THE CHALLENGES OF THE AGRARIAN TRANSITION IN SOUTHEAST ASIA

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Paddy Crop Transition after 31 Years of Green Revolution: Restudy on Farmers’ Communities in Northern Peninsular Malaysia

by

Raiha Ahmad

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**Paddy Crop Transition after 31 Years of Green Revolution: Restudy on Farmers' Communities in Northern Peninsular Malaysia**

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**Abstract**

This paper, based on a restudy of De Koninck's (1992) research, discusses the impact of transition on two farmers' communities after 31 years of Green Revolution. In addition to geographical diversification, this study examines the impact of transition on employment diversity and mobility, paddy production and yield and land use patterns and charts changes in paddy production and yield in two communities based on data from 1975, 1986 and 2006. This study is based on interviews conducted with 58 respondents in Kampung Matang Pinang and Kampung Paya Keladi. When considered along with research from 1975 and 1986, the data from 2006 show that implementation of the Green Revolution has driven increases in the socio-economic status of the farmers, as reflected in indicators such as job diversification and expansion of infrastructures and facilities. While paddy crops retain heritage value and continue to represent a major economic resource for both communities, the impact of environmental development, the increase of paddy production and the drops of employment in paddy field are more evident in the case of Kampung Paya Keladi as compared to Kampung Matang Pinang.

**Keywords**

Green Revolution, transition, farmers, rural communities and socio-economic status.
Introduction: Paddy in Malaysia

Rice cultivation in Malaysia has been closely associated with the rural population and traditional farmers but in the past 30 years, paddy was transformed into a commercial crop (Noraini and Low 2005). In Malaysia, large-scale irrigation systems were first introduced in the early 1900s, especially in the Kerian Irrigation Scheme and the Wan Mat Saman Scheme. In 1932, the Department of Irrigation and Drainage (DID) was established and, together with the Department of Agriculture (DOA), set out to meet the twin objectives of increasing food production and the income level of the rural poor. To these ends, double-cropping was widely introduced in the 1960s (DID report 2000). This included the development of new areas as well as the upgrading of existing schemes. In Peninsular Malaysia, paddy production\(^1\) is concentrated mainly in eight rice-producing areas: MADA, KADA, Seberang Perai, Kerian, Barat Laut Selangor, Kemasin Semarak and KETARA. These areas are actually major irrigation schemes, which account for 70% of total cultivated area and 83% of total paddy production in Peninsular Malaysia (MARDI 2000).

Asia: Green Revolution

The Green Revolution was a technology package comprising improved high-yielding varieties (HYV) of rice, irrigation or controlled water supply, improved moisture utilization, fertilizers and pesticides, and associated management skills. The Green Revolution is a platform for the implementation of a science and technology package in the area of agricultural labour (Brown 1970; Conway 1997; Lipton 1988). The implementation of the Green Revolution started in 1943 through the cooperation of the Rockefeller Foundation and the Camacho administration in establishing an agriculture hub in Mexico (Wright 2004; Kirkpatrick 1993). The International Maize and Wheat Improvement Centre’s research institution (CIYYMT) was formally established in Mexico in 1959 (Wright 2004). This revolution was launched in Asian countries in 1959 with the establishment of the International Rice Research Institute (IRRI) in the Philippines and the launch, in India, of the first application centre in an Asian country. After the implementation in India, this revolution was implemented in Indonesia, Pakistan, Sri Lanka as well as other countries in Asia, Africa and the Americas (Ankomah 2007; Conway 1997; Hayami 2000). The utilization of this technology package in suitable socio-economic environments resulted in greatly increased yields and incomes for many farmers in Asia (Spitz 1987; Rao 2006).

Green Revolution in Northern of Peninsular Malaysia

Given the specificity of Malaysia’s experience – only since 1970 was machinery implemented in certain MADA irrigation areas\(^2\) and barns in the region of northern Peninsular Malaysia (Jegatheesan 1977) – the technology package was still new and many of the farmers still practised manual paddy production (Purcal 1971; De Koninck et al. 1975; De Koninck 1992). The implementation of new techniques and machinery in paddy production has increased the socio-economic status of farmers, with incomes increasing by a factor of 2.4 in Muda Irrigation Area, 10 percent over the period 1972-1975 and 15 percent from 1985, thus manifesting the Green Revolution strategy (Jegatheesan 1977).

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1 According FAO (2005), paddy production represents 30% of world cereal production and has doubled in the past 30 years, in part due to the introduction of new varieties. However, its present growth barely follows consumption; in 2025 there will be 4.6 billion people depending on rice for their daily nourishment, compared with three billion presently. At the same time, small producers will have to use land that is less favourable for cultivation (FAO 2005)

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2 MADA’s irrigation area was divided into 27 development localities and managed by the MADA office in four districts. For each locality, there will be an agricultural complex operating as a centre for Pertubuhan Peladang Kawan (PPK) (MADA 2005).
As another result of the Green Revolution, the National Rice Policy was introduced to reduce rice imports and achieve 100 percent self-sufficiency (Wells and Frederick 1979). As a benefit of this revolution, in 1990 almost 75 percent of rice production used local seed and chemical fertilizer with modern channel crops (Nik Hashim 1994).

The Green Revolution is also known as a development policy that has brought socio-economic changes to Malay farmers (Wan Hashim 1977) through construction of inducement irrigation schemes to generate paddy crops twice a year in West Kedah area and Perlis (Chamhuri and Nik Hashim 1986). According to research by Mansor (1978), the Muda irrigation project to which was allocated as much as RM96 million and RM100 million during the First Malaysia Plan (1965-1970) and Second Malaysia Plan (1971-1975), respectively, resulted in widespread changes to rural structures and facilities. According to Jegatheesan (1977), this cereal crop was the site of the most important transformation during the implementation of the Green Revolution plan in the MADA irrigation area during the 1960s and 1970s.

Between July 1981 and June 1982, advanced technologies were used to conduct large-scale paddy production in Muda Irrigation (Muhammad Ikmal Said, 1985), thus impacting the land prices and rents regime. This phenomena appears in the work of Gibbons (1982) and De Koninck (1992) showing that the opening of the economy was the major cause of income inequality among farmers. Big farmers, owning large parcels of paddy field land, had access to greater capital and labour force, resulting in high incomes. This stable economic position resulted in a clear hierarchy among landowners in social clusters and communities. Keith Griffin (1974: 26) concluded that inequality in profit and distribution entailed polarisation and hierarchy which caused conflict within communities. He also emphasized that though technology reformed the community, community inequality was a symbol of failure. This inequality occurred when small farmers had less access to loans, technical programs and materials compared to big farmers. Thus the implementation of Green Revolution technologies led to the formation of two groups in the community: entrepreneurs and farmers. Small farmers drew smaller incomes from paddy production due to inequality in size distribution of land favouring big farmers (De Koninck 1992; Scott 1987). This situation caused small farmers to look for other jobs for side income (Sukor et al 1981). Research byEng (1986) based on his study in 1982 has shown how many low-income farmers used paddy field as a secondary job to supplement their income. This pattern can also be seen in rice-based communities in Perlis, Negeri Sembilan and Malacca, and is further supported by Affifuddin Omar's (1973) work on farmers forced to find additional jobs to compensate for monthly expenses.

This discussion carries polemics about the transition of paddy crops under the effects of the Green Revolution that ushered in a new modernization era in Malaysia during the 1960s and 1970s. Technological mechanization, new high-yield rice and infrastructure expansion led to increased revenues and rice production for farmers in northern Peninsular Malaysia (Wan Hashim 1984). Even though there was rapid development, the techniques and uses of paddy crops were not the site of any big revolution comparable to the Green Revolution (Oasa 1987) and its broad socio-economic pattern persists to this day.

**Background of the study**
**(1975, 1986 and 2006)**

The TASP research in 1975\(^3\) and 1986 focused on the impacts of the Green Revolution on socio-economic status and paddy production levels in

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\(^3\) Research by De Koninck (et al., 1977) in 1975 namely Technical Social Progress in Malaysia and Indonesia (TASP) based on the observation to the impacts of government policy focussed on investment in agricultural sector through the First Malaysia Plan (1966-1970) or New Economic Policy (NEP). This study examined the effects of agricultural programs on paddy field farmers' and rubber tappers' communities in Malaysia and Indonesia.

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Kampung Matang Pinang and Kampung Paya Keladi. The wide use of machinery in 1978 had an impact on farmers as a work force, such that most farmers began to seek new non-agricultural activity (De Koninck, 1992). The study measuring the geographic development of the population in 1986 concluded that (i) innovation in agriculture gives advantages to big entrepreneurs or farmers; (ii) the government program did not reduce inequality as per the objective of NEP in 1970; (iii) most small farmers started to look for new non-agricultural activity to improve their socio-economic level; (iv) changes in land productivity led to a transmigration process of small farmers to bigger farms and their insertion in the resulting wage system; and (v) more farmers turned to wage labour, creating hierarchy and status determination between small and big farmers. De Koninck et al (1975) and De Koninck (1992) conclude by discussing agro-community in geographic development and the impact of the Green Revolution on a specific community. The implementation of the Green Revolution has influenced the community socio-economy as a cycle in the life of agro-community (De Koninck 1992). Findings in 1975 and 1986 concluded that the inequality of economic growth between agricultural areas was a result of free-market economic development. The Green Revolution caused inequality within populations by producing a hierarchy of large and small scale farmers in the socio-economic pattern of farmers’ communities in the 1970s and 1980s.

Methodology

Aiming for continuity with De Koninck’s research in 1975 and 1986, I carried out interviews with 56 respondents from Kampung Matang Pinang and Kampung Paya Keladi. Subsequently, field research was conducted to collect data and information on the respondents who were interviewed in 1975 and 1986. This method was used in order to draw comparisons with De Koninck’s (1992) studies in 1975 and 1986 so as to inform a discussion of the impacts of transition on two farmers’ communities after 31 years of Green Revolution.


Kampung Matang Pinang and Kampung Paya Keladi are two villages that share traditional features as ‘paddy villages’ (kampung bendang). Both villages are located within the centre of paddy production in northern Peninsular Malaysia. Kampung Matang Pinang, located 30 kilometres from Alor Setar, is among 11 villages under Mukim Jeram’s administration, in locality D II, in MADA Tunjang. Kampung Paya Keladi, situated in Kepala Batas, Penang, is among 220 villages located under 15 parishes and is a paddy crop area in North Seberang Perai (SPU).

Kampung Matang Pinang

Kampung Matang Pinang is positioned at the junction of the roads to Ayer Itam and Jitra near Kampung Padang Limau, Kampung Sungai Korok and Kampung Sungai Keto. The extent of the paddy plant in Kampung Matang Pinang was limited (De Koninck, 1992: 65) with most of its landform as flatland surrounding horizontally with bed up. The three villages Kampung Matang Pinang, Kampung Matang Keriang and Kampung Matang Capa mutually overlap without any obvious border (Ibid.: 48). The placement structure in Kampung Matang Pinang follows a continuous linear shape from one village to the next. During research in 2005, obvious physical changes had occurred when five respondent’s houses in Pulau Jusoh were moved into the seedbed area in Kampung Matang Keriang. In 2006, there remained only one settlement in Pulau Jusoh. The community in Kampung Matang Pinang is composed of descendants of settler and Malay peasants who opened the land after the Second World War (De Koninck 1992). The growth of the local population has led to an in-
crease in the number of homes in Kampung Matang Pinang over 20 years. Based on the findings in 2006, there was an increase from 119 houses in 1986 to 123 houses in 2005. The settlement increase was concentrated in Kampung Matang Keriang with 57 houses in 2006 compared to 51 houses in 1986, whereas the number in Kampung Matang Pinang fell from 42 houses in 1986 into 34 houses in 2006. Settlement in Kampung Matang Cepa increased to 32 houses in 2006 from 26 houses in 1986 (see Figure 1).

The TASP research in 1975 found that 50 percent of the 54 houses in Kampung Matang Pinang practice agriculture as the main source of income (De Koninck, 1992: 45). Over the 20 years from 1986 to 2006, the community focus in Kampung Matang Pinang has shifted towards non-agricultural activities such as employment in government, private, manufacturing and business sectors. Research in 2006 found that there is still no industrial sector developed in Kampung Matang Pinang or in the nearby villages. The marketing of paddy crops was concentrated in Ayer Itam and Tunjang. In 2006, community mobility had improved thanks to the development of systematic road infrastructure.

Other than Tunjang, situated almost five kilometres from Kampung Matang Pinang, Jitra town had also become a center of community activity for Kampung Matang Pinang, with health facilities, a banking and business centre, a District Education Office, a YAWATA Supermarket and the Jitra branch of Padi Beras Nasional (BERNAS). For daily needs, residents of Kampung Matang Pinang obtained provisions from the weekend market called nat by Kedah residents. Normally, nat operates from 8 AM until 12 noon, depending on the day and place. Pulau Capa dan Matang Keriang’s nat were among the nearest nat to Kampung Matang Pinang; they operated every Monday and Wednesday. The biggest nat in Jitra town was in Tunjang; it operated every Sunday.

**Kampung Paya Keladi**

Kampung Paya Keladi is situated between paddy and rubber crop areas. On Kampung Paya Keladi’s eastern side is the Bertam Estate compound (De Koninck, 1992:33). In 2006 the pattern of land use changed under Bertam Holding Sdn. Bhd. Findings in 2006 showed that Kampung Paya Keladi’s community development underwent drastic changes as a result of land use in the Bertam area. Rubber tapping and oil palm labour vanished after the Bertam Estate compound transformed into a residential, ser-

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**Figure 1. Matang Pinang in 2006**

**Sources:** De Koninck (1992: 46) and Field Research 2006
vices, business and educational centre. Kampong Paya Keladi also became a main gateway to Pinang Tunggal, which has been furnished with a business centre, a supermarket, banks, an internet cafe, a food court, and entertainment facilities.

With respect to territorial and administration structure aspects, Kampung Paya Keladi includes three villages: Kampung Paya Keladi Masjid, Kampung Paya Keladi Tengah and Kampung Paya Keladi Hujung. Kampung Paya Keladi Masjid is the main area and includes three smaller areas: Tepi Jalan, Bendang and Jalan Tidur. There are also several houses inside the rubber and oil palm estate located 100 to 200 meters from the main road. Based on the most recent findings, there was an increase in the number of houses since 1986 in the village. Houses were built mainly in Kampung Paya Keladi Hujung with 252 houses compared to 163 houses in Kampung Paya Keladi Tengah and 152 houses in Kampung Paya Keladi Masjid. The paddy field was located in the northern area of the village, not situated near the main road as in Kampung Matang Pinang. There were 190 houses in Kampung Paya Keladi with a total of

**Figure 2. Paya Keladi in 2006**

*Sources: De Koninck (1992: 37) and Field Research 2006*
904 households in 1975. Although no census was carried out since 1973, based on findings from research carried out 30 respondents and their households from 1975 to 1986, there was an increase in the total population (De Koninck, 1986: 39).

With respect to education, besides Sekolah Kebangsaan Paya Keladi built in 1885 (De Koninck, 1992), Sekolah Menengah Paya Keladi Hujung was built in 1992. As of November 2006, this school had a total of 807 students including 425 male students and 382 female students. Almost 80 percent of Sekolah Menengah Paya Keladi Hujung’s students came from Kampung Paya Keladi and Kampung Pinang Tunggal. The establishment of Kepala Batas Community College by the Ministry of Higher Learning in Taman Bertam Indah and the Agriculture Institute in Bumbung Lima were among the educational developments experienced by the community.

The community’s economic resources and income in Kampung Paya Keladi were still based on paddy crops. However, the employment field has widened and includes non-agricultural activities. This was influenced by changes in land usage in Bertam and by development in Kepala Batas creating employment opportunities in fields such as construction, business and services. In terms of marketing facilities for paddy crops, the National Paddy and Rice office (Lembaga Padi dan Beras Negara – LPN), now called BERNAS, was established in 1981 in Kampung Paya Keladi Ten-gah. This office began its operations in February 1983 with costs of RM8.8 million. Originally, the office was based on a small branch of a paddy mill that was founded in 1970. This paddy factory was established as Cooperation Company in 1966, some years after the community was connected to the electrical grid. The BERNAS office is now a centre for farmers to sell paddy crops and to obtain paddy seeds, pesticides and fertilizer. The majority of local BERNAS staff come from the local community. To enhance the integration among farmers, the government has founded Lembaga Persatuian Peladang, now called Per-satuan Peladang Kawasan (PPK). The main office of PPK has been located in Kampung Paya Keladi Hujung since 1986.

Expansion of Mechanisation

Almost 90 percent of paddy fields in Seberang Perai Utara (SPU) and MADA were starting to use harvest machines or combine harvesters in 1987. The first stage of innovation in Kampung Matang Pinang began between 1960 and 1975 with the implementation of the Green Revolution and double-crop application in 1969 (De Koninck 1992: 100). The entry of plough machines in 1975 was followed by the second innovation stage from 1980 to 1985 with the introduction of combine harvesters. Since the 1980s, the adoption of machinery in paddy cultivation has rapidly increased the labour force (see Table 1).

Table 1. Agricultural Innovation in Matang Pinang and Paya Keladi

<table>
<thead>
<tr>
<th>Type of Practise or Use</th>
<th>Period of Year of Adoption</th>
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<tr>
<td></td>
<td>Kampung Matang Pinang</td>
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</tbody>
</table>

Sources: De Koninck (1992:101) and Field Research 2006

Mechanisation was implemented in Kampung Paya Keladi before Kampung Matang Pinang. Although the Green Revolution was implemented in the 1960s, two respondents' paddy field land in Kampung Paya Keladi had been used as test plots for plough machine use, chemical fertilizers, pesticides and direct seeding machines after 15 years (in 1957). Purcal (1971) found farmers in Seberang Perai Utara (SPU) including Kampung Paya Keladi still conducting a once-a-year cultivation system in 1962 and

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1963. Still very few farmers practised a twice-yearly cultivation system in the early 1960s.

According to De Koninck (1986: 100), a second innovation starting in 1980 was more drastic, with two-thirds of respondents in Kampung Paya Keladi having begun to use harvest machines. After 1985, all paddy fields in Kampung Matang Pinang and Kampung Paya Keladi were harvested with harvest machines. Research in 2006 showed the introduction of new technology, *jentanam*, a present-day innovation in the paddy crop transition. This valuable machine, with a cost of almost RM42,000, is the latest innovation in crop technology in the current millennium.

Jamsari (RMP2), a respondent from Kampung Matang Pinang, began to rent *jentanam* from MADA in the second season of 2004. According to Jamsari (RMP2), the *jentanam* machine has been adopted over the past 10 years (between 1995 to 1996) and began to be used more widely in 2004. Meanwhile, based on studies in Kampung Paya Keladi, no respondent used *jentanam* machines due to its high rental price. In 2006, MADA provided a *jentanam* machine charter service to its members at a rate of RM220 per 0.29 hectare. The function of the *jentanam* is to reduce production costs of paddy and eliminate weedy rice disease which reduces paddy crops (Dull, 2005). According to Jamsari (RMP2), two farmers among PPK members achieved high paddy production as a result of using *jentanam* during the main season in 2005; however this technology has not had a major impact on paddy work when compared with the introduction of harvest machines during 1970s and 1980s. The majority of farmers from both villages were using the previous techniques and only a few used this harvest machine. These farmers showed little interest in this expensive technology.

Most machine and machinery owners in 2006 were among Kampung Matang Pinang farmers. Jamsari (RMP2), Nasir (RMP21) and Harun (RMP11) owned machines not only for their paddy fields but also to earn wages from cultivating other paddy fields. A total of 21 respondents rented harvest machines at rates ranging from RM80 to RM90 for each 0.29 hectare; seven of these were not involved in paddy field cultivation.

Jamsari (RMP2) owned a machine worth RM1,400 that he bought in 2001, three knapsack sprayers worth RM400 in 2005 and three motor blowers, two of which he bought in the 1980s and one that he bought in 2005. According to Jamsari (RMP2), although the machine and equipment prices were fairly high, their purchase could be considered a worthwhile investment.

Nasir (RMP21) owned a *Kubota* machine that he bought within the past 15 years at a cost of RM1,500. He purchased machinery from a friend from Jitra as capital and to facilitate his paddy field harvest and jobbing in other farmers’ paddy fields. Apart from cultivating his wife’s paddy field, Nasir (RMP21) was also jobbing, driving harvest machines and charging RM80 to RM90. Harun (RMP11) also owned a harvest machine that he bought in 1980. After suffering a heart attack five years ago, Harun (RMP11) had transferred all paddy field management to his younger brother. Harun (RMP11) was a large paddy machine entrepreneur for the past eight years and owned seven *relung Kedah* of paddy land in Kampung Matang Pinang.

**Diversity of Employment and Mobility**

The transition of national economic focus towards industry in the 1980s triggered a decline in the number of agricultural workers (Seventh Malaysia Plan 1997-2000; Ng 1999; Maznah 1998). This phenomenon prompted rural-to-urban population migration, as people sought better jobs matching their education levels (Affifudin 1970; Mansor 1978). Agriculture remained the population’s main source of income (De Koninck 1992) and research in 2000 showed a diversified economy. Development of facilities and infrastructure had created new job opportunities which influenced the population and job mobilization. Both villages showed increasing
numbers of households with employment other than paddy field or government services from 1981 to 2006 (See Table 2).

Based on the 2006 research, the movement
of younger generations to non-agricultural employment was caused by several factors including: (1) machinery utilisation in paddy fields; (2) increased education levels among farmer’s children leading to better occupations; (3) additional job opportunities as a result of infrastructure development and (5) new business initiatives for local services. In both villages, paddy production had thus become a side occupation (De Koninck 1992).

The economic transition towards paddy field as secondary activity for the younger generation was triggered by technology implementation in paddy field work. Machinery utilisation in paddy fields resulted in reductions in labour requirements. However, economic diversification was more pronounced among Kampung Paya Keladi households, with as many as 101 people employed outside the paddy fields compared to 43 people in Kampung Matang Pinang. Job growth in Kampung Paya Keladi was influenced by the Bertam Estate area effecting changes to the structure of shop lots offering various types of services (See Table 2). This increasing shift is one of the effects of the transition towards mechanization of agriculture over the past 31 years.

Table 2. Non-Agricultural Occupation of Resident Adult Household Members in 1981, 1987 and 2006

<table>
<thead>
<tr>
<th>Type of Employment</th>
<th>1981 (M)</th>
<th>1981 (F)</th>
<th>1987 (M)</th>
<th>1987 (F)</th>
<th>2006 (M)</th>
<th>2006 (F)</th>
<th>1981 (M)</th>
<th>1981 (F)</th>
<th>1987 (M)</th>
<th>1987 (F)</th>
<th>2006 (M)</th>
<th>2006 (F)</th>
</tr>
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<td>Teacher</td>
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<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
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</tr>
<tr>
<td>Clerk</td>
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<td>8</td>
<td>2</td>
<td>11</td>
<td>4</td>
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<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td></td>
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<tr>
<td>Entrepreneur</td>
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<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
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<td>TOTAL</td>
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<td>9</td>
<td>1</td>
<td>25</td>
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<td>6</td>
<td>45</td>
<td>20</td>
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</table>

Note: Respondent aged 17 years and above. (M) = Male (F) = Female
Household employment information from Questionnaire Household Research 1986 - 2006
Sources: De Koninck (1992:178) and Field Research 2006

Land Ownership

Kampung Matang Pinang and Kampung Paya Keladi have a limited land base, with a dynamic and complex (De Koninck 1992: 65) pattern of land ownership based on two modes: exploration and inheritance (Ibid.: 67). According to figure 3, the communities’ land base decreased from 1975 to 2006. This decrease was caused by the pattern of land ownership depending on the inheritance of the owner’s land by those children and in-laws with the capacity to cultivate the land (Mansor 1978; Mahani 2005).

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Land: Rented or Rented Out?

There was a decrease in land renting activity in both communities from 1981 to 1986 and from 1986 to 2006. In Kampung Paya Keladi the number of people who rented land decreased from 17 out of 28 respondents in 1986 to just four people in 2006. This represents a decrease from 60.7 to just 14.2 percent of respondents. Land rental decreased less dramatically in Kampung Matang, from 50 percent in 1986 to 46.4 percent in 2006. Land renting-out activity decreased as well in both communities from 1986 to 2006: from 28.5 to 10.7 percent in Kampung Matang Pinang and from 28.5 to 21.4 percent in Kampung Paya Keladi.

There were two types of land rental activity in Kampung Matang Pinang and Kampung Paya Keladi namely (1) rented land (the group that takes rent) and (2) rented out (the group that hires out the paddy field land). Land rented decreased drastically from 1986 to 2006: in Kampung Paya Keladi it fell from 16.8 to 3.1 hectares while in Kampung Matang Pinang it fell from 21.7 to 11.2 hectares. Meanwhile, in Kampung Paya Keladi, land rented out increased from 3.4 hectares in 1981 to 5.1 hectares in 2006 (see and compare Figure 4 and Figure 5).

<table>
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<tr>
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<th>Land Rented</th>
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<td>Kampung Matang Pinang</td>
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<td>28 28 28</td>
</tr>
<tr>
<td>No. of respondents</td>
<td>15 14 13</td>
<td>9 8 3</td>
</tr>
<tr>
<td>Percentage of respondents involved in the land transaction</td>
<td>53.3% 50% 46.4%</td>
<td>32.1% 28.5% 10.7%</td>
</tr>
<tr>
<td>Kampung Paya Keladi</td>
<td>28 28 28</td>
<td>28 28 28</td>
</tr>
<tr>
<td>No. of respondents</td>
<td>17 17 4</td>
<td>5 8 6</td>
</tr>
<tr>
<td>Percentage of respondents involved in the land transaction</td>
<td>60.7% 60.7% 14.2%</td>
<td>17.8% 28.5% 21.4%</td>
</tr>
</tbody>
</table>

Sources: De Koninck (1992:73) and Field Research 2005/2006

Land Operation

Land is every farmer’s most important asset. The area of land devoted to paddy field crops influences crop production levels. Overall, the total land area used for paddy field operation in both villages decreased from 1986 to 2006. Although paddy field land area decreased in both villages, this decline was more pronounced in Kampung Paya Keladi where it fell to 20.3 hectares in 2006 while in Kampung Matang Pinang this figure was 43.3 hectares. Upon scrutiny the data reveal an increase in paddy area from 1975 to 1986 followed by a decrease since 1986 (see Figure 4). The decline over this later period was effected by the dependence of paddy field ownership on the system of succession system from owners to children and sons-in-law with the potential to cultivate paddy fields (Mansor, 1987; Mahani, 2005).

According to Pak Long (RPK7), total paddy field land area decreased when land was distributed. The division required to distribute land resulted in more of the paddy field land area consisting of smaller plots. This state of affairs was still more distressing in those cases where the farmer’s child and land heir was employed outside the paddy field or migrated out of the village. Within this informal system, many farmers’ children failed to make their payments systematically and consistently. Pak Long also claimed that the limited development of paddy crops was caused by the soil structure that was not economic and by the extent of the ‘sleeping farmer’ phenomenon in the production of rice crops (Nik Hashim 1996). This became a factor contributing to an unsystematic work system and lower paddy production outcomes in one community. Pak Long (RPK7) expressed his opinion on the future of paddy crop developments. Land and inheritance are sensitive issues for Malays. The Malay community considered land as a heritage which

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needed to be preserved. Furthermore, land was the Malays’ major economic asset since the 1920s (Mahan i 2005). Land was not only a bond between children and parents, but also involved the wider family including cousins, in-laws and sons-in-law (De Koninck 1992; Mansor 1978). In fact, market control and management depend on the power of the landowner (Wong 1978) as source of wealth, base of political will and symbol of social honour (Mansor 1978).

**Paddy Production and Paddy Yield: Linkage with Farmer’s Income**

The increase in paddy production yield was influenced by technological competence, infrastructural facilities and farmers’ access to credit (Nik Hashim 1996) – impacts of the Green Revolution package. This increase occurred in rice production in Kampung Matang Pinang and Kampung Paya Keladi over the past 31 years. Tables 4 and 5 show the difference in paddy production between Kampung Matang Pinang and Kampung Paya Keladi for 1975, 1981, 1986 and 2006. In 2006, the main season level of production of Kampung Matang Pinang, at 216.2 tons, was higher than Kampung Paya Keladi’s 134 tons; for the off season these figures were 187.7 tons in Kampung Matang Pinang and 129 tons in Kampung Paya Keladi. Furthermore, the production level increased at a greater rate in Kampung Matang Pinang than in Kampung Paya Keladi from 1975 to 2006.

In 2006, Kampung Matang Pinang obtained higher paddy yields than Kampung Paya Keladi in both seasons (see Table 5), totalling 121.8 tons compared to 82.1 tons. This difference was even more pronounced in the off season, as Kampung Matang Pinang saw yields of 156.9 tons while this figure was 74.1 tons for Kampung Paya Keladi.

Ismail (RPK19) is one of the respondents and is also an active paddy farmer from Kampung Paya Keladi. He actively worked on 7.5 *relung Penang* (4 hectares) of paddy field since the 1950s. 6 *relung Penang* (3.2 hectares) of his paddy land was rented from his aunt for RM500 per season. In 2005, Ismail (RPK19) achieved production levels of 20 tonnes (main season) and


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<tr>
<td>109.7 (t)</td>
<td>158.5 (t)</td>
<td>189.6 (t)</td>
<td>216.2 (t)</td>
<td>97.7 (t)</td>
<td>103 (t)</td>
<td>128.3 (t)</td>
<td>134 (t)</td>
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<td>78.5 (t)</td>
<td>151.9 (t)</td>
<td>163.0 (t)</td>
<td>187.7 (t)</td>
<td>96.2 (t)</td>
<td>112.6 (t)</td>
<td>117.9 (t)</td>
<td>129.0 (t)</td>
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</table>

Note: (t) Production in Tons of paddy  
Sources: De Koninck (1992: 234 - 237) and Field Research 2006


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<thead>
<tr>
<th></th>
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<th>Kampung Paya Keladi</th>
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<tbody>
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<tr>
<td>81.5 (t)</td>
<td>104.6 (t)</td>
<td>110.9 (t)</td>
<td>121.8 (t)</td>
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<td>116 (t)</td>
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<td>62.3 (t)</td>
<td>99.4 (t)</td>
<td>97.2 (t)</td>
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<td>89.8 (t)</td>
<td>100 (t)</td>
<td>74.1 (t)</td>
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</table>

Note: (t) Production in tons of paddy  
Sources: De Koninck (1992: 238 - 241) and Field Research 2006
18.5 tonnes (off season). Ismail (RPK19) has been taken as an example among farmers in Kampung Paya Keladi. Rough estimates place Ismail’s (RPK19) income between RM15,170 to RM16,400 for one season. The position of his paddy field behind his house and loan facilities from BERNAS were not key factors in achieving higher paddy production (Interview with Ismail RPK19/23.12.2006).

Kampung Matang Pinang and Kampung Paya Keladi after 31 years of Green Revolution

The diversity of economic activity other than paddy production, a result of 31 years of the Green Revolution (De Koninck, 2006) as observed since 1975 and 1986, has widened the field of businesses and services involving the children of farmers in both villages. With the reduction in land ownership as a result of distribution of land among farmers’ descendants, the gap in the hierarchy between big and small farmers (De Koninck, 1992) has become blurred and the farmer’s wealth is no longer measured by land ownership and machinery but rather by the increase in socio-economic status contributed by the increased education level as well as children’s contribution to household income. The bulk of the increase in farmers’ socio-economic status can be traced to income from jobs outside paddy fields, infrastructural facilities as well as children’s contribution to household spending. The Malay social system of cooperation and ‘berderau’ activity has been eradicated as a result of the Green Revolution (Wong 1987; De Koninck 1992); cooperation in business and other social and political activities has taken its place. Based on research by De Koninck (1992, 2006), this study has determined that socio-economic development in both villages has been influenced by (1) environmental development factors; (2) increased education levels; (3) facilities and infrastructures for communication between communities; (4) diversification of economic activities and (5) increased paddy income supplemented by other secondary activities. While paddy crop remains the main activity in both villages, the increased socio-economic condition was more clearly apparent in Kampung Paya Keladi than in Kampung Matang Pinang.

References


Affifudin Omar (1973) Some aspects of the socio economic value system of the MUDA rice farming in the development perspectives. MUDA Agricultural Development Authority (MADA). Teluk Chengai, Alor Setar.


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