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Resolving the Food Security Crisis in Nepal

Today, 800 million people in the world live in absolute poverty, spending more than 75% of their expenditure on food. With their low incomes, they struggle to pay for their minimum daily needs, and are highly vulnerable to rising food prices. The overall food production is struggling to meet global demands, as low agricultural productivity growth cannot match population growth, with the population expected to increase by 50 percent between 2000 and 2050. In order to reduce the number of people living in absolute poverty permanently, the implementation of technologies and techniques that will both increase food production and be environmentally sound and the development of existing lands is urgently needed.

Nepal is one country that is severely affected by current rising food price. The country is the most impoverished and least developed country in South Asia with per capita income of only \$230. An 11-year insurgency that has caused the loss of many lives and has led Nepal to fall behind in terms of agricultural productivity and economic growth. This is a problem considering that 80% of the working population is employed in the agriculture sector, most of whom are small-scale subsistence farmers. The agriculture sector only provided 38% of the country's GDP in 2003. Although food security is better in urban areas with poverty rates estimated at about 10% in 2003/2004, food insecurity in rural areas is severe. 35% of those who live in the rural population, most of whom are small-scale subsistence farmers, live in absolute poverty. These farmers are unable to produce enough food to provide for themselves and must buy cheap foods with poor nutrition. Many of these farmers are malnourished, and are highly vulnerable to rising food prices. Approximately 2.5 million people in rural Nepal are in immediate need of food assistance. An additional 3.9 million people in rural Nepal are at risk of becoming food insecure due to increasing food prices. Yet many of the countries that Nepal has long depended on for trade are stockpiling their food and restricting the amount of food that reaches Nepal, and are driving up the price of foods. A key challenge for the newly formed government will be how to deal with the high and unstable prices for imported food and a growing inability to feed themselves.

Yet much of the arable land in Nepal is not very poor in resources, and actually has rich potential. Currently, farmers are not taking advantage of the diverse conditions of their ecological zones, and instead are planting the same crops in each zone. The lands are underdeveloped because farmers have not invested in innovative technologies. The planting methods that are used by farmers are primitive and results in poor yields. If farmers were provided with new farming technologies and educated on how to properly manage their land, Nepal could become self-sufficient and would no longer be dependent on food from foreign countries that have begun to restrict grain exports and raise prices.

To understand why education is the key to strengthening food security we must further examine the lifestyle of the rural poor. These impoverished people own less than half as much land as the non-poor do, they have less irrigated land, and are able to plant less high-yielding varieties than the non-poor, yet they must depend on subsistence agriculture as their main asset. According to Transforming the Rural Asian Economy, a book published by the Asian development bank, most of the poor in rural areas tend to be illiterate and do not have the knowledge or skills to apply to any field other than labor. The produce from the fields of

subsistence farmers is often not enough to support the family of the farmers, so subsistence farmers are unable to acquire a lot of credit. Poor households in Nepal have almost no access to modern agricultural technology, in part due to limited access to credit and little education. Thus, there is only limited potential to increase productivity on the typical subsistence farmer plot and without government support for farmers, the future of subsistence farming is very bleak.

Poor subsistence farmers do not produce enough food to support themselves, and they often end up buying food on credit or borrowing. This is a coping strategy, and farmers who are using it are on the verge of food insecurity. The food that is bought is cheaper and has low nutritional value. A study has found that an average of 44 percent of household expenditure is spent on cereals and less on pulses, vegetables, fruit, milk, and eggs (Household Food Security). This leads to low intake of proteins and micronutrients, and many of the poor face problems of malnourishment.

Among the poor, women and children are the greatest victims of food insecurity. In rural areas, women are given the smallest rations of food. Women workers are paid less than male workers and the status of a woman is low in Nepalese society. Women also have less access to education. In the rural areas, 37% of males are illiterate, while more than 60% of females in 2001 (CBS). These factors most likely affect children's growth and food security, as the relationship between mothers and their children are tightly interlinked, especially when the child is very young. During pregnancy, women in poor families are given almost no special food, which jeopardizes the health of both the mother and the child. Nepal has one of the world's highest maternal mortality rates in Asia. The mortality rate for children under five is 64 deaths for every 1000 live births. Every second child in Nepal is chronically malnourished. Additionally, 90% of rural children suffer from one or another form of malnutrition: Protein-energy malnutrition, iodine deficiency disorders, or deficiencies of iron and Vitamin A. From 1995-2002, Nepal ranked last among 177 countries in terms of the proportion of children classified as underweight (UNDP, 2004). Stunting levels for children in Nepal is 49 percent and the proportion of underweight children is 39 percent.

The government of Nepal has offered rice at subsidized rates in attempt to alleviate the food security crisis in Nepal. However, those who live in remote areas and actually suffer from food shortages rarely see the government-supplied cereal. Most of the rice is sold among government officials and their families. Major NGOs are also sending food aid, but this merely of a coping method that is only beneficial in the short term. Food aid does not address the underlying problems in Nepalese society. It does not propose a permanent solution on solve food insecurity and does not show subsistence farmers how to increase food production to meet the demands of the people of Nepal. Giving education to the people of Nepal is the key to increasing domestic production in Nepal and providing Nepal with a future that is food secure.

Requiring that all children in Nepal attend school, including girls, is necessary. Although the percentage of students who attend has significantly increased, from 69% to 84% from 1995 to 2005, the percentage of students who actually complete primary school is 76% (Nepal MDG progress report). Many subsistence farmers are pulling their children from school early because they feel that the extra labor that can be provided by children on farms would be wasted in school. However according to the CATO institute, education is closely related to increased food production and food access. Children are the seeds of the future for Nepal and if they are not given education, they will not be able to adopt new agriculture technologies and will not be able to properly use these technologies. If no education is provided to children, they will lack the skills necessary for agriculture or any field.

Education for women is especially important because they have fewer self-employment assets and marketable skills than men and because of their low position in Nepalese society. Providing women with the skills they need for life would allow them to demand better jobs in Nepalese society and empower women to fight for social equality. Educating women also will ensure that their families are food secure. Educated women are more likely to take better care of their families and make sure that their family has a nutritional diet. According to the NDHS, the child mortality rate whose mothers have a primary level education is 70 deaths for every 1000 live births, almost half of that of mother with no education. This is mainly because educated mothers bring up healthy and educated children, who have a proper food diet and are food secure. The education of women is important in assuring food security in Nepal because it has been shown providing girls with education will have powerful effects on nearly every dimension of development, from lowering fertility rates to raising productivity, and improving environmental management (World Bank 1996c).

Although the education of youth will eventually benefit Nepal, education should be focused on subsistence farmers who lack the knowledge and skills to apply to agriculture technology. Subsistence farmers in Nepal still rely on antique farming techniques and many have yet to implement innovative technologies such as irrigation systems and high-yield varieties. Extension programs sponsored by the government offering education and advisory services to family farmers should be built and subsidized rates for technologies should be presented to farmers. The direct impact of this education will help farmers to adopt more advanced or complex technologies and crop-management techniques. Virtually all studies confirm that better educated farmers achieve higher rates of return on land (World Bank 1990). Education for farmers will lead to better results in terms of crops and more money for them. Poverty is related to income, and increased income will allow for better food security for farmers.

All of the technologies that need be introduced to farmers should be pro-poor and be ecologically sustainable. The Nepalese ecosystem, because of the young geology, falls under among the most fragile ecosystems in the world. The Agriculture Perspective Plan (APP), one of the agricultural extension programs sponsored by the Nepalese government, suggests the intensification of fertilizers and use of heavy irrigation. However, salinization, water logging, and lowering of water levels are consequences of heavy irrigation and heavy reliance on chemicals deteriorates soil quality. Other agriculture technologies and techniques can ruin the ecological balance and lead to unsustainable development. Heavy and improper use of many of today's technology will deteriorate the land's quality, and moderate use of chemicals along with sustainable agriculture is important in preserving arable land in Nepal.

Sustainable agriculture seeks to make the best use of nature's goods and services (2020 vision Focus). It does this by minimizing use of chemicals and other inputs that damages the environment or harm human health while integrating natural regenerative resources. Farmer-based Agroecological technology does all of this with cheap, low-cost, locally available technologies and inputs. Of course, Agroecology requires that farmers understand the complex ecological and biophysical complexity in their farms and fields, and agricultural extensions programs would need to be built to help farmers make the right decisions. However research has shown that Agroecology makes significant contributions to reducing poverty and improves rural livelihoods, and it is an alternative that should be considered. The University of Essex has recently completed a project on Agroecology in 52 nations and found that improvements in food production occur through one or more of four mechanisms.

The first mechanism of Agroecology is intensification of a single component of the farm system. In Nepal, there are three main ecological zones: The hills, the mountains, and Terai. The

hills have a comparative advantage in a variety of crops, such as off-season vegetables, fruits, tea, coffee, spices, medicinal plant/herbs and seed production. The mountains have a comparative advantage in animal production, livestock products, temperate fruits and nuts and medicinal plants/ herbs. Terai has comparable advantages in tropical fruits, vegetables, oil seeds, and cereals. It is important that farmers exploit the diverse the ecological zones to increase yields on their plots. The second mechanism is the addition of a new productive element to a farm system that boosts the farm's total income but does not negatively affect crop production. One example would be growing fish in rice paddy fields. The third mechanism is making better use of natural resources, especially water and land. Using techniques such as water harvesting and irrigation scheduling will enable growth of additional crops and increased water for irrigated crops. The final mechanism of Agroecology is improving yields by integrating natural regenerative elements into farm systems. Some regenerative elements that can be applied in Nepal are nutrient cycling, nitrogen fixation, and soil regeneration, and using natural enemies of pests. Use of natural systems reduces dependence on chemical farming.

One particular type of sustainable agriculture that is ideal for subsistence farmers in Nepal is the System of Rice Intensification (SRI). SRI does not require the purchase of new seeds, as most local varieties respond well to SRI and receive a higher market price. SRI practices cuts seed costs by 80-90% and saves 25-50% of water compared to rice that is irrigated. Returns to labor can very great, as yield increases are usually 50-100%. SRI does not require chemical fertilizers because organic materials such as manure can give results that are as good or better. Farmers who have used SRI methods have reported that rice plants that use SRI are able to resist damage from pests and diseases, eliminating the need for agrochemical protection (CIIFAD). SRI practices lead to healthier, more productive soil and plants by supporting greater root growth and by nurturing and promoting the diversity of soil organisms. If there is one drawback to SRI, it is labor intensive and requires skillful management, and requires 50% more days to transplant and weed. However, once skills are learned and implements are used, less labor will be required for SRI.

Biotechnology is another emerging alternative to traditional farming methods that can both increase yields and be environmental sustainable. Biotechnology alters the genetic makeup of plants, increasing the crop yields and to make them produce more nutrients and vitamins. Altering the genetic make-up of plants can make crops pest-resistant, disease-resistant, and stress-tolerant and consequently reduces the use of toxic pesticides and improve the efficiency of fertilizer and other inputs, improving environmental sustainability (Biotechnology, meeting the need of the poor?). According to Dr. Borlaug in an actionbioscience.org interview, Biotechnology is also environmentally sustainable because it produces higher yields on less land. Yet despite Biotechnology's potential, one major hurdle prevents it from being accessed by the farmers in Nepal who need it the most. Biotechnology is being researched by the private sector, which lacks the incentive to invest in crops for low-income families (Appropriate technology for sustainable Food Security). Many of the major crops of the poor are being neglected and biotech plants with traits of interest for the poor, such as drought and salinity tolerance, disease resistance, and enhanced nutrition are receiving little attention from the private sector (Biotechnology, meeting the needs of the poor?). To overcome this hurdle, the Nepalese government must cooperate with the private research sector to develop genetically modified plants for the poor so that as Ian Johnson, CGIAR chairman, states, "Biotechnology will play a role in improving agricultural development."

Nepal's government has prioritized using technologies that rely on chemicals such as fertilizers and pesticides in order to increase yields. Although these technologies increase yields and are not necessarily harmful if used properly, heavy usage of them will make it harder to

maintain strong yields. The Nepalese government should broaden its horizons and consider other alternatives that are ecologically sustainable. As the 2007 State of Food and Agriculture states, Ecosystems sustain human life. They supply food and drinking water, preserve and regenerate soils, fix nitrogen and carbon, recycle nutrients, filter pollutants, pollinate crops, in addition to other uses. It is important that agriculture, which is dependent on ecosystem, maintains and preserves it.

NGOs and the Nepalese government should cooperate to provide a better future for the country's people and its resources. Many ambitious programs can be developed oriented toward educating both the farmers and the people of Nepal and providing essential technology such as irrigation systems. However, many of these programs require more participation and funding to be able to function effectively. In the meantime, NGOs should make sure that food aid reaches the farmers who live in the most remote areas, and who are on the food insecure. The new government should ensure that educational programs are built that will inform farmers on new farming techniques such as Agroecology and SRI so that the farmers can maximize yields on their fields while protecting the land for the children and future generations. An education with an effective curriculum must be provided to all children so that future Nepalese citizens will be given the skills to succeed in any field and so that the degrading position of women can be ridden of in Nepalese society. Although different organizations have different missions, all of them focus their efforts on the welfare of the people. Proper investments in education for Nepal will allow for the country to become food secure and self sufficient, while protecting the natural resources of the land.

Education paves a future of food security for the people of Nepal. Educating children, the future of Nepal, will lead them to understand how to use innovative technology and adopt sustainable farming method on the fields. Educating girls will allow them to empower them to fight discrimination and will lead them to raise food-secure families. Educating farmers now will help them to increase crop yields and protect Nepal's arable lands for their descendents. Education will help Nepal become self-sufficient and will lead to poverty reduction. The government of Nepal must realize the potential of what education can do for all the people in Nepal, and take the initiative to establish agricultural extensions programs and better schools in the country.

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