LEVERAGING AGRICULTURE FOR IMPROVING NUTRITION & HEALTH

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GOVERNING THE DIETARY TRANSITION:

LINKING AGRICULTURE, NUTRITION, AND HEALTH

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WHEN IT COMES TO GOVERNANCE, THE BEST POLICY PRACTICES MAY DEPEND ON a country's stage of development. Appropriate labor market policies, for example, can depend on whether a workforce is low-skill, transitional, or high-skill and highly productive. The best family planning policies may depend on a country's place in the demographic transition—from high birth and death rates to a transitional phase where death rates are falling ahead of birthrates to a final stage where birth and death rates are both low. Appropriate public education investments may depend on whether a nation's population is largely urban and literate or still significantly rural and nonliterate.

The same conditions apply for the governance of agriculture, nutrition, and health. Here the best approach may largely depend on a country's stage in the dietary transition—from a diet low in both calories and micronutrients (accompanied by pervasive undernutrition) to a transitional diet that provides adequate basic energy for most but an inadequate balance of nutrients to an affluent diet that provides excessive calorie energy, accompanied by health problems linked to obesity. In Africa, many states have yet to leave the first stage of this transition, so chronic undernutrition remains pervasive. Most middle-income developing countries are moving through the second stage in this transition and are experiencing rapid dietary diversification. A growing number of high-income countries are now moving into the third stage, where food is abundant relative to income and the greatest diet-related risk to health has become overconsumption.

Agriculture, nutrition, and health are of course linked, especially in Stage One countries, where a significant share of the population remains employed in the agricultural sector and therefore depends directly on successful farming for both food and income. As nations move through Stage Two and into Stage Three, the power of good or bad outcomes in the agricultural sector to influence nutrition and health gradually will diminish but can remain significant. At every stage in the dietary transition, governments should be seeking positive synergies across these policy sectors while avoiding negative cross-sector synergies (Kennedy and Bouis 1993). For example, if Stage One countries rely too heavily on food aid to address chronic undernutrition, they will harm the productivity of their farmers. At Stage Two, efforts to increase food production and boost nutrition with intensified farming can pose new health risks if they fail to protect agricultural laborers against exposure to agricultural chemicals and pollution of surface or groundwater. Meanwhile at Stage Three, if nations allow traditional agricultural interests to dominate the content of nutrition policy, they may worsen health outcomes by encouraging excessive food consumption. If cross-sector links are properly leveraged, however, valuable synergies can be realized.

Multisector governance requires more than communication and coordination among officials across sectors. It will not be enough to set up a nutrition office inside the agricultural ministry, or an agricultural unit within the ministry of health. Cross-sector communication within governments must be supplemented by appropriate links between central and local government, government and industry, and government and community-based or nongovernmental organizations (NGOs). As societies move through the dietary transition, the relative importance of their government and its most important functions will change.

In Stage One countries, the best way to capture positive synergies across sectors is often to provide missing public goods, especially in rural areas. Agricultural societies cannot advance without roads, power, transport, and rule of law—as well as schools and clinics—in the countryside. The absence of these public goods will deter private investment, and citizens—especially smallholder farmers in the countryside—will remain caught in a poverty trap. The synergistic cross-sector payoff from public goods investments at Stage One is the

multipurpose value of these goods. Rural roads that reduce transport costs simultaneously deliver productivity gains for farmers (by lowering the cost of purchased inputs and reducing marketing costs) and health gains for young children (by improving access to clinics). Cross-sector links should be considered when making these public investments (for example, when determining sites for new roads, power lines, irrigation systems, or health clinics), but most of the actual synergies among sectors will not be "administered" by governments. Rather, they will be captured privately when local communities, NGOs, private firms, and individual households make use of the new public goods. These smaller, better-informed actors are typically better than governments at local cross-sector work.

Most Stage Two countries will have the essential public goods in place, along with some private investment. Significant economic growth will be under way, and most citizens will have escaped the poverty trap. At this stage the challenge of good governance across sectors switches from public investment to public service delivery targeted to those not yet benefiting from the growth process. The cross-sector services these citizens will need include agricultural extension, child and maternal health services, nutritional supplementation, food fortification, nutrition education, and perhaps food-based income transfers. Public delivery of these services requires a substantial and sustainable mobilization of budget resources, capable institutions, skilled administrators, and an abundance of reliable data, most of which can be found in Stage Two countries. Inter-ministerial communication is necessary but not sufficient for success. The challenge is to deliver essential agricultural, health, and nutrition services to those at risk of being left behind, without interrupting a continued expansion of private investment and private service delivery.

In Stage Three countries economic well being will be widespread and the private sector will have met the preponderance of both investment and service needs . At this stage, the challenge of good governance becomes one of regulating the private sector. For example, modern commercial agricultural practices that carry occupational health and safety risks, or that bring downstream environmental hazards, will require careful regulation in the public interest. Food manufacturers, wholesalers, retailers, and restaurants will need public regulation as well.

One size, then, does not fit all. To better understand the wide variety of governance challenges across the agriculture, nutrition, and health sectors, and the equally wide variety of solutions to those challenges, we first consider a range of illustrative cases from Africa, Asia, Latin America, and the developed world. We will conclude by identifying a somewhat hidden but common theme at all three stages: the essential integrating role within households of primary caregivers to small children, namely the parents—especially the mother.

I. Stage One: Delivering Public Goods to Fight Chronic Under-nutrition

Nations struggling with chronic under-nutrition linked to poverty must give first priority to public investment needs. In these countries, critical public goods are frequently under-supplied especially in rural areas, making it impossible for families, local communities, and private firms to play an effective role either within or across the three sectors of concern. Smallholder farmers or herdsmen typically make up a majority of rural dwellers, and without increased access to markets, improved technologies, health services, and schooling, their labor productivity will remain low. Low farm productivity will lead to low incomes, which likely will have an adverse impact on nutrition and health status. Public investments are essential as the first step out of this poverty trap.

In Stage One countries (for example, most countries in Sub-Saharan Africa) essential rural public goods are often poorly supplied, including crucial infrastructure such as farm-to-market roads, water, and electrical power, as well as clinics and schools. Rural road systems in Africa are primitive: 70 percent of all rural citizens live more than a 30 minute walk from the nearest all-weather road (Sebastian 2007). There is virtually no rural electrical power, rural health clinics are sparse and poorly equipped, and rural education is rudimentary. A majority of adult farmers in Africa, who tend to be women, are illiterate. In Nigeria, one of Africa's richest countries, only 41 percent of rural citizens live within 2 kilometers of an all-season road, 31 percent have access to an improved water source, 53 percent have access to improved sanitation, and 35 percent have access to electricity. As a consequence Nigeria's under-five mortality rate is quite high at 19.4 percent and life expectancy at birth is only 44. In Mozambique, where all-season rural roads are largely absent, only 26 percent of the rural population has improved water and just 1 percent has electricity. In Ethiopia, only 11 percent of rural dwellers live within one mile of an all-season road, only 11 percent have access to improved water, and only 2 percent have access to electricity (World Bank 2008). In these underserved rural settings, good governance requires much more than government officials being able to communicate with each other across sectors. The job of the state isn't to "see the picture clearly"

so much as it is to change the picture. This will require substantial public investment to provide impoverished communities with roads, power, schools, clinics, and rule of law.

Africa's political leaders know they have been investing too little in rural public goods. Economic returns to agricultural research in Africa often exceed 50 percent, yet governments in the region skimp on spending in this area (Alston, Pardey, and Roseboom 1998). Investments in rural roads also bring large payoffs: in Uganda, for instance, spending on rural roads brings better than a 9 to 1 ratio of benefits in terms of agricultural growth and rural poverty reduction (World Bank 2007). Rural infrastructure investments pay off through the health sector as well. The World Health Organization (WHO) has calculated that if all Africans were simply provided with improved water and sanitation services, along with household water treatment at point of use, the annual health, financial, and productivity benefits would exceed costs by a ratio of 14 to 1 (Oxfam International 2006).

African governments repeatedly pledge to increase rural public goods investments, but they often fail to deliver fully on the pledge. In 2003, at an African Union meeting in Maputo, Africa's heads of government pledged to increase their share of the national public budget that went to the agricultural sector to at least 10 percent by 2008. However, a survey of 45 countries in the region by the International Food Policy Research Institute (IFPRI) found that only 8 of those countries met the pledge (Fan, Omilola, and Lambert 2009).

This under-supply of rural public goods in Africa grows out of the "urban bias" often found in the public policies of Stage One countries (Lipton 1977). Rural populations in these countries are numerically strong but politically weak. They find it difficult to organize for effective political action because they are so often isolated from each other, physically distant from the capital city, and less well educated (not to mention unarmed).[1] Weak support from the donor community is another reason rural public goods have recently been under-supplied in Africa. In its pursuit of structural adjustment in the 1980s and 1990s, the World Bank substantially reduced loans in Africa for public sector investments in rural public goods, especially agriculture. Between 1978 and 2006, the share of World Bank lending that went to agricultural development fell from 30 percent to 8 percent. In 2005, World Bank President Paul Wolfowitz admitted in an offhand comment, "My institution's largely gotten out of the business of agriculture" (Hitt 2005). This withdrawal of international support for agricultural investment reinforced an existing tendency among African governments to under-invest in the countryside.

Bilateral donors also decreased their funding to African agriculture after the 1980s. Between 1980 and 2003 the aggregate value of all bilateral agricultural development assistance from all rich countries to all poor countries fell by 64 percent. The United States' official development assistance to agriculture in Africa fell by 85 percent between the 1980s and 2006. Food grain production per capita was declining in Africa and the number of undernourished citizens was roughly doubling, yet the donor community was failing to provide support for the fundamental investments needed in the African countryside (Chicago Council on Global Affairs 2009).

Stage One countries are often tempted to neglect the need for investment and move immediately into public service delivery and even regulation. Moving too quickly or too deeply into these other areas can overwhelm the limited fiscal and administrative capacities of Stage One countries. This was a lesson learned in the 1960s and 1970s when some donors promoted ambitious multi-sector health and nutrition planning efforts in poor countries. The United States Agency for International Development (USAID) funded the creation of some 26 nutrition planning entities in the developing world during the 1970s (Levinson 2002). This effort faltered when the nutrition units remained understaffed, underfunded, and capable of little more than some data generation and analysis. Most governments at that time could not recruit a sufficient number of trained nutritionists to ensure representation for nutrition concerns in each relevant ministry, and the planning models often required data and test results that did not exist. In the end, the established ministries pursued their own agendas as before while the nutrition institutes or cells remained isolated and powerless (Osgood Field 1987). The few successes were the result of exceptional individual leadership (e.g., Soekirman in Indonesia Tagwireyi in Zimbabwe) rather than institutional design.

Multisector policy efforts can easily overwhelm the capacity of Stage One governments. In the agricultural sector in the 1970s, the donor community, led by the World Bank, designed and funded numerous multisectoral integrated rural development (IRD) projects, hoping that careful top-down planning and administration would leverage agricultural development both to reduce poverty and enhance nutrition and health outcomes. Projects

[1] By contrast urban populations are often already organized into unions, a civil service workforce, and armed military or police units, and far better educated and politically informed. They may be fewer in number than rural dwellers, but they are closer to the institutions of the state and to each other. They can threaten to block the streets, shut down commerce, or even take control of government ministries, radio stations, and airports, compelling the state to give priority to their concerns.

were designed to simultaneously undertake ambitious investment and service-delivery initiatives in agriculture, health, and transportation. Yet in many cases there were no institutions capable of implementing these elaborate multisector plans. Trying to do everything all at the same time overwhelmed local administrative capabilities.

IRD project failure rates were high. When the World Bank evaluated its own IRD projects worldwide in 1980-85, it found that 30 percent of the projects were unsustainable or had economic rates of return below 10 percent. By 1987 this failure rate had increased to 39 percent, compared to a 17-25 percent failure rate for projects in other areas. Failure rates were especially high in Sub-Saharan Africa, which was one reason World Bank lending for agriculture and rural development began to decline in the mid-1980s (Lipton and Paarlberg 1990). A retrospective 2004 analysis by DFID summarized the problem:

> The incorporation of non-agricultural components into the projects overloaded management so that implementation suffered. The integrated approach of many of the projects appeared to be based on the misconceived assumption that it was necessary to have all the components in the development of a particular area not only under one particular project but also under one management umbrella. While nonagricultural components should be planned and implemented concurrently if interrelated, this need not be under a single project management, or indeed within a single project.[2]

Asking Stage One countries to move beyond basic public goods investments to the management of complex multisectoral tasks can therefore be asking too much. As political scientist Merilee Grindle has explained,

> Weak formal institutions of governance are emblematic of—at times conceptually inseparable from—poor and developing countries. The poorer, the likelier they are to have weak or non-existent institutions for making public decisions, allocating resources, and protecting citizens (Grindle 2010).

In Stage One countries, the best way to capture positive synergies across sectors may not be through public administration from the top down. Nongovernmental institutions supported by donor agencies are often better able to administer cross-sector projects in these countries. One example in Africa is the development and introduction of orange-fleshed sweet potatoes (OFSP) to address vitamin A deficiencies. Breeding a biofortified OFSP suited to cultivation in Africa was a research challenge that required external leadership from the International Potato Center (CIP). At the same time, introducing this new variety to farmers and consumers was a cross-sector extension challenge well matched by the capabilities of a nutrition-focused NGO, Helen Keller International (HKI). Beginning in 1997, HKI set up village nurseries in schools and gave groups of 30 to 35 women biofortified OFSP cuttings ready for planting, plus advice on fertilization and growing techniques. Consumption of this sweet potato is now spreading. In one province in Mali, more than 80 percent of adult women and 18-30 percent of children consumed OFSP at least once a week during the harvest period. Just 125 grams of OFSP can provide primary school children with over twice the recommended daily allowance of vitamin A.[3]

II. Stage Two: Shifting from Public Investment to Public Service Delivery

For countries at Stage Two in the dietary transition, basic public goods (such as roads, power, water, and public health infrastructure) are already in place or coming into place in most regions, attracting increased private investment and stimulating economic growth. For most citizens in these countries staple food supplies are affordable, and the biggest nutrition challenge is dietary diversification to ensure adequate micronutrient intake. Private companies (such as food industries and supermarkets) are coming on the scene in a position to leverage improved farm productivity into better nutrition and health. The capacity of the state also has grown as a result of increased individual wealth (boosting tax revenues) and improved human capital resources that emerge from urbanization and increased investment in tertiary education. Meanwhile, as the share of the population employed in farming declines, the automatic spillover gains from farm productivity into improved nutrition and health will begin to decline as well.

At this intermediate stage, the central problem of cross-sector governance shifts from simple public investment to targeted public service delivery. Some categories of citizens will not benefit from the productivity gains and the improved nutrition and health outcomes made possible by the growing private sector—including

[2] http://www.dfid.gov.uk/Documents/publications1/evaluation/ev438s.pdf
[3] http://www.hki.org/reducing-malnutrition/biofortification/orange-fleshed-sweetpotatoes/

communities marginalized by language, race, or ethnicity, plus the very poor. For these citizens, the state must provide a supplemental channel of service delivery. Smallholders in the farming sector will require extension services and technical assistance to diversify their production into the higher value crops now demanded by the growing urban sector. The urban poor will require a food security safety net in the form of cash or in-kind transfers, perhaps conditioned on cross-sector activities such as school or clinic attendance. Other services the state can deliver may include supplementation, industrial food fortification, or education on breastfeeding. Governments at this stage are more likely to have both the fiscal and the administrative means to deliver such services.

The problem of multi-sector leveraging and administrative coordination changes form at Stage Two. Agricultural productivity gains come more quickly with rural public goods in place, but leveraging those gains for improved nutrition and health outcomes may become more difficult as the agricultural share of the workforce declines. Administrative capacity improves at Stage Two, but barriers to inter-agency coordination may actually increase as administrative functions become more specialized. Specialized training often breeds disconnection and jurisdictional competition. In Sri Lanka, at one point, nutritionists in the Ministry of Health refused to work with the Food and Nutrition Policy Planning Division (FNPPD) in the Ministry of Plan Implementation because that unit was headed by an agriculturalist rather than a nutritionist or a medical doctor (Levinson 2002). Health ministries often disconnect completely from agricultural ministries. When the Government of China developed its first National Fortification Alliance (NFA) to qualify for funding through the Global Alliance through Improved Nutrition (GAIN) program, it excluded representatives from its ministry of agriculture (Calestous et al. 2007). Efforts to bridge these gaps through technical innovation (for example, by breeding biofortified crops) may have no strong ministerial champion at all.

Disconnections driven by specialization are also found at the international level. When the United Nations Food and Agriculture Organization (FAO) works across sectors, it prefers to focus on issues such as household food availability, food safety, improved food industries, or a food-based approach to micronutrient deficiency. The World Health Organization (WHO) and UNICEF, however, are more comfortable promoting community-based nutrition interventions focused on young children, pregnancy outcomes, micronutrient supplementation, and breastfeeding. Debate over these differing approaches played out for years at meetings of the UN Subcommittee on Nutrition (SCN), at times nearly immobilizing that body. (Levinson 2002) Even so, the UN system preaches multi-sector planning at the national level. Since 1992 the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) have encouraged states to formulate national plans of action for food and nutrition policy, and in the 1990s the FAO and WHO jointly conducted regional workshops to assist countries in formulating national plans. As a part of this effort, FAO and an Interagency Working Group (IAWG) also began helping countries develop integrated monitoring and surveillance systems, such as Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS), to generate the reliable data needed for appropriate and precise policy interventions (World Health Organization 2007).

Governments in Stage Two countries are often in a position to make effective use of such assistance, and many have now developed impressive capabilities in cross-sector nutrition planning and service delivery. For example, consider Thailand's National Nutrition Program under that nation's health development plan. Included are sub-programs to address healthy eating habits among children and adults, including both monitoring and control of nutrient deficiencies (such as iodine deficiency), food fortification and supplementation, nutrition labeling, nutrition education, a food-based approach, immunization, environmental sanitation and deworming, and a community-based integrated approach toward food security. As Thailand moves toward Stage Three, the focus of these efforts is evolving to the prevention of degenerative chronic diseases linked to over-nutrition, through the promotion of increased fruit and vegetable consumption plus moderating salt intake and checking the amount and quality of fat used. One key to Thailand's success has been high-level political commitment from the King and Queen as well as the Prime Minister (World Health Organization 2008).

Political leadership from the top has also been key to Brazil's widely credited multi-sector *Zero Hunger* (*Fome Zero*) strategy, launched in January 2003. This initiative has grown to include 30 programs and activities involving more than 10 ministries plus participation by state and municipal governments as well as civil society. As of 2006, according to FAO, Brazil had used this program to reduce the nation's undernourished population from 17 million to 11.9 million (FAO 2009).

Presidential leadership made the difference for multi-sector effectiveness in Brazil. Upon taking office in 2003, President Luiz Inacio Lula da Silva announced that he would consider his life's mission fulfilled if every Brazilian were able to have three meals a day by the end of his administration. To coordinate the *Fome Zero* program he created an entirely new Special Ministry for Food Security and Fight Against Hunger (MESA). He also

created a special advisory body within the President's office, plus a National Food Security Council (CONSEA) to serve as a policy advisory body. This body comprised representatives of the government, churches, trade unions, NGOs, and business organizations, with the nongovernmental members of this Council actually holding a two-thirds majority. In fact, the most important component of *Fome Zero's* success may have been the President's decision to launch it outside of existing ministerial structures. Not until its second year, in 2004, was the program moved into a more standard ministerial setting, when MESA was dissolved and its work incorporated into yet the new Ministry of Social Development and the Fight Against Hunger (MDS). This ministry also took over the policies of the Social Assistance Ministry and the Executive Secretariat for the *Bolsa Familia* (*Family Grant*) *Program.* A legal framework for the initiative was set in place in 2006 with the approval of a Food and Nutritional Security Law. So, rather than trying to institutionalize cross-sector perspectives within existing ministries, the Office of the President designed and launched the *Fome Zero* initiative outside of traditional administrative channels.

Fome Zero has required a significant outlay of public resources. For example, the strategy initially included a US$400 million conditional cash transfer (Food Card) program to supplement the income of poor families to buy more food (the cash transfers were conditioned on school attendance and health checkups); a US$130 million program to purchase food from family farmers (PAA); a US$65 million health and nutrition program for the elderly, children, and nursing mothers to address illnesses caused by vitamin and micronutrient deficiencies; an expanded school feeding program; a program to monitor food intake; a food and nutrition education program; and a food supply and distribution program targeting low-income populations in larger cities. Implementation was managed at the state level through Coordinating Committees and Food and Nutrition Councils subordinate to the governor, and at the municipal level through Management Committees where civil society again held a two-thirds majority, plus by local Food and Nutrition Security Councils. By September 2009, these programs had grown dramatically. Family Grants benefitting 12.4 million families replaced Food Cards at a cost to the state of US$6.5 billion (FAO 2009).

Less prosperous Stage One countries would not be able afford this approach, yet for Brazil the total cost of the Family Grants in 2009 represented only 2 percent of the federal budget and only 0.4 percent of GDP. In any case, the spending has paid off in terms of improved health and nutrition outcomes. In the city of Guaribas, the Food Card program helped end infant deaths attributable to malnutrition and expand vaccine coverage from 9 to 96 percent, and prenatal care from 10 to 80 percent. The *Fome Zero* program's biggest challenge has always been striking a balance between precise targeting to ensure public assistance reaches the poor and encouraging a continued expansion of private investments in the delivery of market-based nutrition and health services. Local Management Committees help ensure appropriate targeting of public assistance by scrutinizing local *Cadastro Unico* (Unified Registers) of those in extreme poverty.

Other Stage Two countries in Latin America have moved back and forth between public sector versus private sector service delivery in nutrition and health. In Chile, while a public sector approach became dominant following the creation of its National Health Service in 1952, partial privatization of health financing was restored in 1979 through reorganization of the public system into a National Health Fund (FONASA). This proved unsatisfactory, however, as poor citizens concentrated in the public system were underserved, so yet another reform was undertaken after President Ricardo Lagos entered in office in 2000. A new plan was developed—again, facilitated by strong presidential leadership—extending universal coverage guarantees (Plan AUGE) to both public and private system enrollees. These expanded guarantees were affordable because the Chilean economy had been growing rapidly, at an annual rate of 5.5 percent, between 1990 and 2007 (Tsai and Ji 2009). Health and nutrition outcomes in Chile are no longer heavily dependent on agricultural productivity—the country is 86 percent urbanized—so little is now lost by the absence of a strong agricultural dimension to these public health initiatives.

Indonesia, a Stage Two country with a much larger population of farmers, has also been able to use centrally designed and managed nutrition projects (the expansion of the Posyandu in the 1970s and the creation of the Bidan Di Desa program in the 1990s) to deliver significant nutrition benefits to children. Between the late 1980s and 2001, Indonesia had made admirable progress in decreasing protein-energy malnutrition, as the prevalence of underweight among children under age five fell from roughly 40 percent down to just 27 percent. Severe vitamin A deficiency declined to a level where it was no longer a public health problem, and thanks to improved availability of iodized salt due to public health interventions, Indonesia secured the highest coverage of iodine fortified salt use in Southeast Asia.

Yet challenges remain in Indonesia. About 19 percent of women ages 15-49 and 53 percent of children ages 1-4 still suffer from anemia, and those with less education living in rural areas or in poor urban households

have lower access to public programs and hence greater nutritional needs (Friedman et al. 2006). At the same time, excessive calorie intake among middle-aged urban dwellers has led to a growing overweight share of the population. Also, following its 1997 financial and fiscal crisis, the Government of Indonesia attempted to implement a program of administrative decentralization, one that abruptly increased the local contribution to public health spending from 10 percent up to 50 percent by 2001. One goal was to make public spending more responsive to local conditions, but the decentralization initiative in some regions ran into significant local capacity deficits, both fiscal and administrative. Poor agricultural regions lagged in taking over from the center, so dramatic outcome differences began to emerge across districts. For example, while the national iodized salt coverage rate is about 82 percent, coverage at the district level varies from 100 percent in some cases down to only 17 percent in others. At the central level of Indonesia's government, the Directorate of Community Nutrition is adequately staffed, but at the provincial level, heads of the nutrition sections often do not have an educational background in nutrition, and numerous staff have only completed a senior level of high school. Some district level health department offices have no nutrition-related subsections at all, and because of low fiscal resources there is a general lack of monitoring and evaluation.

Cross-sector coordination is actually weaker at the district level in Indonesia than at the center due to an inadequate presence of private companies and capable NGOs. Coordination between the provincial and the local level is also impaired, since the health sector is within Commission E at the provincial level, but is within Commission D at the district level, and coordination with the agricultural sector is essentially absent. Particularly in large Stage Two countries, cross-*level* administrative challenges can be just as great as cross-sector challenges.

In some Stage Two countries at the local level, capable NGOs and INGOs are often well positioned to fill capacity deficits and help capture synergies across sectors. One example in Bangladesh is the work of Helen Keller International (HKI) in promoting homestead food production by providing seeds and seedlings for fruit and vegetable gardens, along with nutrition education. As of 2003, these efforts had reached more than 4.7 million individuals. A strong synergy between food production and nutrition is captured directly as children in families with developed gardens consume 60 percent more vegetables than those in households without gardens (Iannotti, Cunningham, and Ruel 2009). One key is the targeting of women: when women grow homestead vegetables, the nutrition and health payoff is higher because they are more likely to feed the vegetables directly to children, and they also are more likely to invest the garden income in the health of children.

NGOs have also found many ways to partner with the Government in Bangladesh to deliver cross-sector services to targeted populations. The rural development organization, BRAC, uses resources that the Bangladesh Bank provides to offer low interest loans to tenant farmers who are often excluded from credit markets for lack of collateral security. BRAC also uses its village organization systems to deliver agricultural extension services to the rural poor (for example, encouraging dietary diversification through vegetable production), and it partners with the Bangladesh Rice Research Institute (BRRI) and the Bangladesh Agricultural Research Institute (BARI) in conducting applied agricultural research. BRAC's deep involvement at the village level brings strong cross-sector synergies, as it also works to deliver an integrated package of preventive and basic health services to the poor, especially women and children, in part through innovative Micro-Health Insurance systems.

Where public sector health ministries dominate in Stage Two countries, links to the agricultural sector often suffer. For example, India's prime minister launched the National Rural Health Mission (NRHM) in April 2005 to provide accessible and affordable quality health services to the poorest households in the remotest rural regions. This initiative was self-consciously designed to remedy institutional fragmentation in the health sector and to "ensure simultaneous action on a wide range of determinants of health like water, sanitation, education, nutrition, and social and gender equality." It explicitly endorsed "a synergistic approach." Yet the Mission Document for NRHM makes no mention of agriculture or farming. The Ministry of Health and Family Welfare administers NRHM at the national level, and several administrative agencies manage it at the state level, including the Department of Women and Child Development, Medical Education, Public Health Engineering, Water and Sanitation, Panchayati Raj, Rural Development, Social Welfare, Urban Development, Planning, and Finance. Notably absent, however, is the Department of Agriculture (Government of India 2005).

A more formal link to agriculture would seem appropriate if only to help monitor and manage agriculture-related ailments in the farming population caused by chemical exposure or perhaps a change in the disease environment linked to the introduction of irrigation. Yet it remains a question whether such links are best made at the local level through elaborate administrative coordination, which can overwhelm official capacity, or perhaps instead through community-based civil society leadership and NGOs. Even in advanced Stage Two countries such as India, official capacity deficits persist in both the health and the farming sectors. According

to one estimate in 2009, more than 50 percent of specialist posts at India's 5,000 state-run Community Health Centres (CHCs) were unfilled, with the highest vacancy rates found in rural areas (Associated Chambers of Commerce and Industry of India 2009).

The Indian case illustrates one limitation to any rigid classification of countries according to stages in the dietary transition. Large numbers of people can be found within India at all three stages in the transition. India, in fact, faces a "double burden" in its nutrition posture, with large numbers of children in poor communities still experiencing stunting and wasting from under-nutrition, even as a rapidly growing urban middle class begins to suffer from over-nutrition and obesity (Gillespie and Haddad 2003). This obliges government leaders to respond to perform all three tasks at the same time: filling large public goods deficits in some poor rural areas, providing targeted service delivery, and also designing appropriate regulation for a rapidly expanding private food and agribusiness sector.

III. Stage Three: Food Abundance and an Increased need for Regulation

At stage three in the dietary transition, the leading challenge of good governance shifts from public investment and public service delivery to public regulation. This is due to the much larger role of private investors, large corporations (food, agribusiness, and pharmaceutical companies), and service providers. At this third stage in the dietary transition, the agricultural sector is highly productive, highly diverse, and sufficiently capitalized to secure most of the investment, lending, and research support it needs from private sources. Public research and extension systems remain in place, but with a role steadily shrinking relative to private seed, chemical, and machinery companies. In the nutrition and health sectors, the increasing affluence of most citizens will help stimulate private investments to deliver a much wider variety of food products and medical services. However, the abundance of affordable food in these societies relative to income, plus transitions in the workforce away from physical labor, will eventually trigger a new diet-related threat to health: a growing prevalence of obesity.

In Stage Three countries, the most important cross-sector governmental task shifts from service delivery to regulation for public health and safety (including environmental safety), especially the regulation of farm practices, food companies, food retailers, and restaurants,. Some hazardous practices in the food and farming sectors may require absolute prohibition. Others are better managed by creating choice architectures that "nudge" behavior in a safe direction, for example by imposing information and labeling requirements, or taxes and fees as incentive systems (Thaler and Sunstein 2008). As always, it will help if regulatory policy actions in one sector take into account positive or negative synergies with other sectors. Yet the major risk at Stage Three is not an inattention to cross-sector linkages. A much greater problem is the political "capture" of regulators by the private industries being regulated (Stigler 1971).

We can illustrate this danger by considering the weak regulatory response of the United States Government, so far, to that nation's increasingly acute obesity crisis. Adult obesity rates in the United States have increased since 1971 from 14.5 percent up to 34 percent, and this increasingly overweight population now requires more costly medical services to treat ailments such as type 2 diabetes, hypertension, and high blood cholesterol. The medical costs of treating obesity-related diseases in the United States doubled between 1998 and 2008 to reach $147 billion, which is roughly 9 percent of all medical costs (Paarlberg 2010). One clear source of this crisis has been excessive calorie intake from beverages, including juices, dairy drinks, alcohol, and especially sweetened soft drinks. Beverages provide twice as many calories today as they did in 1965, with more than two-thirds of the increase coming from sweetened fruit juices and soft drinks, making these consumer items into something of "a new tobacco" in public health terms. Yet the private industry has effectively resisted efforts to use the regulatory power of the state to discourage sweetened soft drink consumption.

There is no federal taxation of sweetened beverages in the United States, even though public health advocates have long been calling for such taxes both to discourage soda consumption and to help pay the medical costs of managing the consequences. In 2009, when the health care policy debate began in Congress, advocacy organizations proposed helping to pay for the new measure by collecting a small tax on the sale of sweetened soft drinks, but the American Beverage Association (ABA), which represents the beverage industry in Washington, D.C., responded by spending $18.9 million on lobbying and managed to stop the tax (Wall Street Journal 2010). In the following year, after the state legislature in Washington imposed a small tax on soft drinks to help balance the state budget during the national recession, the American Beverage Industry spent $16.5 million to promote a ballot initiative that soon overturned the measure. ABA outspent organizations that favored the tax by more than 40 to 1 (Neuman 2010). Earlier, an organized campaign from the beverage

industry had persuaded New York Governor David Peterson to drop a proposal for an 18 percent tax on sugary drinks.

The beverage industry in the United States has also gained excessive influence inside the executive branch of the federal government. The Food and Drug Administration (FDA) defers to the beverage industry by declining to require health notices on cans and bottles, or to require that added sugars be listed separately on labels, or to require that multi-serving containers list the number of calories for the whole container. Regulatory capture by food and beverage industry groups is even more pronounced within the United States Department of Agriculture. Every five years since 1980, USDA has issued with FDA a joint statement of dietary guidance for health promotion and disease prevention, called *Dietary Guidelines for Americans.* Within USDA there is even a Center for Nutrition Policy with a budget of $6.5 million to promote healthy diets, and a nutrition committee that recommends dietary improvements such as a reduction in the saturated fat share of total calories (from the current 12 percent down to just 7 percent). Yet USDA also houses a nonprofit corporation named Dairy Management Inc. dedicated to increasing the consumption of dairy products, including cheese. Promoting the consumption of dairy products in poorly nourished countries can be a worthy goal, but at home Americans already eat an average of 33 pounds of cheese a year, nearly triple the 1970 level, and cheese has become the largest source of saturated fat in American diets. Dairy Management Inc. nonetheless works to add cheese-laden products to restaurant menus and even promotes the notion that Americans can lose weight by consuming more dairy products (Moss 2010).

In Stage Three countries where industry capture of regulators is a serious problem, taking an "integrated" or "multi-sector" approach to governance is not always an adequate solution. For example, every five years the United States Congress enacts an agricultural policy measure known as the Farm Bill. This important legislative package incorporates both agricultural programs and nutrition programs, which would seem to be an appropriate multi-sector approach, yet the outcome in each sector falls well short of good governance. The agricultural programs include poorly targeted income subsidies to wealthy commercial growers that waste taxpayer money and distort markets. President George W. Bush actually tried to veto the 2008 farm bill on the grounds that it was wasteful, but Congress enacted it anyway by wide majorities in both houses. The nutrition programs in the Farm Bill provide an important consumption subsidy to low-income citizens, but they are not particularly well tailored to improve nutrition. The largest federal nutrition program, the Supplemental Nutrition Assistance Program (SNAP), provides an average monthly cash benefit of $134 to 40 million participants, not only for the purchase of food but also obesity-inducing sugary sodas with no nutritional value. Yet when proposals are made to eliminate sugary sodas from eligibility for purchase under the SNAP program, the beverage industry mobilizes to turn those proposals aside (Hartocollis 2010).

IV. Conclusion

We have argued here that the job of governing across sectors changes as societies move through the dietary transition. In agricultural societies at Stage One, the greatest unmet governance need is usually for public investment in basic rural public goods such as roads, power, water, schools, and clinics. In middle-income societies at Stage Two, the burden of good governance across sectors often shifts to the delivery of targeted public services for disadvantaged populations. Then in more affluent Stage Three countries, where the private sector has taken over most investment and service delivery tasks, the role of government more often becomes one of sound, well-informed regulation, a task sometimes made difficult by the political power of private industries.

Does good governance have any one common feature at all three stages in the dietary transition? What seems to matter most at each stage for capturing positive synergies is not administrative capacity, coordination, or even strong leadership. What consistently matters most is the responsiveness of policy to the changing needs of mothers. When it comes to health and nutrition, those most exposed to risk are usually young children, and the agent best positioned to manage that risk is almost always the child's mother. In Stage One agricultural societies, the child's mother is likely to be a leading household food producer, the grower and server of the child's food, and the daily monitor and manager of the child's health. Parents of young children, particularly mothers, are well positioned at the household level to capture cross-sector synergies.

What governance resources do mothers need most to perform these parental tasks well at various stages in the dietary transition? Arguably, the most important resource will be public education. We have known for decades that more-educated women exhibit behaviors that are more child-centered, leading to better feeding practice and better nourished and healthier children. This is true in Stage One countries where mothers who can read and write gain advantages when learning to take up improved farming practices or when seeking

access health services, and where keeping girls in school helps postpone marriage and child-bearing until the mother is better equipped to be a successful parent. This also tends to be true in Stage Two countries, even when higher educational attainment for young women begins to facilitate employment outside of the home. Mothers may spend more time outside of the home, but usually the health of the child does not suffer because of the added resources the mother will be bringing into the home (Tucker and Sanjur 1988). In Stage Three countries as well, the educational attainment of the mother remains a powerful integrating force within the household, benefiting the health and development of children. In the United States this is particularly the case among racial minority groups. In black families, the impacts of maternal education on a child's birth weight and early motor and social development are positive and large. An additional year of education leads to about 200 extra hours of work, but also to more regular use of formal child care arrangements, prolonged breastfeeding, more time reading to the child, and more children's books in the home (Carneiro, Meghir, and Parey 2007). In lower-income families in some Stage Three countries such as Korea, there is also a significant relationship between maternal education and reduced childhood obesity (Cho, Kang, Kim, and Song 2009).

Good governance across the agriculture, nutrition, and health sectors must therefore begin with meeting the educational needs of young women. In Stage One countries, this may mean programs to keep young girls as well as boys in school, such as homegrown school feeding programs. In Stage Two countries this might mean conditional cash transfer programs that reward mothers for bringing children to clinics, or state-funded nutrition programs and nutrition education programs for pregnant and new mothers. The Indian state of Kerala, which has invested heavily in such programs, boasts infant mortality rates that are a fraction of the developing world average. In Stage Three countries, governments can gain large long-term health payoffs from educational investments if they are targeted at helping young women, including young mothers, complete their education so they will be better equipped to make wise decisions as parents, and to improve their earning opportunities in the workforce. At every stage in the dietary transition, and across all three sectors, the educational attainment of mothers is crucial. Enhancing such attainment should emerge as a key task of government.

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