Endogenous Institutional Innovation and Agroindustrialization on the Peruvian Coast

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Abstract

This paper presents an analysis of endogenous institutional innovations that have recently emerged in the agroindustrial zone of Chincha, on the coast of Peru. These innovations have included: (1) contracts between agroindustrial firm and large farmers, introduced by the firms themselves to assure timely delivery and compliance with strict requirements implied by the emerging demanding quality and safety standards for agro-export of processed asparagus; (2) management services exchanged for labor supervision and land collateral in share tenancy contracts between a management company and "farmer companies" of small cotton farmers; these contracts were introduced by the management company and are an illustration of those described theoretically by Eswaran and Kotwal. The nature and importance of these institutional changes are threefold. (1) They were induced institutional innovations driven by the requirements of agroindustrialization itself. (2) Together they had ambiguous employment and income impacts (tending to the negative). On the one hand, the emergence of asparagus and firm-farm contracts reduced employment through exclusion of small farms and shifts to capital intensive crops. On the other hand, the reinforcement of smallholder cotton and the emergence of farmer companies increased employment and income of smallholders. The institutional innovation allowed them to reduce risk and increase profits and thus access some of the benefits of agroindustrialization and globalization. While processing firm-farm contracts are common in Peru, as is the presence of NGOs bringing subsidized credit, the private management firm innovation is rare and new in Peru and apparently also in the region, and of great interest. In fact, policymakers and NGOs have recently discovered that this innovation is taking place and are asking hard questions about whether this innovation can and will be diffused. The interest in the private for-profit institutional change is sharpened by growing doubts about how economically sustainable and widespread a response that NGO help can be to small farmers in maintaining their participation in income-enhancing agroindustrialization. Moreover, with changes in land laws and markets the fluidity of the situation is apparent, with agroindustrial firms even starting to ask themselves whether contracts with large farms are necessary and best.

JEL Classification Codes:

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Introduction

Agroindustry grew rapidly in developing countries over the past two decades, and most rapidly in Latin America (FAO, 1997). Growth has occurred in traditional agroindustry and the agriculture related to it, such as in the export crops of cotton and coffee. But growth has occurred even more rapidly in agroindustry related to non-traditional products such as fruit, vegetables, and dairy.

The latter growth is driven from the demand side, as predicted by Bennett's Law, by changes in diets as incomes grow in developed countries as well as in urban areas of Latin America. An increase in non-traditional exports has also been spurred on the supply side by policies (such as devaluation, tariff reduction, and international trade liberalization) that put an end to the anti-agricultural bias that the import substitution policies had formed during the prior several decades. At the same time, the withdrawal of government support to small farmers that was part of structural adjustment made it harder for those farmers to participate in agroexport booms (Carter and Mesbah, 1993; Schejtman, 1998).

The effects of agroindustrial growth are making themselves felt in the Latin American countryside. The development literature has tended to focus on issues related to small farmers' involvement in contractual links with agroindustry. That literature found frequently that conditions are stringent and exclusion of smallholders and inclusion of larger farmers is common (e.g., in Chile, Carter and Mesbah, 1993, and in Mexico, Key and Runsten, 1999). Some studies have shown how agroindustry-farm links have affected the technologies used by smallholders (with illustrative cases in Schejtman, 1998).

Less common in the literature, simply because more recent, however, has been examination of agroindustrialization's effects on rural institutions[1] in the post-structural adjustment period. Yet one would expect endogenous institutional change to be emerging with the new constraints and opportunities after deep changes in input and output markets due to state withdrawal support to agriculture, and after substantial "de-protection" of the countryside has occurred with improvements in rural infrastructure and with market liberalization. State withdrawal and rural de-protection has created a different institutional and market context, one with new constraints but also new opportunities for farmers.

This article addresses the gap in the literature, using case studies of agroindustrialization in coastal Peru, to: (1) analyze the endogenous change in rural private institutions, and (2) presents hypotheses as to their effects on the local economy, in particular on small farmers. The latter is of interest to policymakers because of the hope that agroindustrialization, beside being of importance to competitivity of the region in global markets, might also serve to spur local rural employment and development.

The study is of the valley of Chincha on the Peruvian coast south of Lima. The area is ideal for our inquiry because it was historically a cradle of the traditional agroindustrial boom in cotton. The cotton boom has waned nationally but persisted in the most favorable production

[1] We define institutions as in Hoff et al. (1993): "By an economic institution we mean a public system of rules that define the kinds of exchanges that can occur among individuals and that structure their incentives in exchange. Economic institutions include markets and property rights, systems of land and animal tenure, obligations of mutual insurance within lineage groups, and other systems of exchange that are determined by implicit contracts or social norms."

zones such as Chincha. The area is all the more interesting because there has been a recent and large shift of the larger farmers out of cotton and into asparagus, leaving cotton as a smallholder agroindustrial crop. Asparagus dominates the recent horticultural export boom; in 1994, Peru exported 26 million dollars worth of fresh and canned asparagus -- and the value of exports increased 49% by 1996.

For both cotton and asparagus, we found rapid private institutional change and innovation. The most novel is an innovation that is a manifestation in practice of the tenancy contract institution involving exchange of management services for labor supervision, as described in theory by Eswaran and Kotwal (1985) -- that is currently stirring great interest in the development policy and project community in Peru.

The article proceeds as follows. Section 2 describes the surveys and data and zone. Section 3 analyzes endogenous institutional innovation in the cotton agroindustrial economy of Chincha. Section 4 analyzes institutional change in the asparagus economy of Chincha. Section 5 hypothesizes effects of these changes on the local economy in terms of employment and business development. Section 6 concludes.

Surveys and Data and Zones

Between March and May 1997, GRADE - a private research center in Peru - undertook a survey of 30 households in Chincha. In addition, group interviews based on a structured questionnaire were done to collect supplemental contextual data from five groups of 15-19 farmers each. These primary data were supplemented with information from the 1994 Peruvian Agricultural Census and the 1997 Living Standards Measurement Survey, and from key informant interviews in the zone. The data collected comprise qualitative information on spatial

preferences for input acquisition, as well as contractual arrangements and income sources, and quantitative information on outputs and inputs related to the main crops examined. The limits to the survey did not permit collection of consumption expenditure information.

The Chincha coastal zone, 250 km south of Lima by the coastal highway, is one of the most important agricultural valleys of the Peruvian southern coast, and has been linked to the export market cotton for more than a century. The zone has abundant aquifers for irrigation and plenty of flat cropland. The zone is dominated by the intermediate city of Chincha, whose fast growth in the past two decades has been based on agroindustry, fishing, and non-metallic mining. Chincha is near to other intermediate cities in the Sierra (and serves as their link to the coast).

More recently, an asparagus production boom has occurred in the valley, for several reasons. (1) Peru's southern coast provides an exceptionally good climate for asparagus, offering producers two harvests per year. The resulting yields (12,000 stalks/hectare) are far superior to those registered in Spain (7,000 stalks/hectare). Spain is Peru's main competitor and one of the foremost producers and consumers of asparagus. (2) Chincha is close to the Lima market. (3) In the past decade, there has been a virtual elimination of terrorism in the region. (4) Labor costs in Chincha are low compared to those of Spain. (4) Irrigated farmland with registered titles is abundant. (5) The heritage of the long cotton boom is an abundance of experience farmers, agronomists, and input and transport firms geared to commercial agriculture.

A special characteristic of the development of asparagus in this valley has been the contracts formed between modern agroindustrial firms and asparagus farmers. The firms provide credit for variable inputs, technical assistance, and even credit for land rental to induce farmers to switch from cotton to asparagus.

The valley has approximately 8,000 farmers on 81,500 ha. 31,000 of the latter are high quality land, owned primarily by larger farmers. Land is concentrated: only 30% of the farmers have more than 5 ha but control 88% of the land. That 30% is broken down into: 24% with 5-19.9 ha, 3.4% with 20-49.9, and 2.1% with more than 50 ha. 70% of farmers have less than 5 ha, and 24% have less than 0.5 ha. The average farm size is 6.4 ha.

We divide the farmers into "small farmers" (*parceleros*), and the medium/large farmers, which for simplicity we call "large farmers." The cutoff farm size to distinguish between small and large farmers is 20 ha. Small farmers have on average 6 ha, and the large farmers, 68.5 ha.

Compared to the small farmers, large farmers: (1) are more commercialized; (2) use more irrigation; large farmers irrigate 95% of their land, while the small farmers irrigate 70%; small farmers mainly irrigate with river water using the gravity method, while the large farmers irrigate from wells and with the drip method, and thus have greater water control, but also greater capital investment; (3) use more chemicals and machinery; (4) rent more of their land; 30% of the operated land of large farmers is rented, versus 10% of small farmers' land; (5) dedicate more of their land to asparagus (65% for large farmers, 8% for small farmers), and less to cotton (18% for large versus 78% for small farmers). The rest of the land of the small farmers is mainly in maize for home consumption.

At-home nonfarm activity is undertaken by 22% of the farm households. The probability of participation increases with farm size, probably because larger farmers have more cash to meet capital entry requirements. These activities include mainly small-scale processing (cheese and yoghurt), machinery rental, commerce, and cottage manufacturing. Away-from-home employment is undertaken by 30% of the farm households the Chincha zone. The probability of participation decreases with farm size. On average, the composition of income from this activity

is 44% farm wage labor, 20% commerce and transport, 33% construction, 6% other services, only 3% manufacturing, and 21% "other activities." Small farmers work off-farm in farm wage labor and nonfarm activity with low entry requirements (in terms of education and financial capital). Large farmers tend to operate larger scale and capital-intensive nonfarm enterprises and engage in education-intensive nonfarm salaried employment.

Small farmers depend for a part of their incomes on farm wage labor sales in commercial agriculture and agroindustry linked to it. About 18 % of small farmers (in the Carmen district, where we focused a rapid reconnaissance specifically on the farm wage employment issue) live on their farms and work in Chincha or in agroindustrial firms (the importance of the latter been rather small), about 70 % live in the district and work on their farms, while the rest work off-farm. About 76% work mainly on the farm, but 80 percent also sell labor around the farm, in the harvest of asparagus (and secondarily) in asparagus packing/processing plants, and in the cotton harvest. About 40% work off-farm in the surrounding valleys (Cañete and Ica), in other agroindustrial crops (potato, asparagus, grape, and cotton) harvests, and in construction, fishing, commerce, and transport. The latter two are linked to a large extent to commercial agriculture and agroindustry.

Endogenous institutional innovation in cotton agroindustry: a case recalling Eswaran-Kotwal

Cotton was, for most of the past century, the motor of economic and town growth in the Chincha valley. In the past decade, however, the fortunes of cotton have been declining due to real exchange rate appreciation, competition from liberalized imports of textiles and cotton, and increasing input costs for farmers due to cuts in government subsidies for inputs and credit.

These factors provoked a slide in cotton production nationally, from 323,000 tons in 1989 to 95,000 in 1998 (Ministry of Agriculture, 1999).

As cotton became less profitable, non-traditional crops emerged as options and were usually more profitable than cotton. This profit difference, as well as other institutional factors discussed below, provoked a massive shift of large farmers out of cotton and into asparagus as well as oranges, apples, avocados, and lucuma. This left room for small farmers to enter cotton production as a less profitable but also a less demanding crop in terms of organization and capital requirements.

While there has been some recent instances of vertical integration of ginning and textile manufacturing firms, the usual organization has been separate firms. The ginners act as intermediaries, buying raw cotton from farmers without use of contracts, and process the cotton into fiber and oil seeds to sell to textile firms and edible oil factories. When large farmers produced cotton, they either sold to ginners (acting as intermediaries for the textile firms) or bought ginning services from the ginners and sold directly to the textile firm.

When small farmers shifted into cotton, they obtained credit from the ginning firm (or from large cotton growers) and sold the raw cotton to them. When large farms shifted away from cotton, the small farmers where hooked into a system where the ginners where almost the only source for credit which was provided in-kind, in seeds and chemical inputs. The ginners were acting as assemblers for textile firms, as about half of the ginning firms where vertically integrated with the large textile firms.

Starting about five years ago, the difficulties mounted for small farmers to participate in the cotton subsector. Structural adjustment reduced access and increased costs for inputs and credit. The cost increases were magnified by the dismantling of the cooperatives in the 1980s.

Ginners stepped in to fill the input credit gap left by government withdrawal, but at rates well above the former state-subsidized rates.

To partially offset rising input costs, small farmers turned to NGOs and several rural and municipal savings/credit schemes. NGOs offer technical production assistance and credit at below-market-cost, subsidized in the main by foreign donors. These new sources of credit reduced small farmers' dependence on the ginners' expensive credit. The NGOs also negotiated, with patchy success, with the ginning firms to increase the price for raw cotton.

The coverage of the NGO schemes discussed above was partial, and left out numerous smallholders. The schemes were limited to reducing credit costs but did not address a host of other problems small cotton farmers faced, in particular: (1) lack of marketing and negotiation expertise to deal with other cotton chain actors; (2) expensive variable inputs; (3) lack of organizational capital that formerly was embodied in cooperatives which permitted economies of scale in input and credit acquisition.

These gaps in human and organizational capital, and high transaction costs, created both a constraint as well as the opportunity for innovation to meet a need. The latter arose in the form of endogenous private institutional innovation with the advent of a share-tenancy arrangement remarkably similar to that described theoretically by Eswaran and Kotwal (1985), which becomes the central theoretical perspective of our analysis of the endogenous institutional innovation in the cotton subsector in Chincha.

Eswaran and Kotwal note that "sharecropping emerges in a natural fashion as a response to the possibility of achieving a superior input mix through resource pooling in the face of a moral hazard problem." (p 356) That moral hazard is shirking in provision of labor. Supervision of labor to avoid this shirking is costly, such as via fixed-wage or fixed-rental contracts where a

landlord hires small farmers or farm laborers. However, there is a missing market for labor supervision. Small farmers lack human and organizational capital embodied in “management skills.” That lack creates both production and marketing inefficiencies. Eswaran and Kotwal envision the institutional solution as share tenancy, where landlords and small farmers are made residual claimants for management services and labor supervision, respectively. They share profits from the resultant higher output.

That theoretical model closely describes the institutional solution that has emerged in the smallholder cotton sector of Chincha, with a few additions. Three years ago, a local large farmer established what we shall call a “management company.” The latter sells management services to small cotton farmers in return for a share (25%) of the profits from cotton sales. Put in the terms of Eswaran-Kotwal, the following takes place.

The management company is made residual claimant for a factor for which there is a missing market, that of management services for cotton production and marketing. Those services are augmented by the managers’ social capital/reputation. The latter lowers input costs and “augments” with the manager’s reputation the land collateral offered by the farmers, lowering risk and screening costs incurred by local banks. The “market savvy” and bank and commercial contacts of the operator of the management company are crucial to the smooth functioning of the arrangement. He has this human and social capital because he is from a family that has been a large landowner in the area for generations, and because of his education and business experience.

The management company requires the formation of “farmer companies.” With each farmer company, the management company negotiates a contract that involves production and marketing actions, such as timing of input use and bulk purchase of inputs, as well as group

acquisition of bank credit with the manager's intermediation and the farmers' land as collateral. At the time of our survey in 1998 there were six farmer companies totaling 260 farmers. The smallest company had 15 and the largest, 60 farmers. At end 1999, there are four new groups in formation, totaling 150 farmers. Thus, the clientele is growing rapidly.

The above arrangement led to reduction of transaction costs and economies of scale in input purchase and product marketing, as well as to formal input market transactions. The latter allows a farmer company to abandon tax exoneration. (When a farmer company uses the system of tax exoneration, it can no longer use the tax it pays on the purchase of inputs as fiscal credit. At the same time, the textile firm punishes the exonerated firm because when it buys its cotton, the receipts can not be discounted according to the Peruvian value-added system.) The arrangement also allows the purchase of inputs in bulk, transported in trucks rented by the management company, overcoming a physical capital constraint. This allows scale economies in input acquisition, and purchase of inputs in Lima at significant savings compared to buying from local input dealers. Beyond these services, the manager is planning to help the client farmers with diversification of their product mix to lower risk.

Following further the Eswaran-Kotwal schema, we note that the farmers are made residual claimants to a factor that constitutes a missing market. The latter is labor supervision, which is critical in labor-intensive cotton production and harvesting. The small farmers augment this supervision with organizational capital. The latter is the farmer company. Each company must draft production and marketing plans. Their group effort reduces transaction costs in terms of the time in negotiation with the manager and makes sure that the contract is adapted to the specific needs of the group. The group approach, augmented by social capital and information on members, helps in the mutual supervision of accomplishment of production and marketing plans.

This self-supervision reduces the risk of default on loans, similar to the approach of the Grameen Bank (see Hoff and Stiglitz, 1993). Finally, that the small farmers use their own land as collateral for bank loans reduces the risk to the management company.

The arrangement has spurred change in the organization of the cotton subsector in Chincha. The farmers' companies now contract ginners' services and sell the ginned cotton directly to the textile firm. The companies get better prices than before their contract with the management company. This increases profit, as we show below. The other cotton farmers in Chincha (numbering nearly 1000) sell their raw cotton to the ginners at a disadvantage compared to these farmers' companies.

Our survey revealed that profitable options for small farmers have narrowed to either working with an NGO or with the management company. (Subjective comments during the survey revealed that the farmers did not see return to traditional cooperative schemes as an attractive approach at present.) Those outside of either arrangement are going out of business and selling their land, or are taking one of those two survival options. The ranks of those contracting with the management company are swelling with each year. This appears mainly because, even after paying the substantial management fee, the after-fee profit is still greater with the management company than farm profits in NGO-organized schemes. The profit rate (profit/cost) is 80% higher in this tenancy contract as compared to "working alone", and roughly 50% higher than the NGO option due to the use of the tax credit. Moreover, as the NGO arrangement is being fueled "from the outside" by donor funds, it is less endogenous. A working hypothesis is that it is less sustainable in the long run as compared to the arrangement with the management company. We pursue these points further in the conclusions.

Institutional change with agroindustrialization: asparagus in Chincha

The advent of asparagus agroindustry required and brought two institutional changes, the first leading to the second. The first change was in the institutions of grades and standards. The canned/jarred asparagus export market from Peru is highly demanding in terms of quality and safety standards (in particular, process standards of the HACCP type) with certification schemes by the Peruvian export association (Diaz, 1999).

The second institutional change was driven by the stringent standards and technological/capital demands involved in asparagus production. The advent of participation in asparagus export brought with it the institutional change of stringent quality and safety standards. The latter in turn induced further institutional change in terms of the emergence of agroindustry-farm contracts to assure conformance to the standards, *inter alia*. These contracts had not been present before in the Chincha valley because cotton, the dominant crop of the large farmers in the past, had not been produced and sold via contract.

The contracts require farmers to have sufficient quality land and irrigation and human capital and managerial skills to meet demanding production and marketing schedules, and to sell only to the contracting firm and submit to that firm's technical supervision. Virtually only large farmers in Chincha could meet those land and capital requirements. The rewards, via the contracts, are technical assistance, credit for land rental and input acquisition, quality seedlings supplied by the company at agreed prices, and profitability and risk reduction via a fixed price (adjusted between contracts depending on the international price).

The firms also buy asparagus from small farmers but the latter do not enjoy the benefits of contracts, and usually the price they receive is much lower than that to large farmers due to quality differences. The great majority of small farmers are simply not up to the requirements of

quality asparagus production, as they lack managerial and technical expertise. The asparagus agroindustrial firms informed us that they have a very strong preference for contracting with large farmers, because of monitoring costs and capacity constraints of small farmers.

Nevertheless, interviews with the asparagus companies also revealed that they would like to increase the production of asparagus on their own lands, obviously outside the contract system. This has recently been made possible by yet another institutional change. Until recently it was illegal for agroindustrial firms to own cropland and thus vertically integrate. That law was recently overturned. This may then undermine contract agriculture in one of the few places in Peru where it appears to have been functioning well (see Figueroa 1996).

Employment and Income Effects of Agroindustrialization and Institutional Change

Direct effects

The direct employment impact of agroindustrialization includes employment in participating farms from changes in product composition, technology, and scale of production, and employment in the agroindustrial firms. These effects are conditioned by the extent that agroindustrial firms outsource their intermediate inputs or grow/produce their own (such as whether textile firms use imported cotton or buy local cotton), and by the technology and scale differences implied by these alternatives. We hypothesize rough approximations of the effects of cotton and asparagus agroindustrialization in Chincha, and institutional change therefrom, as follows.

First, ceteris paribus, the shift in the past decade by large farmers from cotton to asparagus has tended to reduce the demand for farm wage employment, as well as direct farm labor per unit of agroindustrial output. This can be seen in three points from Table 1 and our

discussion above. (1) Asparagus production is only one-quarter as labor-intensive as cotton production. (2) Asparagus agroindustry favors links with large as opposed to small farmers, and the latter tend to have higher labor/land ratios. (3) The labor/output ratio in the cotton agroindustry is about twice that of the asparagus agroindustry.

Second, there is a countervailing employment increase from the increase in small farmer cotton production (shifting from maize), as cotton is more labor intensive than subsistence maize. The increase in profitability from the institutional innovation discussed above would magnify and sustain this increase.

Third, note that the above two effects on employment are in opposite directions; that is, asparagus agroindustrialization and institutional change implies a drop in local employment, and that of cotton, and increase. Nevertheless, a rough calculation suggests that net aggregate effects are probably negative (a drop of about 8-9%) on incomes of small farmers – but that the potential drop was substantially buffered by the endogenous institutional innovation in cotton. The reasoning is shown in the following two steps.

On the one hand, based on survey information showing that the switch from cotton to asparagus involved roughly 1,700 hectares, and based on the labor/output ratios shown in Table 1, the shift produced a 6.6% drop in agricultural employment and a second round effect in the industry of a 25% drop in employment at the agroindustry level. Overall these figures meant an 18% drop in employment income due to the switch.

On the other hand, the income increase from the increase in cotton production profitability for small farmers from the institutional innovation is roughly 10% to 15%. That income increase is based on the following information about net gains from working with the management company. The company charges 25 percent of farmer direct costs, which works out

to approximately 239 dollars per ha. The benefits can be described as savings of costs relative to what the small farmers paid per ha before entering into this new arrangement: (1) reducing input prices (24% relative to what they pay normally at the stores in Chincha) for reasons discussed above, saving 116 dollars per ha; (2) reducing loan interest by going to the local bank as a group versus to the ginning firm for credit, saving about 90 dollars per ha; (3) obtaining a better price for the cotton (as noted above, by now selling their cotton directly to textile companies after contracting ginning services); this generates gains of about 150 dollars per ha; (4) company status allows a change in tax status, allowing them to fully benefit from the value added tax system that prevails in Peru, which allows savings of 180 dollars per ha. The net effect is that the small farmers spend 239 dollars per ha for the management service, but save 536 per ha with new system, thus netting 297 dollars per ha with the new system. It is no wonder that the clientele of the management firm is swelling each year.

Indirect effects

The indirect employment effects include employment from net output changes in businesses in production-linkages forward and backward from both farms and agroindustrial firms, and from consumption expenditure linkages from incomes earned in farms and agroindustrial firms. Our hypotheses here are also only in terms of rough orders of magnitude and directions of differences, rather than attempting calculations as we did above.

Table 2 shows the use of inputs on asparagus on large farms and on cotton on small farms. While small cotton farmers are much more commercialized and "technified" than subsistence maize or potato farms in Peru, there are, nevertheless, substantial differences in the technologies used and the acquisition practices of the small versus large farmers in Chincha, and thus their impacts on the local economy.

First, nearly all farms use fertilizers, but the use rate per ha is much higher on asparagus than cotton. All use herbicides, insecticides/or fungicides. The difference for the local economy is that the asparagus farmers buy their chemical inputs from input firms in Lima, and the cotton farmers from a merchant in Chincha (although that has started to change with the farmer companies who can buy in bulk from Lima). Why the difference? Large farmers have the asset base to serve as collateral and the management capacity to make the contacts and rent vehicles to go to Lima, where they get lower cost buying in larger lots. The savings can be substantial: fertilizer prices are 20-50% lower in Lima! By comparison, farmers who have to buy from Chincha input firms are forced to buy at higher markups due to lack of competition.

Second, both asparagus and cotton producers produce hybrids. Comparing seed and seedling use rates is comparing "apples and oranges", but we can note that the purchase rate is the same (75%), so these small farmers are relatively technified compared to subsistence farmers in other parts of Peru. Both are bought locally.

Third, both farmer strata use mechanics in Chincha. But for tools, machines, and spare parts, large farmers tend to go to stores in Lima and the small farmers to stores in Chincha or to cottage-manufacture workshops. We found that the institutional change in the cotton subsector reinforces this tendency, as the cotton farmer companies prefer to buy in Lima. However, this may be changing in the medium term, as our recent followup informal survey showing that local Chincha firms are trying to compete with Lima firms and offer similar "bulk buy" deals.

We examined license grants 1989-1996 by the municipality to firms. While unfortunately not a complete inventory, nevertheless it shows large increases in: (1) asparagus agroindustrial firms; (2) farm input stores, transport, and machine and equipment repair firms; it appears that this is due to cotton production increases, and not related to asparagus as asparagus farmers tend

to obtain their inputs in Lima; (3) firms selling consumption goods, which indicates the presence of expenditure linkages from the local boom. However, we should note that the latter could be partly due to the attempts by the city to formalize businesses via registration.

Thus, controlling for the difference in technology between the two strata, there are roughly similar spatial acquisition patterns for inputs, with the smaller/poorer farmers buying locally and thus benefiting the local economy through upstream production linkages (at least to local commerce) and the medium/large farmer buying in Lima and thus getting more known brands, lower unit prices, greater information from the dealer, product quality guarantees, greater diversity of product, larger lots, and perhaps more up-to-date equipment. But they gain all this while "leapfrogging" the local economy.

Fourth, asparagus firms have an "internalization" policy, as they do part of their own transport and repairs, thus reducing linkages to the local economy. This is so mainly because they perceived high monitoring cost in key parts of their production process.

Fifth, although we do not have the data to evaluate consumption expenditure effects specifically in the households surveyed as part of the agroindustrialization study, we were able to use data from the Living Standard Measurement Study (LSMS) Survey of 1997 for the study area. They show that the richer the rural household, the higher the share of nonfarm expenditures in the total, as expected from Engel's law. The 20% poorest households have a share of nonfood expenditures of 51% while the richest 20% has a share of 58%. The share of processed food items in the total food expenditure is for the same area 17% in the 20% poorest segment while it increases to 27% in the richest 20%. Most nonfarm products are purchased in intermediate cities and modern manufactured goods. Hence, as richer households are earning the asparagus profits, and expenditure effects would tend to benefit the intermediate city and Lima, and less so the

rural areas. There is historical evidence of such an effect from large farmers benefiting from the prior agroindustrial boom, that of cotton, as the historical growth of the city of Chincha was linked to the agricultural boom -- for a century that of cotton, and now, spurred further by asparagus.

Conclusions

In an “agroindustrial boom” valley on the coast of Peru, this article analyzed recent endogenous institutional innovation in both traditional crops (cotton) and non-traditional crops (asparagus). These changes have been induced by changes in the general institutional context (such as the emergence of demanding quality and safety standards in agro-export markets), the policy and market context (the withdrawal of government support to input and credit markets), and the factor distribution context (the scarcity of management and technical and marketing expertise among small farmers).

The institutional innovations that emerged in the zone included: (1) contracts between agroindustrial firm and large farmers, introduced by the firms themselves to assure timely delivery and compliance with strict requirements implied by the emerging demanding quality and safety standards for agro-export of processed asparagus; (2) management services exchanged for labor supervision and land collateral in share tenancy contracts between a management company and “farmer companies” of small cotton farmers; these contracts were introduced by the management company (started by a large citrus farmer) and are an illustration of those described theoretically by Eswaran and Kotwal (1985).

The importance of these institutional changes is threefold. (1) They were induced institutional innovations driven by the requirements of agroindustrialization itself. (2) Together they had ambiguous employment and income impacts (tending to the negative). On the one hand, the emergence of asparagus and firm-farm contracts reduced employment through exclusion of small farms and shifts to capital intensive crops. On the other hand, the reinforcement of smallholder cotton and the emergence of farmer companies increased employment and income of smallholders. The institutional innovation allowed them to reduce risk and increase profits and thus access some of the benefits of agroindustrialization and globalization. While processing firm-farm contracts are common in Peru, as is the presence of NGOs bringing subsidized credit, the private management firm innovation is rare and new in Peru and apparently also in the region, and of great interest. In fact, policymakers and NGOs have recently discovered that this innovation is taking place and are asking hard questions about whether this innovation can and will be diffused. The interest in the private for-profit institutional change is sharpened by growing doubts about how economically sustainable and widespread a response that NGO help can be to small farmers in maintaining their participation in income-enhancing agroindustrialization. Moreover, with changes in land laws and markets the fluidity of the situation is apparent, with agroindustrial firms even starting to ask themselves whether contracts with large farms are necessary and best.

Two policy issues then emerge: (1) can policymakers do anything to facilitate the emergence of such private institutions that are profitable for supplier and demander without jeopardizing their inherent strength – their endogeneity? (2) can policymakers undertake other complementary actions to facilitate agroindustrialization in demanding profitable sectors?

On the one hand, there may be a role for the government directly, or by temporarily subsidizing or providing the facilities for private management, accounting, and technical training for farmers in zones already undergoing or with potential for such agroindustrialization. The objective would be to improve the conditions for the emergence and low-transaction cost functioning of such private institutions, both from the side of management service providers and from the side of the farmer companies. Here the policies should be aimed at lowering the transaction costs for the emergence and development of managerial services that will be demanded effectively only if they achieve a superior input mix through resource pooling in the face of a moral hazard problem as in Eswaran-Kotwal (1985). This point complements the point of Rodrik (1997), that globalization is more sustainable and beneficial to the poor when there are better risk-pooling and social insurance mechanisms or safety nets.

On the other hand, as the larger farmers, with better land and education and water access were those to be ready to profit from the shift from cotton to the more profitable asparagus, and among the small farmers, those with titled land were also better positioned to join the lucrative farmer companies, it is important that there be renewed attention to building the private and public asset base of the small farmers in these areas. That is crucial to their participating in agroindustrialization rather than being excluded from it. World Bank (1998) discusses examples of these agroindustry-facilitation actions in other zones of Peru, including provision or facilitation of the private development of: (1) physical capital (wells, nurseries); (2) managerial capital (technical expertise, management experience), (3) infrastructure (mainly roads to growing markets and input sources); (4)) key public services (such as the resolution of problems related to plant and animal health or the availability of registered land titles).

Finally, we have presented at least rough preliminary evidence that the direct employment effects of agroindustrialization in the Chincha valley are ambiguous and tend toward income concentration. However, it seems clearer that the indirect spinoff effects of the process point in the direction of concentration of gains among those already better off: the larger farm households that dominate the off-farm manufacturing and service sectors both in rural areas and in the local intermediate centers.

Recognizing that these impacts have been concentrated and seeking a broadening of participation by poorer groups would be desirable. A step toward this would be training and technical assistance and credit provision for small and medium enterprise development, especially in subsector (e.g., transport and equipment repair and construction) identifiable as profitable spinoffs from the agroindustrial economy.

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Table 1, LABOR INTENSITIES			
	Asparagus	Cotton	
		Small Farmer	Large Farmer
labor per unit of Land	0.654	0.460	0.700
labor per unit of output	0.067	0.335	0.152
crop Labor cost /Output Value	0.115	0.582	
Industry labor cost/output value	0.056	0.125	
Source: GRADE survey and interviews			

Table 2 Input use in large farms (asparagus) and small farms (cotton)

Inputs	Large Farms (asparagus)	Small Farms (cotton)
Fertilizer use	100%	95%
Use per hectare (in kilos) Ammonium Sulphate Ammonium Phosphate Potassium Phosphate	 500 300 400	 200 180 100
Main purchase location	Lima	Chincha
hybrid seed use	100%	100%
Seed Use per ha. (number of stalks/kg.)	20	1800
Seed origin: -own production (%) -bought (%)	 25% 75%	 25% 75%
Main purchase location	Asparagus plants in Chincha/Ica.	Seed producers in Chincha
herbicides, insecticides and/or fungicides use	100%	100%
Main purchase location	Lima	Chincha
Machinery Repair in	Chincha	Chincha
New machinery, spare parts and tools purchases in	Lima	Chincha/Lima
Source: GRADE Rapid Rural Appraisal, Chincha Valley, 1996-1997 cropping season.		