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INDONESIA'S GREEN REVOLUTION:

The Abandonment of a Non-Market Strategy Towards Change

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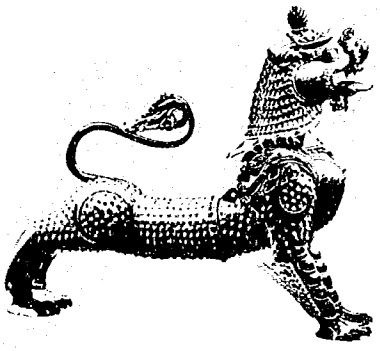

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INDONESIA'S GREEN REVOLUTION: *

The Abandonment of a Non-Market Strategy Towards Change

By

Gary E. Hansen

I

The year 1970 constituted a critical juncture in agricultural development in Indonesia, for it marked a major turning point in the formulation of policies to increase rice production. During the 1960's, the government's strategy to increase rice production was predicated upon the use of non-market mechanisms in the distribution of agricultural inputs. The peasant's traditional prerogatives of choice in the selection and combination of inputs had been directly preempted and vested in the government's own regulatory instrumentalities, the public bureaucracy. This approach was incorporated into Indonesia's five year plan, launched in 1969, one of the major goals of which is the achievement of self-sufficiency in rice production by 1973.

By early 1970, however, it had become painfully apparent to government planners that this strategy would not usher in the desired Green Revolution, let alone sustain a long-run increase in production equal to the minimal food needs of the population. Official production reports from early 1970, indicated that crop yields were lagging substantially behind anticipated targets and

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that many peasants were becoming increasingly defiant of government efforts to introduce the new technologies of rice production.[1] It was therefore, in a mood of concern and anxiety, that President Suharto made an incognito visit to the rice fields in April 1970, in order to discern for himself the basis of mounting peasant animosity against his regime's program.[2] One month later, the President terminated the existing program and higher level officials feverishly set about devising a new set of policies to achieve the rice production goals of the five year plan. The President's abrupt abandonment of a strategy which had prevailed for nearly a decade and its failure to substantially enhance peasant productivity, deserves closer examination, for it clearly illuminates some of the problems associated with developmental policies and the introduction of higher-level technologies in low income countries.

II

In order to understand the pattern of events which unfolded in late 1969 and early 1970, initial analysis must first discern the background of developments which transpired in the pre-1968 period. The Indonesian government's early approach toward rural modernization received its initial impetus in 1963, when the Institute of Agriculture in Bogor successfully conducted a series of village experiments in methods of encouraging peasants to adopt more advanced techniques of rice cultivation. These experiments seemed to verify the basic project assumption that close and enduring interaction between a change agent

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1. In March 1970, the Ministry of Agriculture released a report indicating that achievement had fallen short of its intended goal. Thus, yields from the miracle rice seeds (IR5 and IR8) had achieved 65.17% of their target and conventional seeds had attained 75.47% of their target. *Berdikari*, March 10, 1970.

2. Press reports in early April 1970 indicated that President Suharto and aides, in disguised identity, travelled to several villages in West and Central Java. Three reporters accompanied Suharto and recorded his reactions and conversations with the peasantry. Their press accounts of these interactions revealed that Suharto's inquiries about the government's rice program generally evoked a negative reaction from peasant respondents. Peasant complaints tended to center on issues of administrative deficiency, i.e., government fertilizer was delivered late, or the fear that they would be defrauded and victimized by government officials. For press accounts of the visit see *Kompas*, April 14, 15, *Pikiran Rakjat*, April 18, *Indonesian Raya*, April 14, and *Berita Yudha*, April 15, 16, 1970.

(extension worker) and the peasant results in the acceptance of new technologies and in higher productivity. Nevertheless, the results also revealed that peasants were constantly making modifications in the recommended practices, and many insisted in using a mixture of the old and new methods. The project, therefore, underlined a basic uncertainty as to whether the initial improvements in rice production would endure or whether the peasant would slip back into his old traditional patterns.[3]

The Institute's village experiments represent a landmark in the history of efforts to achieve higher rice productivity in Indonesia, as these studies occurred at a time when government programs had achieved few results and thus public officials were impatiently seeking new approaches to the problem. Government planners seized with alacrity upon the Institute's experiment as the answer to Indonesia's chronic rice deficit, and the project was thereafter transformed from a shortlived university experiment in three villages into a massive national program that stretched throughout the 1960's.[4] More importantly, numerous changes subsequently occurred which served to transform this national program along lines hardly recognizable by reference to the standards of the initial project. For example, the Institute's experiment was a highly flexible and cautiously administered project with an emphasis upon a mutual exchange between peasant and extension agent. However, once the project was expanded into a national effort, these virtues were abandoned, and the emphasis was less upon a personal interaction between innovator and recipient, and more upon the bureaucratic implementation and organizational promotion of a large and unwieldly government program.[5]

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3. For a brief discussion on the Bogor Institute of Agriculture and its role in the development of this project, see D.H. Penny and E.A. Roekasah, "Bimas; A New Approach to Agricultural Extension in Indonesia," *Bulletin of Indonesian Economic Studies*, No. 7, June 1967, pp. 60-69. For the most detailed account of this project, see Djatijanto Kretosastro, *Bimas SSBM: Bimbingan Masal Swa Sembada Bahan Makanan*, Djakarta, Direktorat Pertanian Rakjat, 1967.

4. Thus, in the wet-season of 1964-65, the project was expanded from its initial three villages of 100 hectares to 11,000 hectares. In ensuing years, the area burgeoned to a high of 475,761 hectares in the wet-season of 1967-68. Most of this effort was concentrated on the island of Java. The program came to be identified as "Bimas," an acronym derived from "Bimbingan Massal" or "Mass Guidance."

5. This transformation was most evident in the manpower allocated to work with the peasantry. Whereas, the initial guideline for the Institute's project was one extension worker per 50 to 75 peasants, by 1968, the ratio was up to 300-350 peasants. The Institute severed its relationship with the government's campaign

The rigidities which came to encumber this program were pre-eminently embodied in the government's approach toward the distribution of inputs to its peasant clientele. In this instance, there was a definite bias against deferring to the judgment of the peasant in the amount and kind of inputs necessary for satisfactory growth. Thus, the market mechanism, which would permit the peasant to select his own combination of inputs, was eschewed in preference for the planning mechanism, which vested the power of choice in the hands of the bureaucracy. In practice, the government prescribed the kind and amount of fertilizer and pesticides and distributed these inputs in the form of a packet. In devising the "packet concept," it was intended that each peasant would receive a standard quantity of pesticides and fertilizer, and while some variations in the packet contents were authorized at an administrative level, these modifications were marginal in scope.

The distribution of a uniform input mix not only reflects a lack of confidence in the peasant's capacity to perform effectively his role as a rational decision-maker, but it also constituted an attempt to rectify certain deficiencies in the government's decision-making process. Government records on soil composition and agricultural conditions were either non-existant or unavailable for immediate channeling into the policy making process. The development of a packet concept constituted an attempt to surmount this shortcoming in that the packet contents represented an educated guess on the combination of those factors of production considered most conducive to achieving high yields. In addition, the use of the packet formula corresponded with the requirements of a non-market strategy toward rural growth. Bureaucracies are goal achieving entities which seek to dispense their services according to a definite set of rules and regulations, and the packet approach, with its emphasis upon an invariable input-combination, meshed quite well with this administrative imperative.

While the packet formula was designed to reduce the peasant's freedom of choice in the selection of fertilizer and pesticides, in practice, the administration of this task fell wide of its mark. The rural bureaucracy lacked the necessary manpower and control over its own internal hierarchy which would be needed to compel peasants to react in a manner consistent with government directives.[6] Thus, many peasants sold to local vendors a portion

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in 1967, as many of its staff felt that the program had been expanded too rapidly and thereby its impact was dissipated by administrative inefficiency and negligence.

6. In general, officials of the central and regional government do not reside in the village. Rather, most offices will extend only to the district level. There are exceptions to this rule, as

of the inputs distributed by the government, which either in quantity exceed the peasant's perceived needs or in terms of quality failed to measure up to his expectations. In effect, the emergence of an informal and illegal market mechanism, served to modify and tailor the services of an inflexible program to meet the perceived needs of its peasant clientele. It also tended to rectify some serious deficiencies in administration action; for example, government fertilizer and pesticides frequently arrived at village sites after the planting season had started and peasants were able to rechannel these inputs onto the local market.

Throughout the period from 1964 to 1968, the formal attributes of public policy, i.e., bureaucratic allocation continued to be offset by a series of informal practices, i.e., market allocation, which gave vent to peasant attempts at maximizing the value of government inputs. A weak rural bureaucracy was unable to exact full peasant compliance with government directives and the same maladies of administrative incapacity gave rise to some serious tensions in many areas of government peasant interaction. This was most apparent in the mounting accumulation of debts, as, with increasing frequency, peasants were failing to repay the government for the credit extended to them in the form of fertilizers and pesticides. Many peasants resisted payment because their yields were low and/or for reasons related to their growing dissatisfaction with government services. The peasant's most common complaints were related to the lack of adequate instructional aid from the extension service, the procedural and logistical problems of securing fertilizer and pesticides in time for planting, and the partial appropriation of inputs and credit repayments by corrupt officials.[7]

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in the case of the Department of Agriculture, where one or two extension agents reside in the sub-district and administer agricultural programs to the 5 to 10 villages within this constituency.

7. Aside from press reports on peasant dissatisfaction with the program, the most systematic accounts of these problems can be found in the following two sources: (1) *Perumusan Seminar Bimbingan Massal Swa Senbada Bahan Makanan 1965/66*, Bogor, 28 Mei 1966 s/d 3 Djuni,1966. This is an evaluative report compiled by student participants in the government's program. (2) *Keputusan Rapat Kerdja Anggauta Gabungan Koperasi Pertanian (Gakiperta) Propinsi Djawa Barat* pada tanggal 13 s/d 16 February, 1967. This is a report compiled by leaders of the cooperative movement in West Java and concerns their misgivings about the government's program.

In response to this growing problem of peasant indebtedness, government banks refused, after 1967, to extend credit to any peasant with debts still outstanding from former government programs. This policy immediately precipitated an administrative crisis, for the effect of this prohibition was to subvert the entire program to increase rice production. Since many villages were still in debt they could not receive additional government loans in order to secure pesticides and fertilizer. On the basis of technical considerations alone, many of these villages were considered the most fertile target areas, and their exclusion from additional loans resulted in a rapid diminution in the areas eligible for government credits.[8]

III

The ensuing paralysis in government rice programs and the need to undertake some drastic measures to alter this condition was further accentuated by an excessively long dry-season in 1967 and an attendant decline in the supply of rice in late 1967 and early 1968. The government's response to this emergency clearly unfolded in mid-1968, when it signed a contract with Ciba, a Swiss pharmaceutical and chemical firm, to saturate 300,000 hectares of prime rice lands on Java with high yield seeds, fertilizer, and pesticides for the 1968-69 wet-season. The contract obliged Ciba to deliver these inputs at the village level and also to apply pesticides through aerial spraying. For many officials, the "Ciba" formula seemed to be the answer to Indonesia's rice problem, in that reliance upon external sources of assistance would compensate for the administrative shortcomings of local institutions which had not performed well in the old program. This confidence in external assistance led to the demise of the old program, and, in late 1968 and early 1969, Ciba, and a number of other foreign firms from Japan and West Germany, were contracted to undertake a massive campaign to achieve a Green Revolution by 1973.[9] This program was well underway by 1969, with

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8. This contraction was dramatically manifested in the dry-season of 1968, when a pre-season target was set at 413,000 hectares and only 247,000 hectares was achieved. In the following 1968-69 wet-season, 261,400 hectares were included in this program, and in the 1969 dry-season the total declined to 76,300 hectares. Statistics secured from *Rice in Indonesia*, prepared by James Hawes, Agronomy Advisor, USAID/Indonesia, May 1970, p. 43.

9. The firms included in the program were Ciba (Switzerland), Hoechst (West Germany), A.H.T. (West Germany), Mitsubishi (Japan),

large areas of Java receiving pesticides and fertilizer to cultivate the new miracle (IR5 and IR8) rice seeds.[10]

There were several aspects of this new policy which were expected to elicit a more positive peasant response. In particular, the value of the inputs made available through the old program were subject to price fluctuations on the international market and the Indonesian government was never certain how much foreign currency would be available for the purchase of fertilizer and pesticides. It was, therefore, difficult for the peasant as well as the government to plan and implement programs under conditions where the price and supply of inputs were not predictable. In the new program this problem was resolved, as the companies provided short-term credits to the government for the purchase of these items at a price which remained stable for the duration of the contracts. In addition, on the output side, the new credit program, as it was initially conceived, appeared to possess a definite advantage over that of the old pre-1968 program.

In the old program the peasant had to make a repayment in kind (rice) or money equal to the credit advanced to him by the government; in the new program the peasant would make a repayment in kind equal to 1/6 of his yield. In short, the peasant could make his economic calculation and projections within a more stable environment. Thus, there was a fair degree of predictability on the input side of the calculation; the price of fertilizer and pesticides would not fluctuate over a wide margin. Moreover, the 1/6 formula was more beneficial to peasant interests. Repayment was not an absolute amount as in the old program but one that was pegged to the actual yield and, therefore, more in accordance with peasant capacity to pay. In theory then, the new program seemed to offer a definite set of advantages on both the input and output side of production. This element of stability and predictability would only prevail however, if the government

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and Coopa, a company registered in Europe, but with considerable backing from Indonesian entrepreneurs.

10. The original Ciba target included 300,000 hectares for the 1968-69 wet-season, and with the addition of the other companies, the target rose to 550,000 hectares for the 1969 dry-season, and 1,115,000 hectares for the 1969-70 wet-season. Hawes, *op. cit.* p. 43. The new post 1968 program was now identified as Bimas Gotong Rojang.

did not renegotiate the contracts and thereby alter the cost-benefit ratio midway through the growing season.[11]

Aside from the above described features, the post-1968 program was essentially caste in the same mold as the pre-1968 approach toward agricultural production. Thus, the market mechanism was again shunned, and the foreign companies, acting in concert with the indigenous bureaucracy, dispensed a standard dosage of fertilizer and pesticides for each hectare included in the target area. The new program, however, was more explicit in the application of this strategy, and administrators were more intent upon making sure that the peasant used the packet contents in their entirety. The government's efforts to circumscribe even further the opportunities for the peasant to exercise some discretion in his cultivation pattern rested, in great part, upon the fact that the new miracle rice seeds were more dependent upon a higher dosage of fertilizer and pesticides than conventional seeds. It was therefore assumed that greater effort would have to be exerted to prevent the peasant from persisting in his former practices of selling inputs to local vendors and, perhaps, combining the new seeds with his traditional input formula. In short, the adaptation of a new technology was construed as necessitating a reduction in peasant autonomy.

The most dramatic innovation devised to reduce the possible hazards of peasant indiscretion and non-compliance concerned the distribution of pesticides. Whereas, in the old program, pesticide application was undertaken by giving over sprayers and pesticides to participating peasants, under the new program this was accomplished through aerial spraying. The foreign concerns supplied airplanes and pilots for these operations. Aerial spraying appeared to be a more effective method because its appication

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11. Stability on the prices of inputs were generally assured for the duration of one rice growing season, as the contracts were valid for that period of time. A new set of contracts were negotiated for each wet and dry-season. It is assumed here that peasants knew that the balance of values in the input-output ratio would remain stable, but there is no evidence that peasants in fact were aware of this new element of predictability in the post-1968 program. The evidence does suggest however, that even if the peasant was informed of these advantages, he would be inclined not to trust the government's promises to adhere to these terms. In the peasant's view, the government had frequently reneged on its commitments and his suspicion was born out again when, in September 1969, the government revoked the existing contracts in order to renegotiate their conditions.

did not depend upon the initiative and skill of the peasant. Hand-spraying had not been successful because peasants either did not possess the mechanical skills to maintain the machines or they did not apply the proper dosage. Many peasants tried to economize by avoiding the use of the pesticides. Aerial spraying now transferred this area of decision-making from the peasant to the government bureaucracy.[12] This added a new element of coercion, for in order to profit from the benefits of aerial spraying, it was imperative that the planes be permitted to sweep across large areas of land. Thus, pressure was applied upon peasants with contiguous plots to enroll in the program, as the planes could not skip from one small paddy to another and effectively administer the spray.

The use of aerial-spraying also involved a more authoritarian approach in the distribution of seeds and fertilizer. The government arbitrarily identified large tracts of rice-lands for the use of IR5 and IR8 seeds in order to comply with the requisites of aerial spraying and the attendant need for contiguous plots to use the same inputs. It also followed that these peasants were compelled to receive a prescribed dosage of fertilizer consistent with the needs of a particular seed. Likewise, the old program had depended upon village initiative in transporting the inputs from government warehouses, and it frequently occurred that peasants were less than punctual in securing the material. In order to avoid this logistical lag in the new program, the foreign firms now assumed the task of transporting the inputs directly to the village.[13] In effect, this reduced even more the amount of peasant control over the program. Formerly, a village could have given its initial and tacit approval to participate in the program, but then withdraw by failing to make an appearance at the warehouse. Now, however, once the application

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12. Since a substantial portion of Indonesia's annual rice crop is destroyed by pests, securing more effective methods of pest control, i.e., aerial spraying would yield a sizeable return in production in itself. Thus, the Director General of the Department of Agriculture, Dr. Sadikin, indicated to the press in April 1970, that 10% of Indonesia's annual rice crop was consumed by pests and that with effective spraying for one or two years, not only would the pests be eliminated but so would be need for subsequent spraying. See *Indonesia Raya*, April 25, 1970.

13. In general, the foreign firms were not directly involved in the distribution of pesticides and fertilizers, but sub-contracted these functions to Indonesian firms.

process was initiated, the village had no choice but to receive the inputs.

Initially, the post-1968 approach to rice production appeared to be a workable solution for Indonesia's rice problem, and by late 1969, it appeared that rice production was increasing.[14] Nevertheless, it was increasingly clear that these gains were being purchased at enormous political and economic costs. The program was extremely large, covering vast areas of Java and including millions of peasants. The excessive size of the program made it susceptible to wide-scale inefficiency, waste, and corruption. The foreign companies were unable to resolve these problems because of their limited penetration of the rural sector.[15] More important, peasants and regional officials were becoming increasingly adamant in their opposition to the government's program and the onerous burdens it imposed upon the rural sector. By mid-1970, these economic and administrative pressures were of such magnitude and scope as to impel a radical turnabout in government policies and a sudden scrapping of the post-1968 rice program.

IV

The ultimate demise of the government's rice campaign in 1970 can be attributed to the same factors which engendered the downfall of the pre-1968 program: the persistent attempt to dispense an homogenous and uniform service in a regulated and predictable manner to an atomized and heterogenous clientele, whose initiatives and responses were distinguished by a lack of collective regularity and predictability. The basic tenets of this strategy simply failed to accord with the realities of rice production in Java, and therefore, the gap between the intentions of government plans and actual administrative achievements remain irreconciled.

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14. Thus, on October 9, 1969, after a meeting with President Suharto, Minister of Agriculture, Thojib explained to the press that production for 1969 would exceed the plan target of 10.5 million tons of rice. Finally, on April 23, 1970, in a television interview, the Minister stated that rice production in 1969 had exceeded the plan target of 10.5 and actual production was 10.79 million tons. See *Berdikari*, October 10, 1969, and *Pikiran Rakjat*, April 23, 1970.

15. The foreign firms usually had five to ten representatives in each province to supervise the distribution of fertilizer and pesticides. This number was too small, given the enormous size of the effort, to exercise adequate management control.

These contradictions were dramatically displayed in the aerial spraying program. Aerial spraying was applied at different intervals over large areas of land in which the peasants exhibited great variability in their periods of planting. As a consequence, the spray was frequently applied at the wrong time and had a negligible impact upon pest control. In early December 1969, the Minister of Agriculture confirmed reports that several districts in West Java, the province most exposed to aerial spraying, were suffering from some serious pest control problems.[16] In addition, the ecological dangers involved in a widespread program of aerial spraying were coming to the attention of government authorities. On September 10, 1969, the Ministry of Agriculture announced that it had initiated an investigation in response to complaints that fish in the inland ponds were being poisoned by aerial pesticides.[17]

Major deficiencies in the government's program were compounded by the use of IR5 and IR8, the miracle rice seeds developed in the Philippines. It soon became apparent that IR8 was quite vulnerable to certain pests in Indonesia. In addition, the rice produced from these seeds did not rate high in preferred consumer tastes, and limited consumer demand lowered its price below the market values of non-IR rice. Therefore, many peasants began shifting back to the use of conventional seeds, the cultivation

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16. *Kompas*, December 2, 1969. In late September 1969, the provincial Department of Agriculture in West Java released a report indicating that over 1/3 of the area receiving aerial spray was still subject to pest attacks. *Pikiran Rakjat*, September 25, 1969.

17. Reports concerning the harmful effects of aerial spraying upon fish and livestock as well as on human beings, prompted a call from several sources for greater government control and regulation in the use of pesticides.

In an address given at the University of Gadjah Mada, Professor, Dr. Ir. Otto Sumarwoto indicated that the advanced nations had already taken measures to ban certain dangerous pesticides and now the chemical firms were tyring to market these products in the less developed nations. He claimed that these particular pesticides might have a similar or perhaps more lethal effect in tropical countries, and that experts and instruments would have to be developed to discern their impact upon human beings and the environment. *Lembaran Minggu*, January 25, 1970.

Finally, in February 1970, at a seminar sponsored by the National Biology Institute and the Indonesian Biological Association, a resolution was passed urging the government to use pesticides only in cases of emergency when no other alternative was available. *Kompas*, February 25, 1970.

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of which requires a lower dosage of fertilizer.[18] As a consequence, large amounts of under-priced fertilizer began to appear on local markets, as peasants began to sell the surplus fertilizer acquired in the government's program. This had the effect of further undermining the government's campaign; many peasants now preferred to purchase fertilizer from these market sources rather than having to pay a higher price for the fertilizer contained in the government packet.

Thus it was becoming increasingly more difficult for the bureaucracy to mobilize its peasant clientele in a manner consistent with government directives. These shortcomings were inevitably reflected on the output side. The Minister of Agriculture consistently supported the position that the campaign's annual production targets would be achieved. Nevertheless, when measured by the rate of credit repayment, i.e., the 1/6 return on actual crop yields, the program had to be judged an abysmal failure. By August 1969, one year after the introduction of the 1/6 repayment formula, official statistics indicated that rice repayments were falling from 35% to 90% below the projected rate of collection.

Several factors can be identified which account for the peasant's failure to return a rice repayment in accordance with government projections. First, it appeared that many peasants were submitting inaccurate reports to the government; deflating the estimates on actual yields and thereby reducing the amount of repayment to the government. Second, there were indications that many peasants were not achieving the projected increase in productivity, and therefore the 1/6 repayment was naturally less in absolute terms than what was originally anticipated.[19]

Since official channels of reporting were defective, the government was never in a position to measure these factors and determine to what extent poor collection rates reflected false

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18. For an informative account of peasant behavior in this area and the problems encountered in the adaptation of the new miracle rice seeds see *Problems of the Rice Intensification Schemes in West Java* by Faisal Kasryno, William Collier, and Irlan Soejono, published in Bogor, 1969. Their survey of three districts in West Java indicates that in June, 1969, the price of IR5 rice, sold at the village level, was substantially inferior to the price of conventional rice. For example, in the district of Subang, conventional rice per quintal sold for 1800 rupiahs, while IR5 was selling for 1100 rupiahs.

19. For an excellent survey account of the problems associated with the 1/6 repayment formula in Central and West Java see the

estimates by the peasantry or actual failures in the achievement of higher production.[20] The government was also encountering some serious problems in the logistics of collecting the rice repayment. The agencies responsible for this task lacked the skilled manpower and organizational structures necessary to effectively organize village check points for collection, maintain quality control on the rice collected, and finally transport it to larger collection areas outside the village.

In response to this poor repayment rate, and in an effort to restore the program's fiscal integrity, the government undertook some immediate actions to modify the repayment formula in a manner more favorable to its own interests. In September 1969, the government announced it was abandoning the 1/6 formula and henceforth the repayment would be a fixed amount of rice or its monetary equivalent. The invariable amount was calculated to equal 1/6 of a predetermined yield. In effect, the peasant now lost his opportunity to calculate the repayment according to his own assessment of his yield.

In retrospect, it can now be discerned that it was the adoption of the fixed repayment rate, which decisively hastened the disintegration of the government's rice campaign. From that point on, a ground-swell of resistance began to mount, with peasants becoming more resolute in their rejection of the new repayment formula. The sudden and unforeseen announcement of a shift to a fixed repayment plan, convinced many peasants that they had been victimized by an irresolute and whimsical bureaucracy. In their view, the government's erratic and mercurial policies only served to demonstrate the risks of engaging in any long-term cost-benefit projections. The environment was too unstable for one to indulge in such a luxury.

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two reports prepared in August 1969, by a team of agronomists from the University of Padjadjaran, entitled *Bimas Gotong Rojang Ciba di Djawa Barat: Suatu Laporan Evaluasi* and *Bimas Gotong Rojang Ciba dan Coopa di Djawa Barat dan Djawa Tengah: Laporan Evaluasi II.*

20. Major deficiencies in the gathering of accurate production statistics constituted one of the most critical problems in the entire campaign. Up until its termination in May 1970, the government was never able to discern with precision, the effect of its program on increasing production. The absence of accurate statistics reflects the fact that government agencies had yet to develop reliable reporting systems.

Accompanying this perception was a more acute and salient protest against the substantive aspects of the repayment change. Prior to 1969, the peasant could, with some degree of flexibility, shape the government's program to accord with his own interests, even though the initial services provided were not consistent with his perceived needs. Thus, for example, if a peasant received a packet containing fertilizers and pesticides which did not satisfy his requirements, he could compensate by reducing the 1/6 amount of his repayment. The same arrangement applied when the peasant fell victim to poor administrative services. If fertilizer or pesticides were delivered late or in improper amounts, the peasant could deduct the cost of this inefficiency from his credit repayment. The 1/6 formula, in other words, enabled him to enforce a quid-pro-quo relationship with the government and to adjust his repayment according to the benefits and costs derived from the program. As this practice evolved, however, it was subject to abuse which was compounded by inefficient administrative services. The government soon found itself in a one sided relationship, with the peasantry appearing to reap the benefits and the government the costs. The introduction of the fixed repayment was intended to restore some balance and equity in the contractual relationship between the peasant and the government and thereby reduce the peasant's opportunity to exercise exclusive discretion over these issues.

With the advent of the fixed repayment plan, peasants became much more antagonistic in their reception of the government's packet program. A power struggle emerged, with the peasantry, as prospective program participants, seeking to expand the opportunities to exercise their options, and government agencies, responding to their own bureaucratic imperatives, seeking to circumscribe the boundaries of peasant discretion. On the one side, if the peasant was to profit under the fixed repayment plan, high yields would have to be achieved and therefore he demanded more flexible and efficient government services. On the other side, although government administrators were prepared to improve their performance and introduce some variations in the packet contents, any significant move in this direction would have subjected governmental organizational structures to an inordinate amount of strain.

While the bureaucracy was constrained from undertaking any major modifications to satisfy peasant needs, and administrators frequently exercised negative and coercive sanctions to secure

peasant compliance, there were still some marginal opportunities for the peasant to informally tailor the program to his own needs.[21] Thus, the "blackmarket" on fertilizer still prevailed in some areas. However, by early 1970, many peasants were becoming quite steadfast in their opposition to the government's campaign. This frequently occurred in areas where members of the rural civil service balked at the rigid enforcement of an unpopular program.

It was within this context of growing opposition that the central government moved drastically to alter its agricultural policies. By early 1970, it was apparent that rice yields were still less than expected, and, as a consequence, many peasants persisted in their refusal to pay in full the fixed repayment demanded by the government. In some areas peasant indebtedness to the government was growing at an alarming rate and this constituted a source of great concern to many rural officials. In addition, the collection of the loans, whether in rice or money, continued to constitute a formidable logistics and management problem, and corruption and waste continued to take a heavy toll in this area. In short, despite the best of government efforts, the program remained a losing proposition both from a fiscal and political point of view.[22] More alarming was the fact that an even higher level of underachievement could be anticipated in the near future. A massive amount of resources from internal as well as external sources had been expended in the rice production program and the full weight of the government bureaucracy had been brought to bear in its executive implementation. Nevertheless, the return simply did not equal this input. Moreover, short of some major policy change, there was little the government could do to improve the record of performance. Then, on May 20, 1970, an official announcement was made that President Suharto had decided to abandon the program and terminate the government's

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21. The use of coercion to compel peasant compliance with government directives did not escape the attention of the survey team from the University of Padjadjaran. They expressed concern in their reports that the government's program, particularly in Central Java, where village administration is somewhat more entrenched than in West Java, represented a return to the Dutch Culture System (*Cultuur Stetsel*) with the officialdom authoritatively compelling the peasant to comply with government instructions.

22. By early 1970, estimates from reliable sources indicated that the government had absorbed a loss of perhaps 10 billion rupiah in its post 1968 rice campaign. See *Pikiran Rakjat*, February 25, 1970, and *Berita Yudha*, February 28, 1970.

relationship with the foreign firms.[23] This decision ended another phase in Indonesia's ill-fated attempt to achieve a rapid increase in rice production.

V

With the sudden abandonment of this program the government was compelled to devise a new approach toward the agricultural sector. The attributes of a successor policy began to emerge in the summer of 1970, and a new program was well underway several months later. In many respects, the lessons learned from the past decade appear to have been integrated into the process of policy-making for the 1970's. In particular, many officials are now convinced that the packet formula suffered from a serious shortcoming in that its contents, whether measured in quantity or quality, frequently did not satisfy the perceived needs of the peasant. Thus, the packet approach was replaced by a more flexible system which permitted the peasant to select, within a maximum and minimum range, the quantity of fertilizer and type of seeds he desired.

Accompanying this change, some significant modifications have been undertaken in the distribution of seeds and pesticides. First, the government wisely abandoned the efforts to distribute pesticides from the air and the peasant has regained full control over the allocation of this input through the use of hand-sprayers. Second, while many peasants resisted the use of IR5 and IR8 seeds, starting in 1970, the government began to make available its own miracle seeds. Since these strains were developed for use in Indonesia, they promise to be more adaptable to the peculiar needs and conditions of agricultural production on Java as well as to consumer tastes.

The advent of this new agricultural program represents the end of an era in public policy-making in Indonesia. During the 1960's, the role of the non-market mechanism reigned pre-eminent in attempts to increase rice production. Indeed, the government's campaigns embodied, in pristine form, this approach toward rural

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23. This announcement occurred directly after a cabinet meeting, when the Minister of Agriculture made a terse statement to the press, conveying the President's decision. The Minister cast the event in a positive light, indicating that after intensive study, the government had decided to undertake its own program independent of external assistance. In his words, sufficient fiscal resources were available to finance the program and domestic

modernization. Complete initiative for the adoption of new technologies in rice production was appropriated by the government and the peasant was expected to modify his behavior in accordance with directives emanating from an impersonal bureaucracy. The new post 1970 policy, however, constitutes at least a half-swing of the pendulum. Instead of being under the custody of an administrative hierarchy, the peasant is now accredited the role of a decision-maker. The incorporation of greater flexibility into the packet approach represents a partial restoration of the market mechanism. That is, it is based on the assumption that the peasant can effectively calculate a productive combination of inputs. The entire approach is implictly predicated on the fact that, given the presence of certain economic incentives, the peasant will voluntarily take the initiative to increase his yields.

The government's new orientation towards rural modernization is also reflected in its current efforts at institutional reform. In this respect, the approach towards organizational change in Indonesia has gone full circle. In the early 1960's, indigenous institutions bore the full brunt of achieving higher production targets. The policy changes in 1968 shifted some of this responsibility to the foreign companies, but the recent program modifications in 1970, constitute a return to the earlier dependence upon domestic institutions, and signifies a renewed confidence in their capacity to attain the plan targets. This optimism is associated with some recent changes in institutional practices, the direction of which reflects government efforts to employ market and economic incentives to stimulate peasant productivity.[24]

Finally, the government has undertaken a massive effort to make its credit facilities more accessible to the rural areas. For example, village banks have been rapidly established throughout Java, in order to conveniently dispense credit to peasants. It is intended that each of these units will be complemented by the presence in the village of a fertilizer retailer and a village warehouse, where peasants can deposit their rice during the peak of the harvest season, and secure credit from the village bank for cur-

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institutions were now capable of functioning at a level consistent with plan targets. See *Kompas*, May 21, 1970.

24. These institutional developments are most evident in the government's efforts to improve the competitive marketing of fertilizer and the efforts to manipulate market rice prices in a manner consistent with peasant needs. For a more detailed account of these changes and other institutional developments in

rent living expenses. In the long run, it is envisaged that this matrix of institutions will eventually become a vital and integral part of village life, enjoying peasant support and participation.

VI

In summary, the medium of technological transfer has been shifted from coercive bureaucratic intervention, in which the peasant was reduced to a passive and dependent object of government aid, to a climate in which government policy reflects a more indirect and subtle attempt to foster peasant initiative in the process of economic growth. This new emphasis on the proverbial carrot rather than the stick will not allay the persistent administrative anxiety over the capacity to achieve the plan target of self-sufficiency in rice by 1973. In fact, the new strategy may be more exacting of officialdoms' competency to administer a complex set of policies. For example, the new strategy in rice production rests on the assumption that the government's price support policy will have the effect of making it profitable for the peasant to increase production. The area of price controls on rice was sorely neglected in the 1960's and, therefore, government officials will be forced to acquire rapidly the skills and confidence necessary to undertake such a program in the 1970's. Apprehension about the future course of events is further heightened by the low profile required of this more sophisticated approach to agricultural modernization. In the old program, officials could take some solace in their own self-initiated actions. Although these frequently stifled peasant initiatives, the process did provide a sense of security and a feeling that something was being accomplished. These same officials must now hope that the presumed rewards of advanced technology will stir the peasant to cast his lot with the Green Revolution.

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the agricultural sector see Gary Hansen, "Rural Administration and Agricultural Development in Indonesia," *Pacific Affairs*, Vol. XLIV, No. 3, (Fall 1971).