressed in this interview are his own.