

FOOD WASTE AND GLOBAL POPULATION DYNAMICS

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INTRODUCTION

Based on projections that the global population could swell to over nine billion people by 2050, the need for clean water and food will only become more desperate. Today in 2012, nearly one billion people don't have access to clean water on a daily basis and suffer from routine hunger and malnutrition. Inefficient use of and wasting of food and water contribute significantly to this problem, where approximately one-third of food produced for human consumption is wasted (FAO, 2011). This equates to 1.3 billion tons of food either lost or wasted each year. Water, a foundation of the food supply, is also in dire need. Developing countries are still lacking infrastructure and technology and the lack of clean water contributes to the inability to produce food and marginal lands require tremendous inputs for water when used for crop production. Many estimates show that more than 80 percent of water is used for agricultural applications (Bhatia and Falkenmar, 1992; ERS, 2004), again showing the need for technology to be spread. There are many contributing factors to this food and water crisis, including economic uncertainty, conflicts, and weather patterns, but one of the most critical to understand is the growing urbanization of the world's population, which further puts pressure on agricultural efforts to be more efficient.

Global Population Dynamics

With global population expected to exceed nine billion by 2050 (Lutz and Samir, 2010), food security will become even more critical. The population is also expected to become more elderly. In 2010, eight percent of the world population is above age 65, whereas in 2050, the number of people above age 65 is expected to increase to 19 percent (Lutz and Samir, 2010). These changes in population dynamics are also influenced by the areas of population growth, with developing countries expected

to have the majority of growth, further burdening their already weak infrastructures.

Urbanization

Urbanization is another significant trend to consider, especially as it relates to food production and subsistence farming. In 2008, the urban population exceeded the rural population for the first time (Satterthwaite et al, 2010). Two other population trends bear mentioning. Around 1980, the economically active population employed in industry and services exceeded that employed in the primary sector of agriculture, forestry, mining and fishing (Satterthwaite et al, 2010). Also, around 1940, the economic value generated by industry and services exceeded that generated by the primary sector (Satterthwaite, 2007). Currently, about one-third of the world's labor force receives their livelihood from agriculture. The value-added contribution is difficult to determine because of the other services and inputs such as processing and distribution. The estimates for the contribution of rural and agricultural jobs would also be higher if the value of food produced by rural and urban dwellers for their own consumption is taken into account (Satterthwaite et al, 2010).

Water Demand

A significant contributor to food waste and hunger is lack of availability of clean water. When people are distressed from the results that occur from drinking contaminated water or spend the majority of their time and resources to obtain water, food production and sourcing as well as education all suffer. Specific issues that correlate to water demand are health, poverty, and education. Over 90% of diseases in the world are related to water borne illness due to unsafe drinking water, inadequate sanitation and poor hygiene. It is estimated that at any given time, over half of the world's hospital beds are occupied by patients suffering from a water-related disease (LWI, 2012a). Furthermore, the weakest members of communities are the most vulnerable. Children are especially susceptible to where every day water-related diseases claim the lives of 5,000 children under the age of five (UNDP, 2006).

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Education also suffers when children are sick or must spend their time fetching water. Water-related diseases cost 443 million school days a year (LWI, 2012). More than 150 million school-age children are severely affected by waterborne parasites like roundworm, whipworm, and hookworm. Children who suffer from constant water-related illnesses carry the disadvantages into school by significant absenteeism and limited ability to progress. According to UNICEF (2005), over half of all schools worldwide lack safe water and sanitation, jeopardizing the health and education of millions of schoolchildren. The majority of the 115 million children currently out of school are girls and many of these children are denied their place in the classroom by lack of access to decent toilets at school, or the daily chore of walking miles to collect water.

Poverty is also a cycle that traps people and communities who do not have access to clean water. In sub-Saharan Africa alone, 40 billion hours of labor are wasted each year carrying water over long distances (LWI, 2012). Access to clean water is the foundation for all other development, including food production and sourcing. People are trapped in poverty when the majority of their time is used on efforts to collect water and the bulk of household income is spent on water and water related illnesses. There is no doubt that water management is a key factor in the global battle to remove the scourge of extreme poverty and to build secure and prosperous lives for hundreds of millions of people in the developing world (WHO, 2007).

Finally, the need for access to clean water is a foundation for all other development, including time and resources for food production and collection, which will make major impacts on hunger. Nearly one billion people globally do not have daily access to clean water. Investments in clean water are the first step in helping people and communities begin the climb up from the bottom rung of the ladder as depicted in Figure 1.

Food Waste

Globally, it is estimated that one-third of all food is wasted which equates to 1.3 billion tons annually (FAO, 2011). Throughout the supply chain, food is wasted from the initial agricultural production and harvest phase all the way to household consumption. In medium- and high-income countries, food is primarily wasted at the consumption stage, meaning that it is discarded even if it is still suitable for human consumption. Significant losses also occur early in the food supply chains in the industrialized regions. In low-income countries food is lost mostly during the early and middle stages of the food supply chain; much less food is wasted at the consumer level. The causes of food losses and waste in medium to high-income countries are primarily related to consumer behavior and to the lack of coordination between different actors in the supply chain (FAO, 2011). Poor consumer purchase planning and expiring 'best-before-dates' also cause large amounts of waste, in combination with the careless attitude of those consumers who can afford to waste food. No doubt, there is a need to find unique and beneficial uses for safe food that is presently thrown away (FAO, 2011).

Available Arable Land

As noted in Figure 2, the available arable land will decline over the next forty years in developed countries, and all of the future land needs will have to come from developing countries. This will require inputs of technology and infrastructure to insure the productivity of crops and livestock grown in these new areas.

To meet food demands by 2050, food production must increase through improved efficiency (yield) and through the expansion of the available arable land acreage. By some estimates, this will require an additional 70 million hectares or less than 5 percent (FAO, 2009). Almost all

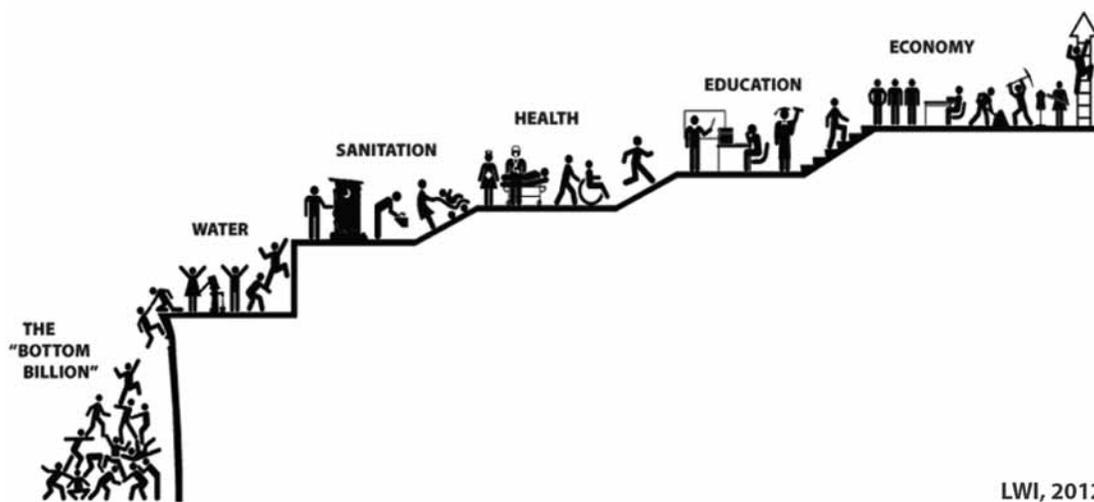


Figure 1. The Water Crisis Ladder

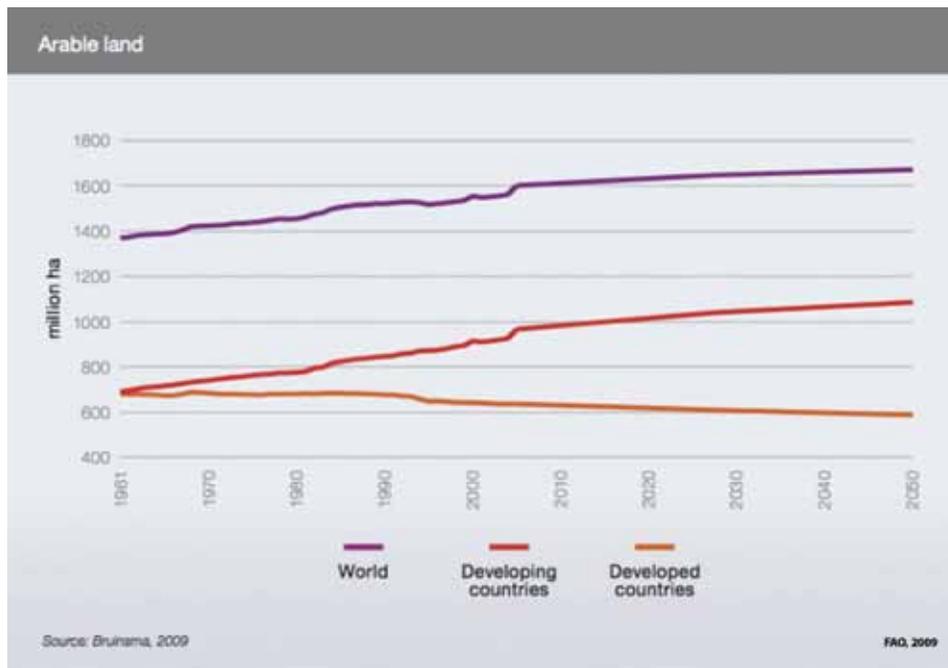


Figure 2. Arable Land Availability Through 2050

of the land expansion in developing countries would take place in sub-Saharan Africa and Latin America. Of course, the availability of suitable arable land is suspect. The ability to make land reasonably productive is certainly climate and moisture dependent. This may be limited by water availability, especially for crops and livestock requiring irrigation.

Technology Needs – Agriculture and Food Waste

All of these global conditions and needs point to the need for the infusion of technology. Water availability is the foundation for communities to be able to use technology and the building of infrastructure must come for the presently available technologies to be feasible. The importance of agriculture in this process was noted by the FAO (2009), where agriculture can contribute to hunger reduction not only in producing food to meet the greatest needs, but also in job creation, economic productivity, and supporting rural livelihoods. This will require investments in sectors strongly linked to agricultural. The need for productivity growth must come after investments such as rural infrastructure (roads, ports, power, storage and irrigation systems). Secondly, investments in institutions and the broader technologies for enabling farmers (research and extension services, land tenure systems, veterinary and food safety control systems, insurance and risk management) will be the key to effective use of existing technologies. Finally, non-agricultural investment is needed to bring about positive impacts on human wellbeing, including targeted food safety nets, social programs and cash transfers to the most needy.

CONCLUSIONS

In addition to the current one billion people suffering from hunger and thirst across the globe today in 2012, an additional two billion people could be added to our population by 2050. With the population aging and becoming more urban, technologies will have to be implemented to feed the world's people.

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