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A Theoretical Analysis of Child Labor in Rural Areas and Its Effect on Human Capital Development

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Abstract:

Child labour persists in developing nations but also causes concern in developed countries due to its alarming prevalence. There is a significant importance to humanitarian research and the sustainability of nations. Child labour is a barrier to human capital building for sustainable development. By using a two-period utility maximisation problem of the representative working family consisting of adult members (the parents) and a child, the study analysed the impact of the local labour market and capital market on child labour incidence theoretically. Depending on the type of land ownership, market flaws in labour, land, and capital can lead to increased child labour and reduce human capital accumulation. The research suggests a different approach to stopping child labour and increasing human capital accumulation. It shows that a rise in market competition on both the capital and labour markets could reduce child labour in farming households. When there is less competition, there will be a higher supply of labour and credit. By accessing the competitive labour markets and capital markets, households have less incentive to employ child labor and can invest in child education. This gives them more incentive to employ adult workers and reduce child labour. However, these markets are often non-competitive. This means that households may find it difficult to access the resources they need, such as capital and labour, to be competitive in the market. As a result, households have greater access to these resources when competition increases in these markets, reducing the use of child labor and increasing the investment in child education. This means that they and their households have limited choice but to rely on child labour to make ends meet.

Key-words: Child labour, Market imperfections, Land, Labor, Credit,

JEL Classification: 012, 013, O15, J13, J43.

Introduction:
The prevalence of child labour is mostly found in developing countries where a multi-class social structure exists and traditional production relations are actively coupled with a capitalist mode of production and exploitation. Children in these countries are subjected to exploitation characterized by low wages, long hours of work, and unclean, unhygienic, and unsafe working and living conditions. In addition, they are deprived of education which hampers their physical and mental development.

Despite nearly 75 years of independence and over a decade as a signatory to the United Nations Convention on the Rights of the Child, our children remain the most neglected segment of our population. A lack of awareness of children's basic needs has made it easy for laws designed to protect and empower them to be violated. The Census of India, 2011, shows that there are 12.26

million working children in the age group of 5-14 years. This is an increase in absolute numbers from 11.3 million in 1991. Since 2001, children (5-14)'s work participation rates have fallen from 5.4 per cent to 5 per cent in 2011. There are also 2.42 lakh child labourers in West Bengal, according to the census report. 58.6 percent of these child labourers (ages 5-14 years) work in agriculture, 8% in industry, and 34% in services (7% domestic). A significant proportion of child labour will likely remain uncounted due to definitional difficulties. This is likely due to the implementation of policies and laws that aim to protect children from exploitation and hazardous working conditions. The government has also tried to ensure that children have access to education, which has helped to reduce child labour. Additionally, NGOs and other organizations have made increased efforts to raise awareness about child labour dangers and to offer support to families in need. International organizations have also implemented initiatives to reduce child labour. These initiatives focus on providing economic opportunities for families so that they don't have to rely on their children to generate income. Furthermore, organizations have set up programs to provide education and job training for children who already work in hazardous environments.

There have been numerous literature works on this topic in the past. A parent's investment in their children's education, on the other hand, will only pay off if the child chooses to send money back to them when they retire. Strauss and Thomas (1995) say a parent's educational background is crucial to minimising child labour. Brown et al. (2002) found that parental education affects their offspring in an empirical investigation. Educated parents value education and hence invest in their children's human capital, but illiterate parents do not value education for their children. Education also impacts household income sources. This encourages parental investment in human capital development. This implies that human capital growth depends on educational outcomes, which depend on educational quality.

In this context, this research examines the impact of the employment market, loan market, and land market on parental decisions regarding their child's education. In particular, this research examines at how parental decisions are shaped by factors such as job availability after graduation. It also looks at loan availability, and land costs in the area. It seeks to understand how these factors can influence a parent's decision to spend money on their child's education. For instance, this research looks at how the availability of jobs in a certain area can influence parents to spend more on their children's education. This is instead of sending them to work instead. For example, if jobs are more available in higher-level professions, parents may be more likely to invest in their children's education to give them the highest chance of succeeding in those professions. This is because parents are more likely to forgo the immediate income their children can earn by sending them to work. Instead, they invest in their education so that they can have access to higher-paying jobs available in their area. This investment in education can lead to a better quality of life for children and future generations. It also can reduce poverty and inequality in the long run.

Child Labor in Rural Areas and Human Capital Development: A Simple Model
Human Capital Theory is based on endogenous growth neoclassical theory. It is presumptuous to believe that education is a valuable resource for individuals. More education will increase output. This theory's core premise is that parents make a trade-off when allocating their children's time, particularly between education and labour. Their selection is influenced by the family's economic and social circumstances. The amount of time spent on child labour has an impact on human capital accumulation. Parents' decision to invest in their child's human capital is influenced by the return on investment. If education returns are high, working children will decrease. We assumed, as Xinye and Zheng (2006) did, that a typical home consisted of two types of agents: the parents and the child. We examined two eras of overlapping generation models to evaluate the effect of capital markets and labour markets on determining child labour and schooling.

Xinye's (2006) model has been modified in the following ways:
- To begin, Xinye (2006) examined two models to assess the role of poverty and the capital market in the case of child labour and schooling decisions. We studied a single model that combined poverty and the capital market.
- In contrast to Xinye (2006), we have considered parents' utility in a positive function of child schooling.
- We also tried to show the effect of the mid-day meal programme on child labour and the schooling decision of the parents.

Children's school hours were assumed to be concave functions of their accumulation of human capital. Moreover, they can borrow money on the capital markets in an amount of k. In addition to schooling, the child also receives mid-day meal assistance (m). As a result, the earnings from the labour market are based on the working time which is (1-ls) at a wage rate of W_1. When a parent is in their second period, their sole source of income is savings and support from their child's earnings. Furthermore, we assume that the household receives a utility that is proportional to the amount of time spent in school. As a result, the return from period 2 is discounted by a parameter, β [0,1], which measures the parents' time preferences. The parents treat future income as equal to present income if $\beta=1$, and 0 means nothing to them.

Therefore the household's problem can be written as $\boldsymbol{maxU_1(C_1) + \gamma ls^2 + \beta U_2(C_2)}$

Such as that,

$$C_1 + Sls = A + W + k + (1-ls) W_1 + mls \text{ and } C_2 = \mu E (ls) - (1+r) k$$

Where C1 and C2 represent the household's consumption during the first and second periods, respectively. A represents the household asset. In our example we assume the total time of the child to be 1 and that the schooling time of the child is ls, which is $0 \leq ls \leq 1$. In addition, we used a parameter μ, measuring the degree of altruism of the child toward his parents, to capture the share of the wage rate returned to the parents. If $\mu = 1$, all the child's income goes to the parents. If $\mu = 0$, the parents receive no future income from their child.

Proposition 1(a): Households will choose no schooling if the opportunity cost of schooling is greater than the benefit from schooling.

The Lagrange-constrained maximisation problem can be written as

$$L = U_1[A + w + w_1 - (w_1 + s - m)ls + k] + \gamma ls^2 + \beta U_2 [\mu E (ls) - (1 + r) k] - \lambda_1 (ls - 1) - \lambda_2 (-ls)] \text{—(1)}$$

The first-order solution for constrained maximisation can be written as

$$(2)\ U_1^{'}() - \beta U_2^{'}() (1 + r) = 0$$
$$(3)\ ls - 1 \leq 0, (= 0, if\ \lambda_1 > 0)$$
$$(4)\ -ls \leq 0 (= 0, if\ \lambda_2 > 0)$$

$$U_1^{'}()(w_1 + s - m)(-1) + 2\gamma ls + \beta U_2^{'}()\mu E^{'}(ls) - \lambda_1 + \lambda_2 = 0$$

To prove our proposition, let $\lambda_2 > 0$, then we have $\lambda_1 = 0$ and $ls = 0$.

From Equation (5), we then have: $U_1^{'}(.)(w_1 + s - m) = \beta U_2^{'}(.)\mu E^{'}(ls) + \lambda_2$.

This means that

$U_1^{'}(.) (w_1 + s - m) > \beta U_2^{'}(.) E^{'}(ls)$. *Since* we have $\lambda_2 > 0$. Combined with (2), we have $\frac{\partial E(0)}{\partial ls} < (w_1 + s - m) (1 + r)/\mu$ -------- (6)

Which is the necessary condition for $ls^* = 0$.

If $\frac{\partial E(0)}{\partial ls} \geq (w_1 + s - m) (1 + r)/\mu$, then we find that an increase in the schooling time would make the household better off. If $ls = 0$, the marginal benefit is larger than the marginal cost, which is not

possible. From this analysis, we can conclude that (6) is also the sufficient condition for $ls^* = 0$. To illustrate the effect of parent decisions on schooling, let us consider the case when the human capital accumulation function grows large. This means that the child is intelligent. The benefits of education will be considered if the child attends school. Now in this situation, parents will not choose schooling if the opportunity cost of schooling is more than the return from education. This is shown in Figure 1. Figure 1 highlights the trade-off between the cost of schooling and the return from education. If the costs of schooling outweigh the returns, then parents will choose not to send their children to school. On the other hand, if the return from education is greater than the cost, then parents will likely choose to send their child to school to reap the rewards of an educated workforce.

Figure: 1 Households Choose No Schooling for High Opportunity Cost
Benefit from schooling
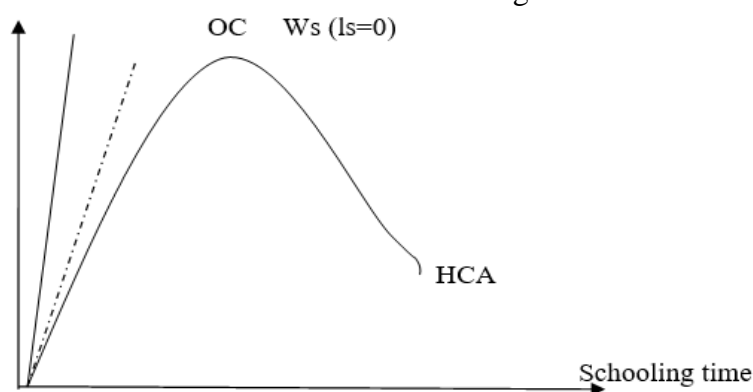
In   Figure 1, the growth rate of the human capital accumulation function (HCA) is high with the child's schooling time. If the benefit of schooling (Ws) is not big enough to compensate for the loss of opportunity cost (OC), then the child's time is allocated to the labour market since the benefit is much higher. This is shown in the following figure. When the benefit of schooling is not high enough, the child has more incentive to allocate their time towards the labour market since the benefit is higher. This is reflected in Figure 1, where the growth rate of the human capital accumulation function (HCA) is low when the child's schooling time is low since the labour market benefit is higher than the benefit of schooling.

The growth rate of the human capital accumulation function is low when a child enrols in school at a low rate. This means that the child is not intelligent. Therefore, the return on investment from education is small. In this situation, the parents will not choose schooling if the opportunity cost of schooling is more than the return from education. This is shown in the following figureFor instance, if a child has a low growth rate of human capital accumulation and the opportunity cost of schooling is higher than the return from education, the parents may choose to forego schooling and invest their resources in other activities. This decision can lead to situations where individuals are not able to take advantage of economic opportunities due to a lack of education. In this way, the cycle of poverty is perpetuated. Additionally, a lack of education can lead to fewer opportunities for economic and social mobility.

Figure: 2 Child Labour: Caused by Low Education Returns
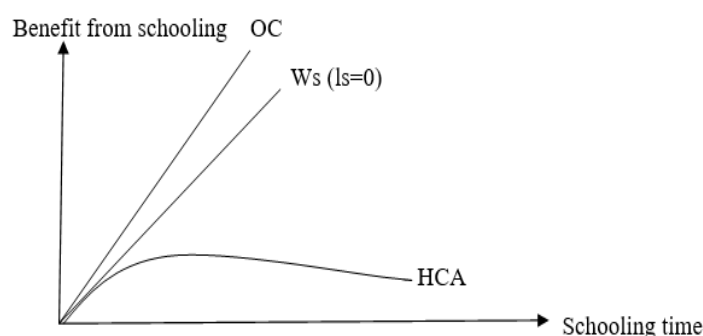
Proposition1 (b): The opportunity cost of child schooling is higher
I.   If the child wage rate is high or the marginal productivity of the children is very high.
II.   When the credit market is imperfect the rate of interest may be high.
III.   If the amount of loan (k) is so high then the burden of the loan will reduce the schooling.
IV. If the quality of the midday meal programme is not satisfied by the parents.
V.   If a parent's not so much interested in education, then utility γ is too small.
VI. If, the parents receive no future income from their child or the value of altruism (μ) is too small
VII. If the future income means nothing for the parents then $discounted\ value\ \beta\ is$ small.

From the following figure, we can see that if the opportunity cost increases, labour time increases. When the opportunity cost is lower than the return from schooling, parents will choose the school. Again if due to any of the above-stated reasons, the opportunity cost increases, the child's working hours will also increase, this can have a detrimental effect on their education and their development, as well as their effectiveness in the labour market. It can also lead to a decrease in the overall productivity of the economy. As a result, the child's schooling time decreases, leading to lower educational attainment. This, in turn, has a direct impact on future economic outcomes, resulting in a cycle of poverty and inequality.

Figure: 3 Labour time increases due to an increase in the opportunity cost
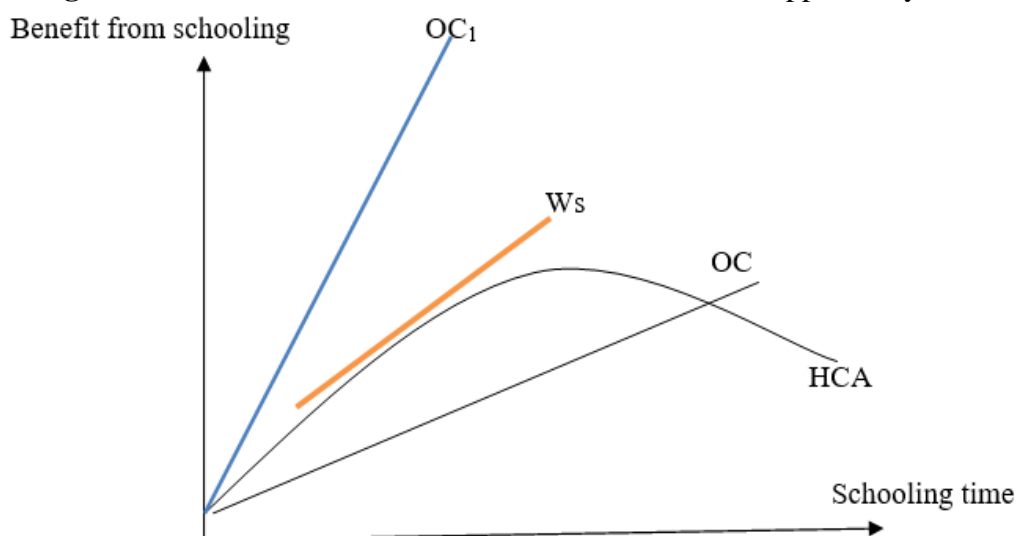
Proposition 2: When the benefit of schooling is higher than the opportunity cost then parents will choose only schooling.

Proof: Above stated constrained utility maximisation condition can be written as

$$L = U_1[A + w + w_1 - (w_1 + s)ls + k] + \gamma ls^2 + \beta U_2[E(ls) - (1 + r)k] - \lambda_1(ls - 1) - \lambda_2(-ls)$$

The first-order condition-constrained maximisation can be written as

$$(2) U_1'(\cdot) - \beta U_2'(\cdot)(1 + r) = 0$$
$$(3)\ ls - 1 \leq 0,\ (= 0, if\ \lambda_1 > 0)$$
$$(4)\ -ls \leq 0 (= 0,\ if\ \lambda_2 > 0)$$
$$(5) U_1'(\cdot)(w_1 + s - m)(-1) + 2\gamma ls + \beta U_2'(\cdot)\ \mu E'(ls) - \lambda_1 + \lambda_2 = 0$$

Now when ls >1, $\lambda_1 > 0$, we can write equation (5) as

$$U_1'(\cdot)(w_1 + s - m)(-1) + 2\gamma ls + \beta U_2'(\cdot)\mu\ E'(ls) - \lambda_1 = 0$$
$$\text{Or, } U_1'(\cdot)(w_1 + s - m) + \lambda_1 = 2\gamma ls + \beta U_2'(\cdot)\mu\ E'(ls)$$
$$\text{Or, } U_1'(\cdot)(w_1 + s - m) < 2\gamma ls + \beta U_2'(\cdot)\mu\ E'(ls)$$
$$\text{Or, } \beta U_2'(\cdot)(1 + r)(w_1 + s - m) < 2\gamma ls + \beta U_2'(\cdot)\mu\ E'(ls) \qquad \text{(from Eqn 2)}$$
$$\text{or } E'(1) > (1 + r)(w_1 + s - m)/\mu - 2\gamma ls/(\beta\mu\ U_2'(E(1) - (1 + r)k))\text{-----------------------(6)}$$

So if the future earnings of the educated child are greater than the opportunity cost, the household will attend school regardless of whether they are poor or rich.The following figure illustrates the case when the opportunity cost is lower than the schooling return. The parents, therefore, chose only one school to attend. The schooling return is higher than the opportunity cost, so the parents wouldn't need to consider the other options. This results in the optimal choice for the family being a single school.

Figure: 4 Full-time schooling due to high education returns
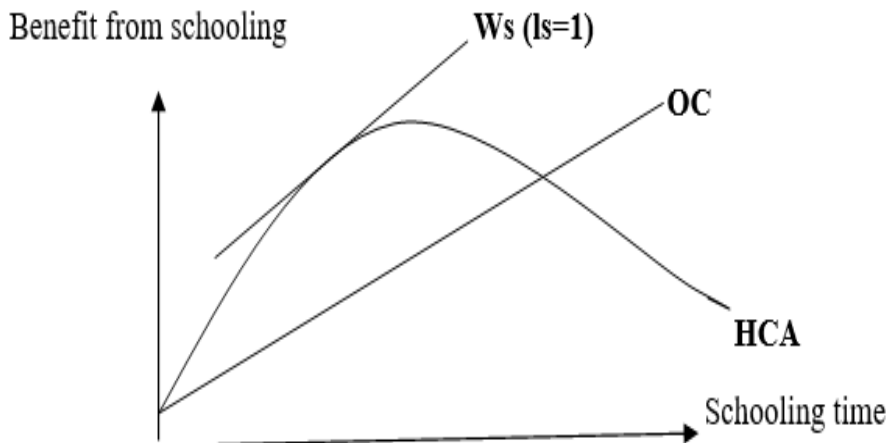
Proposition: 3

The household chooses a combination of both schooling and labour if the opportunity cost of only labour (ls=0) is less than its benefit and greater than full-time schooling (ls=1).

As a result, we have attempted to find the necessary conditions for interior solutions.

When $\lambda 1 = 0$ and $\lambda 2 = 0$, we have the following necessary condition $E'(0) = (1 + r)(w1 + s - m)/\mu$. This is the necessary condition for $0 < ls < 1$.

We need to show that this is also a sufficient condition for $0 < ls < 1$.

Suppose that

$E'(1) > (1 + r)(w1 + s - m)/ - 2 / (\beta U2'(E(1) - (1 + r)k) > E'(0)$

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Note that if $E'(1) > (1+r)(w1+s-m)/ - 2\ ls/\ \beta\ U\ 2'(E\ (1) - (1+r)\ k)$ then choosing $ls^* = 1$ would make the household better off since the marginal benefit is larger than the marginal cost at $ls^*=1$.

When $(1+r)(w1+s-m)/ - 2\ ls/\ \beta\ U\ 2'(E\ (1) - (1+r)\ k)) > E'(0)$ which suggests that at $ls^*=0$ the marginal cost is larger than the marginal benefit. Choosing zero school time would be better for the parents. Thus, parents should not send their children to school. The time can be used more productively by allowing the children to rest, engage in leisure activities, or pursue other interests. This will ultimately be more beneficial for the children in the long run. Therefore $E'(ls^*=0) < (1+r)(w1+s-m)/\mu- 2\ ls/\ \beta\mu U2'(E\ (1) - (1+r)\ b) < E'(ls^*=1)$ is also the sufficient condition. Allowing children to rest, engage in leisure activities, or pursue their interests will help them to develop important skills such as creativity, problem-solving, and critical thinking, which will benefit them in the future. It will also allow them to build relationships with their peers and family, which will give them the support they need to succeed. Apparently, in Figure 5, $ls = ls1$ is not the optimal choice since the marginal benefit is bigger than the marginal cost. More time would make households better off. All choices of ls are inefficient until the optimal value of ls^* is reached where marginal benefit equals marginal cost. This is because there is a point of diminishing returns where the additional time invested in a particular activity yields less and less benefit. Therefore, it is not efficient to continue investing additional time until the optimal value of ls* is reached. However, there are also diminishing returns when it comes to the amount of time spent in a household. Too much time spent at home can lead to cabin fever and isolation. It is important to find a balance between work and leisure time to maintain a healthy lifestyle.

Figure: 5 Allocation of time between schooling and child labour
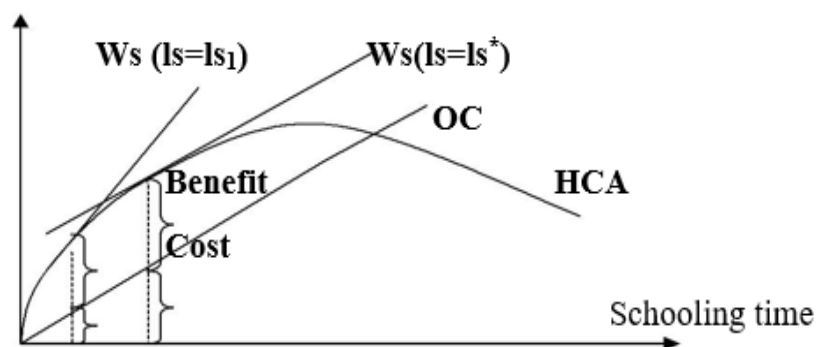
Concluding Observations:

The theory of child labour is well developed and there is growing evidence about the effects of the different interventions implemented to address it. It is interesting to note that most theoretical developments took place around the first decade of the 2000s and that relatively not much has been added since then. The only area that has been relatively neglected from a conceptual point of view is relative to the integration of domestic activities into the analysis of child labour supply. The policies implemented span most of the options identified in the conceptual analyses. The evidence gathered about the efficacy of these interventions points in two directions. The first is that it confirms the complexity of the household reaction to the changes in the incentive set outlined by the theory. The second, linked to the first, is that many policies generate unwanted effects. Albeit not very large the body of research reporting on the effectiveness of policies based on robust estimation approaches has grown substantially in the recent past. It indicates that while poverty matters, relative prices also play a crucial role. In several cases, focusing only on one aspect of child labour determinants, typically poverty, while neglecting the role of relative prices and other effects has led

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to well-intended interventions generating unwanted effects and/or being less effective than expected. Moreover, because of the complex effects they generate, most of the interventions evaluated show, with very few exceptions, limited effectiveness (often also generating unwanted effects dominating the overall impact). These conclusions, whose validity may be limited by the relatively small number of rigorous evaluations available, if taken at face value raise a substantial challenge for researchers and policymakers.

Policies that directly address child labour must be carefully designed to ensure efficacy and limit undesirable impacts. This leaves open the question of whether to follow a different approach supporting interventions that are aimed at promoting human capital accumulation and/or poverty reduction without targeting especially child labourers while ensuring that such interventions are as effective as possible in addressing child labour and do not generate undesired effects. Finally, recent evidence (e.g.Balboni et al. 2021) supports the existence of poverty traps and the role of "big push" interventions in moving people out of them. As seen, the existence of multiple equilibria described in the theoretical literature suggests that households might be trapped in "child labour traps," and that "big push" interventions might help the household permanently move to a low child labour equilibrium. The "big push" interventions are designed to break the cycle of poverty in which households are stuck, by providing them with resources that can help them move out of the poverty trap. This can be done through providing access to education, health services, or capital subsidies, which can help them move out of the trap and achieve a better quality of life. For instance, a program could provide households with access to capital subsidies, such as microcredit, that can be used to purchase inputs for agricultural production or start a business, which can help them move out of poverty. However, it is important to note that not all households will be able to take advantage of these opportunities. For example, some households may not have the land or labour needed to start an agricultural business, or the education needed to take advantage of other opportunities. Additionally, some households may be located in areas where there are no opportunities for economic advancement. To address this issue, governments and organizations should provide resources and support for those who are unable to take advantage of these opportunities. This could include providing access to land, education, and training to increase the economic mobility of disadvantaged households.

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