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CONTENTS

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(January-March, 1990)

EDITORIAL

A HINDSIGHT AND BROADER VIEW OF THE CAVITE LAND USE CONTROVERSY

The raging controversy in the Philippines on whether to use a 230-hectare area in Dasmariñas, Cavite for agriculture under land reform or for an industrial estate allows us a chance to evaluate the issue from hindsight based on the performance of existing industrial estates as well as to expound from a wider perspective on competing development paradigms and strategies being employed in the country today. Indeed, the issue dramatizes the dilemma many Third World countries are currently faced with, i.e., what development path to follow and what priorities need to be attended to. This piece questions the wisdom of converting the Cavite farmlands into an industrial estate and the adherence to the growth center regional strategy and economic growth supra-regional approach that underpin such a move.

The Land Use Controversy

The controversy started when the government-owned National Development Corporation (NDC) which owns the title to the Langkaan estate in Dasmariñas, Cavite announced that it would lease the area to Japan's Marubeni Corporation for conversion into an industrial estate. The farmers occupying the estate opposed the decision and enlisted the support of the Department of Agrarian Reform (DAR) which subsequently ruled that the area is prime agricultural land and by law should be subdivided to farmers as a land reform area. The DAR further said that the Langkaan farmers were identified three years ago as agrarian reform beneficiaries. The NDC's side, on the other hand, was defended by the Department of Trade and Industry (DTI), which pointed out that: the agricultural site was within the industrial zone as declared by the Housing and Land Use Regulatory Board (HLURB) even before the enactment of the Comprehensive Agrarian Reform Program (CARP); the said portion among NDC's agricultural properties was excluded in 1988 by the DAR from its land reform-zoned areas; and the land is marginally productive, having been declared by the National Irrigation Administration (NIA) as non-irrigable.

The Department of Agriculture (DA) came to the aid of DAR by showing documents prepared by the Bureau of Soils and Water Management and the authoritative inter-agency National Land Use Committee

(NLUC) indicating that the Regional Physical Framework Plan of Region IV especially in the CALABAR (or Cavite, Laguna, Batangas and Rizal) area only lists as potential industrial zones the following corridors: Cavite coast (only the town of Rosario and therefore excluding the Langkaan estate), Batangas Bay, Laguna-Lucena and Marikina-Infanta. The NLUC further discovered that, despite the land use restrictions, several agricultural estates are being converted into commercial lots.

But before these revelations by the NLUC, there were certain developments after NDC decided to lease the area in question to Marubeni Corporation. The farmers initially rejected the land conversion in a referendum. But as the issue thickened, NDC paid 23 farmers a disturbance compensation of ₱55,000 per hectare. Reports were rife, too, of armed goons patrolling the area and threatening the farmers, such that when another consultation was held most of the farmers reversed their stand and opted to sell their rights to the land.

To resolve the issue quickly before the major foreign investor gets discouraged, President Corazon Aquino came out with her supposedly "Solomonic" solution. She declared that the government will convert most of the 230-hectare disputed land into an industrial estate but will give farmers opposed to the conversion three hectares of irrigated land each. As it turned out, 94 farmers agreed to the conversion program and have been promised the ₱55,000 disturbance compensation plus homelots and jobs in the industrial estate. The 28 farmers who originally opposed conversion have been given three hectares of farmland each. This decision, however, did not quell protests from many quarters, particularly the farmers' organizations, which favor land reform and agricultural development. Lately, there has been talk of the lands given to the farmers as unirrigated — a sign that the controversy could become a long, drawn-out one.

The Performance of the Philippine Industrial Estates

The issue calls for some analysis particularly from a historical and broader development perspective — that we may be able to decide rationally, with the non-debatable goals of reducing poverty, inequality and unemployment always in mind. A look into the performance of Philippine industrial estates would be instructive in helping us evaluate the issue. Certain performance indicators that may be investigated would be: number of operating manufacturing firms, employment, exports, net trade balance, transfer of technology, investments and industry dispersal/linkage. We can use primarily the data of the National Economic and Development Authority (NEDA) on the country's major industrial estates such as the Bataan Export Processing

Zone (EPZ), Mactan EPZ, Baguio City EPZ, Cavite EPZ and PHIVIDEC Industrial Estate (IE). By way of clarification, the term "industrial estate" is a general one that refers to a tract of land developed for the use of a community of industrial enterprises and usually having an industry mix utilizing local manpower and raw materials, with products destined for both local and foreign markets. The more specialized export processing zone, in contrast, usually utilizes imported raw materials (but not manpower) and has products mainly intended for export. The other industrial estates that may be mentioned are the NHA's Dasmariñas, Carmona, Sapang Palay, Dagat-Dagatan and Macabalan IEs, Veterans Federation of the Philippines Industrial Area, FTI Agro-Industrial-Commercial Estate, People's Technology Complex and Canlubang Industrial Park.

Of the five major industrial estates studied, all, with the exception of the Bataan EPZ which in recent years suffered labor unrest, had an increasing number of operating firms. Overall, the number of firms rose from 64 in 1982 to 90 in 1988. The firms produce garments, electrical machineries, apparatus, appliances and fabricated metal products. However, occupancy is not really an important indicator of success if the yardstick is benefit accruing to the regional and national economies. Again, with the exception of the Bataan EPZ, all industrial estates had rising employment levels. For all the firms, there was an increase of from 23,332 in 1982 to 27,310 in 1988. It may be said that employment is the most important and, from all indications, the only worthwhile benefit that can be derived from industrial estates. Even then, despite the employment increases, there has been no strong impact on regional employment levels. Salaries and wages have also increased from ₱254,386 in 1982 to ₱889,197 in 1988. But as often pointed out by militant observers, Philippine labor in these enclaves suffers from exploitation arising from capital's unconscionable extraction of surplus value.

From 1982 to 1988, the total exports of all the estates rose from $324,917 to $514,182. The total net trade balance per year was also positive for the estates. These could have meant much foreign exchange earnings, but they are deceptive criteria for success. The firms actually benefiting from this are multinational and Filipino joint-venture firms which dominate the estates in number and capitalization. Also considering that these enclaves enjoy tax, tariff, profit repatriation and other incentives and also noting that these firms have no regional linkages as they pursue the country's export-led industrialization strategy, the foreign exchange earned for the country is at best minimal. The transfer of technology is again a dubious impact considering that the mix of industries is mostly in light manufacturing (particularly garments) which employ relatively unskilled workers. The skills learned

are those involving simple, less sophisticated and repetitive operations. It is in the more sophisticated industries like electronics with their higher-level skills where substantial and more desirable technology transfer is expected to occur.

The supposed infusion of substantial investments in the estates is debatable, considering that that it is usually the government which initially spends for the estate infrastructure and considering further that foreign firms are allowed to borrow substantially from local banks. Senator Wigberto Tañada's Senate Bill 1276 attests to this anomaly when it prescribes that a multinational company can only borrow from local sources no more than 10 percent of its equity. In terms of linkages with the local economy, 1987 NEDA data show that EPZ firms procured from local sources only 1.2 percent of their total input requirements. It was only in the PHIVIDEC estate in Misamis Oriental where a significant share of 21.5 percent was observed in 1987 on account of the fact that the estate's firms had local backward linkages in terms of processing of local raw materials such as wood, pineapple and minerals. Subcontracting as another indicator of linkage averaged only 2.0 percent of total production for the EPZs. Only in a few cases or on a company-by-company basis were the percentages higher as in the case of a Canlubang Industrial Park shellcraft firm which subcontracted as much as 85 percent of its production to firms in another region where the inputs are abundant. Thus, it may be observed that the main goal of industrial estates development which is industrial dispersal has yet to be satisfactorily attained. In another recent study focusing on the Bataan EPZ, it was found that zone residents do not produce income for the surrounding rural areas at all nor were there multiplier effects from urban resident spending in the rural areas. This shows non-occurrence of the "trickling down" or "spread" effects as postulated by the growth center doctrine being adhered to by the government.

The Industrial Estates Experience as Applied to the Proposed NDC-Marubeni Industrial Estate

The First Cavite Industrial Estate to be set up in Langkaan, Dasmariñas, Cavite has to be evaluated against the background of the benefits it can provide to the country and to the region. The benefits of the estate to industry and to the economy according to the DTI are: 100 firms, ₱900 million in project cost, $1 billion in exports, 80,000 employment and ancillary jobs created by the demand. It appears that only employment will be the only significant benefit the region can derive from the estate, considering the performance of the existing ones. It may help decongest Metro Manila's high industrial density but it will not be satisfactorily implementing the rationale of industrial dispersal behind industrial estates as it will be moving into a proximate and

practically suburban area of the metropolis. Around itself, the estate will most likely fail to create linkages or the trickling down effect expected from it by the growth center doctrine. The reason is that the facility is not strategically located within a raw material-rich area which can encourage value-added processing from backwardly linked industries. Only a few agricultural products are produced by the area. This is not to mention that *within the province* there are already the competing but only partially occupied Cavite EPZ in Rosario town and the NHA industrial estates in Dasmariñas and Carmona (People's Technology Complex). The benefits from exports, investments and transfer of technology have yet to be seen in the ownership of firms to be set up, in the actual proportion of invested capital and in the industry mix.

The proposed better life for bought-out farmers who will be provided first-priority employment, homelots, skills training, disturbance compensation and added business opportunities according to the DTI would most likely not be realized. The establishment of the estate can result to spirals in the cost of land and housing arising from excessive real estate speculation. Increased urbanization can result to high cost of living that can erode workers' income and turn the estate periphery into slum and squatter settlements as shown by studies of the Bataan EPZ. This discussion brings us to the most recent issue leveled against the estate — that a concomitant motive behind its establishment is the plan of certain decision-makers and their accomplices to cash in on the spectacular rise in real estate values during and after completion of the project. Indeed, the redundancy and ill-logic of the siting and creation of the estate brings out this ulterior motive. Needless to say, after all pros and cons are considered, the decision to convert the area into an industrial estate is ill-advised.

The preceding discussion brings to the fore the conflict between two clusters of development paradigms and strategies being witnessed in the country today. The industrial estates program represents the government's adherence to the "top-down" development paradigm, the neoclassical economic growth supra-regional strategy and its variant the redistribution with growth strategy and, at the regional level, the growth center strategy. More specifically, to complement its export-led industrialization national strategy, the government has embarked on its industrial dispersal regional strategy which it implements through the industrial estates and the 17 regional industrial centers. This is supposedly its way of achieving equity with growth. Clearly understood, the land reform program represents the alternative "bottom-up" paradigm, the self-reliance supra-regional strategy and, at the regional level, the decentralized territorial integration strategy. It is clear that the government adheres more to the first development orientation. At the regional level, it relies heavily on large-scale industrial estates and

on large growth centers as the principal approach in dispersing industries to the regions and ultimately in achieving balanced regional development. But regional disparities and rural-urban dualism still characterize the national landscape, where the trickling down process has yet to operate from growth centers. The insurgency is a clear manifestation of the gross poverty, inequality and unemployment in the countryside today. Thus, the industrial estates are not the panacea to poor economic growth and wealth distribution. Even if they would be providing their theorized benefits, it is best to remember further that they are simply provisional establishments (particularly the EPZs) that are subject to company divestments and economic fluctuations. Multinational companies are here in the Philippines primarily to avail of our cheap labor; however, they can easily move when this is no longer available, or when local labor unrest becomes intolerable, when massive unemployment occurs in their home countries or when more profitable ventures beckon elsewhere.

This uncertainty and economic stagnation resulting from ineffectual approaches and strategies call for the alternative development concepts cited above, particularly one called the territorial decentralization strategy which is designed for the regional level — a more lasting one and maximizes the utilization of local resources. *Land reform is its cornerstone sub-strategy* whose objective is not solely social (e.g., for quelling social unrest/insurgency) but mainly productivity by providing the people the means of production. Land distribution should be followed by mobilization of natural and human resources through intensive primary economic activities and the setting up of resource-based processing industries for these in rural areas. Land reform thus becomes an industrialization strategy following a balanced agro-industrial development scheme in rural communities. It may be noted that land reform or related forms of spatial restructuring were initially and *effectively* carried out by First World countries before they achieved their present developed status.

For our country which is fraught with market distortions, institutional rigidities and urban bias, the best way to achieve industrialization and accelerated economic development is not through enclave establishments and large growth centers but through such local cellular economic schemes as small agropolitan districts, economic districts, settlement complexes or some such schemes where entitlement, empowerment and self-sufficiency transpire. This small-area development is further built on indigenous value systems and principles of community cooperation, decision-making and sharing of proceeds. The territorial integration strategy which is catalytic and at the same time protective of the interests and resources of the local areas has been responsible for sustaining land reform and producing capital surpluses in the newly industrialized

countries. We also see similar successful small-scale schemes in the rural communes of China, in the *kibbutz* of Israel, in the *panchayat* institutions and "block" level development of India and, of course, in the *Saemaul Undong* Movement of South Korea. For our country, there is an urgent need to depart from traditional and Western-oriented models and strategies of development and try alternative national and regional development strategies suited to our Asiatic culture amidst the pervasive poverty, hunger, malnutrition and illiteracy that cannot wait. But what can we expect from a leadership without a *consistent* theoretical guide in its development activities, or the requisite will and confidence to share its power and resources locally and to protect community welfare against private interest as dramatized by the Cavite land conversion controversy?

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ARTICLES

MICRO-LEVEL PLANNING FOR INTEGRATED RURAL AREA DEVELOPMENT: AN ANALYSIS

S.C. Rai and D.N. Singh*

ABSTRACT. The study proposes a micro-level planning for a block administrative area in India following the strategy of integrated rural area development. The paper presents the characteristics of the study area, the agricultural situation, the agro-based industries to be promoted and the identified and proposed central places/ service centers. Kopaganj block is a depressed and densely populated area, with an agriculture-based economy and suffering from a dearth of services. Although three-fourths of the cropped area is irrigated, only a limited number of high-yielding crop varieties have been adopted. Based on available raw materials and existing facilities, the authors propose agro-based, forest-based, cotton weaving and other small-scale industries. Three tiers of central places have been identified using nearest neighbor analysis for the siting of certain economic and social facilities. It has been found, however, that there are spatial and functional gaps in the present network of service centers and for this deficiency, a spatial plan for 2001 A.D. is proposed.

INTRODUCTION

The significance of micro-level planning for integrated development of rural areas, which have for long been neglected with reference to an appropriate planning framework, can hardly be overemphasized. In a broad sense, integrated rural area development may be defined as a strategy for promoting the development of non-urban backward areas and weaker sections of the population. Integration in this context refers to all the three aspects, viz., (1) spatial, (2) functional and (3) temporal, of planning. In fact, spatial integration is a necessary condition for achieving functional integration in a temporal perspective.

In the present study, the points under reference have been highlighted through a case study of a socio-techno-economically backward block of district Azamgarh (U.P.). The paper is divided into four sections. The first section presents a general socioeconomic profile of the study area as a background. In the second section, an attempt is made to assess the agricultural situation and estimate the potential for its development in the light of expected changes in the area as to varieties of the crops associated with the application of agricultural inputs. Subsequently, in the third section the scope for the promotion of agro-based industries,

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particularly the cottage industries, and animal husbandry is discussed. In the last section, various levels of central places are identified and suggestions for filling in the spatial and functional gaps are made, considering them as basic planning units for an effective provision of social facilities and as the main instrument for integrated development of the area.

THE STUDY AREA

The study area — Kopaganj block — being a socio-techno-economically backward segment, is representative of the characteristics prevailing in most parts of the country. It is located in the eastern portion of Azamgarh distt., extending from 25°55′ to 26°5′ N and 83°25′ to 83°40′E in the middle Ganga Plain and embracing an area of 194.6 km.^{2}. As shown in Fig. 1, it comprises 10 nyayapanchayats covering 81 gramsabhas with 144 villages (132 inhabited and 12 uninhabited) and two urban centers — Kopaganj and Adari (Rai, 1984).

The total population of the area is recorded as 142,940 in 1981, of which 117,101 is rural and the remaining 25,839 urban. The population density is 680 persons/km.^{2}, which is higher than that of the state average of 377 persons/km.^{2}. The literacy rate is 25.93 percent, which is below the state average of 27.04 percent. The area has basically an agricultural economy with a predominance of foodcrops. Out of the total geographical area (194.6 km.^{2}), 12.98 percent is classified as land not available for cultivation, 6.92 percent as other cultivable, and 80.10 percent as cultivated area.

At present, the total livestock population of the block is about 41,237, comprising 18,045 cows and buffaloes, 13,610 goats and 2,092 sheep. The pigs and poultry birds number 1,285 and 6,205, respectively. The infrastructural facilities, e.g., transport links, health services, financial institutions, etc., are few and far between.

THE AGRICULTURAL SITUATION

In the planning of agricultural development and its allied activities, it is a prerequisite to examine some components of the existing agricultural situation of the study area. As such, an analysis of the degree of adoption of high-yielding varieties of seeds, irrigation and fertilizers will prove very useful.

In the study area, about 77.20 percent of the grass-cropped area is irrigated. The major irrigation sources are wells (4.71 percent), canals (21.59 percent), government tubewells (17.68 percent) and private tubewells (50.00 percent). The other sources, viz., tank and ponds, contribute to 6.02 percent of the irrigated area.

Wheat, rice, peas, gram, maize, sugarcane and arhar are the major crops of the area. Recently, the government has been laying emphasis

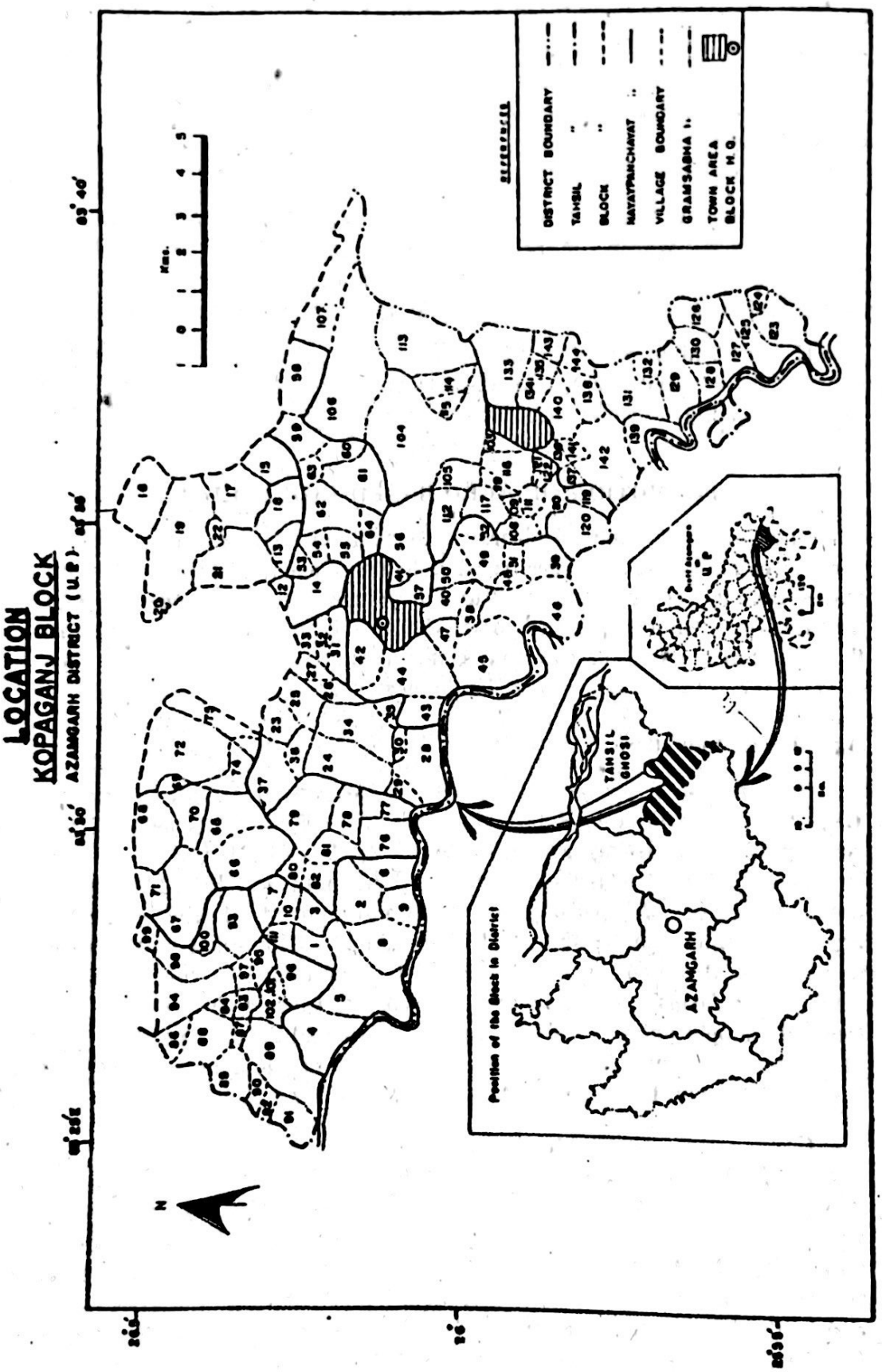

FIG. 1

on developing dry irrigated crops in the block and as a part of this policy future canal water is being earmarked only for dry crops especially during the kharif season. Thus, the area under groundnut crop has to be increased, since it is the only short duration and dry crop in the study area. Also, some of the rabi season crops such as jowar pulses can be grown to consume the moisture retained by the soil.

Percentage-wise and on the basis of the present cropping pattern of the study area, wheat can be grown in about 33.48, rice 36.88, barley 5.09, maize 0.92, gram 3.75, jowar and bajara 2.28, peas and arhar 3.14, sawan and kodo 1.44, and sugarcane 6.58 percent of the cropped area.

However, at present, the high-yielding varieties planted consist only of wheat, paddy and maize. Needless to say, the productivity per hectare of high-yielding varieties are very high when compared to traditional varieties.

PROMOTION OF AGRO-BASED INDUSTRIES

The changes in the agricultural sector will naturally generate potential for the establishment of agro-based industries, such as processing units and servicing centers of agricultural machinery and implements, dairy and poultry farming, etc. In view of the existing infrastructural facilities and availability of raw materials in the area, the following types of industry establishments may be suggested as viable propositions.

Agro-Based Industries

Cooperative dairy farming. The present total urban population (26,000) of the area is expected to reach 49,550 by the end of this century if the existing growth rate of 33.42 percent for the decade continues. Thus, the urban requirement of milk will be 12,337 liters, assuming a per-head per-day minimum requirement of 250 gm. This amount of milk can be produced from about 1,548 milch cattle (cows and buffaloes) which preferably should be maintained in the diversified small dairy farms. Thus, in the first phase there may be introduced two milk supply unions, one each at Kopaganj and Adari. In the second phase, the milk supply unions may be extended to Koiriapar, Kurthizaffarpur, Fatehpur, Dhelabandh, Alinagar, Kasara and Shahroj.

Cooperative poultry farming. Taking the projected urban population (49,550) till the end of this century as base and considering 40 percent as vegetarians, all these will require about 29,730 eggs per day. It means that the area needs more than 21,108 birds to ensure sufficient supply from local resources. For this purpose, there should be developed two poultry farming centers — Kopaganj and Adari in the first phase and in the second phase, seven centers, viz., Koiriapar, Kurthizaffarpur, Fatehpur, Shahroj, Alinagar, Kasara and Dhelabandh.

Flour mill and powerghanis. This area has a high production of wheat, rice and edible oil seeds. So, there is ample scope for processing of these products. As such, flour and rice mills and oil ghanies may be installed at Kopaganj, Indara and some other suitable locations. Their establishment will provide direct employment to a good number of people, assuming a 5-person requirement in each unit.

Agricultural implements repair works. There is an urgent need for agricultural implements repair works in the area, as the introduction of new technology in agricultural operations involving the use of modern implements at different stages of farming has given boost to this sort of demand. At present, there are no agricultural implements repair facilities in the area. Therefore, an agricultural repair works has been proposed, in the first phase, at Kopaganj and Indara and, in the second phase, at Koiriapar, Kurthizaffarpur, Alinagar, Dhelabandh, Shahroj, Fatehpur and Kasara.

Forest-Based Industries

Bidi making. The bidi making business can be better run on cooperative basis. In terms of requirements there are four main collecting and marketing centers recommended, one each at Kopaganj, Indara, Kurthizaffarpur and Koiriapar. These, in turn, will induce several subcenters through which the raw materials will be supplied to the members of the cooperative from which the bidi will be collected for marketing.

Sawmills. A few sawmills may also be established at important centers such as Kopaganj, Indara, Kurthizaffarpur and Koiriapar to process both local and imported timber products.

Paper mills. There are good prospects for the setting up of a paper mill at Indara for which raw materials such as bamboo grasses and similar other plants are abundantly available in the area. It may be mentioned here that Indara is located close to the Varanasi-Bhatani main railway line and is thus linked with the Basara, Sathiaon and Ghosi sugar factories whose *Khoi* (bagasse) may also be used for paper making.

Cotton Weaving Industries

Durries. Under this group of industry there are proposed, in the first phase, 10 durry looms each at Kopaganj, Indara, Adari, Alinagar, Kurthizaffarpur and Koiriapar service centers.

Power loom. For the speedy development of cotton-weaving, it is suggested that powerlooms be provided, in the first phase, at Kopaganj and Indara; subsequently, it may be extended to other centers, viz., Adari, Alinagar, Kurthizaffarpur, Koiriapar, Fatehpur and Mohammadpur Khas.

Spinning mill. In line with the development of the textile industry,

the area is reaching a stage where a spinning mill can be introduced at Indara. There are 8,803 handlooms and 528 powerlooms. The total cotton used by them is 12,111 kg. per day. This makes a spinning mill a necessity for the area.

Other Small-Scale Industries

General repair works. The growing number of tractors, pumpsets, automobile and related machines in the study area has necessitated the establishment of repair works which in the first phase have been proposed at Kopaganj and Indara, with at least one in each place.

Dyeing and printing. In view of the general demand, dyeing and printing works may be developed, first at Kopaganj and Indara and then at second-order centers, viz., Kurthizaffarpur, Koiriapar, Fatehpur, Dhelabandh, Shahroj, Kasara and Alinagar.

IDENTIFICATION OF CENTRAL PLACES

In order to suggest a plan for socioeconomic facilities, first of all three levels of central places/service centers have been identified in the study area and their zones of influence have been delineated to overcome the functional gaps. Socioeconomic facilities are often expressed as central services or functions and as such these are supposed to be non-ubiquitous in nature because of technological, economic or institutional considerations. In this context, eight functional groups, viz., administrative, educational medical, veterinary, transport, communication, agricultural, commercial and marketing have been selected for analysis. These functions have emerged out of a grouping of 80 functions. For convenience, all these can be put under two major heads: (1) economic facilities and (2) social facilities.

Economic Facilities

This category includes agricultural marketing, commercial and veterinary facilities. The seed and fertilizer distribution centers and agricultural care units are the main agricultural facilities available in the area. Under commercial facilities, mention can be made of Shadhan, Sahkari Smiti, Grammine Bank and nationalized bank. The market facilities are limited to bi-weekly and daily markets, while the veterinary facilities incorporate a veterinary hospital and two stockman centers. In order to analyze the distributional pattern of each of these facilities, nearest neighbor analysis (Rn) has been applied (Fig. 1).

Social Facilities

The provision of essential social facilities along educational (primary school, middle school, high school and intermediate college), medical

(medical practitioner, government dispensary, health center, P.H.C., mid-wife center and hospital), administrative (block headquarters, police station), transport (request bus stop, bus stop, railway station, railway junction), and communication (branch post office, sub-post office, P & T office and telephone) lines is now regarded as a prerequisite in any development plan for a backward area. Regarding the distributional pattern of these facilities in the area, again the Rn values have been computed and mapped (Fig. 1).

Transport system. For any spatial development the transport system serves as the main channel of energy flow (Sinah, *et al.*, 1978). In the rural areas, the prosperity of villagers depends, to a large extent, on their accessibility to fertilizers, hybrid seeds and other goods and services for which a transport network with a requisite capacity is inevitable.

As a matter of fact, the road network as the backbone of spatial interaction in the rural areas counts as an important factor in their spatio-functional organization. All in all, there are 5 metalled and 12 unmetalled roads. Through these, a national highway connects the area with other states and the state highways connect the area with other parts in its neighborhood. The area is served by a single-tract meter gauge railway line with Indara as the main junction.

Identification of service centers. The centrality of a service center is defined as an objective measure of its functional importance. The centrality of service centers depends on the variety and types of the central functions available. Accordingly, any settlement having the functions and facilities listed below has been taken into account, provided (1) it holds a permanent establishment, (2) it has a population of 1,000 or (3) at least 1 percent of its population is engaged in commerce and other services, and (4) at least 4 functions from different functional groups are found there.

Considering the importance of frequency of availability of a particular function, the weightage of the kth facility for the ith function is evaluated as N/Fik, where Fik is the number of settlements having kth type of facility for the ith function and N is the total number of settlements (Sharma, 1981). In the present context, the functionality index has been calculated on the above lines for all the centers. The highest-value (1,589.23) has been scored by Kopaganj town which has the higher level of 22 functions by virtue of being the block headquarters. The lowest place is that of Fatehpur, characterized by only four lower-order functions and a score value of 45.42. The functionality index and population size for each center is given in Tables 1 and 2 and the same is represented by a scatter diagram (Fig. 2).

TABLE 1. POPULATION THRESHOLD FOR EACH FUNCTION FOR 1981

Socioeconomic Facilities	Entry Point	No. of Settlement Above the Entry Point	No. of Settlement Having the Function	Cumulative Occurrence	Cumulative Occurrence Probability	Weightage Score
Block hars.	19,040	1	1	1	2.6564	146
Police stn.	19,040	1	1	2	5.3008	146
Primary school	260	96	50	52	0.0138	2.92
Middle school	444	73	19	71	0.0188	7.68
High school	647	63	5	76	0.0201	29.2
Intermediate	3,656	6	2	78	0.0206	73
Medical pract.	366	81	22	100	0.0265	6.63
Dispensary	3,338	7	1	101	0.0267	146
Health center	2,717	11	4	105	0.0278	36.5
P.H.C.	19,040	1	1	106	0.0281	146
Child welfare center	891	52	14	120	0.0318	10.43
Hospital	3,656	6	1	121	0.0321	146
Veterinary Dispensary	770	58	2	123	0.0326	73
Veterinary Hospital	19,040	1	1	124	0.0328	146
B.P.O.	647	63	12	136	0.0360	12.17
S.P.O.	3,656	6	2	138	0.0366	73
P & T	3,656	6	2	140	0.0371	73
Telephone	3,656	6	3	143	0.0379	48.67
Request bus stop	444	73	6	149	0.0395	24.33
Bus stop	818	55	7	156	0.0413	20.86
Rly. stn.	3,656	6	2	158	0.0419	73
Rly. junction	3,656	6	1	159	0.0421	146
Seed distribution center	2,717	11	3	162	0.0429	48.67
Fertilizer	1,109	41	6	168	0.0445	24.33
Ag. case unit	19,040	1	6	169	0.0448	146
Sadhan smiti	903	51	11	180	0.0477	13.27
Gramin bank	3,656	6	1	181	0.0479	146
Nationalized bank	19,040	1	1	182	0.0482	146
By-weekly market	1,426	26	2	184	0.0487	73
Daily market	2,981	9	4	188	0.0498	36.5

TABLE 2. SERVICE CENTERS FOR 1981

Name	Weightage Score	Total Population
1. Kopaganj	1,589.23	19,040
2. Indara	893.99	3,656
3. Kasara	305.76	3,338
4. Alinagar	214.02	2,717
5. Kurthizaffarpur	183.46	6,723
6. Koiriapar	160.86	2,981
7. Faizullahpur	96.20	1,785
8. Adari	92.98	6,799
9. Dhawariasath	82.93	2,729
10. Shahroj	69.75	3,880
11. Fatehpur	45.42	2,328

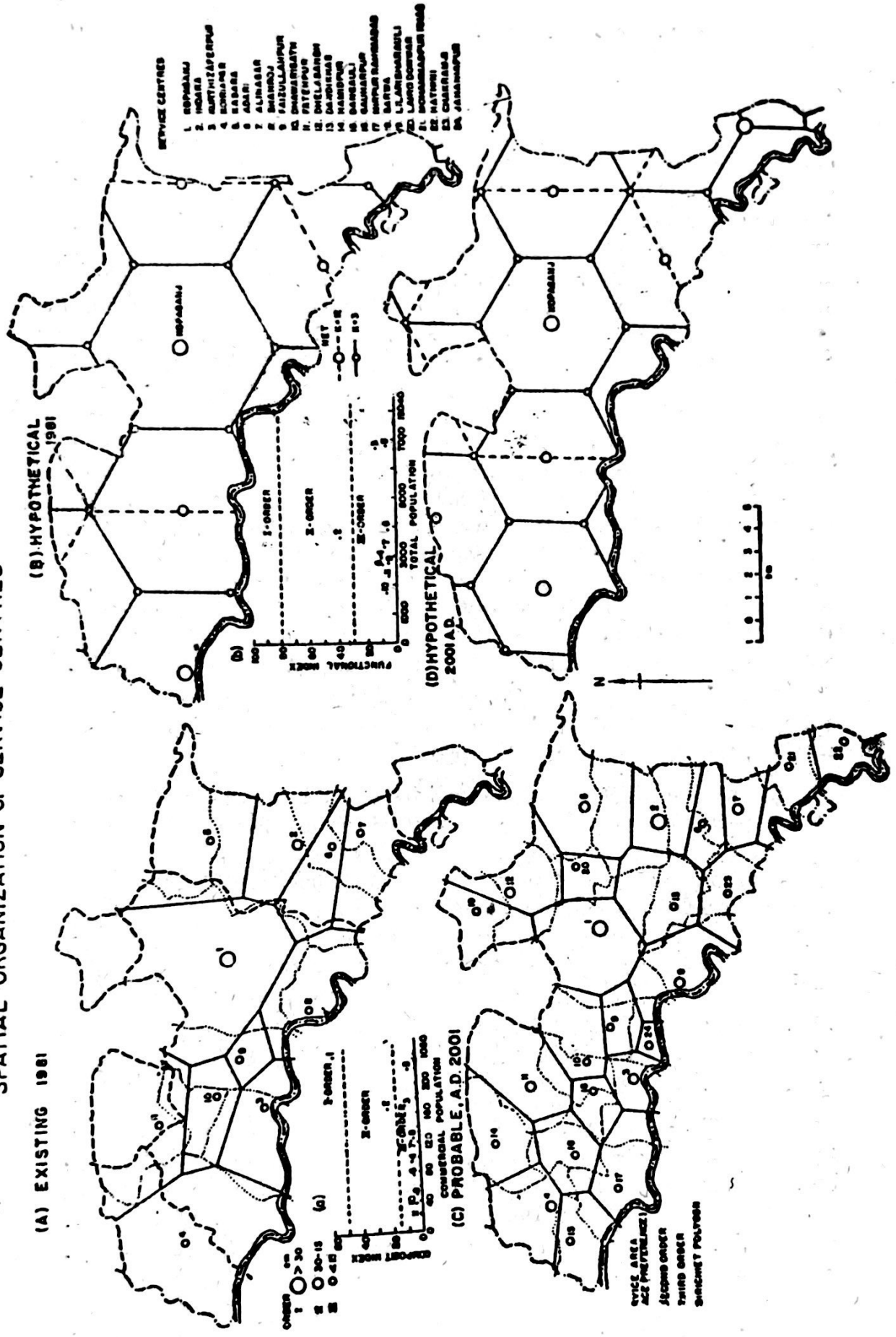

FIG. 2

Hierarchy of service centers. All the centers of an area cannot be equally significant in its total functional organization (Philbrick, 1957). They, in fact, differ in their service-provisioning capacity which in due course generates a kind of hierarchical class system among service centers. Such a three-tier hierarchy of service centers in the study area has been categorically tabulated (Table 2). Kopaganj emerges as an urban center with the distinct characteristic of a rural service center. It is also the block headquarters and police station. Due to the concentration of diversified functions and high population including the commercial one, it has acquired a very high functionality index (1,589.23), which accounts for its ranking as a first-order center. A second-order center, Indara, has a railway junction, an intermediate college and a hospital; it has a functionality index of 893.99. For the third-order centers, the functionality index ranges between 305.76 (Kasara) and 45.42 (Fatehpur). Table 3 presents a comparative view of the frequency of service centers under existing as well as hypothetical situations. The hypothetical spacing is obviously associated with a uniform organization of space, unlike in the case of observed spacing as depicted in the table. The average Hs for the region comes to 4.52 km. but it reaches 15 km. for the first-order center. The nearest neighbor statistics (Rn) show that the first-, second- and third-order centers have values of 1.15, 0.86 and 1.10, which are further supported by Di values: 53.33 percent for the first-order, 40.00 percent for the second-order and 51.30 percent for the third-order centers. Even the block as a whole shows a very low dispersion (Rn=1.28, Di=59.51 percent) trend.

The service efficiency of the centers has been measured in terms of the population and the area served. For this purpose, the K=3 network is taken as a base in view of its proximity to the existing situation. In this type of network, the values increase simultaneously three times from a lower to a higher order. The average efficiency for each center in the study area comes to 12,994 persons and 17.69 km.^{2}, while the first-order center serves an average of 98,958 persons and a 154.72 km.^{2} area. Obviously, there is a wide gap between the first- and the third-order centers, both in terms of population and area. This gap should be minimized through a proper ideal model framework in a spatio-organizational system of service centers.

Spatio-functional gap in the service center network. There are found spatial as well as functional gaps in the existing network of service centers. These gaps represent the unserved areas and a conspicuous lack of transport links among service centers. Such spatial gaps are more obvious in the western, northeastern and southern parts of the block.

TABLE 3. SPATIAL ORGANIZATION OF SERVICE CENTERS

Centrality	No. of Service Centers		Spacing of Service Centers		Nature of Dispersion		Population Served		Area Served	
	Existing	Hypothetical	ro, Observed	Hs, Hypothetical 1981	Rn	Di	Total	Average	Total	Average
Above 30	1	2	8	15	1.15	53.33	98,958	98,958	134.723	134.723
30 — 15	1	4	6	15	0.86	40.00	32,986	32,986	44.907	44.907
Below 15	9	8	2.56	4.99	1.10	51.30	10,995	1,222	14.969	1.660
	11	14	2.69	4.52	1.28	59.51	142,940	12,994	194.6	17.69
				2001 A.D.						
—	2	3	6	10.59	1.22	56.65	151,406	75,703	134.723	67.36
—	7	6	4.86	5.66	1.84	85.86	50,469	7,209	44.907	6.425
—	15	12	2.76	3.87	1.53	71.31	16,823	1,121	14.969	0.997
	24	21	2.22	3.05	1.56	72.57	218,698	9,112	194.6	8.108

Source: Personal observation.

The functional gap is reflected in the significant development of only one center, i.e., Kopaganj. This gap can be removed with the development of second- and third-order service centers.

Proposed system of settlement hierarchy and improvement in existing service centers. The spatio-functional gaps and local demand for services affect the hierarchy of service centers in a region. Therefore, these factors have been taken into consideration while proposing the future service center plan.

Taking into account the spatial infilling process and the population growth rate, a spatial plan has been suggested for 2001 A.D. By the end of the century, based on the present growth rate the region will have to feed 213,698 people and who will need at least 24 centers of different orders. These centers would provide better socioeconomic facilities in the region. Looking to the future spatial arrangement of centers and associated transport networks, their nodality and other favorable conditions, a probable organization of various centers and their complementary regions has been suggested.

Hierarchy pattern. The first-order centers which are equipped with better transportation facilities have a tendency to grow faster; at the same time, the central villages have some functions and facilities which give brighter prospects for development. In view of this, a three-tier system of service centers has been proposed for 2001 A.D., with the end in view of minimizing the regional imbalances through the provision of appropriate services.

There are, in all, two service centers of first order, including the proposed new one (Indara). The first-order service centers are supposed to have most of the central functions. As such, Kopaganj, the most developed and dominant center of the area, has all the considered central functions, e.g., grammine bank, railway junction and intermediate college. Second-order centers, numbering seven, are by and large market centers. In this connection, Koiriapar, Kurthizaffarpur, Shahroj, Alinagar, Kasara, Dhelabandh and Fatehpur which at present belong to the third order, are proposed to be developed as second-order centers. In proposing the spatial pattern of second-order service centers for 2001 A.D., an attempt has been made to maintain a regular Rn value. These, following the hypothetical spacing (Hs), will be reduced from 15 to 5.66 km. But the service range in the population context will be increased. On the average, a center will serve 7,209 persons and a 6.415 km.^{2} area.

The second-order centers will have various functions, e.g., education, medical, credit and extension services, etc. By 2001 A.D., at every such center there will be an intermediate college, a high school, a sub-health center, a branch post office, a bus stop and a cooperative bank.

The third-order centers should have at least the minimum of requisite social social facilities and they should be connected with each other by metalled and unmetalled roads so that the remaining additional facilities may easily be made available to the people. Mirpurrahimabad, Gauharpur, Sarwa, Lilaribharauli, Ramjisikathia, Mohammadpurkhas and Hathini are the proposed third-order centers, in addition to Dhawariasath, Faizullahpur, Adari, Hamidpur, Dangauli, Jahaniapur, Lairodonwar and Dandikhas which are the existing service centers.

The spatial characteristics of third-order centers, as expressed through observed (ro) and hypothetical spacing (Hs), are given due weightage in spatial organization for 2001 A.D. With the proposed growth in the number of centers, the Hs will be reduced from 4.99 to 3.87 km. and the Rn value will increase from 1.10 to 1.53. Thus, in 2001 A.D. a center of the third-order will serve, on the average, 16,823 persons and a 14.969 km.^{2} area as given in Table 3.

In conclusion, it can be remarked that the area under study can achieve its desired growth and development in different sectors of the economy only with the adoption of a multi-pronged strategy. In this,, the socioeconomic facilities will prove to be a crucial factor in upgrading the economic level and welfare of the people in the area.

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ENVIRONMENTAL EFFECTS OF SEAWEED FARMING*

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ABSTRACT. In order to put the question of the adverse effects of seaweed farming on the coral reef environment on a correct perspective, there is a need to understand seaweeds and their ecological role in the marine environment as well as the farming processes associated with them. Together with other marine flora, seaweeds as primary producers in the biotic pyramid provide the base on which the productivity of the marine communities is built. Proper farming practices have shown that the negative effects of farming this resource are actually minimal and, in fact, result in the general enhancement of the marine environment. Potential environmental problems such as those posed by fishing and animal food gathering, domestic waste disposal and illegal fishing methods can be prevented by easily followed measures, by education campaigns and by strict enforcement of laws. Seaweed farming can easily be harmonized with conservation efforts through a compromise approach which includes the zoning of the resource area.

INTRODUCTION

The increasing interest in the open reef farming of seaweeds has generated both favorable and unfavorable responses from various quarters. For those who are engaged in farming as a livelihood the activity is a boon. Because farming is generally sited in open reef areas, it is feared by some quarters that the activities will have some adverse effects on the coral reef environment, i.e., that the influx of farmers in the site and their activities will have negative environmental effects on the local flora and fauna.

The understanding of what seaweeds are and their ecological role in the marine environment as well as the farming processes are important in order to put the question of the effects of farming on the environment on the correct perspective. Seaweeds are one of the main primary producers in the shallow water coastal environment. As such they are one of the primary agents responsible for the production of organic matter and energy on which the other members in the food chain depend. Thus, together with the seagrasses, mangrove and phytoplankton, they provide the base on which the productivity of the marine communities is built. As primary producers they utilize dissolved carbon dioxide and water as raw materials in the production of organic matter

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through the process of photosynthesis. They also absorb nutrients directly from seawater for their growth and development. Oxygen is a by-product they evolve during the process of photosynthesis which is essential in the process of respiration. The presence of seaweeds also enhances the environmental conditions for the other members of the community, i.e., they serve as shelter and habitat for many associated fauna.

ENVIRONMENTAL EFFECTS OF SEAWEED FARMING

The knowledge of the farming processes is important in understanding the possible effects of these activities to the marine environment. The first step is the selection of the potential site. Farming sites are generally located within the reef flat far from the reef edge which is exposed to strong wave-action. These areas are characterized by seagrass/seaweed communities and are generally located far from well-developed coral communities which are mainly distributed at the wave-exposed edge and seaward slope of the reef. When the potentials of the site is ascertained, the next step is the construction of the support system of the farm. During this stage some clearing may be necessary if the area supports thick vegetation. Removal of rocky outcrops may also be necessary in some cases but generally the cutting of tall seagrass and removal of seaweed thalli are all that may be done. The planting and harvesting activities will entail some trampling of the ground by farmers.

From the brief description of the major activities in farming areas one will immediately see that the negative effects of farming are minimal and these are readily offset by the positive ecological benefits from farming. The best farming areas in the Philippines and in the Western Pacific are reef flats which are generally depauperate of living organisms. One has to see these areas to appreciate this point. The introduction of seaweed farming results to the general enhancement of the environment in these areas. As primary producers, seaweeds will significantly enhance organic production to the benefit of herbivores or the grazing animals, e.g., finfishes and invertebrates such as sea urchins and gastropods which are in turn being fed upon by the other organisms at the higher level in the food chain. Thus, a general improvement of the general productivity on the reef flat will result. In addition, the presence of a large biomass of seaweeds attached to the farm support system results to habitat enhancement by providing shade, cover and attachment surfaces to associated marine animals.

In farming areas far from the homes of the farmers, the putting up of some farm houses becomes necessary. Activities other than farming wil be engaged in by farmers such as fishing or gathering

of food animals from the reef. Disposal of domestic waste materials may also be a source of pollutants in the reef environment. These potential environmental problems are, however, readily resolved or can easily be prevented by simple and easily followed measures. Besides, in good farming areas characterized by good tidal currents, domestic pollutants which are organic in nature do not accumulate on the reef because these are very easily dispersed and decomposed. The non-biodegradable wastes like plastic containers/bags, etc., can easily be disposed of by burning. One has to visit the MCPI Corporation farm in Danajon where domestic pollution has never been a problem. On the other hand, the use by farmers of illegal fishing methods such as dynamite blasting is a potential problem which can be resolved by educating them of its bad effects and by the application of appropriate laws. The strict observance by the farmers of the law can be tied to their rights to farm the area, i.e., they lose their farming rights if they fish using illegal methods.

CONSERVATION AND SEAWEED FARMING

While conservation problems may develop in seaweed farming areas, these are not without easily applied solutions. Besides, the decision to permit farming or not on a reef environment should consider other factors, in particular, the need for productive economic activity in the context of the present economic problems in the country especially in the remote rural areas. The shallow coastal areas are resources which when utilized in a rational way can be a boon to the local population. Seaweed farming of the reef flats can easily be harmonized with our conservation efforts. A certain level of compromise between the users of the resources — the farmers — and the need to conserve the other resources can easily be attained in situations where the farming of the area can be organized or managed through a farmers' association or cooperative.

There is no question as to the importance of conserving our natural heritage/resources. Conservation is defined by Webster as "a planned management of a natural resource to prevent exploitation, destruction or neglect." The formulation and application of a management plan for the rational use of a resource may, therefore, be a good compromise approach. The basic plan should include the zoning of the resource area and the definition of the use by users of the different zones to prevent the conflicting use of such zones. Once defined, strict implementation of rules applied to the use of such zones should be complied with.

Among the basic reasons why conservation programs have failed and are continuing to fail is the inability of concerned agencies to strictly

enforce conservation measures and the complete disregard by the resource user in observing the rules governing the use of the resources. But one cannot wholly blame the personnel who are supposed to implement conservation programs and enforce the rules/laws. In most cases, only the most fanatical and the "most highly dedicated" (assuming we still have these types) conservation personnel will risk their life and disregard their own personal needs and basic comfort to manage and implement these programs especially in far-flung places or in very inaccessible areas where the basic and normal amenities such as transportation, food and shelter are not available. On the other hand, the resource users are motivated by different reasons: profit and gain, or plain survival. Those motivated by profit or gain would generally have the means to exploit even conservation areas in far-flung places. Those who are trying merely to survive because of lack of alternative livelihood will continue to exploit whatever resources are available to them. They have no other choice. There are many good examples of conservation or conserved areas which failed and are continuously being destroyed today. These are typical situations where the opposing forces that include the resource users, the lowly fishermen and those mandated to enforce conservation measures do not have, or are not offered the opportunity to agree or harmonize their interests and activities.

More recently, there are resource development efforts where the opportunity for developing a model of a planned and managed resource development project, e.g., seaweed farming and conservation, can be harmonized for the benefit of all concerned. I am referring to the present Tubbataha Reef issue. This case is similar to the plan to totally ban logging to conserve the forest resources, as if the ban will prevent the denudation of the forest. On the other hand, a few conservation areas are quite successful mainly because the resource users are made to understand the need to conserve the area and are made active participants in the management of these areas.

Why don't we give this approach a good try?

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AN OVERVIEW OF THE METHODS AND TECHNICAL CONSIDERATIONS IN THE VALUATION OF AGRICULTURAL LANDS*

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ABSTRACT. The need for accurate valuation of agricultural land in the implementation of land reform cannot be overemphasized. In land valuation, three common methods are used: market approach, income capitalization method and productivity method. The Philippine land reform program has used two methods, one being the productivity approach which during the Marcos administration was used on rice and corn lands. For all other crops, the present Aquino administration uses a method which combines market value, assessor's market value and landowner's declared value. The difficulty with the productivity method lies in the collection of reliable historical data on yield/production. In the second method, the main problem lies in the availability of comparable sales data, not to mention six other weaknesses. A wise approach is to use, where applicable, the different methods as a way of counterchecking each other's results. An agricultural land valuation system is recommended that would require a land information system, training of appraisers and preparation of land value and related maps.

INTRODUCTION

Valuation of land becomes an intricate and tedious process if accuracy or precision is the desired outcome of this exercise. Accuracy and precision of land valuation virtually depends on the availability of reliable data and information at the level of detail needed (i.e., farm level) in estimating or appraising land values. Physical measurements such as size of area, location of property, yield/production, value of improvements, etc., may be determined with a high degree of accuracy whereas other factors such as depreciation, capitalization rate, level of management, land utilization and land rents may be determined with a lesser degree of accuracy because of the difficulty of collecting exact information.

Valuation is a sensitive task since errors committed in the process are greatly magnified. It also counts on the experience, skills and expertise of the land appraiser. Land appraisal which is considered an art and a science has then become a profession. In practice, it has been noted that appraisal of land by a novice is usually conducted in a haphazard manner. In such cases, the real worth of a property or a

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land is not consummated. This case is reportedly common in the appraisal of agricultural lands under the agrarian reform program, both past and present. It is also a widespread observation that most lands voluntarily offered for sale are usually problematic lands — marginal lands, lands located in rebel infested areas, lands occupied by squatters, lands located in inaccessible and remote places — somehow inferring that land prices presently offered by the government are not attractive enough to bring out the prime agricultural lands in the market. It may be possible that this situation reflects the skepticism or distrust of landowners on the land valuation scheme being employed by the government.

Land valuation is not merely the application of given formulas and following strictly valuation procedures. Valuation also entails subjective judgment and requires that land valuers possess a sound knowledge of what they are appraising. Land valuers, for instance, should have an understanding and knowledge of the productivity and potentials of the land, cropping system and other technical requisites for land valuation. A land valuator should actually conduct an ocular inspection of the land to verify the data in his possession and his initial appraisal of the land.

Every land has certain attributes which may not necessarily be found in all adjacent lands. A clear boundary delineation is therefore necessary to group lands with more or less similar attributes. Thus, the primary requirement of a good land valuation system is to have a strong land resource information system at its helm. Likewise, it should also have trained land valuers at its disposal. Without these ingredients even the best valuation guidelines are doomed to fail.

This paper aims to provide an overview of the various methods of land valuation, including those currently being employed by the agrarian reform program of the Philippine government, and some notes on the technical aspects of land valuation that should be given due consideration. The paper, however, will highlight the application of selected land valuation methods in *land value mapping* at the provincial, subregional and regional scale rather than expound on the details and intricacies of valuing properties and sites at the micro-scale (i.e., farm level). The paper hopes to provide some technical directions and insights to agricultural land use planners and provincial/regional planners in the conduct of *land value mapping* for subregional and regional resources assessment and planning. A land valuation scheme is also proposed to set the mode for land value mapping. The figures to be generated by such valuation scheme will serve as bases for roughly validating and checking proposed sale prices and/or computed land values of agricultural lands using certain valuation methods prescribed by the Comprehensive Agrarian Reform Program (CARP).

METHODS OF AGRICULTURAL LAND VALUATION

Value may be defined as the monetary worth of something. It is usually taken as the market price of a property. A market price, however, is not the true value of a thing to a person but rather a compromise value. Nevertheless, the best estimate of the worth of a property is its market value — the price at which a well-informed seller and buyer would be willing to sell and buy, respectively, in the open market under normal conditions or without pressure. The market value of a property is therefore distorted when a seller is under compulsion to sell and the buyer monopolizes the market. This monopsonic condition prevails in the local market for agricultural lands. Under this condition, how do we then determine the value that could be considered as a fair value or just compensation for agricultural lands covered by the agrarian reform program?

There are three common methods of land valuation which are also applicable to agricultural lands. These are: (1) market-comparison or market approach; (2) income-capitalization method; and (3) productivity method. Other methods developed originated from these classical methods and are hybrids of such methods.

Market Approach

The property is valued on the basis of the sale of comparable properties in the market. In this approach, the appraised value is correlated with the current supply and demand conditions. This method is not particularly suited to Philippine conditions because of market distortions as explained above. Under the agrarian reform program, the seller is in a weak bargaining position since he only suggests the price and the government ultimately decides on what is a fair price. If the proposed price of the voluntarily offered lands for sale (VOS) is not acceptable to DAR and the landowner is not amenable either to accept DAR's offered price, the VOS is treated as a compulsorily acquired land and its value will be determined by DAR as provided for in DAR's Administrative Order Numbers 2 and 3, Series of 1989 (Section IV-C (3) and Section IV-D (6), respectively).

It therefore becomes imperative for the land valuation scheme adopted by the government to be just and rational in order to compensate for the imperfect market condition created by the agrarian reform program. The choice of the government for a land valuation method then becomes critical to the success of the land acquisition program of CARP. *It is interesting to note that the blending of a socialistic program with a capitalistic society puts the government in a position which is difficult to reconcile.*

The market approach of land valuation would work best for urban lands and agricultural lands not covered by the Agrarian Reform Law (i.e., below the 5-hectare retention ceiling and at the same time non-tenanted).

Income-capitalization Method

Theoretically, the true value or market value of a property should be close to the present value of the future streams of income it is capable of generating. Agricultural lands in particular are expected to generate income annually into the future. Until when a parcel of land will continuously generate income is quite difficult to determine. It is assumed that prime agricultural lands, if properly protected, conserved and preserved for agricultural purposes, will generate incomes in perpetuity. In this case, a formula to capture the present value of the expected future flow of income from agricultural lands (or what is termed as land rents) is presented below and this is known as the income-capitalization method of land valuation.

$$V = \frac{L}{R} \qquad (1)$$

where: V represents the value of the property
L is the average annual land rent or net return to land expected in the future
R is the rate of interest used in the capitalization process

Land rent is defined as the economic return that accrues or should accrue to land and land improvements for their use in production. Improvements refer to 1) modification of the original conditions of the land such as clearing, draining, or water diversion; and 2) construction of structural facilities such as farm buildings, fencing, etc., in order to enhance production.

Land rent is calculated by deducting from gross income the operating costs, including taxes and insurance. Family labor is costed under operating cost. The basic information/data needed in computing land rents are yield and production, costs of labor and inputs, and farmgate price of produce. In addition, the income derived from land improvements such as farm buildings (e.g., storage) and the costs of maintenance are also accounted for.

Capitalization rate is the ratio between the net returns and capital value of the land or property. Net return is equivalent to land rent while capital value is estimated based on comparable sales. For example, a lowland rice land with a capital value of ₱30,000 per hectare based on comparable sales and an annual net income of ₱6,250 per hectare has a

capitalization rate of about 21%. When comparable sales data are absent or unreliable, capitalization rate is estimated based on the mortgage rate of interest or the rate of interest of government bonds. However, in areas with higher risks of investment (erosion-prone areas, flood-prone areas, typhoon belt areas, drought-stricken areas, areas with history of recurring outbreaks of pests and diseases), a capitalization rate that is higher than the relatively safe, non-risk rate used with government bonds is employed. Likewise, farm ownership carries more risk than mortgage lending and therefore should have a higher rate of return.

In a case wherein land rents are estimated or projected to fluctuate (i.e., increase or decrease) in the future and continue for only a limited number of years, a modified formula is used (See equations 2 and 3 below).

When land rents increase or decrease in the future, the valuer may either adjust his estimate of the average annual land rent to account for these changes or he may employ the following formula (Barlowe, 1958):

$$V = \frac{L}{R} \pm \frac{I}{R^2} \qquad (2)$$

where: I represents the average change in terms of increased or decreased return that is expected to result either from more intensive use of land or continued soil erosion.

When the expected increase or decrease is projected to continue for only a specific number of years and then followed by a period of relatively constant returns, the following formula may be used:

$$V = \frac{L}{R} \pm \frac{I}{R^2} \left[1 - \frac{1}{(1+R)^n} \right] \qquad (3)$$

Productivity Method

Under the *productivity method,* the value of a given agricultural land is based on its level of yield and production. The method is a practical and acceptable means of estimating land values in the absence of comparable sales data. Productivity method is usually used in checking or verifying the market prices of land. The estimates based on this method serve as a solid evidence of the true worth of prime agricultural lands.

It is important to note that in any land valuation, the assumption normally taken is that the land being valued will be devoted to its highest and best use. Otherwise, there would be no common denominator to which values could be compared. Best and highest use refers to the

particular type of land use that will give the highest yield and/or income without degradation of the soil resources. Thus, best use in effect means devoting the land to its most suitable use while highest use connotes the possible maximum sustainable income that could be derived from the land under a particular use. This principle is very important in the determination of land values using the productivity method.

Two approaches may be adopted in the use of the productivity method: (1) estimation of the existing yield/production under the actual level of management and (2) estimation of the potential yield/production under the best management, technology and input levels.

Under the first approach, the average yield of crops planted in a given agricultural land during the preceding 5- to 10-year period serves as the basis for land valuation. The yield data are then converted into their market values to compute for the gross income derived from the land. The average annual costs of all farming operations under average management are deducted from the gross income to get the annual net income from land. The income-capitalization formula is then employed to estimate the value of the land. For the second approach, the potential yield/production of a piece of land planted to the most suitable crops under the best cropping system and utilizing the most appropriate management, technology and input levels is estimated using the results from experimental stations or by employing empirical yield/production models. The net income is then estimated and inputted into the income-capitalization formula to derive the value of land.

Land improvements are valued separately and their value is added to the land value. Land improvements are valued by using the *straight line method* of computing depreciation (i.e., value of structures minus salvage value divided by the expected life span of the improvement structures). Another approach in valuing improvements such as drainage, reclamation, filling, clearing, etc., is the use of the *depreciated replacement cost method.* The value of an improvement may be ascertained at any time by taking the cost of replacement of an equivalent improvement, at the relevant date, and by writing down such cost by the amount of depreciation which has accrued in the existing structure (Murray, 1954).

Methods Used in Agrarian Reform

Valuation of agricultural lands under the agrarian reform program has utilized two methods. For rice and corn lands covered by Presidential Decree No. 27 (Emancipation of Tenant Farmers), the land valuation method adopted employs the productivity approach. Under PD 27, the value of land is equivalent to two and a-half times (2.5 times)

the average harvest (average gross production) of the three (3) normal crop years immediately preceding the promulgation of the decree. For all other crops, the Comprehensive Agrarian Reform Program of the present administration has developed a method for land valuation which combines market value, assessor's market value and landowner's declared value. The land valuation method adopted by CARP claims to subsume all the factors stipulated under the Comprehensive Agrarian Reform Law (Republic Act No. 6657) for determining just compensation. These factors are: (1) the cost of acquisition of the land; (2) its nature, actual use and income; (3) the sworn valuation by the owner; (4) the assessment made by government assessors; (5) the social and economic benefit contributed by the farmers, farmworkers and by the government; and (6) taxes and loans.

As provided for in the Department of Agrarian Reform's Administrative Order No. 6, Series of 1989 (Subject: Rules and Procedures on Land Valuation and Just Compensation), the land valuation formula is presented as follows:

$$TLV = \frac{MV + AMV + DV}{3} \qquad (4)$$

where: TLV is the total land value

MV is the market value which refers to the latest comparable transactions within the municipality/province/region, depending on availability of data. Mortgages which take into account bank exposures shall also be considered in computing for this value.

AMV is the assessor's market value which refers to the assessment made by government assessors.

DV is the declared value which refers to the landowner's declaration per E.O. 229 or R.A. 6657. In no case shall this declaration exceed 200% of the average adjusted values of MV and AMV. In the absence of such declaration, the value of DV shall be based on this upper limit.

In case of idle and abandoned lands where MV could not be obtained, the summation of the values of AMV and DV shall be used divided by two. In all cases, adjustments for inflation are made using the Provincial Consumer's Price Index officially published by the National Census and Statistics Office (NCSO). Inflation factor is computed as follows:

$$IF = \frac{CPI\ (current)}{CPI\ (DDA)} \qquad (5)$$

where: DDA is the date of declaration or assessment.

Improvements which directly contribute to the productivity of land are accounted for using the following formula:

$$PV = (CC - TD)\ (IF) \quad (6)$$

where: PV = present value of improvement
CC = construction cost
TD = total depreciation
IF = inflation factor

$$TD = \text{Annual depreciation (AD) x Number of years improvements have existed (LE)} \quad (7)$$

$$AD = \frac{\text{Construction cost} - \text{Salvage value (SV)}}{\text{Expected life span of improvement}} \quad (8)$$

$$SV = \frac{\text{Construction cost}}{LE} \quad (9)$$

The above land valuation method is presently being followed by the DAR personnel in all agricultural land appraisals. However, there are various proposals to revise some aspects of the valuation method which are currently being discussed.

Very recently, the DAR came up with the revised guidelines on land valuation under Administrative Order No. 17, Series of 1989 (Rules and Regulations Amending Valuation of Lands Voluntarily Offered Pursuant to E.O. 229 and R.A. 6657 and those Compulsorily Acquired Pursuant to R.A. 6657). This new set of guidelines issued by the Santiago administration is an improved version of the land valuation guidelines passed under the Juico administration.

SOME WEAKNESSES AND LIMITATIONS OF VALUATION METHODS

To properly guide valuers in their choice of a method for agricultural land valuation, it is important to point out some of the weaknesses and limitations of the methods discussed in this paper.

1. *Market approach.* This approach is closely associated with the fluctuation of prices in the local market, thereby making it less useful in determining the long-term potential value of an agricultural land. Comparable sales data may also be difficult to obtain with regard to properties which are rarely sold. Furthermore, in areas where sales of agricultural lands are scarce, the dearth of comparable sales data limits the use of the market comparison approach. Appraisers also find it difficult to locate closely comparable properties in a heterogeneous environment.

2. *Income-capitalization approach.* This approach is particularly being used in the appraisal of income-generating properties such as

industrial and commercial properties, commercial farms, and rental housing. An accurate estimate of the land rents and the choice of a capitalization rate involve complicated procedures which may pose some difficulties to non-skilled appraisers. In the calculation of agricultural land rent, the net returns depend on the level of management, thereby rendering the value of land as highly variable. A highly fertile land, for instance, which is poorly managed will give low net returns and therefore will yield a low value when appraised using the income-capitalization method. Inversely, a fairly or moderately fertile land may yield higher net returns if managed properly, thus its valuation may be close to that of the more fertile lands. In many cases, the actual level of farm management is difficult to determine with acceptable degree of reliability.

3. *Productivity method.* Under this method, the difficulty lies in the collection of reliable historical data on the yield/production (i.e., 5-10 years record) of the crops cultivated in a given parcel of land. Furthermore, such scheme may not be particularly applicable to idle and abandoned lands and lands newly opened for agricultural production. On the other hand, in calculating the potentials of the land being valuated, an inexperienced and less trained valuer may find it difficult to apply sophisticated and highly quantitative yield/production models. The use of these models is not only useful in determining the potentialities and limitations of the lands being appraised but also provides an estimate of the productivity of idle, abandoned and newly opened lands for agricultural use in cases where production records are not available.

4. *Valuation methods used in the agrarian reform program.* The CARP method employs several parameters, thus making it more susceptible to selfish manipulations. Again, an honest-to-goodness comparable sales data may be hard to find and could therefore be fallaciously declared to facilitate valuation and easily meet work targets and/or to maliciously jack-up the price of land. It appears then that the comparable sales data is the Achilles heel of the CARP method. Another weak point in the method formulated by the Juico administration is the 200% ceiling of the average of the adjusted values of MV and AMV allowed for the declared value which may result to an overvaluation especially when the market value is marked-up as a result of manipulations in the comparable sales data. A cunning vendor or seller, especially the syndicated middlemen of VOS lands, could easily find ways to overvalue his land using this method.

The productivity method employed under PD 27 has also its inherent weaknesses. Basing the value of land on average production may not be a true measure of its worth since production, as argued earlier, is dependent on the level of management, technology and inputs. The

method under PD 27 stipulates the value of land to be the average gross production multiplied by a factor of 2.5. Fertile lands under poor management and low level of technology and inputs will therefore sell less than its real value as compared to less fertile ones but managed well and employ high technology and input levels. Moreover, obtaining reliable and accurate yield/production data is sometimes difficult. Any slight error in the estimation of yield/production is magnified in the process of land valuation using this method.

An analysis of the Santiago guidelines, considering the administrative system in which they will operate, revealed the following weaknesses:

i. The computational procedures involved in land valuation are too cumbersome. The less trained MAROs[1] will find some difficulties in implementing these procedures, considering their technical competence, other work loads, lean staff and volume of claimants for VOS clients. Perhaps, a straightforward and much-simplified procedure utilizing a minimum set of data which are readily available and/or accessible should be used instead. Moreover, in order to simplify and minimize calculation errors, a user-friendly computer software of the valuation calculus should be made available to the MAROs.

ii. The provisions defining the scope of comparable sales (Section I, No. 3) are inadequate. Comparable lands should not only be similar in topography and land use but also in terms of soil type or characteristics and climatic conditions. All these factors greatly influence yield and production — the major basis for determining the worth of a parcel of land.

iii. The formula for the Capitalized Net Income (CNI) (Section I, letter D), in the absence of data on cost of operations, redounds to the classical productivity method. In this case, the formula becomes redundant. The formula then becomes: CNI = Annual Average Gross Production x Farmgate Price which is no longer appropriate to derive the capitalized net income. Moreover, the given constant value of 20% is an underestimation of the proportion of the cost of operations from the net income.

iv. The capitalization rate employed was fixed to 20%. This rate should not be fixed but rather follow the opportunity cost of capital plus an increment to safely capture the risks involved. Fixing the capitalization rate may result to either undervaluation or overvaluation.

v. Computing the income from multiple cropping is important but tedious. This is the point where most MAROs will encounter some

[1] Municipal Agrarian Reform Officers

difficulties during land valuation because of the variability of multiple cropping practices or patterns and the difficulty of verifying farmers' claims. Another Waterloo for the MAROs and even the concerned LBP staff is the valuation of land improvements. The guidelines did not exactly define the scope of what could be considered as land improvements.

vi. There is no empirical basis for assigning weights to the variables used in the land valuation formula. It seems that the assigned weights (i.e., CS=30%, CNI=40%, and MV=30%) were based on subjective judgment. It would be more logical and acceptable if the major valuation variables (i.e., comparable sales, capitalized net income and market value) would be assigned weights in accordance with the accuracy of the data used. For example, if land characteristics do not fully match between two parcels of land, the use of comparable sales data (CS) is less accurate and therefore should be assigned a lower weight in contrast to capitalized net income (CNI).

With the advent of the Abad administration in the DAR, there is a big possibility that these guidelines would further be amended even before its full-scale implementation. It is quite noticeable that DAR guidelines are being revised in the same frequency as the department is reorganized. The DAR has been reportedly busy for the last two years reorganizing rather than fully expending its efforts in doing its job.

The root causes of the poor implementation of the land valuation system have not been addressed properly. These are: (1) lack of technical competence on the part of the field technicians of the DAR; (2) absence or lack of reliable information and data base; and (3) too complicated or cumbersome guidelines.

CONCLUSIONS AND RECOMMENDATIONS

Going back to the question raised earlier regarding the best method to use in land valuation, it appears that using a single method is not a wise approach to the valuation of agricultural lands covered by the agrarian reform program. It would be more advisable to employ one method such as the income-capitalization method and have the results validated and counter-checked through the use of another reliable method such as the productivity method. Another option for the appraiser is to compare the results obtained from the CARP method with the income-capitalization method. A wide discrepancy in the results of any of the two-combination methods leads the appraiser to suspect some inconsistencies in the data/information or report presented/submitted to him or which he has in possession. This will then compel him to scrutinize closely the details (including the correctness of computations) and to

conduct field verification of data/information. Thus, great blunders in land valuation are avoided under this scheme.

In the development of an *agricultural land valuation system* for the purposes of generating benchmarks useful for regional land resources assessment and planning and for validation of computed prices of VOS lands under the agrarian reform program, the primary requirements include the following:

1. Establishment of a computer-based Land Information System giving data/information on soils and geology, topography, water resources, climate and climatic anomalies (typhoons, drought, flooding, tsunamis), land use, cropping system, management and technology, fare size, tenurial status and other pertinent physical information. A relational data base on agro-economic data/information which includes current prices of produce, cost of inputs and labor, land prices or cost of acquisition, and comparable sales data should likewise be created.

2. Training of appraisers/valuers on the application of selected land valuation methods in addition to the legally prescribed method. The MAROs and other personnel of the DAR who are involved in land valuation should be given the appropriate training in land appraisal to effectively and efficiently discharge their duties. However, the responsibility of valuing lands should not solely be given to the MAROs who are actually tasked with so many other activities. The MAROs require some technical support from the technicians of the other branches of the government such as the Department of Agriculture, Department of Environment and Natural Resources and the Land Bank of the Philippines in the appraisal of agricultural lands involving intricate measurements or technical complexities.

3. Preparation of Land Value Maps covering all agrarian reform areas. Land value mapping at the provincial and regional scales could be undertaken within a *reasonable* period of time (about 15 months), with a *minimum* level of effort (inter-agency collaboration in terms of generation of vital data/information), and with a *modest* amount of resources (₱2.5 million) by using the *rapid land value appraisal technique*. The formulation of land value maps should consider the following guidelines:

a) Agricultural lands should be valuated according to their highest and best use. Valuation could be done under two schemes:

1) Average yield/production accounting under normal or actual level of farm management; and

2) Potential yield/production accounting under the best management level.

Scheme 1 will have to depend on statistical data recorded in the field while Scheme 2 will have to rely on experimental data and/or empirical yield/production models currently available in the market such as the FAO's AEZ model, BSWM's LARIS model, Crop micro-decision model, ECO2 model, Wagenigen's productivity model, Cornell University's ALES model, and UNDP's LECS model. These models determine the land suitability of a given parcel of land and compute the potential yield/production and net income (i.e., land rent) of such land. From the results generated by the aforementioned models, a *productivity index map* could easily be established. The productivity index map is just one of the major inputs to land value mapping.

It should, however, be emphasized that net returns should be computed on the basis of cropping system and not on the basis of the major crop planted inasmuch as secondary crops contribute a significant share in the total income of a farming household. In this light, Scheme 1 should take into account the existing cropping system while Scheme 2 should consider the best cropping system possible.

b) The location of the lands relative to urban centers and markets needs to be established in all agrarian reform-covered areas. Specifically, the distance of the agricultural land to urban and market centers should be measured and expressed in a *locational advantage map.* This map is a composite expression of the locational value of agricultural lands. Lands located nearest the urban centers/markets have greater rent than those located at greater distances because of the increment incurred in transportation costs.

c) Land improvements should also be inventoried and depicted in a *land improvement map.* The inventory should include information on the value, status, life expectancy, income derived and utility of the improvements. This is the most difficult parameter to map due to its dynamic character.

d) A consolidation of the above information will generate a *land grade map.* The land grade map is used as the base map for the periodic updating of land values.

e) The *land value map* for a given province, region or the entire country contains information on the value per hectare of land using the productivity method and the income-capitalization method. Another option would be to use the DAR method and the income-capitalization or productivity method. The map depicts in aggregated form areas with more or less similar values. The values depicted are, however, considered as indicative figures because of the level of detail used in mapping.

Land value maps are very useful as benchmarks for checking and validating the selling prices being offered by VOS clients during land transactions. They serve as a critical input in the land price decision-making of DAR.

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THE JAPANESE TRADITION IN GEOGRAPHY

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ABSTRACT. Modern geography may be said to have developed in Japan after she opened herself to the West during the Meiji Restoration. For its part, Japanese cartography developed quite independently, with maps appearing as early as the 6th century and with later maps concentrating on Japanese islands and neighboring countries. Early geographical writing reflected Chinese influence and emphasized nature and its beauty and hazards. The Renaissance witnessed hightened Western geographic interest in Japan. The Germans particularly made great efforts to spread geographical knowledge on Japan. For their part, Japanese scholars started producing geographical texts in the mid-19th century, with most of them showing strong German influence on account of their German education as in the case of such influential geographers as Fukuzawa, Ogawa and Yamasaki. The 1930s before World War II saw a new generation of geographers who were wholly trained in Japanese universities and who were divided by Inouye into the "landscape, regional, man-environment and historical" schools. Post-World War II Japanese geography was marked by strong American influence.

The development of geography in Japan is relatively young compared with similar developments in China and India. But one of the reasons why we know so little about early Japanese geography is the language problem, since written Japanese is undoubtedly the most difficult language in the world with its use of two Japanese phonetical alphabets (KATA-KANA and HIRA-GANA) in addition to Chinese characters (KANJI). During the military "Shogunate" from 1637 until 1853, Japan was a closed and "forbidden" country, and limited contacts with the outside world was maintained through the Dutch trade mission at Dashima-Nagasaki. During the Tokugawa period (1600-1868), geographical knowledge of the world gained from the reading of European books was monopolized by the Shogunate government with its seclusionist policy (Takeuchi 1980: 246). Japan was opened to the West with the Meiji Restoration in 1868 when it began to enter into full economic and political contact with the outer world. Modern geography therefore started with the advent of the absolutist Meiji regime which was accompanied by thorough reforms in the scientific field. Today, Western influence is very strong and Japanese geography is organized very much like that in the United States, both in professional societies and in universities.

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Japanese cartography developed quite independently. The earliest references to maps and cadastral plans occur in an imperial decree, quoted in one of the chronicles in 646 A.D. ordering that frontiers be inspected, all regions described and maps of them compiled. In the 8th century A.D., a general map of Japan was made, commissioned by Gyogi Bosatu (670-749 A.D.) and probably also made by him. He was a Korean by birth and the Korean influence in cartography was very strong at that time. The oldest surviving map is that of Japan in the Ninnaji Temple near Kyoto, dated 1305, although it is a copy of an earlier (8th-9th century) map. Japanese maps concentrated on the Japanese islands and neighboring countries (China, Korea and the Ryukyu Islands). At the end of the 16th century, European maps reached Japan, but after 1643 all foreign contacts were forbidden. The year 1605 saw the beginning of the first topographical survey of the country. Later surveys were carried out in 1644-1647, 1664-1703 and finally in 1830-1843. Although drawn on a very large scale (1:21,600), they are weak topographically, despite the great number of names they contain. World-famous is Ishikawa Toshiyuki (Ryusen's) Map of Japan (Tokyo, 1697), which was artistically executed, beautifully colored and full of detail, but not as accurate as many earlier maps. Shiba Kokan published the first map of Japan which was engraved in copper in 1792.

The art of land surveying had been introduced from China. The famous land surveyor Ino Chukei (1745-1818) prepared more than 220 maps and topographical manuals by using theodolites, compass, mensula, water-level and other instruments. Printing of maps did not begin until the 17th century. Even then, maps were hand-printed and painted by famous artists such as Hayashi Yoshinaga of Kyoto (1618), Hishikawa Moronobu (1681) and his pupil Ishikawa Ryusen. Copper-plate engravings were not used for maps in Japan until much later. Shiba Kokan first used them for his map of 1792, and the first town plan in this medium was of Kyoto in 1855 (Bagrow-Skelton, 1964:204 ff.).

With regard to geographical writing, the indigenous geographic traditions in Japan had themselves been strongly influenced by Chinese geographical thought. From ancient times in Japan as in China there existed a long-standing tradition of geographical description of states or regions (*Fudoki* or *chishi*) compiled by rulers in order to obtain sufficient information for their purposes, i.e., the enactment of political, fiscal or military measures (Takeuchi, 1980:239). The compilation of local histories and geographies confined to a small area was widespread in ancient Japan. Many early Japanese writers emphasized NATURE in Japan. Japanese landscape is characterized by volcanoes, earthquakes, tidal waves, typhoons, floods, monsoons and hot springs. Japan is indeed a storehouse of seasons. Japanese scenery is often compared to a "miniature landscape." Japanese nature is of the greatest significance

as the environment in which the Japanese people live. Nature affects their emotions, their language and many other aspects of their life.

During the Renaissance period, Japanese geography was better known in Europe than the knowledge of Europe by Japanese scholars. This was mainly a result of the self-chosen isolation during the Tokugawa "Shogunate" in the 17th and 18th centuries. Berhard Varenius' *Descriptio Regni Japonae* (Description of the Japanese Empire) published in Amsterdam by Elzevier in 1649 is an outstanding example of the early European interest in Japan, although the work was not a result of personal knowledge or fieldwork in Japan, but has been compiled from library sources and earlier travel reports, particularly based on descriptions of Marco Polo and Franciscus Xaverius. Afterwards, three German scholars greatly contributed to the geographical research in Japan, before and after the Meiji restoration. *Engelbert Kaempfer* (1651-1716), a German doctor and natural scientist from Westphalia, was based at the Dutch trading station at Deshima-Nagasaki from 1690 until 1692 and carried out, under conditions of personal danger, the first investigations into "forbidden" Japan. His main work entitled "History and Description of Japan" was published posthumously in 1727 in English. *Philipp Franz von Siebold* (1796-1866) from Wuerzburg lived in Japan before the Meiji restoration and most of his research material on geography, cartography, anthropology and biology of Japan was collected at great risk to his life. Finally, *Johannes Justus Rein* (1835-1918), from Raunheim near Giessen, was the first geographer to journey to Japan after the opening of the country in 1868. An extended research trip in the service of the Prussian government took him to Japan in the years 1873-75, and the fruit of these researches was his lifework *Japan from Travel and Study,* which appeared in two large volumes in 1881 and 1886 and was quite soon followed by an English translation. Rein is therefore the author of the first modern scientific study of Japan, and in recognition of his East Asian experience, he became F. von Richthofen's successor in the Chair of Geography at Bonn, a position which he held for 27 years.

In 1869, a Japanese scholar named Yukichi Fukuzawa published a book on world geography which was very much in the tradition of the "universal geographies" of the Western world. Ten years later, in 1879, the Tokyo Geographical Society was founded. In the early period of academic geography in Japan, there was a strong influence from Germany since many Japanese studied at German universities. After the establishment of the Tokyo Imperial University in 1877, it was *Bunjiro Koto* among the faculty who received his geological training under Edmund Naumann in Germany. Koto, the grand old man of earth sciences, founded the Department of Geology at the Tokyo Imperial University and organized systematic geological, volcanological and seismic researches

in Japan. He had undoubtedly a strong influence on physical geography. Two of his students became the leaders of the first generation of Japanese geographers: Takuji Ogawa and Naomasa Yamasaki, both of the same age and life-long rivals in various ways.

Takuji Ogawa (1870-1941) became the first professor of geography in Japan, having been appointed in 1908 in the Institute of History at the University of Kyoto. He later founded the Geographical Department of this university and had a profound impact on the following generation of Japanese geographers.

Ogawa won his spurs with the publication of the first regional geography of Formosa (Taiwan Shotoshi) in 1896, one year after the island was ceded to Japan. In 1900, he toured Europe and became acquainted with A. Geikie, F. von Richthofen, H. Wagner, F. Machatschek and particularly with Eduard Suess in Vienna, whose teachings had a strong influence on Ogawa. In 1909, Ogawa was given the D.Sc. degree by Kyoto University, the first degree in Japan given in geography. He headed the Department of Geography (founded by him in 1910) at Kyoto for more than ten years, until he was transferred in 1921 to the Faculty of Natural Science of Kyoto University to open the Department of Geology and Mineralogy. In 1930, Ogawa retired from teaching at the age of sixty. He was especially noted as a geographer who integrated European geographical sciences with the old Chinese classics. He was strongly influenced by A. von Humboldt's tradition, and specialized on the geography of China, on seismology, the history of geography and settlement geography. His *Studies of the Historical Geography of China* (*Shina Rekishichiri Kenkyu*), a two-volume work written in 1928, criticized the work of Richthofen, who accepted the *Yu King* (an official description of China c. 450 B.C.) as the oldest regional geography of China. Ogawa, with the help of his colleagues at Kyoto, concluded that the *Shan Lai Ching* was older. Together with his colleagues Goro Ishibashi and Shintaro Nakamura, Ogawa organized an association of geographers in 1924 which was named "*Chikyu Gakudan*" (Globe Study Group). He was also an avid collector of old maps during his years as a professor. He gave them to Kyoto University, which in consequence possessed the richest collection of historical maps among the geographical institutes in Japan.

Naomasa Yamasaki (1870-1928) was also a student of Koto. He was, without doubt, the most distinguished geographer of modern Japan. He was the founder not only of the Department of Geography at Tokyo University, but also of the Association of Japanese Geographers (Nippon Chirigakkai) in 1925. Yamasaki received his post-graduate education in Germany, first at Bonn under J.J. Rein, who advised Yamasaki to visit Albrecht Penck (1858-1945) in Vienna. He derived many geographical ideas from Penck and investigated the glacial landforms

of the high mountains of Japan. He attended the International Geographical Congress in Berlin in 1899 where he met many influencial geographers. In 1902, he became Professor of Geography at Tokyo Higher Normal School (now Tsukuba University) and trained many high school teachers. In 1911, he occupied the first Chair of Geography in the Faculty of Natural Science of Tokyo Imperial University. Personal fame came to Yamasaki through the publication of his ten-volume work entitled "The Regional Geography of Great Japan" (Dai Nippon Chishi), published between 1903 and 1915 together with Denzo Sao and others. He later was chosen to give lectures on geography to the Crown Prince (the present Emperor). He was also the founder of the Association of Japanese Geographers with its journal, the *Geographical Review of Japan* (*Chirigaku Hyoron*), and was the only geographer at the time in the Imperial Academy of Science. He established the Tokyo Geographical School and many of his pupils became influential geographers afterwards, some of whom were T. Tsujimura, F. Tada, Akira Watanabe, E. Fakuji and Yoshikawa. His great work was the transformation of geography from a mere assemblage of knowledge into a scientific discipline.

The next generation of Japanese geographers who rose to prominence in the 1930s were trained as geographers from the start in Japanese universities. Many European geographical writings were translated into Japanese, and students in Japan were thoroughly familiar with the ideas of A. Hettner, O. Schlueter and F. Ratzel in Germany, E. Reclus, P. Vidal de la Blache and J. Brunhes in France, and W.M. Davis, E.C. Semple and E. Huntington in the United States. But the 1930s and 40s were overshadowed by the strengthening nationalism of the Great Japanese Empire and its imperialistic expansionism, and the main task of university geography as an institution was to train high school teachers. In the research studies published before World War II, there was a strong emphasis on physical geography, but studies in regional and historical geography were not neglected.

Syuzi Inouye (1938) divided the pre-World War II Japanese geography into four distinctive schools or directions: (1) the *Landscape School* with its center at the natural science college of Tokyo Imperial University under T. Tsujimura (geomorphology), with a strong emphasis on cultural morphology as mainly influenced by the thought of Naomasa Yamasaki; (2) the *Regional School* centering around K. Tanaka at the Tokyo Bunrika University, which specially dealt with regional manifestations of man's actions; (3) the *Man-Environment School* which was divided into two opposing directions: (a) the Kyoto School under G. Ishibashi of the Kyoto Imperial University, who together with T. Ogawa is one of the founding fathers of modern Japanese academic geography, and (b) the Bunrika School under K. Uchida from Tokyo

Bunrika University, which became famous for their studies on local history and topography (Heimatkunde), and finally, (4) the *Historical School* which has a strong orientation towards history and social science as advocated by geographers of the younger generation. The mouthpiece of the Historical School was the journal of the Historical Association "Rekishigaku-Kankyu."

Strong departments of geography in Japan functioned in the University of Tokyo, Tohuku University, Tokyo Kyoiku University, Tokyo Metropolitan University and Nippon University. Among the geographical publications of geography departments, the most famous are "Science Reports from Tohuku University," "Geographical Reports of the Tokyo Metropolitan University," "Bulletin of Geography of the University of Tokyo" and "Tsukuba Studies in Human Geography."

After World War II, Japanese geography looked to America and is organized very much like that in the United States. Japan's interest is presently divided among physical, human and economic geography, and there is a society and a journal reflecting each point of view (James, 1972:342). The most famous geographical periodical is the *Geographical Review of Japan* (*Chirigaku-Hyoron*), published since 1925 by the Association of Japanese Geographers (Nippon Chiri Gakkai). Next comes *Human Geography* (*Jimbun Chiri*), a bi-monthly journal of the Human Geographical Society (Jimbun Chiri Gakkai). There are also specialized journals, like the *Annals of the Association of Economic Geographers* (*Keizai Chirigakku Nempo*) and *New Geography* (*Shin Chiri*), published by the Japanese Association of Professional Geographers (Nippon Chiri Kyoku Gakkai). In 1980, the International Geographical Congress was held in Tokyo.

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BLACK GOLD: HIGHER PRODUCTION NEEDED

Badar Alam Iqbal*

ABSTRACT. Sizable coal deposits constitute a major source of energy as well as feedstock for production of agricultural inputs for the Indian economy. However, in all the country's five-year plans, there have been shortfalls between targets and achievements primarily due to labor unrest, unavailability of explosives and other inputs, acute power shortage and low rate of increase in coal dispatches. These shortfalls have increased despite the increasing trend in production from 1980 to 1988. Added to this supply problem is the significant proportion of low quality coal (lignite) being mined. The government has nationalized the production of both coking and non-coking coal, but this has failed to remedy shortfalls at reasonable prices. In order to achieve targets in the 1990s, there is an urgent need to take short-term measures that include facilitating movement of coal to end-users and long-term measures that include perspective planning for the coal demands of different sectors as well as securing substantial capital outlays for the development of coal mining.

In the Indian economy coal occupies a position of cardinal importance not only as a major source of energy for the key sectors like steel, power, railways and cement, but also as a feedstock for the production of agricultural inputs such as pesticides, insecticides and manures. India is very fortunate in so far as coal reserves are concerned. But the quantum of good quality coking coal needed for steel mills is very limited. Recently, several coal-based superthermal power plants have been established in India. According to the latest data available on coal deposits, India has 11,000 million tons of coal, with 2,100 million tons of lignite in particular.

In 1971, the Government of India took a bold decision to nationalize all the privately owned coking coal mines except those belonging to M/S Iron and Steel Company and Tata Iron and Steel Company. The step was taken mainly for conservation and proper development of coking coal reserves which were being depleted fast because of unscientific mining. The nationalization was also considered necessary for meeting the increasing demand of coking coal for the needs of one of the most important industries of India, i.e., the iron and steel industry. An autonomous corporation known as Bhart Coking Coal Limited was established to manage, restructure and modernize the nationalized coal mines. In 1972-73, the Indian government also nationalized non-coking coal mines. Another autonomous public sector venture in the name of Coal

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Mines Authority Limited was also set-up to deal with all nationalized coal mines as well as mines of the National Coal Development Corporation.

Before the second nationalization of 1973, production was not carried out along scientific and economic lines, resulting in huge wastage. Unhealthy working conditions for workers and an ineffective distribution system compounded the problems. But the output of coal has to be increased for meeting the increasing demand resulting from rapid industrial growth. Triggered finally by the alarming rise in the prices of crude oil, the government of India made serious efforts to augment the coal output during 1977-78, leading to a temporary glut in coal supply. But efforts were made to persuade the textile units to use indigenous coal instead of furnace oil which has remained mostly stagnant. Meanwhile, some of the important users like steel, power, railways, cement and fertilizers increased their capacity, this time resulting to a disequilibrium between the demand for and the supply of coal, particularly in the case of power plants.

The primary aim of nationalization was to ensure an adequate supply of quality coal to the users at a reasonable price. But this particular objective has been totally disregarded, leaving the public thoroughly disillusioned. There are also serious complaints from coal consumers with respect to adequacy, timeliness and quality of coal supplies. In Southern India, the power and cement units are the worst hit as they were forced to cut drastically their capacity utilization because of non-availability of coal. Efforts to replace furnace oil by coal resulted in wastage of manpower, material and machinery. In the state of Maharashtra, scarcity of coal has resulted in a serious power shortage which in turn has led to a curtailment of industrial output. The main factor which is responsible for encouraging such a state of affairs is the continued shortfall in the production targets.

PRODUCTION TRENDS IN THE 1980s

In all the five-year plans, there have been shortfalls between target and achievement and there is not a single plan in which a target has been achieved. The recent trends in this regard can be seen from Table 1. The main constraints responsible for such shortfalls in coal output are labor unrest, non-availability of explosives and other inputs, and acute power shortage, which have all affected the output, transport and final cost of coal. Added to this, there are inter-union rivalries resulting in unavoidable strikes and work stoppages that in turn lead to loss of production.

In India, there are two major producers of explosives. A strike in any of the two plants would certainly affect the supply of explosives to the coal mines. Likewise, coal output is also affected by shortage

of power supply and regular interruptions therein. Aside from the moderate rate of growth in power compared with the previous years, there has been a sharp deceleration in the rate of growth in thermal generation. Still, compared with an increase of more than 16 percent in thermal power generation during April-August, 1987, the rise in power generation was only nearly 7 percent in the same period of 1988. The need to improve thermal power capacity and generation is therefore crucial and increasing the availability of coal will go a long way in this direction.

TABLE 1. TRENDS IN COAL PRODUCTION, 1980-88 (IN MILLION TONS)

Year	Target	Actual	% shortfall (-) or excess in actual production over target
1980-81	114.5	114.0	-0.4
1981-82	124.0	123.2	-0.2
1982-83	133.0	130.5	-1.9
1983-84	142.0	138.2	-2.7
1984-85	152.0	147.4	-3.0
1985-86	154.5	154.2	-0.2
1986-87	166.8	165.8	-0.6
1987-88	183.5	179.8	-2.0
1988-89(T)	196.3	—	—

Source: *The Economic Times*, New Delhi, October 20, 1988.

There is no doubt, however, that thermal power generation can be improved or augmented from the present level of 62,407 million units, provided quality coal in sufficient quantum is made available. Though coal production in the country has been rising at a steady pace, there have been slippages vis-a-vis targets. Further, the quality of coal mined leaves much to be desired.

From 114 million tons in 1980-81, the coal output went up to nearly 180 million tons in 1987-88. However, during the period under reference, the actual production performance remained short of targets (Table 1). For 1988-89, the targeted coal production was 196.3 million tons. Recent trends in the coal sector can be seen from Table 2. Coal India Ltd. (CIL) is to contribute 170 million tons and the balance is to come from Singareni Collieries. On a pro-rata basis, the quarterly total output works out to be 49 million tons and for CIL the corresponding production target stood at 42 to 43 million tons. However, the production of coal by CIL was about 36 million tons during April-June, 1988, which was only marginally higher than the output in the corresponding quarter of last year.

Though there has been an appreciable increase in the output of CIL, SCCL and others in recent years, the overall coal production is

still marginally short of target. The performance of SCCL was affected by labor strikes, breakdown of machinery, absenteeism and power shortages.

Taking into consideration the possible withdrawal from stocks and the need to import superior coking coal to meet the steel plants' requirements, the target for coal output in 1986-87 was fixed at nearly 167 million tons. The actual production was fairly close to this target at 165.8 million tons. The overall performance of CIL has been satisfactory in 1986-87, exceeding the target of production, while SCCL and the TISCO/IISCO/DVC group were behind the target. Except for the northeastern coalfields, the production of all subsidiaries of CIL was ahead of the target. Due to the wider gap between movement and supply plans, pit-head stocks, which ought to have been reduced in order to meet the gap between demand and production, suddenly increased to 29.4 million tons, up from 26.6 million tons between 1985-86 and 1986-87. Coal movement by rail in 1986-87 was 118.1 million tons as against the planned level of 120 million tons. The daily average loading of wagons in 1986-87 was 13,552 tons.

Since 1974-75, the total production of coal showed an overall rise of nearly 88 percent, i.e., from 88.4 to 165.8 million tons in 1986-87. Similarly, dispatches have witnessed an overall increase of nearly 87 percent, i.e., from 85 to nearly 159 million tons during the said period. Likewise, the daily average number of wagons has shot up to 13.5 thousand wagons in 1986-87 from 8.3 thousand wagons during the period under review, while closing stocks have registered an overall increase of 320 percent, i.e., from 7 to 29.4 million tons during the period under reference. This all indicates that the rate of increase in the total production of coal has been higher than that of the total dispatches of coal. This means that the low rate of increase in dispatches is the major constraint in the present coal crisis. This state of affairs has been due to a fall in the number of wagons supplied by the railways and partly due to the low rate of growth in daily average loading during the peak coal mining season. The railways carry two-thirds of the total coal dispatches and obviously the shortage of wagons for coal flow would certainly affect the supplies to the coal users. According to a recent survey, coal was in short supply by as much as 57 percent for units in north India during the first quarter of 1988-89. The survey has also pointed out that this has been largely because of the inadequate availability of railway wagons to transport coal from pit-heads. What is more, industrial users have to face the problem of the inferior quality of coal in terms of high moisture and ash content. This means that the railways' performance has to be improved further. In this regard, it is important to note that here the growth of the carrying capacity of railways is lagging behind the general growth of the country's

TABLE 2. TRENDS IN THE COAL SECTOR (MILLION TONS)

S. No.	Item	1984-85	1985-86	1986-87	April-Dec.£		Percentage Change		
							1985-86	1986-87	1987-88
					1986-87	1987-88	1984-85	1985-86	1986-87
1	2	3	4	5	6	7	8	9	10
1.	Production								
	(i) CIL	130.8	134.1	144.8	97.7	108.3	2.5	8.0	10.8
	(ii) SCCL	12.3	15.7	16.6	11.9	12.9	27.6	6.7	8.4
	(iii) Others	4.3	4.4	4.4	3.3	3.2	2.3	..	3.0
	TOTAL	147.4	154.2	165.8	112.9	124.4	4.6	7.5	10.2
2.	Pit head stocks (year-end)	29.2	26.6	29.4	21.9	26.3	8.9	10.5	20.1
3.	Dispatches	135.5	151.0	158.7	114.3	123.6	11.4	5.1	8.1

£ — Provisional .. — No Change

economy. This means that India is now facing serious supply bottlenecks. The failure of the railways to supply coal to various consumers, particularly thermal plants, has forced the authorities to dispatch coal by road. This means an increase in freight charges. Road transport costs nearly seven times more than the railways.

RECENT TRENDS IN PERFORMANCE

Based on the performance in 1986-87 and the demand for coal in 1987-88, the coal production target during the current year has been fixed at 183.5 million tons. Of this, the relative share of CIL is 158 million tons, SCCL 20 million tons and TISOD/IISCO/DVC 5.5 million tons. The total demand for coal during 1987-88 is estimated at 192.05 million tons. The share of the power sector demand is more than half of this, the other major consumers being steel, cement, railways, etc. The demand production gap is to be met through drawdown of stocks. The required rail movement of coal is estimated at 122.6 million tons.

Due to concerted efforts in bringing an improvement in the movement of coal by rail, the availability of coal across the country has gone up to a reasonable extent. According to available data, as much as nearly 124 million tons of coal was dispatched during April-December, 1987 as against 114.3 million tons during the same period in 1986. The daily average coal loading in the case of CIL during the period under review stood at 11.4 thousand wagons compared to 10.9 thousand wagons per day in April-December, 1986, thus showing an overall rise of more than 400 wagons per day. The movement of coal from Singareni Collieries Co., Ltd. has improved considerably. Loading went up to 1,401 wagons per day during April-December, 1987 as against 1,210 wagons per day during the corresponding period of 1986.

The output in regard to metallurgical grade coking coal during April-December, 1987 was of the order of nearly 20 million tons compared to 21.35 million tons achieved during the same period of 1986. This means a decline in the output and this was attributed to a shortfall in medium coking coal output in the Central Coalfields. The output of washed coal in CIL washeries during April-December, 1987 stood at 6 million tons, compared to 5.87 million tons during the same period of 1986. However, this was short of target for the period by 15 percent.

In 1986-87, nearly 2.6 million tons of coal was imported and the figures of the same for the year 1985-86 stood at 2.4 million tons. Imports of coking coal in 1987-88 was estimated to be nearly 2.5 million tons. Meanwhile, the average ash content of indigenous coal has declined marginally from 19.4 percent in 1985-86 to 19.1 percent in 1986-87. Even though the average ash level is slightly lower, the quality of coking coal supply varied from day to day, with ash content ranging from

17 to 26 percent. This affects the smooth and efficient operation of blast furnaces and their production.

TRENDS IN LIGNITE OUTPUT

The lignite production of Neyveli Lignite Corporation in 1986-87 was registered at 7.13 million tons from the first mine and 1.42 million tons from the second mine. This was higher than the targeted level of 6.5 million tons from the first mine and 0.9 million tons from the second mine. Added to this, the lignite mines of Gujarat Mineral Development Corporation produced 1.1 million tons in 1986-87, compared to 0.92 million tons in 1985-86. The target for lignite output for Neyveli during 1987-88 has been fixed at 9.15 million tons, i.e., 6.5 million tons from the first mine and 2.65 million tons from the second mine. The Gujarat Mineral Development Corporation is also expected to augment its output. The production of lignite from Neyveli Lignite Corporation during the first nine months of 1987-88 stood at 7.01 million tons, compared to the production of 5.72 million tons in the same period of 1986-87. This was higher than the target level of 6.47 million tons for the period by 8.3 percent.

The persistent coal crisis has been the result of a number of factors not necessarily connected with the production process alone. Apart from this, the responsibility of the railways cannot be overemphasized. The coal authorities have blamed the railways for the coal crisis, while railways in turn have accused the coal sector of inadequate movement of coal to rail sidings.

Thus, the need of the hour is to take short-term as well as long-term measures aimed at reducing the scarcity of coal. Long-term measures should include a proper linkage between power stations and coal mines as well as the development of necessary rail capacity for an effective supply of coal. On the other hand, short-term measures can be introduced with regard to accelerating the movement of available coal to steel mills, power stations, cement plants, fertilizer factories, etc. Importation of explosives and installation of big power units for coal mines must be taken so as to maintain high production levels in all the industrial units of the country.

The target for coal output for the year 1988-89 which stands at 196.3 million tons should be attained at all costs. The Ministry of Energy should also take steps to import plants (thermal) to generate substantial power at least for coal washeries. The central government should also adopt a liberal policy for the importation of essential inputs for the coal sector. The central government, in consultation with the concerned authorities of the coal sector, should formulate an effective

and efficient strategy for analyzing and solving the transport problems of the coal sector.

The enhancement of coal production from the existing level to a level of 196 to 200 million tons by the end of 1990 constitutes the most challenging task of the coal sector. This growth rate, if achieved, would be one of the fastest in the world, including the rates of developed countries. This, therefore, calls for sustained and coordinated efforts. The first and foremost task before India is perspective planning for inputs required to achieve grain targets in terms of future demand for machinery and power, arrangements for coal transport to various consumers, availability of basic construction materials like iron and steel, cement and explosives, and training of management staff and technicians. The volume of work load in prospecting, planning, designing and reorganizing is tremendous, especially considering the low level of these activities in the past.

In addition, there is the constraint of required capital for the development of coal mining. It is estimated that huge capital outlays would be needed if India is to achieve the target of 200 million tons by the end of 1990. Therefore, in the years between 1988-89 and 1989-90, substantial financing would be needed. The Ministry of Energy itself found that a total of 3,000 crores would be required to attain the target. The necessary resources must also come from within the coal industry itself as well as from outside sources. Though government revenues have been the major source of finance, assistance from international bodies together with fund-linked technological assistance from foreign governments will play an important role in the development of the coal sector.

Recently, there has been a fresh settlement with labor regarding wages, resulting, among others, in an appreciable increase in the minimum monthly salary of an unskilled coal miner. It is hoped that with the present settlement, the coal sector will also get positive cooperation from the labor force in the common effort of augmenting the country's coal output.

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