

/NATIONAL POLICY APPROACHES TO REDUCE FOOD INSECURITY  
IN DEVELOPING MARKET ECONOMIES/

by

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## Chapter 1

### INTRODUCTION

He spoke of very simple things - that it is right for a gull to fly, that freedom is the very nature of his being, that whatever stands against that freedom must be set aside, be it ritual or superstition or limitation in any form. - Jonathan Livingston Seagull<sup>1</sup>

#### What is Food Security?

"Food security" is an obscure and malleable term. The scholars of food security each employ distinct definitions to the words "food security." The thread which coarsely weaves the research together is "consumption level."

But whose consumption level are we concerned with -- the world, a nation, a region, a household, an individual? Valdes focuses his analysis on the consumption level of the country or a region within the country. "Food security may be defined as the ability of food deficit countries, or regions within those countries to meet target consumption levels on a year-to-year basis."<sup>2</sup> Bigman, however, sharpens Valdes' analysis to include the consumption level of each individual within the country or world. "Food security represents the ability of a country or the world at large to supply the food needs of all its people at all times, now and in the future."<sup>3</sup>

Reutlinger distinguishes the two approaches by separating the food problem into the "overt" and the "silent" food problem. He describes the overt food problem as encompassing inadequate total food supplies and the silent food problem as encompassing chronic malnutrition. The dilemma of the overt food problem is whether the global food supplies will stay abreast of total food demand, and whether developing countries



can meet their growing total demand needs through increasing production and the importation of food. The dilemma of the silent food problem is increasing the persistent deficient consumptive levels of the chronically malnourished individual, given inadequate or adequate total food supplies.<sup>4</sup>

Valdes's and Bigman's approaches differ not only in their national vs. individual approaches to the food security issue. The targeted food consumption levels are based on separate criteria. Valdes chooses a consumption level target based on previous consumption levels in his attempt to reduce short term variability of the total food consumption level. Bigman, however, chooses an individual consumption level target based on nutritional requirements.

And finally, the scholars' approaches differ in their time dimensions. Valdes approaches consumptive level variability solely "on a year-to-year basis."<sup>5</sup> Bigman extends Valdes's short term variability to embrace the long term consumptive trend. To fulfill the food needs of a country's people "at all times, now and in the future," is certainly a long term commitment.<sup>6</sup>

To sum, the pioneers in the study of food security employ distinctly different definitions to "food security." The targeted population, consumptive level, and time dimension varies purposively throughout the literature. Valdes and Bigman accentuate the differences by formulating polarized definitions. These differences allow varying orders and magnitudes of hunger given "food security" attainment.

Although Valdes's definition of food security may be analytically more workable, cavernous gaps allow hunger to manifest itself in his conceptual framework. First, targeted total food supplies will not insure adequate consumption levels of each individual. Second, target consumption

levels may not be sufficient to meet nutritionally adequate consumptive levels. And third, a reduction of short term consumptive level variability does not address the decreasing long term consumption trend below levels of nutritional adequacy.

### The Role of Economics in the Food Security Issue

Lionel Robbins in An Essay on the Nature and Significance of Economic Science states, "Economics, we have seen, is concerned with that aspect of behavior which arises from the scarcity of means to achieve given ends."<sup>7</sup> The given end in the food security issue is the achievement of a targeted consumption level. This is an ethical decision of what ought to be. "...economics is entirely neutral between ends; that, in so far as the achievement of any end is dependent on scarce means, it is germane to the preoccupations of the economist."<sup>8</sup>

If we define means as resources, the "space ship" earth has the means to eliminate food insecurity even as defined by Bigman. The 1970s was a decade of periodic world market grain shortages and devastating droughts. Reutlinger and Alderman's study of thirty-six developing countries show 61% or 808 million people with calorie intakes below FAO/WHO requirements in 1973. The researchers also determined that the situation had not changed drastically throughout the decade. In 1980, "65% of the population in the forty countries reviewed, or approximately 700 million people, consume less than the recommended amount of calories recommended by the FAO;"<sup>9</sup> But Murdock observes that the world had the means to eliminate the widespread calorie intake deficiencies. "...in the 1970s world food grain production was great enough to provide the average person in the world with more food grain than is consumed by the average Japanese, and the Japanese are well-nourished population."<sup>10</sup> The crisis persists,

however, because the individual does not have the means to attain an adequate diet. The means of the individual are insufficient because of an unfavorable economic environment created largely by the national government's and the world community's inability and unwillingness to act effectively. Murdock illustrates the world's inefficient use of means to achieve food security.

The extra food needed to provide adequate diets for the malnourished of the world is not even very large in relative terms. The deficit in calories is equivalent to about 37 million tons of grain. This was one-fiftieth of world grain production and is less than 10 percent of the amount of grain fed to livestock in the rich countries.<sup>11</sup>

The role of the economist is to analyze the current food insecurity situation, determine the root causes, formulate policy approaches to alleviate the problems, and reanalyze the situation under the new policy setting. Given a nation's limited means the economist attempts to develop an economic setting whereby the means are used most efficiently to attain a "given end" — food security.

#### An Operational Definition of Food Security

I must define the "given end" to clarify my intent and thus distinguish the appropriate policy approaches with which we will concern ourselves. I have chosen Bigman's concept of food security to be the "given end": "Food security represents the ability of a country or the world at large to supply the food needs of all its people at all times, now and in the future."<sup>12</sup> "Food needs" are determined by nutritional requirements. Some regard this individual food security as an international right, "the right of every man, woman and child to sleep each night free from hunger."<sup>13</sup>

But a concentration on the adequacy of the food consumption of all individuals necessitates examination of the policies to achieve adequate available total food supplies. So economists such as Valdes who concern themselves with national food security contribute greatly towards the goal of individual food security. In the words of Shlomo Reutlinger, "solving the 'overt' food problem is not sufficient (unfortunately!) nor necessary (fortunately!) to reduce malnutrition in any reasonable period of time."<sup>14</sup>

### The Market Economy

Having selected a concrete definition of food security, we must also distinguish within which economic system we will discuss national policy approaches to reduce food insecurity. Every economic system is confronted with three basic economic choices: what to produce, how, and for whom. In a tradition-directed economic system, traditional patterns, established by prior generations, determine what to produce, how, and for whom. In a market-directed economic system, the market, commanded by the interplay of supply and demand, determines what to produce, how, and for whom. And finally, in a command-directed or centrally planned economic system, an individual or a limited group determines what to produce, how, and for whom. Most societies are directed by all three forces: tradition, the market, and a centralized group of people. But one form will predominate and be more influential in determining what to produce, how, and for whom.<sup>15</sup>

I have restricted the scope of this report to policy approaches to reduce food insecurity in developing market-dominated economies. This restriction is not based on the hypothesis that market-directed

economies are more successful than tradition- or command-directed economies in reducing food insecurity. Time and literature restrictions prohibited me from also extensively exploring policy approaches to reduce food insecurity in a command-directed economy.

Sources of Individual Food Insecurity in a Developing  
Market Economy

Three components in a developing market economy must be present for an individual dependent on a market economy to achieve a nutritionally adequate diet: adequate total food supplies, an extensive and efficient market system, and an adequate real income. If any of these components are deficient, individuals will experience periods of hunger.

In addition, a deficiency in any one of the three components creates a deficiency in the other two. To illustrate, a drought which reduces total food crop supply reduces real rural incomes by reducing production earnings for the farmer and real urban incomes by increasing food prices. The efficiency and extensiveness of the market system diminishes as the transfer of goods decreases which creates an underutilization of existing market structure and allows monopolistic forces to enter. These market inefficiencies decrease the earnings potential of the rural food producer and increases the price of food for the urban consumer. Total food crop supply continues to decrease. A deficiency in any of the three components will have a damaging spiraling effect on all three components.

Deficiencies currently exist in all three components in developing market economies. Determining the most detrimental and easily solvable deficiency must be a continual battle for the economist. And oftentimes many deficiencies must be solved at once or in a certain order if any food security improvements are to be attained.

Victims of Food Insecurity in a  
Developing Market Economy

Having developed an operational definition of food security, limited the study to market dominated economies, and briefly categorized deficiencies which create food insecure situations, we must determine which population groups are most victimized when deficiencies do arise. By isolating the victims the economist may focus his research and the policy makers will have a more appropriate base of knowledge upon which to make and direct policy decisions.

To reiterate, deficiencies in total food supplies or the marketing system or individual real incomes will result in a hunger situation. Deficiencies in these major components may reduce effective demand for staple foods among the subsistence persons. Effective demand for staple foods necessitates the availability of staple foods and an adequate real income.

And effective demand for staple foods is predominantly limited by inadequate real incomes. Real income fluctuates as production or prices fluctuate. These fluctuations severely affect food consumption. John Mellor writes, "On the basis of international comparisons, we can expect income elasticities for all food to be about .8 when per capita incomes are \$100, to drop to about .5 at income, of \$500, and to drop close to zero by the time incomes reach \$7,000."<sup>16</sup> So individuals with low incomes are dangerously susceptible to drops in calorie intake levels below nutritional standards as their real incomes fluctuate.

The targeted population for food security policy should be the poor. Deficiencies in total food supplies, the marketing system, and individual real incomes will reduce effective demand for the poor by limiting the

availability of food and most commonly reduced their purchasing power. The wealthy population, on the otherhand, will have the purchasing power to buy adequate supplies at even high food prices.

#### National and International Policy Approaches

Should the international community become involved in the food security policy approaches of a sovereign nation? Frankly, we are partly responsible for the food security or insecurity which prevails in the developing countries today.

National food policies in developing countries are increasingly influenced by global events and international policies beyond the control of individual governments. During the 1960s and 1970s developing countries stepped up their imports of food substantially, and thus their food supply policies have become more dependent on imports.<sup>17</sup>

The international community may be a catalyst for the promotion of national food security through direct long term assistance in domestic food production, distribution, and storage, the creation of a favorable world grain market, and short term emergency aid.

The international community has fumbled in its attempt to be a catalyst for developing country's attainment of food security. Prior to the recent presses' recent exposure to widespread drought in sub-Saharan Africa, Siamwalla and Valdes reflect:

World food security has ceased to be a major concern for the press and for the general public. Yet the underlying causes of food crisis have not disappeared. Though developing countries have themselves made some important strides in dealing with food insecurity, only limited progress has been made on the international scene to help them in these efforts.<sup>18</sup>

Focus of the Paper

The content of this paper is limited to a discussion of national policy approaches to reduce individual food insecurity in developing market economies. The policy approaches are discussed in the following three chapters titled, consecutively, "Maintaining Adequate Total Food Supplies for the Nation", "Improving the Performance of the Market System", and "Increasing and Stabilizing the Real Incomes of Subsistence Persons".

All proposed and practiced policies may fall under one or more of these categorical headings. Given the copious stacks of literature on this subject, I will attempt to briefly and concisely discuss those policies proposed and practiced which are the most powerful and often debated so as to provide an informative overview for the reader.



Endnotes to Chapter 1

<sup>1</sup>Richard Bach, Jonathon Livingston Seagull, (New York: The Macmillan Company, 1970), p. 83.

<sup>2</sup>Alberto Valdes, Food Security for Developing Countries, (Boulder: Westview Press, 1981), p. 1.

<sup>3</sup>David Bigman, Coping with Hunger: Toward a System of Food Security and Price Stabilization, (Cambridge: Ballinger Publishing Company, 1982), p. 13.

<sup>4</sup>Shlomo Reutlinger, "Malnutrition: A Poverty or a Food Problem?" World Development 5 (Unknown 1977): 715-724.

<sup>5</sup>Valdes, Food Security for Developing Countries, p. 1.

<sup>6</sup>Bigman, Coping with Hunger, p. 13.

<sup>7</sup>Lionel Robbins, An Eassay on the Nature and Significance of Economic Science, (New York: Macmillan and Company, 1962), p. 24.

<sup>8</sup>Ibid.

<sup>9</sup>Shlomo Reutlinger and Harold Alderman, "The Prevalence of Calorie-Deficient Diets in Developing Countries," World Development 8 (May/June 1980): 406,407.

<sup>10</sup>William Murdoch, The Poverty of Nations, (Baltimore and London: The John Hopkins University Press, 1980), p. 98.

<sup>11</sup>Ibid.

<sup>12</sup>Bigman, Coping with Hunger, p. 13.

<sup>13</sup>Barbara Huddleston, "World Food Security and Alternatives to a New International Wheat Agreement," New International Realities 6 (March 1982): 9.

<sup>14</sup>Reutlinger, "Malnutrition: A Poverty or a Food Problem?" p. 716.

<sup>15</sup>Robert Henry Haveman and Kenyor A. Knopf, The Market System (New York: John Wiley & Sons, Inc., 1970), pp. 8-11.

<sup>16</sup>John Mellor, The Economics of Agricultural Development, (Ithaca: Cornell University Press, 1966), p. 59.

<sup>17</sup>Barbara Huddleston et al., International Finance for Food Security, (Baltimore: John Hopkins University Press, 1984), p. 3.

<sup>18</sup>Ammar Siamwalla and Alberto Valdes, Food Security in Developing Countries, (Washington D.C.: International Food Policy Research Institute, 1980), p. 258.

## Chapter 2

## MAINTAINING ADEQUATE TOTAL FOOD SUPPLIES FOR THE NATION

Three major domestically-controlled entities may contribute towards maintaining an adequate total food supply: domestic food production, stocks, and commercial imports. The appropriate policy basket in maintaining an adequate total food supply will depend upon each situation as does the larger appropriate national food security policy basket. "In short, the multidimensionality of the food problem requires that the strategies of food security also be multidimensional. Complete food security will exist only when every aspect of the food problem has been resolved."<sup>1</sup>

Increasing Domestic Staple Food Production

## Introduction

Most developing countries have the potential to feed themselves. But past trends and future projections indicate a widening gap between domestic production and demand. And because developing countries import a small percentage of total domestic consumption, policy efforts to reduce the structural constraints which discourage domestic production are essential for reducing food insecurity.

William W. Murdoch emphasizes throughout The Poverty of Nations that developing countries have the potential to feed themselves. "Buringh and his co-workers, in their exhaustive analysis, estimated the full development of all available and irrigable land and the full use of modern technology would produce a maximum of almost forty times the present annual crop production."<sup>2</sup> But past trends and future projections indicate a widening gap between domestic food grain production and demand. "Staple

food deficits in DME (developing market economy) countries have more than doubled between 1961 and 1976."<sup>3</sup> During the 1960s and 1970s the increase in population and per capita incomes created a growing demand for food, but domestic agricultural production lagged behind. Bigman points to Africa where "agriculture has gradually deteriorated and food production has increasingly lagged behind population growth. Since 1970 locally grown food supplies on a per capita basis have declined by more than 10 percent, a trend likely to continue."<sup>4</sup>

Future projection by distinguished international economic development institutions are pessimistic. "The projections of IFPRI (the International Food Policy Research Institute) (1977), the World Bank (1976), and the Asian Development Bank (1978) all estimate a substantial widening in the gap between foodgrain production and demand in the decade ahead."<sup>5</sup> The International Food Policy Research Institute predicted a production shortfall of staple food crops in the developing market economies of between 120 and 145 million metric tons by 1990.<sup>6</sup>

And because developing countries import a small percentage of total domestic consumption, correlations between staple food production and consumption are very high. In 1978, 90% and 100% of the food consumed in non-communist and communist developing countries, respectively, was produced domestically.<sup>7</sup> Table 1 in the Appendix shows that half of the correlation coefficients between total staple food production and staple food consumption for twenty-four developing countries between 1961 and 1976 was greater than .90. These figures underscore the need to increase domestic production to reduce malnourishing levels of consumption.

So what are the constraints? Existing structures in LDCs stifle the growth potential of domestic staple food production.

...it is clear that the food problem could be handily solved for the foreseeable future by structural changes alone. Note also that the solution would in general require no extra available land, a matter of considerable importance where the use of marginal farmlands leads to environmental degradation.<sup>8</sup>

Most developing countries have the potential to feed themselves. But past trends and future projections indicate a widening gap between domestic production and demand. And because developing countries import a small percentage of total domestic consumption, policy efforts to reduce the structural constraints which discourage domestic production are essential for reducing food insecurity.

#### The Potential for Increasing Domestic Staple Food Production

Two possibilities exist for producing more food in the developing countries. These are land expansion and increasing yields on currently cultivated land. Although the latter is emphasized more vigorously in the economic literature, both must be examined to make a point. Namely that we produce a small percentage of the earth's potential.

#### Land Expansion

Several studies have estimated the total potential cultivable land on the earth. The land currently being cultivated is 1.4 billion hectares. But Mesaronic and Pestel, Norse, and Buring estimate 2.4, 3.1 and 3.4 billion acres, respectively, to be the earth's potential cultivable land.<sup>9</sup>

And these land reserves are located predominantly in the developing countries. "Whereas the total cultivable land in the rich countries can be increased by between 50 and 100 percent, in the developing countries it can be increased threefold and is potentially twice the total in the developed countries."<sup>10</sup>

### Increasing Yields

Although the potential is great for cultivable land expansion, developing countries are relying more heavily on increasing yields. "In the 1950s, more than half of the increased production was created by cultivating more land. Since the 1960s the balance has shifted somewhat, and increasing yields have accounted for 60 percent of the increased production."<sup>11</sup>

Murdoch predicts the trend to continue because of the lower costs involved in increasing yields vs. land expansion. Oram also concludes, "in the next decade low-income countries must rely primarily on raising yields and cropping intensities on land already under cultivation."<sup>12</sup>

When comparing yields between developed and developing countries one witnesses the potential for increasing yield in developing countries. Table 2 below displays average yields around 1975 in developing and developed countries. The average yields for wheat, rice, corn, and sorghum are roughly three times as great in the developed countries.

This potential is verified by crop yields on labor and capital intensive experimental plots in developing countries. In fact, in India the experimental plots have yielded as much as seven times as much produce per hectare than the Indian farmer's crop land.<sup>13</sup>

TABLE 1

AVERAGE YIELDS IN RICH AND POOR COUNTRIES AND  
RECORD YIELDS, AROUND 1975

Crop	Developing Countries	Developed Countries	World Record
Wheat	1.3	3.25 (Western Europe)	14.5
Rice	1.8	5.5	14.4
Corn	1.3	5.4 (U.S.A.)	21.2
Sorghum	0.9	3.0	21.5

Source: National Research Council, Resources for Agriculture, p. 97 and Wortman and Cummings, To Feed This World, p. 147, Cited by William Murdoch, The Poverty of Nations (Baltimore and London; The John Hopkins University Press, 1980): 117, Table 5-9.

Note: Yields are in metric tons per hectare per crop.

As in most farming systems, the missing elements of the Indian peasant's farming system are the capital investments and technological methods utilized on the experimental plot. The major capital investments utilized to increase yields are water control, fertilizer, crop protection, seed improvement and energy. Appropriate technologies and the modern complementary inputs increase the value of the marginal product of the input, thereby increasing input usage to the point where the marginal value product of the input is equal to the price of the input. The increasing marginal value product of the input and the increasing utilization of the input results in increased yields.

Water is the most yield-promoting and limiting input for developing countries. Peter Oram in a study of 36 low income, food deficit countries calculated that "Investment in water resource development could generate about 43 percent of the additional food needed to meet demand at a high level of income in 1990."<sup>14</sup> Whether the ecosystem could compensate for such high levels of ground water depletion is debatable.

Fertilizer also contributes greatly to yields, but the application

levels in developing countries is extremely low. "Excluding China, in 1970 the average cultivated hectare in the developing countries received less than one-seventh of the amount of fertilizer added to a hectare in the capitalist developed countries."<sup>15</sup> Yet, "the average yield response of cereals to fertilizer for both irrigated and rainfed lands is in the neighborhood of 10 kilograms of grain per kilogram of fertilizer."<sup>16</sup>

Crop protection greatly reduces crop losses at a comparatively low cost. "One authority assessed global losses in 1965 at about \$75 billion at current prices, compared to world production of insecticides, pesticides, and herbicides valued at about \$1 billion in 1966."<sup>17</sup>

Oram stresses the potential effectiveness and current inadequacies of seed improvement systems in developing countries.

This is probably the most effective, cheapest, and easiest single method of increasing yields. Yet few countries are providing disease-free seed of improved varieties to farmers in anywhere near the quantities needed. Widespread need and relatively low cost suggest priority for seed development.<sup>18</sup>

Energy may greatly increase production as labor becomes scarce during critical cropping periods and as industrialization and urbanization increases the opportunity cost of farm labor. Yet energy consumption for food production in LDCs is extremely low. "Food production in the LDCs accounts for only about one-half of one percent of the total (world energy consumption)."<sup>19</sup>

In conclusion, modern inputs and technologies increase the marginal value product of an input, thereby resulting in an increased optimal input usage. The complementarities among the modern inputs allows for increased utilization of the optimum where marginal value product is equal to the price of the input. The result is increased output per

unit of land. The forces which are limiting the production potential of the producer in developing countries must be reduced. An examination of these structural constraints will be discussed in succeeding sections.

#### Increasing Yields: Increasing Yield Variability?

Before we explore policies to reduce the structural constraints and thereby increase yields, we must address a very important food security question. Will the increased yields created by the increased usage of modern technologies and inputs be accompanied by increased yield variability?

Studies have shown that these modern inputs increase yield variability which increases individual food insecurity given the strong correlation between domestic production and consumption. Hazell's study of the Instability in Indian Foodgrain Production reveals increasing yields between 1954/55 - 1964/65 and 1967/68 - 1977/78 accompanied by increased production instability. During this period average yields increased by 44 percent as a consequence of improved seed varieties and modern input utilization.<sup>20</sup>

Hazell suggests that the new technologies are more sensitive to weather and disease, input price changes, and curtailments in supply of inputs. These sensitivities create yield variability. Hazell concludes that production instability and rapid agricultural growth are destined to be partners. "The primary conclusion from this study is that aggregate production instability is an inevitable consequence of rapid agricultural growth, and that there is little that can effectively be done about it."<sup>21</sup>

Other researchers have reached different conclusions. Valdes finds that although the absolute variability may tend to increase as production



increases, the "relative variability may in some cases remain unchanged or even decline."<sup>22</sup> And Mehra even points to the stabilizing effect of modern technologies.

Whether modern technology introduces stability depends on strengthening and spreading the elements that stabilize yield and on developing the ability of new technology to not only push up peaks in good weather but also to smooth the troughs when weather is bad. To the extent that this is successful, the severity of conflict between growth and stability will be reduced.<sup>23</sup>

In summary, modern technologies and modern inputs will create production instability if inappropriately utilized. But careful planning and painstaking implementation will reduce the yield variability. Thus, given a real potential for increasing yields and a realization of the possibility of accompanying yield variability if schemes are poorly planned or implemented, we proceed with policy approaches to increase yields.

#### Reducing the Structural Constraints

Implementation of modern technologies and their modern inputs in staple food production is impeded by many structural constraints. If these structural constraints are reduced, the goal of increased staple food production through intensification of both traditional and modern inputs and technologies may be reaped. I have categorized the policy approaches to reduce the structural constraints into infrastructure development, redistribution of the means of production, and reducing price disincentives.

#### Infrastructure Development

An adequate infrastructure will increase the production potential of the farmer. Transportation, communication, research, extension, storage, credit, energy, and education systems become increasingly important as