VIETNAM RICE, FARMERS AND RURAL DEVELOPMENT

From Successful Growth to Sustainable Prosperity

ACKNOWLEDGEMENTS

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LIST OF ACRONYMS

RRD	Red River Delta
NMR	North Midland and mountainous region
NCC	North Central Coast
SCC	South Central Coast (SCC)
CH	Central Highlands
SE	South East
MKD	Mekong River Delta

EXECUTIVE SUMMARY

Vietnam's and especially the Mekong Delta's farmers have been tasked and supported to feed the nation. They have over-achieved! Over the past 25 years, Vietnam's paddy rice production has grown substantially and steadily. The country is now among the leaders of developing countries in terms of food calorie production per capita and food exports. Thus, on an aggregate national level, Vietnam is highly food secure. The great advances in relation to food availability have altered the scope and dimensions of the food security challenges which Vietnam now faces. There remain many small pockets of chronic household or community food insecurity, with this closely tied to poverty and livelihood vulnerability in certain locations. Broader food security concerns now relate more to child malnutrition[1], dietary imbalance, food safety, and staple food affordability. Indeed, Resolution 63 (2009) embraced a much broader concept of food security than the traditional focus on food (and rice) availability. Addressing this broader set of challenges calls for a multi-sectoral approach—covering nutrition, livelihoods development, social protection, clean water supply, and agriculture.

2. While rice remains Vietnam's dominant food staple, its importance in the national diet has begun to decline as rising incomes and demographic changes (including urbanization) are leading to dietary shifts, with incremental food expenditures concentrating on higher value fish, meat, fruits and vegetables, dairy products, other prepared foods, and out-of-home eating/drinking.[2] Per capita consumption of rice is now declining and seems to be declining at a faster rate than population growth[3] —meaning that aggregate national rice consumption has peaked (perhaps three to five years ago) and is now slowly declining. With further income growth and urbanization, Vietnam's national rice consumption will likely decline over the next two decades, before per capita consumption levels off--at between 75 to 100 kg/person/yr. Under realistic assumptions for population growth, per capita rice

[1] Despite enormous gains over time, the incidence of child malnutrition remains unacceptably high at 18.9% nationally and at 18.7% in the food-abundant Mekong Delta. The rate still exceeds 25% in the Central Highlands and Northwest Regions.
[2] The share of rice in national calorie supply fell from 73% in 1990 to 67% in 2000 to 57% in 2008 (IRRI website).
[3] Over the past decade, the share of rice in average household expenditures has fallen by nearly half from 14.8% in 2000 to 7.7% in 2010.

consumption, productivity change, climate change, and land availability, Vietnam is likely to maintain a very large (exportable) surplus in rice over the next two decades. Even when factoring in worst case scenarios, national food availability is still secure for the foreseeable future. There thus appears to be considerable potential for adopting more flexible land use planning and related agricultural policies—promoting more diversified production patterns and livelihood strategies in some rural areas—to raise incomes and improve diets.

3. With steadily growing rice production outpacing domestic demand, most of the increment in production over the past five to ten years has been channeled abroad through a combination of commercial exports and government-to-government transactions servicing public concessional food distribution programs. In recent years, approximately one-third of national production, and nearly 70% of the production from the Mekong Delta has been exported. Vietnam's competitive position has been strongest in the low quality/low price segment of the international market, with little involvement in the markets for higher quality or specialty rice varieties. While export volumes and gross export revenues have risen sharply in recent years, so have the underlying costs—both those which have been commonly measured (i.e. fertilizer, fuel, machinery, labor) and those which have generally not been counted (i.e. investments and operations of water infrastructure, the health and other costs of water pollution and high pesticide use, and methane gas emissions from rice production). The net value added content from exported rice is considerably lower than that for many of Vietnam's other food and agricultural exports.

4. Past gains in rice productivity and national output played a key role in Vietnam's enormous progress from the late 1980s through to the mid-2000s in reducing the rate of poverty and the incidence of hunger and malnutrition. Such gains contributed to social stability and provided a foundation upon which both the rural and more general economy could grow and diversify. Vietnam's rice 'success story' thus made an important contribution to its broader emergence from a low to lower middle income country. This rice success stemmed from several factors including relatively equal agricultural land distribution, improved security of land tenure, the liberalization of the domestic food market, advances in development and spread of improved rice varieties and other technologies, investments in irrigation and water resources management, and lots of hard work (and risk-taking) by Vietnam's farmers.

5. Yet, in recent years, the role of rice as an engine for rural growth and poverty reduction has subsided.[4] Rising input costs, including those for fertilizer, fuel and labor, have outpaced nominal increases in producer paddy prices. Most Vietnamese rice growers have benefitted little from the 2008 international commodity price spike or the more recent pattern of elevated international and domestic food prices. A majority of Mekong Delta rice growers are actually net buyers of rice (i.e. rice expenditures exceed paddy sales). *Farm households with very small landholdings can no longer advance their standard of living by making incremental productivity gains in rice mono-cropping*. Such households are increasingly reliant on non-rice and, indeed, off-farm sources of income and employment. Only farmers with larger landholdings and based in locations with highly favorable agro-ecological conditions have been able to improve their livelihood based primarily upon specialized rice production. The available evidence suggests that the bulk of the recent growth in rice surplus production and exports originates not from a broad mass of smallholder rice growers, but from a segment of relatively larger and better off growers centered in leading districts in a limited number of

[4] And, the prior connection between rice production growth and progress in reducing malnutrition is no longer evident. In the Mekong Delta, some of the provinces which attained the highest rates of growth in rice production over the past decade have made comparatively less progress in lowering malnutrition rates. Areas featuring diversified farm production have performed better in reducing the incidence of malnutrition than have areas featuring rice mono-cropping.

provinces.[5] This structural pattern and other findings point to a need for a more differentiated set of strategies and sets of public support measures.

6. Over an extended period, the performance of the rice value chain has been adequate for what it was asked to do— deliver increasing volumes of acceptable quality rice at reasonable cost to a non-discerning 'customer' base, both at home and abroad. For many years, the value chain performed a valuable social function of moving rice from surplus to deficit areas. Yet, in relation to their expanded size, Vietnam's rice value chains—both domestic and export-oriented—remain highly underdeveloped, from a technical and institutional point of view. The value chains remain relatively fragmented with little coordination and only isolated examples of product and process innovation. Efficiency is generally low; the level of physical and quality losses generally high. Prevailing incentives and support systems for quality management are weak. Thus, while the value chains have in the past tended to meet the 'basic needs' of producer and consumers they are not currently structured or performing to serve the rising aspirations of producers (for a higher standard of living) or the changing preferences of Vietnamese consumers (for safer, higher quality food). *Overall then, the value chain has been adding very little value. Its past success is no guarantee of future success. A 'business as usual' approach almost certainly will not realize the sector's future potential.*

7. There is an evident need to gradually, yet very substantially modernize the domestic and export-oriented rice value chains. This would help to realize major advances in technical efficiencies at different levels, and promote the introduction and spread of an ethos focused on greater production (environmental) sustainability, product quality, and customer service. The competitiveness of the sector would thus come to be based more upon efficiency and innovation, than on the poor remuneration of farmers. Part of this modernization will require additional physical investments—in storage facilities, upgraded milling operations, and logistics. Yet, just as important is the development of modern institutions to facilitate coordination, manage risks, and convey information and incentives. At present, the Government appears to be anticipating that SOEs will be able to transform the sector through their own investments and guidelines on mandated actions. Yet these companies are being increasingly placed in an awkward position of pursuing both commercial and social objectives, yet not being especially well equipped to do either. Given the political sensitivity of food security concerns, the Government is reluctant to embrace the concept that private investment can play an important role in the modernization of the rice sector.

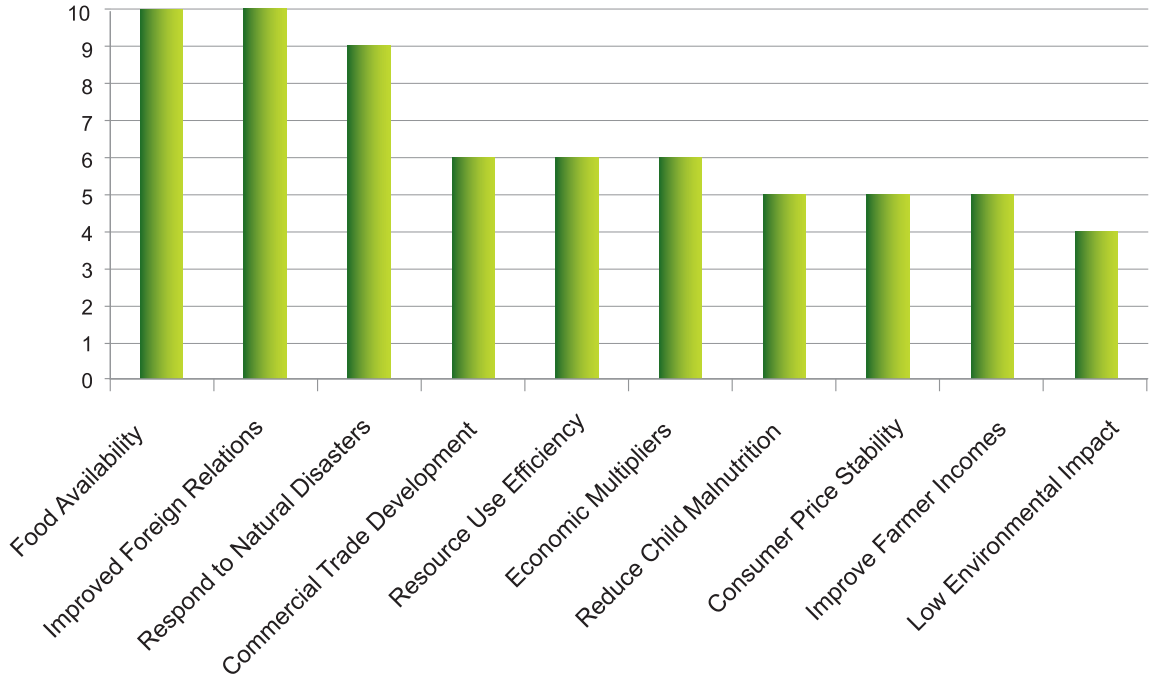
8. *There is an evident need for the Government to more clearly distinguish and separate commercial from social objectives and functions. In many respects the two have been co-mingled, bringing about certain results or trends which fall well below both public policy goals and private aspirations.* Despite the very impressive expansion in MKD rice production and rice exports over the past decade, the benefits to MKD farmers and to Vietnamese consumers appear to have been modest. Use of scarce public resources should generally not be devoted to pursuing commercial objectives in the food trade, especially if there is a private and cooperative sector willing and able to pursue these effectively. On the other hand, there are many instances in which government interventions are well justified in pursuit of social objectives. Some re-orientation or re-balancing of public resources and programs has the potential to yield higher economic benefits from and within the rice sector, while at the same time better addressing remaining food security (and malnutrition) concerns and reducing the environmental imprint of Vietnamese rice.

[5] In 2008, some 20% of the Mekong Delta's rice growers accounted for 63% of the marketed surplus. A core group of some 300,000 to 400,000 growers—operating in about 25 districts in five provinces—have accounted for most of the growth in MKD rice production over the past decade.

9. While the promotion of rice production was historically tied primarily to national food security objectives, with the growing commercialization of rice and with the development of the Tam Nong Strategy and other broader perspectives, the public policy objectives associated with rice have clearly widened to also embrace a range of rural development and trade objectives. As a result of various factors, the level of achievement of these goals—through the mechanisms of rice production supports and value chain interventions—has been quite mixed in recent years. The Figure below provides a stylized summary, with a 'rating' of achievement levels, on a 1 (lowest) to 10 (highest) scale. Considerable achievements have been made for food availability, for utilizing excess supply through exports, and in enabling quick responses to natural disasters when crops or food stocks are impacted. Moderate ratings are given to achievements in developing commercial trade outlets, in resource efficiency use, and in stimulating inter-industry growth multipliers. In recent years, rice has contributed comparatively little to progress in reducing child malnutrition and to farm profitability. Despite large seasonal and annual supply surpluses, Vietnamese consumers continue to experience volatile retail prices. Rice production, as commonly undertaken, has substantial, yet not well quantified adverse environmental impacts.

10. This broad picture suggests the need for adjustments in the public intervention paradigm associated with the rice sector. This paradigm shift would move from a low income country/'basic needs' orientation to a middle income country focus on producer aspirations, consumer preferences, and industry competitiveness. Where previously the focus was predominantly on production and food availability, now the performance of the rice sector is viewed in the context of broader socio-economic objectives. Policies and strategies would be increasingly evidence-based. From a prior unified, 'one size fits all' approach, the newer paradigm would include differentiated spatial, agro-ecological, and farmer type perspectives and strategies. Where previously administrative restrictions played an important role, greater emphasis would now be given to strengthening economic incentives and fostering greater innovation and application of sustainable production and other practices.

Mixed Rate of Achievement of Economic and Social Objectives Related to MKD Rice



Major benefits could accrue directly to Vietnamese farmers and consumers from the adoption of this modified paradigm of public intervention and support. But, there are also likely to be large indirect benefits as well. A simulation of several policy reforms—associated with rice land designation, the scope of involvement of SOEs in the export trade, and other areas—found very considerable benefits, over the medium term at the macroeconomic level (i.e. an increment of some $900 million at 2010 prices), at the household level (i.e. an average increase in household consumption of $49), at the sectoral level (i.e. with an acceleration in agricultural GDP and export growth), and for certain regions (especially the Mekong Delta, Red River Delta, and North Central Coast). Positive impacts were estimated for all income group categories in rural and urban areas for a decade or more from the time when reforms might be adopted. Hence, there would appear to be few prospective 'losers' from such reforms because the gains come primarily from improvements in efficiency.

12. Based upon the analyses undertaken, the following sets of recommendations are made:

- **Recommendation #1: Adopt a more flexible approach to land use planning**
  - Distinguish 'core/specialized' from 'non-specialized" rice growing areas based upon agro-ecological suitability, productivity, likely CC impact, and viability of specialized production. Apply spatial zoning and land use planning.
  - Lessen rigid land use designations. Maintain conversion limits only in the 'core' areas—where specialized production may remain economically viable, while facilitating conversions elsewhere. Adjust downward the protected 'rice land' area (perhaps to 3.3 million hectares). Monitor trends and make adjustments over time.
  - Re-examine farm size limits and the duration of land use rights to encourage investment and the realization of (limited) economies of scale
  - Rely more on incentives and support, rather than restrictions to encourage farmers to continue to grow and invest in rice.
  - Support development of mixed farming and suitable crop (and crop/fish) rotations in the locations which are less ideal for rice production

- **Recommendation #2: Implement differentiated support strategies at regional and provincial levels and among varied households**
  - In the 'core rice areas' implement a Rice Competitiveness and Sustainability Program, involving the so-called '4 houses' (i.e. farmers, government, enterprises, and the scientific community). Promote GAP among specialized rice producers, improved seed systems, mechanization, strengthened producer groups, PPPs and farmer-agribusiness partnerships. Concentrate efforts to improve quality management, logistics and other value chain upgrades in these zones
  - In most non-core rice areas, emphasize diversified rural economic development (i.e. New Rural Areas), with emphasis on infrastructure upgrading, skills development, diversified production systems, and labor mobility. The specific mix/focus would vary and be determined at district and local levels. Rice production would be supported as part of integrated farming systems.
  - In the 'core rice areas' there will be some HHs with smaller landholdings for which support should be given for diversified livelihoods; in the non-core areas, there will be some HHs for which specialized rice production will be viable.

- **Recommendation #3: Intensify a multi-sectoral strategy to address household food insecurity and substantially reduce child malnutrition**
  - Will require close collaboration between MARD, MOH, MOLISA, MPI, MOE, local governments, the private sector, and civil society organizations
  - Need to refine understanding of vulnerable households and groups, and contributing factors
  - Need to enhance and supplement traditional household and community food security strategies
  - Scope to modify scope/nature of safety net programs and other measures to mitigate the impact of food price spikes or volatility
  - For child malnutrition, emphasis may be needed on maternal health, breastfeeding practices, dietary balance, disease control, and safe water supply. Rice fortification may have a role in improving the nutrition of older children.

- **Recommendation #4: Completely separate commercial and 'social' rice export strategies and systems**
  - Adopt a Vietnam Global Food Security Initiative committing to supply a stated proportion of annual production to supply public distribution/safety net programs abroad. These would be governed by MOUs and G2G transactions with oversight provided by the Ministry of Trade and Commerce
  - All other exports would be on a fully commercial basis with a 'level playing field' between SOEs and the private sector. Exports would not be restricted by a quota but instead be subject to a variable export tax. Revenues from the VET could be channeled back to support the Rice Competitiveness and Sustainability Initiative
  - Set a goal to reduce the share of SOEs in the commercial export trade by a specific amount in order to stimulate private sector investment in a modernized value chain. Consider dividing certain companies into two: (i) a purely commercial company and (ii) an entity serving social objectives, with distinct financing and reporting.

- **Recommendation #5: Government to re-direct its focus from commercial functions to focus primarily on social objectives, 'public goods', and risk management**
  - Strengthen food security information systems, esp. for crop forecasting, weather early warning, pest surveillance and reporting, domestic market monitoring, and rice stock inventory monitoring
  - Draw upon international best practices to design and implement a transparent and 'rules based' system to mitigate extreme and weather and food price volatility—involving public procurement, inventory management, and targeted safety nets
  - Intensify efforts to manage and reduce the environmental imprint of intensive rice production, especially in the delta regions. Have Vietnam become a global leader in reducing GHG emissions related to rice. Promote widespread application of '5 reductions; 1 must" based upon applications of S&T.
  - Further study the possible impacts of medium-term factors (i.e. upstream hydropower investments), develop response strategies, and work with stakeholders to implement these.

MOVING THE GOAL POSTS

Vietnam's Evolving Rice Balance and Other Food Security Considerations

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Summary

Over an extended period, food security in Vietnam has been associated with the availability and supply/demand balance of rice. This paper examines the past, present, and likely future scenario for Vietnam's 'rice balance' and the major policy, investment and other factors contributing to these trends. The focal time period is from 1990 to 2030. With Vietnam moving from a situation of food deficit to food surplus to becoming one of the developing world's leading exporters of food, the objectives for and modalities to achieve domestic food security policy should now have shifted far beyond the long-standing focus on food availability, generally, and national rice production, specifically. The paper argues Vietnam's food security challenges now relate more to issues of food affordability (and price volatility), child malnutrition, broader nutritional imbalances, and food safety. While this broader definition of food security has now been embedded in the GoVn's strategic plans, it has not yet translated over to practice. Major policies and programs continue to place primary emphasis on maintaining or even increasing Vietnam's rice production (surplus). The paper argues for a more balanced approach, targeting locations and population groups which remain vulnerability to food insecurity, addressing the broader concerns about (mal-)nutrition, and including increased attention to the role which other types of foods and other (non-production centered) instruments can play in meeting the broader objectives associated with food security. Hence, based upon past successes and remaining gaps, it is time to move the goal posts and adjust the on field strategy for realizing food security goals.

Introduction

From time immemorial, food security in Vietnam has been equated with rice availability and many strategies were put in place to realize the increased supply or rice. Recent decades have seen major advances in rice productivity and the emergence of surplus national production—resulting in a growing rice export trade. Vietnam currently exports nearly one-third of its rice production and accounts for more than 20% of world rice exports.

With its achievements in rice productivity and output and with broader shifts in Vietnamese society (e.g. Increased rural to urban migration and rising per capita income), policy-makers have adopted a broader definition of food security to embrace issues of food affordability, reducing child malnutrition, achieving a more nutritionally balanced diet, improving food safety, and increasing the sustainability of food production. These and other diverse goals are highlighted in the government's most recent (2009) food security decree.

In practice, however, increasing rice availability—by meeting national production targets—remains the central systemic policy, while other elements—including attention to secondary food crops and addressing consumer vulnerability in the face of food price volatility—continue to be given secondary or reactive attention. Recent trends and events suggest a more substantial 'movement of the goal posts' is warranted as Vietnam's food issues increasingly center on matters of nutrition, affordability and pockets of vulnerability.

This paper highlights Vietnam's long-term shift from a deficit to major surplus producer of rice and then considers a range of scenarios for the country's "rice balance" over the coming two decades. Considerations of "rice balance" still play a central role in Vietnam's food security policy and in matters of land use planning. A large amount of agricultural land remains as 'designated rice land' for which there are official restrictions on alternative uses. The paper argues that recent achievements and long-term considerations provide the basis for greater flexibility in land use planning.

From Rice Deficit to Surplus

Rice has long been a dominant food staple in Vietnam and is deeply engrained in the country's culture, traditions, and economy. Rice has been cultivated in parts of present-day Vietnam for several thousand years. While the first rice exports from Vietnam's Mekong Delta date from the late 18th Century or earlier, a regularized export trade was launched in the 1930s and this continued for several decades. The combined impact of war-time disruptions and incentive problems associated with collectivized agriculture resulted in stagnant rice production during the 1960s and 1970s. To address a growing food deficit, Vietnam, both before and after the 1975 unification, needed to import rice, totaling more than one million tons per year.[6]

To address the most severe disincentives from the collectivized agricultural system, farmers were permitted, after 1981, to sell their surplus production once they fulfilled their supply quota. Modest gains were made, although per capita production still did not recover to the level of 1960. More radical reforms were brought in with the launch of the Doi Moi policy in 1986, recognizing agricultural households as the basic unit of production and introducing a freer market for agricultural inputs and products. These reforms, together with subsequent advances in the development and spread of improved rice varieties, and investments in irrigation and water resources management, helped spur a dramatic acceleration of rice productivity and commercialization which has continued, virtually unstopped, for the past two decades.

Figure 1 and Table 1 illustrate this extended trajectory of paddy rice output expansion. Between 1990 and 2010, national paddy production doubled from 19.2 million tons to nearly 40 million tons. During the 1990s, both the area planted and the productivity change each grew at a relatively rapid pace. The area of dedicated rice land increased only marginally from 4.11 million ha in 1990 to 4.21 million ha in 2000, yet improvements in water resources management and the availability of shorter growing period varieties enabled an increased intensity of plantings (i.e. crop seasons per year) from 1.47 to 1.82. The total sown area for rice rose steadily during the 1990s, reaching an all-time high of 7.67 million hectares in 2000.

Rice plantings subsequently declined as some lands—especially in the Red River Delta-- were converted from agricultural to industrial or urban use, and as some other rice land was converted for use in aquaculture, fruit tree production, or, less commonly, other annual crops. While rice plantings ticked up slightly following the food price spikes in 2008, the sown rice area in 2010 was below the 2000 peak and the level of dedicated rice land was more or less the same as that which applied in 1990. Over time, the pace of productivity growth has slowed somewhat, having averaged more than 2.8% per annum in the late 1990s, yet only around 1.5% per annum during the past five years. In 2010, average national yields were 5.32 tons/ha, yet with wide variations among seasons, locations, and farm size categories.[7] Average national yields have been increasing about 1 ton per hectare per decade.[8]

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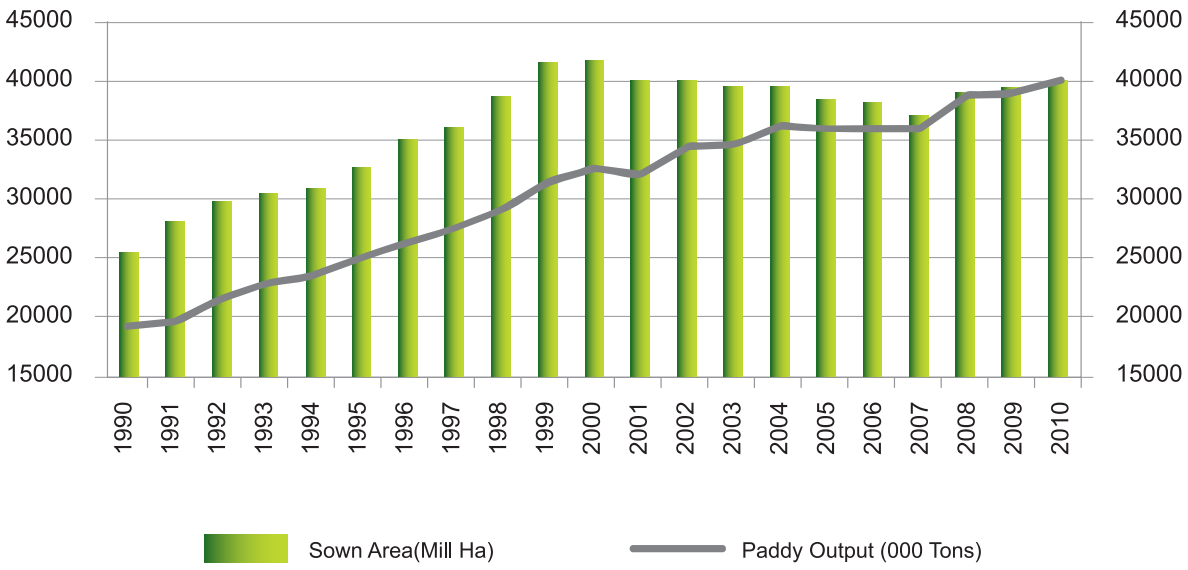
[6] An excellent set of papers covering the history of Vietnamese rice and technological developments in provided in Vietnam: Fifty Years of Rice Research and Development, edited by Bui Ba Bong, Nguyen Van Bo, and Bui Chi Buu, Ministry of Agriculture and Rural Development, 2010

[7] Average national yields were 6.22 tons/ha during the (largest) Winter-Spring season. In contrast, average yields in the Summer-Autumn and Autumn-Winter seasons were 4.77 and 4.62 tons/ha, respectively.

[8] Average yields were 3.18 tons/ha in 1990 and 4.24 tons/ha in 2000.

Figure 1: VN National Paddy Output and Planted Area, 1990 to 2010



While there have been localized problems with drought, pest and disease infestations, extended period flood inundation, and the incidence of salt water intrusion, the national pattern of paddy production has been remarkably stable and consistent—a pattern which contrasts sharply with that of most other major rice producing countries in Asia. Only in two of the past twenty years---2001 and 2005—did national production fall below the total from the prior year and the scale of this drop was very small—between 300,000 and 400,000 tons (e.g. 0.8 and 1.3%). Year to year declines in the production within specific seasons has been somewhat more frequent, yet still relatively uncommon. The largest single drop occurred between the Autumn-Winter seasons of 1993 and 1994, when production fell by 800,000 tons. The largest recent decline occurred between the Summer-Autumn seasons of 2005 and 2006, when production fell by 750,000 tons. That was equivalent to a 7% drop for that particular season.

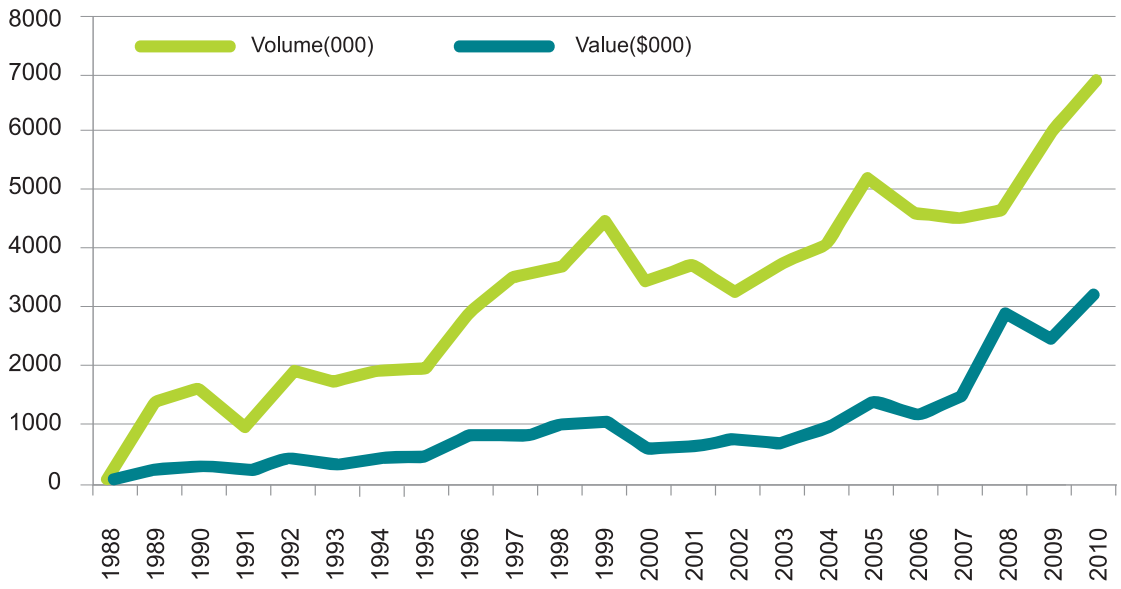
Table 1: Period Trends in Rice Sown Area, Productivity and Paddy Output (Average Annual Change; %)

	90-95	96-00	01-05	06-10
Sown Area	2,16	2,54	-0,86	2,60
Yield	3,05	2,84	2,91	1,72
Production	5,40	5,38	2,05	4,32

Source: Authors' Calculations based on GSO data

With expanding production, national output began to exceed domestic consumption and other requirements (i.e. for seed and feed) by the late 1980s and, during the first half of the 1990s, exports averaged some 1.66 million tons per year. This trade more than doubled, averaging some 3.36 million tons per year during the latter half of the 1990s. As illustrated in Figure 2, Vietnam's rice exports have experienced a more recent surge and are expected to exceed 7 million tons in 2011. In 2010, nearly one-third of national rice production (after considering the conversion from paddy) was exported. These expanded exports have serviced both commercial markets, especially in Africa, and public food distribution and safety net programs.

Figure 2: Vietnam Feeds the Word - Expanding Rice Exports



While the gross value of these exports has exceeded $2.5 or even 3 billion in recent years, the net foreign exchange earnings are considerably lower given the heavy use of imported fertilizers and agro-chemicals, use of imported farm equipment and rice processing equipment, and fuel to run this equipment and to run river barges and other forms of logistics. Some 40 to 50% of the costs of exportable rice are associated with imported inputs. Rice is a relatively low value (and low value added) commodity. At a policy level, the "value" of rice exports also needs to take into account (i) unmeasured costs, including the depreciated value on dedicated water resources infrastructure and the systems for irrigation management, (ii) broader social costs, especially adverse environmental impacts associated with high levels of agro-chemical and fertilizer use (and run-off)[9], and (iii) the opportunity costs of the land, labor, water and other resources devoted to producing surplus rice--as opposed to producing other exportable or import-substitutable commodities. When these factors are taken into account it is evident that generating ever-increasing levels of rice output and continuing to expand rice exports is not, necessarily a good thing. 'More' is not always 'better'. And, under many scenarios, producing and exporting less rice could prove to be much better—from a welfare and economic growth perspective-- for Vietnam.

Thus, in the space of twenty five years, Vietnam has moved from a situation of a national food deficit-- with a relatively widespread incidence of hunger-- to a situation of a very large food surplus with only modest pockets of hunger. Table 2 summarizes the changing rice balance over this period. The country has gone from a modest rice deficit in 1986 to positive balances of approximately 3, 5, and 8 million tons in 1990, 2000, and 2010, respectively. While in 1990, the surplus supply was equivalent to 28% of 'rice available', in 2010 this proportion was 39%. Over this period, the share of exports in 'rice available' has precisely doubled from 16% to 32%.

[9] And the costs of methane emissions from irrigated rice production, especially in the Red River and Mekong River Deltas.

Table 2: Vietnam: National Rice Balance, 1986 to 2010

	1986	1990	1995	2000	2005	2010
Paddy Production	16003	19225	24964	32530	35833	39973
Seed	480	769	999	1301	1075	1199
PH Loss	1600	1922	2496	3253	3583	3997
Feed	480	577	749	976	1792	1999
Rice Available	*7394*	*10372*	*13468*	*17550*	*19393*	*21633*
National Reserves	100	100	200	1179	831	869
Industry Demand	180	207	269	351	582	649
Rice for Consumption	*7245*	*7169*	*9610*	*11043*	*11173*	*11685*
Balance of Supply and Demand	*-132*	*2896*	*3389*	*4977*	*6807*	*8430*
Rice Export	0	1624	1988	3477	5255	6828
Rice Import	132	0	10	40	50	100
Estimated Carry Over Stocks	0	1272	1411	1540	1602	1702

Source: Authors' Calculations based upon multiple data sources

Table 3 summarizes the progress of Vietnam in reducing the incidence of undernourishment[10] and improvements in per capita energy supply. Long-term improvements in rice productivity certainly contributed to these trends. In these and other respects, Vietnam's performance matches or exceeds that of other Asian countries. For example, while the share of Vietnam's population classified as 'undernourished' fell to 11 percent over the 2005-07 period, the comparative proportions for Indonesia, Philippines, Thailand, and Cambodia were 13, 15, 16, and 22 percent respectively. During the 2005 to 2007 period, Vietnam's per capita dietary energy supply was 2770 per day, surpassing the results of all other Asian developing countries other than China. The comparable figures for Thailand and Indonesia were 2530 and 2540.

Table 3: National Food Security Indicators

		Period Average				Average Annual Change		
Indicator	Measure	90-92	95-97	00-02	05-07	90-92 to 95-97	95-97 to 00-02	00-02 to 05-07
Proportion of Undernourished Population	Percent	31	22	17	11	-6,6	-5,9	-7,9
Number of Undernourished	Millions	21.0	16.7	13.3	9.6	-4,7	-4,5	-8,2
Minimum dietary energy requirement	Kcal/person /day	1710	1740	1780	1810	0,3	0,5	0,3
Dietary energy supply	Kcal/person /day	2090	2310	2520	2770	2,0	1,8	1,9

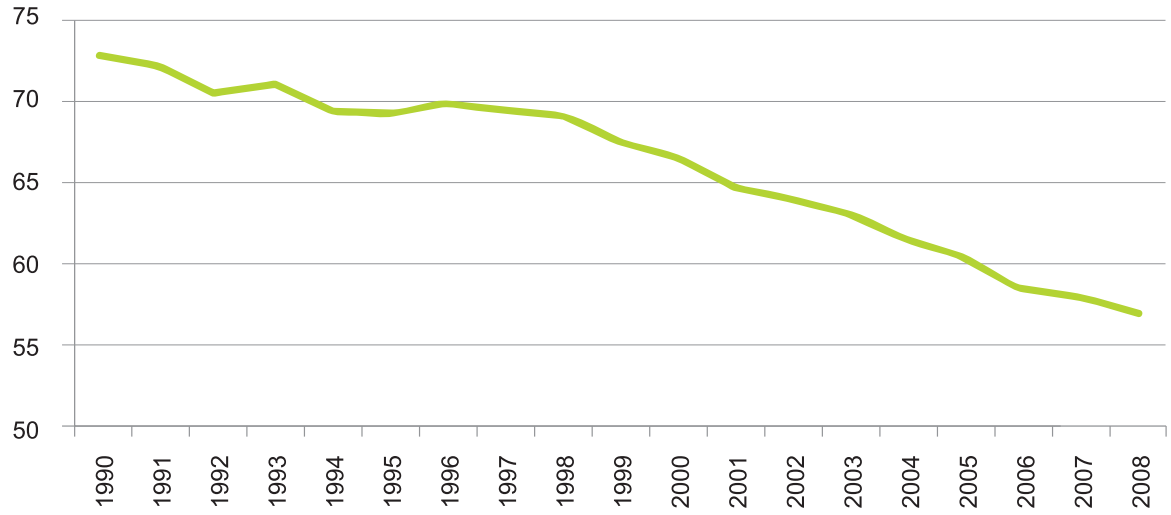
Source: FAO

[10] Defined by FAO as having an inadequate daily energy supply to maintain an active pattern of activity.

While addressing malnutrition (and especially child malnutrition) still remains a challenge for Vietnam, this is less and less an issue of food-- or, more narrowly, rice-- availability. The primary exceptions to that are with localized and temporary losses of crops or stored foods where natural disasters have occurred. Certain segments of the population remain vulnerable to food insecurity, yet this is now primarily an issue of accessibility, associated with periodic food price spikes, temporary loss of income/livelihood activity, or, in some locations, chronic poverty.[11] While the proportion of Vietnam's population that regularly lacks access to sufficient food energy is now in the single digits, the incidence of child (underweight) malnutrition is higher, at 18.9% nationally and above 25% in some regions. Issues associated with poor maternal health, nutritional imbalances in diets, lack of access to clean water supplies, and the incidence of certain diseases or parasites tend to be more important factors to these patterns than the lack of food, per se. [12]

According to FAO data, rice as a share of total calories consumed in the Vietnamese diet peaked in the period between 1975 and 1985 at approximately 75%. As Figure 3 illustrates, this share has been declining steadily and is now approximately 55%. This is still quite high in comparison with other Asian middle income countries. For example, the (2005-07) share of rice in dietary energy supply was 26%, 38%, 48%, and 49% in China, Thailand, Philippines, and Indonesia, respectively. We would expect the share of rice in national calorie consumption to fall below 50% in the coming years as dietary patterns continue to diversify in Vietnam. Rice as a share of household expenditures is steadily declining. It was 17% in 1996, yet below 8% in 2010.

Figure 3: VN: Rice as Share of Total Calories



Based upon VHLSS, GSO and other data, it appears that per capita rice consumption in Vietnam peaked several years ago and has now begun to decline. According to VHLSS surveys, in-house rice consumption per capita fell by an average of 1.4% between 2002 and 2008, with the pace of decline being higher for the urban population (1.7%); and amongst middle and upper income groups (1.9% and 2.4%, respectively). The broader national pattern is consistent with trends observed among other Asian countries (Table 4). *With per capita consumption now declining faster than Vietnam's population growth rate, the absolute consumption of rice in Vietnam has begun to decline, albeit very slowly.*

[11] Four types of households remain vulnerable to food insecurity. These include (i) farm households in mountainous and remote locations, (ii) artisanal fishers in the central coastal region, (iii) poor urban workers with unstable employment, and (iv) landless/near landless households in the Mekong and Red River Deltas which lack reliable income.

[12] Indeed, in 2006, the incidence of child malnutrition was only slightly lower for Vietnam's middle income quintile (23.2%) than it was for its poorest (28.6%) and near poor (24.5%) quintiles.

Table 4: Average Annual Rates of Change in Per Capita Rice Consumption

Country	Period	Rate of Change
Taiwan	2001-2006	-1,52
Pakistan	2001-2006	-1,40
Vietnam	2002-2008	-1,40
South Korea	2000-2006	-1,08
Indonesia	1994-2006	-0,96
Cambodia	2000-2006	-0,86
Thailand	2000-2006	-0,37

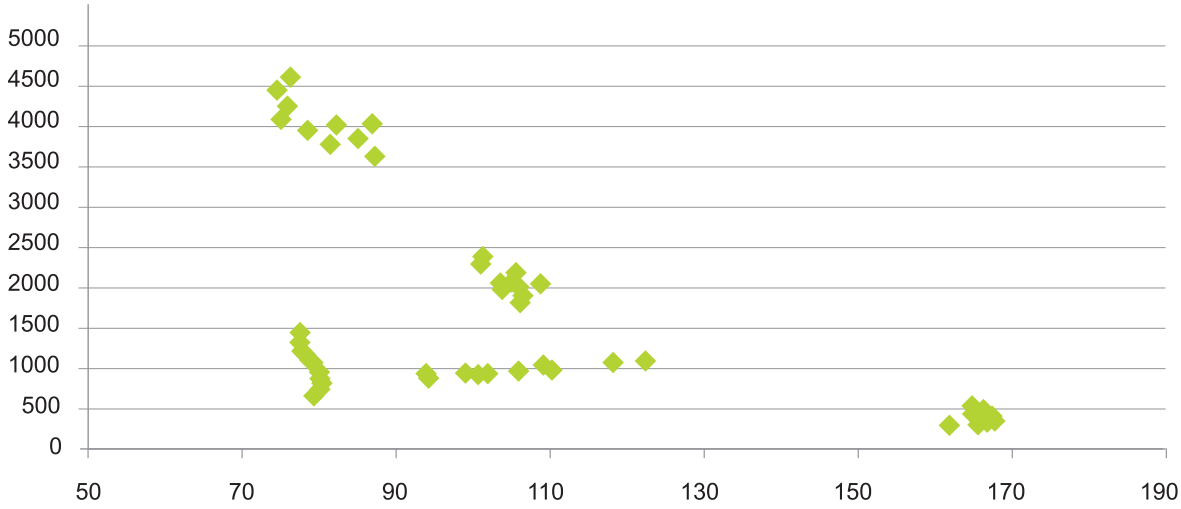
Per capita consumption now in Vietnam is approximately 135 kgs, although this has fallen to just over 100 kgs within the urban population. Consumption patterns within Asia (and within some individual countries) are quite diverse, although for many countries which have moved into middle income status, consumption seems to decline before leveling off in the range of 75 to 100 kilograms per capita. This can be seen in Table 5 below. The government's Food Security Resolution 63/NQ-CP anticipates per capita rice consumption in Vietnam of 100 kilograms by 2020. This would involve a much accelerated decline from the current trend, yet per capita consumption could be expected to reach that level during the subsequent decade.

Table 5: Per Capita Rice Consumption in Asia

Country	Kg/Person/Year
Myanmar	160
Vietnam	135
Philippines	128
Indonesia	104
China	95
South Korea	88
Malaysia	80
India	77
Japan	45

Figure 4 below illustrates the relationship between per capita income and per capita rice consumption, based on data from Thailand, Indonesia, and Vietnam over the 1990 to 2005 period. This suggests as per capita income moves toward and then beyond $1000 there are noticeable shifts (downward) in per capita rice consumption. This is the transition point where Vietnam currently stands.

Figure 4: PC Rice Consumption and Per Capita Income:
China, Vietnam, Malaysia, Thailand, and Philippines, 1995 – 2005



Source: Household Consumption and Expenditure Surveys for Listed Countries

The Policy Context

Thus, Vietnam has achieved remarkable progress over the past two decades in expanding its rice production and overall availability of food on an aggregate and per capita basis. The country has matched or exceeded many of its targets for food availability. It is now generally a large (and growing) surplus producer of rice and other foods, a growing proportion of which it now exports. Vietnam now accounts for some 22% of world exports of rice, in volume terms. Its own consumption of rice has peaked and, despite future population growth, this consumption is expected to decline in the years (and perhaps decades) to come.

Nevertheless, Vietnamese policy-makers remain concerned about long-term food security in the face of uncertain future patterns of climate change and in the context of intensifying competition for available land, including between agricultural, industrial and urban uses. The Socio-Economic Development Strategy sets a vision for Vietnam to be 'modern industrial society' in the near future. This will require creating physical space for industrial parks and other industrial sites, either in the outskirts of urban areas, or, in the case of some agro-industrial sub-sectors, within rural areas themselves. Already between 2000 and 2005, some 366,000 hectares of agricultural land (including 302,000 ha of paddy land) were converted for non-agricultural purposes. In the present decade, the estimated demand to convert rice land to non-agricultural purposes may exceed 250,000 hectares.

Given uncertainty about the future, the Government has set out a policy of 'protecting' rice lands, by restricting its conversion, either for non-agricultural use or for alternative agricultural uses. *The current policy sets a national target for 3.8 million hectares of protected rice lands*. This is just 300,000 hectares below the currently cultivated paddy land. Various incentives and controls are provided to encourage provincial and local authorities to manage land use planning to retain 3.8 million hectares for rice. The large majority of this land is 'designated' as 'rice land' with restrictions placed on its

alternative use. Nation-wide, some 89% of rice-producing land is so designated, with this share being 91% in the Mekong Delta and 94% in the North Central Coast.

This policy, based on food security considerations, has a potentially high cost to the extent to which this land could be put to more productive and profitable use by farmers. Under circumstances of (large) surplus, producing additional rice may contribute little or nothing to addressing Vietnam's remaining food security/child malnutrition challenges, while lowering incomes for farmers and the broader multiplier efforts on rural economies from a more diversified production structure. This is indeed now the situation in the Mekong Delta. Hence, our attention is focused on what is needed to maintain a healthy rice balance (or surplus) for Vietnam for the coming decades.

The current policy suggests that 3.8 million hectares is needed to be retained as 'designated rice land' in order to generate 41 millions of paddy production and provide for long term food security. According to NIAPP, provincial authorities have proposed alternative land use plans which would result in some 3.63 million hectares being retained as dedicated paddy land.

At first glance, even the aggregated provincial proposals would appear to represent a fairly conservative approach to ensuring food availability longer term. This would represent just a 10% reduction in the dedicated paddy land from 2010, yet, as shown earlier, approximately 1/3 of Vietnam's rice production is now exported. A quick calculation from Table 2 above suggests that when holding all other things constant (i.e. consumption), a 10% reduction in production would still result in an available surplus of nearly 6.3 million tons of rice for export or carry over stock. This rice balance is well in excess of what one would consider from a national food security perspective. It would remain a surplus which would still position Vietnam as one of the largest rice exporters in the world. That, however, is a matter of trade policy (or broader rural development strategy) rather than food security per se.

The benefit (or net cost) of such a level of trade would depend upon future world market conditions, the level of prevailing prices, the competition which Vietnam will face, and the basis upon which Vietnam would compete in international markets. Even in recent years the growing seasonal and annual surpluses have periodically led to supply-demand imbalances with the Government needing to provide incentives to companies—through interest free loans—to go out and purchase additional paddy or rice at times when they faced inadequate demand, especially internationally. Without such incentives, there was concern that producers would be unable to sell their crop or face strong downward pressures on spot market prices for paddy. Hence, under some market conditions being a large surplus producer could be a source of considerable risk and financial cost. Recent world market circumstances of relatively high, albeit highly volatile, prices have tended to gloss over such considerations.

Looking to the future, there are many mixed signals and uncertainties about how the trading environment facing the Vietnamese rice industry will evolve. In the short-term, most analysts expect the maintenance of higher than historical average prices. The volume of global trade is expected to edge up as a result of large available supplies among the world's leading exporters.[13] There is expected to be continued upward trends in the import demand from Africa and the Middle East,

[13] "Rice Outlook", USDA, Economic Research Service, May 12, 2011.

although on-going political change in parts of the latter could interrupt this pattern. Import demand from within Asia has been and will likely remain highly volatile as imports are largely driven by unexpected production shortfalls, triggered by major storm or other adverse events. Longer term, overall consumption within Asia is expected to decline, quite substantially.

Africa has been one of the fastest growing rice consumption and import markets, yet several African countries are now investing heavily in infrastructure to support domestic rice production. Both the Philippines and Indonesia, each major importers from Vietnam in recent years, are aiming to increase their self-sufficiency in future years. Cuba, another traditional market for Vietnam, might be expected to source its rice in future years from suppliers from within the Western Hemisphere. And, in terms of competition, both Cambodia and Myanmar have ambitions to expand their export trade and compete in the bulk rice market that Vietnam currently concentrates on. Lots of other uncertainties will impact the regional and global rice trade including future production trends in China, changes in Indian rice trade policies, and the ability of Thailand to cost effectively maintain its levels of support for paddy producers.

The combination of these trends could provide either a favorable or less favorable environment in which Vietnam would participate, substantially, in the world rice market.[14] Yet this is a matter of economics, and, to some extent, also relates to Vietnam's international political relations. Part of the economics of this relate to the profitability of Vietnamese rice growers and the opportunity costs of land, labor and other resources used to produce surplus rice. Yet, retaining a set of policies which continue to generate very large seasonal and annual rice surpluses cannot be strictly justified on the basis of food security.

Rice Balance Scenarios

A detailed analysis was undertaken of alternative scenarios for rice production, rice consumption, and the resulting 'balance' between 2010 and 2030. Considerations were given to a wide range of variables including population growth and composition, per capita rice consumption, non-consumption rice uses (i.e. seed, feed, and industrial use), rice land use and cropping intensity, productivity, and harvest/post-harvest losses. Time series national data on these and selected other variables were gathered for the 1990 to 2010 period. Scenarios were then run for the next two decades.

Given the large number of variables and possible scenarios, some simplifying assumptions were made and a more limited set of scenarios run. For example, we used only one estimate of future population growth (1.2% per annum) which has been made by the United Nations. Regarding cropping intensity, this has been inching up over the years and in 2010 was 1.82 nationally and 2.09 in the Mekong Delta. We simply use a conservative figure of 1.8 and apply this to all the scenarios. We retain the recent figures for seed and feed use as a share of paddy production, although in future years we would actually expect some decline for each as farmers more efficiently apply (high quality) seed and as greater use is made of better quality animal feed. For much of our analysis we also assume no change in the current level of harvest and post-harvest physical losses at the farm level.

[14] The US Department of Agriculture projects global rice trade to increase by 2.7% per annum between 2011 and 2020. On the import side, one-third of the increase is expected to come from the Middle East and Africa, another one-third from the combination of the Philippines, Indonesia, Bangladesh, and the EU. The remaining import growth would be in the Western Hemisphere. On the export side, the USDA expects increased shipments from Thailand, India, and Pakistan. (USDA Long-Term Projections, February 2011)

These average about 10%. Many efforts are being made to reduce such losses—perhaps by half—through improved harvesting, drying, and storage measures. Under a few scenarios below we do assume some success in these efforts which would lower the PH losses from 10% to 7%.

Thus, factors which we run different scenarios for relate to (i) per capita consumption, (ii) productivity (i.e. paddy yield), and (iii) the amount of dedicated 'paddy land'. For per capita consumption, we have two trajectories. One, the most realistic, is that this would fall from 135 kg/yr at present to 100/kg/yr by 2030. This would be consistent with government expectations—as noted in the Food Security Resolution of 2009. A second, less likely, scenario would feature a much slower decline in consumption—to 120 kg/yr by 2030—perhaps due to a slowing of income growth in the economy and thus a slower shift in the composition of the Vietnamese diet.

With regard to productivity, we have run three scenarios. The first is a 'business as usual' one in which yields continue to improve at the recently (slower) pace of 1.5% between now and 2030. If this were to occur, the average national yield would be 7.0 tons/hectare. The other two productivity scenarios are 'pessimistic' since they assume a weakening from the historical trend.

Under one scenario, our 'middle yield' scenario, the rate of growth in yields continues to decline at a slow pace throughout the studied period. The average yield in 2030 would be 6.3 tons/hectare. While in the past yields tended to increase by 1 ton per hectare per decade, this projection would involve the 1 ton increment occurring only over two decades. Some of the leading rice growing areas in the Mekong Delta already have yields exceeding this longer term projection. Our 'low yield' and most pessimistic scenario features a decelerating rate of yield growth and then actual reductions in average yields from 2025 onward. This might occur if the actual adverse impacts from climate change were to exceed current expectations, perhaps with more variation occurring in rainfall or temperatures and rather unusual pest or disease problems. Under this scenario, average national yields would be 5.8 tons per hectare in 2030. This is a level of productivity which is below the current pattern for the five or six provinces which now account for the bulk of the paddy production in the Mekong Delta. It is thus quite a pessimistic picture and essentially assumes that near term efforts to improve irrigation management, promote use of higher quality seed, and develop and spread the use of seed varieties more resistant to water stresses and pests collectively fail. This scenario is also far worse than any existing climate change models would predict. We don't expect this to happen but it is important to consider this very 'worst case scenario' to be cautious.

We thus run six scenarios in relation to selected trajectories in dedicated land use for rice. That is, two consumption scenarios and three yield scenarios. In order to come up with an aggregated, weighted average, result, we have assigned probabilities to these scenarios.[15] The probabilities for these specific scenarios and the overall weighting of different combinations are summarized in Table 6. Thus, the most likely scenario combines a PC consumption of 100 kgs and a future average yield of 6.3 tons/hectare. The least likely scenario, one which we assume a 5% likelihood, is the absolute worst case in which yields level off and then decline and per capita consumption remains higher due to reduced economic growth.

[13] These probabilities were developed based upon the views of a panel of Vietnamese experts who are closely involved in matters of rice research, land use and water resource planning, and agricultural policy analysis.

Table 6: Scenarios and Probabilities for Productivity and Per Capita Consumption

		Yield (T/Ha), 2030		
		7,0 (30%)	6,3 (50%	5,8 (20%)
Per Capita Consumption (Kg/Yr)	100 (75%)	22,5%	37,5%	15,0%
	120 (25%)	7,5%	12,5%	5,0%

In summarizing the results, we first consider the expected outcome if dedicated paddy land falls further only slightly in line with the current policy target of 3.8 million hectares. We then consider a scenario more consistent with the proposals put forward by provincial authorities in which paddy land would be retained on 3.6 million hectares. Following that, we consider other possible trajectories in land use. The results are presented in tables or Figures showing projected production, consumption, and the resulting balance (or surplus). Considerations of non-human rice consumption (i.e. use for feeds and seed; plus additional industrial uses) have been factored into the calculations.

Scenarios under the Current Policy (Option 1)

Option 1 is to protect 3.8 million hectares of land as 'designated paddy land'. The outcomes, in 2030, are summarized in Table 7. With a cropping intensity rate retained at the average of the past five years (1.8) and with no change in post-harvest losses (10% at the farm level), the expected output would be far in excess of national food security needs, with the expected volume of surplus (and, potentially, export) rising to nearly 9 million tons by 2030. Under some scenarios, exports would approach or even exceed domestic consumption. Even under the worst case scenario of higher consumption and declining yield, there would be more than 5 million tons of rice available for export.

Table 7. Food balance scenario with 3.8 million ha of paddy land, post-harvest losses 10%

Unit: thousand tons

Scenarios	2030 performance		
	Paddy Output	Rice Consumption	Rice Export
Land4 + Yield1 + Cons1	47894	10602	11800
Land4 + Yield1 + Cons2	47894	12722	9149
Land4 + Yield2 + Cons1	43343	10602	8886
Land4 + Yield2 + Cons2	43343	12722	6765
Land4 + Yield3 + Cons1	40315	10602	7294
Land4 + Yield3 + Cons2	40315	12722	5174
Weighted Average	**44103**	**11132**	**8872**

Land4=3.8 million Ha. Cons1=100 kg; Cons2=120 kg; Yield1=7.0; Yield2=6.3; Yield3=5.8

It appears evident that a planning target of 3.8 million ha of paddy land is too conservative for domestic food security purposes. Generating this level of surplus would be potentially beneficial only under very favorable international market circumstances-which we do not anticipate longer term. Under less than ideal market circumstances, such a level of surplus would impose very high financial costs on Vietnamese farmers and economic costs on the country.

Scenarios under Provincial Proposals (Option 2)

Option 2 considers the land use patterns proposed by provinces. This would result in some 3.6 million hectares being retained as dedicated paddy land. The results are summarized in Table 8. The general finding is little different than that reported above for the retention of the current policy. That is, under this scenario of land use, a very large surplus would result, with a weighted average outcome of a surplus of nearly 7.7 million tons. If the most likely consumption trend takes place, the minimum level of surplus would be more than 6 million tons. Even under the absolute worst case scenario (for which we attribute a 5% likelihood), the available surplus would still be more than 4 million tons. Again, such a surplus is far above that which would be necessary or prudent to ensure national food security.

Table 8. Food balance scenario with 3.6 million ha of paddy land, post-harvest losses 10%

Unit: thousand tons

Scenarios	2030 performance		
	Paddy Output	Rice Consumption	Rice Export
Land3 + Yield1 + Cons1	45373	10602	10495
Land3 + Yield1 + Cons2	45373	12722	7844
Land3 + Yield2 + Cons1	41062	10602	7706
Land3 + Yield2 + Cons2	41062	12722	5586
Land3 + Yield3 + Cons1	38193	10602	6198
Land3 + Yield3 + Cons2	38193	12722	4078
Weighted Average	**41782**	**11132**	**7671**

Land3=3.6 million Ha. Cons1=100 kg; Cons2=120 kg; Yield1=7.0; Yield2=6.3; Yield3=5.8

The above picture suggests that Vietnam—due to its past successes in promoting food security and the future changes in consumption due to broader economic and demographic changes—has very wide latitude in adjusting its current policy (and target) for 'rice land' designation and restricting the crop choices being made by farmers. Yet, how much latitude for change is there? What would need to be the area of paddy land that would ensure national food security, perhaps with a modest surplus of 1.5 to 2.0 million tons to mitigate against any short term, unexpected downturn in production (say, due to a large pest outbreak or exceptional patterns of salt water intrusion in the Mekong River Delta)? Recall earlier that the largest single decline in seasonal production from year to year, between 1990 and 2010, was 750,000 tons. A cushion of double or triple that amount –in the form of carry-over stocks--could be considered a prudent risk management strategy.

We consider two further scenarios based upon the above trajectories for consumption and yields. These are for the paddy land to decline over time to 3.3 million hectares and to decline to 3.0 million hectares. We consider the results, in turn.

Scenarios under Options 3 and 4

Were the dedicated paddy land to decline over time to 3.3, the projected results would be as summarized in Table 10. From a national food security point of view, the outcomes are acceptable even under the worst case scenario of lower yields and higher than expected consumption. With that combination, the surplus would be 2.4 million tons, a figure three times above any recent seasonal drop in production. If consumption were to fall as expected, the worst case situation for yields would still result in a surplus 4.5 million tons, more than enough for carry-over stocks plus a sizable level of trade. Table 10 summarizes the results if the dedicated paddy land were to decline over time to 3.0 million hectares. With such plantings, the bottom line situation would depend heavily on the trajectory of consumption. If consumption were to fall to 100 kg, then even at 3.0 million hectares, Vietnam would have a surplus of 2.9 million tons even under the worst case productivity circumstances. Yet, we should consider the absolute worst case scenario in which lower yields are combined with higher consumption. With that combination, the available surplus would be only 790,000 tons. This would match the largest recorded short-fall, yet, given broader uncertainties it would not be prudent to consider this as a suitable target today. Based on these considerations so far, a prudent target might be set somewhere between 3.0 and 3.3 million hectares.

Table 9. Food balance scenario with 3.3 million ha of paddy land, post-harvest losses 10%

Unit: thousand tons

Scenarios	2030 performance		
	Paddy Output	Rice Consumption	Rice Export
Land2 + Yield1 + Cons1	41592	10602	8537
Land2 + Yield1 + Cons2	41592	12722	5887
Land2 + Yield2 + Cons1	37640	10602	5937
Land2 + Yield2 + Cons2	37640	12722	3816
Land2 + Yield3 + Cons1	35010	10602	4554
Land2 + Yield3 + Cons2	35010	12722	2434
Weighted Average	**38300**	**11132**	**5870**

Land2=3.3 million Ha. Cons1=100 kg; Cons2=120 kg; Yield1=7.0; Yield2=6.3; Yield3=5.8

Table 10. Food balance scenario with 3.0 million ha of paddy land, post-harvest losses 10%

Unit: thousand tons

Scenarios	2030 performance		
	Paddy Output	Rice Consumption	Rice Export
Land1 + Yield1 + Cons1	37811	10602	6579
Land1 + Yield1 + Cons2	37811	12722	3929
Land1 + Yield2 + Cons1	34218	10602	4167
Land1 + Yield2 + Cons2	34218	12722	2047
Land1 + Yield3 + Cons1	31828	10602	2911
Land1 + Yield3 + Cons2	31828	12722	790
Weighted Average	**34818**	**11132**	**4070**

Land1=3.0 million Ha. Cons1=100 kg; Cons2=120 kg; Yield1=7.0; Yield2=6.3; Yield3=5.8

All the calculations thus far have assumed no change in post-harvest losses at the farm level. Yet, an array of measures are currently being promoted to reduce such physical losses. Let's consider if they were successful, at least on a modest basis. Let's assume that post-harvest losses could be reduced to a 7% level. The impacts would not be trivial. Table 11 summarizes what the new outcomes would be in relation to a paddy land retention of 3.0 and 3.3 million hectares. With this improvement in PH management, the available surplus—even under the worst case scenario for yields and consumption would be 1.4 million tons for 3.0 million hectares and 3.1 million tons for 3.3 million hectares. A paddy land retention of 3.0 million hectares does not look so precarious when the current policy of promoting improved PH management is factored in.

Table 11. Food balance scenario with 3.0 and 3.3 million ha of paddy land, post-harvest

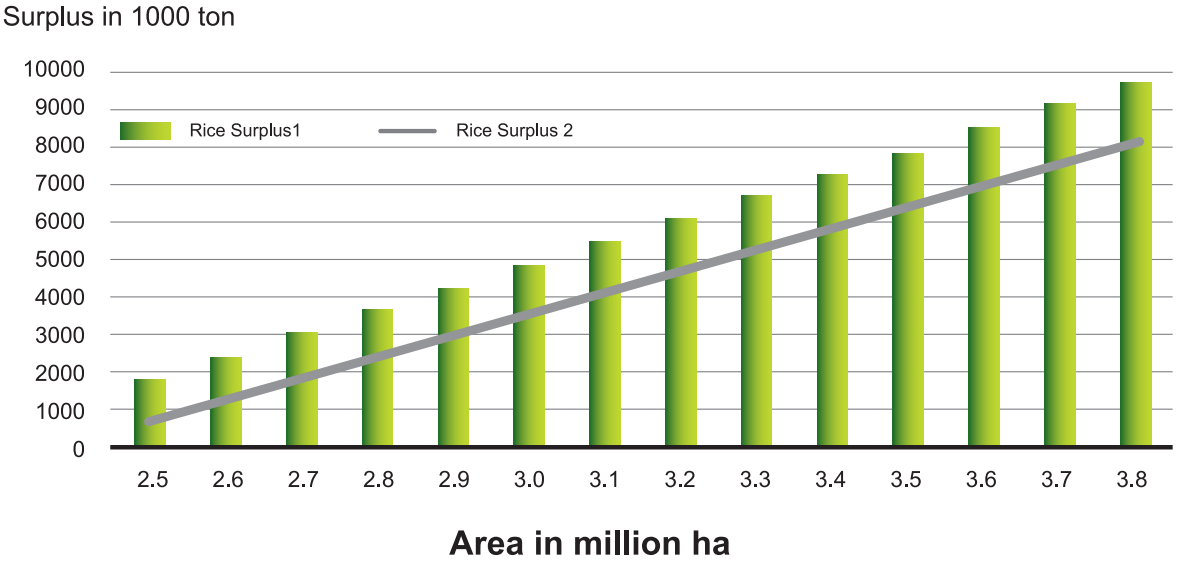
Unit: thousand tons

Scenarios	2030 performance		
	Paddy Output	Rice Consumption	Rice Export
Land1 + Yield1 + Cons1	37811	10602	6774
Land1 + Yield1 + Cons2	37811	12722	4654
Land1 + Yield2 + Cons1	34218	10602	4823
Land1 + Yield2 + Cons2	34218	12722	2703
Land1 + Yield3 + Cons1	31828	10602	3521
Land1 + Yield3 + Cons2	31828	12722	1401
Weighted Average	**34818**	**11132**	**4618**
Land2 + Yield1 + Cons1	41592	10602	8805
Land2 + Yield1 + Cons2	41592	12722	6684
Land2 + Yield2 + Cons1	37640	10602	6658
Land2 + Yield2 + Cons2	37640	12722	4538
Land2 + Yield3 + Cons1	35010	10602	5226
Land2 + Yield3 + Cons2	35010	12722	3105
Weighted Average	**38300**	**11132**	**6486**

Just to provide another perspective on the wide latitude for policy reform, see Figure 5 below. Here, our core assumptions are that consumption will fall to 100 kg/pc/yr and that post-harvest losses will fall to 7%. We fully expect both of these to occur, the former due to broader economic growth, the latter due to the expected efficacy of current programs and investments. In the figure we consider what would be the rice surplus under our two pessimistic assumptions. The bars represent the results with the 'middle yield' most likely scenario. The line represents the results for the 'low yield' scenario.

Under these assumptions the 'prudent surplus' (i.e. 2 million tons of carry over stock) is reached under the 'middle yield' scenario at only 2.6 million hectares under dedicated paddy production. Under the 'low yield' scenario this prudent surplus is obtained at just over 2.7 million hectares. Hence, when we refer to adjusting the planning target from the current 3.8 million hectares to somewhere in the range of 3.0 to 3.3 million hectares, this is done with consideration of a very large cushion in the face of uncertainty.

Rice surplus for different land scenarios by 2030
PcC= 100kg; PhL=7%



Surplus 1 for Middle Case Yield Assumption
Surplus 2 for Worst Case Yield Assumption

Policy Options

In relation to national food security, past policies to promote rice production and to 'protect' rice lands from conversion to alternative uses have been highly successful, having met or exceeded most official targets. In some ways, the policies and investments have proven to be 'too' successful, with Vietnam's rice output far 'overshooting' national needs and with most of the incremental production over the past decade being channeled abroad. The efficiency of and distribution of benefits of those exports are not considered here.

What we've considered here is simply whether Vietnam will have enough rice to feed its growing population in the future. This is an area of concern to policy-makers, despite the country's past success in this area and despite the much more ambitious development objectives which have been laid down for this, now, middle-income country. When considering the time frame of the next two decades, the answer to this question about adequate rice availability is 'yes' under any reasonable scenario, including some quite pessimistic ones. This quantification of various variables and their aggregation into a set of broad scenarios, points to a rather large room for maneuver in the adjustment of government land policies and land use plans. There are potentially large welfare gains—at farmer, regional, and national levels—which would follow from a revised or more flexible rice land policy.

This does not mean that Vietnam has completely solved all its food security problems. There remain population groups who are either chronically food insecure or face temporary food accessibility problems. The solutions to these problems and a broader issue of still high rates of child malnutrition must be tackled on a multi-sectoral basis and now have little or nothing to do with how large Vietnam's

national rice surplus is. These persistent issues of household food insecurity and malnutrition would be little impacted if Vietnam were now to produce five million more or five million less tons of rice. The fundamental problems relate to maternal health, access to clean water, incidence of disease, poverty, and nutritional imbalances. In most cases, 'more rice' wouldn't be the answer.

Policy makers are appropriately concerned about the prospects of haphazard and poorly monitored conversions of rice land for all kinds of alternative uses. On the outskirts of cities there are growing pressures to convert agricultural land for industrial and urban uses. The government is trying to encourage some such conversions—where there are solid economic justifications and where more profitable investments on such land are clearly defined. Still, government is cautious in initiating or granting approvals for such conversions because it is irreversible. Paddy land converted for use as an industrial park is forever lost to agriculture. The government should continue to closely monitor and indeed restrict these types of land conversions, while making sure that farmers who (voluntarily or involuntarily) are involved in these transactions are properly remunerated.

But, when it comes to proposed conversions of paddy land for alternative forms of agriculture, it is recommended that government adopt a more positive and supportive stance. Some continued administrative controls might be warranted in the short-to medium term for proposed conversions from paddy cultivation to perennial (tree) crop production and/or pasture land for livestock feeding. While not completely irreversible, this is almost certainly a 'one-way' step given the investments required, the gestation period for production, and the likelihood that the tree crops would remain in place for many years, if not decades. Nevertheless, government should support such conversions in areas where rice growing conditions are not optimal, and where the proposed perennial crops (or pasture crops) have been demonstrated to be productive and profitable. Policies and programs should be refined to support the successful adoption of those crops as part of a broader strategy of agro-industrial development.

In other locations, successful models of rice/fish or rice shrimp rotations have been developed over the past decade. Government should strongly encourage these production systems as they have been shown to generate higher profits for farmers and also help in managing environmental, pest, and disease issues. In areas experiencing regular salt water intrusion, rather than erecting expensive structures to force back nature, the policy approach could be to assist more farmers to shift over from rice cultivation to brackish water shrimp cultivation or to alternative crops which are more tolerant of salt water. Farmers should choose suitable alternatives for themselves based upon their financial capabilities, skills, and other considerations. Such locations cannot remain specialized rice growing areas longer term. The financial costs—to farmers and to government—of trying to 'protect' those rice lands would be enormous. Support programs tailored to these locations could be refined.

Given the wide latitude for medium-term reform, planners could define the most important rice growing 'belts' in the country, based upon agro-ecological conditions, availability of reliable irrigation water, and lower risk of climate change impacts. The focus on 'protecting' rice lands could concentrate in these locales. Planners would define the most suitable 3.0 or 3.3 million hectares for planning purposes. For larger growers within these 'core areas' specialized rice production would be supported through further public investment in infrastructure and through facilitation of partnerships involving farmer groups and rice milling/trading companies. Even within these 'core areas' some support for agricultural diversification is needed, especially among smaller farmers whose very small holdings no longer enable them to earn a livelihood strictly from rice. These farmers would be supported to apply rotations between rice and other annual crops, including vegetables.

In all areas outside of the 'core rice belts', diversified agricultural production and non-farm employment would be promoted. Land use planning would be open or flexible, with local decision-making. This may require some collective decisions about cropping patterns when irrigation water management must be adapted. Few farmers are expected to abandon rice cultivation altogether because they are

most familiar with this crop and will still want to produce certain volumes for own household needs. Yet, many farmers may want to further diversify their agricultural activities and should be supported in doing so. These 'diversified farming' areas should not be discriminated against in the allocations of public investment or other budgetary resources since the range of crops and livestock products produced will be valuable to the country and Vietnamese consumers. In Vietnam's mountainous area, the diversification of food sources and overall livelihoods is especially important, given exposure to weather-related risks and less developed food markets.

Conclusions

Over time, government should move away from administrative controls on agricultural land use. In a rapidly growing economy, farmers who cannot earn a reasonable livelihood from agriculture will either abandon it or scale back their investment and effort in it over time. If improvements can be made in the rice value chain, then there will be remunerative opportunities for many farmers who choose to remain producing rice. Vietnamese farmers have shown time and again their ability and willingness to respond to favorable market conditions. Just recently, in the aftermath of the 2008 food price spikes, Vietnamese farmers substantially increased their plantings of paddy, reversing a decade long trend of declining plantings.

Still the reforms could take place in stages. For the coming years, the effort to 'protect rice lands' could take on a more narrow focus, covering perhaps 3.0 to 3.3 million hectares rather than 3.8 million hectares. Trends in productivity, consumption, and other factors could be monitored closely with an eye toward incrementally introducing greater flexibilities over time. There are many reasons why farmers will continue to grow rice longer term and many constraints—financial, technical and related to risk—why the adjustment from specialized rice production to alternative production patterns will take an extended period of time. Government should strongly encourage agricultural diversification, while simultaneously supporting the modernization of the rice value chain, especially in its links to farmers in what would be defined as the 'core rice belts'. The latter would include efforts to promote vertical diversification—supporting farmers—through associations or cooperatives-- to participate in rice drying, storage, and perhaps other functions to improve efficiencies and capture more of the value added.

Otherwise, the government's role in supporting food security can increasingly shift to support the livelihoods and coping strategies of vulnerable households and address the multiple factors which contribute to still high rates of child malnutrition—including in locations which feature very large rice surpluses. A broader array of policy, technical and financial instruments can be employed to address these challenges.

Annex 1

Rice Production and Climate Change Scenarios

Vietnam will be impacted by climate change and this will have a diverse and complex range of consequences. The country's weather is already changing. According to MONRE, over the past fifty years, the average temperature in Vietnam has risen 0.5-0.7 degrees Celsius, with the increase being more pronounced in the north than in the south of the country. Over the same period, annual precipitation has decreased slightly in the north and increased slightly in the south. Consistent with global patterns, sea level rise (SLR) in Vietnam has averaged about 3 millimeters per year over the last 15 years.

A wide range of global climate change model scenarios have been developed by the Intergovernmental Panel on Climate Change and various institutes. When downscaled to Vietnam, these different models project quite varied predictions about average future temperatures and precipitation for the country as well as for different regions. The GoV's current 'official' scenario—developed by MONRE—projects average annual temperature increases over the 2016 to 2045 period (2030 mid-point) ranging from 0.50 degrees in the Central Highlands to 0.85 degrees in the North Central Coast. For the Mekong Delta, the expected average temperature change over this period is 0.62 degrees, which is very similar to the pattern already experienced over the 1978 to 2007 period. Expected changes in annual precipitation levels range from +0.1% in the Central Highlands to +2.2% in the North Central Coast. For the Mekong Delta, annual precipitation is expected to increase by 0.9% per annum, between 2016 and 2045, this being a fraction greater than the recent historical period. According to the MONRE scenario, sea level rise in Vietnam will be 12 cm by 2020, 17 cm by 2030, and 30 cm by 2050.

For Vietnamese agriculture and, specifically, rice production, the possible impacts of climate change are varied. These could include changes in the average annual level and seasonal distribution of temperature and precipitation, changes in extreme weather events, alterations in the incidence of various pests and diseases, changes in the incidence of saline water intrusion, and wider impacts on hydrological systems which could affect seasonal and other flood patterns. Hence, both rain-fed and irrigation crop production could be affected. At this stage, there is a wide degree of uncertainty about how different scenarios will play out and interact with adaptive measures that farmers, communities, scientists, and water resource managers will adopt. Given this uncertainty, the best course of action is likely to focus near-term efforts on 'no regrets' types of measures—that is, measures that will have beneficial impacts and help to reduce production risks regardless of the particular trajectory which future climate change takes.[16]

Examples of 'no regrets' types of measures include rehabilitation and improved maintenance of existing water resources infrastructure, systems to improve water use metering and efficiency, investments in varietal and agronomic research, and strengthening farmer awareness and application of risk management practices. Additional investment in large physical infrastructure may be needed, especially to deal with very long term threats posed by climate change, yet these should generally be deferred as long as possible to take advantage of the improved understanding of climate change impacts over time, and, possibly, the emergence of alternative, less expensive and/or more environment-friendly technologies or approaches. In addition to avoiding some possible mistakes, another advantage of deferring such expensive investments is that Vietnam will be a more wealthy country in the future and better able to absorb these costs without having to take resources away from other pressing needs (e.g. upgrading education and health systems).

Scenarios are typically run comparing outcomes 'with' and 'without' adaptation measures.[17] For example, under the MONRE scenarios, IFPRI has estimated that national level rice yields would be 4.3% lower

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[16] See "Climate-Resilient Development in Vietnam: Strategic Directions for the World Bank". Sustainable Development Department, 2011

[17] Analysis is this field continues to evolve with refinements in broad impact analysis and then drilling down to examine the specific prospective impacts for particular regions and crops. For example, two publications release in 2010 and involving overlapping work teams, report somewhat different estimates for expected climate change impacts on Vietnamese and Mekong Delta rice production. That work did not take into account distinctive rice production patterns within the Mekong Delta and thus the prospective impact of SLR, salt water intrusion, and flood inundation in the core growing zone vs. supplementary growing areas. See Economics of Adaptation to Climate Change, World Bank, and Impacts of Climate Change on Agriculture and Policy Options for Adaptation: The Case of Vietnam by Yu et al., IFPRI Discussion Paper 01015.

over the 2016-2045 period than would have been the case in the absence of climate change. For the Mekong Delta, the reduction from the 'business as usual' scenario is projected to be 4.2%. Yet, certain adaptation measures, including improvements in irrigation management and soil fertility management, could compensate for half of more of this reduction (IFPRI 2010). Two of the three scenarios used in this Policy Note are much more 'pessimistic' than what would follow from the official MONRE scenarios for temperature and precipitation change. For our medium scenario, we assume a 10% yield deviation from the 'business as usual', while our low case assumes a 17% yield deviation. These very pessimistic scenarios for the upcoming two decades double or triple the expected adverse impacts of climate change in order to provide an extra margin of safety or caution in our analysis.

There is widespread concern about the implications for Vietnam of long-term sea level rise. Indeed, MONRE has estimated that the SLR facing Vietnam could be as high as 75 to 100 cm by 2100 (compared with the 1980 to 1999 period). That long-term picture presents a frightening picture for many of Vietnam's coastal areas and is leading to discussions about the need for a complex system of sea dykes, sea walls, and mangrove forests to protect these coastal areas. However, the pace of sea level rise is expected to be gradual. By 2050, SLR is expected to be approximately 30 cm above current levels. Longer term scenarios are less certain but more worrisome.

It is not obvious how to factor in long-term considerations of possible sea level rise into nearer term food security strategies. There are simply too many uncertainties and too many factors to consider. The time horizon for current and near term food security strategy should probably only be the expectations over the coming two decades or so. According to official estimates, only moderate amounts of rice growing areas are expected to be impacted by sea level rise and/or saline water intrusion over this period. For example, the incremental area in the Mekong Delta expected to experience salinity levels of 4.0 g/l or above between now and 2030 is only 25,000 hectares, with little of the affected area being core rice producing districts. The area expected to experience occasional flood inundation exceeding 0.5 meters could be larger, at some 261,000 hectares, if no adaptation measures are taken. Again, much of this would occur in coastal and nearby areas which have already been experiencing stagnant or declining rice production for years. Somewhat wider areas would be impacted by 2050, if suitable adaptation measures are not taken. For example, an additional 57,000 hectares of land could be affected by salinity intrusion and an additional 170,000 hectares of land could experience occasional flood inundation exceeding 0.5 meters.[18]

Of course, a range of adaptation measures can and should be taken, covering water resources management, technological change, adjustments in farming practices, and, perhaps, shifts in land and water use patterns. Agriculture in the Mekong Delta has been possible—and has performed exceedingly well—over an extended period of time as a result of constant adaptation. There is no reason to expect this tendency for adaptation to suddenly stop. The risks to farmers could well increase in the face of climate change and this will necessitate improved knowledge and more flexible and diversified farming systems. Research is on-going to develop and spread improved rice varieties which are both saline- and flood inundation-tolerant. And, various proposals are being developed for modified flood and water management structures and arrangements.

While the impacts of climate change on rice production over the next two decades is not, presently, expected to be very severe, there could well be near term threats posed by upstream developments on the Mekong River, especially proposed hydropower dams on the main part of the river in Laos and Cambodia.[19] If undertaken, these investments could substantially alter the flow and flood pattern of the river as well as the downstream sediment flow. Shifts in the river flow could either benefit or harm Mekong Delta agriculture, depending upon how the water resources are managed. Reduced sediment flows would almost certainly have negative impacts on downstream soil fertility and fisheries. Unlike salinity intrusion, which is expected to mostly impact areas which have already converted from specialized rice production to alternative forms of agriculture and, especially, aquaculture, the upstream developments could directly impact rice production in the core producing areas of the Mekong Delta, including the Long Xuyen Quadrangle area. This calls for close collaboration among the countries of the Greater Mekong Delta Region to better understand the prospective impacts of proposed investments on the hydrology and biology of the river, and to impact the potential adverse impacts of those investments which do take place.

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[18] The IFPRI report does not distinguish between levels of salinity intrusion. Land which may experience any level of additional salinity is reported there as potentially 'lost' to paddy production. This exaggerates the potential impact on rice since rice can tolerate moderate levels of salinity and yield reductions occur in increments over a spectrum or rising salinity levels. Further work on this topic is warranted.

[19] See Strategic Environmental Assessment of Hydropower on the Mekong Mainstream, Final Report. International Centre for Environmental Management. Prepared for Mekong River Commission. October 2010.

FROM RICE BOWL TO RURAL DEVELOPMENT

Challenges and Opportunities Facing Vietnam's Mekong Delta Region

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Summary

The Mekong Delta has long been a major producing area for Vietnamese rice. It now accounts for more than half of national production and accounted for most of the growth in that production over the past decade. While this has given the Mekong Delta the reputation as Vietnam's 'rice bowl'—critical for national food security—virtually all of its incremental production (and now 70% of its output) has been channeled into exports. With Vietnam's rice export trade mostly servicing the low price market segment, and with shortcomings in efficiency and coordination within the export supply chain, the surging export trade has not translated into wealth among Mekong Delta farmers. The paper examines the evolving dynamics in rice production and economics in the Mekong Delta, pertinent features of the structure and performance of the rice value chain, and the challenges and opportunities associated both with improving efficiencies and profitability for rice and with promoting a more balanced pattern of rural development within the region.

Introduction

Vietnam has experienced very large and sustained growth in rice production over the past quarter century. This was achieved through land productivity gains and the increased intensification of production. National rice production essentially doubled between 1990 and 2010, even though the 'rice land' area experienced little change. During this period, Vietnam moved from being a food insecure country to being a very large exporter of food. It currently accounts for more than 20 percent of world rice exports. From the mid-1980s to the early to mid-2000s, improvements in rice productivity and increased rice output also played very important roles in reducing the incidence of poverty and malnutrition in Vietnam.

The Mekong Delta region has long been a major producing area for Vietnamese rice, with its relative importance enhanced with the efforts in the late 19th Century and early 20th Century to improve seasonal flood management through an intricate series of canals and other water resources infrastructure. While rice production in the MKD stagnated in the 1960s and 1970s—due to war and the subsequent weak incentives associated with collectivized agriculture—since the introduction of the *Doi Moi* reforms in the late 1980s, the MKD has resumed its critical place in the national rice supply. The share of the region in national output has risen from 49% in 1990 to 51% in 2000 to 53% in 2009. Over the past decade, the MKD accounted for approximately two-thirds of the total country-wide expansion in rice production.[20]

While the MKD's rising share of national rice output has given it the reputation of playing a growing role in national food security—i.e. the "rice bowl", this is not technically true, at least in recent years. Although still the most important food staple for most Vietnamese, the role of rice in the Vietnamese diet is contracting, as rising incomes and changing consumer preferences are leading to increased consumption of fish, livestock products, fruits and vegetables and a range of other products.[21] The share of rice in dietary energy supply has fallen from a peak of 75% in the mid to late 1980s to about 55% recently. The share of rice in dietary protein supply fell from 63% in 1990 to 45% in 2007.[22] The share of rice in average household expenditures is declining and has fallen by half since the mid-1990s.[23]

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[18] Vietnam's second most important rice growing region, the Red River Delta, has experienced no growth in output during the past five years, in part due to the continued conversion of agricultural land to industrial and urban uses.

[18] In some parts of the country, especially the highland areas, secondary food crops such as maize, cassava, and sweet potatoes play a very important role in household food security.

[18] FAOSTAT. Both per capita and total rice consumption in Vietnam are now declining and, assuming continued growth in per capita incomes, this trend will likely continue for about two decades until consumption levels off.

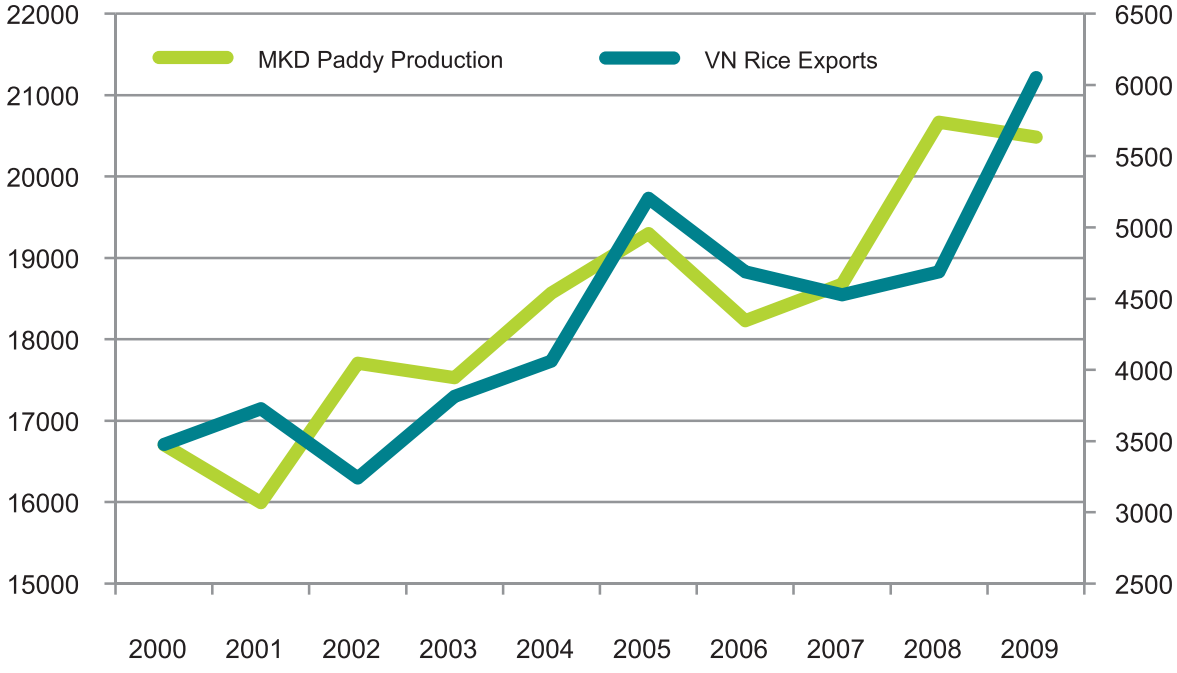
[18] From about 17% in 1996 to less than 8% in 2010.

Another factor is that over the past decade, the bulk of the MKD's expanded rice production has been exported. The region accounts for 95 percent or more of Vietnam's rice exports. Between 2000 and 2009, Vietnam's rice export volume increased from 3.48 million tons to 6.05 million tons. This increase precisely matches the growth in MKD rice production over this period from 10.85 million tons to 13.31 million tons.[24] Figure 1 illustrates the very close correlation between MKD paddy production and national rice exports over the past decade. The only major deviation was in 2008 with this being attributable to the mid-year restrictions placed on exports in the midst of the "food price crisis".

In the early part of the 2000's, about 40% of the MKD's rice output was exported. During the past two years, this share was between 65 and 70 percent.[25] This is a dramatic change. One could argue that Vietnam was 'too successful' in expanding its MKD rice surplus over the past decade and this 'forced' the country to export ever-growing volumes of this relatively low value commodity. To use an expression sometimes applied in macroeconomics, Vietnam may have "overshot" its food security goals with the policies which it has applied.

The role of MKD rice in food security has thus grown *internationally*, rather than nationally over the past decade. This is even more evident when one considers that a large and growing proportion of the export trade was carried out on the basis of government-to-government transactions with the shipped rice frequently being distributed through safety net or other concessional government programs in the Philippines, Indonesia, Cuba, and elsewhere. In recent years, the quantities of MKD rice distributed (abroad) through such public distribution channels—some 2.5 to 3.0 million tons per annum-- was far greater than the amount of MKD rice sold or otherwise distributed domestically outside of the MKD and the nearby HCMC metropolitan area.

Figure 1: Rising MKD Output = Rising Exports (000 Tons)



Source: GSO data

[24] Taking into account a milling rate of 65% from paddy to milled rice.

[25] The Consortium's value chain study found that 93% of the paddy produced by MKD farmers and not used for seed or feed was sold in 2009. Of this, 73% was eventually exported as rice and 27% sold domestically.

Thus, the expanding surplus of MKD rice production has progressively been channeled to exports, both through government-to-government transactions and via commercial channels. The MKD rice sector is now almost entirely commercialized, with only about 7% of the region's paddy production being held by farmers for own consumption.[26] Yet, government support and administrative measures related to MKD rice production and trade still continue to be premised primarily on national food security considerations. *The orientation and approaches used by government do not seem to have fully caught up with the changing circumstances—in the structure of production, in the commodity flows, and in the role which rice is now playing in the livelihoods of MKD households.*

The connection between MKD rice production and national food security is now reduced and is changing in character. The diversification of the Vietnamese diet is an important factor. It could be argued that over the past decade, the contribution of the MKD in enhancing the national food supply and (especially) nutrition has occurred more through its expanded output of fish and fruit, than its additional rice output. While a significant share of these products are also exported, domestic sales of MKD fish and fruit products continue to grow rapidly while that for rice does not. Still, the MKD contributes very positively to what is referred to as the 'national rice balance', which takes into account rice availability and consumption and additional uses (i.e. feeds, seed, industrial use) (Table 1).[27] Rice from the MKD also services the nearby Southeast and Central Highland regions which are, respectively, Vietnam's leading industrial and perennial crop areas.

Table 1: Vietnam's Rice Balance by Region, 2009

	Paddy production (Mill Tons)	Rice Available (Mill Tons)	Rice Requirement (Mill Tons)	Rice Balance (Mill Tons)	Index of Sufficiency
Whole country	39,08	21,13	13,54	7,59	1,59
Mek Delta	20,52	11,07	3,33	7,74	3,33
RRD	6,64	3,75	2,99	0,76	1,25
N/S Central	6,25	3,38	2,86	0,52	1,18
NE/NW	3,05	1,65	1,64	0,01	1,01
CH	0,99	0,54	0,74	-0,20	0,72
SE	1,33	0,72	1,97	-1,25	0,37

Source: Authors' Calculations based on GSO data and Authors' consumption estimates

[26] In addition to their use of paddy for seed or feed.
[27] See Policy Note #1 on the national rice balance and likely scenarios for the future.

In recent years or over a more extended period, the government has applied a broad range of policy and program tools to promote (or otherwise influence) MKD rice, based chiefly upon food security considerations. These have included administrative restrictions on land uses (and their conversions), rice land and paddy production targets, physical investments and management practices to ensure ample irrigation water (and flood control) for paddy production, plant varietal research and foundation seed production, subsidies and technical support for mechanization, tax concessions, financing/subsidies for public investment in rice storage capacity, the accumulation and management of strategic and other reserves by state entities, direct state trading operations, subsidized financing of state enterprise paddy/rice purchases, announced 'floor' prices for paddy purchases, G2G export transactions, and targets or managed limits on annual rice exports.

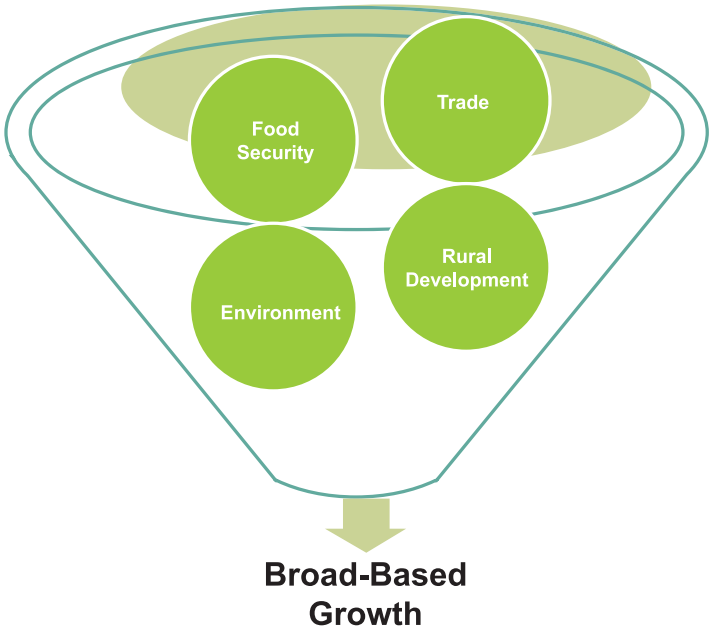
Vietnam's enormous food security achievements over the past two decades have provided the basis for re-visiting the country's food security goals and strategies. Indeed, Resolution 63 (in 2009) embraced a much broader concept of food security than the traditional focus on food availability—highlighting concerns and goals related to food accessibility/affordability, child malnutrition, food safety, and a more nutritionally balanced diet. There remain segments of the Vietnamese population which are vulnerable to either chronic or temporary food insecurity. And, despite enormous gains over time, child malnutrition remains unacceptably high at 18.9% nationally and at 18.7% in the food-abundant Mekong Delta. Addressing this broader set of food insecurity and malnutrition challenges calls for a multi-sectoral approach—covering nutrition, livelihoods development, social protection, and agriculture—and extending well beyond considerations of rice supply and consumption.

With regard to MKD rice, there is evidently a need to more clearly distinguish between social/public objectives, on the one hand, and economic/commercial objectives, on the other. In many respects the two have been co-mingled, bringing about certain results or trends which fall well below both public policy goals and private aspirations. Despite the very impressive expansion in MKD rice production and rice exports over the past decade, the benefits to MKD farmers and to Vietnamese consumers appear to have been modest. Few MKD rice growers have become wealthy and most can no longer rely upon rice as the basis of their household's livelihood. Vietnamese consumers want reasonably priced but, also, increasingly, better quality rice (and other foods). A growing proportion of the high quality rice now sold in Vietnam is imported, as the domestic value is not sufficiently quality-oriented.

The MKD rice system was extraordinarily successful in meeting the basic needs of producers and consumers in the past. It seems to now face considerable challenges in meeting the current and future aspirations of producers (for a higher standard of living) and the preferences of consumers (for safer, higher quality food). Its past success is no guarantee of future success. A 'business as usual' approach almost certainly will not realize the sector's future potential.

There is an evident need to re-visit the concept of the MKD "rice bowl" (Figure 2). Rather than considering the region's white grained bounty as primarily a source of national food energy, rice production and the rice value chain in the MKD should be seen as an integral part the country's and the region's strategies for modernization, industrial development, sustainable development, and promotion of New Rural Areas. The MKD will continue to be a successful "rice bowl" if and only if rice can play an important role in broad-based, sustainable growth. This is fully consistent with the Tam Nong strategy for agricultural and rural development.

Figure 2: The New Rice Bowl: Balanced Growth in the Mekong Delta



In relation to MKD rice, social or public objectives could well relate to household food security, social stability, consumer price stability, environmental protection, and, even, Vietnam's foreign relations. Economic/commercial objectives would relate to farmer economic welfare, resource use efficiency, supply chain efficiency, trade development, domestic market development, and international competitiveness. The efficacy of recent policies and programs of government seem to be strong results in some of these areas, including social stability, improved foreign relations, and trade development. In most of the other areas, progress has lagged. The rice value chain is not efficient and certain aspects of production are not sustainable. The basis for the sector's past competitiveness—very low cost—is unlikely to remain the case in the future with rising labor costs, rising farmer livelihood aspirations, and growing competition for land and (fresh) water resources.

Recently completed research involving the World Bank, a consortium of Vietnamese institutions, and other partners highlights both the need and broad scope for modernizing and encouraging investment within the MKD rice value chain. It also points to opportunities for promoting an even more vibrant rural and regional economy with the MKD in which rice production and value chain linkages are part of an ever more flexible and diversified agricultural and agro-industrial sector. The Government of Vietnam, through its central, provincial, local, and technical agencies has very important roles in supporting and facilitating these processes. The appropriate mix of instruments will, nevertheless, differ from that which were successfully applied during earlier stages of development within the region and within the rice sector. In the coming years there is an evident need for clearer distinctions between social and commercial objectives, with the government retaining if not enhancing its role and focus on the former, while reverting to more of a facilitative role for the latter.

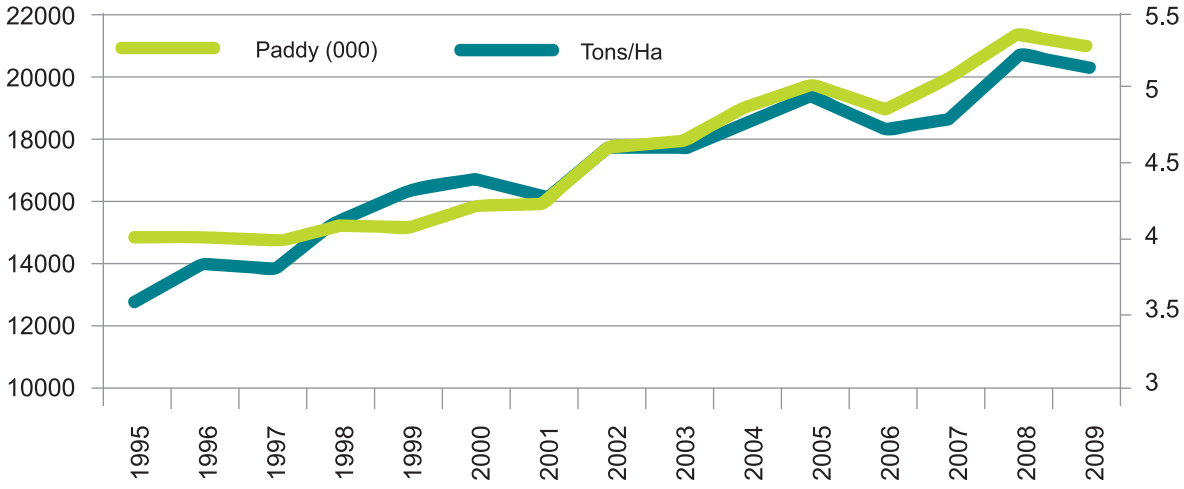
This Policy Note is divided into two main sections. The first section makes observations about and draws policy and program implications from changing patterns in the structure and performance of MKD rice production and the underlying economics of that production for farmers. The second section draws attention to the underdeveloped state of the MKD rice value chain, considers ways in which it subtracts as well as adds value, and considers policy and program options to support the modernization of the chain and an improved position of farmers therein.

Mekong Delta Region Rice Production and Economics

Expansion and Concentration

Figure 3 illustrates the long-term and virtually steady progression of MKD paddy production and productivity. These advances occurred on the basis of long and sustained investments in irrigation canals and other water resources infrastructure, and in agricultural research and advisory services, as well as an enormous amount of hard work by farming households. Despite frequent, localized problems with flood inundation, salt water intrusion, drought, and/or outbreaks of pests and diseases, the overall regional pattern of output expansion is remarkably robust. Over the past fifteen years, relatively modest year-to-year reductions in MKD output occurred only twice, between 2000 and 2001 and then again between 2005 and 2006.

Figure 3: MKD Paddy Prodution and AverageYields, 1995 – 2009
Avarage Yields, 1995-2009



Source: GSO statistics

The MKD farm land dedicated to rice production has actually been declining over the long term. Such land totaled 2.238 million hectares in 1980. Thirty years later—in 2010—in was 1.929 million hectares, some 309,000 hectares (or 14%) less. However, the sown area for paddy has continued to expand. Historically, in most parts of the Delta only one rice crop was grown. Yet, with the successful development of shorter season growing varieties and with improved flood and water management measures, an intensification of production has occurred, first involving the shift from single to double cropping, and, more recently, to the development of triple cropping in suitable agro-ecological areas. Over time, the single cropped areas (typically in the coastal zones) have become less and less important. And, while the triple cropped areas accounted for only 18% of the region's plantings in 2000, a decade later they accounted for 39% (and probably close to half of the total output, given their higher relative yields). This change in the composition of the MKD 'rice land' is illustrated in Table 2.

Table 2: Changing Structure of Rice Cultivation in the MKD

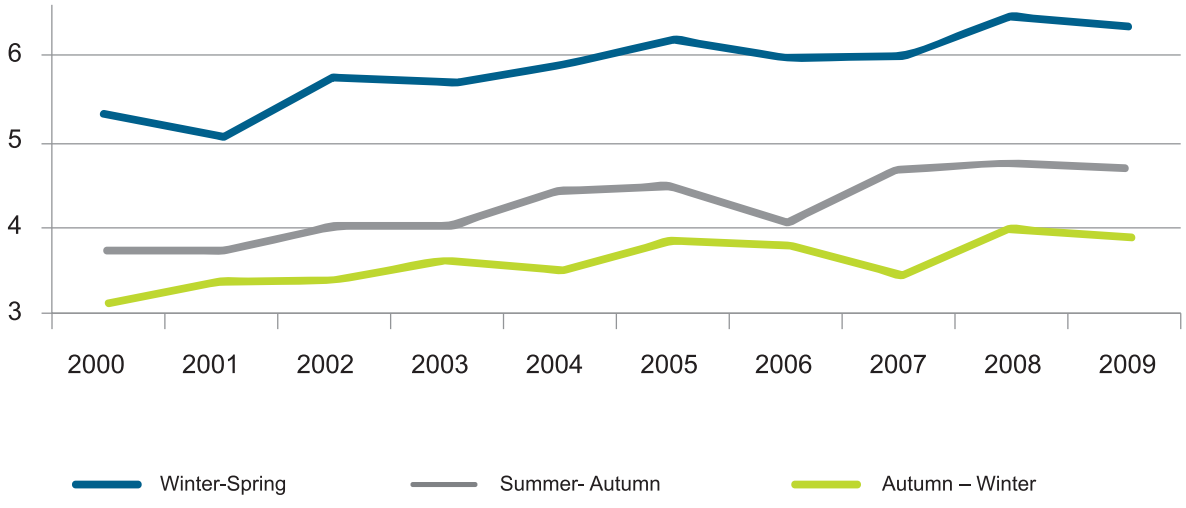
	1980	1990	2000	2010
Single Crop	1.572.800	887.277	431.389	342.250
Double Crop	642.500	1.154.046	1.398.062	1.057.366
Triple Crop	23.000	50.237	237.310	529.270
Total Rice Land	2.238.300	2.091.560	2.066.761	1.928.886
Total Sown Area	2.926.800	3.346.080	3.939.443	4.044.792
Cropping Intensity	1,31	1,60	1,91	2,10

Source: Calculations by NIAPP

Due to varying agro-ecological and hydrological conditions, wide differences exist in the productivity of rice cultivation in different growing seasons. The most productive season is the Winter – Spring season, for which average yields have approached 6.5 tons/hectare in recent years. In recent years, the W-S crop has accounted for just under 50% of the annual paddy production of the MKD and is the primary source of rice sold as exports. The second most important season is the Summer-Autumn season. This is frequently impacted by extended periods of flood inundation. Average regional yields have been about 4.7 tons/hectare in recent years. The Autumn-Winter crop now accounts for less than 10% of the annual MKD output. In recent years, average yields for this season have topped out at 4 tons/hectare.

While rice has traditionally been grown in almost all parts of the MKD, with changing land use patterns and on the basis of irrigation and other infrastructure, certain areas within the Delta have, over time, emerged as the dominant and more reliable producers of paddy. As illustrated in Figures 5 and 6 below, virtually all of the growth in plantings and output since the mid-1990s has occurred in the so-called 'high flooding' zone, constituting the provinces of An Giang, Kien Giang, Long An, and Dong Thap. Paddy production is more or less unchanged in both the coastal zone—where aquaculture has expanded rapidly—and a so-called 'fresh water' zone embracing a set of provinces in which horticultural and other mixed agricultural production has expanded.

Figure 4: MKD Average Yields Per Crop Season(Tons/ Ha)



Source: GSO

Over the past decade, An Giang and Kien Giang provinces have each individually accounted for about 30% of the growth in MKD paddy production, while Dong Thap and Long An provinces, together with a few districts in a couple other provinces, accounted for the remaining growth. A “core rice belt” has thus emerged featuring much higher rates of productivity. A core set of some 30 districts—in and neighboring to the so-called Long Xuyen Quadrangle-- now account for more than half of the region’s production, a large majority of its larger surplus growers, and all but a small share of the rice destined for export. Average annual yields for this ‘core rice belt’ exceed 6 tons per hectare versus typical patterns of 4 to 4.5 tons/hectare elsewhere in the MKD. This ‘core rice belt’ involves double or triple cropping per year so that the amount of paddy produced on farms in these areas is in the order of three to four times that of the coastal or mixed farming areas on an annual basis. Future efforts to enhance the productivity and sustainability of rice production and modernize the rice value chain should concentrate in this ‘core rice belt’. Efforts elsewhere should focus on promoting more diversified agriculture and agro-industry.

Despite being designated as Vietnam’s ‘rice bowl’, and despite a very high proportion of agricultural land still devoted to rice cultivation with the MKD , a smaller proportion of MKD’s farmers are engaged in rice cultivation than is the case in several other regions in the country. For example, according to the Agricultural Census of 2006, only 68% of households using agricultural land in the MKD grew paddy. The comparative proportions in the Red River Delta and North Central Coast regions were 94% and 87%, respectively.

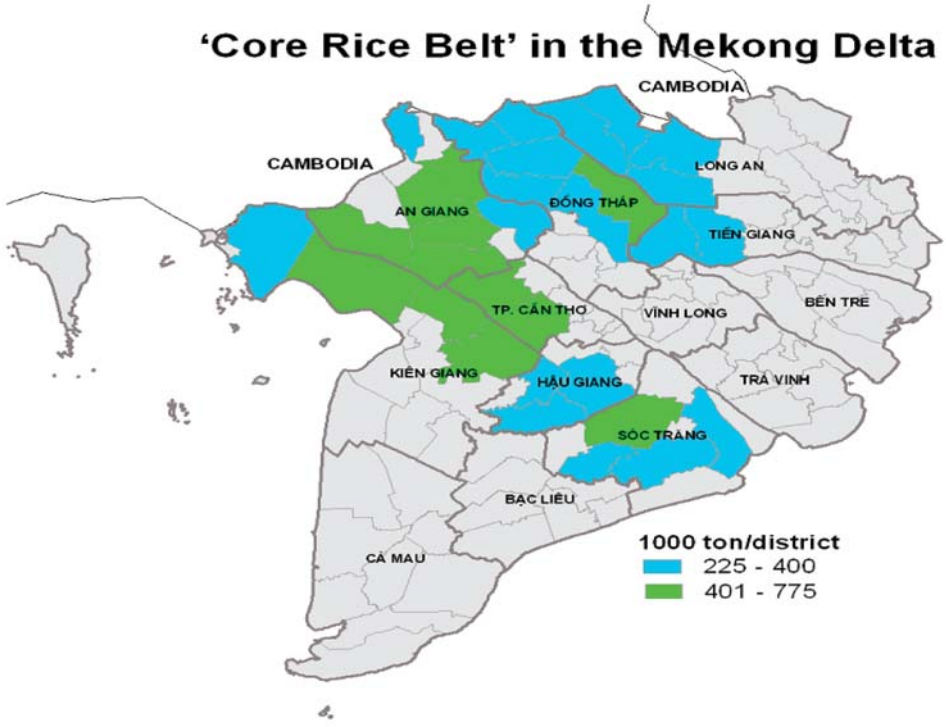
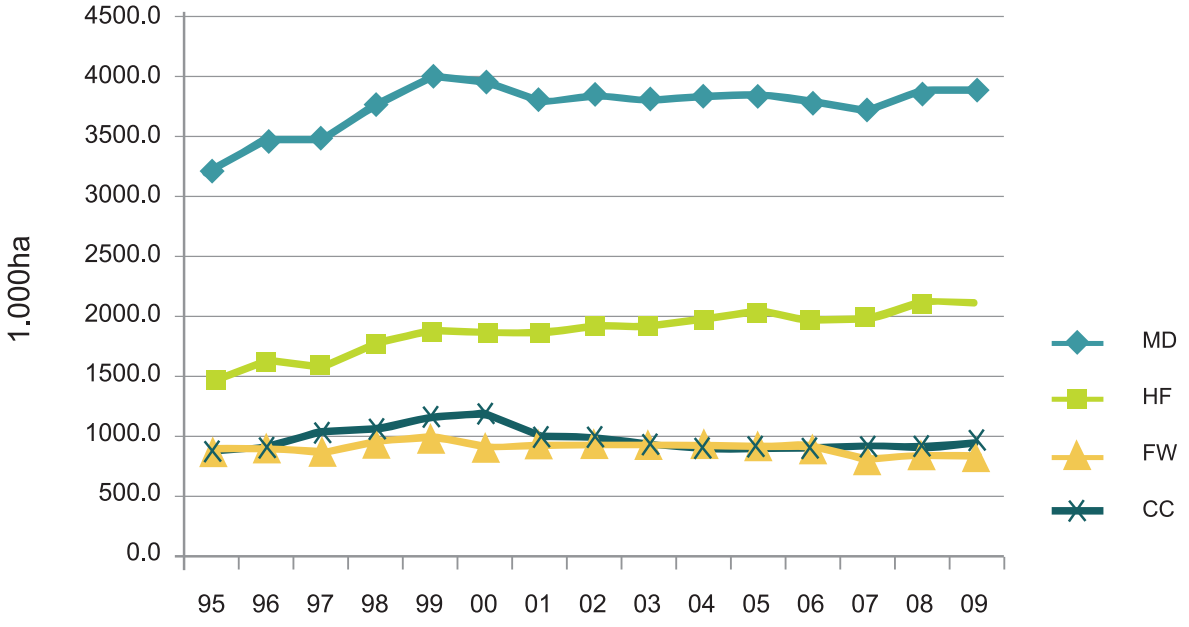
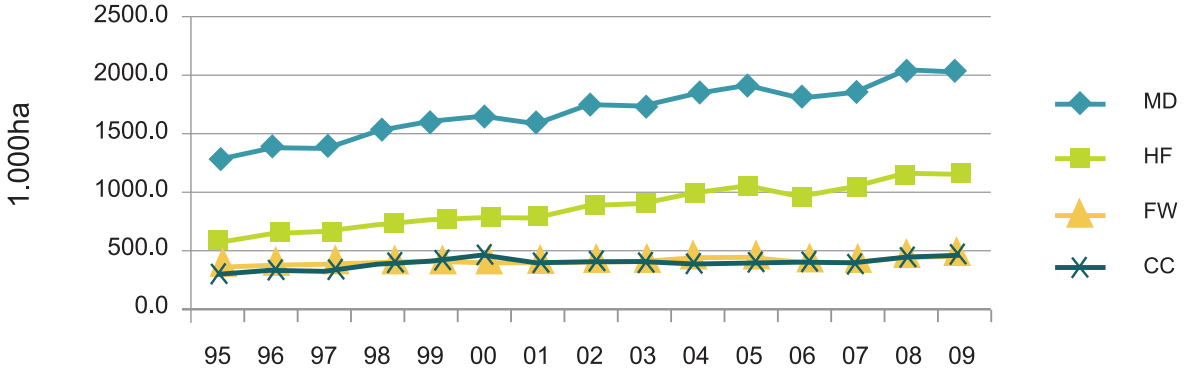


Figure 5: Paddy Sown Area by MKD Agro-Ecological Zone



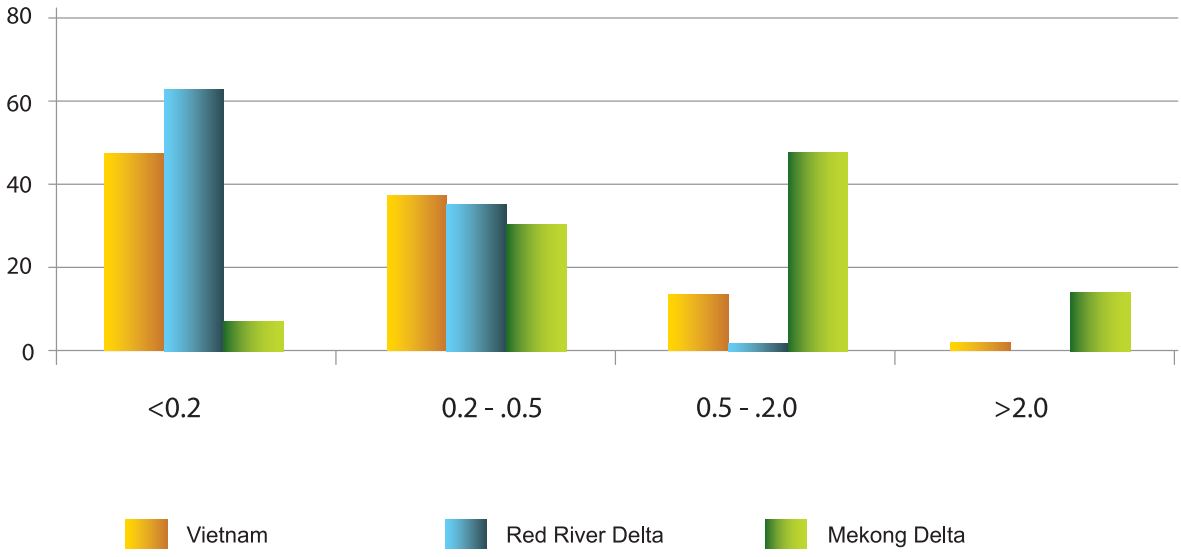
(Notes: MD: Mekong Delta; HF: Flooding zone; FW: Fresh water zone; CC: Coastal area)

Figure 6: Paddy Output by MKD Agro-Ecological Zone



The structure of rice cultivation in the MKD differs markedly from that in most parts of the country. This relates not only to the greater prominence of double and triple season cropping, but also the size of many rice growing farms. For the region as a whole, the average rice growing area, at 1.29, is substantially larger than that in other regions, with the national average being only 0.44 ha. Figure 7 contrasts the production structure among paddy growers in the MKD versus that in the Red River Delta and nation-wide. Nation-wide, some 47% of growers have rice plots of less than 0.2 hectares with this proportion being over 63% in the Red River Delta. Less than 8% percent of MKD rice growers have such small plots. Nationally, less than 3% of rice growers have more than 2 hectares under cultivation; this share is 14% in the Mekong Delta. While the Mekong Delta accounts for only 16% percent of the total number of rice growers nation-wide, it accounts for 55% and 89% of those national rice growers with between 0.5 and 2.0 hectares and more than 2.0 hectares, respectively.

Figure 7 : Proportion of paddy Growers by Land Size Used (2006; Ha,)



Source: Vietnam Agricultural Census, 2006

If there ever was a 'typical' MKD rice grower, it is increasingly difficult to define this actor today. According to results from the VHLSS, the majority of MKD's 1.46 million rice growers are now net buyers of rice, in financial terms if not also in terms of physical volumes. Most 'smaller' growers—which in the MKD can be defined as below 1.25 hectares-- rely upon rice for only a small (and evidently, declining) share of household income (see next section). Smaller growers tend to rely primarily on household labor, are less inclined to use certified seed, have had lower adoption rates of sustainable practices, and utilize little mechanization.

A combination of multiple cropping patterns in some areas and the presence of a cadre of medium and larger growers have resulted in a trend toward an increasing concentration in the commercial (net surplus) position among MKD rice growers (Table 3). Twenty percent of growers (circa 300,000 households) account for nearly two-thirds of the marketed surplus. Their average agricultural land is 2.74 hectares. While the average landholding for this group did not increase from 2004 to 2008, their share of the marketed surplus grew substantially, suggesting that the biggest productivity gains have been concentrated among these farmers. In all likelihood, the vast majority of these farmers operate in the core 25-30 districts noted above.

This trend toward concentration is likely to continue. As we will illustrate below, only a small proportion of growers—generally the larger growers—can earn a reasonably good livelihood on the basis of

specialized rice production. Under favorable market conditions, these growers will likely continue to invest and expand their rice production. Most other growers will likely continue to grow some rice, yet seek to further diversify their farming and non-farm sources of income. This growing concentration of the marketed surplus creates an enormous opportunity for more targeted production and value chain support measures. Efforts to modernize production and the interface between producers and the value chain can primarily focus on this core set of 300,000 to 400,000 growers whose scale of operations are amenable to cost effectively utilizing available technologies for mechanized harvesting and paddy drying and, when grouped together, can provide a reasonable volume of dedicated supply under a coordinated value chain initiative (see below).

Table 3: MKD Farmer Concentration in Net Surplus

	2004		2008	
Quintile	Ave. Agri Land (Ha)	Share of Net Rice Supply (%)	Ave. Agri Land (Ha)	Share of Net Rice Supply (%)
1	0,18	1,6	0,18	1,7
2	0,49	5,9	0,48	5,4
3	0,83	14,7	0,81	9,0
4	1,30	26,2	1,28	20,1
5	2,97	51,6	2,74	63,8
Total	1,16	100,0	1,10	100,0

Source: Study Team. Analysis of VHLSS data.

Production Economics: Who Can Earn a Livelihood from Rice?

The available evidence suggests large and growing distinctions in the performance of different types of growers and their ability to maintain a livelihood based largely or substantially upon rice cultivation. The majority of MKD rice growers are now net buyers of rice, in financial terms if not also in terms of physical volumes. While most of the very small and the middle size (1 to 1.75 ha) growers sell the majority of their paddy, most of these buy back rice with a value equivalent or greater than the value of their paddy sales. This may be due to the volumes involved, to the timing of sales and purchases, or a combination thereof. Hence, for the majority of MKD 'rice growers', household welfare is more affected by the retail prices of purchased rice than the farm gate price of sold paddy.

Tables 4, 5 and 6 provide results from a recent survey, bringing out further differences among rice growing households. Table 4 points to evident economies of scale, at least to the range of 2 to 3 hectare farms. Somewhat larger farms seem to be better able to utilize available technologies, including labor-saving ones and those which reduce post-harvest losses and maintain product quality. Larger farmers are able to realize some economies or bargaining power in the purchasing of inputs and in the sale of paddy and are able to obtain gains from more specialized use of labor. For most categories of farmers, profitability during the Summer-Autumn season is exceptionally low due to the adverse impacts of rainfall, sustained flood inundation, and generally more heavy pest/disease pressures.[29] The only farmers in our sample who earned a reasonable return during that season were those with plantings of between two and three hectares.

Table 5 provides the specific results per season for the survey sample in An Giang. This province features some of the highest yielding farmers in the country. Yet, better than average yields during the Summer – Autumn season still do not protect the profitability of growers during that season, a period in which labor costs are especially high and use of agro-chemicals also tends to be higher.

[27] The low profitability of the Summer-Autumn crop is confirmed by other previous surveys.

Table 4: Paddy Yield and Farmer Profit by Season and By Land Size Category
Yield: Tons/ha; Profit VND 000 per Kg.

Land Size	Winter-Spring		Summer-Autumn		Autumn-Winter		Whole Year	
	Yield	Profit	Yield	Profit	Yield	Profit	Yield	Profit
<1 ha	5,02	1,82	5,02	1,82	5,02	1,82	5,02	1,82
1 - 2	6,70	1,93	6,70	1,93	6,70	1,93	6,70	1,93
2 - 3	7,34	1,98	7,34	1,98	7,34	1,98	7,34	1,98
>3	6,74	1,68	6,74	1,68	6,74	1,68	6,74	1,68
Total	5,80	1,84	5,80	1,84	5,80	1,84	5,80	1,84

Source: Study Team Farmer Survey; 2009-10

Table 5: Farmer Costs and Profitability, An Giang 2009/10

	Total Cost/KG (VND 000)	Profit/KG (VND 000)	Profit/Cost	Profit Per Farm (VND Million)	Profit Per Farm ($)
WS	2,87	1,53	53%	8,7	527
SA	3,96	(0,03)	-1%	(0,1)	485
AW	3,30	1,90	61%	8,0	1012
Average	3,33	1,09	33%		

Average household size is 4.4 members
Average profit per capita $230/year = VND 3.9 million or 316,250/month

Source: Study Team Farmer Survey, 2009-10

Table 6 summarizes the aggregate and distinct sources of household incomes. While the sample survey was relatively small (i.e. 120 farmers), the results seem to suggest that MKD farmers with very small holdings make extremely little money from rice and are heavily dependent upon non-crop and non-farm income. Even the medium-scale growers are predominantly dependent upon income from non-rice sources. Only the larger rice growers can earn a reasonably good livelihood from rice production and sales, although they too derive one-third of household income from non-rice sources. To put these per capita rice income figures in perspective, the new official rural poverty line is VND 400,000 per capita per month. In our survey, growers with less than two hectares were earning far less than this from rice, although these 'rice farmers' were generally earning above this amount from off/non-farm employment.

What is happening to the profitability of rice production over time? On this it is not easy to generalize. One reason is the shifting pattern of rice grower paddy sales and rice purchases. As noted above, the majority of MKD rice growers are actually 'new buyers', selling much of their paddy at harvest time and then spacing out their purchases of milled rice throughout the year. The smaller growers save a somewhat larger proportion of their paddy and their rice cultivation is not strictly a commercial activity. One can map producer and consumer prices over time. These have generally run in close parallel, with periodic divergences, typically due to short-term developments in international prices. Yet, how this all affects the welfare of rice growers depends upon their particular circumstances and the timing of their own sales and purchases.

Table 6: Farmer Incomes from Different Sources
Sample of 117 Farmers
VND/Month/Person (000)

Farm size		Total Income Per Capita	Rice Income Per Capita	Other Crop Income Per Capita	Animal and Aquatic Income Per Capita	Off/Non-Farm Income Per Capita
<1 ha	Mean %	849	151	84	82	533
		100	18	10	10	63
1- 2 ha	Mean %	1165	284	72	359	449
		100	24	6	31	39
2.01 – 3 ha	Mean %	1901	658	26	728	490
		100	35	1	38	26
>3 ha	Mean %	1933	1296	10	88	540
		100	67	0	5	28
Total	Mean %	1312	535	56	209	512
		100	41	4	16	39

Source: Study Team Farmer Survey

Calculations can be made of the 'Terms of Trade' for rice growers, comparing an index of prevailing paddy prices with those for some basic of purchased inputs for which time series data is available. This we do in Figure 8 below. The input cost index used here combines the costs of urea and fuel. It is more difficult to consider a standardized package of agro-chemicals and representative farm labor costs are not readily available. This 'Terms of Trade' is calculated for the period of the calendar year associated with the harvest of the Winter-Spring crop. This crop is the source for a large proportion of Vietnam's annual rice exports. It is a comparatively better quality crop and is more reliable than the others.

There is no clear trend in the MKD rice farmer 'terms of trade' over the course of the decline. Some improvement was apparent in the first part of the decade, then the T-o-T fell between 2004 and 2007. The big jump in 2008 was a bit of an outlier as there was a temporary spike in prices. Farmers that year were subsequently adversely affected during the Summer-Autumn season by which time producer prices had fallen back to earlier levels yet input prices remained elevated. Those declining terms of trade seem to have continued since. We've included the country's export volumes in this Figure to illustrate that the Terms of Trade for growers have generally declined in years in which export volumes increased sharply (i.e. 2005, 2009, and 2010). This same pattern appears to be playing out in 2011. Booming export times don't seem to translate to the bottom line for farmers.

Put more strongly, the MKD farmers seem to be bearing the 'burden of success'. The combination of restrictive land use planning, investments in irrigation and technology, and other means of support have provided a powerful basis for generating surplus rice production in the region. When paired with favorable weather conditions, the region has yielded a bountiful output. This has to be exported because the domestic demand has leveled off. Hence, export volume booms have occurred both in the mid-2000s and during the past three years (2009 to the current year of expected record volumes). The output surges have, unfortunately, resulted in downward pressures on producer prices. Vibrant export performance has not been equating with good times for MKD farmers. Later, we will discuss the issue of how the distribution of benefits within the rice value chain.

Figure 8: MKD Rice Grower Terms of Trade, Winter – Spring Seasons, 2000 – 2010

Source: Authors' Calculations based upon multiple data sources

The government has recognized the challenges facing MKD farmers in earning adequate incomes from rice and is concerned that low or reduced profitability will provide a disincentive for growers to continue. This, in turn, could threaten the sustainability of Vietnam's enormous food security gains up until now. In relation to rice, two different approaches have been taken. One has been an attempt to artificially prop up producer prices. This policy seems to have had little impact. The second approach has been to seek to reduce production costs by promoting reduced use of material inputs. This latter approach shows great promise and should be the focus of government attention going forward.

In recent years, the Government has sought to counteract the downward pressures on producer prices at harvest time by announcing 'floor prices' for paddy and providing interest free loans for milling/trading companies to purchase and store additional quantities of paddy or rice at these times. These purchases are supposed to ensure that farmers earn a net margin of some 30% yet there is no evidence that these periodic interventions are achieving this (or a related) goal.

The companies generally do not buy paddy directly from farmers and thus there is no direct mechanism for them to be paying the floor prices to farmers. The loans have almost certainly increased the liquidity of the trade at certain times, yet it isn't clear whether the primary beneficiaries of this have been the farmers, the collectors, the millers or the companies themselves. Statistics are not publically available on how much incremental rice or paddy has actually been purchased under these programs during the past two years. Most traders and industry observers do not believe that these measures have had much impact on prevailing prices[30], although there may have been some

[30] From a qualitative survey conducted amongst exporters, only 17.8% of the 47 respondents agreed that the floor price system is actually implemented and a similar proportion agreed that this system has helped protect farmer incomes.

months in which farmers were able to sell their crop somewhat faster than they would have otherwise been able to—and thus, may have been spared additional post-harvest losses.

Over an extended period output has grown on the basis of the intensification of production. Farmers got into the mode of 'more is better', tending to apply excessive volumes of seed, fertilizer, agro-chemicals, and water.[31] Farmer surveys and extension worker observations have found that large numbers of farmers are not applying recommended practices. This excessive input use has contributed to added costs, ill-health efforts (from pesticide spraying and storage), and growing levels non-point pollution, as with the run-off of fertilizer and chemicals into surface water moving downstream. While the environmental costs were not borne by farmers, they've been affected by rising material input costs and adverse productivity aspects.

Over the past decade there been a range of initiatives to promote more efficient and sustainable practices.[32] One major approach, first launched in 2002, has promoted "three reductions – three gains", with efforts to encourage farmers to use less seed, less fertilizer and less agro-chemicals and, in the process, achieve higher productivity, higher quality, and more economic efficiency. Adoption rates are uneven. DARD reports indicate that the rate of application of this model rose from 17% in 2005 to 41% in 2008. Progress has varied among the 'three reductions' categories. Comparatively better progress has been made in reducing seed volumes and increasing the use of certified seed, although much further gains are possible.[33] Some gains been made lowering the incidence of excessive use of fertilizer, although in most areas fertilizer use is still not well calibrated to local soil conditions. Various local programs have sought to promote integrated pest management and reduce agro-chemical use. Adoption rates for the "three reductions—three gains" program have been relatively high in some provinces and very low in others, with this likely to be closely associated with the presence of double and (especially) triple cropped rice production.[34]

In recent years, a variant of this scheme was introduced under the heading of "five reductions – one must", with the five reductions including the former three, plus the reduction in irrigation water use as well as the reduction of post-harvest losses. The one 'must' is certified seed. Technically and financially feasible models have now been demonstrated and efforts are being made to scale up the adoption through the spread of demonstration plots and technical and financial assistance to adopting farmers. The success of these efforts will be essential not only for improving the financial viability of MKD rice production, longer term, but also in enhancing his environmental sustainability. One of the 'side benefits' of reducing water use and especially interspersing flood cultivation with growth using drier soils would be to reduce the methane emissions given off by MKD rice cultivation. These are currently one of the highest sources of GHG emissions in Vietnam.[35]

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31 A recent study by Gregory et al (2010) found the mean fertilizer use in Vietnam rice to be 207 kg/ha in 2007, in comparison with 154, 130, 123, and 115 in India, Bangladesh, Pakistan, and Indonesia, respectively.

32 See Huelgas and Templeton (2010) "Adoption of crop management technology and cost-efficiency impacts: the case of Three Reductions, Three Gains in the Mekong River Delta of Vietnam.

33 In 2009 still only 46% of farmers surveyed by the CLRRI used certified seed.

34 According to a 2007 CLRRI survey, the adoption rate was 67% in An Giang and nearly 60% in Can Tho. In contrast, it was less than 10% in four provinces.

35 It is roughly estimated that rice cultivation under MKD conditions gives off 2 tons of methane per hectare. The sown area in the region is just over 4 million hectares per year. In the carbon trading market a ton of methane is traded at $20/ton, meaning that the cost of methane emissions from MKD rice production is in the order of $160 million per year.

Policy and Program Options

The following policy and program implications emerge from the above findings.First, the government should abandon its policy of announced 'floor prices' and subsidized finance for companies to buy up additional paddy or rice. The policy is not an effective means of influencing producer prices, while providing a highly unlevel playing field in the competition among trading enterprises and especially that between SOEs and private companies. This policy is applied in an ad hoc and non-transparent manner. This type of financial outlay is also not sustainable.

There are much better and more sustainable ways to 'support' the level of producer prices over time. One is to raise the actual commercial value of the farmers' crop. This can be through a variety of value chain initiatives to promote improved product quality, and improved satisfaction of buyer and consumer requirements. Producer prices can also be improved by enhancing the position of farmers within the value chain via their ability to dry and store paddy and through the development of longer term partnerships with millers and trading companies.

Second, the government should intensify its efforts—in partnership with researchers, the private sector, and farmer organizations---collectively called the "4 houses"—to promote the adoption of more efficient and environmentally sustainable rice production and natural resource management practices. This may require further investment in infrastructure, the provision of advisory services, support for demonstration plots, and, potentially, some direct subsidies during the transition phase in production practices. The potential economic and environmental benefits from large-scale adoption of these methods are enormous.

It is recommended that this effort to promote 'good agricultural practices' in rice initially concentrate in the 'core rice belt'—the areas which are currently generating most of the surplus and those which will constitute the core of production long into the future. These are the areas where many farmers will remain specialized rice growers. Economies of scale and scope in program implementation can be realized by dedicating the efforts here. Within the 'core rice belt', the government should support an incremental process of landholdings consolidation in order to enable farmers to realize the apparent economies of scale up to approximately three hectares. This implies the strengthening of arrangements for land administration and the facilitation of land sales or leasing arrangements.

Third, in areas outside of the 'core rice belt', especially where only one rice crop can be grown per year, where the agro-ecological conditions are less suited for rice, and/or where medium term climate change impacts could be severe, the foci of government's attention should be in promoting more flexible land use arrangements, agricultural diversification, and a more diversified and vibrant rural economy in general. Farmers in these areas will unlikely abandon rice yet cannot maintain a livelihood based on rice.

Promoting this more diversified agriculture and rural economy will require relaxing the administrative restrictions on 'rice land designation', the provision of longer term land use rights (to encourage investment in perennial crops, etc.), and different types of infrastructure and agricultural support services more appropriate for 'higher value' yet more perishable agricultural commodities and new production activities.

Over the past decade or more a lot of experience has already been gained in promoting agricultural diversification within the MKD. Following the issuance of a Decision in June 2000 ("Some Guidelines and Policies on Changing Production Structure/Model and Consumption of Agricultural Products'),

measures were put in place to encourage more diversified agricultural production in the MKD, including assistance to convert more rice lands for either brackish water shrimp or fresh water fishery aquaculture, promotion of vegetables and other annual crops, and further development of the fruit sector. In some areas, production shifted from rice mono-cropping to various rotations of rice and either fish or shrimp. With heavy investment by both government and the private sector, MKD aquaculture production exploded from some 365,000 tons in 2000 to more than 1.87 million tons in 2009. Vietnam (and the MKD) emerged as one of the leading world suppliers of shrimp and of *pangasius* during this period. The region's fruit exports also grew rapidly.

Overall land use patterns have begun to shift (Table 7) although there is ample scope for continuing this process. Vietnam can remain solidly food secure well into the medium term even if a substantial amount of land currently designated as 'rice land'—with restrictions on its alternative use—is converted to other agricultural uses. Within the MKD, the scope for converting rice lands to more profitable alternative agricultural uses—without, in any way, threatening food security, is at least if not considerably more than the magnitude of land use change which has occurred over recent decades. Future rice cultivation in the region could concentrate in the areas or somewhat just below the area of land currently involving double or triple cropping (i.e. 1.58 million hectares).

Table 7: Changing Land Use Patterns in the MKD (000 ha)

	1980	1990	2000	2008	2010
Rice Land	2238	2092	2067	1874	1929
Other Annual Crops	92	130	135	178	124
Perennial Crops	192	348	397	546	563
Aquaculture	6	145	229	531	
All Agri Land	2522	2570	2599	2597	2616
All Agri/Forest/Aqua Land	2786	2894	3174	3421	3401
Rice as Share of Agri Land (%)	89	81	80	72	74
Rice as Share of all Land (%)	80	72	65	55	57

Source: NIAPP

The diversification of agriculture and the shifts in land use patterns have clearly been beneficial for MKD farmers and for the regional economy. The economic returns for most farmers growing fruits and vegetables, either on a specialized basis, or in combination with rice production, are generally much higher than those of mono-crop rice farmers. The plantings of other annual crops, including peanuts and various types of legumes have brought commercial opportunities as well as contributed to more balanced diets. Several of the provinces which have experienced the most significant shifts in land use from rice to alternative crops and/or aquaculture have been the best performers over the past decade in terms of the reduction in child malnutrition.[36]

The shifts by farmers from rice cultivation to either rice/fish or rice/shrimp rotations or specialized fish or shrimp aquaculture has been a more mixed picture due to the added financial and technical (i.e.

[36] Including Ben Tre, Ca Mau, Tien Giang, and Soc Trang. In constrast, the province which experienced the most rapid expansion in rice production, Kien Giang (at 6.1% per annum between 1999 and 2009) ranked 12th out of the 13 MKD provinces in terms of the reduction rate in underweight children.

disease management) risks faced by farmers. Many have seen huge gains in their incomes and overall standard of living; some of failed in their new endeavors, either reverting back to rice production or being forced to abandon their operations, either leasing or selling their land to others. The pangasius sector is currently undergoing somewhat of a restructuring in the face of financial and technical pressures and it is likely that many of the very small growers—who are unable to apply needed environmental management practices—will exit the sector. The (sustained) success rate among smallholder shrimp aquaculturalists has been much higher. In the areas of rice/shrimp rotations much has been learned about proper water management in order to manage diseases and other production risks. Those areas are demonstrating suitable techniques for climate change adaption for the coming years.

Both the fisheries/aquaculture boom and the expansion in fruit production and exports have created enormous opportunities for seasonal and more permanent employment for the people of the MKD and have contributed growth multipliers through their demand for inputs, packaging materials, and logistical, engineering and other services. Fish processing has been one of the few success stories of the MKD in attracting foreign direct investment. In contrast, rice milling has created only modest growth multiplier, providing only limited employment and thus far being associated with few efforts to more effectively utilize paddy stalks or milling by-products for energy or other uses.

The Rice Value Chain: Observations on Structure and Performance

Adding or Subtracting Value?

An enormous amount of money and human resources have been invested to generate large and growing volumes of paddy from the soil and water of the Mekong Delta. Yet, from the point in time when the glistening paddy crop in the field reaches maturity, the value of this crop begins to decline. From this point onward, the 'value chain' adds considerable cost, experiences considerable physical and quality losses, and adds back very little value. There are exceptions to this pattern, yet this is the norm.

Consider, for example, the harvesting of the paddy. Most farmers do this manually. Labor constraints in some areas result in harvesting the paddy when it is overripe. For the Summer-Autumn crop rice plants are knocked over by falling rain and harvests must be done when rice is inundated by flood water. Physical losses of 2 to 3% of the crop occur plus quality is adversely affected. The use of combine harvesters can address these problems and several government programs have offered farmers incentives to purchase these.

While some 6500 harvesters are currently in use, they cover just below 20% of the sown area.[37] The vast majority of farmers have too small (or too fragmented) landholdings to own this equipment themselves and many of these farmers cannot be custom serviced by others due to the poor accessibility of their farms. While it is unrealistic to expect large numbers of rice growers to individually own combine harvesters, there would appear to be scope for further development of harvest service businesses and for farmer cooperative performance of harvest and other services.

Thus, harvesting bottlenecks result in the loss of some 400,000 to 600,000 tons of MKD paddy. The losses then mount. The harvested paddy is wet and needs to be properly and evenly dried in order

[37] The central government has provided financial incentives to encourage purchases of combine harvesters. To qualify, the equipment must contain at least 60% local content. Most local equipment is manually constructed and of not high quality. Operating and maintaining it tends to be higher than initially more expensive imported equipment. Several local governments have offered subsidies or interest free loans for the purchase of combine harvesters, regardless of their origin.

to prevent cracking, mold build up and to properly prepare it for milling. Improperly dried paddy cannot be stored long without decay. Paddy with a high moisture content reduces the efficiency of milling operations—requiring higher electricity use and lowering milling outturns—and results in more broken rice and lower grain quality. In the MKD most paddy is sun-dried by farmers—either in their fields, in the homestead areas, or along loads (or in other public areas).

The technical results depend upon the prevailing weather and local conditions. During the Summer-Autumn season the results are generally poor. At other times, drying to specification is generally possible, although incentives for more diligent efforts tend to be weak as paddy prices don't differentiate much by quality (or moisture content). The drying stage thus results in more physical and quality losses. The physical losses are estimated to range from 1.14% for the Autumn-Winter crop to 3.49% for the Summer-Autumn crop. On an annual basis, the losses are said to be 2.12%. That is another 400,000 tons of paddy lost, perhaps with only a secondary animal feed market.

Over the years, efforts have been made to encourage farmers to adopt mechanical (forced heat) driers, yet adoption rates were very low due to the added costs and technical difficulties experienced by farmers. Physically moving the paddy to drying sheds proved laborious. The developed technology was found to be non-economic for the smaller farmers to use (during perhaps one month per year) and few successful models of collective action were developed. Large numbers of mechanical driers supported by earlier development projects lay abandoned. Some farmers simply sell their fresh paddy, at a discount, or attempt to do proper drying using sunlight and various improvised techniques (such as use of plastic tents).

Storage is another problem. Long ago when there was generally a single rice crop in the MKD, farmers regularly stored dried paddy in their homes, either in large baskets made of woven bamboo materials or in bags piled up in stalls. With the emergence of double or triple cropping, this tradition waned as farmers began to sell most of their crop, retaining small quantities to have custom milled to meet near term household consumption needs. Currently, there are relatively few examples of farmers, either individually or in groups, storing dried paddy in permanent structures where there is scope to control against humidity and other hazards.

Yet the next few players in the supply chain also rarely have high-quality storage capacity. Dried or semi-dried paddy is transported by barge to small-scale (50 ton/day) millers who husk the paddy and then the intermediate product is transported again to larger millers who produce the polished or unpolished white rice. These first stage millers generally have only rudimentary storage capacity. Before it is milled the paddy tends to sit outside, perhaps under some kind of shading or roofing. Yet, physical losses occur again here estimated at 1.7% on an annual basis. That's another 340,000 tons.

Hence, between the farmers' field and the first stage of processing, approximately 1 million tons of paddy is damaged or otherwise physically lost. That is five percent of the entire crop and equivalent to 25% of the total consumption of rice amongst the MKD's twenty million people. That is a lost value of $250 million, not including the quality losses which have also occurred.[38] Further physical losses in latter parts of the domestic and export value chains deduct an additional $250 million of value from its potential sum. [39]

But other value is lost along the way in relation to quality. There are more than several dozen rice varieties currently being cultivated in the MKD. Some are more popular than others and grown on large areas. Farmers generally are using own saved seeds, with, in recent years, between 35% and 46% using certified seed. Some farmer saved seed is very good; some is poor. Individual farmers

[38] For approximately 650,000 tons of rice at $400 per ton.
[39] This is for physical losses at milling, transport, and wholesale/storage stages.

may thus grow a range of qualities on their own fields. Their small consignments are then mixed with those of others in the transport barges and the lot delivered to paddy millers may then contain many different varieties of different degrees of maturity. This phenomenon gets magnified at the next stage of processing. Leaving the conveyor belt of that miller may be a rice buffet, combining a dozen or more varieties with different sizes and hues. Subsequent polishing operations (for export) may cover up some variation but not most. This 'mixed bag' product is perfectly acceptable for some distribution channels. Yet, it will not sell in discerning overseas markets or amongst consumers or food establishments within Vietnam that are paying attention to quality. For simplicity, let's say that one-third of the potential market for MKD rice would be willing to pay more for a variety and better quality segregated and assured product and would pay $30 per ton above the current selling prices. That is another $100 million in 'lost value'.

Hence, as a result of its current structure, current practices, and available technologies and incentives, the MKD rice value chain loses some $600 million of value in the form of physical and quality losses. This is not a small sum. To put this into perspective, the Consortium's value chain analysis estimated the net value addition for MKD rice exports in 2009 at $87.5 per ton. With exports in that year of 6.052 million tons, the net value addition of that trade would have been $530 million. The estimated magnitude of the physical and quality losses in the MKD value chain put into perspective the potential near-term benefits from a modernization of that value chain—both from a physical and institutional aspect.

Value Chain Underdevelopment

Both for its domestic and export channels, the value chain for MKD rice developed without a strong orientation toward product quality and without strong competitive pressures to achieve technical efficiency. Process or product innovations brought limited rewards. Product quality had to be acceptable, but little would be rejected and higher quality was either deemed too difficult to achieve or not well remunerated. Standardized and old technologies could be used. The emergence of double and then triple cropping reduced the need for and prospect to innovate techniques for paddy or rice storage. The performance of the rice value chain has been adequate for what it was asked to do—essentially deliver growing volumes of acceptable quality rice at reasonable cost to a non-discerning 'customer base', both at home and abroad.

Yet, for such a large producer and exporter, the value chains for MKD rice remain remarkably underdeveloped from both a physical and institutional perspective. While there are certainly exceptional outliers, the chains are generally characterized by the following features:

- The chains are quite 'long' compared with other product value chains in Vietnam and compared with rice value chains in other leading producer countries. In the domestic channels, there are generally at least six active players between the farm-gate and the consumer; for exports, either five or six players are active from the farm-gate to the shipping port.
- The chains feature very little application of collective action at most industry levels. Well functioning farmer cooperatives or other joint action groups are rare. Local trader, miller, or transport operators have little formal means of cooperation although informal commercial ties may be more common. The leading state owned enterprises operate within a cluster of parent and subsidiary companies—probably with high levels of interaction. While there is an Association comprising most of the leading exporters, its functions are more to monitor exports and apply certain administrative rules, while the industry as a whole seems to lack a collective strategy for future market development and competitiveness.
- The chains feature minimal levels of vertical integration and very modest levels of vertical coordination. Few firms operate at more than one level in the chain, with there being a few exceptional companies involved in input supply, milling and trading. Players commonly transact with similar parties just 'above' and 'below' them, although this is generally on a consignment

specific basis and not part of any longer term contractual or other relationship. There are few long-term commitments of any kind.

- The vast majority of the product generated is undifferentiated. Exported product is graded according to the % of 'brokens' although this doesn't reflect the possible (and typical) mixing of varieties. Few Vietnamese brand names are recognized in international markets and product is not distinguished by its geographical origins. In the domestic market some special varietal distinctions and product origins are recognized although as much rice so differentiated comes from imports as from the MKD. The bulk of MKD rice sold domestically is simply divided into standard quality lots.

The long length of the value chains is partly a reflection of the fragmented structure of production. There are some 1.46 million rice growers in the MKD, nearly all of which sell some quantity of paddy to the market. It is not simply their numbers but their locations and the difficult access to some which results in a situation where few millers buy paddy directly from farmers but instead buy from a range of collector/traders who own or rent barges to carry paddy to millers. There are several thousand collector/traders operating at localized levels in the MKD with some specialized in rice and others also handling additional commodities. The first-stage paddy millers have very limited storage capacity and this is another reason why they don't buy directly from farmers. Milling is done in two (or sometimes three) stages with the initial process husking the paddy. The intermediate product is then transported to larger millers for the production of white rice and, if for export, of polished rice. There are several thousand paddy millers in the MKD and approximately few hundred larger millers. A small minority of the latter feature modernized operations and, until recently, no rice mill was HACCP certified.[40]

The larger millers then supply either wholesalers, for the domestic market, or exporters. In recent years Vietnam has had more than 200 registered exporters. However, most of these are very small or part-time operators and about half of these sell less than 1000 tons per year. The export trade is actually highly concentrated, with eleven companies accounting for about 70% of the trade. State-owned enterprises account for about three-fourths of the exported volume. Two companies account for about half of the trade. They are responsible for coordinating the G2G transactions which accounted for 66%, 49%, and 43% of the total export trade in 2007, 2008, and 2009, respectively.

Those companies don't directly procure paddy and don't, themselves, mill all that rice. Rather, after the G2G transaction is negotiated the deal is divided up among their subsidiary companies and other VFA members who are responsible for delivering to rice to HCMC for subsequent shipment by the coordinating company. This trade is then recorded as exported by that company. This arrangement then exaggerates the actual 'dominance' of SOEs in the export supply channels as a sizable proportion (perhaps half) of the rice they export through G2G transactions is procured and milled by private companies. Regardless of who does what, this trade is still characterized by a 'public sector mentality'. Everyone knows that the 'customer' is an overseas public agency which distributes the rice to people in need on a concessionary basis. A price has been negotiated and then margins divided up. Those engaged in this channel will naturally seek to minimize cost even if this means lower quality.

Between the G2G trade and commercial sales to other markets seeking the lowest cost available rice (i.e. several African markets), some two-thirds of Vietnam's rice exports are then sold as low or medium quality grades. Vietnam actually dominates this 'bulk white' lower quality segment of the international rice market and doesn't directly compete with the other leading rice exporters which have targeted other, generally higher priced segments in the international market. Should Vietnam be satisfied with its market position?

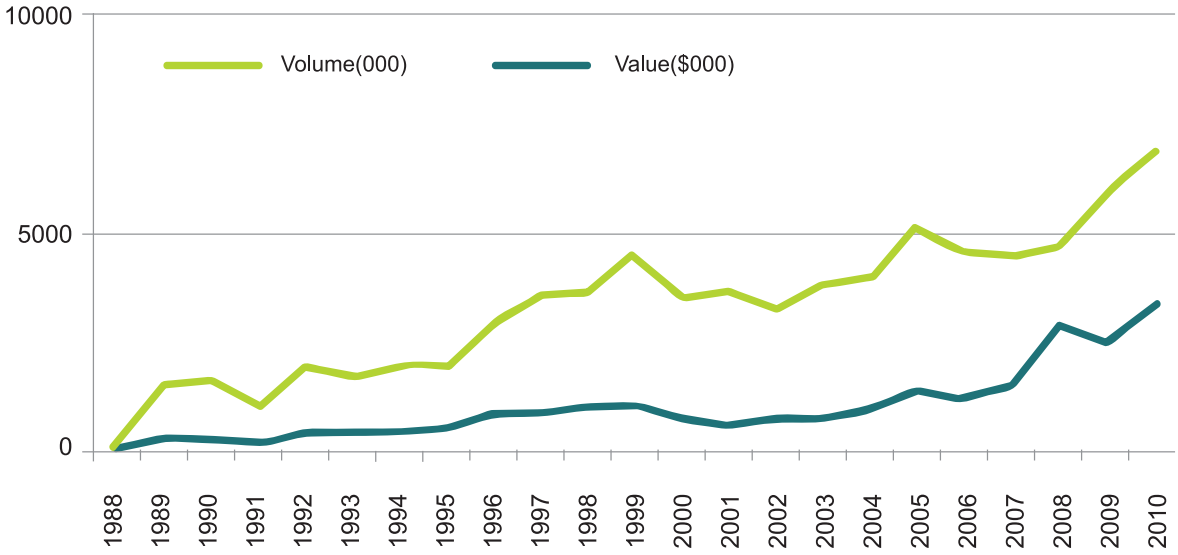
[40] Milling yields or recovery rates in Vietnam range between 60 and 70% depending upon the quality rice being sought. These are in a range similar to that achieved elsewhere in Asia, although the average milling yield is reportedly somewhat higher in Thailand and Malaysia than in Vietnam. (Agrifood Consulting International report to World Bank on Supply Chain Organization and Infrastructure).

There are four things to consider. First, the dominant place of low quality rice in Vietnam's export basket generates a slack mentality throughout the whole system, dampening incentives at all levels to upgrade operations and product quality. Second and related, this weak quality mentality spills over to the offerings available on the domestic market. Generally, the supplies from the MKD which are channeled domestically are of even lower quality than the exported product. There is a risk, over the longer term, that Vietnamese consumers —or at least its middle income consumers—will turn, increasingly, to imported rice to meet their requirements for quality. Third, as we saw earlier, MKD farmers aren't making very much money from Vietnam's sale of low cost rice. If more value is not generated—and shared with them—then the sustainability of the entire value chain is at risk. Finally, no one has reserved the low quality segment in the international market for Vietnam. Other producers, including Cambodia and Myanmar, could increasingly compete, at lower cost, for these markets in the future.

Rice Exports: A Thriving Trade at the Bottom of the Market

Rice exports from Vietnam's MKD date back at least to the late 18th Century and probably much earlier. A vibrant and regular trade was developed in the 1920s and 1930s, varying between 1.0 and 1.5 million tons per year. This trade was subsequently interrupted by war, social conflict, and farm collectivization policies. In the 1980s and early 1990s, production had recovered such that Vietnam once again emerged as a rice exporting country. The pattern of Vietnam's rice exports has been uneven in the period since then (Figure 9). Relatively stable levels of trade have been followed by multi-year spurts, then consolidation, then renewed spurts. Nevertheless, the overall trend during the past decade has been upward. The country remains in the midst of a current upward spurt, which realized record levels of trade in 2009 and 2010 and expected higher levels still in 2011.

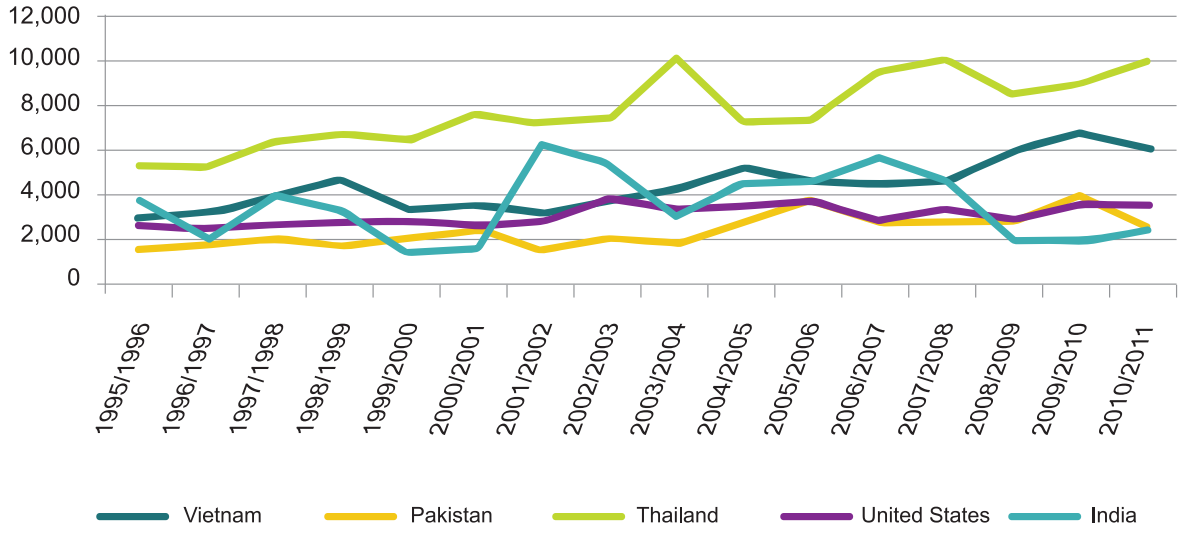
Figure 9: Vietnam Feeds the World – Expanding Rice Exports



Source: GSO

As a result of its recent expansion in trade, Vietnam's share of world rice exports has crossed the 20% mark, having been in the range of 10 to 13% earlier in the decade. None of the other leading exporters have experienced a similar upward trend in trade. In fact, the rice trade of these countries is notable for its volatility over the past decade (Figure 10).

Figure 10: Leading World Rice Exporters by Volume(000Tons)



Source: USDA

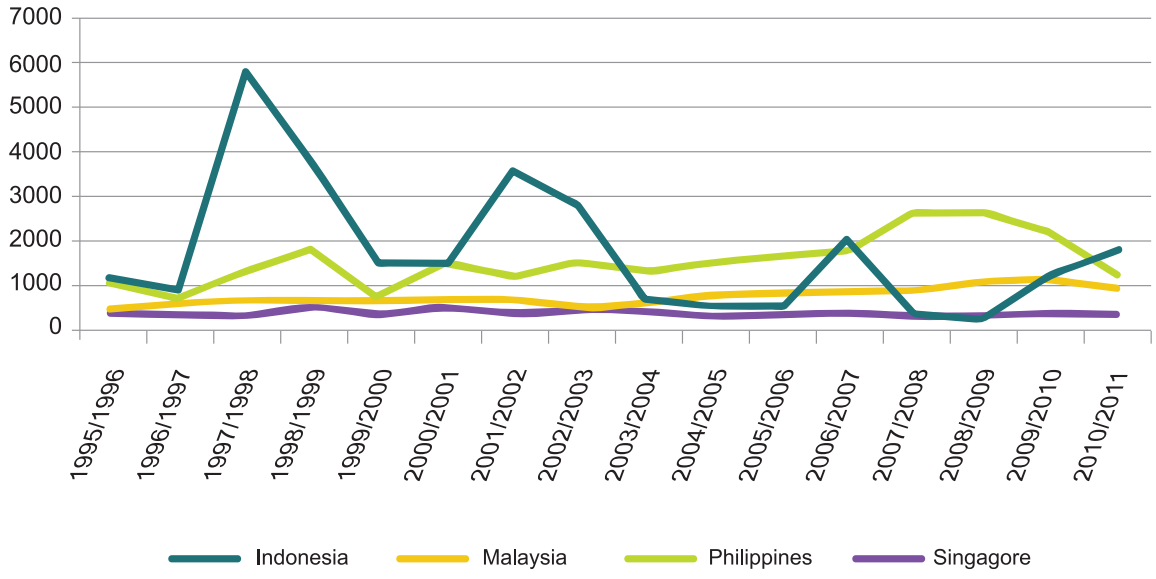
The listed five countries account for three-fourths of world rice exports. The focus of their respective trades are different: India and Pakistani focus on basmati and other specialty/fragrant rice varieties; Thailand focuses on parboiled rice and high quality white rice; the United States on premium quality white rice. Vietnam's trade is primarily of low to medium quality white rice. There are very large price differences among these rice types and they are directed, for the most part, to entirely different customers. For example, in 2010 the average FOB value for Thai fragrant rice, Pakistani basmati rice, and USA medium grain rice was $1045, $881, and $764 per ton, respectively. In that year, the average value of Vietnam's leading product—25% broken white rice—was $387 per ton. Thus, while all these products are called 'rice' some are expensive cereals and some are cheap.

The bulk of Vietnam's rice exports has gone to countries whose rice trade is (or was) controlled by government agencies. These are contingent importers—highly deficit in some years; less so in others. The Philippines has, by far, been the largest recipient of Vietnamese rice in recent years with direct trade accounting for some 40 to 50 percent of exports, and perhaps some considerable further amount being sold there indirectly through traders operating in other regional markets. In some years, Indonesia's state trading company has been a large buyer of Vietnamese rice. Public agencies in Bangladesh, Cuba, and Iraq have also been regular and sometimes quite large buyers. In recent years, between one-half and two-thirds of Vietnam's export volume has taken place on the basis of government to government contracts.

Figure 11 illustrates the volatility in rice imports for some of Vietnam's leading outlets in Asia. This is especially evident for the Philippines and Indonesia. Both countries would prefer not to be reliant on trade to supplement domestic supplies although over the years the incidence of typhoons and other natural hazards has sometimes necessitated large imports—especially to maintain the implementation of public concessional distribution programs.[41]

[41] The volatility in the Philippines rice imports continues. In 2010, these reached 2.4 million tons, yet with plentiful domestic stockpiles, imports in 2011 may not reach 1.5 million tons.

Figure 11: Volatility in Rice Imports for Vietnam's Major Asian Markets

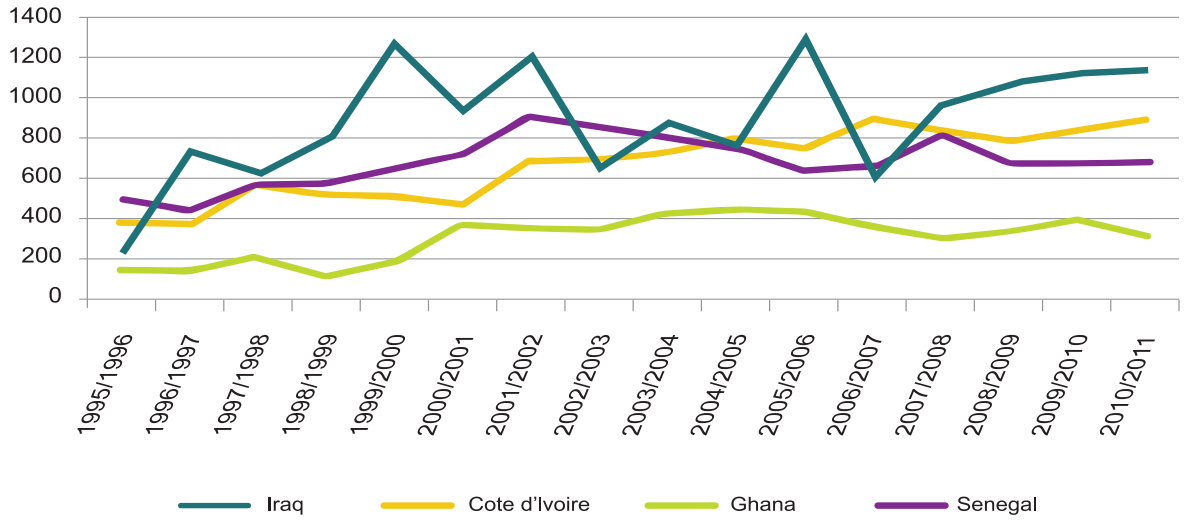


Source: USDA

Less significant has been the development of commercial outlets for Vietnamese rice. Several countries in Africa are among the fastest growing rice importers in the world, at least in volume terms. Vietnam has taken a share of that market, often with trade being brokered by multinational trading companies. Nevertheless, the particular countries within Africa where Vietnamese rice has gained a strong footing—e.g. Ghana, Senegal, and Cote d'Ivoire—have not experienced strong import growth themselves in recent years (Figure 12). Lower priced Vietnamese rice is simply replacing more expensive supplies from elsewhere. Some commercial trade has also been developed within the region, including with Taiwan, Singapore, and Malaysia, although the Vietnamese trade has made little in-roads in servicing the quality segment of these markets or that of South Korea. Little or no trade is being conducted with a range of high income countries which make up the majority of leading rice importers in value terms.[42]

[39] For example, among the top ten importers, in value terms, are the United Kingdom, France, Germany, the United States, Canada and Japan. These are mostly importing high quality and specialty rice varieties.

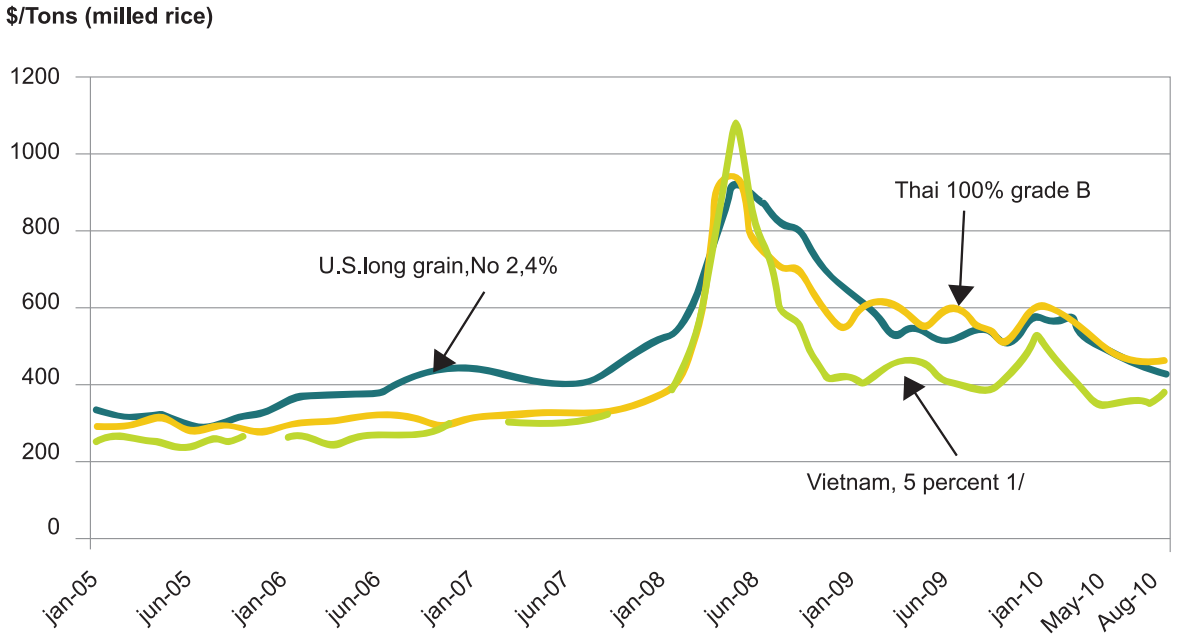
Figure 12: Rice Import Trends in Other Major Markets for Vietnam(000 Tons)



Source: USDA

While the G2G trade normally involves lower grade rice, the commercial trade has involved a spectrum of different quality grades. In recent years, between one-fourth and one-third of the overall trade has involved higher quality rice.[43] Even for that rice, however, the price typically realized by Vietnam has been lower than that obtained by competitors. This can be seen in Figure 13 which shows the 'discount' of Vietnam's highest quality 5% rice compared with other non-specialty quality rice from Thailand and the United States. This discount is associated with concerns about either lower or uncertain quality—including the mixture of multiple varieties, as well as the risk of contract default on the part of the Vietnamese exporter. Only a tiny proportion of Vietnam's trade is based upon recognized brand name.

Figure 13: Comparative Prices of Higher Quality Thai, USA, and Vietnammese Rice



Source: USDA

[43] Although the VFA reports that in the first five months of 2011, only 13% of the trade involved high quality or specialty rice.

Between the late 1980s and late 1990s, Vietnam's rice export trade was carried out entirely by state-owned food or general export-import companies, licensed by the Ministry of Trade. Specific quotas were allocated to different companies. The bulk of this trade, typically averaging about 2 million tons per year, was conducted with state trading enterprises abroad. The main destinations were Cuba and countries within Asia. In 1999, two private companies were given licenses to export rice, although their trade was restricted in volume.

Over the past decade, the structure of the export trade and the underlying 'rules of the game' have evolved. Since 2006, an arrangement has been in place in which a multi-sectoral committee makes an estimate at the beginning of the year on the likely production surplus and recommends an annual target export volume which is then officially approved by the Prime Minister. This estimate and this target may then be adjusted later in the year. The Vietnam Food Association is then responsible for monitoring trade commitments being made by exporters. All enterprises must register their intended rice contracts with the VFA and the latter must approve the transaction before shipments can be initiated. There have been times in the past when companies were told to delay or cancel export contracts due to the aggregate level of commitments approaching/exceeding the national target or some other concern.

Although not referred to as such, the VFA does continue to administer something of a quota allocation among exporting enterprises. The operative 'rules of the game' aren't completely clear. Priority is certainly given to G2G commitments and to other trade involving the leading two SOE companies. The head of one of these SOEs has been the chairman of the VFA. Whether a company can get approval for the full amount of its intended trade may be impacted by its past performance, any role it has played in implementing public policies (i.e. buying paddy at announced 'floor prices'), and other factors. New entrants must have some difficulty breaking into the trade on any substantial basis. The VFA has also announced and periodically (or, more recently, frequently) adjusted minimum export prices, ostensibly to prevent overseas buyers from playing off one company against one another. The VFA is also involved in the negotiation of G2G contracts and the division of the contracted consignments among its members. The trade, therefore, is heavily administered.

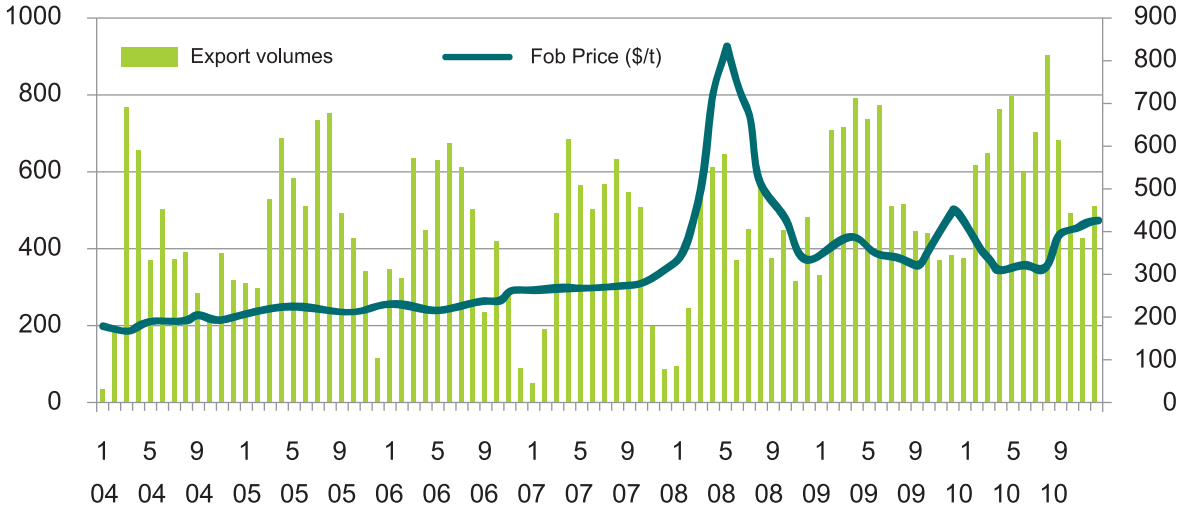
There are several consequences of this administrative system. First, it restricts the ability of private traders to enter into any longer term trading commitments. Second and related, investment in upgraded facilities and in supply chain relationships is surely deterred given uncertainties on if, when, and how a company is able to transact business. The lack of such investment and the limited direct interactions between farmers/farmer groups, on the one hand, and millers and traders, on the other, seems to lock the industry into its current model of generating a high-volume, lower quality product which is sought after—by non-commercial buyers—because it can be bought at a discount to alternatives.

Third, the administration of the trade leads to the bunching of VN exports generally in the first six to seven months of each calendar regardless of prevailing market conditions or near-term expectations. Figure 14 below illustrates the 'seasonality' of VN rice export volumes and their lack of connection to prevailing prices. Companies simply don't want to be left at the back of the queue and so commit to do the bulk of their business in the first part of the year. Favorable trading opportunities late in calendar year often can't be pursued because the shipments or commitments have already reached the annual target. There are other consequences of this. For example, logistical arrangements are also bunched leading to (unnecessary) congestion. The bulk of the exports also draw upon the Winter-Spring harvest. Exporter demand is much weaker for the other two seasonal crops, contributing to the lack of profitability for many farmers for the Summer-Autumn crop.

Over the years, large numbers of companies have entered and exited the rice trading business. For example, in 2008, 151 companies traded at least some quantity. In recent years, there have been more than 200 registered exporters. Nevertheless, the trade remains highly concentrated, even though some particular companies shift in and out of the 'leader board' from year to year. In most years, the ten largest

exporters account for 70 percent or more of the trade. Two state-owned general food companies accounted for 44% of the volume and 53% of the value of Vietnam's rice trade over the 2007 to 2009 period. Each of these is affiliated—through full or partial ownership—to a range of other companies many of which are themselves specialized rice milling and trading companies. Interactions among these companies involve some combination of competition and cooperation. In 2008, majority or fully state-owned enterprises accounted for 79% of the value of the trade, the private sector and companies with a minority state ownership stake accounted for 19%, and cooperatives for 2%. The vast majority of the participating private companies are very small, yet there are a few now among the leading companies with exports exceeding 100,000 tons per year. While the industry is ostensibly open to new entrants, the operating rules of the game and the favored access of SOEs to finance, in the name of fulfilling various social functions, creates far from a 'level playing field'.[44]

Figure 14: Monthly Rice Export Volumes and Price, 2004 – 2010



What are the future prospects for Vietnam's rice exports? In the short-run they are probably reasonably good. Although imports by the Philippines are expected to decline to well below the levels reached in recent years, shipments to Bangladesh, Indonesia, and several African countries have or will increase in 2011. But gazing into the medium and longer terms, there are reasons to be more cautious, if not concerned about Vietnam's rice trade—at least based upon the current model. A survey among leading rice exporters found (i) a majority believing that G2G contracts will play a less important role in the future, (ii) a majority being pessimism about the prospects for maintaining let alone expanding trade in 'bulk' low quality rice, and (iii) a majority indicating intentions in the future to become more involved in domestic distribution and/or to further diversify their business lines to counter expected competitive pressures in the export trade.[45]

[44] New regulations are being put in place to eliminate from the trade very small companies which lack adequate storage or other facilities. Licensed exporters will need to have a minimum storage capacity and when companies come to register their contracts they will need to have at least half of the shipment volume already in storage.

[45] When asked about the prospects of multinational food companies investing in the rice sector, only 40% of respondents thought this would be beneficial to the industry's competitiveness and only 26% indicated that it would be beneficial to their own company.

Why such a cautious tone? One factor is that some of Vietnam's leading markets—the Philippines and Indonesia—don't want to be rice importers at all and are seeking to provide incentives and make investments to increase their own rice self-sufficiencies. They and other countries don't want to be vulnerable to future price spikes—as occurred in 2008 and, to a lesser extent, more recently, and so will be seeking to build up their own food reserves. If successful, these measures would reduce future imports and also reduce opportunities for Vietnamese exporters to profit from price volatility. Another long-standing and significant buyer of Vietnamese rice is Cuba. This market could certainly be affected should the United States re-establish trade relations with that country. While African consumption and imports have been growing relatively rapidly, there is currently a high level of investment going on to raise irrigated rice production in several countries. This is expected to reduce import demand in these countries plus accelerate African inter-regional rice trade. In the coming years, Vietnam is also expected to face intensified competition in the low/medium quality segment from both Cambodia and Myanmar.

Over the longer term, world rice consumption is expected to decline as per capita consumption falls in many countries experiencing relatively rapid rates in per capita income. According to the authors of a recent study[46], global rice consumption in 2050 is expected to be about 360 million MT, about 90 million MT less than now. Of this number 270 million MT is expected to be consumed in Asia (over 100 million MT less than now), 35 million MT in the Americas (14 million MT more than now) and 55 million MT in Africa (a staggering 30 million MT more than now). The authors do, however, note that predictions are difficult and that consumption in Africa could even exceed 100 million MT. Clearly, many experts expect that rice consumption patterns will change over the coming years in a relatively dramatic manner.

Thus, from both a commercial and wider public policy perspective, there are questions about the sustainability of a competiveness model based upon 'low cost', low to medium quality rice, being exported in large quantities primarily to public sector institutions for use in safety net programs abroad. This is essentially the 'bottom' of the international rice market. Competing and excelling in this international 'market' segment may have been more suitable to Vietnam's past than to its future as a middle income country in which the efficiency of investment and the quality of its products will be more central to competitiveness. This is all the more important given increasing competition for land and water among agricultural uses and between these and industrial/urban uses. Unless Vietnamese farmers and firms can obtain reasonably good and reliable profits, the societal value of large volume rice exports is diminished. This is especially the case if one considers the environmental costs of current practices in intensive rice cultivation and the opportunity costs—for farmers and for the country—of alternative uses of land, water, and labor.

While it will certainly be desirable for Vietnam to maintain a strong presence in the international market for rice, the size and nature of that presence should be increasingly determined by commercial (and financial) considerations. This might involve the acceleration of some recent trends toward the increased supply of higher quality or specialty types of rice, and, longer term, to the promotion of 'sustainable rice' for which middle class international consumers would be willing to pay a premium for. Accelerating these trends would require improvements in the rice seed system, more collective action among farmer groups, and strengthened miller/exporter – farmer linkages. Whether the optimal size of this export trade in the future is 6, 4, or 2 million tons would depend upon trends in international markets, both on the demand side and amongst competitors, and the financial returns to Vietnam's farmers and firms.

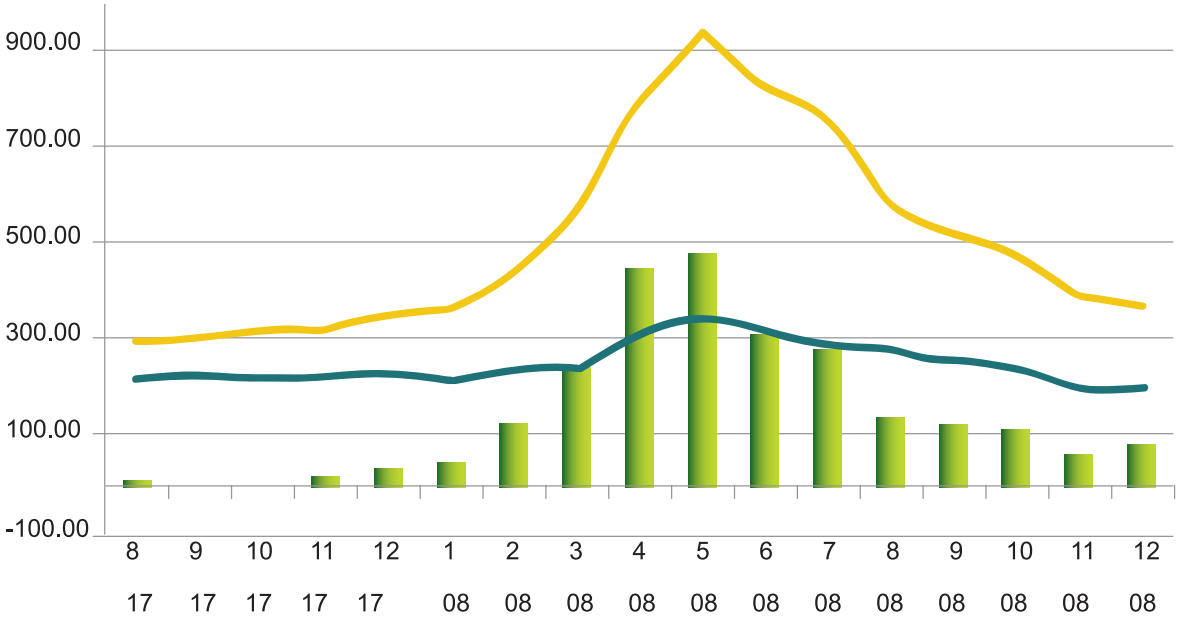
[42] "Long run dynamics of rice consumption, 1960 - 2050", Timmer, Block and Dawe, 2010

Distribution of Benefits within the Value Chain

In recent years, the annual value of rice export has more than doubled from less than $1.5 to over 3.0 billion. Why have burgeoning rice exports not translated into substantial wealth creation in rural areas of Mekong Delta? Several factors seem to be at play here. We showed above that although large numbers of MKD households grow rice, a much smaller number sell significant quantities and are, overall, net sellers of rice. Among producers, then, the potential gains from (expanded) trade might be expected to be concentrated in the highest and second highest quintile. Another factor has been a recent (negative) shift in the Terms of Trade facing MKD rice producers, also illustrated earlier.

The available evidence suggests that MKD farmers have benefitted only modestly from upward movements in Vietnam's export prices, while they bear the burden—in the form of downward pressures on paddy prices-- of periodic downturns in export demand. MKD farmers benefitted quite little from the 2008 export price spike, with the bulk of that year's windfall gains accruing to the trading sector (and thus, perhaps, to the government treasury). This is shown in Figure 15 below. The top highly sloped line represents the average FOB unit value for VN rice exports between August 2007 and December 2008. The dark line shows the trend in paddy prices for producers during this period. The bar graphs represent the gross margins of the milling and trading sector during this period. Thus, producer paddy prices rose from $ 248/ton in March 2008 to $341/ton in May 2008, falling back to $292/ton by July and reaching below the pre-crisis level by the end of 2008. Milling/trader margins, on the other hand rose from only $45/ton in January 2008 to over $400/ton in April and May 2008. In the late months of 2008 these margins remained well above (i.e. double or triple) their pre-crisis level.

Figure 15: Division of Gains from the Price Spike, 2008



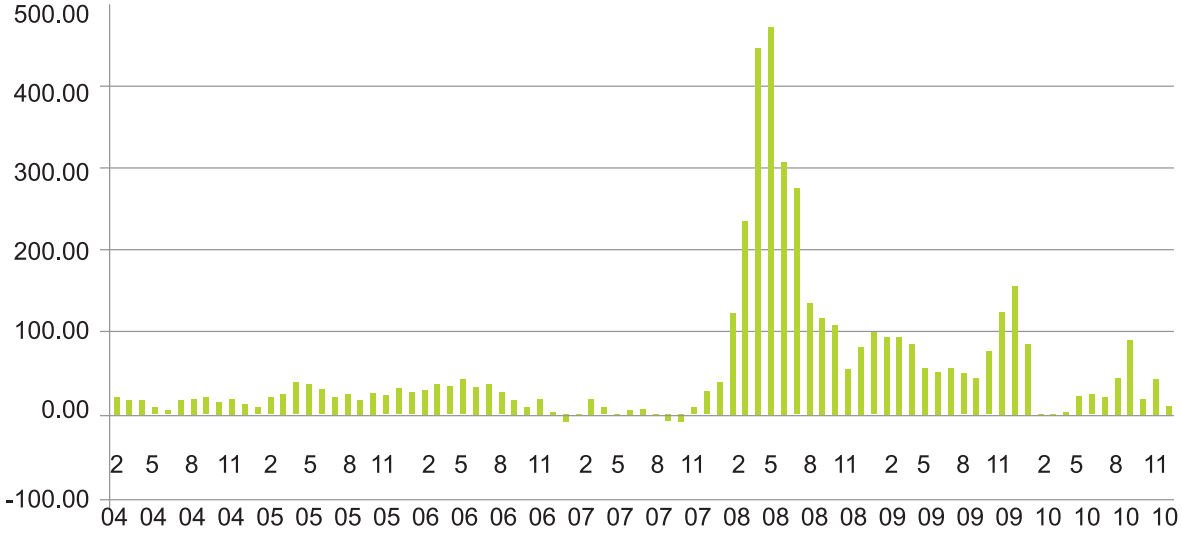
Source: Authors' Calculations from data from GSO, VFA, and private companies

An analysis of results for 2009 and 2010 also show industry/trade gross margins to be considerably above the norm prevailing during the pre-2008 crisis period (see Figure 16), while farmer profitability is tending to be squeezed by rising purchased input and labor costs. In a sector in which trade is generally regarded as being a low margin/high volume business, the Vietnamese trading sector seems to have benefitted quite substantially from the volatile market conditions which have prevailed over the past several years.

What can explain this? Several factors may be at play. First, MKD growers traditionally lack bargaining power given that they produce a generic product, all harvest a surplus commodity at the just about the same time, and lack the capacity to effectively store wet or dried paddy. In a volatile market, their lack of bargaining power is compounded by confusion. Conflicting signals from the marketplace generate 'noise' preventing farmers to understand what are the prevailing prices and what would be 'fair' prices.[47] Also beneficial for companies are the financial subsidies provided by government—in the form of no interest loans—the announced intention of which is benefit farmers by mopping up excess supply. This extra liquidity enables the participating companies to buy extra volumes of paddy and rice at precisely the time when they are most depressed due to supply/demand imbalances. Relieved—by government-- of the financial burden of holding stocks, the companies can potentially take greater advantage of international market price swings.

This weak bargaining power has been combined with weak incentives offered by the rice value chain. For an industry of this size there are remarkably few examples of millers/traders reaching back into the chain and offering clear incentives—in the form of price premiums and provision of support services—to farmers to produce specific varieties, apply certified practices, and raise the standard of paddy quality. Where these efforts have been made, the benefits for the farmers (and the firms) appear to have been large. Yet, these initiatives have thus far reached relatively few farmers and market channels, both for export and for the domestic market, generally lack a quality orientation.

Figure 16: Miller and Exporter Gross Margins Per Ton



Source: Authors' Calculations

[40] Between January and March 2011, the Vietnam Food Association adjusted (upward or downward) its minimum export prices seven times. This generates noise rather than clear market signals to farmers.

Given the small operating scale of many rice growers, the total net margins per individual actor are very small in comparison with those for all other entities, in both the domestic and export value chains. The annual earnings of 'typical' rice collectors ($4,000), barge operators ($15,000), or domestic transport carriers ($25,600) are reasonable, yet none of these actors bears substantial risk. Included in the Table are two different 'types' of rice growers. One is a specialized grower, producing three crops per year on 2.5 hectares. This grower may earn an annual profit of $860, which, on a per capita basis, puts them in close proximity to the current official poverty line. Any supplemental source of income would put them above the poverty line. The other grower type produces only one crop per year on an above average 1.5 hectares. This farmer would earn a profit from rice of less than $200, this being only a small supplement to hopefully other sources of income.

Table 8: Margin analysis of rice value chain in the MD 2009

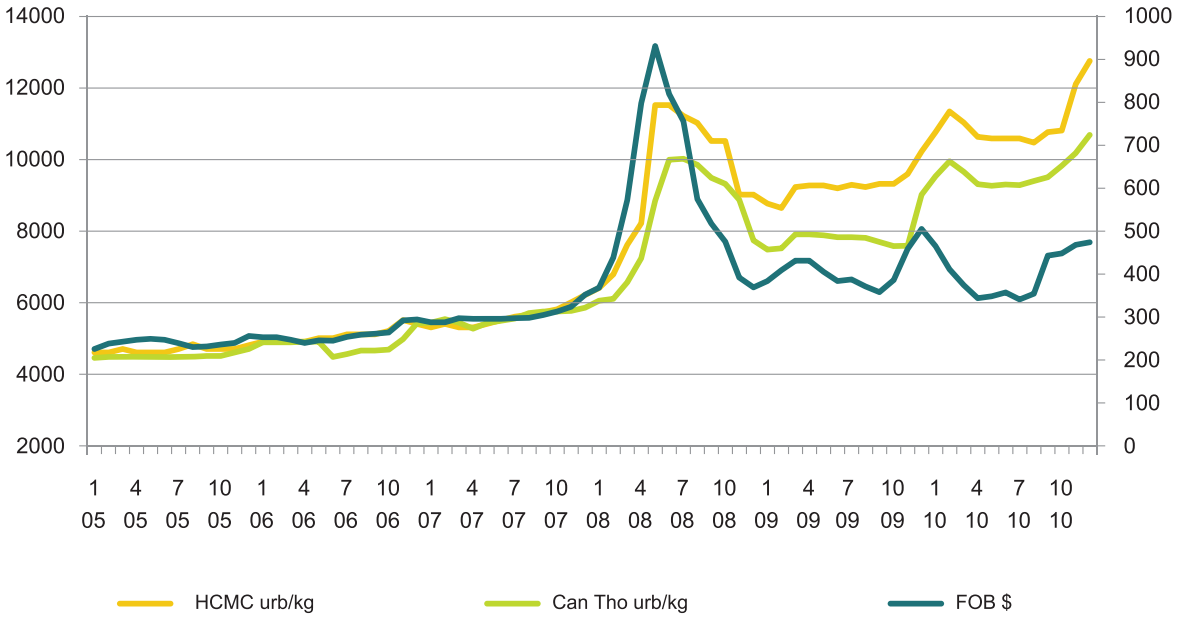
Actor	Total Cost (VND/kg)	Price Received (VND/Kg)	Unit Margin (VND/Kg)	Average Quantity Per Actor Per Year (tons)	Per Actor Margin (millions VND)	Per Actor Margin ($'000)
Domestic rice value chain						
Farmer # 1	4.380	4.887	507	28,03	14,4	0,86
Farmer #2				5,36	2,74	0,19
Collector	5.145	5.184	39	1.700	66,3	4,0
Paddy Miller	5.972	6.100	128	4.948	633,3	38,4
Miller	6.893	6.943	50	1.300	65,0	3,9
Transporter			120	3.528	423,4	25,6
Wholesaler	8.095	8.822	727	1.200	872,4	52,9
Retailer	8.822	9.454	632	240	151,7	9,2
Export rice value chain						
Farmer #1	4.380	4.887	507	28,03	14,4	0,86
Farmer #2				5,3	2,74	0,19
Collector	5.001	5.281	280	1.700	476,0	28,8
Paddy Miller	5.977	6.163	186	4.948	920,3	55,8
Miller	6.893	6.943	50	74.400	3.720,0	225,5
Transporter			29	8.550	248,0	15,0
Exporter	7.720	8.142	422	100.000	42.200,0	2.557,5

Exchange rate: 16,500VND/USD in 2009
Source: Study Team Field Survey

While MKD farmers don't seem to have been major beneficiaries from the 2008 export price spike or from the somewhat higher sustained level of international rice prices over the past year, how have Vietnamese consumers fared? The most direct way to examine this is to consider consumer prices from within the MKD and in nearby HCMC. At least over the past decade, domestic prices in these areas have tended to be strongly correlated with Vietnam's export prices. While most exporters tend to be little or not at all involved in the domestic distribution system, the rice comes from the same farmers and, often, the same or similar processing mills. In contrast, consumer prices in the north and center of Vietnam tend to be only weakly correlated with Vietnam's export prices or the prices prevailing in, for example, Can Tho and HCMC.

Figure 17 graphs consumer prices in Can Tho and HCMC and compares them with the trajectory and volatility of VN FOB export prices. The close tracking of these are evident for the 2005 to 2007 period. During the international price spike in early to mid-2008, domestic consumers experienced lower volatility and less dramatic upward movements in prices. Yet, the evolving situation since this spike occurred in perplexing. Domestic prices have experienced as high or higher levels of volatility than international ones. And the overall level of prices is considerably higher than one would expect given the underlying costs of paddy and milled rice.

Figure 17: Recent Escalation and Volatilytyin Regional Consummer Prices



The wider inflationary pressures have certainly contributed to this trend, although the increased cost of electricity, fuel and perhaps packaging materials cannot account for this variance. The higher cost and more difficult access to finance may have placed further burdens on domestic traders and wholesalers, yet this too does not explain the magnitude of the variance. In recent months, rice prices in HCMC and Can Tho were higher than at their peak in mid-2008, yet paddy prices—for an abundant crop-- were very much lower. The gap between farm-gate paddy prices and consumer retail prices seems to have widened substantially in the past couple of years.

Whether this is due to heightened risk faced by domestic wholesalers or retailers, other bottlenecks, or the exercise of market power, it is not so evident. Recent developments in the domestic market rice distribution system were not an area of focus for the Research Consortium. What is evident, however, is that various, seemingly ad hoc measures taken by municipal authorities and other entities of government to control or otherwise limit the volatility of consumer rice (and other food) prices are not having their intended impact.[48] In the meantime, the bulk of attention by SOEs operating in this sector has been on exports. Consumers in the Philippines, Indonesia and Cuba have benefitted from

[48] Various municipalities have run modest sized schemes to encourage retailers to build up larger inventories of a range of staple and higher value foods and to sell them at a discount to prevailing market prices. Price control measures are in place for dairy products. Yet, the combination of rising fuel and energy prices, the impact of the devaluation of the Vietnamese currency, rising international commodity prices, and some localized , weather or disease-related supply drops, have overwhelmed these efforts and contributed to higher than normal food CPI in late 2010 and early 2011.

this focus. They have experienced far less volatility and escalation of rice prices in the past six to nine months than have consumers in HCMC and Can Tho.

Policy and Program Options

Over an extended period, the performance of the rice value chain has been adequate for what it was asked to do—essentially deliver ever increasing volumes of acceptable quality rice at reasonable cost to a non-discerning 'customer' base, both at home and abroad. For many years, the value chain performed a valuable social function of moving rice from surplus to deficit areas. More recently, the domestic market has become dominated by private sector commercial activity. Exports have grown, yet this trade has largely been administered by government, involved a dominant role of SOEs, and been heavily serving non-commercial purposes, including promoting Vietnam's foreign relations, both regionally and further abroad. This combination of a commercially driven domestic chain and a socially driven export chain is a unique phenomenon among traditional Asian rice producing and consuming countries. For most countries, the domestic market is regulated and features a prominent role for state distribution agencies, while the export trade is conducted commercially without there being deemed any strategic role for state agencies.

The generation of ever-increasing levels of (exportable) rice surplus from the Mekong Delta is a commendable achievement building upon many years of investment and hard work. However, this growth in rice output and trade should not be equated with high levels of efficiency. While few players at any one stage are highly inefficient themselves, the fragmentation and weak coordination within the value chain has contributed to relatively high overall costs and physical losses. A weak incentive structure has yielded large quantities of low quality rice which no one prefers to eat but many do purchase since they cannot yet afford alternatives. Overall then, the value chain adds very little value. With increasing competition for domestic resources and with likely increasing competition abroad, It is doubtful that the sector's growth trajectory be sustained, financially, environmentally, or economically. Given the opportunity costs of some of these resources, it isn't evident that further growth is even desirable. More value can be derived from less rice using fewer resources, while having no adverse impact on food security within Vietnam itself.

What is needed is a gradual yet very substantial modernization of the rice chain so that (i) major advances are achieved in technical efficiencies at different stages, (i) a strong orientation in introduced and spread in relation to production (environmental) sustainability, product quality, and customer service, and (iii) the chain begins to function as an integrated whole. Part of this modernization will require additional physical investments—in storage facilities, upgraded milling operations, and logistics. Yet, just as important is the development of modern institutions to facilitate coordination, manage risks, and convey information and incentives. At present, the Government appears to be anticipating that SOEs will be able to transform the sector through their own investments and instructions on what they can or must do. Yet these companies are being increasingly placed in an awkward position of pursuing both commercial and social objectives, yet not being especially well equipped to do either. Given the political sensitivity of food security concerns, the Government is reluctant to embrace the concept that private investment can play an important role in the modernization of the rice sector.

There is an evident need for government to more carefully distinguish and separate commercial from social objectives and functions. Use of scarce public resources should generally not be devoted to pursuing commercial objectives, especially if there is a private sector willing and able to pursue these effectively. On the other hand, there are many instances in which government interventions can be justified in pursuit of social objectives.

With regard to Vietnam's rice exports, commercial and social strategies and systems should be separated, to the extent possible. In pursuing social (i.e. foreign relations) goals, the government could formally adopt a ***Vietnam Global Food Security Initiative***, whereby the country would commit to devoting perhaps 10% of annual national production to supply public distribution/safety net programs in friendly countries within Asia or elsewhere. These transactions would (continue to) be handled on a G2G basis, governed by multi-year Memoranda of Understanding, and involving seasonal or bi-annual commitments. This initiative could be implemented by Vietnam's leading food SOEs with oversight provided by the Ministry of Trade and Commerce.

Besides these arrangements, all other rice exports from Vietnam would be conducted on strictly a commercial basis with a 'level playing field' among all (public and private sector) participants. The Government might set a target of reducing the share of SOEs in this trade by half over the coming five years and thus provide the space and incentive for increased private investment and more aggressive overseas market development efforts. This commercial trade would not be restricted in volume terms, but a variable export tax system would be applied to prevent short-term domestic market shortages and also to capture some of the periodic windfall gains associated with commodity price spikes. The revenues from this variable export tax could be channeled back to supporting a ***Rice Competitiveness and Sustainability Program***, the outline of which is noted below. A system of minimum export prices could be maintained, yet with only periodic adjustments made. In moving to adopt the above recommendations, there would be a need to revisit the roles of the VFA, perhaps reducing its role in the administration of trade, while enhancing its role and capacity to facilitate trade through provision of market intelligence and the promotion of Vietnam's entry into quality rice market segments abroad.

The government should increasingly focus its attention on risk management and related measures. Part of this would involve strengthened information systems, especially for crop forecasting, weather early warning, pest surveillance and reporting, domestic marketing monitoring, and the monitoring rice stock inventories among public and private companies. Another part could involve a program of price stabilization/price volatility reduction. The specific instruments and approaches would be designed drawing upon international 'best practices' combined with VN circumstances. This could involve some 'rules-based' system for public procurement, inventory management, and stock release for rice, perhaps together with a targeted safety net program.

Either the existing SOEs or a new dedicated Price Stabilization Agency would be given specific mandates and closely supervised. The volume of purchases, inventories, and releases would be determined based upon good practices and financial considerations. This would likely be in the range of 500,000 to 1.5 million tons per year. Part of the 'rules' for the system would be the establishing of clearly defined threshold paddy prices and price bands for consumer prices. The goal of this program would be to mollify the more extreme events of price volatility. Having this program operate on a relatively small (and perhaps geographically focused) basis and having clear, transparent operating rules, such a price stabilization scheme would not unduly disrupt or distort domestic market arrangements or incentives for private trading, storage, etc..Thus, the above recommendations would point to a somewhat reduced role of state agencies in the conduct of Vietnam's rice export trade, in parallel with a somewhat enhanced role of such agencies in domestic rice distribution.

In the 'core' rice areas within the Mekong Delta (and selected locations elsewhere) the government could work closely with other partners to implement a **Rice Competitiveness and Sustainability Program**, involving promotion of 'good agricultural practices', improved seed systems, strengthened farmer groups/cooperatives, upgrading of post-harvest and storage practices and facilities, and farmer-agribusiness partnerships. This effort would seek to drive down production costs, reduce rice's environmental imprint, raise product quality, address yield gaps, and raise farmer profitability. In these locations, rice systems would be the dominant focus, supplemented by broader skills training and

encouragement of crop rotations for pest and disease management. Infrastructure upgrades would concentrate on improving rice-related logistics and quality management.

In most of the non-core rice areas, government would move ahead to implement its **New Rural Areas Program**, emphasizing diversified rural economic development, with emphasis on infrastructure upgrading, skills development, diversified production systems, and targeted safety nets. The specific mix of interventions and areas of focus would vary and be determined at district and commune levels. Rice production would be encouraged as and where it is technically suitable and as part of integrated farming systems. More flexible water management systems will be needed to accommodate changing land use preferences, as per weather and economic considerations. In some selected locations, supplement the broader program with ***dedicated value chain initiatives***, focusing on sustainable and quality production, farmer-agribusiness linkages, investment promotion, etc.

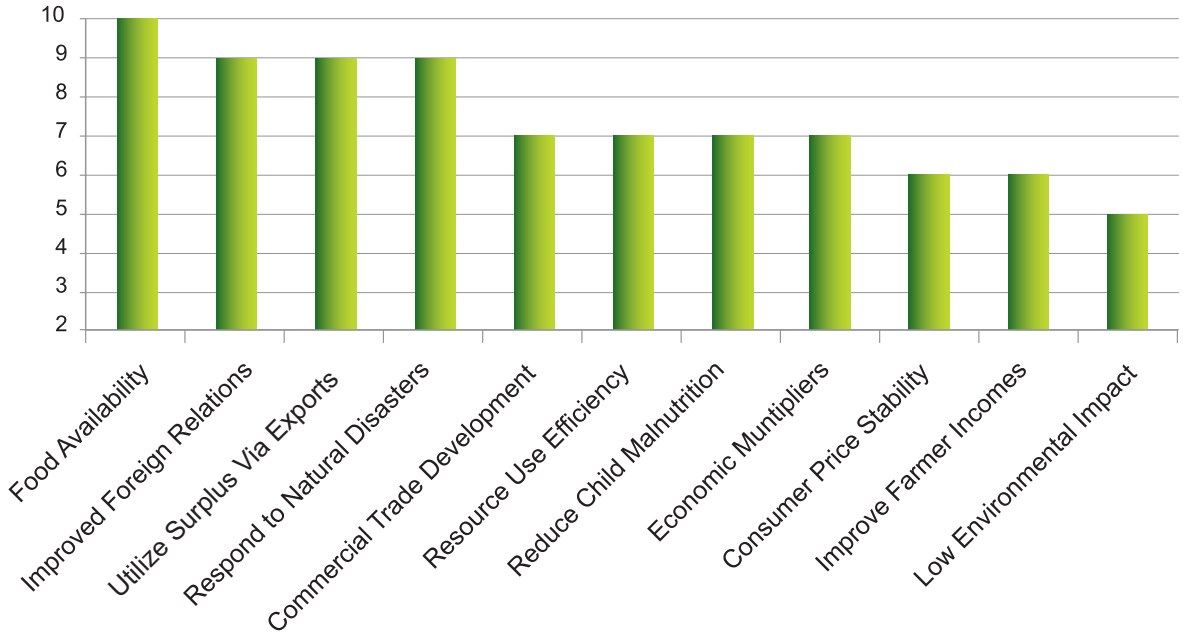
Conclusions

Vietnam's and the Mekong Delta's farmers have been tasked and supported to feed the nation. They have over-achieved! Not only does Vietnam now produce more calories per capita than nearly all other individual developing countries, but Vietnam has experienced a burgeoning trade in rice and now accounts for more than 20% of global exports of this commodity. Nearly one-third of Vietnam's total rice production and nearly 70% of that produced within the Mekong Delta is now exported. The Mekong Delta has come to play a growing role in food security, first, domestically and, more recently, internationally.

However, ever-increasing levels of rice production and export are not indicative of high levels of efficiency. Nor have they been associated with high levels of profitability, at least not for the Mekong Delta's 1.46 million rice producers. Vietnam's rice value chain is relatively fragmented and uncoordinated and features high levels of physical losses. Excessive use is made of seed, fertilizer, agro-chemicals, and water, ostensibly due to a widespread perception that more inputs translate into higher yields. These practices have weakened profitability while contributing to high (unmeasured) environmental costs. Prevailing incentives and support systems for quality management are weak. There are relatively few consumers, at home or abroad, who actually prefer Vietnamese rice over alternatives. Hence, the value chain adds little value and Vietnam 'competes' on the basis of selling a lower cost product than others. This 'low cost' is somewhat related to the high productivity of farmers, but it is equally associated with their poor remuneration. While some nine million Vietnamese households are involved in rice production, few can still derive their livelihood primarily from paddy sales. Within the Mekong Delta, probably no more than one-fourth of rice growers have the prospect to maintain a competitive living standard based upon specialized paddy cultivation.

While the rice of the Mekong Delta was traditionally view as an input Vietnam's national food security needs, with the steady achievement of those needs and with the increased commercialization of rice, a broader range of social and economic objectives have been sought. From the vantage point of 20ll and looking backwards over the past five or so years, it is evident that the rate of achievement of those objectives has varied widely. Figure 18 provides a 'rating' of various goal achievement levels, on a 1 (lowest) to 10 (highest) scale. Ratings are very high for food availability, improving Vietnam's foreign relations, and in enabling quick responses to natural disasters when crops or food stocks are impacted. Moderate ratings are given to achievements in developing commercial trade outlets, in resource efficiency use, and in stimulating inter-industry growth multipliers. In recent years, rice has contributed comparatively little to progress in reducing child malnutrition and to farm profitability. Despite large seasonal and annual supply surpluses, Vietnamese consumers continue to experience volatile retail prices. Rice production, as commonly undertaken, has substantial, yet not well quantified adverse environmental impacts.

Figure 18: Mixed Rate of Achievement of Economic + Social Objectives Related to MKD Rice



Source: Authors' Assessment

The MKD rice system was extraordinarily successful in meeting the basic needs of producers and consumers in the past. It seems to now face considerable challenges in meeting the current and future aspirations of producers (for a higher standard of living) and the preferences of consumers (for safer, higher quality food). Its past success is no guarantee of future success. A 'business as usual' approach almost certainly will not realize the sector's future potential. This Policy Note has outlined a series of policy and program options related to the modernization of the rice value chain, to possible shifts in the relative attention which government has been giving to social vs. commercial objectives, and to the role of rice production in the context of broader rural and regional development strategies.

POLICY REFORMS ASSOCIATED WITH VIETNAM'S RICE PRODUCTION AND TRADE

Simulating the Macroeconomic, Sectoral and Distributional Impacts

James A. Giesecke and Nhi Hoang Tran
Steven Jaffee and Nguyen The Dzung

Introduction

Since the early 1990s, Vietnam has been a net exporter of rice and many other agricultural commodities. At the same time, the government has made food security – that is, food self-sufficiency and universal access to food – a major agricultural policy aim. The main emphasis of the government's food security policy is self-sufficiency in rice production and rice price stabilisation[49]. There are a number of reasons for this emphasis on rice. First, rice remains the most important food in the Vietnamese diet, accounting for more than half of the average energy intake. Second, a significant proportion of the population experiences low income or is otherwise vulnerable to food insecurity, either on a chronic or temporary basis.[50] Reducing poverty and food insecurity rates is a policy priority in Vietnam. Third, Vietnam is vulnerable to natural hazards affecting rice production, such as drought, flood inundation and pests. Fourth, fluctuations in international rice prices affect both the income of rice producers and consumer rice prices. Finally, economic development has placed pressure on paddy land supply, as prices rise for land used for cultivation of aquaculture, cash crops, and industrial and residential development.

To address these food security and food access issues, the Government of Vietnam has instituted a number of direct interventions in the rice market. These include:

(1) designating land for paddy production only;
(2) regulating rice exports via export quotas;
(3) setting a rice price floor to maintain rice grower profits;
(4) encouraging rice trading companies to increase storage capacity; and
(5) granting preference to state-owned enterprises in the rice export business.

While these policies may promote food security and access, they may come at the cost of production and allocative inefficiencies. These costs will be borne differently across industries, regions and household groups. The dynamic impacts of these policies also need to be assessed in light of changes in population, technology, food consumption patterns, land-use patterns, and climate change.

In this report we use an economy-wide model of Vietnam to simulate the effects of removing these policies over a five year period, from 2011 to 2015. We examine the impacts of removing these policies on indicators of economic growth, food security, poverty, and regional growth between 2011 and 2030. This can assist Vietnamese policy makers in tailoring the country's food security strategy and associated rice and trade policies to best meet policy targets.

The structure of this Policy Note is as follows. In the next section we briefly discuss the nature of the rice market intervention policies and their immediate impacts on the rice sector. Section 3 then discusses the analytical tool and methodology we have used to undertake our analysis. Section 4 discusses the baseline forecast against which we evaluate the impact of removing the policy interventions. Section 5 presents the key findings of our simulations. Section 6 concludes the paper.

[49] Government of Vietnam, Resolution No. 63/NQ-CP on National Food Security, Hanoi, December 23, 2009.
[50] In 2006, the national poverty rate was 16 per cent, and the food poverty rate was 6.7 per cent. These national rates, high as they were, masked large regional differences. For example, poverty and food insecurity rates were as high as 52 and 29 per cent respectively in some mountainous regions (Source: Tran Manh Hung, Food security and sustainable agriculture in Vietnam, Country report for Vietnam at the Technical Committee of APCAEM, Thailand, 2009).

The economics of policy interventions

This section discusses the nature of the five policy interventions under consideration, and expands on how we have calculated their effects on the paddy and rice sectors for input to our economic modeling.

Rice land designation

Since *doi moi*, farmers' rights over land use have been greatly extended. However, farmers still do not have full flexibility over crop choice. The Vietnamese government has always followed a strict policy of maintaining a certain proportion of agricultural land for rice cultivation[51]. In 2009, the total rice land area in Vietnam was 4.089 million hectares[52]. In the face of pressure to convert rice land for other agricultural and non-agricultural uses, the government plans to keep rice land at 3.8 million hectare by 2020[53]. This constitutes about 40 per cent of total agricultural land in the country. The government's aim in pursuing this policy is to ensure sufficient supply of rice to meet domestic and export demands. Hereafter, we refer to land with such a policy encumbrance as "designated land".

In general, to maximize national income, agricultural land should be used for the purpose in which it generates the highest land rental rate. If paddy cultivation represents such a use for all of the 3.8 million hectares currently designated for paddy, then in effect the policy is not binding, and no market distortions are introduced, even if the land rental price on paddy land is lower than the rents generated for other land types. However, while it is true that climate and soil conditions in many parts of Vietnam are well-suited to growing rice, there is ample evidence that many paddy farmers would shift to other crops in the absence of the designation policy[54]. This must mean that a certain proportion of designated land earns, on average, a land rental lower than that which it would earn if it were not so encumbered. Indeed, the economic cost of the policy can be viewed in terms of the land rent foregone by constraining the land to use in paddy when more profitable land uses would otherwise be chosen.[55]

We calculate the economic cost of the policy for each of the seven regions in Vietnam by calculating the gap between the average return that could be earned on the same land if it were free to move to its highest value use and the average return that land used in paddy rice production in a region currently earns. We take into account the following factors:

- The gap between average non-paddy land rental prices and average paddy land rental prices;
- The share of land currently used for paddy that is designated as such; and
- The proportion of designated land that would be shifted to other uses if there was no land designation policy.

Table 1 reports the data we use to calculate the land rental gap. In our simulation, we model the removal of this rental gap over the period 2011 – 2015.

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51 See, for example, To Dung Tien, Nguyen Phuong Le and Marsh, S. (2006) Agricultural land use flexibility in Vietnam, in Agricultural development and land policy in Vietnam, eds. S. Marsh, T. Gordon MacAulay and Pham Van Hung, Australian Centre for International Agricultural Research, Canberra.

52 National Institute for Agricultural Planning and Projection (NIAPP), 2010, Policy research on Vietnam's food security and rice value chain dynamics: Theme 1 – Food security research, draft report, Hanoi, November 2010.

53 Government of Vietnam, Resolution No. 63/NQ-CP on National Food Security, Hanoi, December 23, 2009.

54 Markussen, T., Tarp, F., Broeck, K.V. (2009), The forgotten property rights: Restrictions on land use in Vietnam. Discussion paper No. 09-21, University of Copenhagen.

55 Naturally, these costs must take account of environmental impacts of land use change. For example, the highest value use for designated land in a particular region might be shrimp farming. However, shrimp farming may be deemed an unacceptable land use for environmental reasons. Then, we model the cost of the land designation policy in terms of the rents foregone on the next highest value use of the land after shrimp farming, assuming it does not also pose unacceptable environmental costs.

Table 1. Region-specific land rental gap due to land designation

Region	Percentage difference between average non-paddy land rental and average paddy rental[56](%)	Share of paddy land that is designated as such[57]	Proportion of designated land that may shift to non-paddy uses[58]	Percentage land rental gap caused by the rice land designation policy (%)
	R	S_D	ω	$W=S_D\omega R$
Red River Delta	221,8	0,88	0,93	180,8
Northern Mountainous Region	86,6	0,89	0,88	70,4
North Central Coast	108,5	0,94	0,95	98,1
South Central Coast	101,3	0,90	0,85	76,9
Central Highlands	177,3	0,79	0,65	92,2
South East	214,2	0,79	0,81	134,7
Mekong River Delta	177,9	0,91	0,73	119,5
Economy-wide average	165,8	0,89	0,81	123,1

As can be seen from the last row, on average, the land rental earned on non-paddy land is about 166 per cent higher that earned on paddy land. However, the land rental gap caused by the rice land designation policy is only 123 per cent (last row, last column). This is because the rice land policy is restrictive for only about 72 per cent (=0.89 * 0.81) of current paddy land. The remaining 18 per cent of current paddy land is considered by farmers to be unsuited for anything other than paddy, and is thus likely to be used for paddy regardless of whether the designation policy is in force or not [59].

[56] Authors' calculations from: (1) Dao The Anh, Profitability of rice versus other crops (synthesis from different works by the Centre for Agarian System Research and Development (CASRAD) in Farming system during the last ten years), and SCAP (Southern Centre for Agricultural Policy Research) Production cost_selling price_agrocensus06.xls, Internal project data, the World Bank's project "Economic and Sector Analysis for Agriculture, Rural Development and Natural Resources Management in Vietnam in 2009 and 2010; (2) Le Canh Dung et. al. (2010) Economics of rice and alternative land uses in the Mekong Delta,, presentation at the "Food security and rice value chain research consortium: Taking stock of work in progress" workshop, Can Tho 19-20 October 2010; (3) Cheesman, J., Tran Vo Hung Son, et al. (2007). Managing Groundwater Access in the Central Highlands (Tay Nguyen), Research report number 6, Australian Centre for International Agricultural Research (ACIAR), Project: ADP/2002/015.

[57] NIAPP (National Institute of Agricultural Planning and Projection) (2010) Policy research on Vietnam's food security and rice value chain dynamics: Theme 1 – Food security research, draft report, Hanoi, November 2010.

[58] Authors' calculations from Vietnam Access to Resources Household Survey (VARHS) 2008 and NIAPP (2010). Raw data from VARHS 2008 was obtained from Development Economics Research Group, Deparment of Economics, Cophenhagen University, at http://www.econ.ku.dk/derg/links/vietnam. The VARHS covers 12 out of 64 provinces in Vietnam. The provinces belong to all 7 regions in the country, except the South East region. The Mekong River Delta is represented only by one province (Tra Vinh). Based on this province alone, this share would be only 0.13, which is not consistent with other information from the region. We, therefore, have used NIAPP (2010) data to recalculate this number. As for the South East region, due to lack of independent estimate for this share, we adopted the economy-wide average from the VARHS.

[59] This does not mean that if there is no rice land policy then 72 per cent of current paddy land will be used for other crops. As will be seen later in this paper, farmers' choice for land use depends on their preferences, the ease with which land can be transformed across alternative uses, relative land rental rates. The latter, in turn, depend on demand and supply conditions in the markets for different agricultural products. Results from our simulations show that even in the absence of the land designation policy, ceteris paribus, more than 3 million hectares of land would continue to be used for paddy cultivation.

Export quota

The Vietnam government regularly intervenes in the rice export sector to limit export volumes via temporary quotas. When imposed, these quotas have the effect of raising the rice export price relative to the domestic rice price. The effects of export quota are analytically equivalent to that of an export tax. Hence, we model rice export quotas in our business-as-usual baseline simulation as an export tax equivalent. Table 2 calculates the annual export tax equivalent of the export quotas implemented over the years 2000 – 2010. The years in which the binding restrictions (i.e. 'quotas') were implemented are apparent as positive deviations in the export price from the domestic price. Because the quotas are unanticipated and temporary, we cannot know with any certainty what will be the future path for export quotas or their export tax equivalents. However, to model the effects of abstaining from export quota interventions in the future, we must form a view on the business-as-usual level of such interventions. We do this by assuming that the average quota rent tax equivalent over the period 2000-2010 (8.0 per cent) will prevail in each year of the business-as-usual forecast. In our policy simulation, we model the gradual removal of this quota rent tax equivalent over five years, from 2011 to 2015.

Table 2. Export tax equivalent of Vietnam's export quota, 2000-2010

Year	Export volume[60]	Export price[61]	Domestic price[62]	Quota rent tax equivalent
	(Million tons)	(US$/ton)	(US$/ton)	(%)
2000	3,48	186,7	164,7	13,3
2001	3,72	161,0	158,9	1,3
2002	3,24	205,7	186,3	10,4
2003	3,81	182,9	185,4	-1,4
2004	4,06	222,7	221,8	0,4
2005	5,25	256,9	248,3	3,5
2006	4,64	265,0	268,5	-1,3
2007	4,58	311,2	343,6	-9,4
2008	4,74	569,2	416,1	36,8
2009	6,05	406,8	369,8	10,0
2010	6,75	431,2	368,1	17,1
		Weighted average 2000-2010		8,0

[60] Source: General Statistics Office, and Agrimonitor (2010) Vietnam and World Rice annual report in 2009 – Outlook for 2010. Available from www.agromonitor.vn.

[61] Source: Average of the data from (1) Vietnam Food Association, cited in Vo Thi Thanh Loc et al. (2010b) Rice value change analysis in the Mekong Delta, Vietnam 2009. Mekong Delta Development Research Institute, Cantho University, Research report for the World Bank; and (2) and Agromonitor (2010).

[62] Source: The same as for rice export price. Where paddy price is given, it is converted to rice price using the paddy-rice conversion rate of 0.66 and the loss rate in milling and transportation of 5%.

Paddy price support

In recent years, the government has regularly mandated paddy purchases in the MKD by rice trading companies at harvest time. Since 2008, the average annual quantity mandate has been one million rice equivalent tons.[63] The compensation for undertaking the mandated purchases is a reimbursement of the interest paid on four month's worth of loans assumed to be borrowed for these purposes. For example, in 2009, the average rice price was 7,344 VND/kg, and the short-term loan interest rate was 12.7% per annum. The extent of government financial support associated with a 1 million ton extra-market rice purchase would thus be approximately VND310.9 billion. On average, over the period 2008-2010, the interest subsidy represents approximately 0.9% of paddy purchases by the rice processing sector in the MKD.[64] This policy acts as a subsidy on purchases of MKD paddy by MKD rice processing companies, and encourages paddy production in the region to be higher than it would otherwise be. In our policy simulation, we remove this subsidy in five equal instalments over 2011 – 2015.

Prominence of state–owned enterprises (SOEs) in the rice processing sector

SOEs are prominent in the rice processing sector in Vietnam. Due to both their access to capital and the system of rice export quota allocation and export registration, SOE's account for more than 80 per cent of rice exports.[65] In the domestic market, SOEs account for about 15 per cent of supply in northern regions, and approximately 10 per cent of supply in southern regions[66]. Overall, SOEs account for approximately 35 per cent of production in the rice processing industry.

In our modeling, we have assumed that SOEs are characterized by lower efficiency relative to their private sector counterparts. Vu Quoc Ngu (2002) estimates that in the late 1990s, the technical efficiency of non-SOE firms was 13.7 per cent higher than that of SOEs. However, the study also found that SOEs in the food processing sector had a higher level of technical efficiency than the average level for all SOEs.[67] We have assumed that non-SOEs in the rice processing sector are 10 per cent more productive than SOEs in the sector. We have also assumed that, due to their higher efficiency and higher responsiveness to consumer requirements, private companies could secure a 10 per cent higher rice export price than that received by SOEs.

The government is taking steps to further liberalize the rice processing and export sector by allowing higher participation of private companies in the sector.[68] For our policy analysis, we simulate a situation where the SOE share in exports falls from 80 per cent to 40 per cent, and where the SOE share in the domestic market increases to 20 per cent in all regions[69]. Such a change would result in a higher

63 Government of Vietnam, Official letter No. 2081/TTg-KTTH on assistance for purchase of rice from Winter-Spring season 2008-2009. Hanoi, 28 November 2008; Government Office, Official letter No. 5159/VPCP-KTN on measures to facilitate the purchase of rice from the Summer-Autumn season 2008 in Mekong River Delta. Hanoi, 7 August 2008; Government of Vietnam, Decision No. 1518/QD-TTg on the purchase for temporary reserve of Summer-Autum rice 2009. Hanoi, 22 September 2009; Government of Vietnam, Decision No. 993/QD-TTg on the purchase for temporary reserve of Summer-Autum rice 2010. Hanoi, 30 June 2010.

64 Mekong River Delta is where the purchases are mainly implemented.

65 Agrifood Consulting International, Inc. (2009). Economic and Sector Analysis for Agriculture, Rural Development, and Natural Resource Management in Vietnam in 2009 and 2010 (Phase 1), Final Report prepared for the World Bank.

66 Vo Thi Thanh Loc et al. (2010b) Rice value change analysis in the Mekong Delta, Vietnam 2009. Mekong Delta Development Research Institute, Cantho University, Research report for the World Bank.

67 Vu Quoc Ngu (2002). Technical efficiency of Vietnamese industrial SOEs and non-SOEs. Canberra, Working Paper No. 02-6, Asia Pacific School of Economics and Government, Australian National University.

68 Government of Vietnam (2010c). Decree No. 109/2010/ND-CP of November 4, 2010, On rice export business. Hanoi, 4 November 2010.

69 This is to take account of the possible increase in SOEs' share on domestic rice market due to the policy of increasing rice storage capacity by SOEs.

rice export price (because of the increase in the export share of non-SOE's) and an average (economy-wide) rise in rice sector productivity (because of the fall in the proportion of rice activity undertaken by SOE's). Everything else being the same, these changes produce a rise in the rice export price of 3.9 per cent. Changes in rice sector efficiency differ among regions, depending on whether the share of SOEs in the regional rice market increases or decreases. RRD and MKD would experience increases in efficiency of 0.23 and 2.4 per cent because they gain more from the reduction of SOEs' share of exports than the loss from the increase in SOEs' in the domestic market. The remaining five regions experience a decline in rice processing efficiency. On average, northern regions experience a 0.46 per cent decrease in rice processing efficiency, and southern regions experience a 0.9 per cent reduction in efficiency. These regions experience small efficiency losses in rice processing, because they do not gain from the lowering of SOEs' share in rice exports, but they do experience a rise in the SOEs share of their domestic market. Economy-wide, efficiency in the rice sector increases by 1.1 per cent. These changes are implemented over five years, from 2011 to 2015.

Rice reserve

At present, the total storage capacity of Vietnam's rice trading companies is approximately 2 million tons.[70] The Government is implementing a variety of support measures to encourage firms to build an additional 2 million tons of storage capacity by the year 2012. The main aim of the policy is to reduce post-harvest losses.[71] The bulk of this storage space will be in the MKD. In this simulation we look at the costs and benefits of developing the extra 2 million tons of rice storage for the MKD region.

On the benefit side, extra storage space may help reduce post-harvest losses during the drying, storing and milling stages. The average physical losses at these stages are estimated to be 9% - 11% of paddy output.[72] We assume that the new larger and more modern storage spaces can help reduce these losses by 5% for 2 million tons of rice per season. There are, on average, two paddy seasons per year in the MKD, hence the benefit could be 10% for 2 million tons of rice per year.

On the cost side, we model the labour and storage costs of maintaining the rice reserve, and the cost of physical rice spoilage. There are no exact estimates of these costs for Vietnamese rice trading companies. So we adopt instead the costs of the rice buffer stocks of the Indian Food Corporation, which are estimated at 8.5 per cent of the purchase price of rice.[73] This estimate seems to be within a range of allowances for physical loss and maintenance costs stipulated for various types of storage conditions and various types of grain in Vietnam.[74]

Thus, the net benefit of the increased rice storage could be 1.5% of the value of the reserved paddy (=10% - 8.5%)[75]. In 2009, the total volume of rice available in the MKD was around 10 million tons. The 1.5% benefit from 2 mill tons would be 0.3 per cent of the total value of the sector. We model this

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70 Nam Nguyen (2009) "Building rice storage system: A priority", Radio Free Asia (RFA). Access 2 January 2011 at http://www.rfa.org/vietnamese/in_depth/PM-orders-to-double-storage-capacity-to-4million-tons-01092009135555.html.

71 Government of Vietnam, Resolution No. 63/NQ-CP on National Food Security, Hanoi, December 23, 2009.

72 Le Canh Dung et. al. Research on food security policy in the Mekong Delta. Research report for the World Bank, Mekong Development Research Institute, Can Tho University, 2010. The total post-harvest quantity losses are estimated to be from 13% to 16% in all stages from harvesting to milling.

73 Swaminathan, M. (1999). "Understanding the Costs of the Food Corporation of India." Economic and Political Weekly, 34(52): A121-A132.

74 See Ministry of Finance (2009). Circular No. 107/2009/TT-BTC on the allowable maintenance cost for national reserves directly managed by the National Reserve Department. Hanoi, 26 May 2009; Ministry of Agriculture and Rural Development (MARD) (2010). Circular No. 57/2010/TT-BNNPTNT on the allowable costs of intake, maintenance and release of rice seeds and maize seeds. Hanoi, 4 October 2010.

75 The extra storage capacity may have an additional benefit of serving as buffer stocks to cushion supply and demand shocks in the rice market, and thus stabilizing rice price. However, due to lack of empirical estimates of this benefit for Vietnam, it is not included in our simulation.

as an improvement in paddy-saving technology in the rice processing sector. In our simulation, we model the removal of the policy of promoting these additional rice reserves. This means that the efficiency gain that they produce is lost in the policy case, relative to our baseline forecast. Consistent with our other policy simulations, we model the removal of the additional rice reserves in equal portions over the five years, 2011-2015.

Summary of policy simulations and shocks

In summary, to assess the economic effects of the aforementioned five policy interventions in Vietnam's rice market, we run the following 6 simulations with our economic model for the period 2010-2030:

1. *Simulation 1:* Removing the policy of rice land designation. In our baseline, we model the land designation policy as an exogenous 123 per cent gap between land rentals earned on paddy and non-paddy uses. To simulate the effect of removing the land designation policy, we remove this exogenous gap.

2. *Simulation 2:* Removing the rice export quota. This is modelled as the removal of a quota equivalent export tax of 8%.

3. *Simulation 3:* Removing the rice price floor. This is modelled as the removal of a subsidy of 0.9% on the purchase of paddy by the rice processing sector in the Mekong River Delta.

4. *Simulation 4:* Reducing the dominance of SOEs in rice exports and increasing their shares in the domestic market. This is modelled as: (a) a 3.9% increase in the price Vietnam receives for its rice, for any given level of rice exports; (b) an increase in the efficiency in the rice sector in the RRD and MKD regions by 0.23% and 2.37% respectively; and (c) a decrease in the efficiency of rice processing of around 1% for other regions. On average, the rice sector's efficiency increases by 1.1%.

5. *Simulation 5:* Removing quasi-commercial rice reserves of 2 mil tons. This is modelled as a decrease of 0.3% in paddy-using efficiency in the rice processing sector in the MKD due to the loss of the net benefits from reducing post-harvest losses via extra storage capacity.

6. *Simulation 6:* Combined simulation. This simulation is the combination of the five simulations above. That is, all five policies are removed simultaneously.

In each simulation, the policies under consideration are assumed to be removed over five years, from 2011 to 2015.

Methodology

Introduction

Although the policies examined in this paper directly aim at regulating the paddy and the rice sectors, they have indirect economy-wide effects. This is because all industries are inter-related via direct and indirect linkages, as well as via economy-wide aggregate constraints. We outline these linkages below.

First, most industries sell inputs to each other. For example, the rice processing industry sells its output not only for household consumption and for exports, but also to industries producing animal feed, bakery and confectionary, and other food products. It uses inputs supplied by industries such

as paddy cultivation[76], machinery and equipment, gas and electricity, transport and other services. A change in the rice processing industry's activity will affect these and other industries.

Second, all industries compete for primary factors of production, namely labour, capital and land. The rice land designation policy, for example, in increasing land for paddy cultivation, reduces land available for other agricultural industries. This causes the rental price of land in other agricultural industries to be higher than it would otherwise be. This feeds into the cost streams of these industries, causing the price of their outputs to be higher than they would otherwise be. As a result, demand for non-paddy agriculture is lower than it would be in the absence of the land designation policy.

Third, industries are inter-connected on the demand side. Their products may be viewed by consumers as substitutes or complements. It has been observed in Vietnam, for example, that households are increasingly use less rice and are substituting towards other food products.[77] Everything else being equal, this leads to lower demand for rice and higher demand for other foods.

Finally, for an open economy like Vietnam, in which international trade plays a very important role[78], industries are inter-connected via balance of trade constraints. For example, an export boom in one industry may cause the exchange rate to appreciate, causing exports from other industries to become less competitive, and hence reducing demand for their products.

For policy analysis, it is important to take into account these inter-industry linkages. The appropriate tool for this type of analysis is computable general equilibrium (CGE) modeling. CGE models are a class of economic models that use published economic data on the structure of the economy, combined with estimates of relevant behavioral parameters, to estimate how an economy might react to changes in policy, technology or other external factors. A CGE model consists of a system of equations describing the behavior of, and interactions between economic agents in an economy, and a database which describes the initial solution to this equation system[79]. We expand on these features in our discussion of the CGE model we have used for this report – the MONASH-VN model.

Overview of MONASH-VN: A detailed multi-sectoral model of the Vietnamese economy

The MONASH-VN model is a Vietnamese implementation of the well-known large-scale dynamic model MONASH, developed by the Centre of Policy Studies, Monash University.[80] The model database was based on the input-output data for the Vietnamese economy in the year 2005[81], but updated to 2010 and disaggregated further to represent detailed agricultural industries by region, many households and regions. In its final version for this analysis, the model contains 195 industries, of which 91 are regional agricultural industries. For example, there is a paddy industry for each of the seven agro-ecological regions in Vietnam. The regions are: Red River Delta (RRD); North Midland and mountainous region (NMR); North Central Coast (NCC); South Central Coast (SCC); Central

[76] Our model distinguishes the paddy cultivation and rice processing as separate industries.

[77] NM Thang, Popkin B.M. (2004). Patterns of food consumption in Vietnam: effects on socioeconomic groups during an era of economic growth, European Journal of Clinical Nutrition, Vol. 58, pp. 145-153.

[78] The openness ratio for Vietnam, calculated as the ratio of exports plus imports to GDP, was 1.47 (General Statistics Office, Key indicators on National Accounts, available at www.gso.gov.vn).

[79] There are CGE models which capture the interactions between sectors in different economies. One of the most well-known multi-country model is GTAP model of world trade (www. gtap.agecon.purdue.edu).

[80] See Dixon, P. B. and M. T. Rimmer (2002), Dynamic General Equilibrium Modelling for Forecasting and Policy: A Practical Guide and Documentation of MONASH, North Holland, Amsterdam; and Giesecke, J.A. and Tran Hoang Nhi (2010). "Modelling value-added tax in the presence of multi-production and differentiated exemptions", Journal of Asian Economics, Vol. 21, No. 2, pp. 156-173.

[81] General Statistics Office (2007) Vietnam input-output table for the year 2005. Project data. Project VIE/ 03/101 "Strengthening capacity in financial policy analysis for human development". Input-Output tables describe the production structures of industries, and sale and purchase relationships between producers and consumers within an economy.

Highlands (CH); South East (SE); and Mekong River Delta (MKD). Similarly, the following industries are also distinguished by the region in which they operate: unprocessed rubber, coffee, sugarcane, unprocessed tea, maize, cassava, vegetables, fruits, other annual crops, other perennial crops, aquaculture, and rice processing. Regional economies are affected by changes to these industries, and also by changes in national industries[82] via a hybrid top-down/bottom-up regional CGE theory.[83]

There are ten household types in the model, distinguished by rural/urban area of residence, and expenditure quintile. Households supply labor, capital and land to industries, receive income from these industries, and consume products in the market.[84] Thus, the model can calculate changes in income and expenditure of these household types when there are changes in the economy due to a policy shock.

The equations of MONASH-VN assume that optimizing behavior governs decision-making by industries and households. Each industry minimizes unit costs subject to given input prices and a nested constant return to scale production function. Three primary factors are identified: labor, capital and natural resources. The model distinguishes two types of natural resource. One, representing sub-soil assets, is specific to individual mining industries. The second, agricultural land, is specific to regions, but capable of moving between alternative agricultural uses. We expand on our modeling of land supply in Box 1 below.

Households are modeled as maximizing their utility, subject to their budget constraints. Imported and domestic commodities are modeled as imperfect substitutes. The export demand for any given Vietnamese commodity is inversely related to its foreign-currency price. The model recognizes consumption of commodities by government, and the details of direct and indirect taxation instruments. It is assumed that all sectors are competitive and all goods markets clear. The model recognizes three types of dynamic adjustment: capital accumulation, net foreign liability accumulation and lagged adjustments in the labour market. Capital accumulation is industry-specific, and linked to industry-specific net investment. Annual changes in the net liability positions of the private and public sector are related to their annual investment/savings imbalances. In policy simulations, the model provides the option of allowing the labor market to follow a lagged adjustment path. With this option activated, short-run real consumer wages are sticky. Hence short-run labor market pressures mostly manifest as changes in employment. In the long-run, employment returns to baseline, with labor market pressures reflected in changes in real wages[85].

[82] Our top-down theory employs the ORES (ORANI regional equation system) method, described in Dixon et. al. (1982). ORANI: A Multisectoral Model of the Australian Economy, Contributions to Economic Analysis series no. 142, North-Holland Publishing Company, Amsterdam. In ORES, national industries are defined in counterpoint to local industries. Regional prospects for local industries are governed by demand conditions within the regions in which they are located. In contrast, regional output movements for industries defined as national are assumed to follow output movements for the industry at the economy-wide level, as calculated in the core of the national CGE model. In MONASH-VN, national industries include some agricultural industries that have not been modeled as bottom-up region-specific industries (e.g. livestocks and irrigation), and all forestry, mining, manufacturing, construction and services industries.

[83] See Higgs, P. J., Parmenter, B. R. & Rimmer, R. J. (1988) A hybrid top-down, bottom-up regional computable general equilibrium model, International Regional Science Review, Vol. 11, pp. 317–328.

[84] Data on income and expenditure by household come from 2004 Vietnam Household Living Standard Survey.

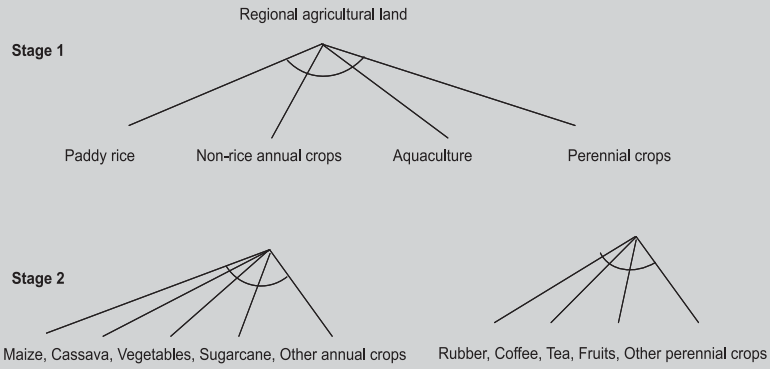
[85] The long-run total employment is determined mainly by demographic factors and labour market characteristics, such as population birth rate, death rate, labour market participation rate, and the number of working hours per year. It is not determined by the policies under consideration in this paper.

Box 1. Modeling of land allocation

In the MONASH-VN model, agricultural land is specific to regions, but capable of moving between alternative agricultural uses. On the demand side, industries choose land inputs so as to minimize the cost of their composite primary factor unit, subject to a constant elasticity of substitution production function and given prices of primary factor inputs.

On the supply side, land owners in each region allocate a given amount of available land in the region across alternative land-using industries in two stages, as illustrated in Figure 1. In the first stage, they supply land to paddy, annual crops, perennial crops and aquaculture. In the second stage, they allocate annual crop land among sugarcane, maize, cassava, vegetables, and other annual crops. Land for perennial crops is allocated to raw rubber, coffee, tea, fruits, and other perennial crops.

Figure 1. Supply of land in each region



The allocation of land depends on movements in land availability and in relative land rental prices across alternative land uses. For example, if the total area of agricultural land in the MKD were to decline, say, due to conversion to non-agricultural uses, then in the absence of changes in relative land rental prices across alternative agricultural land uses, the supply of land to all agricultural industries in the region will decline by the same proportion. If, on the other hand, with the same total area of agricultural land available in MKD, the rental price of paddy land were to increase relative to rents available from supplying land to other crops, then supply of land to paddy will increase, drawing land away from other crops.

The magnitude of the land reallocation will depend on two factors: (1) the magnitude of the relative changes in land rentals between crops; and (2) the ease with which land use can be changed. The latter is reflected in parameters called elasticity of land transformation, which measure the responsiveness of land supply to movements in relative land rentals. In MONASH-VN, for the RRD and MKD, the elasticities of land transformation among crops in Stage 1 (Figure 1) range from 0.5 for paddy and annual crops, 0.25 for aquaculture, and 0.17 for perennial crops. The elasticity of 0.5 for paddy means that if the land rental for paddy rises 1% relative to the average land rental in the region, then the supply of land to paddy will increase by 0.5%. We set elasticities for aquaculture slightly lower for the remaining five regions, to reflect their higher topology and lower availability of water. These elasticity values are adopted from the GTAP model(a), and adjusted to reflect agricultural production and land characteristics in different regions in Vietnam. Transformation elasticities across crops in Stage 2 is higher than those in Stage 1, reflecting the relatively easier transformation possibilities across alternative crop types once the major land use decisions described by Stage 1 have been made. The Stage 2 elasticities are 0.8 for annual crops, and 0.5 for perennial crops in all regions.

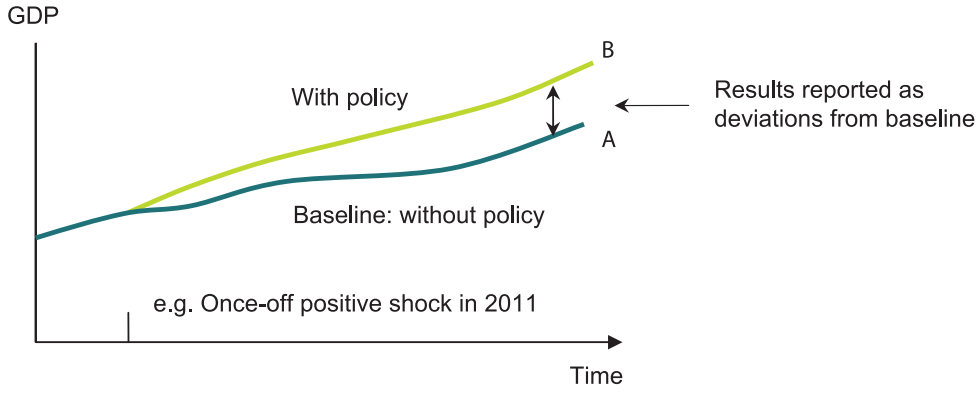
Note: (a) Ahmed, S.A, Hertel, T.W., Lubowski, *Calibration of a land cover supply function using transition probabilities*, GTAP Research Memorandum No. 14, October 2008.

Baseline Forecast

Policy analysis with MONASH-VN

Policy analysis with a model like MONASH-VN requires two broad steps, as illustrated in the Figure 2 below. First, the model must generate a baseline forecast, that is, a forecast excluding the policy under investigation (Line A). Second, the model must generate a second forecast that incorporates all exogenous features of the baseline forecast, but with the addition of policy-related shocks reflecting the details of the policy under investigation (Line B). The economic implications of the policy are reported as deviations in values for model variables between the policy and forecast simulations. This section describes our baseline forecast.

Figure 2. Policy analysis with MONASH-VN



Inputs into our baseline include independent forecasts from international organizations, government agencies and research institutions. Specifically, we use GDP growth forecasts from IMF/World Bank. We complement the IMF/World Bank projections with forecasts from the International Labor Organization for population and the economically active population to 2020, and actual data on GDP and employment for the period 2005-2009 from the Vietnamese General Statistics Office (see Table 3).

Table 3. Projected annual average growth rate of GDP, Population and Employment, 2005 – 2030 (%)

Period	Real GDP[(a)]	Population[(b)]	Employment[(c)]
2005 - 2010	7.10	1.17	2.17
2011 - 2015	7.20	1.01	1.48
2016 - 2020	7.48	0.91	0.97
2021 - 2025	7.48	0.88	0.78
2026 - 2030	7.00	0.88	0.78

(Source: (a): IMF and World Bank (2010)[86]; (b) ILO (2010)[87] for the period 2005-2020, after that, rates are assumed to be the same as in 2020; (c) calculated from the forecast for Economically Active Population in ILO (2010), with the assumption that the unemployment rate remained unchanged throughout the forecast period).

[86] International Monetary Fund and the World Bank (2010). "Joint IMF/World Bank Debt Sustainability Analysis 2010." from http://www.imf.org/external/pubs/ft/scr/2010/cr10281.pdf.

[87] International Labor Organization (2010). Economically Active Population Estimates and Projections (5th edition, revision 2009), International Labor Organization. http://laborsta.ilo.org/STP/guest

We also use forecast changes in region-specific total agricultural land supply, based on government plans for agricultural land supply and on the projected changes in land supply due to climate change and adaptation to climate change. According to the Government of Vietnam's plan and projection, due to the conversion of land to non-agricultural uses, total agricultural land will decline from 9,599 thousand hectares in 2009 to 8,549 thousand hectares in 2030, a decline of 11 per cent. There will be an additional loss of around 0.24 per cent of land if the sea level rises 17cm by 2030 due to climate change[88]. However, Vietnam has plans for adaptation to climate change. An important part of these adaptation plans is expansion of irrigation. This will increase land available for cultivation by about 4.7 per cent[89]. In total, over the period 2009 – 2030, agricultural land is projected to decline by 7 per cent, or an average of 0.344 per cent per annum.

Over the forecast period we determine aggregate consumption spending (private and public) by assuming that it is a fixed proportion of national income. We assume that this propensity to consume out of national income will be unchanged over the forecast period. We also assume that the country's terms of trade will remain unchanged over the forecast period.

For the consumption of rice, we adopt the assumption of CAP/IPSARD[90] that per capita consumption of rice will fall by 1 per cent per annum, from 135kg/person in 2010 to 110kg/person by 2030. We assume that as households reduce their consumption of rice, they increase their consumption of other food items.

Major features of the baseline forecast

At the macro level, the projected GDP growth is high, albeit declining, over the forecast period (see Table 3). The GDP growth rate averages 7.2 per cent over the period 2010 – 2030. Employment grows at a slower pace, at an annual average rate of 1.1 per cent. The capital stock grows at an annual average rate of about 6.3 per cent. Land and natural resources[91] decline by 0.14 per cent per annum. Returns to labor, capital and land comprise 43.7, 33.2 and 9.6 per cent of GDP respectively. Taken together, movements in these primary factors explain around 2.6 percentage points of the WB/IMF's forecast annual average GDP growth. The remainder of the GDP growth comes from technical progress.

In the baseline forecast we find that as the economy grows, so too do all sectors, but at different rates. Agriculture has the lowest growth rate, averaging 5.5 per cent over the period 2010 – 2030. Paddy production grows even slower, at 3.1 per cent. The average growth rates of industry (mining, manufacturing, utilities and construction) and services over the same period are 7.3 and 8.2 per cent respectively. As a result, agriculture's share in GDP declines from 21.7 per cent in 2010 to 21 per cent by 2030. Industry's share in GDP declines from 41 per cent in 2010 to 39.4 per cent in 2030. The share of services in GDP rises from 37.4 per cent in 2010 to 39.7 per cent by 2030.

88 NIAPP (National Institute of Agricultural Planning and Projection) (2010) Policy research on Vietnam's food security and rice value chain dynamics: Theme 1 – Food security research, draft report, Hanoi, November 2010.

89 IFPRI (Zhu, Tingju) (2010), Climate change impacts and adaptation in Vietnam: Agriculture and water, Final report, World Bank project "Economics of Adaptation to Climate Change", International Food Policy Research Institute, Washington D.C.

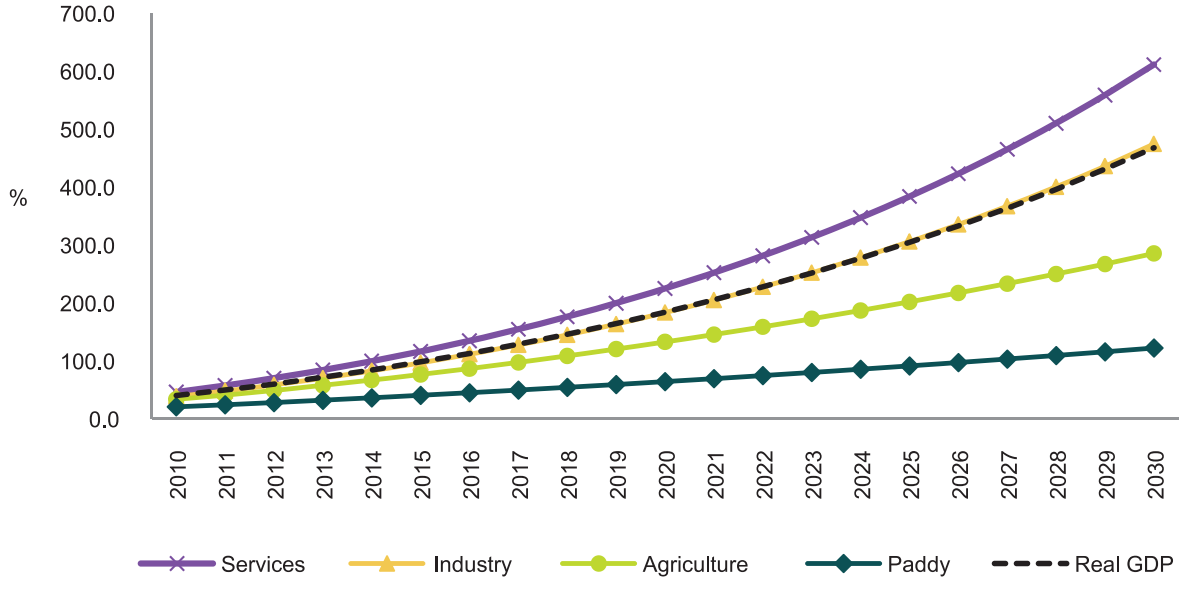
90 CAP/IPSARD (Centre for Agricultural Policy, under the Institute of Policy and Strategy for Agriculture and Rural Development), Rice domestic demand, Presentation at the "Food security and rice value chain research consortium: Taking stock of work in progress" workshop, Can Tho 19-20 October 2010.

91 Land comprises agricultural land. Other natural resources consist of forestry land and subsoil assets (e.g. mines). In our base case, we have no independent forecast data for changes in natural resource availability outside of agricultural land, and hence we assume that these resources remain unchanged from their 2010 levels.

The move away from agriculture and industry and toward services reflects: (a) our assumptions of declining agricultural land and fixed natural resource endowment in mining, which constrain agriculture's and industry's growth; and (b) the pattern of household consumption moves away from food items and towards manufacturing and services.

Figure 3 reports the cumulative growth rates for real GDP, agriculture, industry, services, and paddy production over the forecast period 2010 – 2030. These are the bases against which we will report the deviations in the growth of these variables due to our policy simulations.

Figure 3. Baseline cumulative growth rates for paddy, agriculture, industry and services 2010 – 2030, (%)



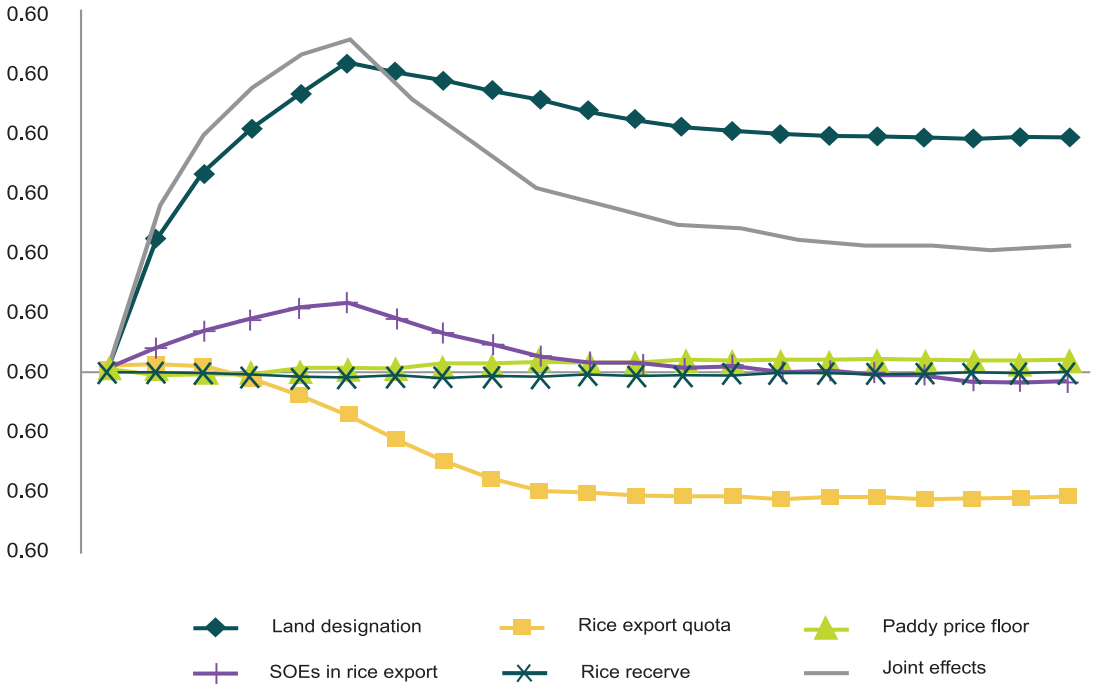
Simulation results

In this section we summarize the macroeconomic, sectoral, distributional and regional economic impacts of the removal of the five policy interventions in the rice market. These impacts are evaluated as deviations from a business-as-usual baseline with all interventions in place.

Effects on GDP and aggregate consumption

Figure 4 reports annual percentage deviations in real GDP caused by the removal of the five policy interventions. These results can be explained by the nature of the policy shocks.

Figure 4. Changes in real GDP under different simulations
(Percentage deviations from baseline)



The intervention policies analyzed in this report can, broadly, be classified into two groups: those that encourage paddy and rice production, and those that discourage it.
Policies that encourage rice production are:

(1) rice land designation;
(2) rice price floor; and,
(3) rice reserves.

Policies that discourage rice production are:

(4) rice export quota; and,
(5) SOEs dominance in rice exports.

In our policy simulation, we simulate the removal of these five interventions. In developing our model, we have been careful to distinguish agricultural land rental rates when land is used for paddy production and when land is used for production of other agricultural commodities. Returns from using land in paddy production are low relative to the potential returns from using the land in alternative agricultural uses. Hence, at the margin, changing land use away from paddy production towards non-paddy agricultural production generates a real GDP gain.

Because policies (1) – (3) encourage rice production, when we remove these policies, rice production (and with it, paddy land under cultivation) falls. The resulting change in land use away from paddy and towards production of other agricultural commodities generates a rise in real GDP (Figure 4).

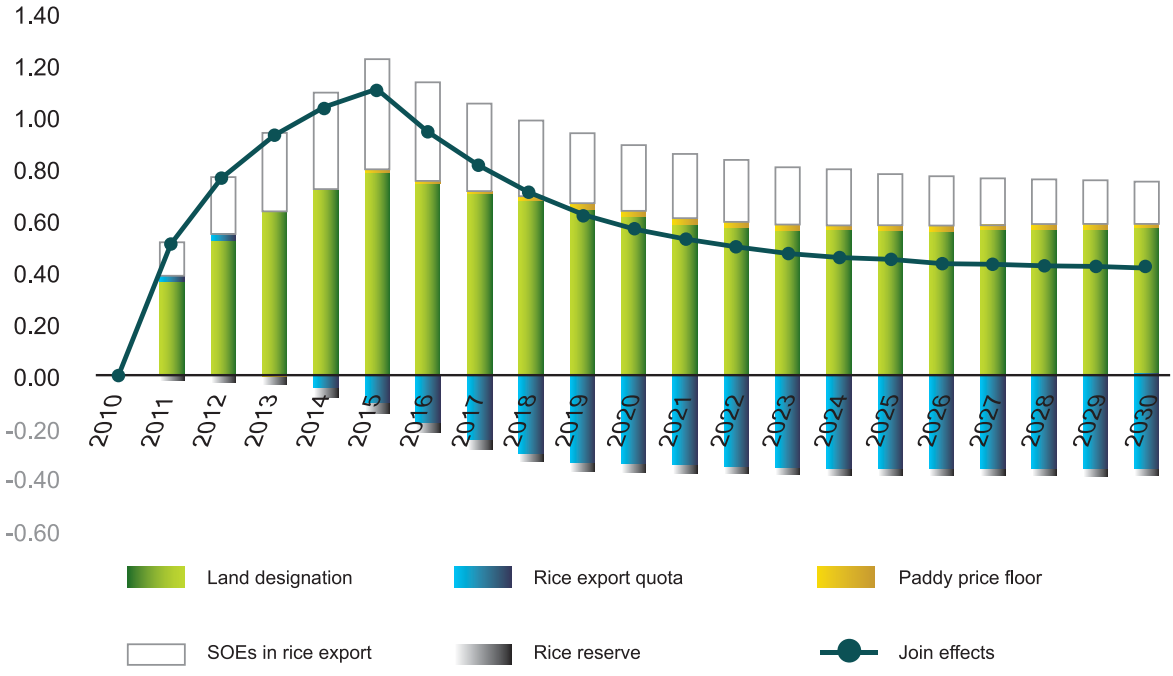
Because policies (4) – (5) discourage rice production, when we remove these policies, rice production (and with it, paddy land under cultivation) rises. The resulting change in land use towards paddy and away from production of other agricultural commodities generates a fall in real GDP (Figure 4).

We find that the macroeconomic results of the five policies are dominated by the effects of changing land use. Second-order impacts arise from technical efficiency gains, allocative efficiency gains, and terms of trade effects. However, the effects of these are small relative to the effects of movement of land between alternative agricultural land uses.

Figure 5 reports outcomes for real consumption. We interpret real consumption as an indicator of the aggregate welfare consequences of removing the five policies. The figure reports both the joint effect of removing all five policies, and the individual contributions of each of the five policies to this joint effect. Comparing Figures 5 and 4, it is clear that the outcome for real consumption closely tracks movements in real GDP.

The joint effect of removing all five policies is to generate a positive deviation in real aggregate consumption throughout the forecast period. Figure 5 allows us to identify the contributions to the aggregate consumption deviation. The largest positive contributions to consumption are made by the removal of the land designation policy, followed by the reduction in SOEs' dominance in rice trade, and the removal of the paddy price floor. Removing the land designation and paddy price floor policies discourage paddy production, allowing land to flow to higher value uses, lifting real GDP, and with it, real consumption. Reducing SOE dominance in rice exports encourages paddy production. This accounts for the small long-run real GDP loss generated by removal of this policy in Figure 4. Note however that among the effects of reducing SOE dominance in rice exports is an improvement in the foreign currency price realized on Vietnam's rice exports. This represents a gain in Vietnam's terms of trade. This accounts for the consumption gain generated by reducing SOE dominance in rice exports (Figure 5).

Figure 5. Decomposition of in real aggregate consumption under different simulations



The removal of both the export quota and the rice reserve has long-run negative impacts on real consumption relative to baseline (Figure 5). This mirrors the GDP consequences of these policies (Figure 4). The export quota discourages paddy production. It also reduces rice exports, improving Vietnam's terms of trade. When the quota policy is removed, paddy production rises, causing GDP

to fall relative to baseline (Figure 4). By encouraging trade, removal of the quota also causes a small decline in Vietnam's terms of trade. Together, the decline in real GDP and the terms of trade account for the consumption loss reported in Figure 5. As discussed in Section 2, the rice reserve provides an efficiency benefit in the baseline. When the policy is removed in the policy simulation, this efficiency benefit is lost. This accounts for the real GDP loss generated by removal of the policy in Figure 4. This GDP loss accounts for the real consumption loss reported in Figure 5.

Table 4 reports the simple average changes per year compared with the baseline for the period 2011-2030 in real GDP and real aggregate consumption under different simulations and their joint effects, valued at 2010 prices. Consistent with the results reported in Figure 5, we see positive contributions to GDP and consumption from the removal of land designation, removal of the paddy price floor, and the reduction of SOEs' role in rice trade. The removal of the rice export quota and the rice reserve reduces GDP and consumption. Generally, the change in consumption is comparable with the change in GDP. The exception is the SOE simulation, where the gain to consumption is much greater than the gain in GDP. As outlined above, an important aspect of reducing SOE's role in rice trade is an improvement in the price Vietnam secures on its rice exports, i.e. an improvement in the terms of trade. This leads to a higher positive deviation in gross national income than for GDP, explaining the higher outcome for consumption relative to GDP in Table 4.

Table 4. Average changes in real GDP and real aggregate consumption per year, at 2010 prices

	Total per year (US$ million)		Per household per year[92] (US$)	
Simulation	Real GDP	Real consumption	Real GDP per household	Real consumption per household
Land designation	1,323,9	1,229,8	56,9	52,9
Rice export quota	-600,8	-628,8	-25,4	-26,5
Paddy price floor	8,7	2,7	0,4	0,1
SOEs in rice export	29,1	440,3	1,5	19,1
Rice reserve	-28,4	-26,5	-1,2	-1,1
Joint effects[93]	900,5	1,133,7	39,2	49,3

In the simulations we report here, changes in real GDP are caused mainly by changes in effective land supply, that is land supply weighted by land rental prices, a measure of the marginal product of land.[94] Hence, to understand the effects of the policies on real GDP, it is helpful to understand the effects of the policies on effective land supply. Figure 6 decomposes the joint effects of the change in effective land supply into contributions by each of the five individual policies. By far the largest positive contribution to the deviation in effective land supply is made by the removal of the land designation policy. This is because, as reported in Table 1, land used for paddy receives much lower rentals than are available in alternative uses. When the land designation policy is removed, land moves away from paddy and towards other higher value uses, generating a gain in effective land supply, and with it, real GDP.

92 This calculation takes into account changes in population over the period. Based on projections for population growth rates by the international Labour Organization, Vietnam population will increase from 86.9 million in 2010 to 104.5 million in 2030. We assume that there are 4.2 persons per household (based on VHLSS 2004).

93 The joint effects are close to, but not identical to, the sum of the effects of the individual simulations. This is because there are interactions between the policies when they are considered jointly.

94 By movement in effective land supply, we mean the weighted average movement in land supply across alternative agricultural industries using rental values as weights.

Figure 6. Decomposition of changes in effective land supply
(Percentage deviations from baseline)

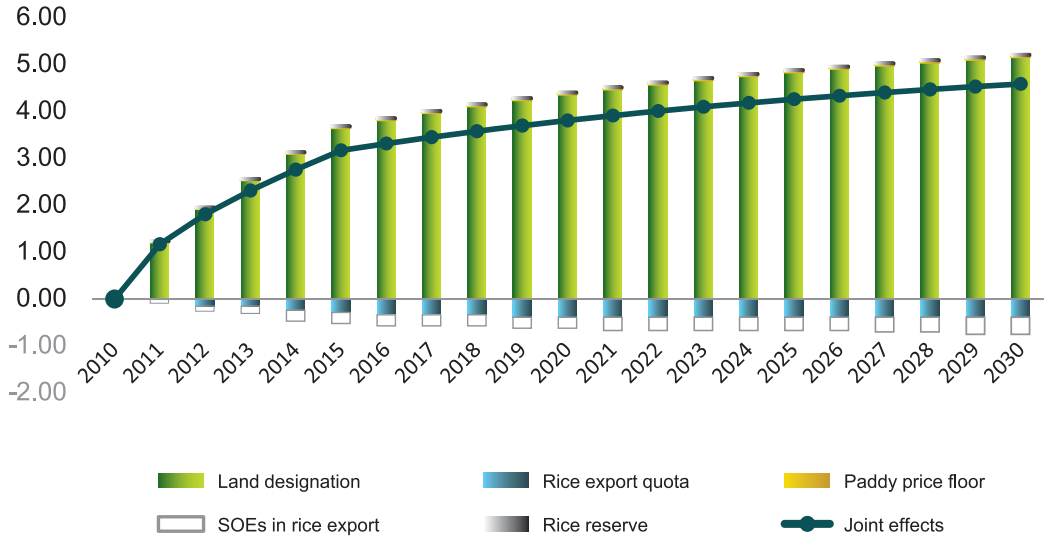


Figure 7 reports projected paddy land area under the baseline forecast and under different policy simulations. Recall that under our baseline simulation, all five policies are in place. We assume that the rice land policy will be maintained in a fashion that keeps the current land rental gap between paddy and non-paddy uses unchanged[95]. As is clear from Figure 7, in our baseline simulation we see that paddy land gradually declines, reaching a little under 3.5 million hectares by 2030. This reflects shifting household spending away from rice. In our policy simulation, where we remove all five policies, the paddy land area declines to 3.1 million hectares by 2030, 0.4 million hectares less than baseline. Note that, as is clear from Figure 7, the fall in paddy land relative to baseline is due almost entirely to the removal of the land designation policy. The impacts of the other four policies on paddy land area are very small in comparison.

Figure 7. Changes in paddy land under different simulations

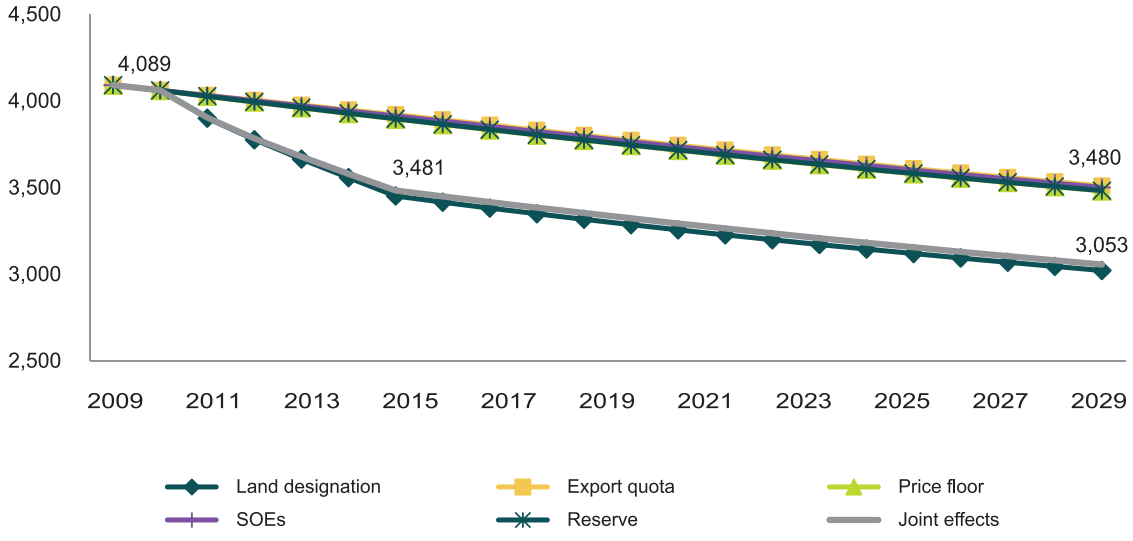
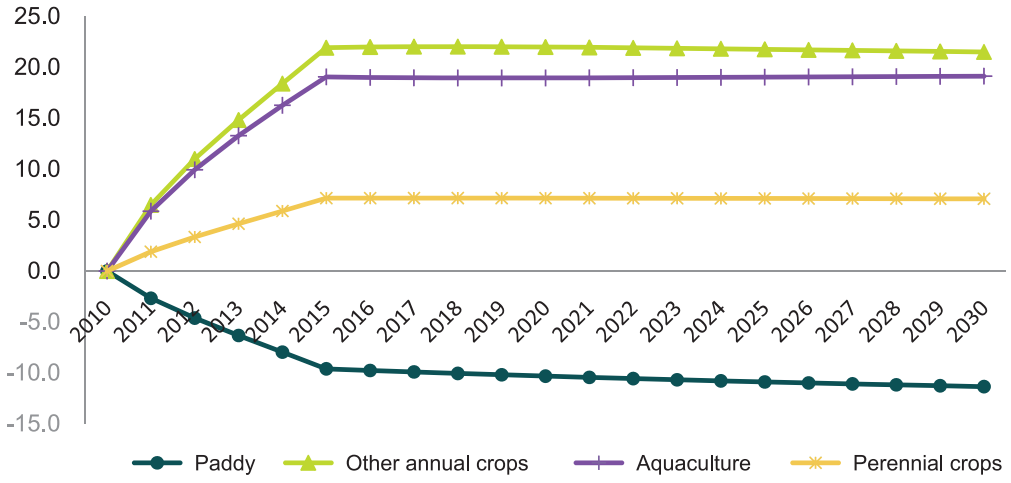


Figure 8 reports the joint effect of removing all five policies on the area of land employed in the four major agricultural uses (namely paddy, other annual crops, perennial crops and aquaculture). As discussed in reference to Figure 6, the impacts on effective land supply are mostly determined by changes in land use caused by the removal of the land designation policy. This accounts for the fall in land supplied to paddy. The land moved out of paddy is redeployed in other agricultural uses. The largest expansion in land use is in other annual crops, followed by aquaculture, and perennial crops. The magnitude of these changes depends on the responsiveness of land supply to differences in land rental rates. As discussed in Box 1, land use change is easiest for annual crops, and hardest for perennial crops.

Figure 8. Joint effects of policy simulations on land area for different agricultural uses

(Percentage deviations from baseline)



Effects on rice production and food security

We propose two measures of food security: the rice surplus index, and the food cover index. The *rice surplus index* is the ratio of quantity of rice production to the quantity of total domestic rice demand. This measures the extent to which domestic rice production exceeds domestic uses. The *food cover index* is the ratio of total household expenditure to the value of household spending on all food and drink items.[96] It measures the ability of households to cover their food bill.[97] Changes in these indexes due to the removal of all five policies are reported in Figure 9.

At the beginning of our forecast period, the rice surplus index is 1.6. As is clear from Figure 9, removal of the five policies generates an increase in the index, despite the fact that paddy production falls

[96] That is, it is the inverse of the household food budget share.

[97] The Food and Agriculture Organization (2003) notes that food security is a complex concept, encompassing three dimensions: availability, access and stability. They distinguish four levels of food security: global, national, household, and individual. For the purpose of this research, we are concerned only with national, and to some extent household, food security. There are several food security measures at the national level, such as the *food gap* and the *food import capacity index*. However, these are designed mainly to measure food security in food shortage countries (see *Trade reforms and food security: conceptualizing the linkages*. Food and Agriculture Organization of the United Nations, Rome, 2003). As such, they are not particularly relevant to Vietnam, a country which, for the last two decades, has experienced a surplus of rice and many other food products.

slightly relative to baseline (Figure 10). This is due to a rise in the numerator of the rice surplus index (rice production) and a fall in the denominator of the rice surplus index (domestic rice demand). Rice production rises relative to baseline, despite the fall in paddy production (see Figure 11). The net rise in rice production reflects the efficiency improvement generated by reducing the SOE share in domestic rice production. The fall in domestic demand is due mainly to the decrease in household rice consumption relative to baseline (see Figure 11).

The food cover index also rises relative to baseline (Figure 9). There are two main forces affecting this share. First, as the supply of land to paddy falls, the rental price of paddy land rises. This feeds into the cost stream of the paddy industry, and in turn, the rice processing industry, causing the consumer price of rice to rise relative to baseline. Ceteris paribus, this causes the cost of the household food bundle to rise, causing the food cover ratio to fall. However, the supply of land to non-paddy uses rises, causing land rental prices in non-paddy agriculture to fall. Ceteris paribus, this reduces the cost of the household food bundle, causing the food cover ratio to rise. The latter effect exceeds the former, reducing the cost of the household food budget, and thus reducing the denominator of the food cover ratio. At the same time, removing the five policies generates a positive deviation in national income, and with it, household consumption. This increases the numerator of the food cover ratio. That is, the capacity of households to purchase a given food bundle is increased.

To explore further the sources of the changes in our two food security measures, we investigate the change in production and prices of rice and other agricultural products.

Figure 9. Change in food security measures due to joint effects of policy simulations

(Ordinary change from baseline)

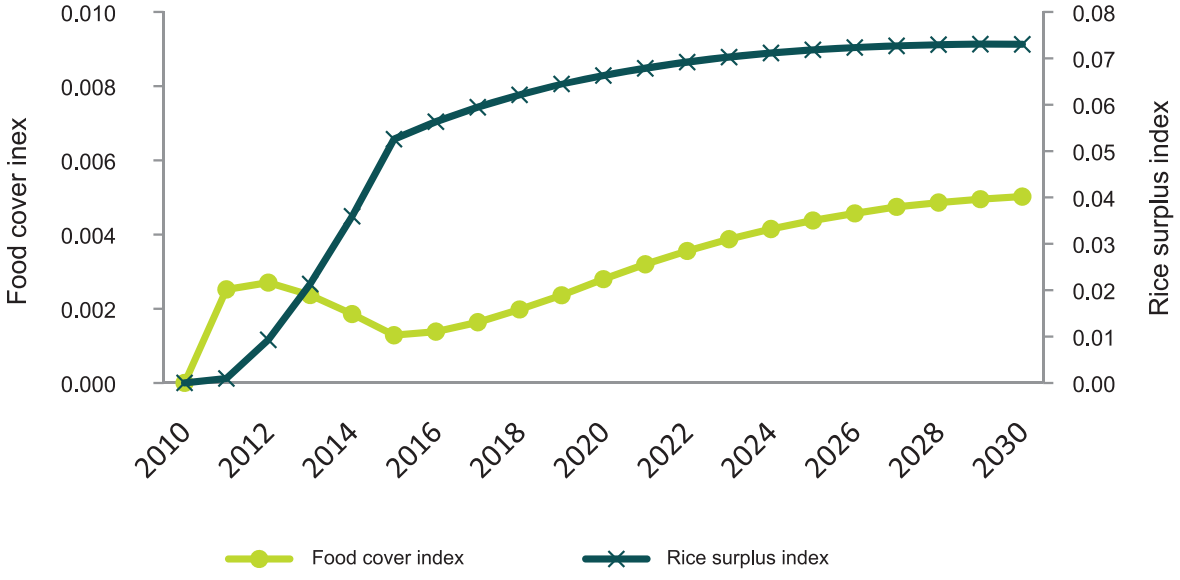


Figure 10. Changes in paddy production
(Percentage deviations from baseline)

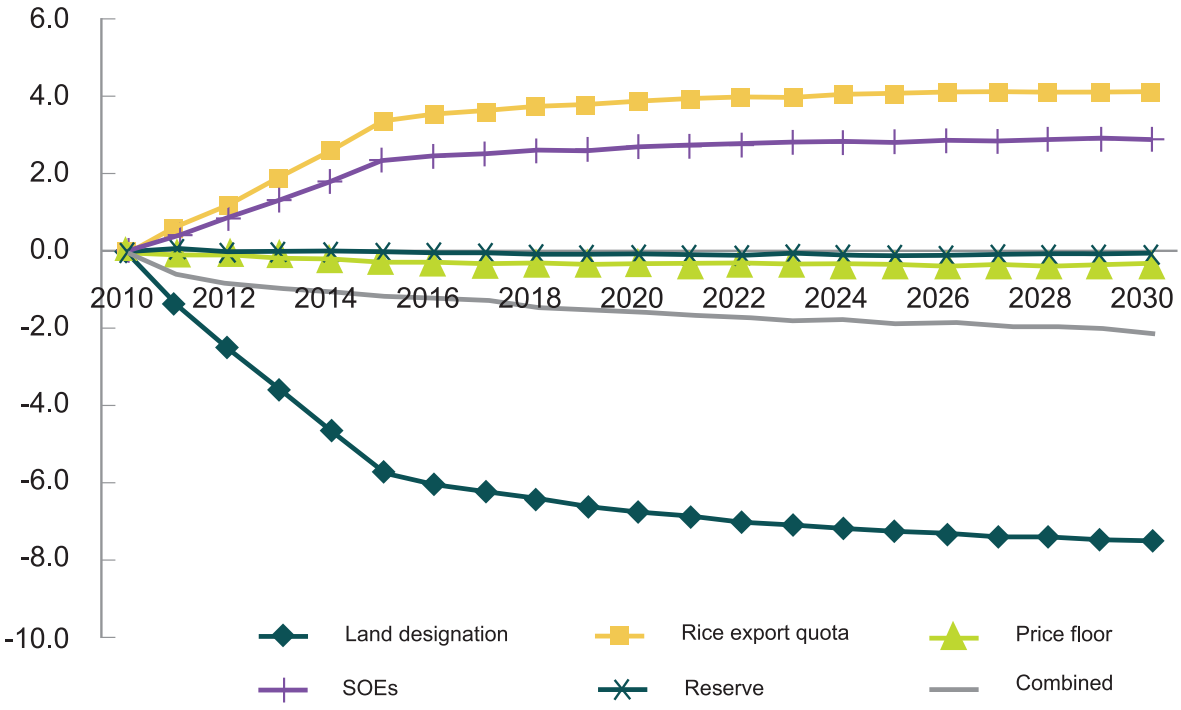


Figure 11. Joint effects of policy simulations on prodution, export and consumption of rice

(Percentage deviations from baseline)

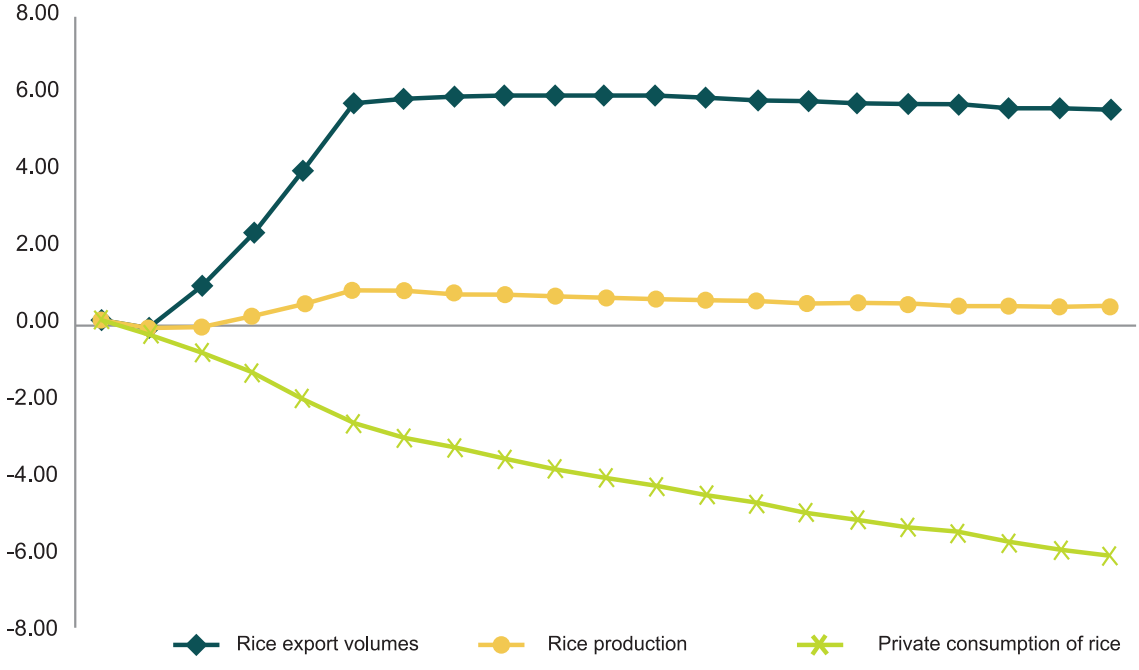
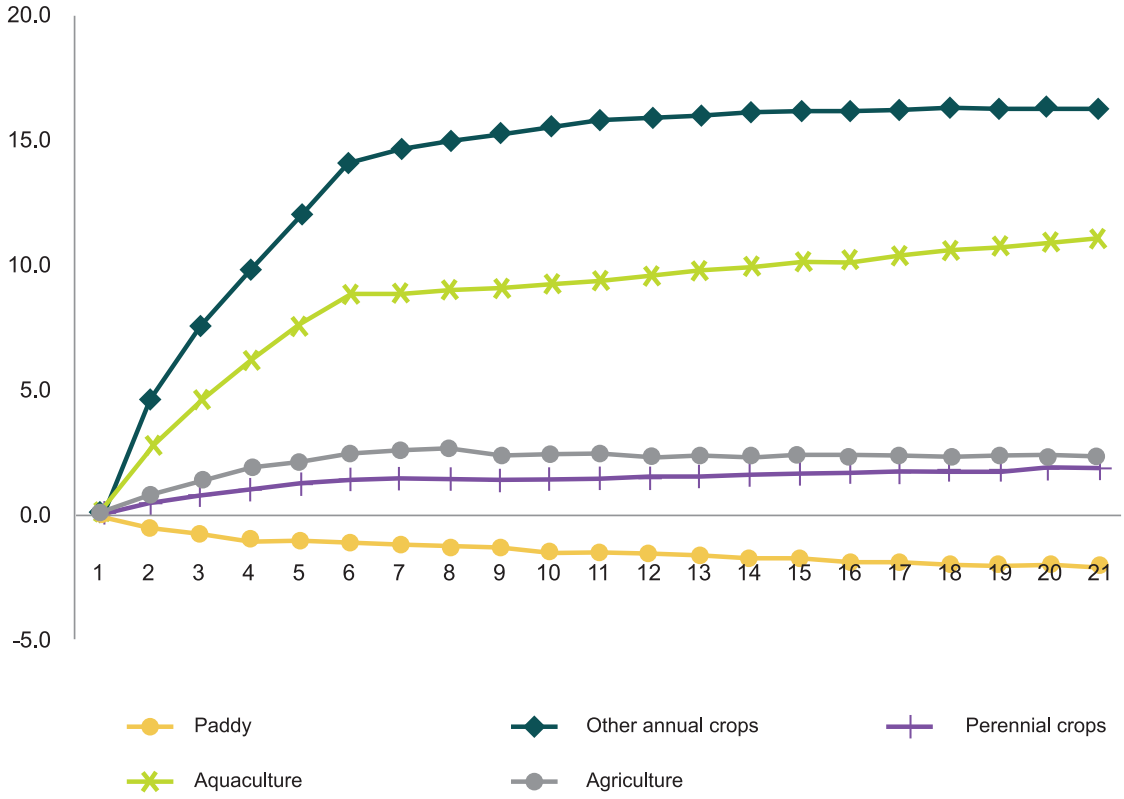


Figure 12. Join effect of policy simulations on output of agricultural sectors

(Percentage deviations from baseline)



Sectoral effects

The joint effect of removal of all five policy interventions causes paddy production to fall by approximately 1.5 per cent relative to baseline by 2030 (Figure 10). Despite the fall in paddy production, the rice processing sector expands by approximately 0.4 per cent relative to baseline (Figure 11). This is due mainly to the increase in the efficiency of the rice processing sector due to the rise in private enterprise activity relative to SOE activity. Besides the rice processing sector, the paddy sector also sells over 10 per cent of its outputs to sectors such as livestock and other food products. As the rice sector becomes more efficient relative to these sectors, more paddy is diverted to it and away from these other sectors.

Despite the fall in paddy production, the agricultural sector as a whole expands by approximately 2.2% relative to baseline (Figure 13). This reflects the shift in land use towards other crops and aquaculture.

The impacts on other sectors are diverse (Figure 13). The deviations in dwelling services output are positive for most of the forecast period due to growth in household consumption. The deviation in construction is also positive in the first ten years due to an increase in aggregate investment, but then declines, again reflecting the decline in the aggregate investment deviation. Other manufacturing and services decline slightly (averaging around 0.5 per cent). This is due mainly to real exchange rate appreciation caused by the strong increase in the exports of rice and other agricultural products. We draw the reader's attention to the fact that the negative deviation in output of manufacturing and services does not reflect an absolute decline in the activity of these sectors, only a decline relative to their (growing) baseline levels of activity. In our baseline forecast, both manufacturing and services are projected to grow strongly (see Figure 3). The effect of removing the five rice market policy interventions is only to cause these sectors to grow slightly more slowly than they would otherwise (see Table 5).

Figure 13. Joint effects of policy simulations on output of seven broad sectors
(Percentage deviations from baseline)

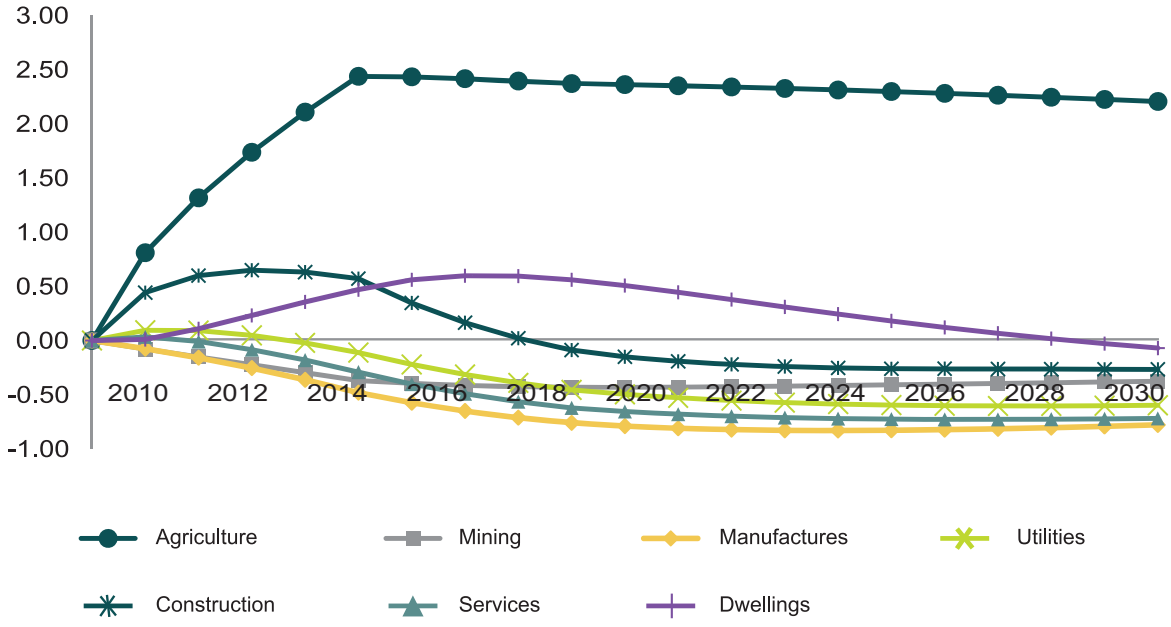


Table 5. Cumulative sectoral growth rates of real output and export value over the period 2010-2030

	Output growth rate (%)		Export growth rate (%)	
	Baseline	When all five interventions are removed	Baseline	When all five interventions are removed
1 Agriculture	297,2	306,0	221,5	253,4
2 Mining	235,3	234,0	196,0	195,0
3 Manufactures	334,4	331,0	455,1	449,0
4 Utilities[98]	303,9	301,4	-	-
5 Construction	239,1	238,2	-	-
6 Services	343,3	340,0	460,2	442,9
7 Dwellings	300,3	300,2	-	-

The different growth rates by sectors lead to structural changes in the economy. Sectoral shares in GDP in the business-as-usual baseline simulation and in the combined simulations (where all policy interventions are removed) are reported in Table 6 for the years 2010, 2020 and 2030.

[98] Note that there are almost no exports of utilities (which consists of gas, electricity and water), construction, and owner-occupied dwelling services.

Table 6. Sectoral shares in GDP, %

		Baseline		When all five interventions are removed	
Sector	2010	2020	2030	2020	2030
1 Agriculture	21,7	21,3	21,0	21,8	21,4
2 Mining	10,0	9,0	8,1	8,9	8,1
3 Manufactures	21,8	22,5	23,0	22,3	22,9
4 Utilities	3,8	3,9	3,7	3,9	3,7
5 Construction	5,4	4,9	4,4	4,9	4,4
6 Services	31,4	32,5	33,9	32,3	33,7
7 Dwellings	5,9	5,9	5,8	6,0	5,8
Total	100,0	100,0	100,0	100,0	100,0

Regional effects

The Mekong River Delta (MKD) experiences the largest gain in real GDP from the removal of the five policy interventions. On average, its GDP deviation is approximately 2 per cent (Figure 14). This region experiences a large real GDP gain for a number of reasons. First, the paddy industry represents a substantial share of the region's activity. As such, it stands to gain from removal of the land designation policy. Second, the region's land can be readily used for other agricultural products that can generate higher returns on paddy land, relative to other regions. The MKD region also gains from the improvement in the efficiency of rice processing, which represents a relatively large share of the region's economic activity. Red River Delta (RRD) also experiences a sizeable positive GDP deviation, for reasons similar to those outlined for MKD. Other regions experience small negative deviations in real GDP relative to baseline. While these regions gain from expansion of agriculture, real appreciation generated losses in other trade exposed sectors such as manufacturing and services more than offset gains in agricultural production.

Table 7 reports changes in per capita GDP by region from the joint effects of removing all policy interventions under consideration. Consistent with results in Figure 14, per capita GDP grows the fastest for the MKD, followed by RRD. Changes in per capita GDP in other regions are small.

Figure 14. Joint effects of policy simulations on regional GDP

(Percentage deviations from baseline)

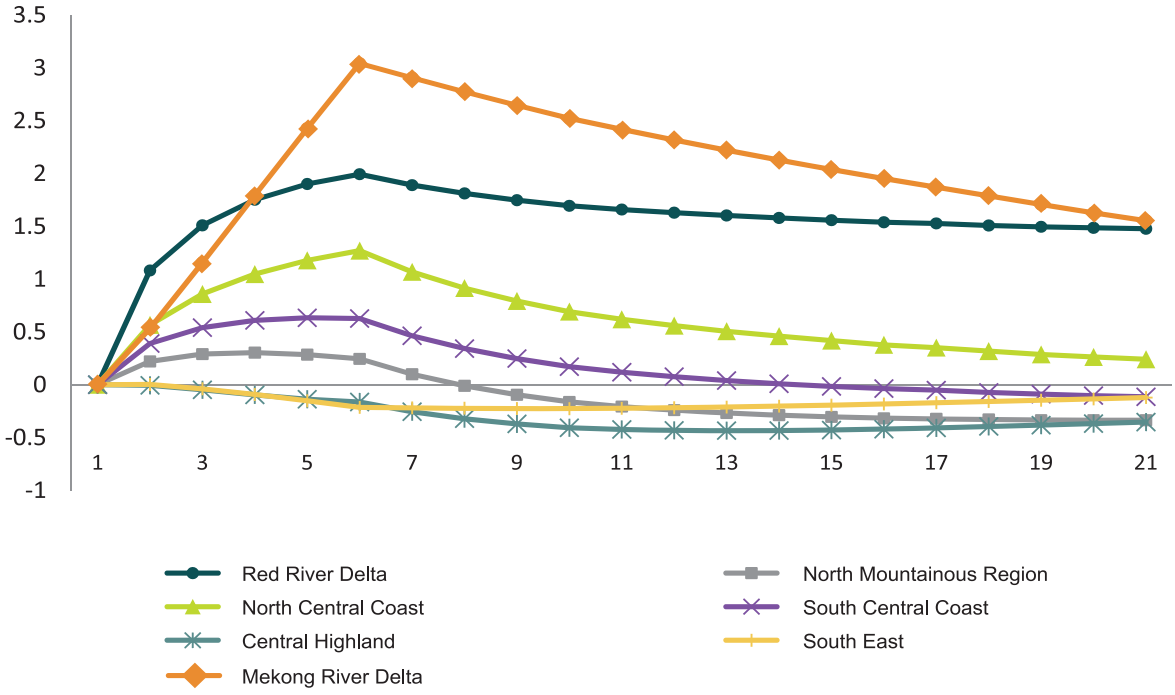


Table 7. Regional GDP per capita[99], in the years 2010, 2020 and 2030 (US$, at 2010 prices)

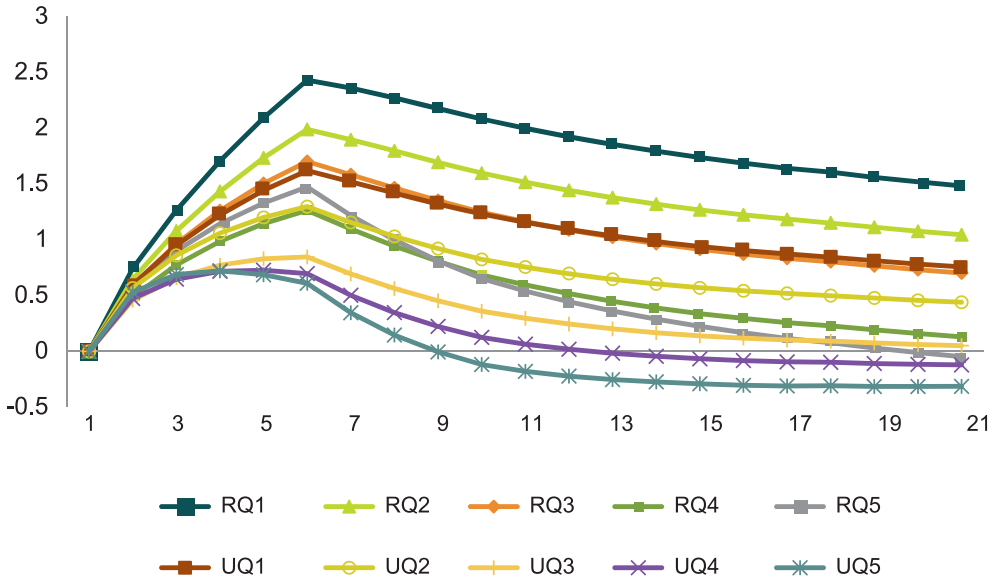
		Base		Policy	
Region	2010	2020	2030	2020	2030
Red River Delta	1.388,8	2.638,0	4.946,6	2.681,8	5.019,7
North Mountainous Region	729,6	1.304,6	2.348,7	1.301,9	2.340,9
North Central Coast	686,3	1.234,4	2.257,0	1.242,0	2.262,4
South Central Coast	834,9	1.541,5	2.874,7	1.543,3	2.871,5
Central Highland	783,8	1.429,4	2.514,3	1.423,4	2.505,4
South East	3.321,4	6.203,5	11.511,2	6.189,6	11.497,3
Mekong River Delta	1.360,4	2.481,4	4.516,4	2.541,4	4.586,6

Income distribution effects

Almost all households experience real consumption gains relative to baseline, but poorer households in both urban and rural areas tend to gain more than do richer households (Figure 15). This is because poorer households derive a larger share of their income from agriculture and/or from agricultural labor than do richer households. In our simulation, agriculture expands, and the total wage bill increases because the long-run real wage rises relative to baseline.

92 Assuming that in all regions population grows at the same rate as national population.

Figure 15. Joint effects of policy simulations on expenditure by ten household types

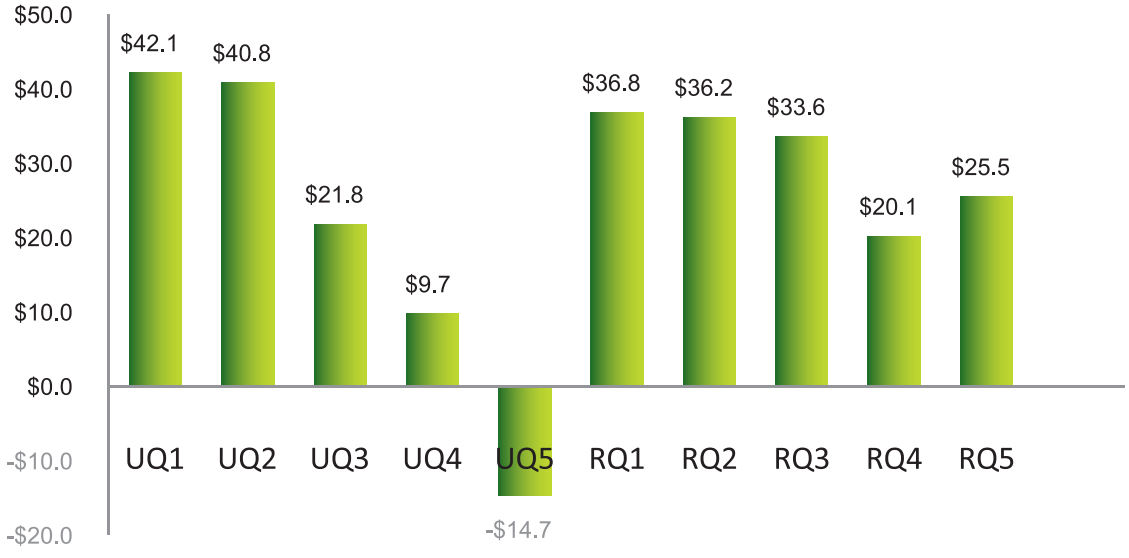


(Percentage deviations from baseline)
(Note: R and U stand for rural and urban areas. Q stands for quintile, where Q1 is the poorest and Q5 is the richest quintile)

Figure 16 reports the simple annual average of changes during the period 2011-2030 in the real expenditure of ten household types from the joint effects of removing all five interventions in the rice market[100].

Figure 16. Average changes in expenditure per household per year, by household types

(US$, valued at 2010 prices)



[100] The reader may note that the ranking of the average changes of household expenditure deviations differs from the ranking of percentage deviations in household expenditure reported in Figure 15. This reflects the differing money value of base expenditures per household upon which the percentage deviations reported in Figure 15 are applied in order to generate the values in Figure 16.

Concluding remarks

We have assessed the individual and joint effects of removing the five elements of Vietnam's policy interventions in its rice market: paddy land designation; rice export quota; paddy price floor; SOE dominance of the rice export market; and planned additional rice storage.We find that the joint effects of removing these policies benefits the economy by causing real GDP and consumption to increase, and inequality to reduce, without compromising food security.

However, the effects of individual policies on the economy differ. The removal of paddy land designation policy has by far the largest beneficial effects on key measures of welfare, such as real consumption, GDP, and inequality among household types. With regard to food security, although less paddy will be produced, there will still be a large rice surplus, of over 80 per cent. Household food security increases due to an increase in the supply of other food items.

The removal of the paddy price subsidy and the reduction of SOEs' role in rice trade also have beneficial effects on most economic indicators by increasing allocative and productive efficiency. But their effects are relatively small.

The removal of rice export quota, on the other hand, has negative effects on GDP, consumption, and industries other than paddy and rice. This is because removing the restriction on rice exports encourages the use of land for what is relatively low value paddy production. Paddy and rice production and exports expand. This causes output to contract in other industries as resources are drawn into the paddy and rice sector. In addition, their products become less competitive in international markets due to the exchange rate appreciation caused by an increase in rice exports. We, therefore, see there may be a case for keeping the rice export quota, or some other form of rice export restriction, such as an export tax, although further work examining such a policy would be required to fully articulate its consequences for agricultural value added, allocative efficiency, and the terms of trade. As for the additional rice reserves, as modelled, the benefits from them exceed the costs. However our modelling of rice reserves should be viewed as illustrative. The costs and benefits of alternative approaches to rice inventory management need to be further examined.

Note that the results reported in this paper are not forecasts of what will actually happen. Economic activities depend on numerous factors, such as weather conditions, world market conditions, changes in technology and tastes, and changes in the economic environment in general. Our analysis of the effects of removing rice policy interventions is conducted with the assumption that all factors other than these policies remain unchanged. The analysis is based on the best available information, but this information is subject to a substantial degree of uncertainty. Therefore, the results are best viewed as providing a starting point for understanding the potential importance of each rice intervention policy under consideration, and the relative importance among them

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