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THAILAND AND THE WORLD TOMATO: GLOBALIZATION, NEW AGRICULTURAL COUNTRIES (NACs) AND THE AGRARIAN QUESTION*

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The fact is that the food business is entering a period of unprecedented turmoil.

—*The Economist* (1993)

Thailand has figured centrally in the catastrophic economic events of the last several years. The widely recognized problems of the Thai banking sector in 1996 and 1997 triggered a devaluation of the Thai baht in July 1997, which was followed by currency crises in Indonesia, Malaysia, Philippines, Taiwan, Korea, Estonia, Russia and Brazil. What began as a southeast Asian crisis became a Great Asian Depression, the “Asian economic flu.” In spite of the devaluations and the financial problems, however, Thailand continued to run a current account surplus. While this surplus reflects import contraction more than export expansion, the reality is that exports have not altogether collapsed despite low commodity prices.

A part of the Thai growth machine, and a sector which remains a source of exports even during the crisis of the last two years, has been the agro-food sector. Thailand emerged not only as an erstwhile aspirant to the mantle of “a new NIC” (new industrial country), but also as an aggressive player in the new global agro-food economy, the “food business” as *The Economist* calls it. In this article we explore the genesis and character of the so called “new agricultural countries” (NACs), focusing on Thailand in particular and exploring some of the dimensions of both turmoil and growth in the agro-food economy. We begin with a brief overview of the rise and character of the NACs, turning then to the Thai case and its peculiarities and form. The second section explores the general question of how

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and in what senses are the NACs genuinely global in their agro-food sectors and what are the sorts of production and institutional relationships which characterize agro-food *filières* or commodity chains. These questions are then explored in detail using the case of hybrid tomato seeds and processing tomatoes in Thailand. We end this piece by drawing connections between our findings and Kautsky's "agrarian question" of a century ago.

HIGH VALUE AGRICULTURES AND NEW AGRICULTURAL COUNTRIES [NACs]: WHAT SORT OF NAC, THAILAND?

An assumption of research on transnational processes and agrarian-food orders is that the "old" or classical international division of labor within the agro-food system has been irretrievably altered in the last twenty-five years. Classical export commodities like coffee, tea, sugar, tobacco, and cocoa have been increasingly displaced by so-called "high value foods" (HVF) such as fruits and vegetables, poultry, seeds, dairy products and shellfish. During the 1980s, the aggregate value of world trade in cereals, sugar and tropical beverages declined, quite dramatically in some cases; conversely HVF grew by 8 percent per annum. In 1989 HVF represented 5 percent of world commodity trade, roughly equivalent to crude petroleum (Jaffee 1994). Developing economies currently account for over one-third by value of HVF production, roughly twice the value of Third World exports of coffee, tea, sugar, cotton, cocoa and tobacco. In 1990 there were 24 low and middle income countries which annually exported more than US\$500 million of HVFs, mostly located in Latin America and Asia. But four of these countries actually account for 40 percent of total HVF exports from developing states. These countries correspond to what Friedmann (1993, 1994) refers to as "new agricultural countries" (NACs), the agro-industrial counterparts of the NICs, who occupy a central location in what she calls the durable foods, fresh fruits and vegetables, and livestock/feed complexes. Archetypal examples of these new agro-food systems are Brazilian citrus, Mexican "non-traditionals" and "exotics," Argentinean soy, Kenyan off-season vegetables and Chinese shrimp (see Watts 1994a, Kimenye 1993, Jaffee 1994, Friedland 1994).

The debate over the rise of the NACs, parallel in some respects to the 1980s work on the Asian Tigers of Taiwan, Singapore, South Korea and Hong Kong, turns on the purported successes of commodities such as Mexican tomatoes, Central American exotics, Brazilian soy, Thai poultry and seed multiplication (see McMichael 1995). What is striking in all of these cases is: (i) the extent to which, in some cases, domestic consumption was key in a purportedly export-led strategy, (ii) the importance of local private, as much as foreign, capital, (iii) a high degree of concentration in export-oriented production, processing and marketing (Heffernan and Constance 1994), and (iv) the prominence of contract production and/or vertical integration in linking farm-level production and downstream processing and trade (Watts 1994a). Of course the emergence of high value agriculture is highly uneven, like "Third World" manufacturing itself, and the underbelly of new agricultural countries is agricultural marginality.

Thailand offers an intriguing case which has been put forth both as an example of a second or third generation NIC (Muscat 1994; Phongpaichit and Baker 1995; 143), and as a quintessential NAC (Burch 1996), or NAIC (new agro-industrializing

country; see Bello et al. 1998). For while Thai manufactured exports multiplied an astounding twelve times between 1985 and 1996, Thailand had earlier achieved a preeminent position as the world's number one rice exporter and had diversified its agroexport economy from there (Phongpaichit and Baker 1998:5-6.). While the Thai export boom, and indeed the bust that followed, were certainly impressive by any standards, a close examination of the evolution of post-war development policy by the Thai state reveals, in contrast to the typical NICs, a heavy emphasis on agroexport promotion, with input substitution manufacturing, as the *sine qua non* of modernization (Phongpaichit and Baker 1995, 1998). This provided the basis for the boom in manufactures, which began with forward and backward linkages to agriculture via inputs and processing. Many of the key domestic conglomerates who participated in the manufacturing boom cut their teeth in agroindustry.

While high population densities and scarce land helped push the four Asian Tigers toward a central role for manufactured exports, the extensive, unopened agricultural frontier in the northeast made agricultural development the most logical policy for Thailand. During the Vietnam war, US aid reinforced this tendency, as strategic air bases were located in the northeast, also the site of a guerrilla insurgency led by the soon-to-be smashed Communist Party of Thailand (CPT) (Phongpaichit and Baker 1995, 1998). The later boom in manufacturing may be more attributable to the relocating of Japanese capital following appreciation of the Yen than to NIC-style development policy, in contrast to the Thai government's more active early role in setting the table for various stages of agricultural export diversification (Phongpaichit and Baker 1995, 1998; Burch 1996).

Massive forest clearing and population resettlement and many large, medium and small-scale irrigation projects during the 1960s and 1970s opened the northeast region, known as Isaan, to rice cultivation, helping Thailand hold onto and consolidate its position in the global rice trade (Table 1; Phongpaichit and Baker 1995, 1998). A wave of state supported diversification which began in the 1970s built upon the rice economy through this dry season irrigation, tied to the promotion of HVF commodities such as frozen and canned fruits and vegetables, vegetable seeds and poultry, most of them contract farmed. Between 1981 and 1990, the export of poultry and poultry products grew by 55 percent annually, that of canned pineapple by 27 percent and canned baby corn by 17 percent, also annually (Burch 1996:323).

Yet Burch (1996) points out that while this spectacular growth fits the NAC model in many respects, in other ways it deviates from a more simplistic interpretation of it. Thailand has, for example, remained a dominant exporter of basic foodgrains, in contrast to the NAC model under which we might have expected it to become dependent on northern countries for the import of essential foods. Perhaps most surprising is the predominance of Thai, rather than transnational, capital in most of the HVF commodities, as seen in Table 2, contrary to the expectation of subordination to transnational enterprises.

In fact the whole pattern of export growth, both in manufacturing and in agriculture in Thailand, is quite different from the state-led, or 'governed market', experience of the first wave of NICs (i.e. Korea), from the state and foreign capital-led pattern of the second generation NICs (i.e. Malaysia), and from the foreign

Table 1. Growth of Irrigated Area in the Northeastern Region Thailand (millions of Rai)

| Year | Large- and Medium-scale | Small-scale |
|------|-------------------------|-------------|
| 1961 | 0.658 | n.a. |
| 1967 | 0.688 | n.a. |
| 1972 | 1.281 | n.a. |
| 1977 | 1.395 | 0.033 |
| 1982 | 2.002 | 0.809 |
| 1987 | 2.478 | 1.471 |
| 1988 | 2.428 | 1.537 |
| 1989 | 2.468 | 1.659 |
| 1990 | 2.547 | 1.759 |

Note: 1 rai = 1600 m².

Source: Royal Irrigation Department.

Table 2. Thai Capital as Percent of Total Investment in Selected Agri-Food Sectors, 1990

| Sector | Percentage of Thai Capital in Total Investment |
|-------------------------|--|
| Large-scale cultivation | 88 |
| Processing of: | |
| rubber | 88 |
| tobacco | 63 |
| woodchips | 77 |
| fruit & vegetables | 86 |
| seafood | 84 |
| milk & dairy products | 48 |
| poultry for export | 84 |
| Animal feed | 77 |
| Cooking oil | 77 |
| Aquaculture | 79 |
| Vegetable seeds | 61 |

Source: after Burch (1996: table 18.2).

capital-led model in Latin America. For manufactured exports, Phongpaichit and Baker (1995, 1998) describe a Thai pattern with a state that is far less interventionist than some Asian counterparts, though certainly playing a stronger role than in Latin America. The lead role in each wave of export diversification has been taken by domestic Thai capital, usually associated with powerful Chinese-immigrant capital groups. Typically, domestic investors have pushed the state to support activities that they are already undertaking.

For the most part, these capital groups extended backwards or forwards from existing enterprises through upstream production of components or downstream

value-added. They usually purchased foreign technology, or actively sought out joint ventures to supply technology. Only later have certain sectors been thoroughly penetrated by foreign transnational corporations (TNCs), who have sometimes then pushed out or bought out the Thai pioneers. In this regard Thailand resembles South Korea but without a dirigiste/military state apparatus and without the Korean type of state ownership of industry and tight regulation of credit.

Table 3 shows the recent history of the export agriculture economy, which accounted for fully 70 percent of export earnings as recently as 1970. With the manufacturing boom of the 1980s and 1990s the contribution of agricultural exports to total exports dropped to 16 percent by 1995. This was not due to stagnation of the agricultural economy, as agricultural exports continued to grow at a rapid clip; they were simply dwarfed by the growth in manufactured exports, which did include some agro-industrial exports. Rice maintained a key position throughout this time period, fluctuating between a one-quarter and one-fifth share of agricultural exports, while HVF exports took off in the late 1970s with fruit and vegetable products, whose export share actually exceeded that of rice during much of the late 1980s and early 1990s, and meat and poultry products.

Rice was the first major agricultural export, and early on rice trading conglomerates back extended into agricultural inputs (Phongpaichit and Baker 1995, 1998). With state supported irrigation they then diversified into dry season crops in a series of investment waves. Table 4 shows how Thailand first achieved global dominance in canned pineapple, followed by diversification into poultry meat and frozen vegetables. Fresh tomatoes were the basis for backward extending into seeds and forward extending into tomato juice and paste, followed by canned baby corn. Baby corn began as a way to utilized idle machinery at tomato canning plants, as the harvest seasons do not overlap, but eventually eclipsed tomato products in terms of dollar value (Table 4; and Yao and Chiou interview 1998).

The Northeast Agriculture Co. Ltd. (NACO) built the first tomato processing plant in the northeast, which opened in 1987. The technology was bought on a turnkey basis from a leading Italian manufacturer (Becker 1989). The principals included leading Thai producers of canned pineapples (31.5 percent) and processed tuna (10 percent), as well as a local landowner (20 percent), and counted on additional financing from the Asian Development Bank (15 percent), the International Finance Corporation of the World Bank (13.5 percent), and the Thai Military Bank (10 percent) (Asian Agribusiness 1987). This was a typical Thai case with domestic capital taking the lead, building on experience in related industries, and seeking foreign sources of technology and capital.

More recently, market forces have affected the tomato paste industry in the northeast. Rising labor costs in Thailand and competition from China in the low grade end of the paste market caused four of Thailand's fourteen tomato processors to go out of business between 1995 and 1998 (Yao and Chiou interview 1998; and Kowithayakorn interview 1998). Perhaps the strongest competitor among those left is a relatively late arrival, the Thai Soon Co., which is owned from Taiwan and partially financed from Japan. Thai Soon is a premium, "custom" paste manufacturer for high-end clients in Japan and elsewhere. Each batch is custom ordered by buyers, at a premium price, with the buyers specifying all details of the produc-

Table 3. Total and Selected Agricultural Exports from Thailand, 1970-1995 (in millions of US dollars)

| Year | Total Exports | | Agricultural Exports | | Rice Exports | | Fruit and Vegetable Products | | Meat and Poultry | |
|------|---------------|-------|----------------------|-------|--------------|------------------------|------------------------------|------------------------|------------------|------------------------|
| | Value | Value | Percent Of Total | Value | Value | Percent Of Ag. Exports | Value | Percent Of Ag. Exports | Value | Percent Of Ag. Exports |
| 1970 | 708 | 494 | 70 | 121 | 24 | 78 | 16 | 0 | 0 | 0 |
| 1975 | 2377 | 1490 | 63 | 287 | 19 | 281 | 19 | 1 | 0 | 0 |
| 1980 | 6505 | 3344 | 51 | 953 | 28 | 922 | 28 | 33 | 1 | 1 |
| 1985 | 7122 | 3202 | 45 | 829 | 26 | 885 | 28 | 63 | 2 | 2 |
| 1990 | 22972 | 5388 | 23 | 1086 | 20 | 1521 | 28 | 314 | 6 | 6 |
| 1995 | 56442 | 9022 | 16 | 1952 | 22 | 1492 | 17 | 550 | 6 | 6 |

Source: FAO-STAT, 1990-1998.

Table 4. Selected “High Value” Agricultural Exports from Thailand, 1970-1995 (thousands of US dollars)

| Year | Canned Pineapple | Poultry Meat | Frozen Vegetables | Fresh Tomatoes | Tomato Juice and Paste | Canned Sweet Corn |
|------|------------------|--------------|-------------------|----------------|------------------------|-------------------|
| 1970 | 2661 | 0 | 0 | 0 | 0 | 0 |
| 1975 | 16971 | 560 | 0 | 0 | 0 | 0 |
| 1980 | 69948 | 32508 | 34 | 1 | 65 | 0 |
| 1985 | 121219 | 63048 | 159 | 592 | 14 | 0 |
| 1990 | 216788 | 308358 | 9722 | 232 | 3714 | 26 |
| 1995 | 234125 | 533483 | 47216 | 298 | 3478 | 9204 |

Source: FAO-STAT, 1990-1998.

tion process, from seed variety and soil preparation, to agrochemical use and processing specifications. Japanese customers make frequent and long site visits (Yao and Chiou interview 1998). Foreign companies are now beginning to displace the Thai pioneers as happened often in the manufacturing sector, even as the basis of Thai competitiveness may be evolving from cheap labor to quality.

The Thai HVF model clearly differs from the classic Brazil-style NAC model in a number of ways. The persistence of basic grain production, the dominance of manufacturing over agriculture, the persistence of domestic capital, though that may change, and the step-by-step evolution from one related industry to another are all key ‘deviations’. Yet Thailand is not a typical NIC either, with its strong base in agriculture and a weaker state role. However, world market conditions have recently had dramatic impact on the Thai economy. Rising labor costs and the impact of competitors, like China, have damaged the competitiveness of Thai companies, just as the market forces, and the aggressive role of hedge funds in particular, played a role in the much heralded collapse of the larger Thai economy in late 1997 (Phongpaichit and Baker 1998; Bello et al. 1998).

The Thai 1997 economic collapse, ironically, may have benefited HVF exporters. Interviews in mid-1998 with tomato processors (Yao and Chiou interview 1998) and seed industry representatives (Chompradit and Kowithayakorn interviews 1998) revealed that baht export earnings from sales were up as a result of the devaluation. Costs had risen somewhat, but had not kept pace with sales, as only part of production costs, such as agrochemicals supplied to growers by purchasers, had foreign exchange components. Furthermore, the collapse of industrial and other urban employment had reversed rural-urban population flows, with as many as 20 percent more able bodies now present in villages and available for agricultural labor. This reversed a situation observed only three years earlier when seed companies and processors reported difficulty in find enough farmers to take contracts. In 1998 the farmers were queuing up and the purchasers could have their pick, thus enabling them to suppress production costs.

GLOBAL FILIÈRES, GLOBAL COMMODITIES: ARE THE NACs GLOBALIZED?

The Thai experience and the debates over HVFs and the so-called “new agricultures” pose a number of questions concerning the relations between the NACs, HVFs and the globalized and de-regulated agro-food system of the 1990s. The first concerns the relation between agricultural restructuring and regulation. The food regimes literature (Friedmann 1993, 1994), which starts from the presumption of a relatively stable, rule-governed food order, has seen the period since the oil/wheat crisis in 1972/73 and the collapse of Bretton Woods as a transitional period in which the dominance of transnational agri-capital and de-regulation are the precursors of a new, if unstable, food regime. This transition has necessitated “the restructuring of national agricultures and shifts in the regulation of food production and consumption” (Raynolds et al. 1993:1106). Implicit in this sort of analysis is the hegemonic role of global capital circuits (transnational agri-capitals), the standardization of diets, new forms of international division of labor, a distinctive social economy, regional specialization, global sourcing, the homogenization of production conditions, and the undermining of state autonomy (Raynolds et al. 1993:1103). The role of GATT, NAFTA and the hegemonic role of multilateral lending agencies signals, in this view, the ascendancy of “private global regulation” (Friedmann 1993:52).

While it would be wrong-headed to deny the extent to which agricultures have been de-regulated in the last decade, the pace and direction of liberalization remains uneven and underdetermined. The NAFTA reforms are far from an unalloyed championing of tariff reduction and free trade (Goodman and Watts 1994). According to an OECD study (*The Economist* 1995), total state support to agriculture in 1994 was, with one exception, *higher* than the 1979-1981 average. By the same token, de-regulation in the agrarian sector has typically been accompanied by re-regulation elsewhere within the sector, especially in the area of diet, health and the environment (Marsden and Wrigley 1994).¹ In this sense, Raynolds et al. (1993) are right to point to the multiple trajectories associated with

1. Some interesting applications of French regulation theory to the re-regulation of national agricultures have been undertaken by a group of INRA in Toulouse (Allaire and Boyer 1994).

agrarian internationalization in which the state continues to play a central role in domestic restructuring and negotiating a competitive global environment.

A second concern speaks to the nature of globalization and global commodity chains in agro-food. Globalization of agro-industrial corporations has clearly accelerated; the affiliates of the world's one hundred largest firms increased in number from 2070 in 1974 to 5173 in 1990 and in value from US\$121 billion to US\$517 billion. The number of sources and host countries also increased. However, growing competition within this sector has produced increased cross-investments within OECD, more than a search for global sources or new markets in the South (Rama 1995). Indeed, partly due to the 1980s recession, there was a *reduction* in direct agro-food investment in Latin America, Africa and South Asia. While this capital mobility has resulted in the centralization of power by retailers, with the share of the ten largest food retailers in Belgium, the UK, Spain and the US amounting to 79, 78, 66 and 65 percent of total sales respectively, it does not suggest the uniform emergence of global commodity chains in agriculture along the lines argued by Gereffi (1994) for automobiles (producer driven) and textiles (retail driven).

Indeed the very nature of globalization with the agro-food system is problematic and often confusing. If globalization is to refer to the spatial configuration of markets, deterritorialized corporations, new forms of corporate and inter-firm organization exemplified by strategic alliances and networks, with the paradigmatic cases being electronics and automobiles, then the agro-food sector is clearly *not* global in any simple sense. In spite of the claims by Bonanno et al. (1994) and Friedland (1994) that fresh fruits and vegetables are "truly transnationalized" and "global production systems," it is clear that the industry is not characterized by intra-firm, vertically-integrated, transnational production systems. Neither do key firms centrally coordinate global intra-firm divisions of labor involving global outsourcing (Goodman in press). The likes of ConAgra and Cargill are in many cases exemplary of multinational "multi-domestic" strategies rather than sourcing through centralized, global intra-firm production systems. Work by Gouveia (1994) suggests that the much vaunted parallel between the world car and the world steer is also misplaced; the key corporate actors have greater similarity with mercantilist trading companies and "Swift-type ventures minus the direct overseas investment" (Gouveia 1994:136). Some of the food processors and retailers have been and are aggressively global, Kentucky Fried Chicken, McDonald's and so on, but they must be located on a much more nuanced and heterogeneous map of commodity *filières* or chains within the agro-food system (Storper and Salais 1997).

Examining cross-border integration mechanisms and international production organization more closely, the UNCTAD-PTC (1993) refers to a spectrum from stand-alone or "multi-domestic" affiliates to "simple integration" and, more recently, "complex integration."² The TNCs provide the formative dynamic element

2. Briefly, in the case of "simple integration," parent firms integrate specific production activities performed by their affiliates into their value-added chain, notably through outsourcing. In contrast, the more recent "complex integration" strategies potentially integrate all parts of the value-added chains of both parent firms and their affiliates through vertical and horizontal production and functional linkages. Affiliates thus become more highly specialized as their activities are subordinated to the demands of firm-wide strategy.

in this movement as they respond to competition, policy developments, and institutional change, and so, in turn, help to shape and deepen international economic integration. There are, in short, a number of varied forms of corporate international production subsumed under the composite label of globalization: “multi-domestic” affiliates, simple integration through outsourcing, and complex, vertically and horizontally integrated systems, exemplified by leading TNCs in electronics and automobiles. These differences across sectors are significant in conceptual and empirical terms; nevertheless, the label “globalization,” with its allusions to outsourced international production and intra-firm integration, has become common currency in agro-food studies. Admittedly, a select group of giant food TNCs, like Coca Cola, McDonald’s, Kellogg’s, Nestlé, Unilever, with global brand names, have evolved global marketing strategies, albeit with adaptation to local tastes, but production typically is locally based. Few food manufacturing companies or retailers conform to the industrial model of transnationalization; that is, centralized, global intra-firm divisions of labor, with production-based sourcing of intermediate components from specialized sites for final assembly.

This raises the question, then, of the senses in which the Thai NAC strategy, as atypical as it is in relation to other classical NACs, is globalized, or put differently, can be understood as a sort of exemplary case of globalization comparable to the world car or the world steer. In addition, the following account of tomatoes highlights some of the other key characteristics of the HVF sector, namely forms of vertical co-ordination through contracting, the dispersion of risk and costs onto the growers, and the institutional ways in which local and foreign capital collaborate.

THAI AGRO-FOOD AND GLOBALIZATION: THE WORLD TOMATO IN NORTHEAST THAILAND

“Hybrid seeds built this house...”
—*a village farmer*³

The northeastern Thai region of Isaan is a low-lying zone long characterized by rain-fed rice production, harsh living conditions, and grinding poverty (Boontawee

UNCTAD-PTC (1993) estimates that roughly 35 percent of the productive assets in the United States and Japan “are potentially part of integrated international production,” while “the share of world output potentially subject to integrated international production may well be around one-third.”

3. The comment of a woman (Mrs. Hom) in the village of Ban Non Wamphai, as she talks about pesticide use in the production process. Her husband, Mr. Hom, said the Department of Health tested his blood and told him they detected pesticides – suggesting he stop his exposure. He says he can’t. Hybrid seeds are his livelihood. There is no other job he can do. He rents land (he’s landless) and has become a fairly good hybrid seed producer. His 11 kilograms per 120 wah² (equivalent to more than 36 kg per rai) represent the highest yields of the entire village (for the year 1995). It is a distinction of which he is obviously very proud. Yet, he, too, must borrow money. He borrows from one source to repay another, maintaining a constant cash flow into and out of his family finances.

1994). Rainfall distribution allows for one rice crop per year, a factor that has led to tremendous outmigration from the region to other parts of Thailand and neighboring countries. The introduction of water management schemes since the 1950s has allowed for two rice crops in some areas, as well as the establishment of contract farming in the dry season. At the national level, the Isaan has traditionally been a backwater region neglected by the central Thai government. Thai experience with dry season tomato production provided the basis for seed production, and later diversification into tomato processing. The former case departed from the typical Thai export development pattern described above, as the initial impetus and production experiences came at the hands of transnational companies. But Thai subcontracting companies later came to dominate the seed sector (Table 2). Processing tomatoes, on the other hand, have more closely adhered to the typical pattern, as discussed in the first section above.

In the specific case of quality hybrid vegetable seeds, the production process is complex and delicate. Operation sites and production conditions linked to major transnational seed companies provide a glimpse of the ways in which production and distribution of an increasingly important upstream component of the agro-food complex, hybrid fruit and vegetable seeds, fit into recent changes associated with the global complex. The commercial production of hybrid seeds for certain crops, among them tomatoes, cucumbers, cantaloupes, watermelons and peppers, relies upon the tedious operations of hand emasculation and pollination of individual flowers. These labor intensive tasks have led internationally positioned seed companies to seek cheap labor markets in the developing economies of the South.⁴ Since the 1950s, when hybrid tomato seed production was driven from Japan's rural sector because of competing industrial wages, companies have either located their own production, or more commonly contracted with local companies, successively in Taiwan, Chile, Thailand, and, most recently, Vietnam and China.

A common production arrangement in each of these cheap labor markets features some form of contract farming with small producers. At the same time, however, the ecological conditions, usually a pronounced dry season during which disease-free production can occur, must suit the demands of seed companies. The production of hybrid fruit and vegetable seeds in northeast Thailand, contoured by the concerns capital interests maintain about product quality, suitable ecological conditions for production, and labor discipline, offers a window through which to view a small portion of the global organization of this specialized and profitable sector.

Before focusing on the production conditions of hybrid fruit and vegetable seed in this region, it is worth exploring the consumption of such products, using tomato seeds as an example, at a global scale.

Seeds: Assessing the Market

Industry representatives refer to the North American market for hybrid tomato seeds as being saturated. Whether seed for fresh market or processing tomatoes, upwards of 90 percent of all tomatoes produced in the United States are hybrid varieties.

4. The term "the South" here refers to developing countries, those which have heretofore fallen within the category "Third World."

Similar conditions hold true for the European market. Yet, the current status of demand for high-value hybrid tomato seed is seen as being linked to a market in ascension. Recent decades have seen a substantial increase in the production and trade of fresh fruits and vegetables. Total world exports of fresh fruits and vegetables have grown at an average annual rate of 3 percent since 1979, reaching 41.5 million metric tons and valued at US\$18.6 billion in 1988 (Buckley 1990:17). But seed trade data *per se* remain elusive at all levels. Moreover, hybrid seed sales and trade are not separated out from those scant data that do exist, making accurate assessment of the hybrid fruit and vegetable seed market very difficult.

A survey aimed at the major hybrid vegetable seed companies based in North America, Asia, and Europe in 1994 addressed this issue. Marketing and sales division representatives, as well as industry researchers, were asked to estimate the degree to which hybrid tomato seeds dominant total tomato seed sales by "developing world" region. The estimates in Figures 1 and 2 reflect sales data, and represent the "best estimates" available from company personnel positioned to provide such information. Given that the global hybrid vegetable seed industry derives from the three industrialized centers of the globe, Japan, North America, and Europe, the survey responses are grouped by geographical headquarters of the company personnel providing the estimates. A total of fourteen international seed firms responded, with four, five, and five companies giving percentage estimates from Japan, Europe, and North America, respectively. The results show that indeed there is substantial room for growth for hybrid seeds for both fresh market and processing tomatoes in the non-industrialized economies around the world.

Exploring Seed Production

The case of northeast Thailand provides an example of how NACs participate in the global agro-food complex, and how this participation relates to the transnational seed companies' goal of remaining competitive in a specialized market through capturing low cost production conditions in a remote area, while at the same time insisting upon and obtaining a quality product in the form of hybrid tomato seeds. Production relations pass through contract agreements between individual peasant farmers and the companies. Northeast Thailand has emerged over the last fifteen years as one of the most important locations on the globe for production of hybrid vegetable seeds of specific families demanding intensive labor. Some of the world's largest seed firms have appeared upon the scene, taking advantage of the ecological and labor conditions that characterize the Isaan. International companies from the United States, Europe and Japan have representation in this heretofore neglected and agri-capital-poor region of Southeast Asia. Since its inception, the model has relied heavily upon "surrogate" companies of local (Thai) or regional (Taiwanese) origin to handle the headaches of production.

Efforts to initiate production began in the 1970s. Early interest by companies like Goldsmith and Petoseed placed northeast Thailand high on the list of possible areas for expanding production. A symposium in Taiwan at the Asian Vegetable Research and Development Center sponsored a field trip to the area in 1976, generating increased interest on the part of other international companies. Major concerns included honesty of potential contractees and manual dexterity for the work involved. Training of villagers interested in producing seed proved possible, while

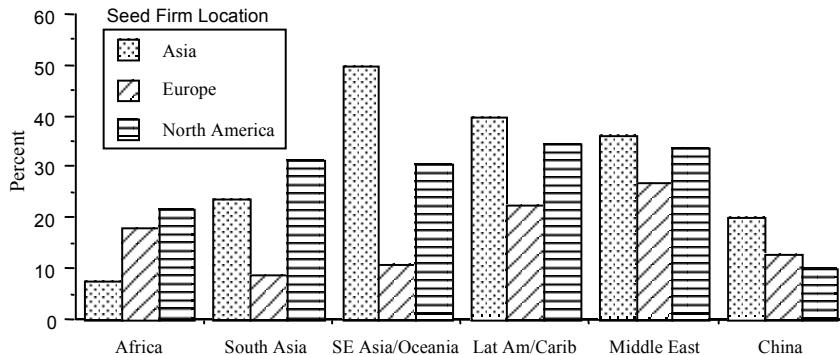


Figure 1. Regional Estimates of Hybrid Fresh Tomato Use, by Location of Seed Firm (based on market sales)

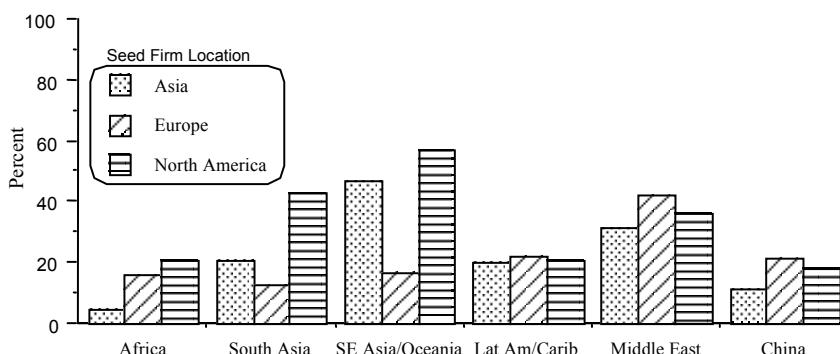


Figure 2. Regional estimates of Hybrid Processing Tomato Use, by Location of Seed Firms (based on market sales)

remote villages attracted attention because of firms' concerns about trust around the issue of emasculation of flowers. In 1977, with a target quota of 500 kg of seed production, Petoseed managed to obtain only one tenth that with four or five villages participating. The following year saw the 500 kg goal reached, with 1970 seeing production exceed 2000 kg. By 1980, with production aimed at 3000 kg, the area apparently secured its place on the world map of hybrid seed operations when 9000 kg left the villages. The rush was on for other companies to get into northeast Thailand (Thaworn Kowithayakorn, personal communication).

Near the regional center of Khon Kaen, the US-based seed company Petoseed, then owned by the George Ball Seed Company, began producing hybrid tomato seed in 1979 by contracting with Adams International via a third company from Taiwan. By 1984, Asgrow had initiated relations with local Thai firms such as Uni-

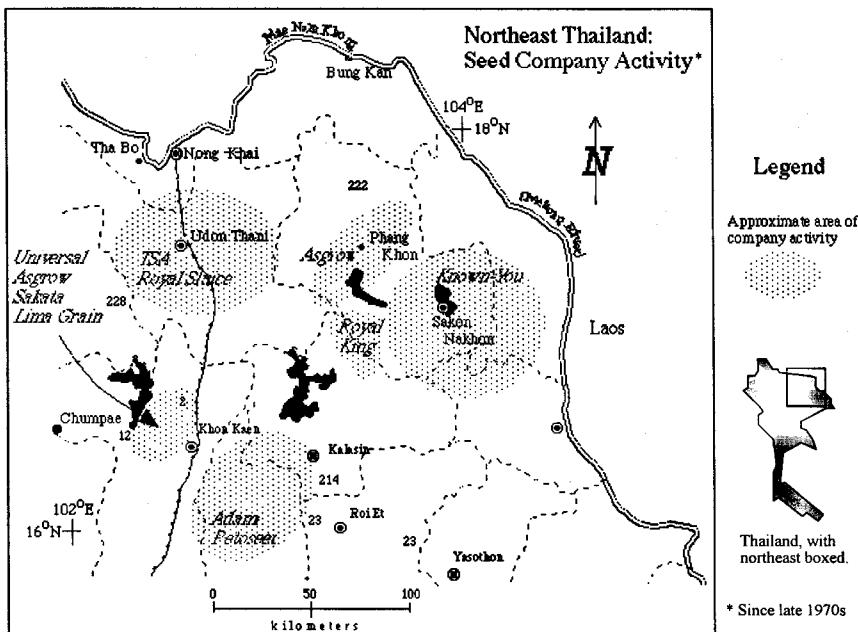


Figure 3

Figure 3. Seed Company Activity in Northeast Thailand

versal Seeds, with operations in the Khon Kaen area, and Thai Seed and Agriculture Company (TSA), active to the north around Udon Thani (Figure 3). Two years later, Asgrow Thailand was founded and direct contracting with growers began in earnest.

Today, most local firms continue to have production arrangements with foreign interests, with Taiwanese firms playing a major role. Known-You Seed Company of Taiwan established a subsidiary in Thailand in 1984 and still operates around Sakon Nakon (Figure 3), producing for its parent company. That same year Hsin Seeds Company was founded as a joint venture between Thai and Taiwanese (Ching Chong Seeds) interests. For the first two years, Hsin contracted no growers, as attention and efforts went to train the staff. The first year of farmer contracts for Hsin saw only 150 growers producing seed for the company. Today, some 1000 farmers produce for Hsin under contract on about 1700 to 1800 rai. The lion's share of this area is planted in watermelon and cantaloupe, plants that, due to the size of the flowers, are easier to work with than the smaller-flowered solanaceous crops like pepper and tomato (Table 5). Tomato area contracted by Hsin Seeds has fallen from 300 rai (1 rai = 1600 m²) three years ago to only 50 today (Watcharawut Sawamis, personal communication).⁵ Sakata Seeds of Japan associates with Ag-

5. Other Thai capital has also taken advantage of the seed production conditions of this area. The Known-You Seed Company, for instance, located in Chang Mai in northern Thailand, ranks as the largest seed company in the country in terms of sales. Many of its seeds are

Table 5. Area contracted (in rai) for Hybrid Vegetable Production in Northeast Thailand by Hsin Seed Company, 1995

| Seed Crop | Area (rai) |
|---------------------|------------|
| Pepper (sweet/bell) | 300 |
| Cantaloupe | 550 |
| Watermelon | 550 |
| Cucumber | 150 |
| Eggplant | 20 |
| Tomato | 50 |

Note: 1 rai = 1600 m².

Source: Field notes and interview with Watcharawut Sawamis, Managing Director of Hsin Seeds in Khon Kaen, August/September 1995.

Universal Seeds via a joint venture called Sakata Siam, while Japan's other seed giant, Takii, works closely with TSA. Adams Enterprises Ltd. holds shares in East-West Seed Co., producing for a wide range of US and European customers. Sluis and Groot, a Dutch firm, has production relations with Hsin Seeds Company (Simon Groot and Thaworn Kowithayakorn, personal communication).

Asgrow obtains 90 percent of its hybrid tomato seed for global sales from Thailand, with most of this production derived from the Isaan. Throughout the country, Asgrow draws from 5000 rai, or 800 hectares. About 2000 rai are planted in this region, with 450 devoted to tomato seeds and the remainder divided between watermelon and cantaloupe seeds. Production upon these 2000 rai in northeast Thailand is mediated through 2000 individual contracts with growers in the region, and overseen by some 200 field technicians. Twenty percent of this production area falls around the city of Khon Kaen, and 80 percent lies in the Sakon-Nakon region to the east (Visut Chompradit, personal communication).

Thus we see a strong presence of foreign capital in the hybrid seed business of northeast Thailand, the activities of which are colored by the unusual demands of the production. Production of certain hybrid vegetable seeds, especially tomato seeds, is difficult. Given the physiological constraints of the plants involved, and what has to be accomplished in order to make the genetic crosses for the desired hybrids, intensive and dexterous manual labor forms the central core around which production revolves. Tomato flowers are small. In order to create a hybrid cross, plant breeders develop two "parent lines." These are lines that breed true for specific traits, such as color, shape, skin thickness, solid or sugar content, that plant geneticists want expressed in the hybrid. Such lines are selected and developed by the research and development section of the seed companies and usually perfected in corporate greenhouses facilities. Once these lines are developed, the pollen from one line is placed onto the flowers of the other line. The fruits that set and grow from such a cross contain seeds that produce plants and fruits with the desired characteristics.

produced in northeast Thailand, especially around Sakon-Nakon and Kalasin – towns to the east of Khon Kaen.

The nature and success of hybrid tomato seed production, as well as that of a number of other vegetables, rests upon intensive manual labor. The heavy labor demand stems from tomato breeding techniques, the structure of the tomato flower, and the temporal aspects associated with flowering. Growers must conform to the companies' designated tasks in terms of actual physical operations and strict schedules. For instance, the first several flowers to emerge on a tomato plant must be removed, an operation that corporate researchers have determined increases the overall production of given plant, yet a practice that a grower might see as contradictory to production. Furthermore, once an average of 40 to 45 flowers have successfully been crossed and the fruit set, subsequent flowers must be removed.

The actual crossing of the lines demands intensive, back-breaking labor. The two lines are grown in separate plots or rows. The labor involves collecting the pollen from the "father" line and keeping it dry and viable until the cross is to be made, usually a matter of days. All flowers belonging to the "mother" line, those plants designated to receive the pollen and produce fruit and ultimately the hybrid seed, are emasculated. Emasculation entails opening the flower about three days prior to its natural flowering date and removing the anthers. This operation assures that no self-pollination occurs, a process that would produce non-hybrid seed and affect the purity of the final product. Diligence and honesty on the part of the farmer, and any family or hired labor involved in this stage, is of utmost concern to the company.

Issues of the purity and germination rate of the final seed product fuel the quality control and farmer discipline concerns of the companies. A company selling hybrid seed around the world cannot afford to have (1) low germination rates or (2) non-hybrid plants associated with the seed they sell. To that end, contract agreements stipulate a host of conditions to protect the company against having to pay for low-quality product or worry about germplasm – i.e., parent line materials – getting into the public domain where costly research/development of a particular hybrid could be thwarted in a matter of years through unregulated production. To protect against the "escape" of germplasm, such that production of certain hybrids could occur outside a company's control, firms insist upon the destruction of parent lines in the field once crosses are made. After pollination operations are completed by farmers, companies retrieve the equipment used in these activities.

Once hybrid seeds are harvested and processed, which involves holding the picked fruit for three days in bags, screening and washing the seeds with water, another washing with carbolic acid, and drying them for three days in the open and dusting them with fungicide, a grower delivers the seeds to the company. Producers rarely receive full or immediate payment. Payment schedules are linked to tests that determine germination percentages and purity of the hybrid seeds. Some contracting companies allow for partial payment to be made upon delivery; others insist upon tests being conducted prior to any payment. Often the first payment (50 percent of the contracted price) is made shortly after delivery, once germination percentage is determined. Companies demand 90 percent germination. The balance payment comes after purity tests are conducted. Purity of a farmer's seed is determined by sampling the entire batch, and either growing tomato plants from the seed sampled, or conducting electrophoresis on the seed sample (Visut Chompradit, personal communication).

Of course, not all farmers can live with such conditions. Whether due to inability or unwillingness to conform to company demands, companies generally see a 12 percent attrition rate from year to year with farmers involved in production. Moreover, demonstrated success in production is rewarded only up to a certain point. For instance, once the price is set at the time of the contract, a company pays said price for up to the 120 percent of the contracted amount, a figure calculated from the number of plants put in the ground. If a grower delivers more than 120 percent of the anticipated weight, the company pays about 30 percent less than the set price for anything up to 150 percent of the contracted amount. The price paid for any production exceeding 150 percent of the anticipated weight is negotiated.

Tomato Farmers

In 1995 and 1996 we surveyed 111 tomato farmers in the Isaan, including 35 seed producers and 76 growers of processing tomatoes (Table 6). Of the seed producers, 75 percent contracted with two seed companies, and contract farming, whether for seed or fruit production, accounts for the primary source of income for 80 percent of them. Those involved in tomato seed production devote an average of 0.39 rai, an area equivalent to 25m by 25m, to this effort. The net income derived from tomato seeds averages slightly more than 17,000 baht, equivalent to US\$680 at the 1995-96 exchange rate of 25 baht to the dollar. Growers of processing tomatoes devote seven times more land, an average of 2.72 rai, to this much simpler and more extensive form of tomato cultivation. Their net incomes are higher, averaging 30,000 baht.

For those farmers producing tomato seed, interview data reveal that 69 percent of the total income comes from contract farming, while 69 percent of respondents have grown cantaloupe for seed and 26 percent have grown tomatoes for processing. All other farming, including rice production, accounts for just under 25 percent of total income. Overall, more than 85 percent of the tomato seed farmers report that they feel wealthier at present than in the past. As for plans related to future planting of tomatoes for seeds, 49 percent responded that they plan to increase the area currently devoted to seed production, while 11 percent said they would decrease it. Twenty-nine percent reported that they would leave it the same. Processing tomato growers earned 63 percent of their total income from contract farming, with 24 percent coming from all other farming. Eighty-four percent of the respondents reported feeling wealthier now. Only 38 percent said they would increase the area devoted to tomatoes, while 49 percent said they would leave it the same.

More than 97 percent of seed producers receive inputs from the contracting buyer, and the same percentage report that credit or advances are conditional upon using pesticides in the production process. While growers belong to village associations and groups are well organized around many local issues, the vast majority of contracted seed producers (94 percent) negotiate the terms of their contracts as individuals. Reflecting a lower intensity relationship, only 33 percent of processing tomato growers received inputs from the buyer, while 55 percent received credit from cooperative banks and only 65 percent of their credit was conditional upon use of pesticides. Unlike their seed producing counterparts, only 51 percent negotiated their contracts alone while 41 percent did so as part of a vil-

Table 6. General Profile of Farmers Involved in Hybrid Tomato Seed or Processing Tomato Production in Northeast Thailand, 1995-1996

| | Tomato Seeds | Processing Tomatoes |
|---|--------------|---------------------|
| Number of observations | 35 | 76 |
| Years involved in contract farming | 5.2 | 7.4 |
| % for whom contract farming is primary source of income | 80 | 68.4 |
| % who planted tomatoes for seed/processing* | 58 | 67 |
| Area planted (rai) | 0.39 | 2.72 |
| Typical yields (kg/rai) | 13.15 | n.a. |
| Typical prices (baht/kg) | 2274 | n.a. |
| Net income from tomatoes for Seeds/processing (baht) | 17135 | 30107 |

* averaged over three years (interview year plus two previous years).

village group or cooperative.

The importance of contract farming in general and of tomato seed production in particular is obvious from Table 6. Yet, the rural sector is obviously composed of farmers with differing access to resources. Dividing the tomato farmers into categories based on access to land, the most precious resource in an agrarian setting, we find added texture to the characterization given above. Table 7 provides a profile of the farmers' contract history and activities associated with production tomatoes, broken down by farm size category. As it shows, the majority of those involved in seed production belong to the smallest farm size category of 10 rai or less. The average area devoted to seed production in this category is quite small at 0.28 rai, or the equivalent of a 21m by 21m area, a testament to the labor intensive nature of the work involved. Processing tomatoes, on the other hand, are more evenly distributed across farm sizes. While the smallest size category accounts for more farmers than any other size, this still reflects less than half of the growers (41 percent). Surprisingly, farmers in the largest size category devote the least land to processing tomatoes.

Of note is the fact that the seed producers in the smallest farm size category weigh in with the highest average yields, as well as with relatively high prices paid for their seeds. The higher yields are probably associated with the greater attention given to production by smaller producers. Higher prices are usually associated with degree of difficulty associated with the labor process, which can vary even within tomatoes, depending upon the seed variety being produced. This same group of producers reports the highest percentage of total income (72 percent) being generated by contract farming, and the lowest percentage (20 percent) derived from all other farming, including rice production. In the case of processing tomatoes, it is the second from the smallest size category which reports the highest yields, and it is the largest farmers who receive the highest price. The latter feature is more in accordance with reports on contract farming prices elsewhere in the world, where the larger volume offered and stronger negotiating power reported by larger growers

Table 7. Profile of Farmers Contracted to Produce Hybrid Tomato Seeds or Processing Tomatoes in Northeast Thailand, by Farm Size, 1995-1996 (averages)

| | | <u>Farm Size</u> | | | |
|---|-------------------|---------------------|------------------|------------------|-------------------|
| | | <u></=10 rai</u> | <u>11-20 rai</u> | <u>21-30 rai</u> | <u>>30 rai</u> |
| Number of observations | <i>seeds</i> | 19 | 8 | 4 | 4 |
| | <i>processing</i> | 31 | 25 | 12 | 8 |
| Years involved in contract farming | <i>seeds</i> | 4.4 | 5.9 | 5.2 | 7.5 |
| | <i>processing</i> | 9.4 | 5.8 | 6.5 | 6.0 |
| % for whom contract farming is primary source of income | <i>seeds</i> | 74 | 100 | 75 | 75 |
| | <i>processing</i> | 68 | 84 | 58 | 37 |
| % who planted tomatoes for: [*] | <i>seeds</i> | 66 | 54 | 42 | 42 |
| | <i>processing</i> | 70 | 69 | 67 | 46 |
| Area planted (rai) | <i>seeds</i> | 0.28 | 0.33 | 1 | 0.44 |
| | <i>processing</i> | 2.48 | 3.30 | 2.58 | 1.88 |
| Typical yields (kg/rai) | <i>seeds</i> | 14.67 | 13.14 | 8.05 | 11 |
| | <i>processing</i> | 5513 | 6656 | 5758 | 2887 |
| Typical prices (baht/kg) | <i>seeds</i> | 2447 | 1713 | 3025 | 1667 |
| | <i>processing</i> | 3.09 | 4.47 | n.a. | 6.18 |
| Net income from tomatoes for seeds (baht)* | | 18117 | 12688 | 20,000 | 18,500 |
| Net income from processing tomatoes (baht)** | | 30251 | 38244 | 20717 | 18200 |

Note: 1 rai=1600 m².

* averaged over three years (interview year plus two previous years).

** 25 baht = US\$1.00 in 1995/96.

translates into a price premium, as in the example of melons in Central America (Conroy, Murray and Rosset 1996). In the case of tomato seeds there is a strong diseconomy of scale due to the intricate labor involved, while in processing tomatoes a more typical marketing economy of scale seems to act.

The issue of access to land and the tendency of villagers to contract their labor out to seed companies poses some intriguing patterns when we consider the participation of landless villagers as part of the equation. Village leaders were asked about the landless families in their villages, and specifically about their participation in contract farming. There are two ways to examine the importance of contract farming to this resource-poor group. One is to calculate the fraction of the total number of contract farmers who are landless peasants, that is, how do landless villagers contribute to contract farming? Averaging across the six villages for which we can make such a calculation, we find that 19.5 percent of all villagers participating in contract farming of some kind are landless. The data do not allow for determining the percentage involved expressly in processing tomato or seed production, but we do find that within those four villages in which tomato seed production is contracted, 23.6 percent of those involved in contract farming are landless. The more widespread distribution of processing tomatoes in seven of the

eight villages surveyed makes a similar calculation meaningless.

Another way to assess the linkages between landless farmers and contract farming is to determine the proportion of landless families who do contract farming arrangements; that is, how important is contract farming to landless peasants in the area? We find that for all eight villages combined, an average of 96 percent of the landless farmers contract with companies during the dry season to produce a crop of some kind. Again, the data do not allow for calculation of those involved directly in tomato seed production, but for those surveyed villages involved in producing hybrid tomato seed, 93 percent of the landless families are involved in contract farming of some sort.

Economically, peasants involved in contract farming in northeast Thailand appear to be reaping a number of benefits. Empirically it is obvious that substantial quantities of cash are flowing within the villages involved, with new pickup trucks, communal projects, and private building efforts in evidence. A 1992 study focusing on contract farming in the Sakon Nakhon province of northeast Thailand, an area of active hybrid seed production, observed similar consequences linked to what that author called "managed production," with home improvement, increased levels of spending on "large ticket" items,⁶ and a general increase in financial resources on the part of many villagers involved in contract farming (Dolinsky 1992). This same study reported higher levels of indebtedness since managed production emerged on the scene.

Today, although we find banks more willing to lend to farmers who have joined with a company in a contracted situation, growers involved in seed production rely heavily upon the companies with which they contract to provide credits. These take the form of cash advances and/or agrochemical inputs. Whether examined from the standpoint of villages involved in seed production or by farm size categories, more than 95 percent of the respondents identify the companies as the source of credit. Less than 6 percent make use of private banks, in contrast to the processing tomato growers who rely much more on bank credit.

In light of this detailed examination of tomato production in northeast Thailand we can return to our earlier questioning of the degree to which HVF production represents the popular notion of a "globalized" sector. If we examine the corporate structures of the tomato seed and processing tomato industries in northeast Thailand we see two very different patterns. The former case is very textured, but at one extreme offers a case of much greater vertical and intra-firm integration. Quality-control and proprietary germplasm in seed production requires a high intensity contractual relationship with farmers. The majority of the Thai seed industry that is domestically owned encompasses seed companies that produce seed on contract for several transnational seed companies. On the other hand, the largest seed operation in Thailand is that of Asgrow, which recently merged with Petoseed into Seminis Vegetable Seeds, and is part of a complex, vertically and somewhat horizontally integrated system (Chompradit interview 1998).

Asgrow has subsidiaries around the world, though northeast Thailand dominates for hybrid tomato seeds, serving as channels to bring various products to market.

6. Such items included televisions, sewing machines, and gasoline-powered hand tractors.

Many of these “channelers” produce the same seed varieties, all of which are shipped to a central plant in California for “conditioning” and packaging. Packaged seeds then go out around the world under a variety of different brand names having been “conditioned,” treated with pesticides, and packaged according to local market requirements.

And at least within the hybrid vegetable sector, global agri-capital has seen its affiliates proliferate and sometimes prosper in northeast Thailand in what qualifies as “simple integration” for the specific operation of delivering a hybrid seed product to California for conditioning. Asgrow Thailand is an arm of Asgrow USA’s global system and solely devoted to production. As such it sells the seed produced under its direction to Asgrow USA. As an in-house transaction, profit is supposedly saved for the consumer end of the chain. “We are an expense center [for Asgrow USA], not a profit center” (Chomparadit, personal interview). The consumers do indeed pay. A Thai farmer receives the equivalent of US\$100 to US\$200 per kilogram for hybrid tomato seed produced on his plot, an amount which the international firm sells for anywhere from US\$1000 to US\$3000, depending upon the variety.

The late 1990s may represent a transition period in which the dynamic force of competition is operating. In 1995 interviews, all reports pointed to the eventual migration of hybrid seed production and tomato processing to China, where costs of production are significantly less than in northeast Thailand. Due to the inexperienced labor force and corruption involving export licensing and other government controls, however, we find a selective migration occurring. Newer, more popular varieties of tomatoes seeds are staying in northeast Thailand. Production of older varieties, as well as that of easier-to-produce seeds such as melons and other cucurbits is moving to China and Vietnam (Kowithayakorn, personal interview).

At the other extreme, Thai production of tomato paste produced for export is controlled almost exclusively by domestic capital, with little international intra-firm integration, and reflects a relatively low degree of contractual intensity with farmers. Again, lower production costs in China act to attract regular, non-specialized, paste production. As work force knowledge, experience, and discipline deepen, we might well expect the eventual migration of all tomato paste, and perhaps even the high-end, difficult tomato seed, production to China.

While unanswered questions remain as to the type and degree of Thailand’s globalized condition, clearly the incorporation of Isaan peasant families into what is an economic force of the region by means of contract farming with international ties, underscores the persistence and continued importance of peasant production. The science-based details of hand pollination for hybrid seed production, the transportation and communication linkages of the late twentieth century, irrigation technology for dry-season production, and speed with which financial decisions and action are taken, all converge to make this incorporation into the agro-food sector possible. Yet, whether the product is the regionally important processed tomato or the internationally valuable hybrid seed, we find the small, often landless peasant, working long hours alongside spouse and children, forming the social platform of production.

CONCLUSION: THE NACs AND THE LATE TWENTIETH CENTURY AGRARIAN QUESTION

Kautsky's *The Agrarian Question* (1906), published a century ago, was framed by two key processes: on the one hand, the growth and integration of a world market in agricultural commodities, especially staples, and the international competition which was its handmaiden, and on the other, the birth and extension into the countryside of various forms of parliamentary democracy. Both forces originated outside of the agrarian sector but lent to agriculture its particular political and economic visibility. International competition in grains was driven not only by the extension of the agricultural frontier in the United States, Argentina, Russia and eastern Europe, or what Kautsky called the "colonies" and the "Oriental despotisms," but also by improvements in long distance shipping, changes in taste, such as from rye to wheat, and the inability of domestic grain production to keep up with demand. As a consequence of massive new supplies, grain prices, as well as rents and profits, fell more or less steadily from the mid-1870s to 1896 (Konig 1994). It was precisely during the last quarter of the nineteenth century when a series of protectionist and tariff policies in France (1885), Germany (1879) and elsewhere, were implemented to insulate the farming sector. New World grain exports were but one expression of the headlong integration of world commodity and capital markets on a scale and with an intensity then without precedent and, some would suggest, unrivaled since.

The Agrarian Question spoke, in other words, to the consequences of the European farm crisis at a moment of globalization: falling prices, rents and profits coupled with transnational market integration and international competition. The crisis of European peasants and landlords in the late nineteenth century was "resolved" by *intensification*, particularly in cattle and dairying, in a new ecological complex, and by the *appropriation of some farming functions by capital* in processing and agro-industry (Goodman et al. 1987; Hussain and Tribe 1981:70). Kautsky concluded that industry was the motor of agricultural development, or more properly agro-industrial capital was, but that the peculiarities of agriculture, its biological character and rhythms (Wells 1996), coupled with the capacity for family farms to survive through self-exploitation, by working longer and harder to in effect depress "wage levels," might hinder some tendencies, namely, the development of classical agrarian capitalism. Indeed agro-industry, which Kautsky saw in the increasing application of science, technology and capital to the food processing, farm input and farm finance systems, might prefer a non-capitalist farm sector.

Kautsky's book was remarkably forward-looking and prescient and indeed has much to offer an analysis of the NACs in general and Thailand in particular. Kautsky was of course writing toward the close of an era of protracted crisis for European agriculture, roughly a quarter of a century after the incorporation of New World agricultural frontiers into the world grain market had provoked the great agrarian depressions of the 1870s and 1880s. A century later, during a period in which farming and transportation technologies, diet and agricultural commodity markets are all in flux, the questions of competition, shifting terms of trade for agriculture, and subsidies remain politically central in the debates over the European Union, GATT and the neo-liberal reforms currently sweeping through the

Third World.

But what does the Thai case have to say to Kautsky's argument, to the late twentieth century agrarian question? We shall briefly focus on three issues. First, the Thai case obviously confirms the general argument of periodic waves of globalization and free-trade reform, but in a way which extends beyond trade *per se* which dominated the 1890s discussion. In ways that Kautsky did not and could not predict, the transnational flows of capital and investment have laid the groundwork for more integrated production circuits which link local and foreign capital in complex configurations, but we have emphasized that these global tendencies have limits. Second, the dynamism in technology which Kautsky saw in its infancy is now central to agro-food dynamics, and the case of the Thai tomato industry reveals the ways in which the life science companies and the agro-food companies work together in complex global production circuits. And third, Kautsky's concern with forms of integration, primarily with how finance capital was "vertically" integrating the small scale agricultural sector, remains central to the late twentieth century agrarian question. Thailand's tomato industry, and one might as well invoke its poultry sector, is constituted by forms of vertical co-ordination and sub-contracting in which contracted growers are especially significant. These institutional relations in which the company displaces the market to some extent, makes Kautsky's argument about exploitation and self exploitation, and the purported autonomy of the farmer, more relevant today than ever.

It is sometimes said that Kautsky's political economy was deterministic and retrograde, but his analysis of agriculture always grappled with, and admitted, the complexities and paradoxes of the agricultural sector in which it was, as he argued, unlikely that the world would follow in the footprints of the English model of agrarian capitalism. There are unevenesses within the agricultural sector as the current phases of globalization demonstrates. Nonetheless, his focus on how capital is, and is not, directly taking hold of the point of production, is surely as relevant in 1999 as in 1899 when his book first appeared. A century ago of course there were no obvious equivalents to Tyson or Asgrow or General Foods and the advances in biotechnology and agricultural sciences have been unprecedented. In fact it is to the question of these differences that current agro-food studies must speak.

REFERENCES

Allaire, G. and Boyer, R. 1994. "Régulation et conventions dans l'agriculture et les IAA." Pp. 9-29 in *La grande transformation de l'agriculture. Lectures conventionnalistes et régulationnistes*, edited by G. Allaire and R. Boyer. INRA Editions/ECONOMICA Collection Economie Agricole et Agro-alimentaire.

Asian Agribusiness. 1987. "Tomato paste factory for Thailand." 4(4), July/August:5.

Becker, Truman 1989. "Asia's Most Modern Tomato Paste Factory." *ADB Quarterly Review* (Asian Development Bank), January:11-13.

Bello, Walden, Shea Cunningham and Li Kheng Poh. 1998. *A Siamese Tragedy: Development and Disintegration in Modern Thailand*. London and Oakland: Zed and Food First Books.

Bonanno, Alessandro, Lawrence Busch, William Friedland, Lourdes Gouveia and Enzo Mingione, eds. 1994. *From Columbus to ConAgra: The Globalization of Agriculture and Food*. Lawrence: University Press of Kansas.

Boontawee, Kampoon. 1994. *A Child of the Northeast*. Translated by Susan Fulop Kepner.

Editions Duangkamol: Bangkok.

Burch, David 1996. "Globalized Agriculture and Agri-food Restructuring in Southeast Asia: The Thai Experience." Pp. 323-344 in *Globalization and Agri-Food Restructuring: Perspectives from the Australian Region*, edited by David Burch, Roy E. Rickson and Geoffrey Lawrence. Aldershot, England: Ashgate Publishing.

Buckley, Katharine C. 1990. *The World Market in Fresh Fruit and Vegetables, Wine, and Tropical Beverages – Government Intervention and Multilateral Policy Reform*. Washington, DC: Commodity Economics Division, Economic Research Service, USDA.

Chompradit, Visut. Interviews with Mr. Chompradit, Seed Production Manager of Asgrow Thailand (now called Seminis Vegetable Seeds), September 1995 and June 1998.

Collins, J. 1993. Gender, Contracts and Wage Work: Agricultural Restructuring in Brazil *Development and Change*, 24(1):53-82.

Conroy, Michael, Douglas Murray and Peter Rosset. 1996. *A Cautionary Tale: Failed U.S. Development Policy in Central America*. Boulder: Lynne Rienner/Food First Development Studies.

Heffernan, William and Douglas Constance. 1994. "Transnational Corporations and the Globalization of Food." In *From Columbus to Conagra: The Globalization of Food an Agriculture*, edited by Alessandro Bonanno, Lawrence Busch, William Friedland, Lourdes Gouveia and Enzo Mingione. Lawrence: University Press of Kansas.

Dolinsky, Diane J. 1992. "Contract Farming at Lam Man Oon: An Operational Model for Rural Development." Institute Report, East Asian Institute, Columbia University.

The Economist. 1993. Special Supplement on the Food Industry. November 16:18.

The Economist. 1995. June 3:97.

Friedland, William. 1994. "The New Globalization: The Case of Fresh Produce." Pp. 210-231 in *From Columbus to Conagra: The Globalization of Food an Agriculture*, edited by Alessandro Bonanno, Lawrence Busch, William Friedland, Lourdes Gouveia and Enzo Mingione. Lawrence: University Press of Kansas.

Friedmann, Harriet. 1993. "The Political Economy of Food." *New Left Review* No.197:29-57.

Friedmann, Harriet. 1994. "Premature Rigor." *Review of International Political Economy*, 1(3):552-561.

Goodman, David and Michael Watts. 1994. "Reconfiguring the Rural or Fording the Divide?: Capitalist Restructuring and the Global Agrofood System." *Journal of Peasant Studies*, 22(1):1-49.

Gouveia, Lourdes. 1994 "Global Strategies and Local Linkages." Pp. 125-148 in *From Columbus to Conagra: The Globalization of Food an Agriculture*, edited by Alessandro Bonanno, Lawrence Busch, William Friedland, Lourdes Gouveia and Enzo Mingione. Lawrence: University Press of Kansas.

Groot, Simon. 1999. Written correspondence with Mr. Groot, President of East-West Seed Company in Thailand, March.

Hussain, A. and K. Tribe. 1981. *Marxism and the Agrarian Question*, Vol. 1. Atlantic Highlands, Humanities Press.

Jaffee, S. 1994. *Exporting High Value Food Commodities*. Washington, DC: World Bank.

Kautsky, Karl. 1906. *La Question Agraire*. Paris: Maspero.

Kimenye, L. 1993. "The Economics of Smallholder Flower and French Bean Production and Marketing in Kenya." Ph.D. dissertation, Michigan State University.

Konig, N. 1994. *The Failure of Agricultural Capitalism*. London: Routledge.

Kowithayakorn, Thaworn. Interviews with Mr. Kowithayakorn, Professor of Horticulture at Khon Kaen University in Khon Kaen, Thailand, February, 1996; and June, 1998.

Marsden, T, and N. Wrigley. 1994. "Regulation, Retailing and Consumption." Paper delivered to the Association of American Geographers Meeting, San Francisco.

McMichael, Philip, ed. 1995. *Food and Agrarian Orders in the World Economy*. New York: Praeger.

Muscat, Robert J. 1994. *The Fifth Tiger: A Study of Thai Development Policy*. New York

and Tokyo: M. E. Sharpe and United Nations University Press.

Phongpaichit, Pasuk, and Chris Baker. 1995. *Thailand: Economy and Politics*. Oxford and Bangkok: Oxford University Press and Asia Books.

Phongpaichit, Pasuk, and Chris Baker. 1998. *Thailand's Boom and Bust*. Chiang Mai, Thailand: Silkworm Books.

Rama, Ruth 1995. "Latin America and Geographical Priorities of Multinational Agroindustries." Unpublished manuscript. Paris: OECD.

Raynolds, Laura T., David Myhre, Philip McMichael, Vivian Carro Figueroa and Frederick Buttel. 1993. "The 'New' Internationalization of Agriculture: A Reformulation." *World Development* 21(7):1101- 21.

Sawamis, Watcharawut. 1995. Discussion and interview with Watcharawut Sawamis, Managing Director of Hsin Seeds in Khon Kaen, August/September.

Storper, M., and R. Salais. 1997. *Worlds of Production*. Cambridge: Harvard University Press.

Watts, Michael. 1994a. "Life Under Contract: Contract Farming, Agrarian Restructuring, and Flexible Accumulation." In *Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*, edited by Peter D. Little and Michael J. Watts. Madison: University of Wisconsin Press.

Watts, Michael. 1994b. "Contracting, Social Labor, and Agrarian Transitions." In *Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*, edited by Peter D. Little and Michael J. Watts. Madison: University of Wisconsin Press.

Wells, Miriam J. 1996. *Strawberry Fields: Politics and Work in American Agriculture*. Ithaca: Cornell University Press.

Yao, Chin-Tsai, and Milton Chiou. Discussion and interview with Chin-Tsai Yao and Milton Chiou, General Manager and Marketing Manager, of Thai Soon Food Products Co., Ltd., Nong-Khai, June, 1998.