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The Case for Agricultural Hubs as Platforms for Growth and Development in sub-Saharan Africa

Harvey Leared

Trade, the Efficient Use of Land and Agricultural Productivity: The Case of Costa Rica and Lessons for Africa

Alberto Trejos

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About the Authors

Professor **Alberto Trejos** is with the INCAE Business School. He is a former minister of trade for Costa Rica. **Harvey Leared** is the managing partner at Acumen Africa - an agricultural consulting organisation working in the sub-Saharan region and is the Zimbabwe representative for the AGRA based African Enterprise Challenge Fund.

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E Oppenheimer & Son (Pty) Ltd
PO Box 61631, Marshalltown 2107, South Africa
Tel +27–(0)11 274–2096 · Fax +27–(0)11 274–2097
www.thebrenthurstfoundation.org

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The case for agricultural hubs as platforms for growth and development in sub-Saharan Africa

Harvey Leared

Small-scale farming has long been the mainstay of rural communities in sub-Saharan Africa. It serves as the principal livelihood activity for families and in Zimbabwe's case sustains some 70 per cent of the population. Over the past three decades, however, while the Asian nations experienced radical increases in productivity through the 'Green Revolution', southern Africa, in the main, appears to have been left behind. Whereas agricultural production was growing at an average rate of 2.4 per cent in the late 1960s and early 1970s, more or less in line with population growth, there was a drastic collapse over the next decade or so where production growth rates fell back to just 0.3 per cent while the population growth accelerated to around 3 per cent.[1]

While there have been exceptions, most recently in Malawi on the back of a massive Government input scheme, it appears that the small-scale farming sector, far from being the 'engine of economic growth' for the region has in fact become increasingly marginalised. In Zimbabwe and neighbouring countries, there appears to be a yawning chasm between the large scale commercial farming/plantation sector on the one hand and the small scale sector on the other. Small scale farmers are unable to 'tap into' the sophisticated value chains where in fact they exist. Skills transfer is limited. Donor and non-governmental organisation (NGO) assistance along with government subsidies and vacillating agricultural policies appear to alleviate the symptoms at times but never the root cause. Both the people and the environment suffer in an incessant spiral of despair.

A plethora of development paradigms have been advocated and implemented by various international agencies as well as governments over these 'wasted years' ranging from the 'commercialisation via cash cropping' in the 60s, through the structural adjustment based on demand management in the 70s, supply shifters and regional integration in the 80s and more recently sustainable development and attention on the linkages within agricultural value chains.[2] However, very little has changed on the ground and in some situations, such as Zimbabwe, small scale farmer production yields of food crops and particularly the staple maize, have actually declined over the last decade despite regular handouts of inputs from government. The charts below illustrate that even though maize production area has

increased significantly, productivity has declined sharply as well. At the same time, contracted cash crops such as cotton grown in out grower schemes for private sector organisations, show a lower rate of productivity decline in comparison to increase in production area.

At the same time, throughout southern Africa, there are in fact 'pockets of hope', small success stories which have seen radical increases of crop yields within small groupings of out grower farmers, contracted and financed in the main by private sector organisations, a natural evolution of the value chain as well as innovative and sustainable improvements in tillage methods. While there are some critics who suggest that there should be less emphasis on the small-scale sector and more on commercial agriculture if food security and economic growth are the ultimate aims, it should be noted that detailed studies have proven that small-scale food crop production shows a significantly larger multiplier effect on GDP[3] than both traditional and non-traditional commercial export crop sectors.[4]

The purpose of this paper, then, is to reflect on the experiences within the southern African agricultural sector generally and the small scale farming sector particularly, winnowing the more effective 'seed' from the 'chaff' of development paradigms and agricultural policies in an attempt to 'isolate' those principles which work from those which don't. In effect, to search for the 'missing links' and put forward a series of stepping stones which might assist agricultural policy makers and institutional agencies in order that they might more effectively link markets and inputs, labour, land and capital in a sustainable and equitable manner. A manner which might arrest and redirect that 'cycle of despair' into one of development and hope.

The constraints – why small-scale agriculture isn't working

Primarily, the problem can perhaps be seen as one of epistemology. Poverty alleviation, 'small', 'pro poor', subsistence farming and even 'food security' are terms which imply the need for charity and financial assistance rather than seeing this sector as 'an engine for economic growth' which might require a 'business model' overhaul by way of improved policies, institutions and technologies on the one hand and an injection of new oil in the form of working capital on the other. Using an economic worldview, then, the major constraints appear to surround the three key areas of policy (both Government and donor) geography and capital.

Government and Donor Policy

Over the last three decades it appears that both government and donor policy has acted as a short-term pain reliever rather than a long-term growth formula for small-scale farming communities. Given that the vast majority of voters are rurally-based, governments are ever ready to distribute analgesics in the form of subsidised inputs such as fertiliser and seed while at the same time regularly interfering in the market with inconsistent pricing policies. Such 'electoralism' serves only to create a dependency mindset amongst farmers which is exacerbated by price controls on their output and eliminates the incentives of increased yields and profit. Assistance from Donors and NGOs is scattershot in its approach and too often is overly focused on short-term poverty 'alleviation' rather than long-term wealth creation. Interventions, while often well intentioned and potentially effective, do not gather momentum or build up enough critical mass to be successful in the long- or even medium-term.

Geography

Sub-Saharan Africa is a vast region with an equally wide range of soils and climatic zones. Much of the land is arid and unsuitable for crop production while the fertile areas often occur in low rainfall and drought prone regimes. High temperatures and humidity facilitate the incidence of disease – Malaria and Trypansomiasis particularly affect farmers and livestock respectively. The distance factor adds a significant cost to both inputs and outputs and there is little in the way of extension, research, support, marketing or post-harvest management and storage in the more remote locations.

While these challenges have been successfully addressed in Asian and Latin American nations by improved agricultural technologies and access to markets, this has not been the case in sub-Saharan Africa.

Capital and Capacity

Throughout the subcontinent and particularly in Mozambique and Zimbabwe there has been massive erosion of physical, financial and human capital. In Mozambique's case this was as a result of the decade long civil war between Renamo and Frelimo and more recently a series of floods and droughts. In Zimbabwe, this can be attributed in the main to the chaotic implementation of what is commonly referred to as the 'fast track' land reform programme. Across the region, Malaria and HIV/AIDS continue to ravage rural communities resulting in an imbalance in the family unit, with many such units now being headed by teenagers who lack the agricultural or business expertise which would normally be handed down by their parents.

In summary, the model isn't working. Poor and inconsistent policy – both government and donor – implemented by weak leadership across a geographically challenging subcontinent, with little capacity and even less capital has served only to perpetuate this relentless cycle of agricultural decline and despair amongst the smallholder agricultural sector.

Pockets of Hope – the elements of success

Too much of the literature on sub-Saharan agricultural production focuses on the failures of this sector rather than highlighting the admittedly less common success stories. It is hoped that by exploring the latter, lessons learnt might be incorporated in designing more effective policies for the future. In general, it appears that where there is a significant private sector linkage with small-scale farmers in the form of contract and/or out-grower schemes which are premised on sustainably increasing yields and profitability rather than merely 'assistance', there is increased probability of success. Such schemes are common across Zambia, Zimbabwe, Malawi and Mozambique and normally focus on the cash crops of tobacco and cotton and more recently specialised labour intensive crops such as paprika, chilies and sugarbeans. Secondly, care should be taken not to 'throw the baby out with the bathwater'. Across the region there has been a natural development of complex value chains, which although haphazard, unregulated and at times chaotic, can as Ian Scoones[5] points out, 'enhance broad-based and resilient growth and livelihood generation in ways that the old agrarian structure could never do.

A tale of two villages

More accurately, this was a detailed study of 12 villages in two small-scale farming regions in Zimbabwe over a three year period in the late 1980s carried out by David Rohrbach from Michigan State University in conjunction with the University of Zimbabwe and sponsored by the United States Agency for International Development (USAID).[6] Mangwende is a high-potential region in the north-east of Zimbabwe while Chivi is a low-potential farming region in the lower rainfall area south of the country.

Since independence in 1980 and the end of a decade of war there was a remarkable surge in small-scale farming, both in terms of area planted which was nearly double that of the war years as well as productivity where small-scale maize yields increased nearly three-fold resulting in this sector overtaking the commercial farming sector in national production. In effect this 'surge' in productivity transformed

the smallholder sector from a minor participant in the economy to the major driver of national production growth. In just six years small-scale maize sales had increased some 35 times, raising earnings for this sector from Z$1.2M to some Z$64M whilst at the same time increasing household maize retentions to their highest level in 15 years.

The drivers of this often-overlooked smallholder agricultural revolution mirror to a large extent the Green Revolution which was occurring in Asia concurrently, namely:

- Availability of improved technologies and expansion of access to these technologies after the war of independence.
- Growth of input market infrastructure by government (Grain Marketing Board) and private sector suppliers.
- Establishment of credit programmes (government-owned Agricultural Finance Corporation [AFC]).
- Increased use of fertiliser and hybrid maize seed on the back of credit expansion.

However, while the villages of Mangwende continued to thrive, along with the top 20 per cent of the country's small-scale farming regions, with per capita production yields more than twice the national average and per capita maize sales at more than three times the national mean, the villages of Chivi fared much worse, reflecting the general demise of this sector over the next two decades, with productivity well under the national mean and households in this region earning less than one third of those in the Mangwende area.

What went wrong in Chivi (and most of Zimbabwe) and what went right in Mangwende?

The implications for policy makers are immense: what went wrong in Chivi along with 80 per cent of the small-scale agricultural sector and perhaps more importantly what went right in the Mangwende region? The following charts illustrate some of the differences between the two areas which to some extent approximate the diverse circumstances between high and low potential maize producers in the smallholder sector nationally.

In both Mangwende and Chivi 20 per cent of the farmers produce at least one half of the region's maize. In contrast the poorest 40 per cent are largely subsistence producers and account for less than 10 per cent of production and 5 per cent of

maize sales. The author terms the middle 40 per cent as 'transitional' who generally only contribute to maize sales in 'bumper' seasons.

Figure 1: Zimbabwean maize and cotton production (ha) 1986–2008

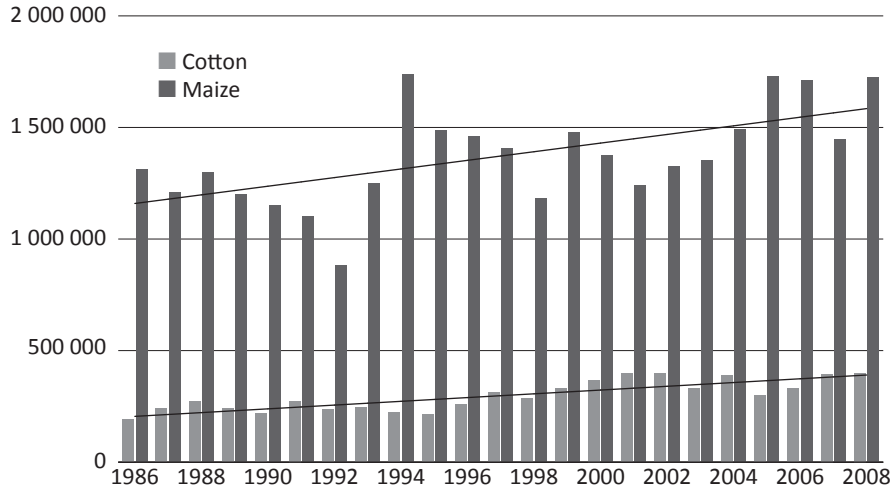


Figure 2: National productivity (kg/ha) 1986–2008

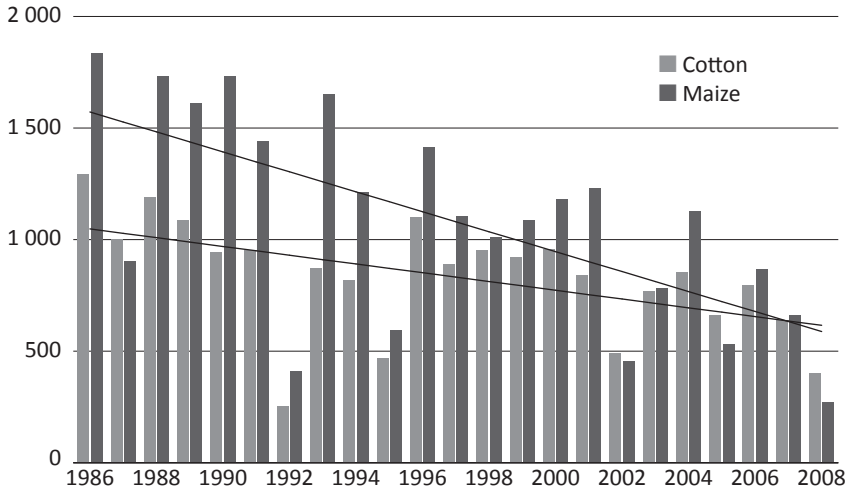


Figure 3: Annual rainfall (mm)

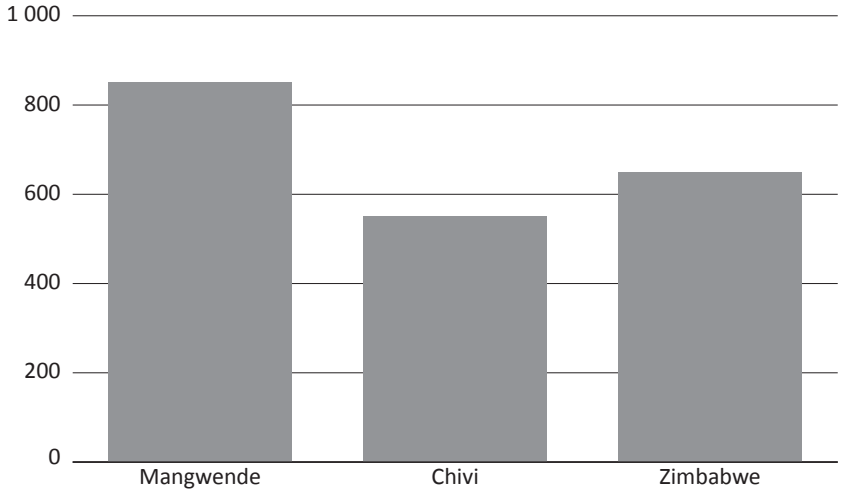


Figure 4: Cash income level

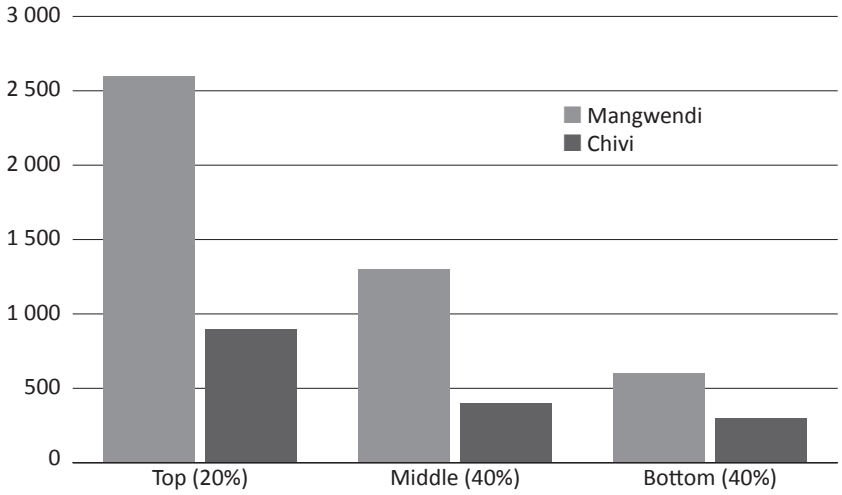


Figure 5: Mangwende households (%)

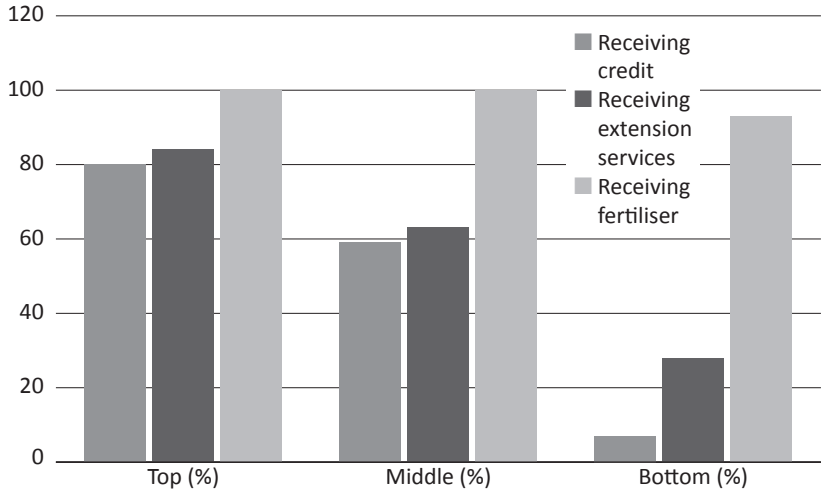


Figure 6: Chivi households (%)

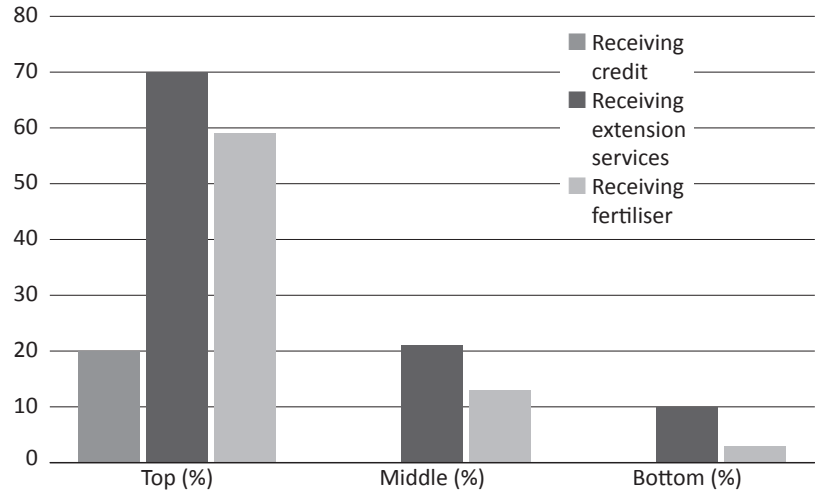
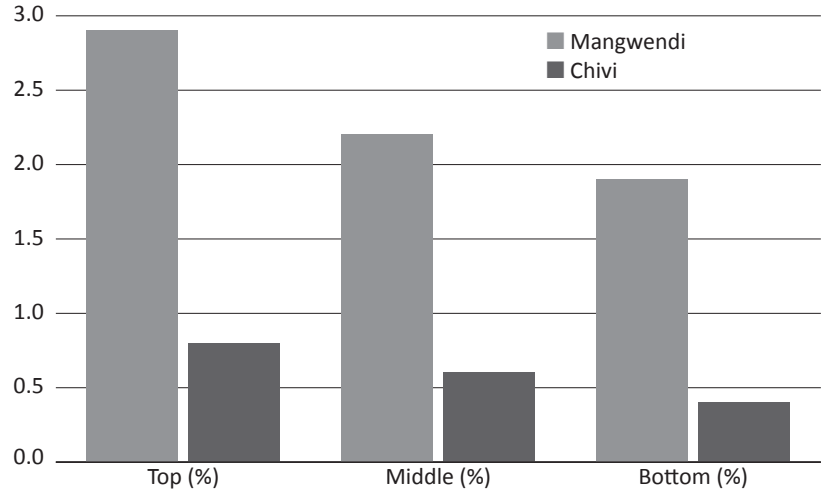


Figure 7: Maize yields (t/ha)



Project function analysis in this survey indicates fertiliser as the largest single determinant of maize yields in both regions. The survey goes on to indicate that fertiliser sales were closely linked to credit access. No credit, no fertiliser, low yield, no surplus, no re-investment.

Summary

While it is clear that the smallholders of high potential Mangwende fared significantly better than their counterparts in lower potential Chivi as a result of credit access, usage of fertiliser and proximity to markets, no single factor explains the phenomenal growth in small-scale maize production in post-independence Zimbabwe generally. Rather this can be attributed to a complementary set of changes in agricultural policies, institutions and technologies including the following catalyst and key actions:

1. The catalyst was the ending of the independence war.
2. The expansion of product markets by public and private sector.
3. The expansion of small-scale credit.
4. The expansion of input markets and increased use of fertilizers and hybrid maize seeds.
5. The maintenance of favourable producer prices.
6. Strong research and extension support.

So, what in fact are these 'stepping stones' of effective agricultural policy creation and how can they be brought together to create a solid 'platform' for competitive, sustainable, equitable growth?

Seven Stepping stones of Highly Effective farming programmes

Use Natural Principles, Adopt an African Philosophy

Policy formulation for African agriculture is too often based on Western models and Western mindsets in exchange for Western financial assistance. The success stories in small-scale agriculture on the other hand appear to be based on more natural principles and tend to address the whole system rather than parts of it.

Natural selection: in most of the successful contract growing schemes there is an element of natural selection. The more effective farmers with the highest yields and who repay their inputs gradually increase their production base while those whose yields are regularly below average and who do not service their debts become marginalised.

The group and the family unit: The African philosophy is one of the group before the individual. The more successful farming communities are those self regulating groups made up of family units who work together in the spirit of cooperative competition. These are the communities who insist on grass roots policy formulation and will not accept a top down approach. It is amongst such groupings that innovation is most abundant and where there is a natural development of the value chain.

The Mixed Model: Much of the literature on agricultural development separates small-scale agriculture and 'subsistence farming' from commercial farming. On the ground, however, it is evident that there can be no such simplistic divisions. Many of the so called 'small-scale' contract growers in this region have gradually increased their operations to what can only be called 'small- to medium-scale commercial'. Scattered in between such 'commercial' farmers are both large-scale commercial and small-scale farmers.

Symbiosis: Where mixed models are prevalent there is a natural symbiosis which occurs. The community provides labour to the medium- to large-scale commercial sector at harvest and planting while gaining access to inputs, extension and other services throughout the year.

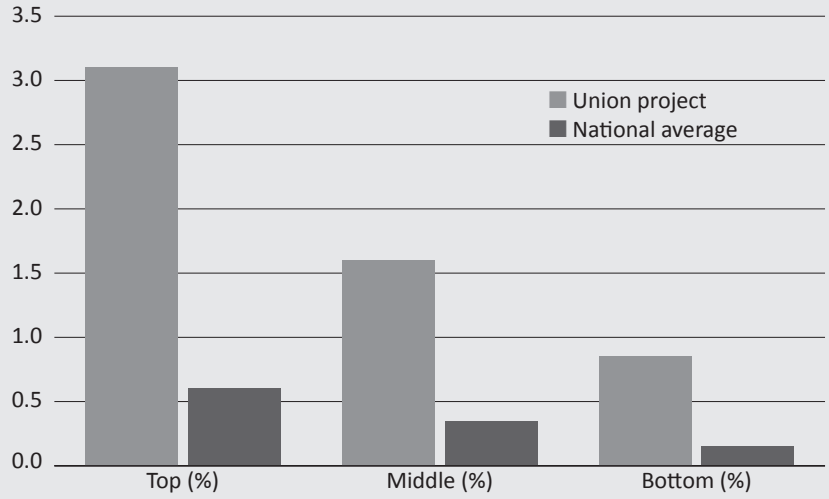
The mindset: Many donor interventions are premised on capitalism and fail to take into account the reasons why rural people engage in small-scale production

The Union Project

The Union Project is a programme sponsored by the European Union which serves to link all farming unions in Zimbabwe with stakeholders throughout the agricultural value chain with the particular aim of encouraging small-scale farmers to link up with private sector companies as out growers. Over the last three seasons, one such private sector company is Farmco – a division of Origen Agriculture.

Farmco has taken on some 600 farmers from the Union Project as contract growers, where Farmco provides the inputs, extension and support to such groupings across central Mashonaland. The results to date are promising with farmers yields increasing from the appalling current national average of under 200 kgs per ha to between 2000 and 3000 kgs per ha. Most of this improvement can be linked to reducing hectarages under cultivation, improving management techniques including minimum tillage and applying the right fertilizer at the right time.

Maize yields (t/ha)



in the first place and the diverse socio-economic circumstances they periodically find themselves in. Tim Hart, [7] in a recent paper points out that in South Africa only 8 per cent of the population derive their main source of food security from agriculture and only 3 per cent derive their main source of income from this sector. It is important, then, to design policies which take into account the concerns and realities of the small-scale farmer which differ widely from village to village and region to region as the Mangwende/Chivi study has illustrated. Food security and

access to retroviral drugs may well be more important to the small-scale farmer in the first instance than access to credit or hybrid seeds.

Aggregate!

The second and perhaps most important stepping stone is that of aggregation. This most natural of development principles seems to have been overlooked in African agriculture and to a large extent would serve to address the geographical challenges of distance. The annual surplus output of a remote farming community is not attractive to the market, given the necessary premium on transport. However, the aggregation of many similar communities in terms of both the annual output and usage of inputs and services is an attractive business proposition. In Zimbabwe some 400 000 cotton farmers are aggregated in groupings across the country by Cottco – a Zimbabwean listed company. Universal Tobacco has leveraged this principle in northern Mozambique by aggregating the production of some 120 000 small-scale into one of the most progressive out-grower schemes on the subcontinent. Aggregation into agricultural 'clusters' hubs serves to:

- Reduce the transaction costs, taking both the market to the farming community.
- Afford access to the agricultural value chain including inputs, services, transport and logistics, processing, retail and in some cases storage and post-harvest management.
- Increase the flow of information to and from the farming community.
- Provide non-farm jobs and a local market for food crops.
- Create a natural medium for the transfer of skills and agronomic extension.

Adopt Appropriate Technology, Resuscitate Research, and Intensify Training

A key driver in the Asian Green Revolution was technology and more particularly the use of high yielding rice varieties. While South Africa has adapted the use of genetically modified (GM) grains countries such as Zimbabwe remain 'queasy' over the issue. In almost all successful small-scale farming schemes there is found to be a technical edge, whether by use of more appropriate seeds such as the short season dwarf varieties of maize in those areas prone to early cut-offs of the summer rains, or fertilizers blended for particular soil types. Successful schemes always include an element of on-site training, trial plots and the like. Clearly one size does not fit all in Africa. Other important elements of successful programmes include:

- Linkages with agricultural research institutions and universities internationally.

- Community discussion forums where farmers discuss best practice.
- Appropriate and informed selection of seed varieties for particular cropping areas including reassessment of GM strains such as Bt cotton and 'Roundup Ready' soyas.
- Use of appropriate fertiliser blends for differing soil types and users.
- Effective systems of monitoring and control by coordinators and extension officers representing the private sector contractors and financial institutions.

Attract Private Capital – Reduce the Risk, Ratchet the Reward

Where there are successful agricultural contract or out-grower schemes operating in southern Africa there is also private sector finance involved. This applies to the major cotton and tobacco schemes through to the sugar out-growers and the small grains and capsicums. Given the dismal performance of investments in financial institutions, property and mining stocks across the Western world over the last year there is a real case for a return to the 'vanilla' investment in agricultural production in Africa where returns should average between 12–25 per cent annually. Overall there should be an investment environment which leads to private sector pull rather than Public sector Push. The key however is to ratchet up the reward and reduce the risk:

- **Ratcheting the reward**:
  - Liberalising controls on production and encouraging market forces to prevail.
  - Allowing investors in agriculture tax breaks and establishment of agricultural export zones with appropriate incentives.
  - Encouraging 'social' and 'environmental investment' by working with development agencies to provide concessionary finance for the establishment of health and education facilities, use of renewable fuels and re-establishment of plantations, dams and the like.
  - As a general policy and in line with the recent Lake Kivu consensus,[8] governments should ensure future agricultural policies and donor relationships are based on loans not aid.
- **Reducing the risk**:
  - Use of supplementary irrigation significantly reduced the risk of low yields or crop failures and attracts private sector investment.
  - Rigorous screening of contract growers in terms of credit and husbandry rating through community representatives reduced the risk of side marketing and poor farming practice.

- Peer review mechanism was used in many schemes where groups instituted 'self policing' and underwrote the loans of all members of the group.
- Insurance of crop inputs and in some cases the entire crop proved a major incentive to investors as well as farmers.
- Access to storage facilities such as grain silos reduced the risk of price volatility.

Build Effective Shock Absorbers

Agriculture on any continent is not for the feint-hearted. Unlike manufacturing or financial services the variables are myriad and at times biblical in proportion – particularly in Africa. Floods and droughts, pestilence and disease, commodity price fluctuations, random subsidies and taxes; all conspire to create risk and uncertainty. The small-scale farmer – unlike his Western equivalent – has little to no working capital let alone insurance or savings and normally no access to any form of social welfare. The overriding principle of successful agricultural models is the delicate balance of merit and equity. There is then, the necessity, over and above the need to 'reduce the risk and ratchet the reward' to build effective shock absorbers. These are the safety nets which are necessary to absorb the major systemic shocks of drought and flood, as well as the more minor shocks of market fluctuations and individual crop failure. (Currently in Zimbabwe, small-scale farmers are being forced to barter their life savings in the form of livestock for basic grains at around 10 per cent of the market value.) Critical to the effectiveness of the whole system is that such shock absorbers do not detract from the overall 'yield and profit' incentive. Some elements of such shock absorbers would include:

- Guaranteed floor prices for staple crops.
- Storage facilities to act as buffers to price volatility and reservoirs of grain in times of famine.
- Access to free basic healthcare facilities and appropriate drugs such as retrovirals.
- Adapt a Stepwise Approach to Land Tenure

The question of land tenure is perhaps the most emotive of all issues affecting agriculture in the region and particularly present-day Zimbabwe. While in the medium- to long-term there is a critical need for this to be addressed equitably, productively and sustainably there is, in the short-term, a critical need for pragmatic, albeit transitional, solutions. Simply put, appropriate land must be made available for effective production which leads to immediate food security and job creation and medium-term sustainable economic growth.

To that end it is suggested that larger tracts of under-utilised land should be targeted for the establishment of commercial agricultural hubs which create development and service linkages with existing small-scale producers, on a leasehold basis. Government could attract development and donor finance as well as private sector investment for the establishment of such hubs with rental incomes generated, then being available to compensate those parties who have claims on the title, being both former owners and newly resettled farmers. A critical factor is the ability to create collateral, upon which nearly all agricultural finance is premised – whether freehold or leasehold. It is the opinion of this author that, provided there is law and order, that market forces will prevail resulting in a new model of agriculture in the region which is a highly integrated mix of the formerly two disparate agricultural sectors.

Create Sustainable, Equitable, Competitive Advantage

The final stepping stone is more of an overall mission statement or overriding ethos for the agricultural sector than a particular ingredient of success. The three words, sustainable, equitable and competitive are perhaps the essence of the other six 'stepping stones' and, critically, must all be present together in any successful policy. Sustainability as a criterion is not enough on its own without competitiveness as many of the recent biofuels projects have discovered. Competitiveness without equity might be seen as the Achilles heel of the white commercial farming sector in Zimbabwe. Sustainability and equity without competitiveness on the other hand could be seen as the weakness of many of the donor schemes in Africa to-date.

- **Sustainability**
  - Minimum tillage is a proven element of success in African agriculture, reducing compaction on the soil, increasing yields and eliminating use of non-renewable fossil fuels.
  - Farming communities should be producing at minimum a mix of food, and cash crops including starch (maize), protein (soya and sugar beans) and cash crops.
- **Equity**
  - Historical disadvantages associated with colonial legacy issues and power imbalances need to be addressed in an inclusive, future looking manner. In Zimbabwe such equity would extend to redressing former title-deed owners, current sitting tenants as well as those who have been marginalised by both political regimes.

- **Competitiveness**
  - Costs of production must be competitive with regional and international trading partners.
  - Central Africa has abundant, competitively priced, fertile land in reliable rainfall or irrigable zones with access to competitively priced labour.
  - There must be attention to competitiveness all along the value chain rather than undue attention to the production aspects.
  - Government and donor policy must not undermine natural competitiveness of the market or the producer through subsidies or price fixing.

Building the Platform – Putting it all together, Agri-hubs as development beachheads

So, how best to weave together these elements of success? What scalable vehicle can be created by African policy-makers to best address the outlined constraints in order to kick start this 'engine of economic growth'? It is clear from the evidence on the ground that governments need private sector capital and at the same time the private sector needs consistent enabling policies and support from government.

This paper argues for 'aggregation' of capital, skills and services in the form of growth corridors and agricultural clusters or 'agri-hubs' which address both the distance factor and the scarcity of skills and services in a mixed commercial/small-scale model of production. The 'core' of such a hub would be commercial agriculture producing the yields and financial returns to 'pull' private sector investment. Linked to such commercial production would be substantial out-grower schemes financed by and sharing the services, logistics, extension and marketing of the commercial enterprise.

Just as the military use strategic beachheads to build critical mass in times of invasion it is suggested that agri-hubs will provide similar platforms for growth across the subcontinent. Such aggregation of agricultural activity would provide the critical mass necessary to allow skills transfer or absorption as well as specialisation and the natural development of the value chain, including value addition and non-farm job creation. In a paper presented at the PEGNet conference in Ghana in September 2008, H. Hoeffler[9] underlined the need for competitive value chains and the danger of looking at value chains exclusively from the farmer's perspective as has been the case with many of the recent interventions by African governments, international agencies and NGOs. Commercially orientated aggregation of small-scale and commercial farming would naturally ensure attention to all links in such a chain resulting in long-term viability and sustainability. This would also lead to

the development of improved 'location-specific technologies' which would reduce cost of production and increase yields and competitiveness.

Over time with 'natural selection' the more competitive out-growers would, as is happening today, access more land and more finance and develop into something of a 'medium-scale commercial' farmer. Those small-scale farmers who were not efficient would naturally be absorbed by increasing farm and non-farm jobs within the geographic reach of the hub and at worse be assisted by integrated 'safety nets'.

To offer the small-scale farmer the best chance of success the agri-hub needs to provide the following:

- Access to seasonal and developmental finance – implemented and monitored locally.
- Access to 21st century technology and appropriate mechanisation and particularly:
  - Area specific hybrid seeds and fertilizers.
- Access to agricultural inputs at the right price in the right pack sizes and on time.
- Provide planning, agronomy and extension services.
- Access to information communication technology.
- Centralised marketing and storage.
- Post harvest management services and processing.
- In-house training programs affording long-term skills transfer.
- Access for farming families to basic health and education.
- A conduit to government and donors to absorb the systemic shocks of droughts and floods.

In effect such agricultural hubs would serve to create natural and efficient links between the producer – both small and large – the supplier, the financier, the market and the provider of logistics. Each hub would provide an effective feedback loop for Government and donor policy-makers as well as institutions and researchers. In short, the agri-hub concept will serve to link land, capital and people in a sustainable, equitable competitive manner.

The advantage to southern Africa of the shared-hub concept is that it enables more effective use of scarce capital and a diminishing skills/knowledge pool during a transition period of economic growth where general development and institutional capacity is expected to lag behind such interventions. Further, by 'technology gearing' – i.e. providing linkages to regional and offshore skills through effective

use of IT such hubs can provide 'virtual research spaces' where such skills are not available domestically.

The implementation of a number of such 'beachheads' or hubs throughout Zimbabwe and the Southern African Development Community (SADC) region which balance the wants and needs of both the foreign investor with the local community and government while simultaneously addressing the key areas of education, health, and business acumen, will play a major role in the rapid increase of regional food security, the eradication of poverty and the economic growth of the region.

Endnotes

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2 *Dominant Paradigms of Agricultural Development in Africa*: Christopher Delgado.

3 Smallholder food crop production shows a larger GDP multiplier than both the traditional and nontraditional export crop sectors. Smallholder agriculture is found to have the largest GDP multiplier – 1.92; on this basis, each Zimbabwe dollar of additional value added (at 1991 prices) generated in smallholder farms leads to an increase of Z$0.92 in income elsewhere in the economy.

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8 Lake Kivu Consensus, Brenthurst Foundation Discussion Paper 2/2009.

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Trade, the Efficient Use of Land and Agricultural Productivity: The case of Costa Rica and Lessons for Africa

Alberto Trejos

In this paper, I discuss the impact that international trade can have on the allocation of agricultural land among different crops, and through that on total factor productivity in farming. I will argue that a country that faces impediments (whether policy-induced or logistic) to the agile exchange of farming products with the rest of the world, is pushed by market forces to use its land growing the food it consumes, rather than the products for which it is better suited, and that the implied loss in productivity is a major burden on farming incomes, food security and sustainable development. When a country has a very peculiar natural endowment the potential gains from trade – and thus the sacrifice that these impediments to trade impose – become very large. This idea is of course old, tried and well known – nothing other than David Ricardo's comparative advantage. The novelty – if anywhere – is in the illustration and quantification provided by the sustained trade reform in one specific country.

The illustration in point is the case of Costa Rica. This is an experience I know well and have been party to. It is also a very relevant example for two reasons. First, the size of the reduction in trade barriers – and the resulting reallocation in land-use across crops – has been particularly large. Second, by being a very humid, fertile and mountainous tropical country, its natural endowment differs significantly from the average participant in the world market, making the gains from trade a very important part of potential productivity.

Getting farming right is important for most developing countries, and certainly for most of Africa. Agriculture is in many countries the most common economic activity, and often the industry of last resort to which people fall back when more ambitious endeavours fail.[1] Much of the local market of manufacturing and services provides inputs for farming production, sell against incomes generated by farming, or process its resulting crops. In some places, there are genuine issues of international security that make it of essence that the country produces and stores enough of its food needs, rather than purchase it with surpluses from other activities. Tradition, and even religion, sometimes gives agriculture a distinct role – making it not merely another economic activity. In most countries, rural communities are in general poorer and less developed than urban ones, and their economy

relies excessively on farming. Individuals that are very poor in human capital may only be productive going back to mankind's oldest job, as farmers.

For sub-Saharan Africa, this is an essential matter. For almost all countries in the region agriculture is the main economic activity of a majority of the population, food is expensive, and youth migration to the cities is the source of several major problems. Everywhere, tradition seems to dictate what is grown and how – at the expense of well being and modernisation. Commercial farming seems to be the domain of large-holders only, a reality that contrasts with most of the world. In vast and well irrigated places like Zambia, not accessing world food markets implies leaving most land unused. In very dense and mountainous Rwanda, specialisation in the wrong products can affect whether the country's farming is a net contributor or a drain of foreign reserves, and – much more importantly – can be the key determinant in whether millions are able to feed themselves.

More than anywhere else on the planet, the world's poorest continent, and the one most linked with agriculture, depends on farming productivity being high. In Africa, few achievements would better help in dealing with rural poverty, income distribution, industrialisation and vertical integration, internal migration, unemployment and currency shortages, to name a few issues, than a better agriculture.

A better agriculture means higher productivity and stability in all farming units, including the small ones. The bulk of the improvement has to come from the efforts and entrepreneurial responses of the farmers themselves. But there are many aspects in which it is appropriate to consider agricultural productivity to be partly determined by the quality of public policy, with strong arguments for market intervention. There is one type of policy, on the other hand, that is NOT needed: the government-induced price distortions that lead farmers to assess incorrectly the relative profitability of alternative crops. When government does something that makes one agricultural product seem dearer, and another more abundant, than they really are, it is inducing farmers, through prices, to shift land use from the latter to the former. Because shifts in land usage can provoke major changes in land productivity – even in the best technological and market situations – such price distortions could impoverish agriculture quite significantly. And the largest such distortion, among developing countries, is the wedge between the world and local prices of exportable and importable crops that is induced by trade barriers.

In this paper, I explore the previous ideas. I will illustrate with numbers how theory, indeed, works in the case of Costa Rica to predict that the removal of trade barriers leads to a reallocation of land and agricultural resources towards crops with comparative advantage, thus raising measured productivity, the income of farmers, and the effect of agriculture on the economy as a whole. I will also discuss some

other aspects about what Costa Rican agricultural policy did right and wrong in this period, and derive the lessons applicable to Africa from this experience.

The Costa Rican experience

I will illustrate the main point of this paper focusing on the experience of my own country, Costa Rica, over the last 25 years. I think that this is a good case study because it did very well in terms of land reallocation across crops and international trade of agricultural goods, while being far from exemplary in a number of other dimensions, including the weakening of other policies and public services aimed at increasing agricultural productivity more directly. This contrast underlines the importance of the link between trade and measured total factor productivity.

Costa Rica's uniqueness in agriculture stems from its natural endowment. On the one hand, it is a very small country, mountainous, densely populated and with a broad system of national parks and environmentally protected regions. This implies that only 8.6 per cent of national territory, or about 450 000 ha, is arable land, adding up to about 1/10 of a hectare per person –ranking 140th in the world at that. Additionally, most of this land is topographically rugged, unsuitable for the mechanised production of the world's leading grains and commodity bulk crops. Its cereal yield, averaging this decade about 3.3 MT/ha, is behind the Latin American average.

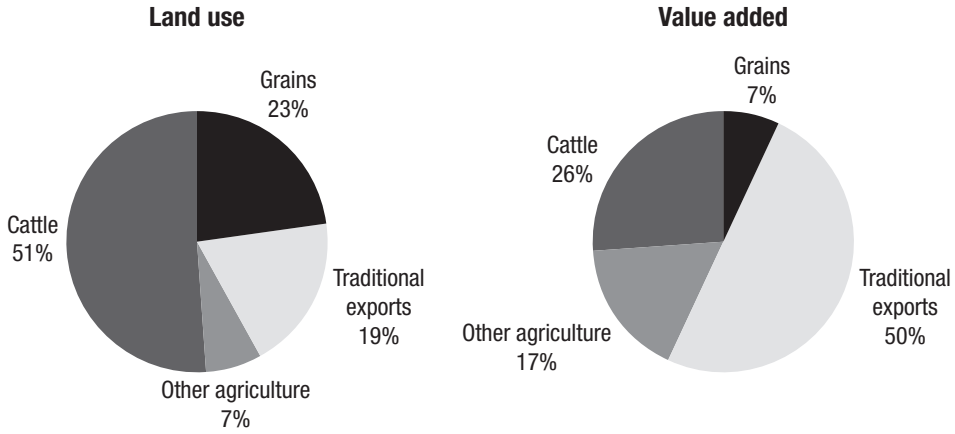
On the other hand, this little land endowment is especially valuable. Very well irrigated – Costa Rica's average rainfall of 2 926 mm per year is the highest among non-island states in the world – it is also very fertile due to the contributions of altitude, overwhelming biomass, and volcanoes. Costa Ricans are very productive workers, almost all farms are commercial (in the sense that the farmer grows his crop to sell in a market, rather than for auto-consumption), and infrastructure connecting the countryside with the city, ports and airports is very adequate. The availability of agricultural machinery and fertilisers is strong – few countries in the world use more fertiliser per hectare.[2]

In summary: Costa Rican land is a valuable resource, ideally suited for the kinds of crops where fertility, rainfall, access to market and labor productivity are important. It is, on the other hand, very scarce, and very unsuited – by quantity and characteristics, but especially by opportunity cost – for the large-scale production of grains and other bulk commodities.

Back in the 1980s, around the time of the Latin American Debt Crisis, the Costa Rican economy was one of the most closed markets in the hemisphere. Tariffs for the average good, and certainly for the majority of agricultural products, were in triple digits; non-tariff measures, including quotas, currency restrictions and other practices, also affected about half of the tariff headings, and induced a significant additional cost to the import of goods. As is often the case, the most protected markets happened to be those for agricultural raw materials.[3] There were also export taxes affecting several of the key export crops.

As a consequence of these trade practices, Costa Rican farming into the 1980s consisted of two distinct parts: a highly protected, very inefficient sector producing part of the food that the local market demanded, at relatively high prices, on the one hand, and fairly large scale industries producing traditional products almost exclusively for export: coffee – by far the most important quantitatively and historically – and bananas – mostly grown near the coasts in plantations managed by the same US companies that commercialised the fruit internationally. The alleged objective of this policy was to achieve food sovereignty (that is, self-provision of the dietary needs of the population), but this proved to be an impossible goal since certain cereals that are key in the Costa Rican diet and as fodder for Costa Rican livestock – wheat, soy, and malt – are virtually impossible to grow in the mountainous tropics, and since Costa Rica's arable land endowment is less than 1/10 of a hectare per person.

Figure 1: Land use and value added in 1980



The previous charts[4] show the resources going in, and the value coming out, from this pattern of land use, back in 1980. It should be noted that 'Traditional Exports' (which, in the case of these figures, includes sugar as well as coffee and bananas)

yielded half the output value through using less than one fifth of the land, while 'Grains' (primarily rice and corn, although, in the case of these figures, also including sorghum and black beans, [which are not a grain but rather a legume]) used up almost a quarter of the land, and yielded only 7 per cent of the value. The implied productivity difference is almost 9 to 1.

Why would farmers stay in grain production, rather than traditional exports (or the productive smaller crops that fall under 'Other agriculture'), if the value obtainable from the land can be thus multiplied by nine? Part of the answer is, of course, that not all land is suitable for all crops, nor are all farmers knowledgeable and creditworthy enough to enter – and finance their transition – into every product. But the main reason is a lot simpler: policy. Not only were the credit, technical support and other market necessities rationed in the direction of import substitution. More importantly, trade barriers of all sorts made sure that, in the land on the margin between these uses, grain profitability was biased up, while export profits were biased down.

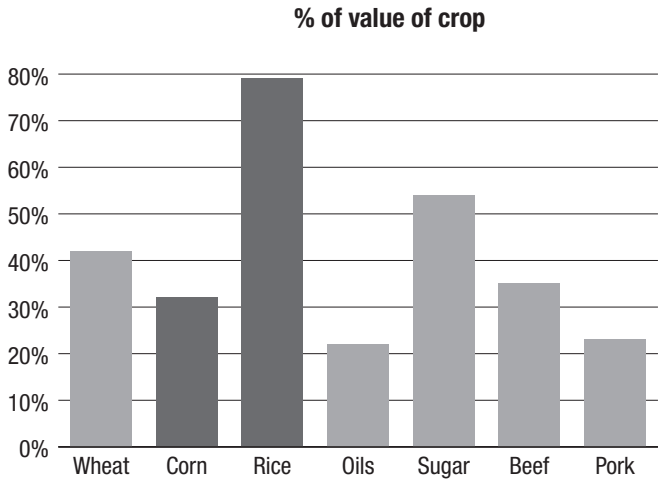
Coffee and banana exports were taxed very heavily, while plenty of regulations – among other barriers – made sure that local farmers in those products could not vertically integrate easily. Meanwhile, tariffs and other barriers applied to the import of rice, corn, sorghum, beans and most meat and dairy products ensured that the local prices for those products were significantly higher than international prices. Several staples were distributed – at a loss – by the government through the National Production Council, in a fashion that constituted both a price support and a transfer scheme. None of these measures were available for farmers in exportable products, or in alternative crops like vegetables, tubers or fruits, for which Costa Rican land happened to be more suitable.

Figure 2: Strategic Flaws of Keeping Agriculture Isolated from the World

Created a weakness where a strength was

Agricultural protectionism implied that farmers were being pushed in the direction of several crops, most specially sorghum, rice and corn, in which not only Costa Rica does not have comparative advantage, due to the lack of enough appropriate land, but also crops that happen to be heavily subsidised by other countries. In particular, rice is even today the agricultural product that is targeted by the most distortive internal support measures worldwide, and the average ton of rice produced in the world fetches $79 in government transfers for each $100 it gets in market price. Corn subsidies are not that high, but still significant enough.

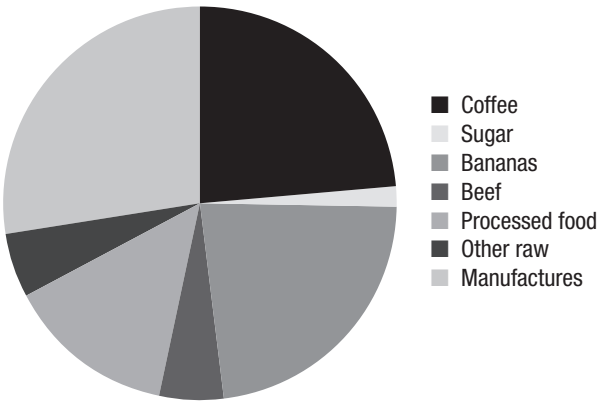
Figure 3: Global subsidies



Committed maximum PSE allowed in the Uruguay Round
Source: World Trade Organization

A strategic contribution that agriculture could also make back in the early 1980s was as a currency earner, since at the time there was a balance of payments crisis and extremely limited access to reserves. The following chart[5] shows the total export revenue back in 1982. A closed economy implied that many potentially competitive products – in and out of agriculture – could not emerge as exports, making total currency earnings smaller, and concentrating them among too few products, with significant short-term volatility.

Figure 4: Costa Rican exports, 1982



The choice of using policy instruments to push land into import substitution was a large strategic mistake. The key weaknesses of import substitution policies are well known, and this is not the place to repeat them. Nevertheless, other implications of this policy need to be pointed out. It was distributionally very damaging, as the ranks of the poor were enlarged by making food expensive, and by making small farmers mis-utilise the main asset they owned. Indeed, at the time, earnings per worker outside of agriculture were 2.5 times larger than those in agriculture, and despite significant migration to the cities, rural poverty was significantly higher than urban poverty.[6] Isolation from the world also implied that Costa Rica failed dramatically at another challenge: that of opening non-farming opportunities to some of the children of farmers, so that small land holdings did not get further diluted with each generation.

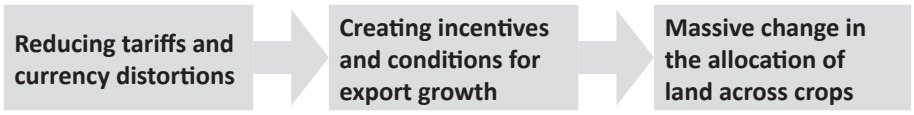
Change

As the debt crisis turned worst, the political forces that had preserved the status quo eroded, and reform was finally possible in Costa Rica. I, and others, have discussed that process in depth elsewhere. For what matters in this paper, the key issue is that policy was re-directed towards the joint goal of opening the economy to the benefits of international trade, and fostering the abilities and private initiatives that would allow exports of new products – initially, mostly agricultural – to compete in the international market and to grow.

The most significant change was, simply, reducing the barriers to imports and exports. Tariffs were reduced dramatically, first unilaterally, and later in application of the entrance to GATT and to a variety of bilateral and regional trade agreements. Quotas were eliminated. The use of customs and sanitary practices as an excuse for

imposing non-tariff barriers to trade was significantly reduced. Practices of central government control over land use and crop allocation were eliminated, and support to agriculture stopped being linked, in most cases, only to import-substituting crops. Today, the weighted average tariff is 2.3 per cent, 80 per cent of imports enter the country tariff-free, and with only seven exceptions, all applied tariffs are coordinated with the Central American Common Market neighbours through a simple formula that ranges between 0 and 15 per cent .[7] The job is incomplete: a subset of those seven exceptions still causes a costly distortion, and further transition is necessary, as discussed below. Nevertheless, the elimination or significant reduction on the overwhelming protection to some products, and the creation of an environment that fosters entrepreneurship towards exports, still left significant results.

Figure 5: The Process



The elimination of tariffs and import barriers is a necessary condition for export growth: without it, the artificial profitability of producing import substitutes will be the main reason why land is not reallocated to exportables. But it is not enough. The process also included a series of initiatives aimed at fostering exports. Some of them were very blunt, like a 15 per cent subsidy (known as the CAT) for all non-traditional exports that existed for over a decade between the 80s and 90s. Others were more subtle, like the activities of the Costa Rican Investment and Trade Development Board (CINDE) (a private foundation that facilitated the training, market intelligence and technological transfer for new exporters in the 80s, and redirected itself to foreign direct investment (FDI) attraction since the mid 90s) and the Foreign Trade Corporation of Costa Rica (PROCOMER), the government export promotion agency. Other policies included an exchange rate management that prevented the oscillation of the real exchange rate, providing a safer environment for exporters by reducing currency risks.

Besides direct export promotion activities, Costa Rican agricultural exports have benefited from a series of practices that emerge from private initiative. Cooperatives have enabled small and medium size farmers to engage in downstream activities (processing, distribution) that require volume, in important crops including coffee, dairy, sugar and palm oil.[8] In other crops – with potatoes and onions being the main example – the product is sold raw and then there is little purpose of

cooperatives for vertical integration, but organisations putting together hundreds of small farmers (like the *Coorporación Hortícola Nacional*) can give them a better position to negotiate with government and with retailers, and also to undertake research, labelling, sanitary, dedicated infrastructure and other initiatives. Public/private institutions exist for coffee, bananas and sugar to manage the market power that, collectively, the country has in the global markets of those products, and also to undertake research and development initiatives.

Most interesting, small producers of golden pineapple and citrus enter into strategic alliances with processors/exporters, by which the technological package is exchanged for long-term delivery and purchase contracts, and productivity has risen somewhat rapidly.

In a context in which general policy instruments are aimed at fast export growth and diversification, while specific policies directed at raising agricultural productivity and competitiveness have been weak, these social and institutional arrangements for specific crops have played an important role, without which the fast transformation of Costa Rica into a major agricultural exporter would not have taken place, and/or would not have involved a broad range of small, medium and large farmers alike.

Some Interesting Collective Arrangements

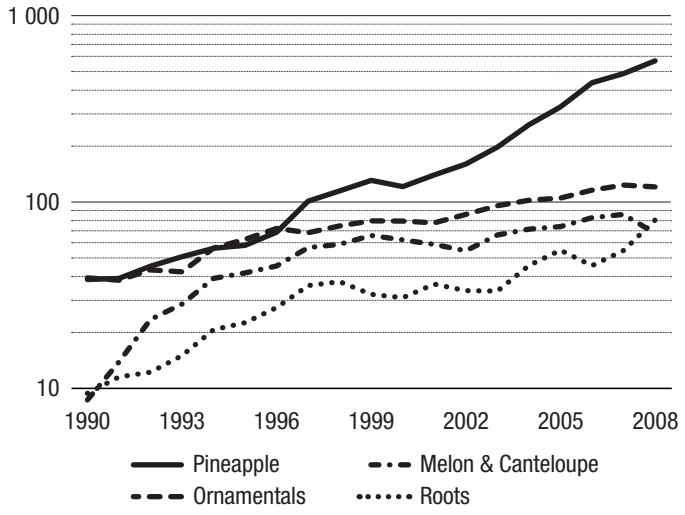
Cooperatives • Coffee and dairy
Producers organisations • Potato
Public-fostered industry organisations • Sugar
Technical transfer arrangements • Pineapple
Research centres • Banana

Hausmann and Rodrik[9] have argued that the development story of several fast-growing nations share an important role of discoveries, that is, of the fast learning and productivity increase processes that are unleashed in the early emergence of a new industry, perhaps one for which barriers to entry are suddenly removed. Umaña[10] has argued that, quantitatively or qualitatively, the origination of several crops – mainly golden pineapple – in Costa Rica is a good example of this

process. This, not only because those activities came out of nowhere and became very large very quickly, but also due to the technological and productivity forces that were unleashed, and the creative new organisational arrangements that accompanied them. Indeed, it is the case that during the years of protectionism and an overvalued currency, investing in unknown and risky new activities as strongly discouraged, especially when compared to the relatively easy decision associated with following the path of import substitution. Only those export crops that the country had known for years – coffee – or that had been developed in extraordinary circumstances from outside – bananas – could jump over those hurdles.

As exporting innovation was not only allowed but clearly fostered by policy and the economic environment, entrepreneurship and innovation in other fruits, raw products and processables unleashed, and Costa Rican farmers 'discovered' the country's latent comparative advantage in new products like golden pineapple, melon/cantaloupe, roots and ornamentals. The following graph illustrates the fast and steady process by which those products grew and rode those early and productive learning curves.

Figure 6: New export crops



Discoveries: The emergence of new export crops[11]

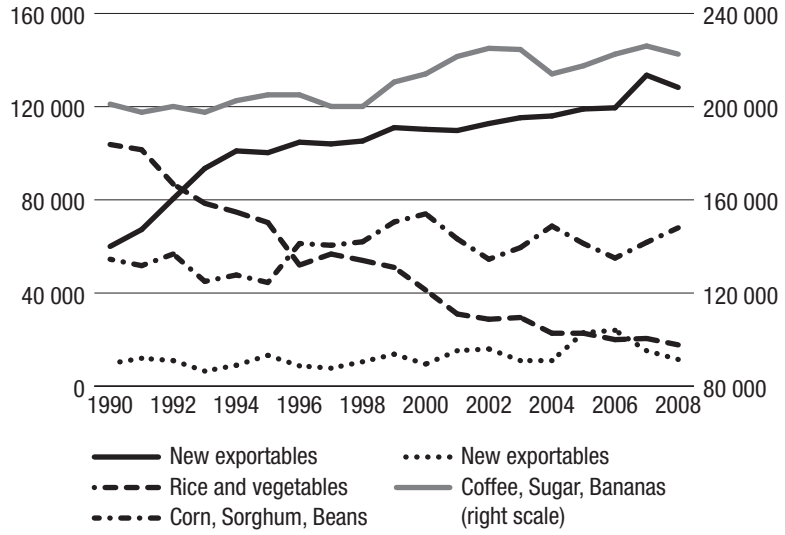
The Consequences

The initial consequence of the trade policy shift was a massive change in the pattern of the use of land, away from the newly unprotected staples of domestic

consumption, and towards a large variety of exportable products that went along with comparative advantage. Mostly, land was pushed away from crops for which mountains, tropics and water are problems, to others in which they are blessings. The process was quick in some products, and slow in others. It also required some fits and starts, with several exportable crops emerging for a few years and then being replaced by others, as the industry matured. But, in the end, the main consequence of all this has been that nearly 150 000 ha (more than a quarter of the total arable availability) has shifted from import substitutes to exportable commercial crops in the last quarter of a century.

The following graph illustrates the pace and magnitude of the change post-1990. The data are eloquent: since 1990, the area destined for sorghum, corn and beans has fallen by 81 per cent, liberating nearly 82 000 ha (or about a fifth of Costa Rica's arable land) for the expansion of exportable crops, both new and old. This is only part of the story, as much of the change happened between 1986 and 1990 already. Corn production already had fallen by half during the late 1980s, while sorghum pretty much disappeared – output fell by 95.2 per cent. Tobacco and cotton, two products of lesser importance that were also heavily protected back then, also fell by 16 per cent and 25.6 per cent in the late 1980s.[12]

Figure 7: Land use in Costa Rican agriculture, 1990–2009



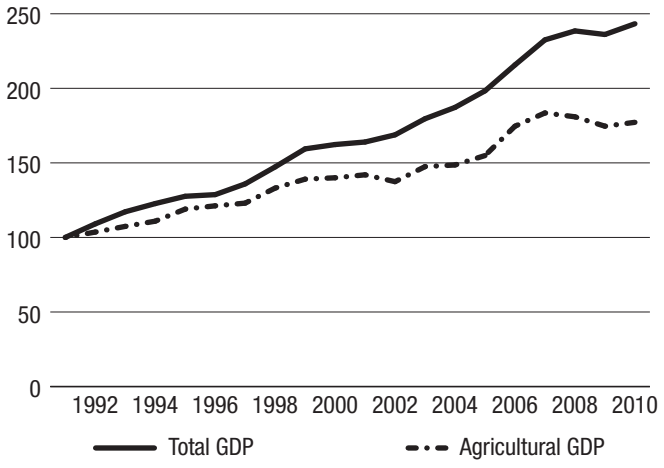
Why is this change important? Because once the obstacles to the message of prices and land reallocation are removed, this shift goes in the direction of higher productivity. Back in 1990, the productivity of a hectare in vegetables was 6.73 times that of a hectare in corn or beans; the difference was 6.98–1 for the traditional products

(coffee, sugar and bananas), and 23.34–1 for new exportables. Moving 70 000 ha from corn and beans to new exportable crops was, in value terms, the output equivalent of adding 1.6 million extra hectares to the old crops (that is, four times the country's total arable land endowment). A better use of land was therefore the main consequence of trade liberalisation: being in the right crop can lead to significantly better results than getting more productive in the wrong one.

This argument, furthermore, strengthens over time, because the 'discovery' features of some of the new products far surpass what one could have hoped to achieve in the old crops. The 23.34 x 1 difference in 1990 grew into 32.31 x 1 by 2007, after the fast productivity growth enjoyed in new crops (mainly in golden pineapple) that did not take place in other, older, uses of land.

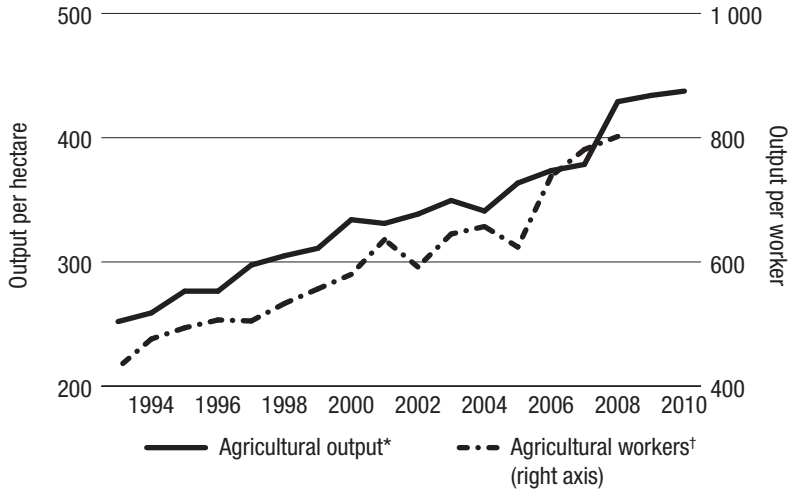
In the almost 20 years included in the following graph – again, omitting from the calculation the 1986–90 period due to changes in measurement method – the size of the agricultural sector, measured in inputs, shrunk slightly: roughly the same amount of land, planted by 9.7 per cent less workers, and receiving 5 per cent less real financing per hectare. Agricultural output did, nevertheless, grow by over 3/4 in the same period.[13]

Figure 8: Total GDP and agricultural GDP



Considering the fall in inputs, the growth in output represents a significant increase in productivity. The next chart shows the evolution of productivity per hectare and per worker.

Figure 9: Agricultural output per hectare and per worker



* Planted area has not changed more than 3% up or down in three decades. There is no new land … on the contrary, as conservation recovers the cattle and some marginal lands, and urbanisation continues in the Valley.

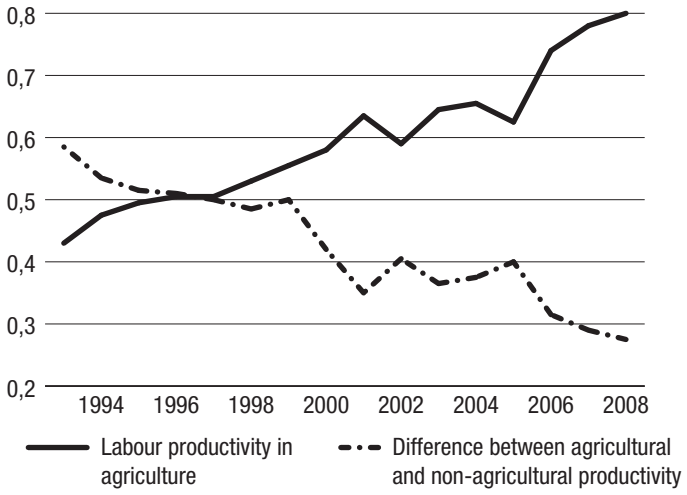
† In the same period, the number of farm workers falls 9.7% while the working population of course doubled.

One should note that most of the observed increase in productivity per hectare responds to the reallocation of land away from import substitution and towards more productive exportable crops. To be precise: three quarters of the gains can be explained by trade policy, and not by physical or technological production improvements at the farm level.

An example may help illustrate the forces at play, and the numbers are quite revealing. Consider for a moment the case of yellow corn and golden pineapple, two crops that to some extent can be grown in the same places. Corn is a staple carbohydrate in the Costa Rican diet (as well as fodder for poultry, the main protein in that diet). The domestic market for yellow corn in 2007 reached 607 000 MT. Since the conditions for growing this cereal in a Costa Rican climate and topography are not ideal, it would take on average as many as 281 878 ha – well over half of the available arable land – to grow that much corn locally. Meanwhile, the same quantity of corn can be purchased in the international market at a cost of $124.5 MM, and it only takes 8 958 ha to grow the necessary pineapple to get that amount of foreign currency. The implied productivity difference is 31 x 1!

Is this a good performance? I believe the answer is a qualified yes.[14] The growth in agricultural output and productivity has implied that the gap in income between agriculture and non-agriculture, as the next picture illustrates, has been falling significantly in the same period. While in 1993 the average output per worker in farming was almost 60 per cent lower than in other activities – with remuneration obviously following suit – by 2008 it was only 25 per cent lower.

Figure 10: Gap between farming and non-farming labour productivity[15]



Of course, as will be argued below, this is not a finished process, and there is at least one product – rice – in which protectionism is still causing some inefficient distortions in the allocation of land, costly to consumers and to the farmers themselves. Nevertheless, considering the size and density of Costa Rica, the results in export growth are quite significant. The next two tables show that Costa Rica is the sixth highest agricultural exporting nation per person, and the third highest per area, in the world. The countries in the first table are typically very well endowed in land per person, and therefore unlikely to be in the second table. Only Costa Rica, New Zealand and the EU appear in both tables.

Table 1: Top ten nations in exports per person[16]

	Exports	Population	Exports per person
New Zealand	6 320	4	1 510
Australia	13 480	21	651
Uruguay	1 701	3	513
Canada	16 016	33	591
EU	167 837	388	432
Costa Rica	1 898	4	431
Cyprus	327	1	387
Argentina	13 940	39	356
Lithuania	1 208	3	356
Latvia	791	2	346

Table 2: Top ten nations in exports per hectare

	Exports	Arable land	Export per hectare
Switzerland	2 385	410	5 817
EU	167 837	73 272	5 298
Costa Rica	1 898	425	4 466
Malaysia	7 982	1 800	4 434
New Zealand	6 320	1 500	4 214
Kuwait	50	15	3 361
Cyprus	327	100	3 275
Mauritius	301	100	3 011
Israel	761	317	2 402
Jordan	343	184	1 866

Effect on the Overall Economic Performance

I have argued elsewhere[17] that the broader economic change in Costa Rica over the last quarter of a century is exemplary in many ways, and results largely from its efforts in trade liberalisation, export promotion and FDI attraction. While it is not one of the fastest growing nations in the globe, it is an interesting case of a middle-income country with a comparatively high growth rate, which is concerned and has preserved a series of social, political, institutional and environmental strengths that complement economic performance and is in the path, hopefully, of sustainable development. Costa Rica's growth in real PPP income per person is the second highest in Latin America (after Chile's) since the end of the Debt Crisis. The qualitative changes in its economic make-up, again largely thanks to trade, are very promising.

The impact of this growth is not only felt by the well off, but also by the middle classes and the poor. We can see this in the fall – faster than every other country in

the hemisphere – of the extreme poverty rates, measured on a common methodology using PPP real income, and illustrated in the next graphs:[18]

Figure 11: Percentage of population under $1,25 per day PPP

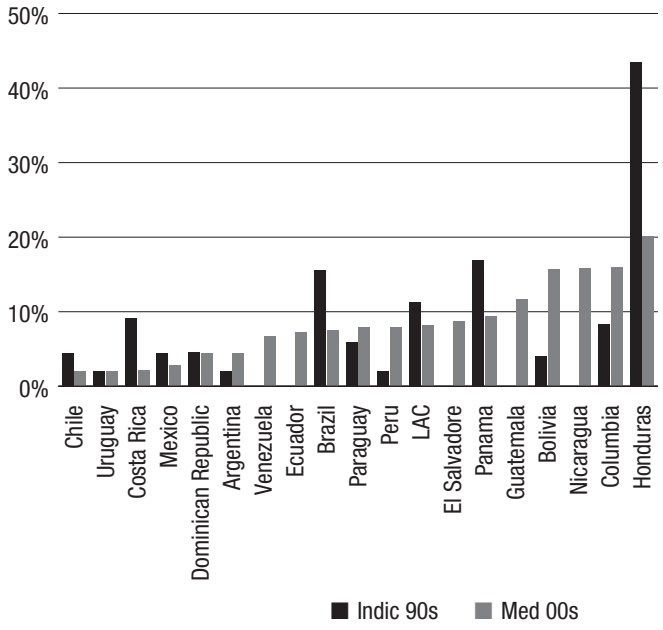
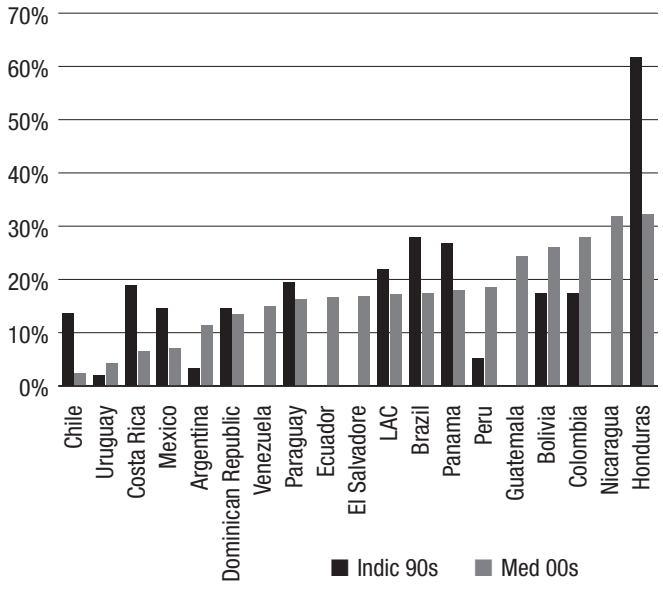
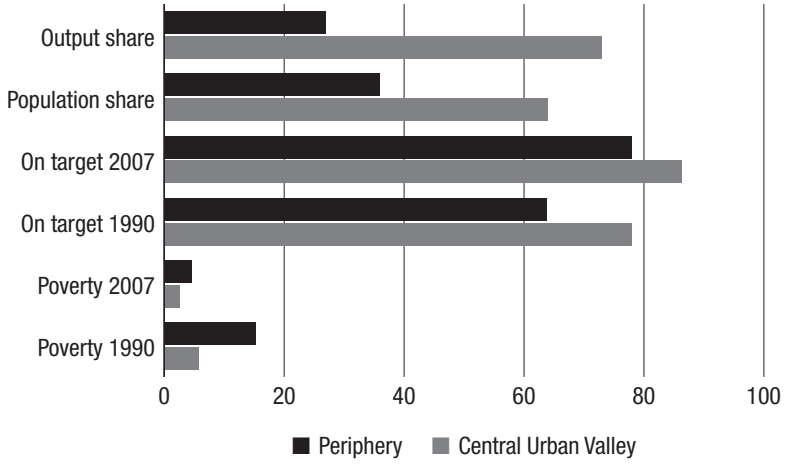


Figure 12: Percentage of population under $2 per day PPP



The change in agricultural productivity, and the emergence of a non-agricultural rural economy, are the main reasons why the gap between the city and the countryside has closed somewhat. This gap still exists, and is large: as shown in the next graph,[19] the urban Central Valley holds 64 per cent of the population and 73 per cent of national output, implying a 52.1 per cent difference in per-capita income relative to the rest of the nation. At 86.3 per cent, the fraction of the population of the Central Valley that can afford the nationally-defined 'Basic Consumption Basket' is higher than the 77.9 per cent that can do so in the countryside; the extreme poverty rate in the Central Valley, at 2.6 per cent, is much less than the rural 4.6 per cent. But the graph also shows that the improvement, according to both poverty rates, has been much larger outside the Central Valley, where since 1990 the fraction of the population reaching the Basic Consumption Basket has increased by 5.8 per cent more, and the poverty rate has fallen by 7.6 per cent more, than in the Central Valley.

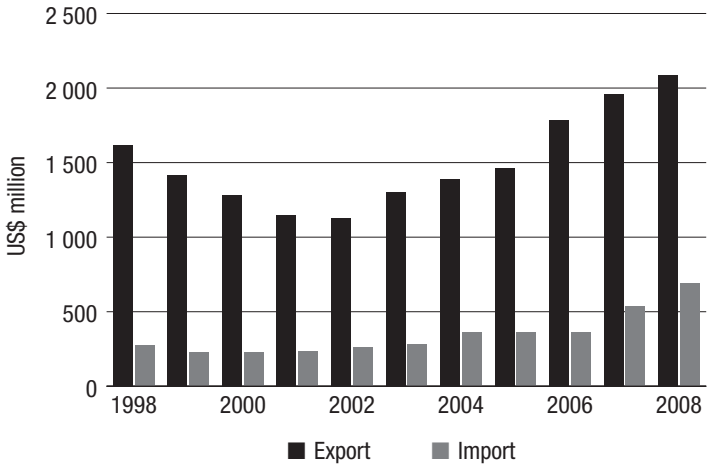
Figure 13: The Central Urban Valley and the Periphery



One must underscore the strategic importance of the trade surplus that Costa Rica now enjoys in agriculture. Although the value of agricultural imports has increased recently – in part as less area is dedicated to import substitutes, and in part because commodity prices have increased, including wheat, corn and rice, our main imports – the value of exports has increased even more, and there was in 2008 a trade surplus in agriculture of over $1.3 billion, as illustrated in the next graph.[20] Without this surplus, the balance of payments would not be solvent, and the equilibrium exchange rate would imply a much weaker local currency. More importantly, this

surplus can now purchase the grain needs several times over, while under import substitution the needed purchases could barely be paid for.

Figure14: Costa Rican agricultural trade



Things that Went Wrong, and Why

So far in this paper, only the positive side of the story has been told: opening of the economy leading to prices that better reflect the opportunity cost of alternative crops in the international markets and, with the help of other interventions, pushing to a massive reallocation of land between crops, in a manner that increases productivity, farm incomes and overall national socio-economic performance. While I do believe that is the main gist of history, it is important to learn as well from the failures and mistakes of the last 25 years, which reveal that more could have been achieved, and that some pain could have been avoided. Two salient problems should be highlighted: the weakening of productive development policies in agriculture, and the misdirection of the scarce public resources to keeping doomed crops rather than to reconverting and promoting viable ones.

Weak productive policies

- For fiscal and other reasons, government ceased investing in raising the productivity of agricultural producers
- Agricultural institutions were left too weak to do something, and too expensive for doing nothing

Misdirection of resources

- While new exporting sectors flourished without the direct help of the state, public resources kept being directed at compensating the weaknesses rather than fostering the reconversion of the old, protected crops

Even analysts that are very trusting of the creative forces of markets and international trade would acknowledge that there is an important role that public policy, and in particular productive development policies, can have in agriculture. In particular:

- Many public goods, which are under-provided by the market even in the best of circumstances, are specific to agriculture. Cases in point include transportation, storage and irrigation infrastructure.
- There are many externalities in farming, related to the non-proprietary value of knowledge and technological progress, and also in sanitary problems, water usage and other matters.
- There are scale problems in the needs that small farmers have of technical advice and extension, as well as mechanisation, which require some forms of pooling among many producers for these things to be available. Such pooling emerges privately sometimes, but not always, and certainly not in places lacking the type of social capital that enables the requisite trust and coordination.
- Storage, distribution, commercialisation, processing, financing and insurance are needs that the market in principle can provide, but that in the conditions of economic instability, weak property rights and feeble rule of law often prevailing in developing countries, will not emerge in the absence of some policy action.
- In many developing countries there is a strong correlation of poverty, on one hand, with agriculture and rurality, on the other. In those circumstances, the effort for more equity passes through aiding the weakest members of society who are, often, farmers. It also relates to ensuring – through regulation, organisation or the promotion of competition – that the rewards to production really reach into the value chain all the way back to farmers, in circumstances in which processors and distributors hold much of the market power.
- Finally, food security is also a reason why a country needs active agricultural policy. It is a strategic issue for any nation to secure that the necessary products to feed the population are available, and in a position to be stored and distributed – a goal that in some places requires a sufficient fraction of that food to be produced and stored domestically. This food must have the sanitary and dietary qualities to ensure effectiveness and sustainability. Finally, it should also

be affordable to the broad majority of the population, either directly or through income support. These three objectives, at times in contradiction, of availability, quality and affordability, are necessary if the country is to consider its food supply to be secure.

In other words, there is an important role for agricultural policy. By the mid 1980s, however, in a severe fiscal crunch due to the pressures of the Debt Crisis, and facing fairly ineffective agricultural state institutions, the choice was made to sacrifice their general budgets significantly.

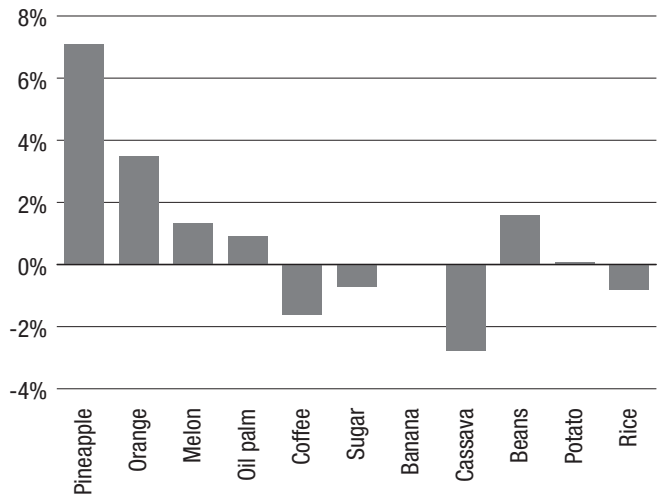
The little budget that was left in those institutions began to be captured by pressure groups through policies that have little to do with agricultural productivity, and that can only be described as transfers. One example of this is the use of the Productive Reconversion Program – originally thought out as a credit fund to help small farmers to leave uncompetitive crops and enter more promising ones – increasingly as a general credit program, typically funding the large rather than the small farmer, for activities that have little to do with shifting between crops, and with the main expense being the politically motivated and periodical episodes of indiscriminate debt forgiveness. Another example is that the entire WTO allowance of internal support for agriculture that Costa Rica has committed is allocated to only one crop – rice – in which 80 per cent of the crop is produced by large-scale, industrialised companies that hardly need or deserve the subsidy, and the other 20 per cent by small-holders that would be better served by helping them change their crop, rather than stay in it.

The budget of the Ministry of Agriculture and its counterpart institutions for 2010 was well under $150 million, very small for a country with $30 billion annual output, a government costing roughly $9 billion, $3 billion worth of agricultural output and $1.8 billion total farm exports. Its allocation is also clearly inefficient. Almost 40 per cent of the total goes to the National Production Council (that used to manage the price support mechanism during the 1980s, and today does little more than pay for its bureaucracy and run the wrongly named Production Reconversion Program). Administration and payroll expenditures of the ministry itself, plus the IDA (land redistribution), take another 36 per cent. Only 8.6 per cent of the money goes to agricultural extension, and 4 per cent to planning, sanitary measures and technological transfer.

In this context, it is hardly surprising that this period of record growth of productivity across crops, the performance of productivity within crops has been dismal. The next graph[21] displays the annual average growth in productivity per hectare for a number of key crops. Not only is it telling that so many of the numbers are

negative, and almost all are generally low. More to the point, the top three performers are crops in which the state has invested nearly nothing in promoting technological change, extension or any other form of improvement and the entire change has come from private solutions. As a producer once told me, for farmers (small and big) in the new crops, the Ministry of Agriculture might as well not exist; for some farmer organisations, the livelihood comes from the Ministry, and it is the farm that might not exist.

Figure 15: Costa Rican annual productivity growth



Food Security and Food Sovereignty

In the domestic debate about agriculture, opponents to international trade often cite their concern for food sovereignty, understood as the autonomy and safety that a country gets from growing its own food. The notion is that by no longer growing essential crops that we eat, but rather substituting them by exportable non-essentials, the country is made weaker and more dependent on the rest of the world.

The notion of food sovereignty is often used as interchangeable to that of food security: the safe supply, adequate quality and affordability of the required diet for the citizenship. The point I wish to make here is that these two concepts are instead at odds with each other. Protectionism, the only way to pursue food sovereignty, is the largest threat to Costa Rican food security.

Why? There are three main reasons.

First, in a country so unsuited for grain production as Costa Rica, well linked to world markets and at peace with others, an adequate supply of food is more at

peril by barely producing some of our cereal needs, than by producing less of them and instead generating an agricultural surplus that can easily pay those cereal needs several times over. A country with no agricultural trade surplus, needing to use non-agricultural currency to pay for all of its wheat, some of its corn and some of its rice, is less safe about its access to those than a country that produces none of its corn and a bit of its rice, but has enough exports to pay for those fourfold.[22] If, as the example illustrated above, a hectare of land planted with pineapples can generate the currency that pays for 31 times the corn that could be produced directly in it, the adequate access of that corn is more secure by using the land efficiently.

Second, some foods are inputs in the production of other foods. Costa Rica has competitive poultry and dairy industries in part because the inputs for those industries can be purchased at international prices. If tariffs and other distortive mechanisms were put in place to induce the profitable auto-provision of corn or soybeans, by making them more expensive, could the poultry industry – whose main cost is precisely that corn and soy as fodder – compete?

Third, protectionism makes it feasible to produce certain foods by making them more expensive, and thus threatening the ability of the general population to afford those foods. Costa Rica still has about 6 per cent of its population in extreme poverty, and about 17 per cent under the national poverty line. If, by insisting on self provision at a higher cost, food was made more expensive, how many more people would be in poverty? How many Costa Ricans could no longer afford the basic diet? Would they be more sovereign by going hungry?

The Pace of Reform and the Agricultural Agenda Ahead

If one agrees that the productivity increase associated with the gains from trade and comparative advantage are too large to give up, a question remains about the right pace of reform. Should the market of key agricultural products be opened quickly, prompting the rapid change in the use of land, but at the expense of higher costs for farmers along the transition? Should slow adjustments be made instead, giving plenty of time for the grower to prepare for change and adapt to new crops and uses of land, but delaying the increase in overall productivity thus implied?

Costa Rica has tried both extremes. In the case of the tariff reduction that led to the substitution of corn and sorghum for exportable crops, the surgery was performed without anaesthesia. Tariffs fell in a matter of a few years, and farmers were given very little support in learning about it and preparing to grow other crops. Sadly, many of those farms had to change hands, as the original grower of the protected crop was not prepared to also be the one changing the use of the land.

In the case of other protected products, transition has instead been remarkably slow. The most obvious example is rice, the key staple in the Costa Rican diet.[23] Costa Rica possesses sufficient suitable land for producing about half of its rice needs, out of roughly 50 000 ha of well irrigated flat, appropriate lands, almost all of which are held by around 230 large-scale, mechanised operations (exceeding 50 ha each, with a few in excess of 1 000 ha). Those farms have a production cost of $70–95/ton, that can compete profitably in an open domestic market. The largest of those farms also run the mills that process and distribute the rice – their own, that of smallholders, and imports – wholesale. Protection is not necessary to keep those farms in business, although the price increase it provokes – at the expense of the poorest Costa Ricans, who spend as much as 10 per cent of their income in rice alone – of course adds to the profits.

On the other side of the equation there are around 740 smallholders, who keep about 11 000 additional hectares in rice. They produce in inappropriately irrigated land, with low yields and very high production costs. Those farmers need the high tariff – and the subsidies and other transfers the complex rice industry regulations provide[24] – to barely make ends meet in the short run, but their interests would be much better served by helping them make the transition to alternative crops in the long run. The combination of the funds and connections of the large growers, with the symbolism and prevailing social concerns about the small ones, has provided the political capital that allowed rice protectionism to subsist until now. As with some other protected products, the opening of the rice market will only happen through CAFTA – the trade agreement with the US – in the year 2027, more than four decades after the opening of the Costa Rican agricultural market started. The transition was in that case excessively slow, as the 35 per cent tariff is making rice – the main staple in the diet of the Costa Rican poor – more expensive than it could be in every year that passes.[25]

The target, this time, should be to use the transition period creatively, engaging the resources of the government to aid the smallest farmers in the transition to other production methods, or other crops. Ideally, transitions should be fast enough to accelerate the overall benefits of higher productivity, while slow enough to avoid unnecessary suffering by small producers, and to make sure that most of them can make the transition.

Lessons for Africa

Trade liberalisation and facilitation could raise African productivity very significantly, through a very similar process as the one illustrated here. Estimations of a broader TFP model that include the efficiency gains from exploiting comparative advantage have demonstrated that, by virtue of its low capital–labor ratio, African countries are among the largest winners from trade.[26] These estimates emerge from a model where capital and labour are the only relevant resources. I do not know of a similar effort that takes land endowment data into account.

Africa's agricultural potential is in other products, and the mechanics by which trade may affect productivity somewhat different from the Costa Rican case. The following two charts[27] show precipitation and arable land availability across countries, separating African nations (green), island-nations (blue) and Costa Rica (purple) from the rest (red). Some African nations, by virtue of their desert landscape, will hardly find agriculture to be a big ticket towards productivity growth and higher incomes.

Figure 16: Annual precipitation (mm)

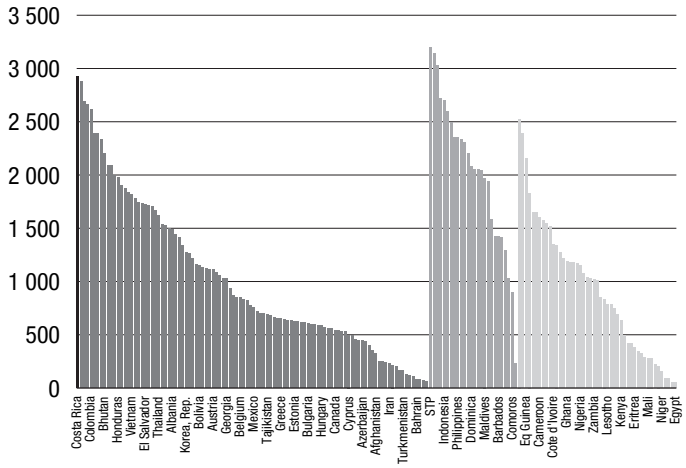
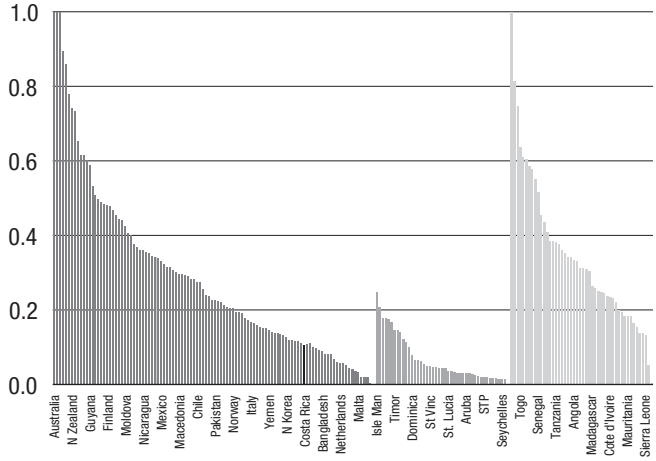


Figure 17: Arable hectares per person



Other African nations, and in particular those with flat, abundant land mostly apt for grain cultivation, may find that access to the world market, and a better exploitation of their agricultural prowess, would be key, but not for the reasons that proved effective in Costa Rica, since their problem is not that they are in the wrong crop, but rather than they are cultivating in the wrong manner, or failing to reach the market.

Finally, for some African nations (Rwanda and Lesotho, in my experience, come to mind), not only are good things in store by facilitating international trade in agricultural products, but also this benefit would probably come from the same source as in the Costa Rican case: by the reallocation of land across crops, following comparative advantage rather than the composition of domestic demand.

Whichever the mechanism, it is easy to agree that agricultural prosperity is more important, and holds more in store, for Africa than any other region in the world, simply because of its poverty, and the high fraction of the African workforce and output that relates to farming.

I hope that the story in this paper evokes some resonance among African readers. Rather than reiterate what I think are the main lessons my country has learned from its own experience, I close underscoring some key issues on the topic that are particularly relevant for Africa.

Prosperous agriculture requires letting go with tradition

- It is very human to approach certain topics – agriculture happens to be a very good example – with love for tradition and fear of change.
- Nothing more primal than the desire to do the oldest economic activity in the traditional way.
- Agriculture as it has always been implies giving up too many opportunities. Africa must embrace change in many areas including, if necessary, the way it farms its land. This is politically difficult and painful, but must be accepted.
- There is a social cost of transition that justifies for change to be slow, and with plenty of support from government. It does not justify not doing the change. The social cost of keeping things as they are is also immense.

The transition from self-production to commercial farming is important

- The Costa Rican story shows very clearly that commercial farmers can be easily misled into the wrong usage of their land by distorted relative prices.
- It also shows that those farmers, even if they are very small, can respond to market incentives and price messages when these are sent clearly.
- A farming family engaged in growing its own food, without a relationship with a market, is not only by definition engaged in production following demand, rather than supply, realities, but is also very unlikely to understand and follow price signals, and to tap opportunities if and when these are created.

It's the performance of the farming sector, and not its relative size, that matters

- Any country can create prosperity for those in agriculture that helps the aggregate performance of the nation.
- But for countries that are dense or poor in their land endowment, even a good agriculture will be able to absorb a decreasing minority of the population.
- An increase in the income of the average farmer, while the share of farmers in the population decreases, is the best that can be hoped for in those cases.

Food security is more important than food sovereignty

- In some places, it is impossible to have agricultural development without allowing – even fostering – a change in the crops that are grown, away from the composition of demand, and towards the nation's comparative advantage.
- What is the true vocation of small and dense mountainous countries, like Rwanda or Lesotho? Of better connected places, like Kenya? Of more productive places, like South Africa?

Some of the key barriers to a prosperous African agricultural export sector are physical and logistic, not only policy-induced

- Landlocked countries, in the current situation, cannot get the benefits from trade if the physical cost, delay and risk of transportation does not fall dramatically.
- Engineering-wise, the world has known how to solve this problem for half a millennium. The problem is political.
- Africa's best-endowed country in terms of irrigated arable land (Zambia) does not utilise its resource because logistics make trade almost impossible.
- Sometimes the problem is not misallocation but rather lack of allocation of land to crops.

Everybody has a responsibility and a stake in this effort

- The process of reducing the obstacles to trade (whether logistic or policy-induced) must come from government. It will face significant political opposition from those that dislike change, and from the few that profit from the status quo. But it must be done.
- Experimentation and selection of new crops and manners of land use has to come mostly from the farmers and the private sector. Entrepreneurship is the key to discovering one's own abilities. There is nothing about smallness that implies that farmers have to be big to be good entrepreneurs.
- The challenge to raise productivity and competitiveness, levelling the playing field, and paving the way to new markets, falls on the shoulders of both government and farmers. The longer they keep discussing the wrong things, the longer it will take to fix the right ones.

Endnotes

1 Agriculture even acts as an informal mechanism of unemployment insurance in some developing countries. The family farm produces a similar level of output whether the unemployed members of the family work in it or hold another job. The farm then simply absorbs the extra labor as a mechanism of spreading the income and pooling the labor-market risk, and not only as a productive input.

2 Sources: SEPSA and World Development Indicators.

3 According to Klenow and Rodriguez-Clare (1997) (Quantifying Variety Gains from Trade Liberalisation, working paper, University of Chicago), the weighted average of tariffs for consumer goods fell from 48.5 per cent to 22.1 per cent between 1986 and 1992.

4 Sources: SEPSA and Central Bank of Costa Rica.

5 Source: Central Bank of Costa Rica

6 Source: Central Bank of Costa Rica, National Income and Product Accounts.

7 Source: COMEX. Of course, the seven exceptions are all in agriculture, and include extremely high MFN tariffs applied on poultry leg-quarters (150 per cent), dairy (72 per cent), potatoes and onions (45 per cent), pork (35 per cent), rice (35 per cent) and sugar (30 per cent). The political challenge to open those markets has been significant, yet it is also the case that much progress has been made.

8 Those crops are interesting examples in which the optimal size, or at least the minimum viable size, of a farming operation, may be relatively small, yet there are significant scale economies in processing, distribution or exports. In the absence of an alternative arrangement, small farmers are kept solely in the initial stage of the value chain, leaving lots of value downstream. The broad Costa Rican cooperative movement has been a channel for those farmers to be able to participate in the industrial and commercial stages of their product, rather than sell in bulk an undifferentiated commodity.

9 See Hausmann, Ricardo and Dani Rodrik. 'Economic Development as Self-Discovery'. *Journal of Development Economics*. 72: 603–633.

10 See 'Grado de Preparacion de Centroamerica para el Comercio Internacional', Victor Umaña, UNDP.

11 Source: Central Bank of Costa Rica.

12 All the data about land use comes from SEPSA. Unfortunately, the data for land use before and after 1990 are not comparable, due to methodological differences in how it is gathered. The production data in the 1986–90 period may reflect other factors – climate, investment, etc. – and not only land use.

13 Source: Central Bank of Costa Rica, National Product and Income Accounts.

14 Some argue that the results are disappointing because agriculture's participation in the national economy shrank. Indeed, in the same period, agriculture's share in employment fell from 24 per cent to 11.9 per cent, and in bank credit from 18 per cent to 4 per cent. This is a blessing, though, not a problem. In a country endowed with so little arable land per person, and with no open agricultural frontier, shifting workers away from farming is the only way to prevent the shrinking of the average farm as the population grows.

15 Source: Central Bank of Costa Rica, National Product and Income Accounts, and General Directorate for Statistics and the Census, Employment and Household Survey.

16 Source: FAO and WTO. This table and the next only take into account the 119 countries larger than 10 000 ha of arable land and 500 000 inhabitants.

17 Trejos (2009) 'Country Role Models: the case of Costa Rica.' In *Country Role Models for Development Success*, Augustin Fusu (ed.), United Nations University Press.

18 Source: World Development Indicators, World Bank.

19 Source: General Directorate for Statistics and the Census, Employment and Household Survey.

20 Source: Central Bank of Costa Rica.

21 Source: SEPSA and Central Bank of Costa Rica.

22 What is at stake is the provision of grains anyway. Costa Rica, with or without trade, self-supplies itself competitively with its vegetable, tuber, cooking oil and miscellaneous needs, as well as with a vast majority of its dairy and meat demand, and about half of its beans, the other staple. Of the grains in high consumption, wheat and soy cannot be produced at all in the tropics; corn, sorghum and part of the rice are the only key dietary inputs on which there is a choice between importing competitively or producing them inefficiently.

23 Costa Ricans eat annually about 57 kg per capita of rice, second highest in the Americas and equivalent to Japanese consumption. About 8 per cent of the cost of the basic dietary needs basket corresponds to rice, and the poorest quintile of households spend

about 6.5 per cent of total income on that product. Since 2003, between a third and a half of total consumption has been provided by imports.

24 A recent study by the Interamerican Development Bank (Arias, Diego. 'Agricultural Support Policies and Programs in Central America and the Dominican Republic in Light of Trade Liberalisation'. 2007) estimates that the producer support – including tariff protection – enjoyed by Costa Rican rice growers is 46 per cent of the value of the crop, higher than both the US and the EU.

25 There are several dairy and meat products with slow transitions towards an open market, for which CAFTA also provides the schedule and terms, phasing out very gradually until 2022–27. In those cases, however, matters are made simpler by the fact that the same industries have at the same time some highly protected sub-products and other globally competitive ones, so the transition needs to happen within the industry, not across industries.

Another interesting example is black beans, important in the Costa Rican diet, and grown by especially poor small-scale farmers. CAFTA will be the definitive transition mechanism for black beans, as the US is not a competitive producer of that crop. The reallocation of that land to other uses is a desirable transition, but trade instruments need to be complemented in that case by comprehensive and well-funded policy initiatives to facilitate the reconversion, rather than efforts to keep the farmers in the crop.

26 In Ferreira and Trejos (2006) 'On the Output Effects of Barriers to Trade', International Economic Review, we develop a theoretical model where gains from trade filter into total factor productivity through the efficient use of intermediate products, and calibrate that, for very poor countries, the expected gains in PTF could reach 95 per cent. On a follow-up paper, 'Trade in Intermediate Goods and Total Factor Productivity', we make a cross country development accounting exercise to assess the importance of the same idea. African countries are found, by far, to be the biggest losers of productivity due to the barriers – whether induced by policy or nature – to the swift exchange of goods.

27 Source: World Development Indicators, World Bank.