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SOME SPECULATIONS ON THE LONG RUN FUTURE OF
RICE IN THAILAND*

Delane E. Welsch**

Introduction

Discussion of Thai rice problems in the long run is a timely topic for this conference. Thailand has been an important rice producer and consumer for centuries, and a major rice exporter for about 120 years.^{1/} There have been disruptions in production or exports or both in the past, with those during and after World War II perhaps the most severe since the fall of Ayuthia.^{2/} In each case recovery from the disruption consisted of returning to the old way, i.e. "weathering out the storm" until the situation returned to normal. However the forces underlying the changes in food grain production, (the green revolution), marketing, and international trade during the past several years are fundamentally different than those behind previous disruptions. Therefore if the adjustments are to be to the benefit of Thailand, different strategies

* This paper was initially prepared as a background paper for the Annual Conference of the Agricultural Economics Society of Thailand on "Thai Rice Problems in the Long Run." Scheduled for November 20, 1971, the Conference has been postponed.

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^{1/} It is generally considered that the Bowring Treaty of 1855 with Great Britain opened Thailand up to international trade on a significant scale (Corden & Richter p. 128). There is evidence that some rice was being exported prior to that (Ingram p. 37).

^{2/} In 1767.

than previously used may be called for. The central thesis of this paper is that Thai rice problems in the long run should be dealt with in the context of the management of the adaption and creation of new technology in agriculture in Thailand. First the current situation is briefly reviewed, with attention to the legacy of past policies (particularly the rice premium) as they affect possibilities for resource adjustment. The discussion then centers around resource endowments, and factors which may affect resource mobility. The paper concludes with some policy suggestions.

The Legacy of the Past

A conference on Thai rice problems in the long run presupposes that there are or will be problems with Thai rice. A casual observer might remark that for the past 120 years, or at least up until several years ago, Thailand seems to have done pretty well with rice as a means of agricultural growth. Thailand had a particular resource situation that resulted in enough rice production above domestic needs to permit sizeable exports, which earned large amounts of foreign exchange. Thailand did all of this while, since 1950, taxing rice exports heavily through the "rice premium" to finance the government and keep rice prices to urban consumers very low. The particular resource situation that permitted this was one with much land relative to population. Some of this land was well suited to rice production. The population was mostly rural, so that it didn't take much of the producers' marketable surplus

to feed urban people, leaving the rest for export. There was also little alternative use for most of the resources employed in rice production, especially the land resource. As the population increased there was new land available to open up. This land for the most part was not well suited to rice, but it was suited to corn or cassava or kenaf, and so the production of these crops boomed, resulting in the rapid growth of aggregate agricultural output in the 1950's and 1960's. (9)

Thailand was able to do this for several reasons. First and foremost of course was the resourcefulness and industriousness of her farmers, a fact which still remains true, and one which is sometimes overlooked by policy makers. Second, most of the other rice exporting countries with similar levels of economic development, per capita income, etc., were all using the same rice production technology, namely a traditional technology. The importers were also using a low level of technology, and so at this low level equilibrium, there was generally a market for most of the rice Thailand wanted to export. The important point is that Thailand had a strong comparative advantage in rice production, based on a lack of alternative production possibilities on her rice land.

The use of the rice premium as an export tax to keep domestic rice prices below world levels undoubtedly had an effect on the pattern of resource use in agriculture which exists at the present time. The major effect was probably a lower level of capital formation and accumulation on rice farms than would have occurred if rice prices to farmers would have been higher. The many forms of physical capital accumulation,

such as land leveling, irrigation and drainage ditch construction at the farm level, and other land improvements which increase the degree of water control in the individual paddys, just didn't occur. To some extent however this effect was offset by transferring capital through the export tax to public sector investments in things farmers cannot do individually, i.e. roads, big dams and major irrigation structures.

Low rice prices also affected labor use within agriculture. Much of the population increase in rice growing areas migrated to open up new land. This has had three distinct consequences. It resulted in the rapid expansion of the output of upland crops, much of which was exported. It led to a more extensive form of rice production practices in rice growing areas than would likely have occurred if part of that labor had stayed and farmed rice more intensively. The third consequence was connected to capital formation in that labor migrated rather than make labor intensive rice land improvements. Although this resulted in lower capital formation on rice farms, it led to considerable capital formation in land clearing on upland farms.

Low rice prices probably had the least effect on land use within major rice growing areas, because the technical possibilities of shifting land use out of rice were so limited that low rice prices probably did not reduce the area planted to rice. This aspect will be discussed later in the paper.

The Current Situation

The problems facing Thailand at the start of the 1970's, however,

are considerably different than the previous situation. The rest of the world has changed, and Thailand has to change to keep up with it. These changes have been technological, economic, and political. Technological change, the "green revolution", consists of the rapid adoption of new production technology in several cereals in localized areas in several parts of the world.^{3/} This has depressed world prices and the domestic prices of these products except in a few countries where high farm price support policies have been followed.

World prices have been adjusting fairly rapidly to the increased supplies forthcoming as a result of the new technology, adjusting much more rapidly in fact than domestic prices in individual countries. April, 1971, marked the lowest rice export prices for Thailand in 20 years, and it was hard to find cash buyers even at these prices. Consequently, some credit sales were made. Low rice prices, high corn prices, and

^{3/} Although the "revolution" usually referred to in "green revolution" is the doubling or tripling of yield per hectare, I feel that there are four other aspects that are frequently overlooked. They are revolutions in the:

- (1) confidence of researchers that a well funded, team-work organized, commodity research program with clear cut objectives and a problem focus can create new technology;
- (2) radical changes in popular and policy makers' views of peasant farmers who have now demonstrated that if conditions are right they are capable of rapid adoption of new technology and rapid increases in output;
- (3) expectations of farmers regarding the incomes that they can earn if conditions are right;
- (4) world grain markets and the price relationships between food grains and feed grains.

Some surplus wheat being dumped resulted in severe price competition between food grains (rice and wheat) and feed grains in some Southeast Asian markets. Within Thailand, glutinous rice (paddy) was priced lower than corn on a feed equivalent basis and consequently was being fed to livestock. Thus in late April, 1971, the rice premium was abolished on all grades except 100 and 5 per cent white, parboiled, and cargo rice (six grades). The premium was also abolished later on the two grades of parboiled. Not much cargo rice is exported, leaving the highest quality as the only rice on which there is still a rice premium.

The rapid technological change in rice production in Asia, and subsequent change in world rice prices, are predominate factors affecting the future of rice in Thailand for the next ten years. There are a wide range of relevant questions that need to be asked and answered in planning Thailand's response to these long run problems. The rest of this paper will deal mainly with questions about resources. Three important resource questions are:

1. What resources are currently employed in rice production?
2. What restraints prevent these resources from shifting as a result of price changes from rice production to production of other commodities with stronger markets?
3. What can government do to provide a higher degree of resource mobility?

Resources in General

A lack of detailed knowledge about the resource base is a common

problem in developing countries, and Thailand is no exception. This knowledge must be detailed enough to use in formulating policies to facilitate production adjustments during times of rapid changes in technology in agriculture and subsequent changes in international markets and prices. This lack is particularly serious for a substantial exporter of agricultural products such as Thailand. Over the centuries traditional agriculture evolved into a rather efficient user of the available resource base, given traditional technology and relative factor prices. New technology frequently disturbs this equilibrium, when it augments or makes one factor of production more productive relative to other factors, compared to the traditional equilibrium combination of factors. Resulting changes in relative factor prices then tend to change the mix of resources used in production. Although the market tends to transmit price signals that lead to change, governments can establish policies that hasten change or reduce burdens of producers in adjusting to change. Governments can hasten change by supporting research that will increase the use of factors that are relatively abundant and, therefore, relatively cheap in the economy. An example was the early 1950's Thai government support of corn research to use the abundant and cheap uncleared land. These concepts are difficult to operationalize, because research doesn't always turn out as expected, and technological change may displace labor, which may already be the cheapest factor. If technological change comes in from outside, the government can sometimes reduce bottlenecks or ease constraints that limit adoption, thus increasing resource mobility. However, planners need good information to do this.

Resource Realities in Thailand

Careful and effective evaluation of resources currently employed in rice production, restraints that prevent or impede shifts to alternative uses, and policies and programs to increase resource mobility also require a detailed look at each agro-climatic or agronomic zone within the Kingdom. The four political regions or the six physiographic regions are too broad. The 71 Changwats (provinces) are not useful as agro-climatic areas because administrative boundaries rarely follow major resource boundaries. An example of what is needed is Small's delineation of six agronomic regions within the Northern Greater Chao Phya water control project area. (7) There are probably 15 to 20 major agro-climatic zones within Thailand. Most of them now produce some rice. Each has a different resource base or endowment, different restraints on shift of these resources to alternative uses, and different potential and needs for new agricultural technology. (2,5) The thrust of future development can only be speculative until these agro-climatic zones are delineated, their resources inventoried, the most important constraints determined, and the costs and methods of easing the restraints evaluated.

Speculations on Demand

I would now like to offer the following speculations on the pressures on rice in Thailand in the next 10 years.

1. Thailand may be able to export from 1 to 1.5 million metric tons

of rice per year, at prices no higher and maybe lower than at present. Prices for high quality rice will be stronger than for low qualities, with some of the lowest qualities being diverted to feed grain uses.

2. Domestic demand for food is likely to increase steadily at about three per cent per year due to population increase.
3. Domestic demand for livestock feed will increase only slowly, probably not over three to five per cent per year. Corn production will continue to expand, prices will be steady to slightly lower, and most will continue to be exported. Production of grain sorghum will increase rapidly, with part exported and part fed to livestock, displacing some of the market for rice for livestock feed.
4. Continuation of present rice yields will not be tolerable (from general economic growth as well as political standpoints) and so the objective of increased rice yields will be strengthened.
5. If rice yields are drastically increased, then market conditions will require diversion of considerable resources, particularly land, to other uses.
6. There will be even greater pressures on agriculturalists to find solutions to low incomes in the poorest agro-climatic zones.

The remainder of this paper will deal with possible solutions to the fifth speculation above.

Speculations on Resource Adjustments

A quick look at rice yields per rai by region and by changwat shows a very wide range. This is due in part to inherent characteristics of the land, in part to degree of water control, and in part to intensity of labor use. If any amount is increased at a compound interest rate of 7.2 per cent per year, then that amount will double in 10 years. Hypothetically, if Kingdom-wide average rice yields were increased by 7.2 per cent per year, then in 10 years either:

- (a) the present quantity of rice produced annually could be produced on one-half of the area presently in rice, or
- (b) double the present quantity of rice could be produced on the present area in rice, or
- (c) some combination of (a) and (b), such as 60 per cent more rice on 80 per cent of the area now in rice, etc.

The above postulations are not intended in any way to suggest or recommend a national goal of 10 per cent per year increase in rice yields and diversion of 50 per cent of land out of rice over a 10 year period. I don't know of any other country that has been able to make such a shift in 10 years. What the above is intended to do is to illustrate the kinds of targets that are going to have to be set and the kinds of adjustments in resource use that are going to have to be made if Thailand is going to solve some of these long run rice problems.

Setting of such goals or targets raises three further questions.

On what part of the present rice land should rapid increases in yield be sought and what part should be shifted out of rice? How should or could rice yields be increased rapidly on the land selected to stay in rice? What crops can be produced on the land being shifted out of rice? Definitive agro-climatic zone studies would provide some answers to these questions and permit detailed planning of how to go about the shift. In the absence of these studies, or while they are being undertaken, what can be done to get the desired adjustment process started?

The growth of corn, cassava, and kenaf production indicates that Thai farmers will rapidly adopt a new crop if it is profitable. Rapid spread of the new rice varieties in the Suphanburi area indicates that they will rapidly adopt new technology in a traditional crop.

Types of Land in Rice

Conceptually there are three categories of land presently in rice: land with no alternative use but rice; land that is suitable for both rice and other crops; and land not well suited for rice but now in rice for some reason.

The first category of land includes vast areas in the delta, and in scattered river valleys. Some are limited to rice because of soils, and some because of annual deep water flooding. (8) Thailand's comparative advantage in rice production lies in these lands, and this advantage can be further increased with judicious investments in resource development and research. There may well be a green revolution underway in the western part of the Choa Phya delta and in the Chieng Mai valley

with RD-1 and RD-3. And Thailand leads the world in developing deep water rice technology. (11)

The second category of land is suitable for both rice and other crops, and presents a major challenge to research and to imaginative policy that increases resource mobility. In some cases rice yields on this land are higher than on the first category. In other cases yields are lower. But the important point is that this land, under present soil and water management technology, has the potential for producing both rice and other crops. The fact that it remains in rice raises both resource mobility and research questions.

The third category of land does not have a supplementary source of water at the present time. Although the paddys are banded and rice is grown under swamp rice techniques, water comes only from rainfall and from surface runoff of rainfall from surrounding areas. For this third category of land, it is technically and economically unfeasible to provide supplemental irrigation from surface sources.^{4/} Rice is now a high risk crop on this land. Yields are low. The crop fails in as many as one-half of the years, or barely returns the seed, and in some years the land is not even planted. This marginal rice land is scattered all over the Kingdom, but the biggest concentrations are probably in the Northeast. Rainfall conditions also make this land risky for corn,

^{4/} This ignores the possibility of tubewell irrigation from ground water resources, an area in which research and hydrological surveys are badly needed.

food legumes and oilseeds. The drought tolerance of sorghum and the very promising materials researchers are now testing could very well lead to rapid shifts from rice to sorghum on this land.

Factors Reducing Resource Mobility

Prices are normally expected to provide the signals for shifts in resource use. Farm prices of rice in Thailand, however, have been kept at one-half to three-fourths of world levels during the past 20 years by the rice premium. Prices of feasible alternative crops have been free to move with world levels, or kept above world prices (cotton). The drop in world rice prices together with the removal of the rice premium has not led to major changes in relative prices within Thailand. Resource shifts out of rice and into other crops due to relative prices have already been achieved by the rice premium in the past. This is quite different from the situation in some countries where high domestic support prices have led to excess resources in rice.

Second is the question of the availability of alternative crops for land on which it is technically feasible to grow them. This discussion is not about the vast areas of the first category of land in the delta on which nothing else but rice can be grown. It is about the areas discussed as the second category, suited both to rice and other crops, and the third category, on which rice is not very well suited but which are nevertheless still in rice. The argument that farmers on these lands are tradition bound and do not respond to economic incentives or relative prices is not acceptable. The evidence is otherwise. Some, however, particularly in the Northeast, have so recently joined the market economy that production of sufficient rice to feed the family

for the year still has a high priority in their farming decisions. But when their incomes are high enough, they will be willing to buy rice for consumption, as the corn farmers now do. But it has not yet been demonstrated to these farmers that highly profitable alternative crops are available to them. And this is what new technology in agriculture is all about, namely the creation or adaption of highly profitable new alternatives for farmers. For Thailand to adjust to long run rice problems will require new technology to promote two kinds of resource mobility. Category three land must shift out of rice. Category two land must be able to shift back and forth from rice to other crops as market forces dictate.

Some Policy Questions

This section will deal with five policy questions. The first three are immediate and fairly clear in direction, and recommendations are offered. The fourth and fifth are longer run in nature, and will require considerable professional and public discussion and some hard choices.

The first has to do with product price policy. Thailand has in general in the past followed a fairly open free market price policy, with several exceptions. The future is likely to be one of rapidly changing technology in countries with which Thailand competes, and resource adjustments in Thailand will be facilitated by allowing price signals to come from the world market. At times there will be strong political pressures for support prices, particularly when, in a year of exceptionally

good weather, grain from other Asian countries comes on the market in a rush and has a chaotic effect on world prices. (1,3) However, trying to play a counter-cyclical strategy by means of price stabilization on an internationally traded commodity such as rice is very dangerous, and trying to stabilize world rice prices could be disastrous for Thailand. But the pressures to do something will remain. The past year's experience of trying to weather the storm through concessional sales should be studied very closely, for it may prove to be the best, if not the only means. The United States probably does not provide a good model for examining alternative policies. A good look should be given to some other countries, such as Australia and wheat, for possible policy instruments.

The second policy has to do with input prices and availability. All attempts to solve Thai rice problems will be futile if present fertilizer policies are maintained. Thailand has developed significant new technology in the form of new high yielding rice varieties. But the full potential of this technology will not be achieved at present fertilizer prices. The policy direction is clear. The present embargo on urea and ammonium sulfate should be abolished. There should be free import of all fertilizers, both elements and mixed. If the Mae Moh plant cannot compete under these conditions, then either a mistaken investment should be acknowledged and the plant closed now, or the plant subsidized until the foreign loan which built it is paid off. This is not a plea for subsidized fertilizer in Thailand. It is a plea,

that if Thai farmers are going to receive world level prices for their products, then let them pay world level prices for their fertilizer. Trying to subsidize fertilizer use on a particular crop would be futile, for its use will shift to wherever it is most profitable. Building a fertilizer distribution system will be difficult, but it can be done by the private sector, which is being discouraged from doing so by the present policy. The government should get totally out of the fertilizer business.

Third, the necessary research policy seems fairly clear. Agricultural research in Thailand is likely to be most effective in increasing farmers' incomes if it is by commodity and specific to each agro-climatic region. Rice research and extension must receive strong emphasis for the areas with no alternatives to rice. Deep water rice research is particularly important. Of equal priority is the creation of feasible and profitable alternatives to rice on the second and third categories of land. Sorghum as a rice replacement in the Northeast and food legumes/oilseeds in upland areas have already been mentioned. Corn should also be able to carry a good share of the adjustment burden. There are several advantages of such a strategy. First, it stresses continuing to exploit comparative advantage on land best suited to rice. Second, it is geared to production of commodities that are likely in the future to face stronger world markets than rice on land that is capable of shifting in and out of rice. Some of these commodities would also provide the inputs for an expanded livestock sector. Third, in very poor areas it concentrates on income level and distribution directly, rather than throwing the whole burden on rice.

"Farming systems" research will be needed for some agro-climatic zones, but this too is likely to be most effective when it proceeds from strong commodity research. Long run rice problems will not be solved by concentrating only on rice.

There are some hazards in following a general strategy such as this if individual crop campaigns arise out of the commodity oriented research teams. This danger is greatest on category two and category three lands, when a specific crop or livestock activity is pushed very hard without attention to possible negative consequences on established production activities in the area. Such dangers can be avoided by careful use of agro-climatic zone specific research and development centers, such as at Chainat, where solid backup by commodity specific research is blended with area and resource specific problems.

The fourth policy question has to do with some very difficult choices with respect to increases in the level of income and the distribution of income.^{5/} The areas in which there is widespread poverty are areas in which rice doesn't have a great potential. They are not the areas which make up Thailand's comparative advantage in rice production,

^{5/} I appreciate W.P. Falcon's pointing out (personal communication) that one cannot say very much about the effect of new technology on income distribution unless one deals simultaneously with four questions:

- (a) What are the economies of scale embodied in the technology?
- (b) What is the distribution of farm size?
- (c) How are the rural villages organized (horizontally or vertically)?
- (d) How are institutional services provided in the countryside?

but instead are areas such as those bordering with Laos, Cambodia, Malaysia, and Burma. These areas are large and contain a lot of poor people. The directions for rice outlined thus far in this paper seem to indicate that rice will not be the most important or effective instrument for dealing with income growth and distribution in those areas, and some other means will have to be chosen. Trying to push a Kingdom-wide rice productivity program into these poverty areas is likely to make the whole program fail. This is not to imply that some other single commodity or single policy might be better than rice, for rice is likely to continue to have a role in these areas. But their problems are complicated, and many of these farmers do not own sufficient resources to earn an acceptable level of income, no matter how productive these resources are made by new technology. The reader is referred to an earlier paper for a more complete discussion of such areas. (9, p. 97-99, or 9-11 in reprint)

Fifth, a country wanting to improve the level and distribution of income while increasing production by technical change must also be interested in capturing as much value added in production as possible. In general, this requires expanding the opportunities for processing, both on and off farm. Very little can be done in increasing value added to rice beyond the production stage. Most other crops have greater possibilities of adding value that can be captured by Thailand, both domestically and through export. Examples are grains that are fed to livestock, and fibers, to the extent that they can be processed domestically (silk,

cotton, kenaf) etc. Capturing the value added increases income, but unless this processing is dispersed, it can lead to more unequal regional income distribution. Unfortunately, processing seems to be concentrated more and more in the Bangkok area. Thailand has a good transport situation relative to other countries in the region. However, a simple application of the efficiency criterion, which argues that raw material can be moved cheaply into Bangkok for processing, is misleading when income distribution becomes an important policy objective. Given the considerable dispersion of rice milling that has occurred during the past 20 years, Thailand should be able to find a way to achieve a regional dispersal of the processing of other agricultural commodities.

Summary and Conclusions

Rapidly changing world market and production conditions make this an opportune time to formulate a long run rice policy for Thailand. The most relevant questions concern resources currently employed in rice production, factors reducing their mobility and policies to increase mobility. But these questions must be asked in the context of desired patterns of income growth and distribution. The most pressing problem concerns the creation and adoption of new technology in agriculture. First priority should be given to the creation of feasible and profitable alternatives to rice, while at the same time rapidly increasing rice yields on the land best suited to rice. Then it will be possible to shift as much as one-half of the land currently in rice to other crops,

while at the same time increasing aggregate rice output and maintaining the present level of rice exports. To do so will require imaginative and forward looking policies with respect to product prices, input prices, research, income distribution and increased opportunities for the creation of added value to what is produced. But it can be done.

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