

## Farm Mechanization: Scaling Down To empower the Small Farmers

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### Introduction

The government's push for mechanization in the country is coherent with the aim of 'doubling the farmer's income'. It is palpable that the labour shortage and increasing wages prompt more farmers to adopt mechanization. Thus, we can see the change is already on board and even though in fits and starts, going to take off into the sky of modern mechanized farming. However, it is necessary to pause and ponder for a while the potential outcomes of large-scale mechanization in India, as we see the consequence of full-fledged mechanization elsewhere in the world. Certainly, the wise men do not hesitate to learn from the past.

### Lessons of large-scale mechanization

When we look in the history, it is no surprise to see that each time a technology spring emerged along with a formidably long war! So, it turns out that big machines were built for big wars. Why? The scale of extended mechanization and its efficiency was a prerequisite for war-time mobilization of resources and massive production. It is astonishing to find that many of the technologies developed at the time of the second world war in the 1930s were carried over to civil utilities after the war, where the major receiver sector was agriculture. The US farms started to use aircrafts to spray pesticides in the sprawling farm lands. And for their massive scale of production, it was not only affordable but profitable. So, the giant machines are designed and utilized for some very specific objectives; maximum yield, maximum speed and maximum profit. Even when the war and war-time urgency became a thing of the past, the technology and mechanization continued to progress in the same direction.

Towards the end of 20<sup>th</sup> century, giant machines made their way to India as well. Helicopters started to hover around our sky to spray pesticides in the large estates of big companies. This method helped to spray pesticides efficiently in plantation crops. Yet, the experience of this experiment was a disaster for the local people in the Kasargod district of Kerala. As the pesticide (Endosulfan) rained from the sky, it started to pollute the waterbodies and air in the



region. The aftermath was inextricably tragic. Children were born with severe genetic disorders, incurable diseases and organ deformities. This is a living monument of a blunder in the name of mechanized farming.

Experiences like this demand a basic rethinking of the direction in which we have to take farm mechanization in our country.

### **Large-scale mechanization and small farmers**

If it was not for the high wage rate and shortage of seasonal labour, the small farmers would have preferred human labour over the big machines. But unfortunately, the farmer is given a bleak choice between expensive human hands and dominating machine hands.

A giant 100hp combined harvester can reap a hectare of paddy in a couple of hours with only a couple of operators. Their efficiency ranges anywhere between 95 to 98%. So, the farmer gets his job done in time and with higher efficiency. Nevertheless, this is not the end of the story. From a broader economic point of view, this story has a very grim flipside.

### **The elusive energy loss**

Firstly, replacing expensive human labour with very sensitive and unsustainable energy source makes the trade-off less desirable. The giant farm machines have giant fuel tanks and wider exhaust pipes as well. These machines burn quite a lot of oil in the field. A disturbing fact is that, in India these machines will have to burn much more oil than they do in developed countries. Because while the western countries use much efficient engines with precise sensors, Indian machines lack precision and hence devour more oil. Another problem is the small size of holding and scattered fields. As the small patches of fields are scattered across the villages, these heavy machines have to move frequently from one field to another burning very large quantities of fuel. These show us a very critical energy leakage in our system.

Secondly, moving heavy machines frequently in the field causes soil compaction. Soil loses natural fertility, water holding capacity and proper aeration. In order to compensate the resulting drop in productivity, farmers have to use more fertilizers apart from using more machine hours for ploughing. This is a slow and gradual degradation.

Finally, who will bear the cost of these disadvantages and who will take home the benefits? Obviously, the small farmers have to bear the brunt. In the harvesting season, the farmer sleeps every night on nightmares. An unpredictable rain could hamper the hard work of the entire year at once. So, one has to harvest his field in time. But, with peak demand, the supplier can charge inexorable rent. The small farmer who cannot afford a machine, pays the rent whatsoever. This, by any standards, is exploitation.



On the other hand, those who own the machines, obviously the rich farmers and machine suppliers, make up their profits. For small farmers, a 76 hp tractor worth 8 lakh is well beyond affordable range, let alone 100 hp combined harvester that costs 20 lakhs.

### **Finding an alternative**

Pushing back mechanization is retrogressive and void. But it is also important that the flaws we enumerated are practically significant. These lead us to more specific solutions, solutions that can accommodate mechanization, but with broader objectives and changed priorities. Hopefully, we can change the direction of mechanization.

Our objectives are wider now. We have to be much concerned about sustainability and the long-term impacts of machines. At the onset of 21<sup>st</sup> century, our country pledged to the sustainable agriculture objectives. It means we need to prioritize equitable and sustainable distribution of the technology improvements. Now the question is how can we drive mechanization in the direction of sustainability and equity.

### **Scaling down**

The main villain of the story is not machine, but the size of the machines. So, what if we can scale down the size of the machines and make it more affordable and operable for small farmers? Then the scenario changes. Let's see how.

Small machines are affordable for small farmers. while this means more human labour, the skill needed to operate small machines is simpler and easily acquirable. This means the labourer himself or small farmer can afford the machine. A machine thus improves the marginal productivity of labour, substantiating high wage rate. small machine also means lighter machines which causes less soil compaction and since small farmers can afford it in their own small field, frequent on-road transportation is not needed. This is real empowerment of small farmers and farm labour class in our country. On top of that, a prerequisite for incorporating renewable energy systems into the machines is 'smaller size'. So, scaling down will help to build machines that can run on CNG, electricity or even hydrogen in the future.

### **Conclusion:**

Technologies obsessed with scale of production and efficiency have been increasingly proven detrimental for small farmers. The country needs much more sustainable approaches to deal with the emerging challenges. A mechanization with empowerment of our small farmers is desirable for Indian conditions. At the end of the day, farmer should run the farm to feed man, not the machines to feed pockets.