Food and Agriculture Organization of the United Nations

Will promotion of agricultural mechanization help prevent child labour?

POLICY BRIEF

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

IFPRI

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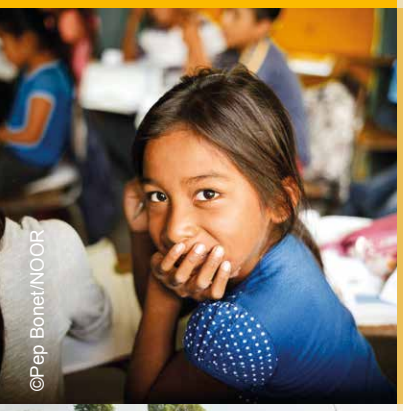
For the first time in a decade, **child labour is on the increase**, severely threatening the realization of the SDGs.

Of the estimated 160 million child labourers in the world in 2020, **70 percent are engaged in agriculture, forestry, fisheries and aquaculture**, most in family operations, and there will be no elimination of child labour if small-scale farmers and fishers are not mobilized and supported.

Agricultural work is often an entry point into child labour, and **children working in agriculture are generally very young**. Agriculture accounts for 76.6 percent of all child labour in the age group 5-11 years and for 75.8 percent in the age group 12-14 years.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Young people between 15 and 17 years of age are particularly vulnerable to hazardous work, though they may legally join the work force in non-hazardous work. **Stepping up the protection of young workers in agriculture** must be an urgent priority if the world is to realize the Sustainable Development target 8.7.

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For younger children below the age of 14 to 15 years, ensuring that alternatives to child labour are in place for the children and their families is essential. This includes first and foremost **ensuring that all children, including children in remote rural areas and children on the move, have access to free, good quality compulsory education.**

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Many children engage in productive activities in developing countries. The prevalence is particularly high in parts of Africa, such as in Ethiopia where more than one third of children aged 5–14 years old engage in farm or off-farm work.

The prevalence of child labour in agriculture is lower, at 10 percent or less in seven countries in Asia and Africa that were subject to a recent Food and Agriculture Organization of the United Nations (FAO) and International Food Policy Research Institute (IFPRI) study. While this share may seem low, **at least 6 million children in these countries do work that is at the expense of their opportunities in adulthood**.*

* Please note that – given limitations in the available data – the estimate for the prevalence of child labour refers to productive engagement by children aged 5–14 years old that is not age-appropriate, involves work for fourteen hours or more per week, and occurs at the cost of school attendance.

Agricultural mechanization, reflected in farm household's use of machinery such as tractors, significantly reduces the likelihood of the use of children's labour and increases the likelihood children attend school.

While significant, **these impacts of mechanization are modest in magnitude and dependent on the extent to which mechanization helps improve household income and on local conditions** (such as quality of rural infrastructure, accessibility of education and other social services).

Hence, promotion of agricultural mechanization by itself is not sufficient to prevent the use of child labour.

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Engagement of children in productive activities mostly relates to **farm household poverty** in developing countries.

Child labour and agriculture

Child labour in agriculture remains a global concern. Agriculture is the sector where worldwide most child labour is found. Engagement of children in productive activities mostly relates to farm household poverty in developing countries. This raises the question as to what extent the modernization of agriculture leading higher productivity can contribute to the prevention of child labour in agriculture. Little is known about whether the use of potentially labour-saving agricultural technologies, such as mechanization through use of machine-powered equipment, also reduces the need for productive engagement of children and helps do away with conditions characterized as child labour. A new study from the Food and Agriculture Organization of the United Nations (FAO) and The International Food Policy Research Institute (IFPRI) addresses this question and provides evidence for seven developing countries in Africa and Asia (FAO-IFPRI, Forthcoming).

The concern here is not so much that children should not be allowed to undertake any form of on- or off-farm productive activity, but rather whether such work is detrimental to their development. International conventions define tasks undertaken by children as "child labour" when they are by law underage to be in any form of employment, work conditions are detrimental to their development as human beings, interfere with their education and affect their health.

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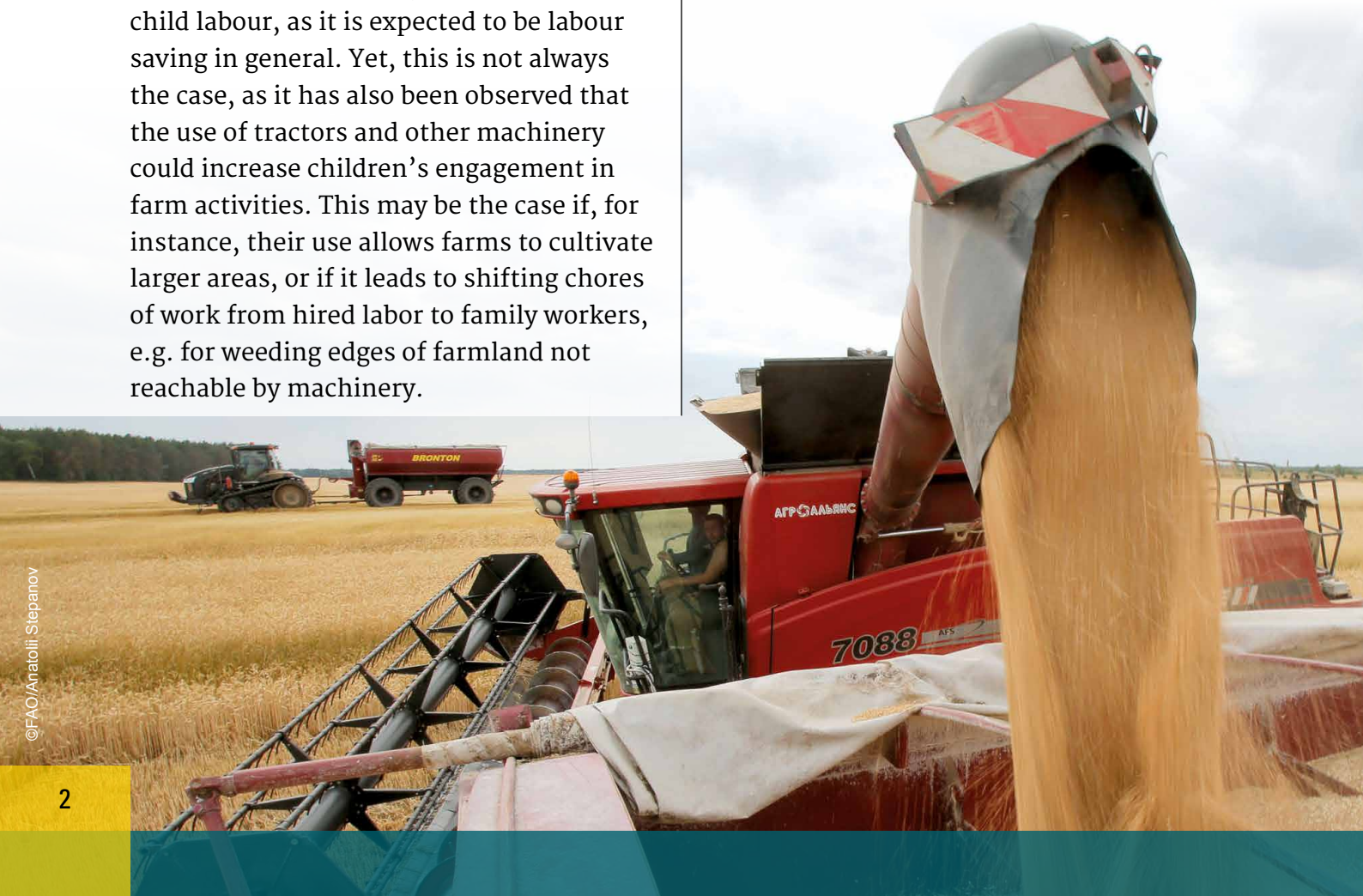
What is at stake?
The role of mechanization

Agricultural mechanization can take a variety of forms. The FAO-IFPRI study focuses on the use of tractors because they are among the most versatile farm mechanization tools and are universal power sources for all other driven implements and equipment in agriculture, with significant potential to replace animal draught power and human power, including children's muscle power. Tractor use is typically also the first type of machine-powered equipment in use at lower levels of agricultural development, the context where most child labour is found.

Mechanization is mostly assumed to reduce child labour, as it is expected to be labour saving in general. Yet, this is not always the case, as it has also been observed that the use of tractors and other machinery could increase children's engagement in farm activities. This may be the case if, for instance, their use allows farms to cultivate larger areas, or if it leads to shifting chores of work from hired labor to family workers, e.g. for weeding edges of farmland not reachable by machinery.

Evidence has been scant thus far, but the few available studies have mostly lent greater support to the hypothesis that mechanization reduces children's productive engagement. Most available studies have focused on specific cases and based on scant data. The new FAO-IFPRI study provides a rigorous quantitative assessment for seven developing countries in Asia (India, Nepal and Viet Nam) and sub-Saharan Africa (Ethiopia, Ghana, Nigeria and the United Republic of Tanzania) based on comparable farm household survey data.



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The few available studies have mostly lent greater support to the hypothesis that **mechanization reduces children's productive engagement**.

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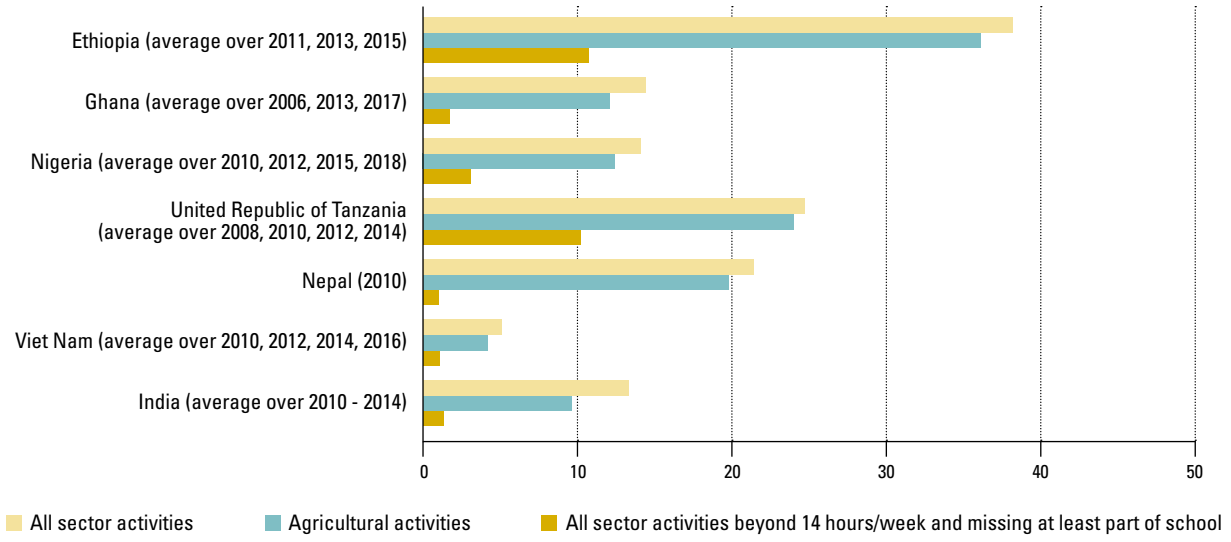
The challenges: children's work in agriculture and impact on schooling

The key findings regarding the prevalence of child labour in agriculture in these countries and impact on schooling are as follows (Figure 1):

- **Children's engagement in productive activities is substantial in countries with less advanced agricultural development.** The proportion of children aged 5–14 years old engaged in at least some productive activities is high in all studied countries, ranging between 20 and 30 percent, except in Viet Nam where the proportion is less than 10 percent.
- **Children of farm households in the seven studied countries mostly do agricultural work.** The share of working hours in agriculture is 90 percent or more in most cases, except in Ghana and Viet Nam where children spend a substantial share of labour time in non-agricultural activities (around 30 percent). Farm activities by children vary greatly, involving land preparation, planting, weeding and ridging, harvesting and threshing, as well as livestock rearing.
- **Children working in agriculture generally have long working hours.** Between 5 and 15 percent of all children in Ethiopia and the United Republic of Tanzania, and 0 to 5 percent of children in Ghana, Nigeria, Nepal and Viet Nam work at least 14 hours a week. In every country of the study, at least twothirds of children's engagement in productive activities are in agriculture and are typically unpaid. Amongst these, many work more than 14 hours per week, ranging as widely as between 21 percent in Nigeria and 67 percent in Ethiopia.
- **Many children do not attend school regularly, but those spending more time working are much more likely to miss school.** School absenteeism is particularly high in Ethiopia, Nigeria and the United Republic of Tanzania, ranging between 24 and 55 percent.
- **The prevalence of child labour in agriculture is around 10 percent or less** in the seven countries when defined as children engaging more than 14 hours per week in productive activities and not regularly attending school. While this share may appear low, in absolute terms, child labour identified this way affects large numbers of children: about 2.5 million in Ethiopia, 1.5 million in Nigeria and the United Republic of Tanzania, and between 30 000 and 100 000 children each in the cases of Ghana, Nepal and Viet Nam.

Figure 1. Shares of children aged 5–14 years old engaged in productive activities in Africa and Asia (period averages in %)



Note: Figures for India are not nationally representative.

Source: FAO & IFPRI, Forthcoming.

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Opportunities: does mechanization help reduce child labour in agriculture?

Is agricultural mechanization, and, specifically, usage of tractors associated with less productive work by children of farm households? The study concludes the following:

- **Farm households with basic use of mechanization equipment (such as tractors) make less use of child labour than farms that do not have mechanized equipment.** While the impact is not equally strong across the seven country cases, the finding broadly holds, also after ascertaining other determinants of children's productive engagement and context-specific factors.
- **Tractor use (as well as usage of combine harvesters in India) reduces the probability of children's work engagement on average by 5 to 10 percentage points (Figure 2).** The impact varies; however, it ranges from near zero (insignificant) in Viet Nam to 30 percent in Ghana, depending on the country context and whether machine power is used for land preparation and planting or for harvesting (see also below).
- **In the African countries (except the United Republic of Tanzania), the use of tractors reduces both children's engagement in productive activities and the risk that they do not attend school.** The latter impact is less clear in the Asian context, where school absenteeism is reportedly low, also among children engaging in farm work.

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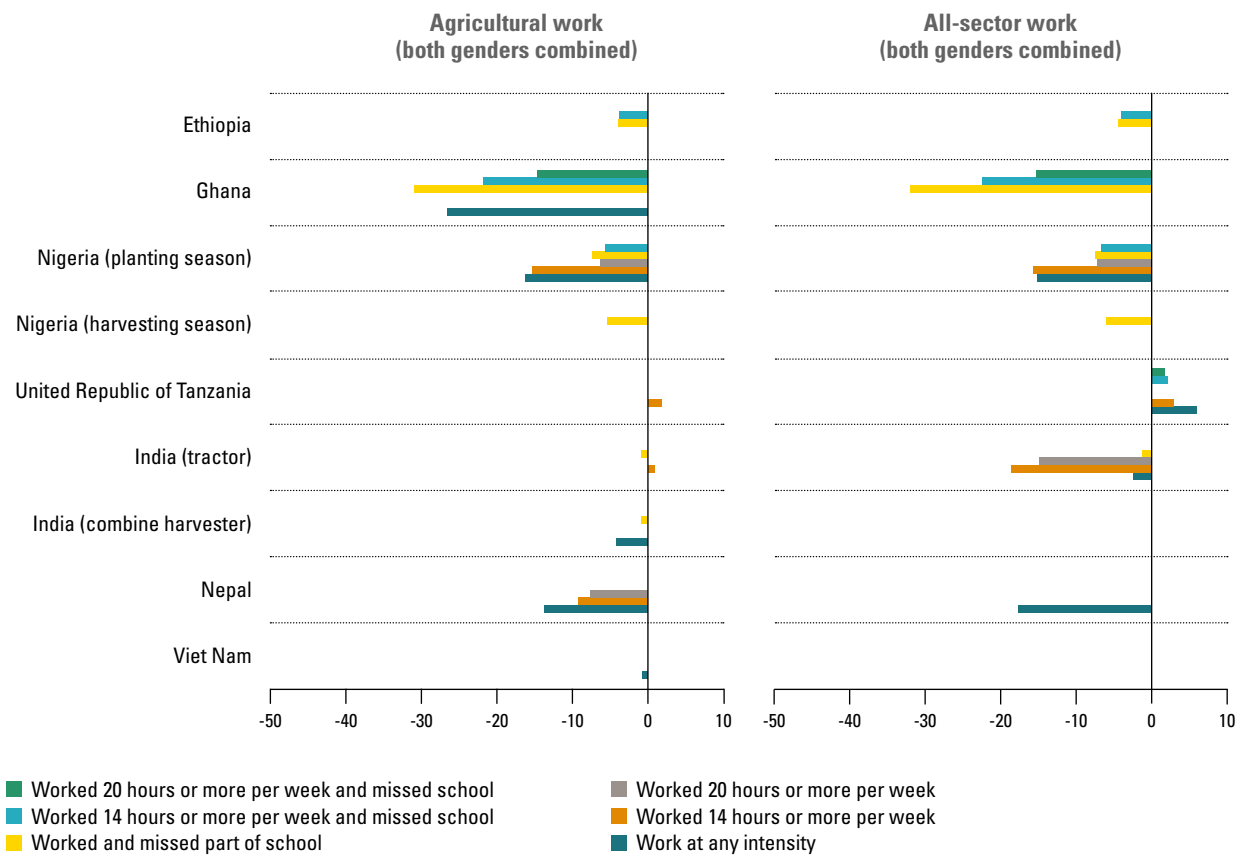
Figure 2. Impact of adoption of tractors or combine harvesters on use of children in productive activities (percentage points)



Note: "Impact" is identified as the (statistically significant) percentage point difference in children's engagement in productive work between farm households that use and do not use tractors or combine harvesters.

Source: FAO & IFPRI, Forthcoming.

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- **Where access to education is limited more in general, introduction of agricultural machinery may end up merely shifting children's labour time from farm to non-farm activities.** For example, in the United Republic of Tanzania, school attendance among rural children is low in general, and farm households using tractors engage more children in livestock rearing or non-farm activities.

- **The effect of tractor adoptions in reducing children's engagements in productive activities is generally stronger during the planting season (except in India).** Most farm households in the studied countries use tractors mainly for planting and land preparation. Tractors may allow adult household members to spend less time on land preparation and more on activities previously undertaken by children, thus reducing children's labour time.

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- **Extended use of tractors for off-farm work or the use of other machines can expand the scope for mitigating child labour beyond the planting season.** In India, for instance, the adoption of combine harvesters is found to reduce significantly the likelihood of onfarm work by children, while the use of tractors appears to reduce the likelihood of any type of work by children, whether on- or off-farm.

- **Mechanization has gender-sensitive impacts, but implications for boys and girls are context specific.** Where the work engagement of boys is significantly higher, such as in Ethiopia and Ghana, mechanization strongly reduces productive engagement on farms by boys. In other contexts, like in Nepal, mechanization seems more likely to reduce engagement of girls in agricultural work. The contextual factors that cause these gendered differences are not obvious and require further research.

- **While alleviating heavy work, mechanization can expose children to new hazards.** Operating tractors and other agricultural equipment can be hazardous for children for several reasons: the equipment may be inadequately operated without safety rules; children may not have been properly trained to use them; or the equipment may be too heavy for children to handle, for instance. Lack of data prevented the FAO-IFPRI study to assess the incidence of injury or accidents associated with mechanization and, hence, this remains an important issue for further research and data collection. The mere possibility of such risks stresses the need for applying occupational safety and health rules when introducing mechanization on farms, including adequate protection of mechanical components to prevent accidents and proper training in equipment use.

Recommendations and lessons for policies

In summary, mechanization can contribute to the elimination of child labour in agriculture while improving their school attendance.

There are multiple ways to promote mechanization in agriculture in low-income countries, including by (FAO & AUC 2018; Diao *et al.* 2020):

- **Promoting farmer-to-farmer custom-hiring services and training of both farmers and custom-hiring service providers.** Training for multi-functional uses of the same equipment is important to reach sufficiently high machine-utilization rates and generating income outside of planting season, so the business is profitable to the service provider and cost of usage can be kept low to ease access for smallholders.
- **Promoting the development of rental markets for machines and equipment through targeted subsidies.** If well targeted and applicable to a broad range of machinery and brands, initial hurdles to service provider start up and to affordable access for smallholders can be overcome.
- **Supporting the development of local engineering capacity and investing in research and development (R&D) to adapt agricultural machinery and equipment to local needs and conditions.**

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By itself, however, mechanization will not suffice to end child labour in agriculture. First, the findings of the FAO-IFPRI study indicate that tractor use may reduce children's productive engagement by no more than 10 percentage points in the studied low-income contexts. Second, the use of children for farm and non-farm work has multiple causes, with household poverty likely being the main factor. Hence, to address the root causes of child labour, the promotion of mechanization should form part of broader agricultural development policies that raise agricultural productivity and improve the livelihoods of poor farm households. In that context, proper attention should be given to safety rules and adequate training to prevent the introduction of machinery creating new hazards to children. Proper attention should also be given to the training of women in the use and maintenance of equipment such that mechanization also helps reduce women's work burden, which in turn has been found to reduce child labour (FAO, 2020). This way, mechanization not only improves agricultural productivity and reduces child labour, but also creates opportunities for better-quality on- and off-farm employment, including for rural youth.

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