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Hidden Hunger

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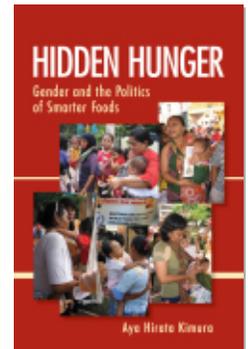
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1. UNCOVERING HIDDEN HUNGER

1. The Grameen Bank's founder, Muhammad Yunus, received the Nobel Prize for his work in microfinance. The joint venture is called Grameen Danone Foods.

2. For instance, in the United States, salt iodization began nationwide in the 1920s (Backstrand 2002), and iodized salt accounted for 90–95% of salt sales (UNICEF and Micronutrient Initiative 2003). Vitamin D's link with rickets was discovered in 1924 (Carpenter 2003c), and large-scale milk fortification with vitamin D was soon developed (Bishai and Nalubola 2002). Thiamine (B₁) was synthesized in the 1930s, and thiamine fortification of flour began soon afterward (Bishai and Nalubola 2002). In addition to voluntary fortification schemes, many states started to require flour fortification in the 1940s (Park et al. 2000).

3. The concept of nutritionism has been used by Gyorgy Scrinis (2008) and also popularized by Michael Pollan (2008). Other scholars have discussed the growing power of nutritional science (Belasco 1993; Dixon 2002; Dixon and Banwell 2004; Levenstein 1993). For instance, Jane Dixon and Cathy Banwell use the term “nutritionalization” as “the growing dominance of nutrition and health considerations in all facets of dietary discourse and of the food supply itself” (Dixon and Banwell 2004, 119). The concept of nutritionism denotes a particular tendency influenced by modern nutritional science but does not assume that all nutrition-related concerns have this tendency. The concept also equips us to highlight where such tendencies surface, rather than project a sweeping shift.

4. Of course, nutritionism is not the only reductionist tendency in the agrofood system. Modern agricultural technologies are rooted in a reductionism that disembeds farming from its local ecological and social contexts (Scott 1998), and the contemporary advocacy of genetically modified crops is closely linked to molecular reductionism (McAfee 2003; Sarkar 1998).

5. See, e.g., Ferguson (1990), Mitchell (2002), Agrawal (2005), and Li (2007).

6. Nutritional fixes can be considered a version of the “technological fixes” theorized by physicist Alvin Weinberg in his science and technology classic *Controlling Technology* (1991). Weinberg famously advocated technological solutions for social problems. Rudi Volti (1995) argues that technological fixes have not been able to solve underlying problems and that technology has always been influenced by power relations.

7. For instance, in their review of existing fortification projects around the world, Darnton-Hill and Nalubola (2002) identified the “support of industry, with early involvement of local industry and the private sector” (235) as one of the key success factors for fortification initiatives. The partnership with the private sector is a dominant reason for the enthusiasm for fortification by the Business Alliance for Food Fortification (BAFF) with multinational corporations from Coca-Cola to Nestlé. Biofortification emerged in the context of the growing need of international agricultural research institutions to draw on corporate expertise and resources (Brooks 2010).

8. While the origin of the Green Revolution can be located with private foundations such as the Rockefeller Foundation, which provided funding to improve yields of corn, wheat, and beans in the 1940s, the agricultural research centers of private foundations were eventually consolidated under the Consultative Group on International Agricultural

Research (CGIAR), which was a loose network of national centers with various funding sources, and the network of national agricultural research systems in different countries. In addition, governments took the lead in promoting the Green Revolution (Gupta 1998). In Indonesia, the government conducted the Mass Guidance program (BIMAS) that distributed necessary agricultural inputs, particularly in Java (Hansen 1978). They were accompanied by a food price–control mechanism via the Food Logistics Agency (BULOG) (Arifin 1993; Thorbecke and van der Pluijm 1993).

9. Neoliberalization describes the rise of neoliberal ideology but pays attention to its heterogeneity and open-endedness, as opposed to the “teleological reading of neoliberalism” (Peck and Tickell 2002, 400).

10. See Avakian and Haber (2005) for a summary of works on women and gender, mainly in anthropology, history, and cultural studies. For pioneering gender work in rural sociology and geography, see Sachs (1983; 1996) and Whatmore (1990), among others.

11. According to the UN’s Food and Agriculture Organization (FAO), on average, 43% of the agricultural labor force of developing countries is female. The female share of the agricultural labor force varies widely from 20% in Latin America to almost 50% in East Asia, Southeast Asia, and sub-Saharan Africa (FAO 2011, 7).

12. Note the peculiarity of the pattern of women’s incorporation into the global food production system. An increasing number of women work as hired laborers, but women are less likely than men to own land and livestock (FAO 2011). For more on the feminization of agriculture, see Barndt (2002), Barrientos (1997), Carr, Chen, and Tate (2000), and Raynolds (1998).

13. More problems arise from the fact that many of the new types of export crops—such as vegetables—are traditionally considered “women’s crops” in many parts of the world. New export crops often mean that women’s plots are put under the control of men (Carney 1994; Dolan 2001). For more discussion on the gendered nature of contract farming, see Dolan (2001), Raynolds (2002), and Carney (1994).

14. The works in this area are too many to provide a comprehensive list, but classics include Amartya Sen’s *Poverty and Famines: An Essay on Entitlement and Deprivation* (1981), Alex de Waal’s *Famine That Kills: Darfur, Sudan* ([1989] 2005), Mary Howard and Ann Millard’s *Hunger and Shame: Child Malnutrition and Poverty on Mount Kilimanjaro* (1997), and many World Watch Institute works on food issues such as *Underfed and Overfed: The Global Epidemic of Malnutrition* (Gardner and Halweil 2000).

15. For instance, the late-nineteenth-century food reform movement in the United States attracted middle-class women who later became active in local schools and charity organizations. “Domestic science” gave women from a privileged background the opportunity to gain higher education and a respectable career (Shapiro 2009). World War II’s food programs elevated women’s status by praising their patriotic contribution to the war effort (Bentley 1998). More recently, alternative agrofood movements that aim to create a more sustainable food system have attracted women activists (Allen 2004; Allen and Sachs 2007; DeLind and Ferguson 1999). Women are also overrepresented in contemporary food education movements, and some women are able to gain access to public policymaking as experts on food education and food literacy (Kimura 2011).

16. Laura Shapiro, in her historical analysis of the cooking school movement, provides various examples of irony in the food reform movement. For instance, she quotes a newspaper column that said of then-increasing labor protests and strikes: “Many of the so-called strikers would strike no matter how much work they had on hand” and “They are illy fed. Not from lack of money, but from lack of knowledge. Poor things, how are they to find out the best food to sustain their needs? . . . I verily believe if the rigid instructions for food and feeding were implanted in the minds of our girls during their early school days, the labor element would not be such discontented individuals” (2009, 131).

17. For instance, in Indonesia, the New Order government of Suharto, which replaced the Sukarno government in the 1965 coup, wholeheartedly embraced the paradigm of “overpopulation.” The government set up the Family Planning Institute (Lembaga Keluarga Berencana Nasional) in 1968, which in two years became the National Family Planning Coordinating Board (BKKBN). The BKKBN was very powerful, being operated directly under the president’s supervision (Achmad 1999), and well funded, and it amassed a large workforce (Achmad 1999; Caldwell and Caldwell 1986). Contraceptive devices and pills were well stocked by the central government. The BKKBN also had an extensive network at the village level, employing many Family Planning Field Workers (Petugas Lapangan Keluarga Berencana) in local municipalities. These Family Planning Field Workers were the arms of the government, vigorously promoting contraceptive use, sometimes in a coercive manner (Achmad 1999; Hull and Hull 2005; Newland 2001).

18. During the Green Revolution, increase in agricultural yield through modern technologies was seen as a critical ingredient for national development by many Third World leaders. Cullather (2004) argues that “developmental populists couched the goal of self-sufficiency of food in nationalist terms, as an attribute of a progressive, independent nation” (246), pointing out that two slogans of Ferdinand Marcos in the Philippines were “Rice, Roads, and Schools” and “Progress Is a Grain of Rice,” while one of Dudley Senanayake’s in Ceylon was “Grow More Food.” The Green Revolution’s “miracle grains,” he argues, became “a living symbol of abundance, an apparition capable of inducing mass conversions to modernity” (228).

19. Within agrofood studies, one can find excellent analyses of the political economy of the agrofood system, particularly its globalization, in works such as Bonanno et al. (1994), Friedmann (1991), and Magdoff, Foster, and Buttel (2000). For gender analysis of globalized food, see J. Collins (1993; 1995) and Barndt (2002). Many works have analyzed the cultural and social history of food through commodity case studies, including Pilcher (1998) on corn, Grossman (1998) on bananas, DuPuis (2002) on milk, and Dixon (2002) on chicken. Agrofood studies have also documented and encouraged recent social mobilizations that problematize the status quo of policies and structures of modern food. Some conceptual developments influential in food movements include Kloppenborg and Lezberg’s (1996) call for localizing the “foodshed,” Lang and Heasman’s (2004) and Lang’s (1999) call for “food democracy,” and Lyson’s (2004) call for “civic agriculture.” Critical analyses of food movements include Allen (2004) and Hinrichs and Lyson (2008).

20. In an approach pioneered by Friedmann (1982; 1987), Friedmann and McMichael (1989) theorized two distinct food regimes. In the first food regime (1870–1914), the New World supplied cheap food to Europe, which lowered wage costs and supported extensive capital accumulation. The second food regime (1947–73), formed under US hegemony, constituted a livestock complex and a wheat complex. Bringing together insights from regulation theory and world systems theory, food regime analysis pays particular attention to international food complexes and how they are linked with key changes in the state systems. It points out symbiotic relationships between capitalism and particular configurations of food relations. For elaborations and extensions of these authors’ work, see the 2009 special issue of the journal *Agriculture and Human Values* (Campbell and Dixon 2009).

21. Instead of direct income support, the US government opted for price supports for agricultural commodities, which meant that it needed to control imports and subsidized exports. Food aid was a key mechanism of subsidized exports that did not lower world market prices (Friedmann 1993, 33).

22. Since the early 1950s, world wheat exports have increased 2.5 times; the US share has increased substantially (Friedmann 1982).

23. Chapter 5 examines how this happened in Indonesia. Another example of the profound impact of US wheat is in Japan, where the United States encouraged consumption of wheat through numerous trade missions and school lunch programs. As a result, Japan “became the largest of the new wheat importing countries after World War II” (Friedmann 1982, 43).

24. For instance, Pritchard (2009, 299) points out how, during the first food regime, India exported grains but in the 1960s became dependent on US grain imports, absorbing up to 25% of the annual US wheat crop in some years in the 1970s. However, the Green Revolution reduced the necessary imports, and by the 1990s, India became a net exporter of grains.

25. For instance, Indonesia’s BIMAS program for rice intensification used foreign companies such as the Swiss chemical company, Ciba, the German chemical company, Hoechst, and the Japanese trading company, Mitsubishi, to distribute agricultural inputs. Crouch (2007) argues that the BIMAS “led to a substantial increase in rice production through the introduction of new seed varieties, but it was also very profitable for companies involved which were guaranteed payment by the government” (290).

26. McMichael (2005) argues that this privatization of security under the globalization project is profoundly different from socialization of security under the development projects.

27. The WTO’s Agreement on Agriculture was negotiated in the 1986–94 Uruguay Round. It aimed to improve market access and reduce trade-distorting subsidies in agriculture.

28. The WTO required all states to allow imports of at least 5% of domestic consumption (McMichael 2005, 277).

29. I put “cheap” in quotation marks because they are often artificially cheap. According to the Institute for Agriculture and Trade Policy, in 2003 US wheat was exported at an average price of 28% below the cost of production, corn at 10% below, and rice at 26% below (Hansen-Kuhn 2011).

30. Describing global agricultural trade, McMichael (2005) points out that the political function of the notion of privatized food insecurity was to add further justification for pressing markets in the global South to open up to products from the global North. The neoliberal mantra of the free market obfuscates the reality of the political determination of the market. The hypocrisy of the “free trade” regime is that powerful countries, notably the United States and the EU countries, continue to subsidize their agriculture, whose artificially cheap produce floods developing markets. The notion that trade can reduce food insecurity has helped to justify opening up states in the global South, while the states of the global North have managed to keep their subsidies thanks to their political and economic advantages (Rosset 2006).

31. For excellent discussions of biopower and modern science, see Dan-Cohen and Rabinow (2006), Kay (2000), and Petryna (2002). Scholars have also used the concept productively in relation to the developing countries; see Escobar (1995), Peluso and Vandergeest (2001), Agrawal (2005), Goldman (2001), Gupta (1998), Shivaramakrishnan (2003), and Anderson (2002).

32. Examples of such interventions abound in history. For instance, the bodily conduct of local subjects in matters of hygiene and nutrition has provided humanistic justification for continuing the civilizing mission of colonial power (Anderson 2002; Arnold 1993). Scholars analyzing contemporary international development projects similarly have found that the representation of the “problems” of Third World peasants, women, or the environment have helped justify additional development projects (Escobar 1995), enabling those from the developed North to portray themselves as educated, modern, enlightened, and

benevolent (Mohanty 1991). Identifying “problems” has never been innocent of political consequence.

33. A good example of the difficulty of defining critical human needs is the failed attempt by international development experts to define and standardize “basic human needs.” Starting in the 1960s, international development organizations such as the International Labor Organization (ILO) and the FAO tried to define “basic human needs.” Yet the endeavor, in spite of much excitement and investment, was ultimately not successful. It was reduced to either “specify what commodities fulfill basic needs and so run the risk of introducing culturally unsuitable goods” or “provide abstract definitions that are virtually unusable” (Douglas et al. 1998, 213). As Mary Clark put it, “the abstract word, ‘needs,’ is never clearcut” (quoted at 206).

34. Feminist scholars have pointed to the politics of expertise in defining human needs. In her analysis of the welfare state, Nancy Fraser (1989) examines the construction of women’s “needs” according to the specific logic of a managerial bureaucracy. With the notion of “politics of needs interpretation,” she highlights the ways in which potentially political “needs” are depoliticized and subsequently naturalized. The politics of needs is also a subject of Haney’s (2002) analysis of Hungary’s welfare system.

35. The assumption that food governance is best left to “experts” also relates to a broader cultural understanding of a lay-expert divide that sees laypeople as incapable of understanding technical issues (see, e.g., Brooks and Johnson 1991; Perhac 1996). Many theoretical and empirical studies show how this might not be the case. The involvement of laypeople in a formerly expert-only space has grown in research on HIV/AIDS (Epstein 2000), breast cancer (Brown et al. 2006), and environmental pollution (Brown and Ferguson 1995). There have also been experiments to establish a forum to bring lay citizens into policy debates of a highly technical nature. Citizen involvement in the deliberation of technoscientific matters in the forms of “citizen jury,” “science café,” and “consensus conference” have been tried in many areas from biotechnology and telecommunications to nanotechnology (Powell and Kleinman 2008; Rowe and Frewer 2005; Sclove 2000).

36. The decline in public international agricultural research has been accompanied by the expansion of private sector research. Since the 1990s, for instance, private breeding programs have superseded public breeding programs and 38% of agricultural biotechnology patents are held by five private corporations (Byerlee and Dubin 2009). Nestle (2002) also documents how industry interests shape the direction and agenda of nutrition research.

37. Additionally, Brooks (2011) notes how the new cohort of private charity organizations such as the Bill and Melinda Gates Foundation emphasizes science-based solutions and “break-through science.” This suggests the implications of scientized framing of food insecurity and the lure of technical fixes.

38. The earlier productivist policies of the Green Revolution also scientized food insecurity. Gupta (1998) observes that the Green Revolution was envisioned as “the application of ‘scientific methods’ and a top-down, production-based strategy” (53) and that it operated with the assumption “that scientific work inherently results in the greater social good” (56).

39. The Bill and Melinda Gates Foundation committed a total of \$14.7 billion to global health and \$1.8 billion to agricultural development between 1994 and 2011. The largest agriculture-related grants by the Gates Foundation were all started after 2006. It committed \$100 million to the Alliance for a Green Revolution in Africa in 2006, \$45 million to HarvestPlus II for biofortification in 2008, \$33.3 million to the International Maize and Wheat Improvement Center’s project on drought-tolerant maize for Africa in 2006, and \$39.1 million to the African Agricultural Technology Foundation’s project on water-efficient maize in 2008 (Bill and Melinda Gates Foundation 2011).

40. For instance, the WFP is still pushing fortified food, and CGIAR in 2008 identified biofortification as one of the “best bets” worthy of “scaling up” (Brooks 2011).

41. The demand for biofuel has increased since 2003 and consumed 25% of US crops in 2007. High oil prices are a factor, not only because they affect fertilizer prices but also because they make biofuel prices competitive. Poor harvests of US and Australian wheat were also a potential contributing factor. In addition, important rice-exporting countries such as Vietnam and India banned the export of rice in 2007–8. China’s and India’s increasing appetites, especially for meat, are also thought to be a factor, although the increase in demand has been steady. What’s more, China and India are importing less wheat than in the 1990s, and India is generally a net exporter of rice (Headey and Fan 2008).

42. While various governments have also declared renewed commitment to agriculture, they tend to view the role of the public sector as laying the basis for the private sector. For instance, the African Union urged its member countries to increase public investment in agriculture by a minimum of 10% of national budgets to increase agricultural productivity by at least 6% in the Comprehensive Africa Agriculture Development Programme in 2003, and this was followed by the Abuja Declaration at the Africa Fertilizer Summit (Miltz 2011). These government activities are also accompanied by a belief in the power of the private sector, as evinced by a report from the Fertilizer Summit that says that “the underlying thesis was that an enabling environment must be created for the identification of actionable programs that, if implemented, will result in the establishment of private sector-led fertilizer markets to achieve the African Green Revolution” (Wanzala and Roy 2007, 2).

43. Miltz (2011) discusses how subsistence farmers are often forced to convert to monocropping and intensive use of agrochemicals and cites a farmer who said that “the authorities wanted us to become commercial seed growers, but the women of the cooperatives wanted to keep growing sweet potatoes, cabbage, and other vegetables in the marshes. They wouldn’t back down and the authorities wound up sending in the army to pull up our crops.”

44. A 2008 article in the journal *Foreign Affairs*, entitled “The Politics of Hunger: How Illusion and Greed Fan the Food Crisis,” by an Oxford University economics professor is another example of the four shared characteristics of nutritionist and productivist discourses. In his polemical analysis of the crisis, Paul Collier condemns the “middle- and upper-class love affair with peasant agriculture” (71) and “romantic hostility to scientific and commercial agriculture” (73) for the making and exacerbation of the crisis. He argues for the increase in production of food as the key solution, saying that “the world needs more commercial agriculture” and “the world needs more science” (68). Specifically, he argues that in order “to counter the effects of Africa’s rising population and deteriorating climate, African agriculture needs a biological revolution” (76). In his view, peasants “are ill suited to modern agricultural production” (71) and are incapable of innovation and entrepreneurship. Arguing that “peasants, like pandas, show little inclination to reproduce themselves” (70), he embodied the view that the problem lies in the lack of science and modern technologies and that the solutions would come from politicians, scientists, and the private sector, not from the urban/rural poor themselves.

45. A growing number of scholars have noticed that “quality” has become a central organizing principle in contemporary food systems. While governments are increasingly hesitant to impose standards, given their WTO commitments, private corporations, especially retailers, are imposing their own standards (Busch 2011; Friedmann 2005). Social movement-inspired standards such as organic, fair trade, and animal welfare labels have also proliferated. Several studies have pointed out that demands for higher quality often get appropriated as private standards, expanding corporate control and increasing profit margins (see, e.g., Guthman 2007; Kimura 2010; Mutersbaugh 2005). I point out a

different yet related politics of food quality and how it intersects with changing notions of food insecurity. Friedmann noted that, with the growing power of private standards regulating global sourcing of food, two types of food are provided by corporations: rich consumers get “fresh, relatively unprocessed and low chemical input products” assured by privatized quality assurance systems whereas poor consumers get cheap, standard commodities (2005, 258). On the surface, the quality turn might seem to contradict such an analysis, given that the majority of people in the developing world fall into the latter category. However, by framing food insecurity in strictly micronutritional terms, cheap standard commodities can be framed as quality products as long as they have added micronutrients. The attention to “quality” often has functioned to justify the use and benefits of biotechnology and “durable food” in the developing world.

46. Plumpy’nut is a French patented fortified peanut paste that has been used by UNICEF and other aid organizations to address acute malnutrition. The *New York Times* (Rice 2010) reported that its American manufacturer wanted to expand the market base by using it to prevent malnutrition. GSK sells health drink and fortified instant noodle under the Horlicks brand.

2. CHARISMATIC NUTRIENTS

1. Of course, vitamin A is a type of micronutrient. I consider vitamin A here as a separate charismatic nutrient, since it was not until the 1990s that the overarching concept of “micronutrients” became a focus of concern.

2. Medical anthropologists have used the term “charismatic authority” to describe non-Western healing in contrast to the “rational” authority of Western medicine (see, e.g., MacCormack 1981; 1986). My intention here is to flip this argument over and direct a similar gaze at Western medicine.

3. McLester continued to link superior physique with protein intake in the 1949 edition of the book, arguing that “the development of races as well as that of individuals may be influenced by the liberality of the intake of protein” (60).

4. For instance, Waterlow later reported on the same disease but refused to call it kwashiorkor. Instead, he called it “fatty liver disease” (Ruxin 1996, 67).

5. They identified fish, soybeans, peanuts, sesame, cottonseed, and coconut as the ideal candidates.

6. Pretorius and Smith (1968) found that when children with kwashiorkor were fed diets with relatively low protein but high energy content, they showed healthy recovery. In 1975 Philip Payne found that any diet with a density of protein greater than about 10% would be sufficient for nutrition and that most staple grains meet this criterion (cited in Solomons 1999, 154).

7. Partly because of frustration with protein’s ineffectiveness, international organizations started to look for alternative health programs. For instance, UNICEF decided to focus on growth monitoring, oral rehydration therapy, breast-feeding, and immunization to improve child survival. This was decided at the 1977 Alma Ata meeting and called the GOBI initiative. Lindsay Allen (2003) argues that the central impetus for these activities was the growing concern that little progress was being made in addressing protein deficiency.

8. Their difficult balancing act is also reflected in the following statement by the FAO/WHO, which was at pains to assert the legitimacy of the existing protein paradigm while recognizing the need for modification: “As the widespread use of the term marasmic kwashiorkor suggests, kwashiorkor may be superimposed on any degree of marasmus... the attention of these investigators and of those responsible for preventive and corrective programmes should be directed, without decreasing the interest in kwashiorkor, to all aspects of the problem of protein-calorie-deficiency disease” (quoted in Carpenter 1994, 182).

9. Indeed, one might say that the story of protein is a story of women made invisible. It was a woman whose kwashiorkor research was long marginalized. Later, many protein projects implicitly took women as only a means to an end.

10. According to Reddy (2002), USAID established the International Vitamin A Board in 1973, and USAID and WHO held a joint meeting in Jakarta that led to the establishment of IVACG in 1975. IVACG included not only academic researchers but also policy-makers and development practitioners. IVACG holds regular meetings to discuss vitamin A issues that emerge both in academia and the practical policy arena.

11. The interview with Sommer took place in Baltimore on September 7, 2004. A meta-analysis of replicate studies confirmed the Aceh study's claim, finding on average a 23% reduction in mortality in children (Beaton et al. 1992).

12. By the 1960s, vitamin A's role in the prevention of xerophthalmia was known thanks to several studies (see, e.g., Oomen, McLaren, and Escapini 1964). WHO conducted the first global survey of xerophthalmia in the early 1960s.

13. Interview with Alfred Sommer, September 7, 2004.

14. However, it should be noted that the breast milk of the poor Indian mothers they studied had lower levels of vitamins.

15. It is instructive to note what the decoupling of this dyad does to women. In addition to the neglect of "non-reproducing" postmenopausal women's issues, another stark example is provided by Kilaru et al. (2004) in their analysis of Indian policy on reproductive health. They point out that the attention to children's health led the government to focus exclusively on medical risks during pregnancy and at childbirth, while postpartum risks were not sufficiently acknowledged. And this, despite maternal death being more common during the postpartum period than in the prenatal period or childbirth itself. Once separated from the child women's medical and policy value diminishes.

16. Historian Ann Stoler (2002) points out the particularly complicated history of native women's motherhood that was tangled up in colonial anxiety about racial purity and sexuality.

17. Home economists in the United States in the early twentieth century were predominantly (white, middle-class) women. Many of them entered the field because they could not enter other natural science fields (Levine 2008, 19).

18. The concept of a "boundary object" highlights the importance in scientific work of materials or objects that facilitate linking of researchers by serving as a focus of attention and forming a basis of shared identity (Star and Griesemer 1999). Joan Fujimura (1992) has proposed another useful concept, that of a "standardized package" of technologies, which enables researchers to construct a relatively stable object of research and standardized methods of investigation.

3. SOLVING HIDDEN HUNGER WITH FORTIFIED FOOD

1. Biofortification is a new addition to this list of "solutions."

2. Of course, economization of nutrition and health is not limited to the practice of international development. For an example of economization of health policies in developed countries, see Sjögren and Helgesson 2007.

3. The 1991 "Ending Hidden Hunger" conference specifically addressed micronutrient deficiencies and ways to combat them. At the 1992 International Conference on Nutrition, representatives from 159 countries reaffirmed the goals of the 1990 World Summit for Children.

4. The Program Against Micronutrient Malnutrition is coordinated by the faculty at the Rollins School of Public Health of Emory University, the Centers for Disease Control and Prevention (CDC), and program officers at the Task Force for Child Survival and Development. PAMM's network also extends to the International Agricultural Center and

the Department of Human Nutrition of Wageningen Agricultural University in the Netherlands (OMNI n.d.).

5. PubMed is a database of the National Library of Medicine, which includes over 14 million citations for biomedical articles back to the 1950s. The URL is <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>.

6. Initially, corn-soy milk from the World Food Programme and USAID was distributed to children. But international donors decided to look for fortified products and worked with the government to identify locally made baby food products. They chose an Indonesia-based food conglomerate, Indofood. Indofood is one of the largest food manufacturers in Asia and produces a variety of food products, most notably, instant noodles. Indofood already had a popular product, SUN baby food, that was fortified with micro-nutrients. In April 1998, the phase 1 distribution of SUN started as a national emergency nutrition intervention. To promote its acceptance, the government and donors conducted a social awareness campaign with the slogan “Save young children from being a lost generation.” “The lost generation” became a popular phrase to talk about the impact of “hidden hunger” in the country. The SUN emergency distribution originally targeted select areas considered most affected by the crisis: slum areas near four cities where many factories were closed down and many women workers were suddenly unemployed. Subsequently, UNICEF campaigned among its donors to expand the project to other areas, and major donors such as Australia, Norway, the UK, and Canada agreed to fund it.

7. Vitadele was also produced by Indofood.

8. Interview with WFP staff in Jakarta, October 2004.

9. Interview with Mercy Corp, Indonesia country director, December 2004.

10. Through International Relief and Development, the USDA donated rice, soy, and soy flour, which local contracted factories made into these various products.

11. Interview with staff at Helen Keller International, Indonesia, November 2004.

12. It has fourteen vitamins and minerals, providing one-eighth of the recommended daily allowance (RDA) for children under five years old.

13. See the Grameen Group website, www.grameen-info.org.

14. It is interesting that a fortification program in a given country often starts without a complete set of data so that it can ascertain whether the program improves the nutritional status of a target population as intended. A powerful discourse that has rationalized fortification involves the notion of “mimicry” of the West. Akhil Gupta has argued that the broader notion of “Third World development” maps developing nations as juniors in relation to the West, with the key to overcoming such junior status being to mimic their senior by learning to “follow, replicate, repeat, improve” (1998, 40). The call to follow the West’s example has figured powerfully in the global debates on fortification, and its proponents have drawn on fortification experiences of developed countries. For instance, the World Bank’s *Enriching Lives* (1994) promoted fortification by basing its recommendation on the *assumed efficacy* of fortification in the developed nations. This kind of reasoning was most clear in a section titled “How Fortification Won in the West” that emphasized the effectiveness of fortified flour in decreasing anemia in the United States and vitamin D-fortified margarine in eradicating rickets in Britain (World Bank 1994). It further proclaimed that “indeed, fortification...has eradicated most vitamin and mineral deficiencies in the industrial countries” (27). Such a line of logic is not limited to the World Bank. UNICEF also promoted fortification by claiming that “fortification of an appropriate vehicle with specific nutrients has been practiced in numerous industrialized countries for many years with considerable success” (Darnton-Hill et al. 1999, 26). Evident in these statements is the assumption that developing nations are temporarily inferior to the West and that “however the paths or strategies to achieve development are described, the means to that end is assumed to be mimicry” (Gupta 1998, 40).

15. Actual impact of SAPs is highly contended. For instance, a 1998 study by the World Bank on health expenditure found little negative impacts from the SAP projects (Ruger 2005).

16. The 1984 figure is from Fair (2008). In 2007, the health and social service sector (\$2.8 billion) constituted about 11% of total World Bank lending (\$24.7 billion). Other large sectors included law, justice, and public administration (22%); transportation (20%); and water, sanitation, and flood protection (12%) (World Bank 2008a).

17. The economization of nutrition was not limited to the World Bank in the 1990s. Nutritional experts have tried various arguments to try to get attention from funding agencies and governments. Casting malnutrition in terms of the economic losses it causes is one of the arguments that some international organizations have tinkered with. For instance, in the 1960s, the FAO made a similar argument when it tried to recast malnutrition as the cause of worker lethargy and loss of productivity (1962). The Protein Advisory Group also experimented with such economic language when in 1965 it said, “The maimed survivors become adults lacking the vigor and enterprise essential for productive advancement. Their shortened life span and decreased ability to produce gravely impede the physical, mental and economic growth of the population” (quoted in Ruxin 1996, 179). Yet, since the 1990s, the economization of nutrition has been promoted by powerful actors who exert tremendous financial and epistemological influence in the sphere of international development.

18. It should be noted that in 2008 major grain-trading companies saw record profits at a time when the poor suffered from high food prices. The *Wall Street Journal*, in an article titled “Grain Companies’ Profits Soar as Global Food Crisis Mounts,” reported that Archer-Daniels-Midland’s profits jumped 42% and Cargill’s 86% (Kesmodel, Etter, and Patrick 2008).

19. It is telling that World Bank president Robert Zoellick continued to promote the market as the solution for the food crisis even during the 2008 financial crisis. He stated that global trade was the “key to lower food prices” and thus was contributing to, rather than destabilizing, food security (World Bank 2008b).

20. This study, published in the *American Journal of Clinical Nutrition*, followed thirty-three Indonesian women who were instructed to take iron tablets every day for two months. They matched the results of tests on the women’s stool samples and the women’s claims to have taken all the pills and found that “although 64% of the women claimed to have taken all iron tablets, the actual percentage of women who took all tablets is most probably much lower” (Schultink et al. 1996, 137).

21. The concept of gender mainstreaming was officially adopted at the Fourth World Conference on Women in Beijing in 1995, which committed UN organizations to systematically incorporate a gender perspective into policymaking. It is now the official policy of the UN, and many governments have adopted the concept. For discussion of the role of transnational networks in promulgating the concept worldwide, see True and Mintrom 2001. Gender mainstreaming should be located in a longer history of struggles to get the international development community to pay attention to women. The 1970s concept of “women in development,” or WID, was a response to criticism for neglecting the role of women in development. Although initially welcomed as an improvement over the previous neglect of women’s role in development, scholars have criticized WID for understanding “women” as a generic category devoid of history and culture. WID was also criticized for offering a restrictive understanding of the transformative capacity of women, as women were considered victims of men. An alternative framework, “gender and development,” has been proposed to discuss the social construction of gender and the interconnections of gender, class, and race (Parpart, Connelly, and Barriteau 2000).

22. One of the problematic implications of Brown’s contention is that the rejection of such identities might make social activism less effective. Whether “identity politics” is

necessary or desirable has been contested fiercely by feminist scholars (Scott 1996; Fraser 1997; Young 2000; Butler 2000; Pratt 2004), as there is a recognition that identity-based claims (“we women”) could generate “subversive energy” for feminist organizing (Pratt 2004, 71) while still risking universalizing a subcategory of the group (such as white, middle class, or heterosexual). The problem of biological victimhood goes further, in that its claiming is not made by women but imposed by scientific and technocratic experts.

23. In her analysis of international health politics, Beall (1997) notes similar dynamics when women, particularly mothers, are identified as the strategic point for health interventions that aim to improve key health statistics such as maternal mortality rates and infant mortality rates. But, she writes, “the result has been the use of women as development solutions, to increase the effectiveness of development interventions, rather than to accord them any agency” (82).

4. BOUND BY THE GLOBAL AND NATIONAL: INDONESIA’S CHANGING FOOD POLICIES

1. PAMM is a project of the Rollins School of Public Health at Emory University, the US Centers for Disease Control and Prevention, and the Task Force for Child Survival and Development.

2. Micronutrient programs had existed before the 1990s. Indonesia’s first major policy regarding a micronutrient was vitamin A capsule distribution, started with Helen Keller International’s distribution of vitamin A capsules to children under five in Java (Pollard and Favin 1997). The government made it a national program in 1974. In the same year, the government started to distribute iron tablets to pregnant women in order to combat iron deficiency anemia (Hartini et al. 2003). In addition, in order to tackle iodine deficiency disorder, the government started lipiodol injections of school children and newly married women in highly endemic areas. However, the implementation of these micronutrient-related programs was at best uneven. For example, even the vitamin A program, which was considered the most successful among these, reached less than half of the target population in 1986 (Pollard and Favin 1997). Moreover, these nutrition programs were dwarfed by expenditures on population and agriculture programs that tried to decrease the rate of population growth and increase agricultural production. The all-powerful population control machinery gradually seeped into what was technically a nutrition program. For instance, the Family Nutrition Improvement Program (Usaha Perbaikan Gizi Keluarga or UPGK) eventually came under the control of the powerful National Family Planning Coordinating Board, with many projects shifting from nutrition to contraceptive acceptance (Pandi 1987; Achmad 1999; Rohde 1993). So, while micronutrients programs did exist in the pre-1990 period, it was only in the 1990s that they started to command a growing presence in how food insecurity was framed in Indonesia.

3. Repelita is an acronym for Rencana Pembangunan Lima Tahun (Five-Year Development Plan) and a pun on *pelita* (lamp, or light).

4. This phenomenon is not limited to Indonesia. Kiess et al. (2000) summarize the general situation: “Traditionally, surveillance systems have relied on anthropometric indices of children to monitor health and nutrition ... there is little experience in incorporating indicators of micronutrient status, such as anemia and vitamin A deficiency, into surveillance systems and interpreting the trends and patterns of such indicators” (230).

5. Interview with a former BAPPENAS staff member, November 2004.

6. Interview with a staff member at the Ministry of Health, April 2005.

7. The KFI was established with Soekirman (formerly with the government’s BAPPENAS), Suroso Natakusuma (formerly with government agencies BULOG and the Office of State Minister of Food Affairs), and Thomas Darmawan from the food industry as founders. It also includes industry members such as the CEO of Bogasari Flour Mill and the CEO of Kimia Farma.

8. Some Indonesians have only one name and others have a first and last name.

9. Repelita VI (1994–99) states: “Greater attention will be paid to efforts to overcome the problem of IDD, remembering its negative impact on children’s intellect and psychology. For that purpose, the addition of iodine to salt [salt iodization] for consumption will be conducted” (Repelita VI, 188) (Government of Indonesia 1993).

10. In addition, as we saw in chapter 3, fortification was portrayed as a perfect example of private–public partnership, the use of the market approach, and a cost–benefit–efficient public policy. The noted nutritional expert Soekirman echoed this widely circulated discourse by insisting that the “food industry community has to be the pioneer and the primary actor” for fortification, and he urged the industry to become aware that fortification would provide additional income (Soekirman 1998, 913). With fortification, the solution to the micronutrient problem could be offered through the market rather than the state, and this was good for national development.

11. Puslitbang Gizi was first established by the colonial Dutch government as the Institute of Nutrition Research in 1934. It conducted nutrition research, surveys, and education, as well as advising the government (Soekirman et al. 2003). After independence, the institute was renamed Lembaga Makanan Rakyat (LMR) under the leadership of Poorwo Soedarmo, the father of nutritional science in Indonesia. In 1967, it was split into two bodies—one became the policymaking body (the current Directorate of Community Nutrition in the Ministry of Health), and the other became the research body, initially directly under the Directorate of Community Nutrition as Balai Penelitian Gizi and in 1975 renamed Puslitbang Gizi and with a higher bureaucratic status. Many prominent nutritional scientists have been affiliated with Puslitbang Gizi. For instance, Muhilal and Darwin Karyadi, who both have served as its head (Karyadi: 1975–93; Muhilal: 1994–99), are prominent nutritional scientists whose works have appeared in leading Western academic nutrition journals.

12. Interview with a staff member at the Food and Nutrition Research and Development Center, August 2005.

13. Interview with a staff member at Bogor Agricultural University, July 2005.

14. decree is No. 202/BM/DJ/BGM/II/1996 Tanggal 13 Februari 1996 tentang Penanggulangan Anemia Gizi bagi Pekerja Wanita (Direktorat Bina Gizi Masyarakat 1996).

15. Spar (1996) reports that in 1995 shoe and textile industries opposed the increase in the Indonesian minimum wage, saying that it would force them to move their business outside the country (35).

16. The Marsinah case galvanized labor activism. The mid-1990s saw an increase in labor protests, often led by women workers (Silvey 2003).

5. BUILDING A HEALTHY INDONESIA WITH FLOUR, MSG, AND INSTANT NOODLES

1. It reads “*Certificate of Appreciation*, Presented to *PT Sriboga Raturaya*, for being the *First* company in the world to *Fortify* its wheat flour with *Zinc* in addition to iron, thiamin, riboflavin and folic acid. The United Nations Children’s Fund (UNICEF) expresses its appreciation to the company for its concern for improved health and nutrition as part of this business mission and for taking on this noble initiative on a voluntary basis” (Woodhouse 1999).

2. Interview with a former Office of State Minister of Food Affairs official, December 2004.

3. There was a corporate partner called the Zurich Group that helped open the flour mill, but I could not obtain further information on this group.

4. Bogasari also became a subsidiary of Indofood in 1995.

5. According to APTINDO (2003), the final use of wheat flour in the country is as follows: wet noodle and small industries (32%), instant noodle (20%), bakery and cake

(20%), household (10%), biscuit and snacks (10%), and dry noodle (8%). Given the increase in wheat consumption in Indonesia, researchers have discussed “Westernization of diet” (Fabiosa 2006). Many now consume wheat-based products, particularly instant noodles.

6. According to the USDA PSD data, in 2010, Indonesia was the world’s third-largest wheat importing country, after Egypt and Brazil (USDA n.d.).

7. This effort was successful in 2003, raising the tariff back again from 0% to 5% by decree: Surat Keputusan Menteri Keuangan no. 127/KMK.01/2003 tanggal 10 April 2003 tentang Perubahan Tarif Bea Masuk atas Impor Tepung Gandum (Ministry of Trade and Industry 2003).

8. Interview with a former staff member at the Office of State Minister of Food Affairs, December 2004.

9. Interview with a staff member at the Ministry of Health, April 2005.

10. Kesehatan no. 962/Menkes/SK/VII/2003 tentang Fortifikasi Tepung Terigu. Before this regulation, there was another decree (SK no. 632/Menkes/SK/VI/1998 tentang Fortifikasi Tepung Terigu), but it did not require registration.

11. Of course, without mandates, the private sector has fortified the products with various vitamins and minerals since the 1950s (interview with a former employee of Indofood, December 2004).

12. Interview with a staff member at the Ministry of Health, April 2005.

13. Interview with a staff member at the Ministry of Health, April 2005.

14. Interview with a staff member at the Ministry of Health, April 2005.

15. Keputusan Menteri Negara Urusan Pangan no. Kep 14/M/08/1997 tentang pembentukan komisi fortifikasi pangan.

16. An interviewee in the Ministry of Health described the impact of this survey: “From the national survey, we found that we are facing not only macroprotein energy malnutrition, but also we find out that anemia is prevalent not only among pregnant mothers, but also for those under fives, as well as women of reproductive age. We see also deficiency of vitamin A not only among those under five, but also pregnant mothers and nursing mothers. In addition, I attended several international meetings, I see the global trend, that micronutrient intervention is very cheap, but very effective, if we implement in a proper manner. So it should be the national program” (April 2005).

17. There are some experts who are still advocating cooking oil fortification with vitamin A. They point out that even compared to sugar and wheat flour, more cooking oil is used by both rural and urban people. They further point out that the production of cooking oil and margarine are relatively concentrated (215 factories owned by 7 corporate groups), making it ideal for quality control. They also cite successes in other countries.

18. Interview with a member of the Indonesian Fortification Coalition, November 2004.

19. No. 632/MENKES/SK/VI/1998.

20. Interview with Muhilal, August 1, 2005.

21. The decree on SNI was No. 153/MPP/Kep 5/2001 no. 323/MPP/Kep/2001. The government issued several other decrees that facilitated the implementation such as Kepmen Menperdagangan no. 153, Kepmen Menperdagangan, no. 323/MPP/Kep/11/2001, and Kepmen Menperdagangan no. 59/Mpp/Kep/1/2002 Jan 31.

22. USAID purchased the premix worth \$850,000 from global chemical companies such as Roche and BASF. This initial premix only contained elementary iron.

23. Another science and technology studies scholar, Brian Wynne (2001), has similarly called for “critical self-reflexivity about the implicit limitations and contingencies of their own knowledge” in his criticism of scientific experts who tend to engage in “systematic patronization of the public as intellectually vacuous” (447).

6. SMART BABY FOOD: PARTICIPATING IN THE MARKET FROM THE CRADLE

1. To be specific, she fed the porridge to children less than six months old, which health authorities would consider a bad practice given the six-month exclusive breastfeeding rule.

2. Apple (1995) defines “scientific motherhood” as the idea that the practice of mothering ought to be based on scientific knowledge and guidance.

3. For instance, historians have found that scientific feeding and child rearing are linked tightly with the concept of modernity in the context of the West. See, for instance, Levenstein’s discussion of the development of formula milk and how it was touted by scientists as “modern, scientific, and American” (2003, 128).

4. I obtained copies of all past issues from 1979 until 2005 at the publisher’s Jakarta office. The initial plan was to sample three issues each year before 1989, but it turned out that older issues had very few advertisements for baby food (although many advertisements for books, medicines, and toiletries). Therefore, I analyzed all advertisements for baby food that appeared during the period 1979–89 to have a large enough sample. For a more recent analysis, I randomly selected three issues from 2005. All advertisements in these two groups (old and new) were translated and analyzed for significant concepts and themes. To be sure, there are some limitations to this methodology. *Ayahbunda*’s readership is very limited. Its price (currently Rp 17,500, approximately \$2 per issue) makes it unaffordable for most Indonesians. Interviews with mothers indicated that they saw advertisements on television rather than in magazines. Therefore, the analysis of television commercials would have given a more realistic assessment of the exact messages that are received by the majority of consumers. However, as sampling TV commercials, let alone historical samples, was logistically difficult, I decided to take samples of advertisements in this magazine throughout its history. There is no strong reason to believe that producers drastically change messages from magazines to television. I also confirmed with mothers during the interviews that what they saw in TV commercials was similar to what appeared in the magazine in terms of main messages. In addition, because I am comparing the advertisements in the same medium (magazine) across time, I could expect that any possible biases, if they exist, would work in similar ways over time. The objective of the content analysis is to illuminate historical changes in the corporate marketing strategy and whether it exists in Indonesia’s baby food industry, rather than to analyze class differentiation of marketing messages.

5. I use this word, “uncover,” with an awareness of much debate among feminist researchers. (See, e.g., Sprague 2005 and Escobar 1995 for critiques of a hegemonic undertaking to make women “visible” in international development.) I hoped that interviews would provide a small window through which we could begin to imagine alternatives to nutritionism.

6. All the interviews were conducted in Bahasa Indonesia. Interviewees were contacted in the following way: I asked the Jakarta city municipality’s health department to select four impoverished subdistricts. In each subdistrict, I relied on *kadres* (health volunteers) to select interviewees. Most of the women were stay-at-home mothers, although some of them occasionally sold homemade food on the street or from home. Informed by feminist research methods that key our attention to possible power relations between researcher and “subject” (Reinharz 1992), I was keenly aware of the social, economic, and cultural distance between myself (a Japanese academic) and my interviewees. Although I can never claim to have eliminated the power asymmetry between us, I tried to minimize it in various ways. First, I did not invite government officials to my interviews, although some officials strongly suggested that I should. Second, being aware of possible pressure from *kadres*, who tend to be older and somewhat better-off even though they were from the same neighborhood, I was able to ask the *kadres* to leave us alone. At the beginning of each interview, I also emphasized to the interviewee that the result of the interview

would not be reported to any authority, or to the *kadres*, and that I would not disclose her identity. With permission, I tape-recorded all interviews and later transcribed them. Most of the interviews were about one-hour long, and almost all of them took place at the interviewees' residences, or on streets in front of their houses. When other people were around, they sometimes joined the conversation.

7. It should be noted that once formula or solid food is introduced, it tends to decrease breast-milk production.

8. These are government-run community health posts and health centers that provide basic health services. The association with vitamins is likely to come from the fact that they serve as distribution points of vitamin A capsules.

9. Note the similar social function of fortified food products in the context of developed nations. One motivation for the food companies to market fortified food (or what is often called "functional food" in the advanced capitalist markets) is to defend themselves against growing criticism of the food industry for its neglect of the health impacts of its products, particularly for the rising rate of obesity (Heasman and Mellentin 2001). The industry strategy has been primarily to argue that "there is no bad food, there is only bad diet," pointing the finger at consumers' dietary choices rather than at their own unhealthful products (Oliver 2006). But with functional food, they can now proudly say that their products are "healthy." Such a strategy was clear in a new product from Coca-Cola (Diet Coke Plus), which was fortified and marketed as a "good source of vitamins." After a warning from the Food and Drug Administration, the company dropped the claim (Heavy 2008).

10. Peraturan menteri Kesehatan no. 240/menkes/Per/V/85 tentang pengganti air susu ibu dibidang peningkatan penggunaan air susu ibu di rumah sakit; revised in 1997 with Keputusan menteri kesehatan no. 237/Menkes/SK/IV/1997 tentang pemasaran pengganti air susu ibu.

11. Peraturan Pemenrintah Republik Indonesia no. 69/1999 tentang iklan dan lable.

12. For instance, interviewees talked about how clinic workers were given financial incentives by corporations to sell formula and baby food products.

13. In particular, see his discussion in the epilogue.

14. Hays (1996) points out that one of the central components of the ideology of "intensive mothering" is the need for expert-guidance. O'Reilly (2004) argues that "sacrificial motherhood" is characterized by the following themes: the need for care by the biological mother; the availability of the mother 24/7; the commitment of energy, financial resources, and time to the child; the prioritization of the child's needs before the mother's; and the need for expert instruction.

15. On the cultural construction of "good" versus "bad" mothers, see Chase and Rogers (2001), chap. 2.

16. It is also important to realize that some are considered "worthy mothers of the nation" while others are not. Patricia Hill Collins (1999) notes in the context of US policy that nation-states control mothers of different classes, races, and citizenship groups differently. It is the most marginalized who become the most visible and invite the most stringent forms of state control.

17. A similar case of class and racial stratification of the ability to comply with scientific guidance is documented by Litt (2000), who studied the impacts of medicalized motherhood in American minority communities.

18. Important books on the feminist debates on Foucault include Hartsock (1990), McNay (1992), Ramazanoglu (1993), Sawicki (1991), and Pratt (2004, chap. 2).

19. Lock and Kaufert (1998) similarly point out that women's response to medicalization is not a simple one of victimization but is characterized by pragmatism and ambivalence, as indicated by the title of their book, *Pragmatic Women and Body Politics*.

7. CREATING NEEDS FOR GOLDEN RICE

1. The top five solutions they chose included micronutrient supplements, combating malnutrition, the Doha development agenda, micronutrient fortification, and expanded immunization coverage. It is noteworthy that fortification was also chosen.

2. Beta-carotene is a precursor to vitamin A.

3. For instance, a search for the term “biofortification” in PubMed found the earliest entries were all after 2000 (Poletti, Gruissem, and Sautter 2004; Hossain et al. 2004; Timmer 2004; Bouis 2003; Bouis, Graham, and Welch 1999; King 2002).

4. Of course, criticism of the Green Revolution has much broader theoretical grounds. For instance, there has been significant epistemological criticism from ecofeminists such as Vandana Shiva (1988) and Shiva and Maria Mies (1993) that condemns the Green Revolution as an example of Western patriarchal violence.

5. There were some even earlier attempts. For example, a 1968 report by the Advisory Committee on the Application of Science and Technology to Development at the UN included the development of genetically improved plants as a potential tool to combat protein malnutrition (Carpenter 1994, 162).

6. For the Golden Rice research, the Swiss Federal Institute of Technology (1993–96) and the European Community Biotech Program (1996–99) provided funding along with the Rockefeller Foundation. Total research investment was \$2.4 million over nine years (Potrykus 2004).

7. This is the title of a book by the president of the Rockefeller Foundation, Gordon Conway (1998).

8. Alston, Dehmer, and Pardey (2006, 322) write, “By 1970, the four founding centers—IRRI, CIMMYT, IITA, and CIAT—were allocated a total of \$14.8 million annually. The progressive expansion of the number of centers, and the funding per center, during the next decade involved a 10 fold increase in nominal spending, to \$141 million in 1980. During the 1980s, spending continued to grow, more than doubling in nominal terms to reach \$305 million in 1990. The rate of growth had slowed but was still impressive. In the 1990s, however, although the number of centers grew—from 13 to 18 before contracting to the current 15—funding did not grow enough to maintain the level of spending per center, let alone sustain the growth rates.”

9. The Gates Foundation became the wealthiest charity organization when Warren Buffett gave it \$37 billion, increasing its endowment from \$29 billion to \$60 billion. According to Okie (2006), the foundation has committed more than 60% of its resources to health-related projects. In the mid-2000s, it started to increase funding for agriculture. For instance, the Alliance for a Green Revolution in Africa (AGRA) was started in 2006 (Toenniessen, Adesina, and DeVries 2008).

10. Total funding for HarvestPlus was \$100 million. While this may sound modest in scope, it is about a third of the annual funding of the entire CGIAR system.

11. For instance, the World Bank pledged to rectify its neglect of the agricultural sector in its World Development Report 2008, and the Gates Foundation has also started to emphasize agriculture.

12. Currently, there are five “significant” developing countries in terms of GM adoption: Argentina, China, South Africa, India, and Brazil. These five countries account for 89% of GM crop area in the global South (ISAAA 2010).

13. For instance, with Argentine soybeans, 3% of the producers are responsible for 70% of the production (Binimelis, Pengué, and Monterroso 2009).

14. The vast majority of India and China’s GM production is in Bt cotton. ISAAA (2012) reports that India had total of 10.6 million hectares in GMO production, of which 10.6 million hectares were in Bt cotton, while China had a total of 3.9 million hectares in GMO production, of which 3.9 million hectares were in Bt cotton, although there

seemed to be some plantings of GM papayas, tomatoes, and peppers. Brazil and Argentina are second and third in global soybean exports. (The United States is number one.) (Thoenes 2004).

15. The Network involves the International Rice Research Institute, the Philippines National Rice Research Institute (PhilRice), Vietnam Cuu Long Delta Rice Research Institute, India Department of Biotechnology, India Directorate of Rice Research, Indian Agricultural Research Institute, University of Delhi, Tamil Nadu Agricultural University, Patnagar University of Agricultural Sciences, Bangalore Chinsurah Rice Research Station, Bangladesh Rice Research Institute, China's Huazhong Agricultural University, Chinese Academy of Science, Yunnan Academy of Agricultural Sciences, and Indonesia Agency for Agricultural Research and Development (Golden Rice Humanitarian Board 2005).

16. Therefore, IRRI researchers have to find suitable varieties that are popular and successful in a particular environment to receive the new genes, such as BR 29 from Bangladesh, Immyeobaw in Burma, and Nang Hong Cho Dao and Mot Bui from Vietnam (Rice Today 2003). Golden Rice made from these *indica* rices has given disappointing results, however, with the carotene content at 1.05 mcg/g in the best line, lower than the original Golden Rice (1.6 mcg/g) (Datta et al. 2003).

17. In this survey, a variety of stakeholders—farmer leaders, business people, extension workers, and researchers—were asked whether they thought a particular biotechnology application is useful/risky/morally acceptable/to be encouraged. When asked what they thought about “use of modern biotechnology in the production of foods to make them more nutritious, taste better and keep longer,” consumers, businessmen, extension workers, and farm leaders tended to think it should be encouraged. The nutritional application of GMOs received more positive responses compared to other applications, such as “taking genes from plant species and transferring them into crop plants, to make them more resistant to pests and diseases,” “introducing human genes into bacteria to produce medicine or vaccines, for example, to produce insulin for diabetes,” “modifying genes of laboratory animals such as a mouse to study human diseases like cancer,” and “using genetic testing to detect and treat diseases we might have inherited from our parents.”

18. Examples of similarly politicized foods include meat in Chile (Orlove 1997) and potatoes and chicken in Jewish culture (Frank 1985).

19. Belasco also points out that women have been another type of “victim” to be saved by technological fixes (2006).

CONCLUSION

1. Furthermore, the public health promotion of fortified processed food can accelerate the problem if ordinary consumers have difficulty distinguishing “properly fortified” from regular food. In the context of a growing global social movement against junk food in developing countries, the claim of “healthy fortified processed food” could be seen as part of a public relations campaign by the global food industry. For an example of the emerging anti-junk food movement in developing countries, see Consumer International (2008).

2. Food sovereignty's conceptual orientation becomes clearer when we compare it with its predecessor, “food security,” as the food sovereignty concept was created as an explicit critique of the food security concept. “Food security” was defined at the World Food Summit (FAO 1996): “It exists when all people, at all times, have physical and economic access to safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.” Although they are ostensibly both responding to the same problematic of the Green Revolution, there are several major differences between these two concepts. First, while food security is concerned with macro, aggregated food availability typically calculated on the national level, food sovereignty focuses on individual access to

food, particularly by marginal groups. Second, given its focus on national food availability, food security tends to see international trade in food as useful and helpful, whereas food sovereignty criticizes neoliberal trade policies. Third, food security demands that policy focus on food access in general and the purchasing of food. Instead, food sovereignty concentrates on access to and control of productive resources (Windfuhr and Jonsén 2005). In the case of Indonesia, food sovereignty activists acknowledge the existence of malnutrition and undernutrition in the country, but identify problems of the food system beyond a narrowed focus on the nutrient makeup of food. They point out that “farmers are often defeated by the concept of food security which is only emphasizing food availability even though it has to be imported from foreign countries” (quoted in Winarto 2005, 2).

It is interesting to see how two very different concepts have been proposed to rectify the perceived difficulties. Both food security and food sovereignty can be considered as a response to the Green Revolution’s environmental, nutritional, and social externalities. But, as Foucault pointed out, a particular interpretation of a “problem” can invite different responses. Diagnosis and prescription are very different in food security and food sovereignty.

3. <http://www.poptel.org.uk/panap/latest/wfs3.htm>.