ISSN 0031-7551

PHILIPPINE GEOGRAPHICAL JOURNAL

VOLUME XXXI JULY-DECEMBER, 1987 NUMBERS 3 & 4

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ARTICLES

PUBLISHED QUARTERLY BY
The PHILIPPINE GEOGRAPHICAL SOCIETY, AND The NATIONAL RESEARCH COUNCIL OF THE PHILIPPINES, DEPARTMENT OF SCIENCE AND TECHNOLOGY
MANILA, PHILIPPINES

The Philippine Geographical Journal

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The *Philippine Geographical Journal* is published quarterly by the Philippine Geographical Society, the National Research Council of the Philippines (NRCP), Department of Science and Technology, and is sent to all members of the Society.

Subscription Rates: Philippines, per year (1987) — ₱14.00
Foreign countries, per year — US$14.00
For 1988 — local — ₱30.00; foreign — US$16.00

All remittances should be payable to the *Philippine Geographical Journal.*

Editorial and business correspondence should be addressed to The Editor, *Philippine Geographical Journal,* P.O. Box 2116, Manila, Philippines.

Office Address: c/o Bureau of Soils and Water Management, Fifth Floor, Sunvesco Bldg., Taft Ave. cor. T.M. Kalaw, Manila, Philippines.

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Re-entered as second-class mail permit at the Manila Post Office on July 5, 1933.

The
PHILIPPINE GEOGRAPHICAL JOURNAL
VOLUME XXXI July-December, 1987 Numbers 3 & 4

DEVELOPMENT OF MINING AND GEOLOGY 1987-1992 PRINCIPLES, CONCEPTS, ISSUES*

by

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ABSTRACT

The advent of a new political order in early 1986 made it imperative to restructure government policies in order to attain social and political stability within the democratic framework of a market economy. To attain such goal, it is presumed that the benefits and costs from mineral and geology resources must be equitably distributed, that government must be credible in the administration of mineral and related wealth and that growth of the mining and geology sector must be efficient and sustainable.

Problems, issues and concepts about the mining industry and geology were identified through hearings, seminars, workshops and researches and then evaluated. Finally, policy recommendations, in the context of stipulated guidelines to address the pertinent issues and problems were given.

1. Introduction

The Philippines is a country with a significant Mining and Geology Sector though poorly understood or appreciated. Although the significance of its role in the national economy may vary in accordance with the prevailing political, social and economic environment, its contribution should remain important at any time if viewed from the proper perspective.

Although Geology, the study of the earth which deals, among others with such things as minerals, rocks, mountains, plains, water and air, is intimately related with all the facets of human activity, it is relatively unknown to most people, even to some important decision makers. Instead, only its small component, mining, is familiar to many. A brief background of the local mining industry is set down below to provide

* This paper was delivered by Dr. Teodoro M. Santos as Filemon Rodriguez Professorial Chair Lecture at the National Institute of Geological Sciences on April 28, 1987 and is essentially based on the Policy Advisory Group Document submitted to the Secretary of the Department of Natural Resources on March 27, 1987.

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some basis for the subsequent analysis of issues, concepts and recommendations.

Hard minerals produced in the Philippines consist mainly of copper, gold, nickel, chromite, iron, silver, zinc, cement, clay, fertilizer raw materials, marble, gravel and sand, and concrete aggregates.

The nonmetallics (cement, fertilizer raw materials, etc.) are mainly produced for domestic consumption; their importance to the local economy is expected to increase as the country develops. Though there are many of them in kind, they are poorly known in quantity, quality, location or use.

Table 1 shows the volume and value of major mineral production in the Philippines. Note the up trend in gold production up to 1984, and the increasing trend of copper production up to 1980 followed by subsequent decline. Notice the progressive decline in chromite and nickel production. Observe also the very rapid increase in the production of nonmetallics, classified under "Others". In a nutshell, this table captures the behavior and performance of the most important mineral commodities. It likewise points to minerals which offer good prospects for future development.

Metallic minerals like copper, gold, nickel, chromite and silver are among the country's principal exports. During good times, such minerals had accounted for up to about 20% of the country's total export earnings as Table 2 indicates. This suggests that minerals can indeed be a very important foreign exchange provider to the economy if the necessary conditions for the purpose obtain.

Gold is one of the most interesting and promising minerals in the country. One advantage it has over all other products is that there is virtually an "unlimited" market for it. In fact, it need not be sold abroad to earn hard currency; it is the best form of money one can have. Furthermore, the country's geology strongly suggests the existence of very substantial amount of gold resources. The country formally produces around 25 metric tons annually, and informally perhaps about the same amount, or a little less.

Formal gold production comes from registered mining firms, either as the principal product or as a joint product with copper. Gold produced in this way are sold to the Central Bank.

Informal gold production is done by unregistered (illegal) small operators, scattered in various parts of the country, particularly in Davao, Surigao, Samar, Negros and Benguet. Though very poorly understood, informal gold producers attract wide attention especially due to the large number of participants which has been estimated at about one hundred thousand, including nonminers like merchants and hospitality girls (BMG, 1987).

TABLE 1

MINERAL PRODUCTION IN THE PHILIPPINES
(Volume in 1000 units; value in million ₱)

Mineral Products	*Unit*	*1960 Volume*	*1960 Value*	*1970 Volume*	*1970 Value*	*1980 Volume*	*1980 Value*	*1984 Volume*	*1984 Value*
Gold	kg	12.8	58	18.7	130.3	20	2784.9	24.5	4539.9
Silver	kg	35.2	2	52.9	15.5	60.7	268.2	49	199.1
Chromite Ore	DMT	734.4	33.9	566.4	63.6	496.1	276.9	259.2	353.1
Copper Metal	t	44	59.1	160.3	1113.1	304.5	4409.3	233.4	4970.1
Iron Ore	DMT	1138.8	20.7	1869.9	83.1	—	—	—	—
Nickel Metal	t	—	—	0.1	1.7	47.1	1437.2	13.6	466.4
Zinc Metal	t	5	2.8	3.2	4.2	6.8	22.3	2.2	16.5
Coal	t	147.2	3.4	42.4	1.1	325	58.5	1194.7	1113.4
Others			94.1		308.5		3563.2		4913.7
TOTAL			274		1721.1		12820.5		16572.2

Source: NEDA, Philippine Statistical Yearbook 1986.

TABLE 2

PRINCIPAL EXPORTS OF THE PHILIPPINES BY COMMODITY GROUP
(FOB Value in million US$)

Commodity Group	*1970*	*% of Total*	*1975*	*% of Total*	*1980*	*% of Total*	*1985*	*% of Total*
Mineral Products	224	19.6	332	14.4	1030	17.7	243	5.24
Copper	185		212		545		84	
Gold	—		76		239		100	
Iron Ore & Conc.	13		13		—		—	
Chromite	9		13		33		12	
Others	17		18		214		47	
Agricultural (1)	475	41.5	1263	55.0	1894	32.7	1061	22.9
Forest	301	26.3	260	11.3	468	8.08	246	5.31
Fuels & Lubricants	17	1.48	37	1.61	38	0.65	42	0.90
Chemicals	5	0.43	21	0.91	89	1.53	141	3.26
Textiles	5	0.43	22	0.95	33	0.57	39	0.84
Others (2)	115	10.0	359	15.6	2235	38.6	2847	61.5
TOTAL EXPORTS	1142		2294		5788		4629	

Source: NEDA, Philippine Statistical Yearbook 1986.

Notes: (1) Agricultural Commodity Group includes: coconut products, sugar products, fruits and vegetables, abaca products and tobacco products.
(2) Others include: miscellaneous manufactures, re-exports, etc.

It is important to note that output from the informal gold miners are not necessarily sold to the Central Bank and presumably are smuggled out of the country. Such gold can therefore be used to buy items such as weapons and ammunitions to the detriment of the country. Likewise in such operations, safety against mine accidents and hazardous chemicals like cyanide and mercury is difficult to insure. (BMG, 1987).

Though many problems need be hurdled, expansion of the gold industry is most promising from the point of view of geology, economics and society. For instance, the gold industry can be harnessed to pay for the $26 billion national debt and the cost of the comprehensive land reform program of the government, provided that it is officially expanded in proportion to such needs.

Another promising mineral for expansion, despite its current down trend in production, is chromite. It is a strategic mineral which is imported mainly from South Africa by the market economies of the western world. Exacerbation of political and social problems there, even if the world economy does not improve over the current levels, could make the local chromite industry boom and allow it to play a more important role in the economy. Like gold, many small and shallow seated deposits are amenable to small scale mining.

Copper and nickel are both smelted and refined locally, at least in part. The wave of substitutions and probably the general decline in global economy triggered by the Energy Crisis since 1973 have depressed the copper and nickel markets to the extent that most copper and nickel companies in the country (and even abroad) are in distress. Many such firms have defaulted in paying their financial obligations to local and foreign creditors and consequently have become heavy burdens to the government, the ultimate guarantor of such loans. Should the world economy improve and copper and nickel prices rise to reasonable levels, copper and nickel can play an even more important role in the economy.

Two important general problems, among others, tend to impede development in the mineral industry. First is the system of mineral rights allocation which conduces to speculation, interminable litigations and consequently to dubious methods of settling conflicts. The second is the inadequacy of risk capital which again result from existing statutes as well as from the unfavorable interpretation by officials of such statutes particularly in the previous years.

Notwithstanding the various problems noted above, the expansion of selected areas of the mineral industry is undoubtedly in the interest of the country. It can be done by providing an investment environment that is stable, reasonable and competitive. Errors in policies and strategies in the past must be rectified as this work intends to suggest.

Current developments in the Philippines political, social, and economic arena impel government to reexamine and modify, if necessary, its policies and programs to enhance the people's welfare and promote social and political stability. Guided by a set of basic principles, this work seeks to identify issues and problems; analyze alternative policies and institutional framework to address the pertinent problems or issues; and to specify both near term and long term policy objectives, programs and

key result areas. The ultimate objective is the sound development of the Mining and Geology Sector to serve the interest of the Filipino people best.

In preparing this paper, existing documents in the Ministry of Natural Resources, the Bureau of Mines and Geosciences, and position papers from the private sector were considered. Extensive dialogues with representatives of small scale mining, large scale mining, concerned groups, academic and government representatives have been conducted.

Issues, problems and perceived solutions identified through such media are presented and analyzed in this work. However, decision as to what exactly went into this report was made by the author on the basis of the guidelines given by the Secretary of Natural Resources.

We briefly present below the principles, concepts and issues which underlie the policy recommendations on the minerals and geology sector submitted to the Secretary of the Department of Natural Resources (DNR) in March, 1987. Such recommendations have been discussed extensively in two seminars, one held on January 9-10, 1987 at the PCED Hostel, UP, Diliman, Quezon City and the other held on February 14-15, 1987 in Cagayan de Oro City. The same recommendations were discussed also in several smaller gatherings in Makati and Quezon City.

The basic principles or premises of the policy paper mentioned above are the following:

— Attainment of political and social stability within the democratic framework of a market economy.
To contribute to attaining the desired stability, it is perceived that the following three events must obtain in the sector:

— Credibility in allocating mineral rights as well as in managing mineral and geological resources.

— Equity in the distribution of benefits and costs from mineral and geological resources.

— Sustainability and efficiency in economic growth of the sector.

These premises and principles are likewise assumed in this paper.

2. Central Issues, Problems, Concepts

Although the original document (Policy Advisor Group, Mining and Geology Subgroup, 1987) dealt with many problems and issues, this paper, however, addresses only the most crucial ones. The discussion are presented under four headings: Government Credibility, Equity in Sharing of Benefits and Costs, Economic Efficiency in Growth; and Institutional Issues.

2.1 Government Credibility in the Administration of Mineral and Geology Resources

Examination of the various reports and opinions regarding the administration of mineral and geology resources (e.g. Chamber of Small Scale Mining Industries, 1986; Chamber of Mines, 1987) lead to the conclusion that government credibility suffers in at least two areas: honesty and integrity of certain officials, and organizational structure defects.

Unfairness in the allocation and administration of mineral rights has been advanced as probably the most fertile cause of erosion in government credibility. For instance, rights on certain properties, after have been lost to new claimants due to error in the spelling of the name spent on improvements and hundreds of thousands of pesos paid in taxes, having been established for many years, after millions of pesos have been of the former claimant or due to error in the tie line of the mineral land (Chamber of Mines, 1987).

Again, while it takes months, even years for ordinary citizens to secure certain exploration or mining rights on small properties, some people or groups who have close connections with certain high government officials were able to secure the same over vast tracts of land in a few days. (Chamber of Small Scale Mining Industries, 1986).

It has also been mentioned in several form that "certain government officials had the habits of declaring certain areas which are suspected to be highly mineralized as mineral reservations and therefore closed to exploration and location by the general public, but made available to a selected few." As a result of the above and other related problems, the mining industry has been described as "80% litigation and 20% development" (Chamber of Mines, 1987; Chamber of Small Scale Mining Industries, 1986).

Bureaucratic red tape which results from defective organizational set up or procedures contributes also to the erosion of confidence in government. It is indeed very frustrating to prospect and develop a mineral property and in the process spend millions of pesos, only to discover later that what was awarded as mineral land is a forest reservation and hence not open to mineral exploration, as experienced by a gold mining firm in Davao.

Granting that one has already discovered and developed a mineral deposit, it is a tedious, expensive and frustrating experience to secure about 38 signatures in different offices just to obtain the necessary permits to construct the mine facilities (Ong, Pablito, 1985).

Certain policies have been made to favor or disadvantage specific parties. For instance, certain laws were made specifically in favor of some firms, or to prevent others from continuing with their usual operation (e.g. beach sand miners).

Although we can cite additional instances whereby confidence in government is eroded through flawed administration of mineral properties, it is informative to look into another related concern, the issue of equity.

2.2 Equity in the Distribution of Benefits and Costs

The exploitation of mineral resources of necessity confers benefits or entails costs which must be distributed equitably to pertinent parties. Equity, as used in this paper, refers to socially just distribution of benefits or costs of mining, not only in the context of legal but more in the sense of what is generally considered reasonable or fair in a particular milieu (Mangahas, M., 1986).

Benefits from mineral rights arise in at least two forms, as can be inferred, say from the Mining Code (PD 463). In a sense, possession of a certain mineral right, per se, say, a lease, is considered a benefit. This benefit is perhaps more political than economic in nature. In another sense, dividends, profits, taxes and employment, among others, are benefits in the economic sense. Costs in the political or economic sense can be deduced in a similar fashion.

We illustrate below some of the important equity issues relating to the distribution of mineral rights, taxes and pollution.

The Philippine Constitution of 1973 or 1987 explicitly limits the allocation of mineral rights to Philippine citizens or to corporations where at least 60% of the equity is owned by Filipino citizens. Furthermore, there are provisions in the mining laws and in existing bureaucratic procedures which favor the rich and influential Filipinos in the distribution of mineral rights, e.g. the requirement of adequate technical know-how and financial capability to develop the particular property as a condition to securing the mineral right.

This implies that both political and economic benefits accrue mainly to Filipino capitalists who determine the timing and magnitude of the flow of pertinent economic benefits, according to their best interests.

In order to rectify bias in the distribution of political (as well as economic) benefits, some natural basis must be resorted to. To do this, one must observe that certain mineral deposits are not risky to develop and require little investments to exploit, such as the land based gold placer and shallow seated pocket deposits of gold and chromite, among others. Small miners must be given priority in the allocation of these resources in accordance with the concept of equity.

Of course, it is well-known that most mineral deposits are very risky to explore or develop, require huge investments and sophisticated state-of-the-art technology. This type of mineral deposits can be justly given

to competent firms so that the economic benefits can be derived to improve the welfare of the people, particularly the poor.

The principle of equity requires also that a competent firm must be awarded only that amount of mineral land at any time which it can reasonably develop. It should not be allowed to hoard mineral claims especially for speculations as that will prevent their development by other operators and deprive the country of the corresponding economic benefits.

One of the important benefits from mining operation come in the form of taxes. The principle of equity highlights three pertinent issues. First, different minerals are taxed differently without equitable reasons. For example, limestone when used as cement raw material is charged 5.0% tax on gross production but this becomes 20% when limestone is produced as marble (Chamber of Small Mines, 1986).

Another important issue is the sharing of mineral taxes between the local and national government. Under existing arrangements, the local government gets very little share (if at all) from the taxes of mining firms, or if ever they get any, it is very difficult to use meaningfully as release by the national treasury is hampered by frustrating red tape. The principle of equity suggests that the local government must have a fair share in the benefits from mineral exploitation, because such minerals are endowed to their land by Providence, instead of, say a fertile plain or a lucrative prime industrial site.

Finally, taxes are used by government to get its share in the revenues from mining operation. The principle of equity requires that the firm must be allowed to earn reasonable rate of profits, but unearned rent or surplus must be taken by the government or at least shared with the government. Of course, normal income tax, just like in other businesses must be paid to the government.

Pollution from mining, on the other hand, is cost which must also be shared equitably. Ideally, pollution must be controlled and the cost borne by the producer. However, in most situations, complete pollution control is not feasible. In this case, the principle "the polluter must compensate the polluted" is applicable. Current practice is such that the government imposes certain charges or fines in proportion to the pollution caused by a mining firm. However, the magnitude of the charge does not seem to be commensurate to the damage, hence ineffective. Moreover, such charge tends to go more to the government than to the adversely affected parties.

Hence, some people conclude, perhaps erroneously, that the economic method of controlling pollution by a system of charges does not work (NRMC, 1985; RPSRD, 1985).

In the case where pollution is produced in small increments by numerous small units, as in small scale gold mining, the control either

by environmental regulation or fine obviously can not work. Due to the large number of small, poor and technically unprepared polluters, it makes sense for the government to educate them on the virtues of controlling pollution and subsidize the control of the residual pollution as a form of "social justice" (BMG, 1987).

We turn now to that aspect in which the economic benefits of mining become manifest, that is production.

2.3 Economic Efficiency in Growth

Granted that the machineries for promoting equity and government credibility are in force, the attainment of social and political stability further requires the provision of increased economic benefits which result from the sector's growth such as employment, taxes and export revenues. If properly handled, growth in the mining industry can be used to address important national concerns such as the payment of the costs of the government's comprehensive land reform or of the country's huge foreign debt.

Some of the principles that must be recognized before we examine the growth related issues are as follows:

- Minerals are exhaustible resources, however, they can lose value through obsolescence, substitution or competition by superior sources.
- Mining is more risky than most other businesses because of the large geologic risks which exist over and above the other types of risks common to other businesses. It is particularly high at the exploration and development stages.
- Some mineral deposits, because of their inherent characteristics, are suitable to low capital, labor intensive operations, whereas others are amenable only to highly capital intensive operations.
- Taxes must be fair and reasonable to allow reasonable return on investments while allowing the government to recover much of the unearned rent.
- Investment policies must be stable to allow predictability of the results of investments and must be just right to attract the desired level of investments without causing resource misallocation in the economy.
- Considerable external effects are associated with mining: some are desirable such as the creation of employment, either directly or through backward and forward linkages and provision of infrastructures to host and neighboring communities; but some are undesirable like mine tailings and other forms of pollution.

Several selected issues or problems upon which the growth of the mining industry depends are briefly described below. Three of these

problems are in the nature of infrastructure or precondition to growth, viz., peace and order, honest and efficient bureaucracy and available and accessible market information.

Reasonable peace and order condition is necessary before any respectable level of mining activity can take place. In some places, the operation of existing mines have been made infeasible while in other areas, even access to mining prospects have been prevented by poor peace and order situations.

Efficient and honest bureaucracy, one which is able to do the necessary task adequately within a reasonable time at normal costs, is another precondition of sustainble growth. At present, the bureaucracy is perceived to fall short of the minimum requirements as can be discerned, for instance, from the large number of signatures needed from different government agencies to obtain a mining permit (Ong, P., 1985).

Virtually free access to the right information is of course necessary to guide numerous decision makers so that the market can operate properly. For instance, vast amounts of geological information not yet available are needed to assess the mineral resources of the country and to minimize the high geologic risks in mineral exploration and development. In another sense, some of the small gold miners are said to have been taken advantage of by gold buyers due to their ignorance of market information, particularly gold prices.

Given the preceding premises, along with a promising mineral endowment, reasonable growth in mining can be achieved by attracting considerable volume of risk capital through a reasonable and competitive package of taxes and incentives. Taxes and incentives must be competitive with those in other mining countries as the country has to compete with them for investments; they also should be fair, equitable and non-distortionary.

The kind of risk capital needed to support a reasonable growth rate in mining is too large to be provided from local sources and the enterprise too risky to justify securing it by way of foreign loans as recent experience among distressed and foreclosed mining firms have shown (Chamber of Mines, 1986). The desired capital belongs to that type which will not hurt the country's economy should the investment fail, nor deprive other sectors of investments, such as that associated with foreign corporate equity or service contract.

Considering the constitutional provision on foreign corporate equity, the inadequacy of local risk capital and the experience since 1974 during which virtually no foreign equity came into the industry, service contract or its variant is the only manner by which adequate risk capital can be made available in the country (Walde, 1986).

One of the factors that constrains growth is the access to market. Creation of a market for a domestically produced mineral is therefore growth promoting. For instance, development of the local jewelry industry will provide a new market for locally produced gold as well as precious and semi-precious stones. Such an industry, if guided properly, can be made instrumental in increasing the share of the national government and hence in minimizing the illegal outflow of gold produced by small gold miners. Creation of a local market for many nonmetallic minerals will undoubtedly promote further growth among them.

Growth in mining can also be promoted by opening to exploration and exploitation hitherto unexplored lands. The Exclusive Economic Zone, reserved lands the original purposes of which are no longer served and abandoned lands that revert to the public domain offer a vast mineral resources horizon for growth.

Recent development in small scale gold mining has brought to focus a potent mechanism for promoting growth in gold mining. Expansion in production can be effected with the use of a relatively small capital within a short time as a large number of jobs, reported to be in the order of more than a hundred thousand for all small scale gold mining at present, is generated. This is complemented in a very important way by the fact that the country's geology suggests that it is blessed with a rich gold resources endowment as indicated by the widespread occurrence of small scale gold mining operations in places like Davao, Samar, Negros, Mindoro, Bicol Region, Tanay and Benguet.

Despite the bright prospects for growth in small scale gold mining, several serious problems must be recognized. The problems may be grouped under the following categories: legal, economic, mine safety and security.

Areas where small scale gold mining take place are usually covered by valid mining or forestry rights. Hence, most small gold miners are illegal operators resulting in conflicts. Since it is in the national interest to resolve such conflicts, and to spread the benefits from mineral wealth to the greatest number, specifically to the poor, some equitable basis of sharing may have to be found.

For example, agreement between the legal owners and the numerous small operators may have to be made, even through compulsory arbitration by government, based either on sharing of revenues or on the principle that the small operators may be given access to that portion of the deposits that can be mined without the use of motor driven equipment or explosives (Daet Province, 1986; Dominguez, C., 1986, oral communication.)

Economic gains from small scale gold mining come in the form of increased income for the operators as well as for the host and surrounding

communities and the generation of other economic activities. However, the bulk of the gold produced which should normally be sold to the Central Bank flows out of the country through illegal buyers. Furthermore, there seem to be a tendency for financiers and such other participants other than the small miners to corner an increasing proportion of revenue from gold (BMG, 1986a, 1986b).

Since large numbers of people without knowledge and experience in mining or in handling toxic chemicals such as mercury are involved, they are exposed to frequent accidents such as the collapse of mine tunnels or mercury poisoning.

Security, that is, peace and order situation in the gold mining areas has also been a problem since all sorts of lawless elements converge there. Certain areas where gold suitable for small operation take place have been discovered can not be developed due to unfavorable security conditions.

Mining, like other economic activities generate siltation and some other forms of pollution or environmental degradation. This problem is one of the most important barriers to the growth of the industry. It is of interest to the mining firms, the government and the people who will be affected to solve the problem to their mutual satisfaction. Should doubts exist, the problem must be resolved in the interest of the greatest number without exacting excessive sacrifices on the minority.

As mentioned under small scale gold mining, the problem of security or adverse peace and order situation is a strong deterrent to the growth of mining. This problem must therefore be solved, too.

The geology and mining sector requires a reasonable institutional arrangement to nurture its growth. Hence institutional concerns are very relevant.

2.4 Institutional Issues

Current institutional set up in the sector conduces to the neglect of the development of the country's geological resources and to the non-optimal development of the country's mineral resources. Three important types of works in relation to geological and mineral resources are being undertaken by the pertinent institutions, viz.: (a) geological survey works which deal with the development of a coherent body of knowledge about the earth under the country's jurisdiction, such as geological, geochemical and geophysical maps which are essential to national, social, economic and political planning; (b) development, management and regulation of the country's hard minerals and energy resources; and (c) manpower training and research. The Bureau of Mines and Geosciences (BMG) of the Department of Natural Resources (DNR) and the Bureau of Energy Development (BED) of the former Ministry of Energy are doing the first two tasks separately; both agencies emphasize

the second more than the first. On the other hand, formal manpower training and external (non in-house) researches are undertaken by educational institutions without clear ties with DNR.

The existing arrangements imply that the very broad field of geology is but a part of the relatively restricted field of mining, hence, geological survey works are done by the BMG and its counterpart in energy, BED. This illogical premise leads to the logical result that only those parts common to both geology and mining are attended to. In the allocation of scarce resources, of necessity, the larger share goes to the pursuit of mining related task, resulting to the relative neglect of geological survey work.

Ideally, the geological survey works are done by a Geological Survey Office separate from the Bureau of Mines which in turn undertakes the development, management and regulation of the mining industry. They address different needs, require different approaches as well as personnel qualifications and values.

As regards manpower training and research done in the universities, they have been considered "irrelevant" to the needs of the DNR and the private sector. This result should be expected since under the present arrangement, the DNR does not reflect its needs and priorities by supporting activities and programs in the universities in which it is interested.

3. Selected Recommendations

Conclusions of this paper are presented in the form of recommendations which are structured to address the most important issues or problems raised, arranged according to the basic principles assumed.

Credibility of government in the administration of the country's mineral wealth can be improved if the following acts are done: (a) Promote openness in official transactions so that each party concerned can be made easily accountable for his acts. For instance, the preparation of a master map of all mineral rights, including ownership, status, and plotter, among others, is an illustration of this suggested openness. (b) Improve personnel morale by respecting their civil service rights and providing decent compensation and opportunities for professional growth. (c) Remove existing rules and avoid formulating new ones which tend to favor any special group. (d) Restructure bureaucratic organizations and procedures to allow convenient processing of papers within a reasonable amount of time.

From the viewpoint of attaining equitable distribution of mineral wealth, the recommendations are: (a) Preference shall be given to small scale miners in the allocation of mineral deposits suitable to small scale operations. (b) Expansion of economic benefits to host communities from mining operations beyond the "normal" level shall be deliberately

encouraged. (c) Prevent speculation on mineral rights by awarding a firm at any time only that amount of land which it can reasonably explore, develop and use. (d) Taxes among minerals must be reasonable and fair. (e) There must be a fair sharing in tax revenues between the host local government and the national government. (f) Cost of pollution must be borne by the firm, except in some situations where national interest is involved, in which case the government may bear the cost of pollution. (g) Government must allow the mining operator to earn reasonable profit but must seek to get unearned rent.

After the policies for government credibility and equity in the distribution of benefits and costs have been set down, it is essential to lay down the policies for the industry's growth. The most important policies are: (a) Maintain peace and order, especially in the mining areas. (b) Provide an efficient and honest bureaucracy for the administration and management of mineral properties. (c) Make available adequate geological, mining, mineral markets and related information at reasonable cost. (d) Open to exploration and exploitation suitable reserved lands which do not serve their original purposes, as well as the Exclusive Economic Zone. (e) Develop a reasonable mechanism to insure adequate supply of risk capital. (f) Develop local mineral markets such as the gold jewelry industry to increase the economic benefits derived from local minerals. (g) Assist small scale miners to legitimize and render safe their operations as well as obtain reasonable share from gold revenues. In addition, the government must seek to capture with the use of appropriate economic devices the gold produced by small miners. (h) The existing mining laws must be amended or replaced with a new one to reflect the philosophies, values, goals and priorities of the new political order as articulated in the 1987 Constitution, this paper and other related documents.

In order that adequate geological and mining information will become available and in order to set up an appropriate orgnizational structure for the development, administration and management of the country's geology resources and mineral industry, the following recommendations are made: (a) Creation of a Philippine Geological Survey Bureau autonomous from the Bureau of Mines. (b) Upgrade the Bureau of Mines so that it can effectively develop and manage the mineral industry (a parallel organization can be earmarked for energy resources, or can be incorporated in the two bureaus above).

Finally, in order for the DNR to enlist the help of the pertinent educational institutions in producing trained manpower and research outputs that are useful in the development and management of mineral and geological resources, the DNR must develop a comprehensive program through which it assists, financially and in some other ways, the programs, projects and activities that are mutually beneficial. In this way, man-

power training and researches in the pertinent institutions can be made truly relevant to the needs of DNR.

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SOME PROMISING/USABLE FARMING SYSTEMS TECHNOLOGIES FOR THE RAINFED AREAS IN EASTERN VISAYAS[1]

by

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"If no major breakthroughs in food production are achieved soonest, a catastrophic famine will stalk this part of the world in the 1980's". This is based on an Asian Development Bank report which warned Asian Nations including the Philippines. Indeed, this heartening statement is now approaching its reality. Consider the following signs of the times: (1) prohibitive cost of energy and fertilizer; (2) typhoons and prolonged drought; (3) food shortage; and (4) tight farm credit.

In the Philippines, a large fraction of the agricultural lands is dependent completely on rainfall for its water needs. A large proportion of the country's agricultural lands is in fact rainfed, only one crop a year is grown and the yield of which is as uncertain as the rain.

On the other hand, most national government programs are still tilted toward irrigated farming thereby neglecting the development of rainfed areas. To balance our effort in developing the countryside therefore is to shift our attention to the neglected rainfed farming communities. These areas must be the orientation of our R and D efforts nowadays for it is in this areas where the greater magnitude of the so-called "poorest of the poor" exist. In this region, Eastern Visayas, we still have a very significantly large area under rainfed condition and the most relevant approach to increase the productivity of this type of farm is via the farming systems. Hence, the paper will give you a profile of the region and farming systems as well as supportive technologies which we believe could contribute to developing its full potential.

REGIONAL PROFILE

The Eastern Visayas (region VIII) is composed of two major islands, Samar and Leyte, and a few smaller islands including the sub-province

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of Biliran. These two major islands have somewhat different topography. Leyte has vast plains dissected in the center by mountainous ranges with peaks measuring from 700 to 1,000 m high. On the other hand, Samar is more rugged with low hills nearly covering the entire territory and no extensive plain and lowland areas except along the coast.

The climatic condition of the region is relatively humid, characterized by pronounced rainfall and periodically accompanied by trade winds and storms during the months of October through January. The region is frequently visited by destructive typhoons in fact, it ranks fourth among the 12 regions of the country in the rate of actual exposure. Rains occur more frequently in the Samar provinces where temperature is generally lower than in Leyte.

Of its total land area of 2.14 million ha, commercial forest accounts for 22.7%; non-commercial forest, 17.2%; brushland, 5.8%; open land, 5.3%; swampland, 3.0%; agricultural land 42.7%; and roads, rivers, and residential areas, 3.0%.

The region is one of the least developed regions in the country. Most of it is still rural, in fact, majority of the population is concentrated in the coastal areas and river valleys. It is basically dependent on agriculture as farming is its major economic activity. Its agricultural lands of almost 50% of its total land area are cultivated and planted to agricultural crops. The main products are copra, corn, palay, root crops, abaca and sugarcane (Table 1). Inspite of this agricultural orientation, however, the region is neither self-sufficient in its 2 major staple foods, rice and corn, and so it resorts to importing these cereals from nearby provinces.

Only around one-fifth of the total palay area is irrigated. The rest are mostly rainfed and some upland areas. Normally, only one harvest per year can be made in these rainfed and upland rice areas and the average yield is less than half of that in irrigated lands. On the average, palay and corn yields are 3.2 mt and 0.666 mt/ha, respectively. During the dry season, the rainfed rice lands are planted to other crops such as corn, vegetables and rootcrops. Backyard vegetable production is the most common type of vegetable farming in the region.

The causes of low crop productivity as stipulated in the region's five year development plan, 1978-1982 which includes the ten year development plan, 1978-1987 includes the following: (1) non-usage of improved and high yielding varieties; (2) high farm labor cost; (3) prohibitive cost of fertilizers; (4) inadequacy of farm-to-market roads; (5) fluctuating market prices; and (6) insufficiency of manpower trained in modern agricultural technology.

TABLE 1. MAJOR CROPS AND AREA PLANTED, 1982

CROPS	AREA (HA)
Coconut	345,440
Corn	204,020
Palay (Rice)	171,140
Root crops	86,540
Abaca	61,440
Sugarcane	16,340

TECHNOLOGIES FOR EASTERN VISAYAS

In its development plan, Eastern Visayas envisaged to increase agricultural production with a prime though ambitious objective to be self-sufficient in rice, corn and meat production. "Particular emphases are being given on the intensification of land use through expanded irrigation, multiple cropping and the increased use of high-yielding seed varieties; the development of more effective farm management and farm support systems; the development of improved breeds of livestock and more stable feed grain supplies; and improvement of fishermen's skills and formation of fishermen's cooperatives. The growing of non-traditional crops which thrive well on the region's wet climatic conditions like coffee, black pepper, cacao, pineapple, citronela and even ipil-ipil, are also being encouraged as a means to increase and diversify the income sources of local farmers, and possibly lessen the region's dependence on traditional crops". With these focuses, farming systems would be a better way of intensifying land use and consequently increasing farm productivity. And this approach generally embraces all of the above-mentioned development focuses or emphases.

Coconut-based farming systems

Area devoted to coconut in the Visayas Islands had aggregated 632.0 thousand ha or 19.7% share to the total Philippine coconut hectarage. Eastern Visayas had the widest tract with a total of 355.4 thousand ha or 56.2% of the island's total. Grown in all parts of the region, particularly along the coastal areas, coconut is the main export and income-generating crop of the region. However, with the fluctuation of the price of copra, the principal product of coconut, the economic viability of coconut farmers in the country has been destabilized. The following specific coconut-based farming systems involving either annual crops, perennial crops and livestock integration are suggested to increase the coconut farms' returns:

1. **Intercropping with annual crops.** In 9 provinces of Luzon and Visayas, 26 species were reported as intercrops for the coconut

farms. Of these, the most commonly preferred annual crops are corn, cassava, camote, rice, gabi and peanut. When intercropped, sweet and hot pepper, gabi, sunflower, mungo, tapilan, bush sitao, peanut, eggplant and arrowroot can give yields of 60% or more of their corresponding yields in open fields.

Five sweet potato varieties including 'BNAS', 'Minuras', 'North Carolina', 'Jap XUS 17' and 'C-7' are also recommended for intercropping coconut farms. Other annual crops that could be used as intercrops includes sorghum Cosor 3, Los Baños Bush Sitao No. 1 and peanut BPI 9. Five varieties of taro are also identified as promising intercrops. These are Yellow Binahi, Kalpao, Señorita, Tinarugu, and PR-G-095.

Trials in Davao involving cassava, cucumber, ginger, okra, winged beans and peanut among others showed that profits derived from these as intercrops maybe less than their corresponding profits in the open field but are profitable under coconut. Ginger also showed promise of contributing additional income to coconut farmers.

Research on coconut-based farming systems has been actively pursued by the Visayas State College of Agriculture (ViSCA) in Leyte. For instance, they have identified that annual crops such as corn, sweet potato, mungbean, cassava and vegetables are used as intercrops in Leyte with corn and sweet potato as the most frequently grown under coconut. In a separate study, 11 upland rice varieties were evaluated as intercrops of 20-year old coconut palms. The high yield obtained by IR 2071-586-6-3-4 could be attributed to the high number of plants/linear meter, production of 1-2 productive tillers/plant and the relatively longer panicles. High yield of C 166-133 could be due to the comparatively heavier weight of seeds. Several varieties of mungbean were also found adapted to conditions under 9-meter tall coconut palms. These includes CES 10-21, CES-ID-21 and CES x 10. CES ID-1 and CES 10-21 were resistant to powdery mildew and cercospora leaf spot, while CES x 10 was moderately resistant to these diseases.

Under 25 year old coconut palms, several cultivars of rice, corn, sorghum, mungo, peanut, sweet potato, cassava and gabi were identified as promising intercrops. Initial results of intercropping young coconut palms showed that green corn-rice is a promising cropping pattern.

When provided with proper fertilizer and other cultural management practices, peanut grown under coconut can yield comparably to those grown in the open field without adverse effects on the yield of coconut.

Madre de cacao or kudzu as green manure significantly increased the nut and copra yield of coconut palms.

2. **Intercropping with perennial crops.** Perennial crops provide more income than annual intercrops of coconut. Not much labor and capital inputs are required in the production of perennials when they began fruiting. They generally require deep soils. In the long run, they can stabilize in less fertile soils with proper soil management.

   The following perennial crops have been reported as intercrops of coconut farms: (1) fruit crops such as banana, pineapple, papaya, lanzones, jackfruit, rimas, santol, calamansi, avocado, mango, macopa, guava, tiesa, balimbing, camansi, chico, starapple, rambutan and atis; and (2) plantation crops like coffee, cacao, abaca, buri, and black pepper.

   In a 9-year intercropping study, cacao, pineapple and bananas as intercrops have been found to have no adverse effect on the yield of coconut. In 1972, coffee and pineapple were found to be the most economically feasible intercrops. Significant increase in total income can be realized even in 0.25-2 ha farm size intercropped with coffee, papaya and pineapple.

3. **Multi-storey cropping systems.** This is an old practice of farmers in Cavite, Laguna and Batangas. This system basically maximizes the utilization of the interspaces of coconut plantation and creates economic and social impact badly needed by the industry today. This technology provides continuous flow of income to the coconut farmers.

   Multi-storey cropping system calls for the growing of combination of annual and/or perennial crops of different height, rooting and canopy patterns in order to maximize use of solar radiation, soil nutrients and moisture. The compatibility of the various crops is a very important consideration in this system.

   An example of this systems is the pineapple + papaya + coffee + jackfruit cropping combination. This is done by planting pineapple first at spacings 30 cm x 100 cm followed by 2 rows of papaya at 3 x 3 m in every in-between rows of coconut. In between papaya, coffee is planted at the center of each coconut block of 4 palms. Jackfruit may also be planted.

   Papaya is harvested at the end of the first year, continuing up to the third year. Pineapple is harvested on the second year and allowed to ratoon. By the time papaya and pineapple fade out, coffee and jackfruit are expected to start bearing fruit.

4. **Mixed cropping.** Where coconut plantation is found, one will find some sorts of mixed cropping practiced by farmers at

varying proportions and using different crop combinations. This particular type of cropping pattern involves the unarranged simultaneous growing of two or more crops, be it annual or perennial crops, in the coconut farms.

In Davao, mixed cropping of black pepper, cacao and pineapple improved significantly the nut production of palms by as much as 33%. Copra yield per palm tended to improve with increasing intercrops per unit area. This is attributed to cultivation, weeding and fertilization of the intercrops (the coconut palms were also fertilized).

5. **Coconut-livestock integration.** The potential of integrating livestock into coconut farming is tremendous especially if it is supported by improved pasture management. Experience in Mindanao has shown that a hectare of improve pasture under coconut can easily support 3 animal units for grazing under proper management. This is comparable to improved open pasture.

Actually, coconut-livestock farming systems is not new to us as this has been practiced in the country since the turn of the century. Aside from raising farm income, livestocks are traditionally raised under coconut plantation for their biological "lawn mower" function to keep indigenous grasses and weeds under control. In turn, the grazing animals return back to the soil about 4,200 kg of solid excreta/animal per year and about 1,000 kg of urine. Thus, each animal returns to the soil approximately 21 kg N, 17 kg $P_2 0_5$, and 17 kg $K_2 0$/year. Although, it has been found out that the amount of nutrients being returned to the soil by the grazing animals is not enough to maintain the fertility of the soil, the viability of the system has been demonstrated in a number of provinces of the country even with smaller coconut farms. For instance, coconut-diary farming system has become a popular industry in the Sta. Cruz, Laguna and Sariaya, Quezon. A 1968 survey showed that coconut-cattle farming system is widespread in the southern provinces, namely: Cotabato, Zamboanga, Davao and Agusan. The system also exists in Masbate. Economy-wise, a net return of 30% of the capital investment can be realized per year when cattle is integrated with coconut farming and by following improved technologies.

The success of coconut-livestock farming system is dependent on improved pasture management. An important component of an improved pasture management is the use of improved pasture and legume species. Suitable species should be adopted to lower light intensities. They should not compete with the coconut

palm but provide moderate if not high herbage yield. The following are the interim recommendation: (1) grasses: para grass (**Brachiaria mutica**), ginea grass (**Panicum maximum**), signal grass (**Brachiaria decombens**), and napier (**Pennisetum purpureum**) with N and K fertilization; (2) Legumes: Centro (**Centrosema pubescens**), perennial stylo (**Stylosanthes guyanensis**), ipil-ipil (**Leucaena laucocephala**), siratro (**Macroptilium atropurpurecum**), and kadios (**Capanus cajan**); and Other grasses: African stragrass (**Cynodon plactostachus**), (**Setaria aspens**), Buffel grass (**Cenehaus ciliaris**) and Kennedy ruzii (**Brachiria ruzizieasis**).

In farms of less than 5 ha or where coconut palms are still young, sheep or goats may be the more suitable animals to raise. This is especially true in plantations where it is difficult to raise improved pasture due to stoniness and steepness of land. Smaller capital investment is needed for their housing and feeding.

Rainfed rice-based farming systems

Rice is the major staple food of 80% of the region's total population. However, as indicated earlier, self-sufficiency in this staple food has never been attained. One reason for this is that most of the rice lands in the region are rainfed and these are usually planted only once a year. Yet, too much emphasis is given to the Masagana 99 program which has left the rainfed areas generally unattended or neglected in previous years although there are already available productive technologies to raise farm productivity. For instance, the Iloilo-developed KABSAKA technology can intensify the cropping intensity of rainfed areas. This particular farming system calls for the introduction of another crop of rice or upland crops to maximize land use throughout the year. This is done by growing two crops of rice during the wet season plus an upland crop like mungo, peanut, cowpea, sorghum or corn after the second rice crop to make use of the residual moisture in the soil. Availability of early maturing crop varieties coupled with suitable modifications of cultural operations like zero or minimum tillage, direct seeding or broadcasting and timely application of pre-emergence herbicides for effective weed control enhances cropping intensification in rainfed areas.

Another technology developed at the Visayas Experiment Station in Iloilo and similar to KABSAKA is the upland crops succession after the harvest of rice in rainfed areas. These upland crops include watermelon, mungbean and sweet potato and planting should be done in November to December. In 1981, the feasibility had been proven to yield at least ₱2,000/ha. Similarly, three cropping patterns such as rice, watermelon, rice-squash and rice-rice were found to be adapted in the region considering the climatic condition and market potential as well as economic viability.

Corn-based farming system

Corn is another staple food of the region which has never attained self-sufficiency in local production. To offset the low productivity of corn (0.666 mt/ha), intercropping with leguminous crops such as mungo and peanut would be in order. These crops will definitely improve soil fertility thereby helping in the reduction of production cost. Furthermore, intercropping gives the crops more benefit in terms of more efficient absorption of nitrogen. Overall, corn-legume combination bolsters the productivity of corn farms. For instance, the combined yields of the system are usually 25-50% more than the monoculture of either corn or mungo. Although the individual yields of both corn and mungo are reduced when the two are planted together, the combined yield from the two crops gives the farmer higher return per hectare.

According to IRRI findings, corn-legume combination is a good intercropping system. Small farms would do well with this system. Besides maximization of land productivity, the system's best advantage is weed control. Since the intercrop help the main crop compete with the weeds, intercrops have better yields than pure crops.

As early as 1947, intercropping corn with sweet potato was tried. Sweet potato planted at almost the same time as corn, gave a much better yield than when planted after corn had been hilled up. Similarly, cassava planted with corn at almost the same time in the row and between the hills of corn gave a fairly good yield of roots. Corn yield were not affected by intercropping with cassava.

The on-going Farming Systems Development Project in Eastern Visayas (FSDP-EX) is an important activity in the region that caters to the needs of the small farmers in rainfed upland areas. Some of its upland crop-based cropping patterns being tested for their adaptability in different parts of the region include the following:

Basey

Mungo — upland gabi + upland rice + corn
Mungo — upland rice + sweet potato
Gabi/gabi

Bontoc

Corn + mungo — corn + peanut
Upland rice/sweet potato (ipil-ipil based)

Gandara

Corn + peanut — upland rice
Mungo — corn — upland rice
Mungo — upland rice/sweet potato

Matalom

Corn + peanut — corn/sweet potato
Corn + peanut — upland rice-mungo
Corn + peanut — peanut + corn

Villaba

Corn + peanut — sweet potato
Corn + peanut — peanut + corn
Corn + peanut — upland rice — mungo

Aside from these cropping patterns, it has also some back-up researches relating to farming systems. For instance, madre de cacao and ipil-ipil are being developed as hedgerows for either corn-based, rice based or abaca-based cropping systems in slopping areas.

Sugarcane-based farming system

Diversification of the sugarcane farms has been given attention only recently. This is because the world sugar price was favorable in the past decades. In 1976, however, its price started to dwindle thereby threatening the economic viability of every sugarcane farm in the country. To date, growing sugarcane solely in the field is no longer attractive especially to small scale sugar farmers. Thus, an alternative for increasing farm productivity and labor utilization per unit area is imperative to intensify land use. In sugarcane farms, this is best accomplished by intercropping early maturing upland crops. The slow growth behavior of sugarcane at its early stage is conducive for intercropping.

As early as the 70's, however, several upland crops such as mungo, peanut, soybean, corn, rice and sorghum have been intercropped between sugarcane rows. These can be harvested within four months before the canopy of the sugarcane covers the inter-row spaces. Recently, sugarcane + corn + soybean (corn along sugarcane row with soybean in the row interspace) have been tried in La Granja.

The sugarcane-based intercropping system has been viewed as economically viable only in small scale farms but not on large scale farms due to uncertain constraints in cultural operation specifically inter-row cultivation. However, inter-row cultivation — a very important weed control operation is practically eliminated with the introduction of the intercrops. Yet, this could be dispensed with considering the development of herbicides which are suitable to the main crop and intercrop.

The profitability of the sugarcane intercropping system is affirmed by both the private and government sector. And since the system is profitable or provides additional income to the sugarcane farmer, this should be integrated as a normal activity in sugarcane farming.

Abaca intercropping system

Abaca is another commercial crop of Eastern Visayas but affected by irregular price movements in the world market, proliferation of low-priced synthetic substitutes as well as natural fibers and high production cost, among others. In this region, plantations are mostly found in mountain slopes and areas around the base of mountains where other agricultural crops do not seem to thrive as well.

The risk of the abaca farmers could be minimized through the farming systems approach. Specifically, intercropping has been considered by the Bureau of Plant Industry (BPI) as early as 1956. In the Abaca Development Project in Davao, intercropping with kenaf and upland rice gave extra cash and reduced the incidence of the mosaic disease. Moreover, maintenance cost of the plantation is decreased with the system.

Conceived to provide partial shade to abaca plantation, fairly fast-growing leguminous trees with moderately dense foliage were reported in 1955 as the best shade trees. These trees increase production by stimulating robust growth and suckering and inhibiting to a certain degree, weed growth. They also increased soil moisture and kept soil and air temperatures constant. We are pretty sure that these shade trees can be a good additional source of income.

In the Bicol region, the abaca Technoguide recommends intercropping peanut, mungo and other short duration crops during the first and a half years of the plantation. However, to avoid too much depletion of nutrients from the soil, the intercrop should be given the required amount of fertilizer for normal growth and development. Covercropping with sweet potato is also recommended during the first year of the plantation.

Root crop-based farming systems

The government presently gives priority to root crops in its agro-development programs due to the importance of this commodity as an energy source. In Eastern Visayas, a vast area is devoted to this commodity which also serves as staple substitutes for rice and corn in some areas, especially in the more economically depressed rural hinterlands where rice is not grown or is scarce. This is how important root crop is in this region.

Considered long time ago as the "poor man's crop", root crops take strides in Philippine agriculture with the establishment of the Philippine Root Crops Research and Training Center (PRCRTC) in 1977 at the Visayas State College of Agriculture (ViSCA). Since then, the role of rootcrops is undergoing transition from backyard production to commercial farms and from supplementary food to industrial products. Generation of farming systems technology as an approach to improve root crop production started only very recently, yet, the research efforts is now starting to pay-off with the following technologies:

1. **Intercropping.** Cassava + bush sitao or corn intercropping systems was evolved in 1980 at the UP at Los Baños. This is done by planting corn or bush sitao between and within the cassava rows. In La Granja, BPI determined the economic feasibility of intercropping cassava with field legumes such as peanut, bush sitao, cowpea and mungbean. These intercropping systems indicated higher returns compared to cassava monoculture.

   The best intercrop for sweet potato according to a ViSCA study is bush bean which gave increase in sweet potato yield over that with mungbean or soybean as intercrops. By innoculating the intercrops, an average of 7% increase in sweet potato yield was obtained.

2. **Crop rotation of rootcrops with legumes.** This is another technology evolved in ViSCA from 1977-1982. Of the 4 rotation crops (peanut, mungbean, soybean and bush beans), the rotation pattern with peanut had the highest net returns. Rotation system with peanut increases the yield of gabi or taro, sweet potato and cassava by 12.3%, 81.6% and 38.44%, respectively, compared to the monoculture of the root crops.

   Annual crops like corn and some root crops like sweet potato together with cassava and banana are planted in small patches in the hill slopes of Samar. Owing to the rugged terrain and erosion-sensitiveness of the hilly lands if placed under cultivation, the following technologies can be tried in the Eastern Visayas.

   1. **Ipil-ipil and corn farming** system for hilly areas. This is a low cost production technology for subsistence farmers. This system enables the farmer to make use of the ipil-ipil leaves for fertilizing the corn, a crop which depletes soil nutrients faster than many other crops.

      Aside from easing the cost of production particularly inorganic fertilizer and the difficulty of transporting it over distant hilly areas, the system provides firewood and charcoal which are definitely additional sources of income of the farmers. Once the ipil-ipil hedgerows are established, it can provide a continuous source of nutrients to the corn plants.

   2. **Agro-forestry.** Actually, this is a new term for an old practice of growing food crops in association with forest trees. Basically, agro-forestry calls for the intercropping of food crops in between the newly planted forest tree seedlings. Livestock may also be integrated into the system.

      At ViSCA, the use of nitrogen fixing leguminous trees is being explored to serve as soil building and

conserving crops which control and minimize soil erosion, and as strip crops or windbreaks in slopy areas.

3. **Root crop-legumes intercropping in marginal hilly areas with ipil-ipil buffer strips.** This is another ViSCA intercropping innovation to recondition marginal hilly areas. This system is done by spacing the ipil-ipil buffer strips at 25 cm between rows and drilling at the rate of 10-15 plants/meter. Sweet potato and cassava are planted 6 months after planting the ipil-ipil.

   With this system, intercropping leguminous crops with root crops were also tried with encouraging results. For instance, bush bean yielded better than mungbean and soybeans as intercrops. Moreover, mungbean and soybeans planted 3 weeks ahead of sweet potato gave highest herbage yield. Cassava and taro planted between centrosema as green mulch gave better results than those planted in between native grass.

Other technologies supportive of farming systems

Aside from the various farming systems earlier discussed and the component technologies developed by micro-commodities of the research system, there is a good number of support technologies that may be worthwhile considering in the transformation of the present farming systems to a more progressive one and in support of the region's ambitious objectives of self-sufficiency in rice, corn and meat supply. These are the following:

1. **Small water impounding.** The first small water impounding project (SWIP) in the country was developed in Bohol by the Bureau of Soils (BS) in 1950. This technology refers to the construction of farm ponds and/or check dams in selected sites either for crop production, livestock production, fish culture, power generation, recreation and agro-forestry. Attest to its viability, it is now possible for the farmer-clienteles to plant 3 croppings of rice per year compared to only once before the SWIP was constructed. Where other sources of irrigation water are not available or dependable for dry season cropping like in the Eastern Visayas, impounding water during its abundance could be an appropriate prescription for selected rainfed areas. In fact, the Bureau of Soils in 1980 proposed 5 SWIPs in this region for construction. The sites are located in the following: (1) Sogod-soron, Catubig, Northern Samar; (2) Tabauan, Calbayog City; (3) Malogo, Canabid, Eastern Samar; (4) Malinao-Salvacion, Boac Gamay, Sogod, Southern Leyte; and (5) Paglaum, Alang-alang, Leyte.

2. **Indigenous fertilizer technology.** The prohibitive cost of inorganic fertilizer should prod us to take a second look on indigenous fertilizer sources. Under this, guano and peat deposite have been identified in the region. Two open-cut deposite of guano in Northern Leyte were classified under Grade A (20% P_2O_5). For the guano-derived phosphate rocks whose mineral composition is dominantly strengite, variscite, crandellites, a low-input process of increasing their citrate soluble P content was found through calcination.

   On the other hand, peat has been found in Samar. It has the highest organic matter content which ranges from 50-85%. Although deficient in zinc, its total nitrogen content is also high, ranging from 0.5-15%. This could be used as fertilizer to supply up to 40 kg N and 40 kg K_2O but it should not be used in P-deficient soils without supplementing chemical P fertilizers.

3. **Low-cost machinery technologies.** These technologies are simple in design and low in cost. They also reduce time, labor and cost of production and processing, and improve work quality and cropping intensity. Bureau of Plant Industry has the following:
   a. **Animal-drawn potato planter.** This is a single-row planter mounted to an animal-drawn plow. It has a field capacity of 0.25 ha/day. This can totally replace the back-breaking hand-dropping method of planting seed potato. It is best suited to low and medium elevations where the growing areas are, more or less flat.
   b. **Cassava lifter/harvester.** This is a first-class lever type that lifts the tubers from the soil. It only requires 15 man-days to harvest a hectare of cassava with the lifter, while it needs about 22.5 man-days to dig and pull it manually.
   c. **Cassava-chipping machine.** An engine or pedal operated machine, it produces chips 6 cm wide with an average thickness of 4 mm that is sufficient for efficient drying. It has a capacity of 200 kg/hr of chips when pedal-operated and 1,300 kg/hr with 2½ hp engine.
   d. **Seed and fertilizer applicator.** This is a single application, animal-drawn seeder with a capacity of about 0.25 ha/day. It makes a furrow and applies fertilizer, seeds and cover the seeds.
   e. **Rolling Injection Planter (RIP).** Operated by one person, it has a capacity of 6,000-16,000 hills/ha with a row spacing of 18 or 25 cm. It is designed for seeding in zero tillage.

   There are also a number of improved hand tools and other labor saving devices developed by BPI. Among these implements are variations of hoe, weeder, furrower, hiller, trowel, sickle, grass cutter, and hay lifting fork.

The Philippine Root Crops Research and Training Center (PRCRTC) at ViSCA has been developing production and processing tools and implements applicable for small-scale operation at village level.

1. **Multi-purpose plow with replaceable bottom.** It can be used in level and rolling land under both lowland and upland conditions. The average field capacity is about ¼ ha/day in level land and slightly lower in rolling land. Harvesting sweet potato using this plow is five times faster than with the use of a bolo.
2. **Tooth harrow.** This can be used with lowland and upland conditions. Field capacity is 0.8-1.3 ha/day without extension teeth and 1.5-1.8 ha/day with extension teeth.
3. **Weeding tools.** Six weeding tools were developed recently which includes the following: Z-blade push/pull weeder, plane blade push/pull weeder, scraping hoe, sharp-crested weeder, dentate weeder and serrate weeder. All are easy to operate and it is possible to weed the plants while standing.
4. **Hand wheel cultivator.** The wheel in the front of the frame increases its mobility. With this, the operator can cultivate the field in a standing manner.

   It can be used in making small furrows for peanut production and even for planting sweet potato. Field capacity averaged 1/5 ha/day at an average walking speed.
5. **Off-barring plow.** The share and the moldboard are mounted/facing each other to allow the plowed soil to converge in the center thereby covering the weeds growing in the furrow. It has an average weight of 19 kg.
6. **Single wheel fertilizer/corn seeder.** It is best used for preplanting application of fertilizer. It is convertible to function as a corn seeder by simply changing its metering device.
7. **Cutter/rake.** Use for cutting and rolling sweet potato vines to the sides of the field before the sweet potato harvester/digger, an attachment of PRCRTC plow, can be used in digging the tubers.
8. **Cassava lifter/digger.** This is a second class lever, hence, a lifting force is needed to harvest the roots. Aside from being a lifter, it can also be a digger for the remaining roots in the field. Its capacity is 1 hill/min.
9. **Cassava harvester.** A first class lever such that a downward pushing force must be applied to harvest the roots. It has a capacity of 1 hill/min.

CONCLUDING REMARKS

The paper identified various farming systems and supportive technologies that could be adopted to accelerate the development of the

Eastern Visayas. In as much as the economy of this region is predominantly agriculture, developing the present farming systems is inevitable for a take-off for development. This is because the farming systems approach views problems of agriculture production from the farmer's perspective by involving the farmer in the R and D process. As the Director of the University of Florida based Farming Systems Support Project (FSSP) Dr. Chris O. Andrew puts it, "a farmer does not approach production and management problems from a discipline perspective. Thus, a holistic or system approach is called for which incorporates a team of scientists and farmers in a process of problem diagnosis and resolution. The result is integrated solutions to farm problems instead of single, isolated solutions."

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GEOGRAPHERS REORGANIZE

In a recent meeting of the Executive Council of the Philippine Geographical Society (PGS) at the Philippine Social Science Council (PSSC) Center, Diliman, Quezon City, the PGS Governing Board reorganized its officers membership. Elected were: President Emeritus — Prof. Dominador Z. Rosell, President — Dr. Domingo C. Salita, Vice-President — Col. (ret.) Paterno R. Santos, Treasurer — Ms. Aurora S. Tolentino, Secretary — Ms. Shirly C. Estrellon, and Directors — Messrs. Artemio E. Gesmundo, Feliciano M. Lapid and Antonio Varias. This reorganization move is aimed towards pursuing with more vigor and dedication the objective of the society.

The PGS was founded on December 8, 1950 with twenty-one technical men composed of geographers, soil technologists, foresters, agriculturists and businessmen under the leadership of Dr. Jose M. Feliciano who was then the head of the Department of Geology and Geography, College of Arts and Sciences, University of the Philippines. Among the living charter members of the society as of today (7 August 1987) are Dominador Z. Rosell, Domingo C. Salita, Arturo Alcaraz and Daniel Basco.

The objectives of the society are (1) to foster geographic interest and concern among our people; (2) to advocate and stimulate geographic education and research; (3) to encourage and enchance the application of geographic knowledge in education, government, business, industry and national development; and (4) to inspire and challenge our people in the study and proper application of geographic information for the improvement of the quality of life.

The late Dr. Jose M. Feliciano was the first President of the Society. Prof. Rosell and Dr. Salita served also as President in previous years. During the 30th anniversary of the organization (Dec. 1980) charter members, Rosell, Salita, Samaniego and Alcaraz were conferred the title of Fellows of the Philippine Geographical Society. The PGS is a regular member of the Philippine Social Science Council, a federation of national societies of the different disciplines in the social sciences which has its center building at Diliman, Quezon City.

(Continued on page 127)

MALAYSIAN AGRO-RESOURCES POTENTIAL UNTAPPED*

by

DR. BADAR A. IQBAL**

Malaysia is one of the growing agricultural economies of South East region (ASEAN) having vast resources for attaining rapid agricultural progress. It occupies a place of pride on global scene in regard to agro resources namely natural rubber, hardwoods and palm oil, and accounts for 41 per cent, 39 per cent, 37 per cent, respectively. The need is to analyse how to make use of these agro resources so that the country's agricultural economy could attain a high degree of development on all horizons for which the Government of Malaysia has stood on firm grounds for the last 15 years.

In 1971, the Government of Malaysia, for the first time took a bold step in the form of New Economic Policy (NEP) for the betterment of masses, which had given a sound and wide enough base for rapid agricultural growth. The NEP had laid down four very important objectives to be achieved with zeal. Firstly, to remove poverty, stagnation and higher rate of backwardness among the masses and to give a better socio-economic pattern of society to the people depending upon equitable distribution of economic gains. Secondly, to generate more employment opportunities to enable the people to raise their income levels as well as standard of living. Thirdly, to bring to a possible extent the existing regional and economic imbalances and lastly, to identify the race with economic functions.

If we throw a glance on the statistics available on the basic objectives of NEP we find that the Government has got success in breaking the vicious circle of poverty and regional imbalances though the degree of success has been slow which requires immediate as well as concentrated efforts after making a deep review of the entire agricultural economy.

So far the Government of Malaysia has formulated four Five Year Plans and the results are quite encouraging.

The Fourth Malaysian Plan (1981-85) with a huge investment outlay amounted SM 1,026,390 has given a new direction to Malaysian agricultural economy and added emphasis has been laid down on the development plans relating to agricultural sector. This may lead to a rapid agricultural progress as well as of the masses.

Recently, Dr. Mahathir has given certain guide posts. Firstly, to expand agro-based industries. Secondly, to give added attention on the development plans and schemes relating to less developed areas. Thirdly,

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* Data used in this paper have been taken from World Survey, Euro-Year Book and the Economic Times, Bombay.

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to enhance domestic output of agricultural and industrial goods by increasing productivity and efficiency to enable the country to earn more valuable foreign exchange which is essential for the development plans. Fourthly, to provide a good as well as wide enough base for the agro-industrial development so that it could contribute maximum amount for the benefit of the masses.

During the Second and Third Five Year Plans, Agricultural Sector recorded slow growth but got momentum in the Fourth Plan (1981-85).

NATURAL RUBBER

Malaysia is the largest producer of natural rubber in the world. In 1971, Malaysia's total production of natural rubber stood at 13.2 million tonnes accounting for nearly 43 per cent of the global output of natural rubber. Whereas in 1982 the production of natural rubber went up from 13.2 to 15.2 million tonnes — indicating an over-all rise of 15.1 per cent during the period of 11 years. The share of a natural rubber in the global output has gone down by nearly 2 per cent i.e. from 43 per cent to 41 per cent over the years. This is because of the increase in the production of natural rubber in other countries of the world and the rate of growth in output of Malaysia was not commensurating with the world growth rate in natural rubber. If concentrated efforts are not being taken right from now, Malaysia may lose its top position and Indonesia which is the second biggest producer as well as close competitor in natural rubber in the world may outpace her in years to come.

According to the available data the rate of growth in global output of natural rubber is much higher, i.e. 21.7 per cent than the rate of increase in production of natural rubber of Malaysia. This has resulted in the form of a decline in the share of Malaysia in global production of natural rubber. Since 1976 the relative share has been on the decreasing side till 1980 and thereafter it showed a slight improvement in 1981 and again went down marginally in 1982. This is because of the lack of effective management on the part of the Government of Malaysia to keep pace with the rate of growth in the output of other major producing countries. The Government has to make all possible efforts to enhance the output by maximising the yield per hectare. Nevertheless, Malaysia with its output of natural rubber nearly 1.6 million tonnes accounts for nearly 41 per cent of the total annual production. Therefore, the Government of Malaysia should be more cautious in this regard. This natural resources provides employment to substantial labor force.

WOOD BASED UNITS

Malaysia is also one of the leading countries in the output of hardwoods and constituting 39 per cent of the world production of the same. It is because of the availability of hardwood forests which provide the raw material in abundance to hardwoods based units. The wood based units export potential and always bring a substantial amount of foreign

exchange for meeting the country's development needs. The events provide a sound and wide enough base for environmental stability. These units are also important from employment potential angle. In 1978 they had provided employment to 1.2 million people, whereas the figure for the year 1982 the figure comes to 1.7 million workers — indicating an over all rise of nearly 42 per cent over the years. This shows the degree of potential of these industries in providing employment to the masses which is of vital importance. If the Government of Malaysia wants to remove the problem of unemployment, it should make all efforts in this direction as they are labour-intensive in character.

According to the statistics available, the forests are spreading over 1,937,000 hectares which accounts for 50 per cent of the total geographical area of the country. Under the Fourth Plan (1981-85), the Government of Malaysia has formulated a dynamic as well as result-oriented policy in this direction. Under the new policy, the Government earmarked 29,000 hectares of land for fast growing plantations. This step will go a long way in supplementing the hardwoods output from natural forest and the country can sustain its production at a higher level till the year 2,000.

The wood-based units consist of two types of mills, namely saw mills which are 585 in number and they produce 5.4 million cubic meter of sawn wood and veneer plywood mills which are 35 units with an annual production of 91 million sq. meteres of plywoods. These units have been earning a substantial amount of foreign exchange from different Asian and European countries of the world.

In order to enhance the production of hardwood based units further, a national forest policy has come up and the same has been accepted by the apex body popularly known as National Forestry Council. Now it is to be seen to what extent this policy will be implemented with zeal and what would be the outcome of the same. The implementation of this scheme requires an effective management in regard to forests keeping in mind the sustained yield per hectare which has already been laid down by NFC.

It is high time for NFC to launch an integrated policy for keeping these units on sound footing and new species of quick yield should be conserved from the environment point on the one side and to make the country self-sufficient in timber requirements on the other side.

PALM OIL

In Malaysia, palm oil has been one of the best and most healthy cooking mediums and there has been a disequilibruim between the demand and supply for palm oil. Since 1974, there has been a situation in which the refinery capacity always exceeds the supply of crude oil (CPO). This to be dealt on war footing.

Recently, 17 small palm oil refineries have closed their operations due to acute shortage in the supply of domestic crude palm oil. This situation has been there for the last so many years. Now the small

palm oil refinieries have started facing the problem of keeping themselves in motion as they can not by the CPO from international market at a fairly high rate of unit of value because of the lack of resources at their disposal. This has caused a panic among the owners of refineries in general and small refineries in particular. As a result, the Malaysian refineries have to face the problem of competitiveness with their counterparts. This needs an immediate review of the situation and calls for concerted efforts in this direction. All possible measures should be taken for enhancing the domestic and regular supply of CPO to all refineries in general and small and medium refineries in particular. Efforts should also be made to import palm oil from neighbour countries like Indonesia till the supply of CPO within the country increases at a desired extent. According to an estimate the output of CPO which is around 3.0 million tonnes should go to the extent of 4.0 million tonnes by the end of 1990 to coup up the rising trend in the demand of CPO. Under the Fourth Plan (1981-85) the output of palm is to be grown at a rate of 8.5 per cent.

In 1970, the total output of palm oil was around 430,000 tonnes and the same went up to 2,600,000 tonnes in 1980 indicating an over all rise of nearly 505 per cent. This is an appreciable rise which is due to the painstaking efforts made by the Malaysian Federal Development Authority (MFDA) in this direction in the form of high rate of conversion to palm oil by estate, effective implementation of land developmental plans and scheme and appreciable rise in the yield per hectare. During the period 1970 and 1980, the acreage under cultivation rose to 890,000 hectares — a rise of more than 187 per cent. It is important to note here that the rise in the acreage is much higher than the rise in the output. This increase can not be considered at a satisfactory level.

This all indicates that Malaysian palm oil has bright future in years to come. Hence, the need of the hour is to formulate a long-term strategy in regard to production, yield per hectare and capacity utilisation of refineries. The strategy should be well knitted and comprehensive in character with a high degree of flexibility depending upon the approach of result oriented rather than target oriented.

From the foregoing analysis, it has brought out that Malaysia has great potential for agricultural growth and all symptoms required for rapid growth and development are very much there. The only question is how to make full use of the effective and efficient manner. Every effort should be directed towards productive channels. Infrastructural facilities should also be made available on an increasing scale as well as at a cheaper rate so that various facets of Malaysian agricultural economy could be able to record an appreciable degree of economic progress at a minimum cost. This could be achieved if the country does have a well integrated policy and the same should be result-oriented rather than target-oriented.

AREAL PATTERNS OF SOVIET URBANIZATION

by

LYSANDER A. PADILLA*

I. INTRODUCTION

Rapid urbanization is widespread in today's world. It is observable not only in those parts called "developed", but also in the "underdeveloped". As a social and environmental change, the scale and tempo of modern urbanization is unprecedented. Like all changes, it creates problems, as old, traditional structures are disorganized and new or better ones are demanded to replace them.[1] Thus, studies of urbanization have become very helpful in analyzing the complexity of the process, and in suggesting possible solutions to its problems. Undoubtedly, this will become increasingly so as urbanization continues unabated.

The discussion which follows focuses on some salient geographic characteristics of urbanization in the Soviet Union. Soviet urbanization can be thought of as different from the urbanization that occurred in Western countries, or from that which is occurring in Third World countries.[2] Urbanization in the USSR exhibits little of the social ills that accompany the urbanizing activity of most other countries. There is a very low incidence of urban criminality in the USSR. There is no unemployment. This discussion, however, stresses only the special characteristics of Soviet urbanization. Specifically, it examines the pattern of areal distribution of the levels and trends of urbanization in the Soviet Union.

Urbanization in the USSR, viewed across its different regions, can be described summarily as: (1) balanced, because rates of urbanization magnify more in regions which are comparatively less urbanized to start with, that is, in areas where urbanization is likely to be most needed; and (2) systematic, because it increases in conjunction with the growth of total industrial product, that is, with increasing capacity to sustain it. It is further systematic because the growth of industrial product, in its turn, is also proportional and balanced. In keeping with the planned development of the national economy, industrialization is accelerated in areas where rates of industrial growth are initially less in relation to other regions, such that industrialization in the Soviet Union occurs in formerly less industrialized areas relative to the rest of the country.

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[1] B. S. Khorev, "Problems of Modern Urbanization", in D. I. Valentey (ed.) 1978. *The Theory of Population.* Moscow: Progress Publishers. pp. 336-337.

[2] Urbanization, as other socio-economic transformations in the Soviet Union, has a planned and, as claimed, proportional character (*The Soviet Union.* Third Issue, 1983. Moscow: Novosti Press Agency Publishing House. pp. 45-48).

II. METHODOLOGY

The bulk of the discussion is based on the analysis of statistical data, which are presented in tables. The first columns where the raw data are given will not be numbered, and will be followed by the processed data in numbered columns. Because this approach relies on previously defined units, a debate on definitions of what is "urban" or "non-urban" does not arise.[3] Also, due to central planning, the USSR has uniform procedures of statistical reporting, so that data are consistent with each other, with methods of enumeration, and with level of aggregation.[4]

The indicators of urbanization used in this discussion are: (1) proportion or percent urban population; and (2) number of cities. The categories of distribution, or level of aggregation used for the study are either the economic region or the republic, and both.

Every geographic analysis must choose its level of aggregation. The choice of this study is occasioned by two reasons:

1. The main sources of our data, the Statistical Yearbook of the USSR, Narodnoye Khozyaistvo, and the Ekonomicheskaya Geyografya, gives figures by republican, and both regional and republical levels, respectively; and
2. Since we are interested in spatial differentials, the process under investigation — urbanization, must be distributed among unit areas which are as meaningfully distinct from each other as possible. The economic regions, by Soviet definition, is an areal division which fulfills this condition.[5]

While both republican and regional levels are used, the smaller subdivision is preferred, every time. Most regions are smaller than their corresponding republics, e.g., the Russian Soviet Federated (RSFSR) contains ten regions. On the other hand, three regions are each composed of several republics. See below.

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[3] Sihce, at any one time, when enumerations are made for the whole country, the categories of distribution are already defined. They may change only after this enumeration, in which case, a redefinition is made explicitly. See Lex Volodarsky, 1984. *What Statistics Tell Us.* Moscow: Novosti Press Agency Publishing House. *passim.*

[4] *Ibid.* See also A. Yezhov, 1967. *Organization of Statistics in the USSR.* Moscow: Progress Publishers. pp. 31-50, *passim.*

[5] Economic regionalization is based on territorial differences, not only of geophysical differences, but more especially of productive specialization and labor resources. See Stroyev, Kovalevskaya and Rom, 1982. *Ekonomicheskaya Geyografya SSR* (in Russian). Moscow: Izdatelstvo Prosveshenye. p. 96.

Khorev, op. cit., p. 326. Harris, C. 1970. *Cities of the Soviet Union.* Chicago: Rand McNally and Company, p. 148.

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TABLE 1. THE SOVIET ECONOMIC REGIONS AND THEIR RELATIONSHIPS WITH CORRESPONDING REPUBLICS

A. Those belonging to the RSFSR
   1. Northwest
   2. the Center
   3. Volga-Vyatka
   4. Central Black-Earth
   5. Volga
   6. North Caucasus
   7. Urals
   8. West Siberia
   9. East Siberia
   10. Far East

B. Those belonging to the Ukrainian Republic (UKSSR)
   1. Donets-Dniepr
   2. Southwest
   3. South

C. Those composed of several republics
   1. the Baltic, composed of Estonia, Latvia and Lithuania
   2. the Transcaucasus, composed of Georgia, Armenia and Azerbaijan
   3. Middle Asia, composed of Turkmenia, Uzbekistan Tadjikistan and Kirghizia

D. Those co-extensive with republics
   1. Kazakhstan
   2. Byelorussia

E. the Moldavian Republic

At this point, it is conceded that either level is rather large, and may conceal local detail. Nevertheless, these levels of aggregation are maintained, because they sufficiently weigh and test the hypothesis and its corollary. Our reasoning follows from the organization of planning and administration in the Soviet Union: the economic regions and the republics are the foci of design and implementation of development plans for the entire country. We expect, therefore, that urbanization differentials will be adequately measured through them.

III. DISCUSSION

Human settlements in the Soviet Union may be classified as: (1) cities; (2) settlements of city-like characteristics; and (3) rural settlements.[6] However, the bases for rural-urban distinction are primarily population size and function of the settlement, which is either economic or administrative.[7]

[6] Chauncy D. Harris. 1970. *Cities of the Soviet Union.* Chicago: Rand McNally and Company. p. 9.
[7] *Ibid.*, p. 29.

Economic function is operationalized as the main employment of the majority of its population, while administrative function connotes that a settlement is officially recognized as urban primarily because it is a center of government activity.[8]

By the beginning of 1979, the USSR had approximately 6000 urban settlements, the total population of which combined was 62 percent of the all-Union population.[9] Following is a list of major cities according to their regional location.

TABLE 2. MAJOR CITIES OF THE USSR BY ECONOMIC REGION

Northwest Region

1. Arkangelsk
2. Valogda
3. Leningrad*
4. Murmansk
5. Novgorad
6. Petrosavodsk
7. Pskov
8. Syktyvkar
9. Cherepavets

the Center

1. Moscow*
2. Bryansk
3. Vladimir
4. Ivanovo
5. Kalinin
6. Kaluga
7. Kalomna
8. Kastroma
9. Novamoskovsk
10. Orel
11. Orekhavozuevo
12. Padolsk
13. Rybinsk
14. Ryazanh
15. Serpukhov
16. Smolensk
17. Tula
18. Yaroslavl

Volga-Vyatka

1. Gorky*
2. Dzerzhinsk
3. Yushkar-ola
4. Kirov
5. Saransk
6. Cheboksary

Black-Earth

1. Belgorad
2. Varonesh
3. Kursk
4. Lipetsk
5. Tambov

Volga Region

1. Astrakhan
2. Volgagrad
3. Kazanh*
4. Kuibyshev*
5. Naberezhniye
6. Chelny
7. Penza
8. Saratov
9. Tolyatti
10. Ulyanovsk
11. Ufa*
12. Elista

[8] *Ibid.*, pp. 29-53. Khorev, *op. cit.*, p. 326. Khorev, however, in the very same work, questioned the concept of urbanization as indicated by the nature of employment, areal concentration of housing, or even the way of life, as inadequate to express the urbanization process. p. 331.

[9] G. H. Fomin, "Problem Razrabotki i Realizatsii Generalnoi Skemy Rasselenya na Teritorii SSR" in Akademy Nauk SSSR. 1982. *Rasselenye Nasselenya i Razmeshenye Proizvodsy* (in Russian). Moscow: Izdatelstvo Nauka. p. 12.

North Caucasus
1. Grozny
2. Krasnodar
3. Makachkala
4. Nalchik
5. Novarossisk
6. Ordzhonikidze
7. Rostov on Don
8. Sochi
9. Stavropol

Urals
1. Izhevsk
2. Kurgan
3. Magnitagorsk
4. Nyzhny-Tagil
5. Ohrenburg
6. Perm*
7. Sverdlovsk*
8. Chelyabinsk*

West Siberia
1. Barnaul
2. Kemerovo
3. Nizhnevartovsk
4. Novasibirsk*
5. Omsk*
6. Tyumen

East Siberia
1. Bratsk
2. Irkutsk
3. Krasnoyarsk
4. Kyzyl
5. Norilsk
6. Ulan-ude
7. Chita

Far East
1. Blagaveshensk
2. Vladivastok
3. Komsomolsk on Amur
4. Magadan
5. Petropavlovsk
6. Kamchatki
7. Khavarovsk
8. Yuzhno-Sakhalinsk
9. Yakutsk

Donets-Dniepr
1. Varoshilovgrad
2. Dnepropetrovsk*
3. Donetsk*
4. Zhdanov
5. Zaporozhye
6. Kharkov*

Southwest
1. Vinnitsa
2. Zhitomir
3. Kiev*
4. L'vov
5. Chernovtsy

South
1. Kerch
2. Nikolayev
3. Odessa*
4. Sevastopol
5. Simferopol
6. Kherson

the Baltic
1. Vilnius
2. Kaliningrad
3. Kaunas
4. Riga
5. Tallin

the Transcaucasus
1. Baku*
2. Batumi
3. Yerevan*
4. Kutaisi
5. Sumgant
6. Sukhumi
7. Tbilisi*

Middle Asia

1. Ashkhabad
2. Dushanbe
3. Nukus
4. Samarkand
5. Tashkent*
6. Frunze

Kazakhstan

1. Alma-ata*
2. Dzhambul
3. Pavlodar
4. Semipalatinsk
5. Tselinograd
6. Chimkent

Byelorussia

1. Brest
2. Vitebsk
3. Gomel
4. Minsk*
5. Mogilyev

Moldavia

1. Kishinev

*cities with at least 1 million population in 1985.

A. Levels of Urbanization

The simplest way of describing geographic differentials in urbanization is to tabulate the percent urban population for each region, and then by ranking them. Such a profile is given to Table 3.

TABLE 3. PERCENT URBAN POPULATION BY ECONOMIC REGION IN 1980

Region	Urban Pop. (%)	(1) Rank*
1. Northwest	77	1
2. Center	76	2
3. Volga-Vyatka	63.5	9
4. Black-Earth	54.3	12
5. Volga	66.2	8
6. North Caucasus	56	11
7. Urals	75	3
8. West Siberia	68.5	6
9. East Siberia	69	5
10. Far East	75	3
11. Donets-Dniepr	72	4
12. Southwest	39.3	15
13. South	63.2	10
14. Baltic	67.3	7
15. Transcaucasus	54	13
16. Middle Asia	40	14
17. Kazakhstan	54	13
18. Byelorussia	56	11
19. Moldavia	40	14

Source: Stroyev, *et al.* (1982)

* ranks are given in whole numbers, equal ranks have the same number.

It can readily be seen that by 1980, the regions of the Northwest, the Center, the Urals, and the Far East are most urbanized. With the exception of the Far East, all derive their present positions from pre-Revolutionary times. Historically, they were all industrial centers of Tsarist Russia. The major cities of the Northwest and the Center, Leningrad and Moscow, respectively, with their satellite towns were manufacturing centers, in addition to seats of political authority, being interchangeably capitals of old Russia.

The Urals were mining sources, and their urbanization was attendant on the processing of the minerals and other raw materials obtained from that area. Unlike theirs, however, the urbanization of the Far East is largely a result of modern Soviet industrial activity.

The next highly urbanized region are the Donets-Dniepr in the Ukraine, East Siberia, West Siberia, the Baltic, the Volga and Volga-Vyatka. Of these, the Donets-Dniepr and the Baltic were old urban centers. The former was a rich coal and fuel source of the empire. The Baltic republics were, of course, highly developed manufacturing and trading partners of Western Europe, even before they became part of the Soviet Union.

Note that with the exception of the Donets-Dniepr in the Ukraine, which is fifth in rank, and the Baltic (eight) all the regions of highest urbanization are all parts of the RSFSR. The Russian federated republic by far exceeds all other republics in terms of proportion urban. When the percent urban is presented by republic, the same hierarchy is maintained. See Table 4.

TABLE 4. PERCENT URBAN POPULATION BY REPUBLIC, 1980 AND 1985

Republic	% Urban, 1980	% Urban, 1985	(1) Rank, 1985
USSR	63	65.20	
1. RSFSR	70	72.58	1
2. Ukraine	62	65.38	6
3. Byelorussia	56	62.02	7
4. Uzbekistan	41	41.89	13
5. Kazakhstan	54	57.09	8
6. Georgia	52	53.79	9
7. Azerbaijan	53	53.71	10
8. Lithuania	62	65.68	5
9. Moldavia	40	44.68	12
10. Latvia	69	70.50	3
11. Kirghizia	39	39.55	14
12. Tadjikistan	35	33.60	15
13. Armenia	66	67.59	4
14. Turkmenia	48	47.44	11
15. Estonia	70	71.43	2

Source: Tsentralnoy Statisticheskoy Upravlenye (TSU), SSR v. 1984 g. for column 2.
Stroyev, et al. (1982) for column 1.

The basic pattern for both years given in the table remains unchanged. In 1980, the RSFSR was the most urbanized among the republics, seven percent above the Union average of 63 percent. In 1985, it also led all the republics, also with approximately the same amount of percentage above the national average for that year. After the RSFSR come the two Baltic republics of Estonia and Latvia. The fourth is Armenia in the Caucasus, and only then follows Lithuania. The Ukraine places sixth. All the rest have indices below the Union average.

The position of Armenia is seen as a result of a very modern trend, as only forty-five years back, it had a very low index of urbanization. In the discussion of trends we will see that urbanization after the Socialist Revolution proceeded in conjunction with increasing industrialization.

B. Trends of Urbanization

Urbanization in the Soviet Union follows five channels: These are: (1) the natural increase of the urban population; (2) the increment of the urban population from the rural population, or mechanical growth; (3) the founding of new towns and cities; (4) the inclusion within a city's limits of its suburban areas, or their administrative subordination to it (including towns, communities and villages); (5) the transformation of rural communities into urban ones.

From 1926 to 1970, migration from the countrysides accounted for 57 percent of the urban growth in the USSR, natural increase of the urban population 26 percent, and the conversion of rural communities into urban ones 17 percent.[10]

In Table 5, we give the percent of towns built after 1917, the year of the Socialist Revolution.

TABLE 5. TOWNS BUILT AFTER 1917, BY REGION AND REPUBLIC, 1980

Region/Republic	Total towns	Towns after (1)	Percent
USSR	2074	1383	66.6
RSFSR	1004	617	61.4
Northwest	116	59	50.8
Center	238	119	50.0
Volga-Vyatka	65	37	56.9
Black-Earth	48	17	35.4
Volga	104	66	63.4
North Caucasus	97	71	73.1
Urals	123	98	79.6
West Siberia	66	53	80.3
East Siberia	63	48	76.1
Far East	63	50	79.3
Ukrainian SSR	412	314	76.2
Donets-Dnieprr	175	144	82.2
Southwest	190	144	75.7
South	47	26	55.3

[10] Khorev, *op. cit.*, pp. 331-332.

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Urals	123	98	79.6
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East Siberia	63	48	76.1
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Donets-Dniepr	175	144	82.2
Southwest	190	144	75.7
South	47	26	55.3

[10] Khorev, *op. cit.*, pp. 331-332.

Kazakh SSR	82	62	75.6
Byelorussian SSR	96	66	68.7
Middle Asia	144	121	84.0
Uzbek SSR	93	81	87.0
Kirghiz SSR	18	15	83.3
Tadjik SSR	18	14	77.7
Turkmen SSR	15	11	73.3
Transcaucasia	135	103	76.2
Azerbaijan SSR	60	44	73.3
Georgian SSR	51	38	74.5
Armenian SSR	14	21	87.5
Baltic	202	98	48.5
Lithuanian SSR	92	43	46.7
Latvian SSR	56	35	62.5
Estonian SSR	32	20	62.5
Kaliningrad	22	—	
Moldavian SSR	21	14	66.6

Source: Stroyev, *op. cit.*

By region, Middle Asia, the Donets-Dniepr, West Siberia, the Urals, the Far East and East Siberia were locations of more post-revolution urban settlements. With the exception of the Donets-Dniepr region which is in the Ukraine, all these regions were relatively new. They were also considered under-developed areas of the USSR. The creation of new urban settlements there reflects the policy of the Soviet government and the Communist Party to balance the development of the Soviet Union by channeling resources to less developed areas.

By republic, the construction of new towns occurs most in Armenia. Recall that shown in Table 4, Armenia is currently the fourth most urbanized republic, exceeded only by Russia, Estonia and Latvia. Meanwhile, in Middle Asia the Uzbek Republic has only 5 towns less than Armenia, and ranks next. All the republics of Middle Asia — Uzbekistan, Tadjikistan, Turkmenia and Kirghizia — have high ranks. It is because as a group, they have commonly high rates that their region is topmost in recent urbanization as defined by the building of new towns. The Transcaucasian region, to which Armenia belongs has members which had comparatively lesser new towns. Even then, as a group, it is sixth in rank among regions, ten of which had rates above the Union rate of 66.6 percent. The structure that emerges from the ranking shows clearly that new towns were built mostly in the southern and eastern portions of the Soviet Union, away from the Center.

The trends in Soviet urbanization can be thought of as having two periods: pre-World War II, and post-War. The pre-war period extends from 1922 until 1940. The post-war period will be indexed by the years 1941-1985. In the pre-war years, the weighted growth rate for the whole country was 101.17 percent. While from 1941 to the present it was 100.55 percent. These figures support the statement that the pre-war urban growth of the Soviet Union was one of the fastest in the world,[11]

[11] Harris, *op. cit.*, p. 240.

averaging more than 5 percent per annum. The components of these rates, however, were very different in these two periods. That is to say, the areal subdivisions are growing at very different rates in these two periods. But one can immediately notice in the trends an "equalizing" of the differences, such that those areas with either slower rates of growth or lower percent urban in the first period compensated in the latter period by a faster rate of growth: See Tables 6 and 7.

The first column in Table 6 gives a profile of the newly born state in terms of percent urban population, about to start on an ambitious scheme of five-year planned developments. The Union of the Soviet

TABLE 6. PERCENT URBAN IN 1922 AND 1940, BY REPUBLIC

Republic	(1) 1922	(2) Rank	(3) 1940	(4) Rank
USSR	16.16		32.51	
RSFSR	14.93	8	34.44	4
Ukraine	20.38	3	33.92	5
Byelorussia	18.33	5	21.28	13
Uzbekistan	19.18	4	24.51	10
Kazakhstan	8.90	11	29.81	8
Georgia	20.60	2	30.62	7
Azerbaijan	26.08	1	37.01	1
Lithuania	—		23.04	10
Moldavia	16.81	7	13.45	10
Latvia	—		35.10	3
Kirghizia	10.75	10	21.72	12
Tadjikistan	7.42	12	19.21	14
Armenia	16.87	6	28.40	9
Turkmenia	12.40	9	35.25	2
Estonia	—		33.58	6

Computed from: TSU. *Narodnoye Khosyaistvo* SSSR for the years shown.

TABLE 7. PERCENT INCREASE IN PERCENT URBAN, BY REPUBLIC

Republic	(1) 1922-40	(2) Rank	(3) 1940-85	(4) Rank
USSR	16.35		32.69	
RSFSR	19.51	3	38.14	4
Ukraine	13.54	4	31.46	7
Byelorussia	2.95	11	40.74	2
Uzbekistan	5.33	10	17.38	12
Kazakhstan	20.91	2	27.28	9
Georgia	10.22	9	23.17	10
Azerbaijan	10.93	8	16.70	13
Lithuania			42.64	1
Moldavia	3.36	12	31.23	8
Latvia			37.40	5
Kirghizia	10.97	7	17.83	11
Tadjikistan	11.79	5	14.39	14
Armenia	11.53	6	39.19	3
Turkmenia	22.85	1	12.19	15
Estonia			31. 85	6

Computed from: Tables 4 and 6

Socialist Republics was constituted in 1922 with 7 republics: Russia, Ukraine, Byelorussia, Kazakhstan, Azerbaijan, Armenia and Georgia. In 1924, Uzbekistan, Moldavia, Turkmenia and Kirghizia joined the Union, followed by the Baltic republics in 1940. No data are given for the latter in 1922.

In this year, largely as a result of pre-Soviet development, the republics of Azerbaijan, Georgia, Ukraine, Uzbekistan and Byelorussia were comparatively more urbanized. The Russian republic had lower percent urban population than Armenia and Moldavia, because its other regions apart from the Center, the Northwest and the Urals, were yet very undeveloped. This was especially so for the eastern parts. Russia was among those republics whose percent urban is below the Union index of 16.16 percent. In fact, however, it had more urban inhabitants during this period than all the other republics' urban population combined!

The years from 1922 until the attack of the Nazis was characterized by heavy industrialization, and attempts for nationwide electrification, as the five-year development plans went into effect. Among those areas which developed greatly were the Siberian and Far Eastern portions of the RSFSR, the Middle Asian republics, and Kazakhstan. The rates of urban growth varied widely, but they corresponded to the vigorous industrialization going on in the different regions of the country. The republic of Turkmenia led with 22.85 percent of urban growth. By 1940, it had moved to the position of second most urbanized republic from its former rank of ninth. The other top placers exhibited similarly large growth rates. Kazakhstan became the eighth most urbanized republic in 1940 from eleventh position in 1922, while the RSFSR became the fourth most urbanized republic from being eighth — both spectacular achievements. The remaining republics grew slower than the Union average of 16.35 percent.

Turkmenia and Kazakhstan, located on the southeastern fringes of Russia, began urbanizing in earnest following incorporation into the Soviet Union. Railways were established linking their sparsely inhabited areas with urban centers. In Debit Dagh and Vyshka in Turkmenia, oil was discovered, and in Karganda, Kazakhstan, one of the richest coal deposits was found. The need to mine and process these minerals led to the building of power generators and industrial complexes, which later became whole cities themselves. This pattern repeats that of the eastward colonization of the RSFSR — from the Urals to West, and then East Siberia — where transformation of settlements into towns quickly followed the founding of industrial complexes in their locations: Magnitagorsk, Novokuznetsk, and Komsomolsk-on-Amur. One can indeed say that the "Sovietization" of these areas was achieved by electrification and industrialization, in confirmation of Lenin's definition of Soviet power.

In Table 8 is given the rates of growth of the gross industrial output of the fifteen republics from 1913 to 1940, the first period, and

the second period from 1940 to 1980. The first period indexes pre-war developments. All the top industrial growers of this period were also the most urban in 1922, or else had one of the highest growth rates of urbanization until 1940. Until 1940, the republics of Georgia, Armenia, the Middle Asian republics, Byelorussia, Kazakhstan, and the RSFSR were outgrowing the rest of the country, and the Union average of

TABLE 8. RATES OF GROWTH OF GROSS INDUSTRIAL PRODUCT FOR REPUBLICS

Republic	1913-1940	1940-1984
U S S R	7.7	24.0
RSFSR	8.7	21
Ukraine	7.3	16
Byelorussia	8.1	35
Uzbekistan	4.7	19
Kazakhstan	7.8	36
Georgia	10.0	20
Azerbaijan	5.9	15
Lithuania	2.6	70
Moldavia	5.8	65
Latvia	0.9	51
Kirghizia	9.9	44
Tadjikistan	8.8	21
Armenia	8.7	56
Turkmenia	6.7	13
Estonia	1.3	54

Source: TSU SSSR. Narodnoye Khozyaistvo for the years shown. Moskva, SSSR.

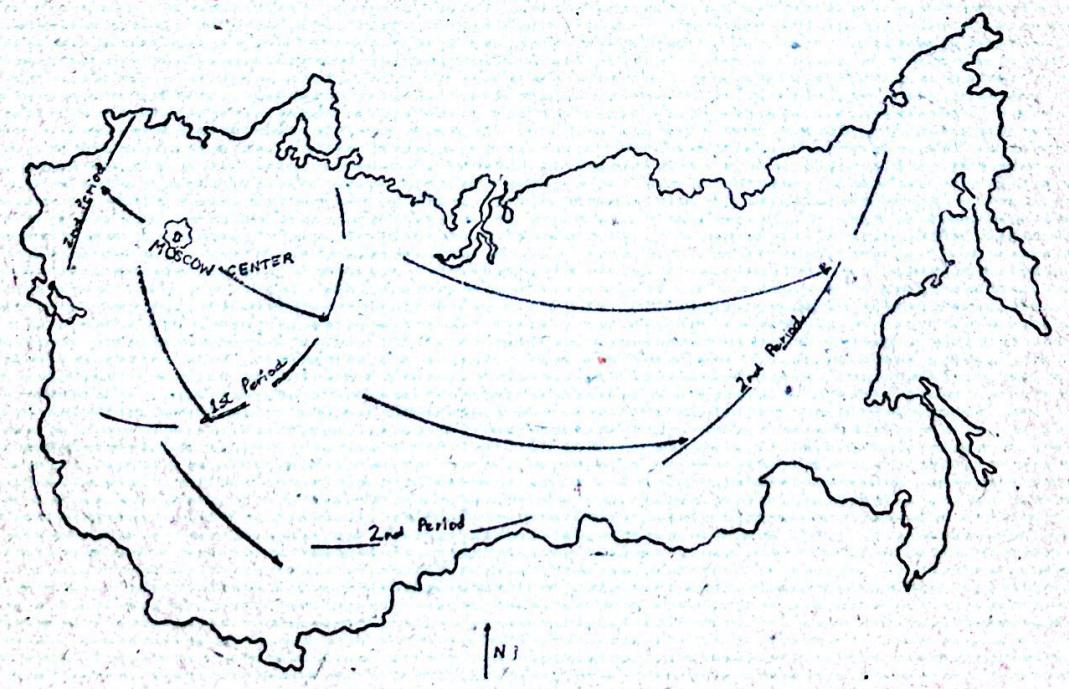

FIGURE 1. SPATIAL PATTERNS OF URBANIZATION in U.S.S.R.

7.7 percent. All of these regions form a "ring" that almost immediately encircles the Center. This ring represents the first reach of regional development in the Soviet Union. The ring is completed in the second period by the inclusion of the Baltic republics and Moldavia. In this second period, Byelorussia, Kazakhstan, Kirghizia, and the Russian federated republic were still above the Union average in rates of growth, but they yielded to Moldavia and the republics of the Baltic. Only Armenia maintains its pre-eminent pace, outstripping its fellow republics in Transcaucasia, and becomes the most urban republic in southern USSR by 1985. The ring which represents the wavefront of industrialization and urbanization therefore expands outward to the south and east, further away from the Center. Refer to Figure 1.

Other studies have already shown the very high correlation between the percent urban population with various indices of industrialization. Padilla (1986) states that the Pearson coefficients for relationships between percent urban and percent industrial output is .83, and significant at the .05 level. The coefficient for percent urban and length of rail in kilometers is .37, not significant. Khorev (1980; 1975) using Spearman rank coefficients, claims that they range from .80 to .90 for percent urban and gross industrial product. Industrial production includes all mining and machine industries, but excludes food and textiles production. By Soviet definition, the services sector is non-commodity producing; and is therefore excluded in the statistical reckoning of production.

IV. CONCLUSION

The growth trends discussed here were accomplished to a large extent through population redistribution.[12] Since the Soviet Union has no unemployment, the redistribution of the labor force may be said to occur due only to "pull" factors, or the attraction of better conditions on those accepting regions. It is commonly known, for example, that in Siberia, which continues to attract migrants, the wage rates are much higher than in European Soviet Union.[13] Government investments in large-scale production of cotton and sub-tropical fruits and vegetables in the southern republics, favored both old and young migrants.

Urbanization in the modern world is universal. But the Soviet experience is distinguished from the rest by its tempo and pattern. Of the two, its spatial pattern deserves special attention. In the Philippines, urban development concentrates in the Center, the Metropolitan Manila region, to the detriment of the other regions. This kind of polarization is minimized in the USSR. To the contrary, there is an intense effort to develop the peripheral regions. Enormous amounts of

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[12] Khorev, *op. cit.* Also Pokshishevsky, 1974. *Geography of the Soviet Union.* Moscow: Progress Publishers. pp. 81-84.

[13] V. Pokshishevsky, "Population Distribution" in Valentey, *op. cit.*, pp. 70-83. Also Harris, *op. cit.*, p. 308.

capital and welfare incentives are mobilized in the southern and eastern regions to stimulate the growth of output and the increase of resident labor. By the same measures, in-migration is also encouraged to augment the local labor force. It is a cardinal principle of socialist planning that territorial differences among regions be compensated to maintain the equality of benefits for Soviet citizens. In a speech to the Communist Party, Leonid Brezhnev directed decision-makers to "equalize social differences in territorial plans.[14]

Pokshishevsky (1978; 1974) has always stressed that it is the geography of production that is always the decisive factor in the morphology and distribution of population settlement.[15] Having such a large territory to reckon with, the geography of Soviet industrialization and urbanization had been asked, in favor of the immediately accessible areas. This was particularly the case in the period before the Second World War. After the war, there was greater attention to developing the peripheral regions, such that urbanization occurred faster in them. The unparalleled history of urbanization in the southern and eastern regions of the USSR has been due to the conscious effort of the government to focus socio-economic development there.

The Philippines as a rapidly urbanizing society attempts to maximize the demographic and socio-economic benefit of its transformation. The results of Soviet urbanization can serve as a "yardstick" against which our progress in urbanization may be measured.

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[14] Materials of the 25th Congress of the CPSU (in Russian). 1981. Quoted in S. Smidovich. "Politika Rasselenya V SSR: K Problyeme Vybora Tselei" in D. Valentey, 1983. *Rasselenye i Demograficheskiye Prossesy* (in Russian). Moscow: Finansy i Statistika. p. 54.

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THE COCOA INDUSTRY IN MALAYSIA
A SUMMARY OF RESEARCH FINDINGS[1]

by

WOLFGANG SENFTLEBEN[2]

Malaysia is currently the world's sixth largest producer of cocoa beans after the Ivory Coast, Brazil, Ghana, Cameroon and Nigeria, respectively. In 1985 Malaysia produced around 100.000 tonnes of dry cocoa beans out of a total world production of 1.802 million tonnes. The growth rate of Malaysia's cocoa production is remarkable when

Table 1: Cocoa in Malaysia: Planted Hectare Area and Production

Year	Area (Hectares) West Malaysia	Sabah	Sarawak	Total Area (ha)	Production (tonnes)	World Total Production (tonnes)
1965	761	2.187	—	2.940	1.000	1.508.000
1970	3.362	4.019	—	7.381	2.400	1.435.000
1971	5.878	4.517	—	10.395	4.000	1.499.000
1972	8.984	5.447	880	15.311	5.000	1.583.000
1973	11.599	6.242	1.481	19.322	9.000	1.397.000
1974	13.634	8.126	2.313	24.073	10.000	1.448.000
1975	17.587	9.823	2.870	30.280	13.000	1.547.000
1976	20.796	11.673	3.342	35.811	15.434	1.410.000
1977	29.635	14.994	3.850	48.479	16.708	1.339.000
1978	34.268	22.467	4.557	61.292	17.564	1.502.000
1979	45.168	37.803	6.385	89.356	26.580	1.481.000
1980	57.345	57.984	8.526	123.855	36.500	1.557.000
1981	64.618	83.455	10.711	158.784	45.200	1.675.000
1982	66.256	114.474	12.740	193.470	66.200	1.581.000
1983	68.341	132.729	14.402	215.472	69.000	1.520.000
1984	80.000	146.000	15.000	241.000	85.150	1.710.000

Source: "Profile of the Primary Commodity Sector in Malaysia", Ministry of Primary Industry, Malaysia
"Commodity Review and Outlook" 1970/71 to 1984/85 issues, Food and Agriculture Organization, Rome

[1] This case-study on Malaysia is part of a larger piece of work on "THE COCOA WORLD MARKET — WORLD MARKET INTEGRATED DEVELOPMENT AND NATIONAL POLICIES OF THE COCOA PRODUCING COUNTRIES" undertaken by the Institute of International Affairs of the University of Hamburg, West Germany, which includes country reports on Brazil, Ecuador, Ghana, Ivory Coast, Nigeria, Cameroon and a general evaluation of the world cocoa market. The author was in charge of the country report on Malaysia.

[2] Dr. W. Senftleben is research fellow at the Institute of Southeast Asian Studies in Singapore.

considering that until 1970 there was almost no cocoa in Malaysia at all. However, Malaysia can be regarded as a special and unique case of cocoa cultivation in a certain way, and Malaysia differs from the West African and South American cocoa producers in multiple respects.

1. *Historical Development:* Malaysia is relatively a newcomer on the world cocoa market. Although first cocoa trial plantings in West Malaysia go back to 1934 when cocoa was planted for experimental purposes at the Agricultural Station at Serdang and cocoa was first introduced on a larger scale at a plantation of the United Cocoa Development Company at Landas in Ulu Terenganu in the 1950s, the large scale introduction of cocoa in Malaysia as a third permanent crop after rubber and oilpalms started only in the mid-seventies.

Cocoa Plantings in Sabah are much older, and the first mentioning of cocoa trials in British North Borneo goes back to 1890 when seedlings were imported from Ceylon and planted at the Agricultural Stations at Sandakan and Lahad Datu. In 1957 the famous cocoa research station at Quoin Hill near Tawau was founded which did pioneering work in the introduction of large-scale cocoa plantings in Sabah. Whereas the area of cocoa cultivation in all Malaysia represented only 7,381 hectares in 1970, it grew to over 285,000 hectares in 1985.

2. *Cocoa as a Plantation Crop:* In contrast to West Africa and South America, the overwhelming part of cocoa cultivation in Malaysia is grown on medium-sized plantations according to the following proportions: Approximately 63 per cent on plantation basis, 29 per cent on smallholdings, and 8 per cent on government-aided land settlement schemes, respectively. Reasons for the striking success of cocoa cultivation on plantation basis are three factors: (1) The long tradition of plantation agriculture in Malaysia which dates back to the turn of this century, (2) the relatively high standard of education and training of the plantation labour, which predominantly belongs to the Indian (Tamil) ethnic group, and (3) the high sense of responsibility and dedication of the plantation management.

Table 2: Percentage Distribution of the Area of Cocoa Cultivation among Smallholdings, private Plantations and Land Settlement Schemes in West Malaysia, Sarawak and Sabah, as well as in All-Malaysia, for 1984

Area	Smallholdings	Plantations	Land Settlement Schemes
West Malaysia	29.95%	51.33%	18.71%
Sabah	23.03%	73.42%	3.54%
Sarawak	83.88%	6.55%	9.57%
All-Malaysia	29.19%	62.82%	7.99%

Source: Oil Palm, Coconut, Cocoa and Tea Statistics Handbook, published by the Department of Statistics, Malaysia, 1984

3. *The Role of Cocoa in the Entire Economy:* Malaysia's economy is well diversified, however, two-thirds of the export are still coming from the primary sector (agriculture and mining). The cocoa industry occupies only a very small portion of the gross inland product. In 1985 the cocoa industry contributed only 1.4 per cent to the total export of Malaysia. At the same time the area under cocoa cultivation occupies only 6.4 per cent of the total agricultural land use area in Malaysia.

4. *The Role of Cocoa in the Regional Economy:* Cocoa cultivation plays a significant role in the regional economy in the East Malaysian State of Sabah, and is after petroleum, timber and palm oil one of the most important money-earners in this State. Out of a total area of 285.000 hectares under cocoa cultivation in Malaysia, 63.2 per cent are located in Sabah. The traditional area of cocoa growing is located in the Tawau and Lahat Datu districts bordering Indonesian Kalimantan, an area which is known for its fertile volcanic soils. With regard to West Malaysia, the main cocoa growing areas are in Lower Perak (Hilir Perak) and the entire alluvial coast of Selangor where cocoa is interplanted under old existing coconut trees. Smaller areas of mono-cocoa are located in Central Pahang (Jangka Triangle) and in the interior of Trengganu.

5. *The Shade Regime:* Whereas the largest part of cocoa in West Malaysia is planted under old existing coconut trees, especially along the entire West coast area, cocoa plantings in Sabah tend to be predominantly mono-cocoa planted under artificial Gliricidia as shade trees.

6. *Cocoa Pests and Diseases:* In contrast to West Africa and South America cocoa growing areas, Malaysia's cocoa growers have been largely spared from devastating cocoa pests and diseases. Although cocoa diseases are not completely unknown, their spreading has only regional character, and the local occurrence can be easily controlled through spraying of insecticides and pesticides. "Vascular Streak Die-back", a virus disease, is known to exist in all parts of Malaysia, whereas the "Pod-borer" disease and the "Cocoa moth" disease are of minor importance and have only regional significance.

7. *Governmental Policy towards Cocoa Development:* Until now the government has exercised only limited influence on the Development of the cocoa industry. Cocoa development has been left to the private sector. A uniform governmental policy towards cocoa development is practically non-existing, since competence for matters relating to agriculture is shared between the Federal and the State governments, with the East Malaysian States of Sabah and Sarawak being almost autonomous in matters relating to agriculture. The government's influence on cocoa development is limited to five areas: (a) the alienation and disposal of State land to plantation companies and smallholders for the purpose of cocoa cultivation; (b) the formulation of planned targets for cocoa cultivation as spelt out in the five-year development plans, and he com-

pilation of National cocoa statistics; (c) with regard to cocoa research and cocoa marketing the government sector is competing with private institutions in order to provide a healthy competition; (d) the introduction of cocoa on government-aided land settlement schemes has been exremely hesitating, however, the Federal Land Development Authority and the Sabah Land Development Board have opened up a few schemes exclusively for cocoa cultivation; and (e) the Agricultural Department has subsidized the rehabilitation of moribunt coconut areas along the West coast of Peninsular Malaysia through interplanting with cocoa under existing coconuts between 1973 and 1985.

8. *The "Malaysian Cocoa Research and Development Board":* It is the intention of the government to set up a centralized agency for the purpose of promotion, development, research, and marketing of cocoa in Malaysia, and such a Board is likely to be located in Sabah. However, the establishment of a Cocoa Board has failed so far because of financial problems. As a result of the current economic recession in Malaysia, the government wants the Board to be financed through levying of an export cess, whereas the cocoa producers argue that the cocoa industry is still in its infancy stage and and cannot bear additional financial burdens.

9. *Taxation of Cocoa:* In contrast to rubber and palm oil there is no direct taxation levied on the production or export of cocoa products in Malaysia. However, between 1979 and 1983 a local cocoa cess was collected by the district authorities in Sabah for the production of cocoa, if the cocoa price exceeded a certain lower ceiling. The legal foundation for the collection of the cess was based on § 89 of the LOCAL GOVERNMENT ORDINANCE (Sabah No. 11 of 1961), whereas the collection of agricultural taxes is a Federal prerogative. The collection of the cess was therefore in conflict with Federal laws, and Sabah discontinued the collection of the cess after the 1984 devastating floods and subsequent prolonged drought. As an incentive for further investment into the Malaysia cocoa industry it seems unlikely that an export duty is levied on the export of cocoa beans in the near future.

10. *Cocoa Smallholdings:* For the large majority of smallholders in West Malaysia earnings from cocoa cultivation constitute only a sideline additional income, whereas rubber, coconuts and animal husbandry is the main source of income. The yield per hectare is for West Malaysian smallholders extremely low. Reasons for this can be seen in (a) the lack of adequate knowhow in cocoa planting; (b) inferior alluvial soils along the West coast; (c) inadequate financial input and low productivity; and (d) cultural restraints. In striking contrast to West Malaysia, the yields per hectare for smallholders in Sabah belong to the highest in the world which can be easily explained: (a) Sabah smallholders concentrate on cocoa as sole crop; (b) Sabah has a longer tradition in planting cocoa; (c) excellent volcanic soils in certain areas, especially in

the Tawau region; (d) cultivation of mono-cocoa under artificial Gliricidia trees, and (e) high financial input and intensive cultivation. Almost all cocoa smallholdings in Lower Perak, Selangor and Sabah are owned and cultivated by the same person. In case of Muslim cultivators, however, we can notice a large degree of land fragmentation and multiple ownership as a result of the "Muslim law of inheritance".

11. *Rehabilitation of Coastal Coconut Areas:* The Department of Agriculture in West Malaysia has subsidized the replanting of old coconut trees and the interplanting with high-yielding cocoa along the West coast areas of Johore, Selangor and Perak until end-1985. Due to the economic recession of the National economy, the scheme was discontinued, and from 1986 onwards subsidies under this programme have to be repaid by the smallholders. Nevertheless, almost 80 per cent of the coastal coconut areas in West Malaysia have been rehabilitated so far.

12. *The Marketing of Cocoa Beans:* Large cocoa plantations usually have their own marketing channels. In contrast to West Africa, neither West Malaysia nor Sabah has a government monopoly or centralized government marketing agency for smallholders and land settlement schemes. In West Malaysia the Federal Agricultural Marketing Authority (FAMA) trades only around 17 per cent of West Malaysian cocoa bean production. The greater part of West Malaysia's small local dealers who usually own sundry shops nearby and who are willing to extend short-term credits to the small farmers for buying groceries. FAMA does not give credits, that is why many smallholders avoid selling cocoa to FAMA. Small and middle-ranking dealers usually pay slightly more than FAMA. Similar marketing pattern exist in Sabah, but due to the low population concentration the network of cocoa dealers is wide-meshed. The Sabah Marketing Corporation (SAMA) is the largest marketing agency in Sabah and it functions according to private enterprise and profit-oriented principles. With regard to the marketing policy of agricultural products Malaysia stresses free enterprise and a healthy competition according to the principle of "supply and demand". When it comes to external marketing, Malaysia increasingly tries to move away from the traditional markets in Europe and North America by opening up new market outlets, particularly in East Asia (Japan and China), in the Pacific region (Australia and New Zealand) and towards the Soviet block countries. Since Communist countries are reluctant to spend valuable foreign exchange for luxury consumer goods such as cocoa, Malaysia is willing to engage in barter trade by accepting machinery and raw materials in exchange for cocoa.

13. *Linkage Effects of the Cocoa Industry:* So far cocoa cultivation had very few linkage effects on input, transport and the service sector of the National economy. At the moment only 17 per cent of the raw cocoa beans are processed and manufactured into semi-finished products in West Malaysia; for Sabah this percentage is even smaller.

The cocoa processing industry is still very young and in its infancy stage. There are seven cocoa manufacturing companies in Malaysia, and all of them are operating by losing money in the initial stage. It is true to say that semi-finished cocoa products are more difficult to sell on the world market than raw cocoa beans,, and often large Transnational Corporations are boycotting the import of semi-finished products. A local Malaysian market for chocolate is practically non-existent, and only chocolate-drinks and chocolate-flavoured sweets are produced at present in Malaysia. Since the Malaysian cocoa aroma is slightly inferior and differs from the standard Ghanan taste, there is no immediate intention to produce chocolate in Malaysia. However, Singapore has already a substantial production of chocolate.

14. *The Cocoa Promotion Policy:* Malaysia undertakes every effort to conduct research relating to the development of cocoa and its products. The Malaysian Agricultural Research and Development Institute (MARDI) maintains a large cocoa research station in Lower Perak (near Telok Intan), and the Sabah Department of Agriculture has a world-renowned cocoa station at Quoin Hill near Tawau. The present emphasis in cocoa research concentrates on the following fields: (a) Increase in production, productivity and higher yields per hectare; (b) Controlling and eliminating of cocoa pests and diseases; (c) Improvement of the Malaysian cocoa aroma; (d) Better utilization of cocoa by-products which are obtained from processing; (e) Development of an appropriate cocoa manufacturing technology. Until now all equipment for cocoa processing is imported from overseas; and (f) Development of a monitoring and supervision mechanism. With the introduction of "Standard Malaysia Cocoa Grades" (SMC) by FAMA in West Malaysia an effective quality control for the export of cocoa beans has been created. It is intended to extend the SMC grades scheme also to Sabah. However, the plantation sector in Sabah is currently opposed to the scheme arguing that due to the special transport situation in Sabah, it would reduce the competitiveness of Sabah's cocoa vis-á-vis other producers.

15. *Employment on Cocoa Estates:* A high percentage of laborers on cocoa plantations are women. For those directly employed by the cocoa plantations the wages and other benefits are regulated through an agreement between the National Union of Plantation Workers (NUPW) and the Malaysian Agricultural Producers Association (MAPA). However, the old agreement has expired and the new one has not come into force, since justified demands by the NUPW for higher wages and better working conditions, particularly for higher compensation during the lean months of cocoa harvesting, cannot be implemented immediately because of the economic recession and depressed prices for primary commodities. However, in West Malaysia many laborers are not directly employed by the plantations, but they are

loaned from contractor companies according to their seasonal and regional requirements. Then, these laborers from outside are not subject to the tariffs and regulations agreed upon between the Union and the producers sector.

16. *Cocoa Production Costs:* Cocoa plantations in Malaysia are very capital intensive, and the high investment costs for setting up of a plantation are usually provided by large plantation companies with international affiliations. The wage level in the plantation sector is relatively high, since Malaysia already belongs to the group of threshold countries. The high cost for labour is partly compensated through efficient management and intensive cultivation. With very little inflation in Malaysia, the input costs have remained constant over the last years. With regard to the application of fertilizers, pesticides and insecticides, it can be noticed that the input is higher when the world market price for cocoa tends to be high. In 1986 cocoa plantations made a substantial profit, whereas rubber and oil palm plantation were losing money. In the process of replanting old-aged rubber, more emphasis is given to the diversification with cocoa. Bank loans for investments in the cocoa sector predominantly comes from private commercial banks.

17. *Outlook:* Unlike the Philippines which are plagued by typhoons and tropical storms every year. Malaysia's climatic and environmental conditions are almost ideal for the planting of cocoa. The only other competitor on the Asian cocoa producers scene is Papua-New Guinea. Malaysia intends to increase the area under cocoa cultivation considerably during the next decade. Until 1990 it is envisaged to add another 80,000 hectares of cocoa to the already existing 285,000 hectares. For this reason, Malaysia did not sign the International Cocoa Agreement of 1986. It fears that through a production quota system the projected growth of the cocoa industry could be curtailed. Also for the years to come, Malaysia's cocoa industry will remain a domain of the private sector. Governmental land development agencies, such as the Federal Land Development Authority, the Federal Land Rehabilitation and Consolidation Authority, the Sabah and Sarawak Land Development Boards and the various State Economic Development Corporation will refrain from planting cocoa on a large scale. The cultivation of cocoa in Sarawak is relatively unimportant until now. However, the current area under cocoa of 15.000 hectares in Sarawak will be expanded rapidly during the next fifteen years. For Malaysia as a whole, cocoa still plays a minor role in the National economy, and despite tremendous increases of the production area, the cocoa industry may not be very dominant in the near future. This, however, is very different in Sabah. With world market prices being low for petroleum and palm oil and an increasing depletion of Sabah's once unlimited timber resources, the cocoa industry could become the leading economic sector in this State.

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Geographers Reorganize... *(From page 100)*

During the same Board meeting the Board decided to reorganize also the composition of the Editorial Staff of the Philippine Geographical Journal (PGJ). Appointed as Editor is Mr. Feliciano M. Lapid, Associate Editor — Ms. Aurora S. Tolentino, Advertising Manager — Mr. Ernie Ebasco, and Circulation Manager — Mr. Manuel P. Poliquit.

The Journal, a quarterly magazine, began in 1953, is the official publication of the Philippine Geographical Society. The journal is sent to all Society members and contains various articles dealing on human and physical geography, urbanization settlements, natural resources management, population, environmental problems, industrialization, conservation and other aspects of geographic interest.

The journal has been edited and managed by the board of editors headed by Prof. Dominador Z. Rosell as Editor-in-Chief since its inception. Lately however, due to health reasons, Prof. Rosell decided to forego active participation. The journal has many technical magazine exchanges coming from various parts of the world as well as paid subscription. During its many years of existence, now in volume 31 and up to date, the journal has gained recognition not only nationally but internationally as well. The authors of the published articles came from different nationalities and this makes the journal very informative to a wide variety of readers. Moreover, the new thrust of the present set of officers is to concentrate on carrying out the Society's noble objectives such that geographic information becomes wide spread in all parts of the country and becomes a living tool and asset valuable in the everyday life struggle of every Filipino worth his salt!

INDEX TO THE PHILIPPINE GEOGRAPHICAL JOURNAL VOLUMES 26-30, 1982-1986

by

AURORA S. TOLENTINO*

Part I

AUTHOR INDEX

* Planning Officer II, Department of Sciences and Technology (DOST) and Treasurer, PGS.

Part II

SUBJECT INDEX

OBITUARY

DOMINADOR Z. ROSELL
1905-1987

The officers and members of the Philippine Geographical Society and the editorial staff of the Philippine Geographical Journal keenly feel a great loss in the demise of their immediate past president and President Emeritus, and Editor-in-Chief and Business Manager, respectively, on 25 August 1987 in Cavite City.

Born in Malitbog, Leyte on 5 November 1905, he obtained his degree in B. Agriculture (soils) at the University of the Philippines, Los Baños in 1928, his BS (geography) at UP, Manila in 1935, and an MBA on Management and Administration at the Manila Central University in 1950.

Soon after graduation from the UPLB, he entered government service at the Bureau of Science, Manila, where he was assigned in soils work, pioneeering in soil survey and classification of Philippine soils. This activity continued later under the Division of Soil Survey, Department of Agriculture and Commerce under the Commonwealth Government. In the early fifties, he was appointed Chief Soil Scientist, Bureau of Soil Conservation. On October 1, 1952 he became the Administrator, Irrigation Service Unit and Program Director Pump Irrigation Program of the Philippines up to November 5, 1960 when he was appointed Supervising Scientist, National Science Development Board which is today the Department of Science and Technology. As Supervising Scientist he was also the Chief, Division of Agriculture and Natural Resources Research until he retired on November 5, 1968 at the age of 63 years.

He was Professorial Lecturer in Geography, Philippine Women's University from 1952 to 1975, and in the College of Arts and Science, University of the Philippines from 1973 to 1978, a Visiting Professor in the De La Salle University in Conservation of Natural Resources.

Prof. Rosell was co-founder and served as President of the Philippine Geographical Society (PGS), which was founded on December 8, 1950. He initiated and was largely responsible for the publication of the Society's official organ — the Philippine Geographical Journal in 1953. Since then to this year's Volume 31, Nos. 1 & 2 (Jan.-June) he held the top positions of Editor-in-Chief and Business Manager. As a geographer, he was appointed Chairman, National Committee on Geographical Sciences, NSDB and later under the National Research Council of the Philippines.

Prof. Rosell was also active in technical volunteerism. He was President, Volunteers in Technical Assistance, Philippines, Inc. (VITAPHIL), which was active during the late 60s and early 70s. He was also Past President, Philippine Association for the Advancement of Science, the Soil Science Society of the Philippines, and the Radioisotope Society of the Philippines. He was a member of the International Honor Society of Phi Kappa Phi, U.P. Chapter and the Honor Society in Agriculture, Gamma Sigma Delta, UPLB Chapter.

As a researcher, he had written many scientific paper dealing on soils, agriculture, geography, human settlements, conservation of natural resources and environmental management. His latest research project as project leader was the preparation of a monograph on "Geography in the Philippines, 1903-1980," funded by NRCP. He co-authored the book entitled, Economic Geography of the Philippines, 1980.

Prof. Rosell represented the Philippines in various international conferences and congresses under the auspices of the International Geographic Union and other international organizations.

Surviving him are daughters Luz, Rosario (Ms. Arca) and Diana, son-in-law P/Capt. Pacifico M. Arca, Jr., grandchildren, brothers and sisters.

In sum, we who are left behind in the PGS and PGJ, can honestly say that Prof. Rosell lived a full and productive life, highly dedicated to the improvement of the country and the Filipino people, having been active as a soil scientist, agriculturist, geographer, educator, administrator and environmentalist. May he find a much better environment in his spiritual travel beyond.

Republic of the Philippines
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National Capital Region
LEGAL AFFAIRS SECTION
Manila 2801

SWORN STATEMENT

The undersigned, FELICIANO M. LAPID, editor of PHILIPPINE GEOGRAPHICAL JOURNAL, published QUARTERLY, in ENGLISH at Rm. 503, Sunvesco Bldg., T.M. Kalaw, Manila, after having been duly sworn to in accordance with law, hereby submits the following statement of ownership, management, circulation, etc., which is required by Act 2580, as amended by Commonealth Act No. 201.

Editor, Feliciano M. Lapid	Rm. 503, Sunvesco Bldg., T.M. Kalaw, Mla.
Bus. Mgr., Feliciano M. Lapid	Rm. 503, Sunvesco Bldg., T.M. Kalaw, Mla.
Owner, Phil. Geographical Society	Rm. 503, Sunvesco Bldg., T.M. Kalaw, Mla.
Publisher, Phil. Geographical Society	Rm. 503, Sunvesco Bldg., T.M. Kalaw, Mla.
Printer, Bookman Printing House	373 Quezon Avenue, Quezon City
Office of Publication, Rm. 503, Sunvesco Bldg., T.M. Kalaw, Manila	

In case of publication other than daily total number of copies printed and circulated of the last issue dated January-June, 1987.

1. Sent to paid subscribers	510
2. Sent to others than paid subscribers	490
Total	1,000

(Sgd.) FELICIANO M. LAPID
Editor

SUBSCRIBED AND SWORN to before me this 2nd day of October 1987, at Quezon City, affiant exhibited to me his/her Residence Certificate No. 80545G, issued at Quezon City on February 24, 1987.

Doc. No. 73
Page No. 16
Book No. VIII
Series of 1987

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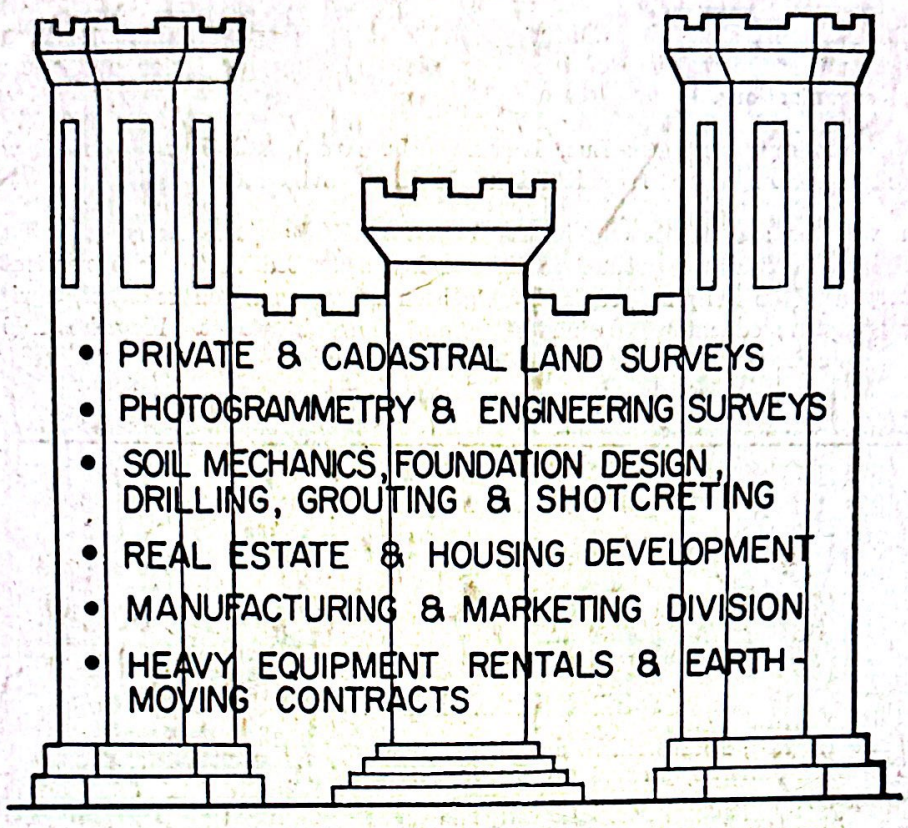

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