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The PHILIPPINE GEOGRAPHICAL JOURNAL

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GEOGRAPHICAL VIEWPOINT**THE SECRET HEALTH OF PLANTS¹**

by

ROBERT RODALE

There is a benign connection between the plant world and the human world which we have yet to appreciate to its fullest extent.

A time of enlightenment is coming, though. I believe we stand on the threshold of a new understanding that plants have the ability to influence our lives in ways that transcend conventional thinking.

Just one example of that spreading enlightenment is the change that is taking place within the minds and bodies of people who practice vegetarianism. I feel qualified to comment on that change because, while I'm not a vegetarian, for over 40 years I have known people who are opposed to the eating of meat. I have also experimented with vegetarianism for short periods of time.

In the early days, the overriding motivating thought of vegetarians was the avoidance of cruelty. They didn't like the idea of killing so they refused to eat meat in order to save lives of animals.

What did they eat instead? Many of the vegetarians I knew as a child ate more of the standard junk foods of the day to make up for the meat they weren't getting. White bread, ice cream, cakes, pies, candy and other processed foods were popular.

Today, vegetarianism is entirely different. The idea of protecting animals is still there, but becoming more important all the time is the realization that a diet of fresh vegetables, fruits and whole grains can help you to feel better. Vegetarians today tend to eat a remarkably good diet, much richer in truly good foods than the diet of the ordinary person.

¹ Reprinted from *Organic Gardening*, Vol. 26, No. 2, February 1979, pp. 36-42.

And they often report that their diet creates a good feeling, an inner calmness, a happiness that they appear to value even more than the idea that they are protecting animals.

The idea of wellness is also growing hand in hand with diet ideas that bring people closer to plants in their natural state. Not being sick is insufficient. Wellness means carrying health to a higher level of achievement where you feel more at peace with yourself, your body functions better, and periods of supreme happiness — euphoria — come more often.

The way a diet rich in fresh and natural plants creates wellness is not yet completely known. We have some clues, though. Vegetables leaves, fruits and grains contain much more fiber than does meat. Meat may be tough at times, but it contains little bulk to help your intestinal system function well.

Vegetables, fruits, seeds and grain tend to be rich in fiber, but it is important not to think of that fiber in your system as merely doing the same thing as pure cellulose, or sawdust. (One large, national bread company adds such purified sawdust to its bread to be able to make more fibers claims.) The fiber in fresh plant foods is now known to be active, in the sense that eating more of it can help to lower both cholesterol and blood pressure, and can insulate the system against toxic factors in other foods. In other words, the eating of more fresh food from plants has introduced a whole new range of benefits into our diet that remains to be fully understood. Yet we are quite sure the benefits are real.

We should also realize that plants harbor within themselves a tremendous chemical imagination. Each different type of plant is made up of its own specific panorama of compounds. And these chemicals, found in plants in such rich profusion, are not only the ordinary types — the kinds you would find in bottles on the shelves of a druggist or in a school chemistry laboratory. Many of them are so diverse, and so unusual in their function, that even to this day plant chemicals are seen by scientists as a rich storehouse of inspiration. The leaves of unusual plants are still being analyzed to see whether the chemicals they contain might be useful as new drugs, as pesticides, or to suggest solutions to any one of dozens of chemical problems.

Why have plants spawned so many different chemical compounds? I think there can be only one reason. They do it to survive (and in turn to help us live better).

Gardening organically is . . . finding ways to connect yourself more directly to the natural world and its benefits.

Think about the challenge of plant survival for a moment. There are tens of thousands of different types of plants on this earth. They live under all different kinds of climatic and soil conditions. Some nestle among rocks on mountainsides, and others find their niche in swamps or in humid jungles. Everywhere there are differences in the kind of soil, in the diseases and insects that cause trouble, and in the community of other plants in which plants live. No wonder that for survival plants have created such a rich storehouse of inner diversity. Keep in mind also that plants can't move around all the way animals, birds and insects do, so they reflect more closely the unique chemical makeup of the place where they live. Soils are remarkably different from one place to another, so to some extent plant merely mirror that diversity in the elements they feed from.

Primitive peoples learned to use the chemical diversity of plants in many ways, but primarily to preserve their health. Thousands of years ago, people who knew nothing of chemistry identified those plants which contained basic drugs like quinine, curare, caffeine and many others which are still in use today. They knew which plants were rich sources of vitamins, and sought them out. In primitive societies — as in many Third World countries today — human survival depended to a great extent on knowing how to put to use the chemicals in local plants.

Today, we don't absolutely have to know plant chemistry to survive. (If we want, we can go to a drug store or a doctor and get synthetic imitations of chemical ideas that came from plants originally). But people are going back to plant medicine anyway, because they see it as a way to increase their wellness. Herbalism is a fast-growing art. Herb gardens are sprouting up everywhere, herb teas are selling faster than ever, books on herb culture are extremely popular, and herbs are rapidly gaining popularity for use as food flavors. The natural chemical diversity present in plants is also being understood better as we explore "new" ways to garden that are in reality old ways that are again being seen as very sensible and useful. I am referring mainly to companion planting and interplanting, which are efforts to create in our gardens communities that allow plants to grow in more comfortable and efficient ways.

In nature, plants seldom grow in pure stands. They like to grow in mixtures of different kinds of plants. And it is perfectly obvious when you look at those natural mixtures that the plants living in them tend to be much healthier than are most farm and garden crops living in monocultures. Somehow, in still mysterious ways, plants of different species and types can draw strength from each other.

The secrets of that inter-plant cooperation are now being unraveled. Starting from a base of folklore, gardeners began using companion

planting some time ago to create a "comfort zone" where their plants were better able to resist insects and disease, and grow in more healthful ways. Now there is a rapid movement toward interplanting techniques, which also have been used in the past (mainly by the Chinese). Interplanting might be called more mechanical than companion planting. Every other plant in the row or every other row, can be planted to alternating vegetables or farm crops that merge well physically. The basic idea is that each of the different plants uses the root zone in a slightly different way, or presents its leaves to the sun differently, so that by sharing the same space they can grow more efficiently.

There could also be chemical connections between plants, though. Researchers have already found that mixtures of plants resist insect attack better than plants growing in pure stands. It is also known that applications of weed-killers and insecticides can cover up and render ineffective the natural chemical resistance of plants to pests. Spray toxic chemicals on your garden, and you do more than kill insects or weeds. You also wipe out the subtle pattern of chemical interactions that plants generate for their own protection. We know what happens, even though the exact names and functions of the chemicals involved have yet to be discovered.

When we advise you not to spray your garden with potent chemicals, we are as much concerned about helping you preserve the integrity of the natural chemical network within your plants as we are about the damage you can do to yourself by being exposed to those chemicals. Gardening organically is therefore more than just avoiding chemicals. It is also finding ways to connect yourself more directly to the natural world and its benefits through your garden.

There are many practical ways that you can achieve those benefits. Here, partly in review and partly to suggest the large number of ways you can link up to this potent world of plant secrets, are a few suggestions for action. Some relate to how you garden, and others to how you eat your garden:

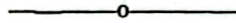
1. Grow more different kinds of plants in your garden this year. Look for diversity. Bring in kinds of plants that may contribute good vibrations to the community of plants in your garden.

2. Arrange your plants so they can help each other grow better. Study, companion planting methods, and also learn about interplanting.

3. Try to use plants to feel the connection between what you eat and what you are. Think about how you want your food to make you feel when you plan your garden. Admittedly, that is a vague statement. But we are dealing here with a benign mystery that affect each person in slightly different ways.

4. Increase the proportion of vegetables, fruits and whose grains in your diet to get in closer touch with the rich nutritional resources that are in plants. Especially eat more vegetables and fruits raw so that the natural qualities of those foods are not changed.

5. Look for more than just short-term benefits. The health values of many foods are preventive. The best health secret you may find in the leaves of a plant may not be the cure of a headache, but the key to a more healthful life many years from now.



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ENVIRONMENTAL STUDIES: THE FIFTH TRADITION OF GEOGRAPHY¹

by

PROF. DOMINADOR Z. ROSELL²

INTRODUCTION

Environment, pollution and technology are the three major areas of concern of the Philippines today. In June 1964, the National Water and Air Pollution Commission was created by the Congress of the Philippines. Today this agency is known as the National Pollution Control Commission. (1) Our deep concern on environmental quality was shown by our sponsoring the International Conference on the Survival of Humankind: The Philippine Experiment last September 6-10, 1976. Today we have the Ministry of Human Settlement, the Technology Resource Center, and the National Environmental Protection Center, all geared toward the study of environmental degradation and maintenance of environmental quality.

What relation has environment to geography?

WHAT IS GEOGRAPHY?

Geography comes from a Greek word meaning, literally, description of the earth. But geography today goes beyond the study of the earth. It is now concerned with man's relationship and analysis with his surrounding as well as with description.

"Geography attempts to picture *man's habitat* at a specific time through the study and arrangement of natural, physical and human settlement over the earth. The effect of the past in the creation of the present is recognized; the effect of the present on the future is implied.(2)

The natural, physical and cultural (human) elements of the man's habitat as per Kendal, et al. are:

I. Physical (Natural) Element

1. Atmosphere — climate and weather — the short term and long term behavior of the atmosphere.
2. Hydrosphere — water features such as oceans, seas, lakes, ponds, streams, sheet flow, soil water and underground water.

¹ Paper read at the Joint Convention of the PhilAAS and Philippine Geographical Society, January 25, 1979 at PICC, Manila.

² President, Philippine Geographical Society, Past President, Philippine Association for the Advancement of Science and Chairman, National Committee on Geographical Sciences, NSDB.

3. Lithosphere — landform, major and minor including rocks and minerals.
4. Biosphere — natural vegetation, natural wild animal life.

II. Cultural (Human) Element

5. Homosphere —
 - (1) Population — number, densities, pattern and distribution.
 - (2) Cultural Inheritance — man's acquired capabilities, habits, institutions, especially those that relate to his uses of physical elements and habitat.
 - (3) Major Occupations—agriculture, manufacturing, mining, trade, hunting, and fishing, etc.
 - (4) Major Works and Accomplishments

On the basis of these elements, "Geography" is a science as wide as the world and as general and broad as anybody of knowledge can be. In the words of the University of Colorado Professor, Geography has the claim to be the Queen of the Sciences.

As the science of geography progressed, it has established prestige throughout the world within the umbrella of the International Geographical Union. This Union will celebrate its 108th years of existence on September 1980 in Tokyo, Japan where it will meet for the 24th IGU Congress.

Within the methodology of Geography, Dr. William D. Pattison in 1964 identified the four traditions of geography, namely:

1. Earth Science Tradition — geography within the concept of the planet earth in the solar system.
2. Spatial Tradition — geography within the concept of space and reality.
3. Area-Studies Tradition — geography within the concept of studies of regions.
4. Man-Land Tradition — geography within the concept of man and his relationship to land and soil and other physical and cultural elements.

Earth Science Tradition:

Within the concept of the planet earth in the solar system, physical geography in elementary and high schools were usually taught before 1935. After this year geography as a distinct subject was not taught anymore. In the words of Dr. Bonifacio Sibayan, a linguist, and I quote: "One of the horrible mistakes of the Department of Education was when it abolished the teaching of geography and relegated it with Social Science subjects," unquote.

However, today Earth Science is taught in colleges and universities especially in the University of the Philippines at Diliman, Quezon City and at the Philippine Women's University, Manila.

First year students in College of Arts and Sciences taking Earth Science subject learned a number fundamentals especially in the relationship of temperature and substance. For example, the professor said that at high temperature the substance expand and at low temperature the substance contract. When the student is asked to give an example, the clever one said, "Sir during the warm season the days are longer and during the cool season the days are shorter." Of course this phenomenon has something to do with summer and winter seasons and the distance of the earth from the sun during these times.

Spatial Tradition:

This is an aspect of geographic studies that concern distance, location, space and their inter-relationship to each other. In the spatial interaction, let us take a river for example. The Pasig River is natural linkage between Manila Bay and Laguna de Bay. Putting a flat boat on this river is taking advantage of hydrologic inter-relation and at the same time giving it a new and different meaning as a transportation link. When part of the river is dredged and deepened or regulated by a dam, the hydrologic characteristics of the river is altered in order to increase its value as a means of transportation. (4) The study of spatial inter-action is concerned with movements between areas or the effects of objects or processes in one area upon those in another. Subject like relationship between place of work of people and where they live is a very interesting subject for study here in Metro Manila.

Area Studies Tradition:

In this concept of area studies tradition, geographical studies of region in various scales are made. In the Philippines we can divide the country into Ilocos Region, Cagayan Valley Region, Mountain Provinces Region, Central Luzon Region, Southwestern Volcanic Region, South-eastern Volcanic Region, Bicol Region, Visayas Region and Eastern and Western Mindanao.

An American Geographer, Dr. William L. Thomas has made a good study of the Ilocos Region comprising of La Union, Ilocos Sur, Abra and Ilocos Norte. (5) The Economic Geography class of UP made a good study of CABALAG region comprising the provinces of Cavite, Batangas, and Laguna. There are now a number of geographers who specialized in Regional Geography, like regions of Southeast Asia, Mediterranean in Middle East and others.

Man-Land Tradition:

This tradition of geography covers a broad area where man has dealt with widely. Area of geographical studies such as Economic Geography, Agricultural Geography, Conservation of Natural Resources, Political Geography and Human Geography and many others associated with Social Science studies have been made by many prominent geographers.

An example of this study came out in February 1952, when Dr. Josue de Castro of the Institute de Nutricao, Universidad de Brasil, Rio de Janeiro, published his book on the *Geography of Hunger*. (6) A brilliant exposition of Human Geography, the author has attained his purpose — the study of the phenomenon of hunger in its Universal Manifestation. "The term *Hunger* in the past, means lack of food to satisfy appetite and the number of deaths from hunger limited to the emaciated people who died from sheer starvation as in famine. The author, however, uses it in the modern sense as lack of any of the *forty as so food constituents* needed to maintain health. The lack of any of these causes premature death, though not necessarily from emaciation due to lack of any kind of food that can be eaten. Lack of any kind of food as occurs in famine, has always been a major cause of death. Even in recent times, more people have died from famine than have been killed in war. But these numbers are small when compared with the number whose diet is inadequate to maintain and who consequently suffer to some degree from nutritional diseases. If hunger is used in this sense then according to the past pre-war estimates two-thirds of the population of the world are hungry. A recent American Committee put the number as high as eighty-five percent."

AWAKENING OF ENVIRONMENTAL CONCERN

One of the classical exposition on the subject of environment was written by Ellen Churchill Semple in 1911 in her book on the *Influence of Geographical Environment*. (7) The theater of her study was the Mediterranean Area where dramatic changes for hundred of years came about due to the degradation of the environmental quality of the whole Mediterranean region. From King Solomon time to various Empires, this theater of dramatic changes was fertile ground from Miss Semple brilliant exposition.

In 1928, Van Hise wrote another classical book on *Conservation of Natural Resources*, (8) an American documentary of environmental degradation due to the clearing of virgin forest from the East at Plymouth to the Middle West at Iowa. This book warned the people of United States of the deforestation that created the imbalance of nature to the degradation of environmental quality. It was during this

time that the Name of the Game was Conservation which means the wise utilization of natural and earth resources.

In 1936, came Stuart Chase Book — *Rich Land, Poor Land*, (9) that described the vanishing resources of the West, changing the landscape and consequently deteriorating the environmental quality.

In 1938, Russel Lord's book — *Behold Our Land*, called the attention of the American people of the wanton destruction of forest, the soil and water resources. This destruction lead to the imbalance of nature thus of the environmental quality. (10)

In 1948, ten years later, two great pastoral books came out. The first was William Vogt's — *Road to Survival*, that described conservation measures to effect maximum yield production. (11) The second book was Fairfield Osborns, *Our Plundered Planet*, that was dedicated to all who cares about tomorrow. (12)

Tomorrow might be next year, or year after next year, or the year 2000, when the Philippines will have 84 to 90 million people on the piece of land of 30 million hectares. Some of us may not be here on the morrow but our grandchildren dear to us will still be here to experience the environment with standing room only, and not knowing where to get the next meal.

Things were quite for a while until 1962, when Rachel Carson, a brilliant writer published her book — *Silent Spring*. (13) Everybody including the vested interest group took the book for granted. But the conservationist, geographer, ecologist, biologist, botanist, climatologist, hydrologist, and environmentalist who came from no where agitated to save the planet earth for the future due to environmental degradation.

In 1970, the book — *The Environmental Crisis*, edited by Harold W. Helfrich, Jr. came off the press. "The sixth decade of the twentieth century finds mankind confronted by an unyielding paradox. Many people have concluded that because we are at the pinnacle of technological achievements, with an amazing list of accomplishments to our credit, our scientific ability to control and shape the human environment is without limit. Yet, even as our technical ability grows, there is a steady and seemingly inexorable deterioration of our environment. The rising crescendo of discord created by unplanned and unforeseen technological by-products is beginning to penetrate the ears of even the most optimistic. Man's footprints are on the moon, but on earth hardly a stream remains free of pollution, palls of smog shroud our cities, pesticides telescope thru deadly effects through worldwide food chains, beauty falls before the omnivorous advance of urban sprawl, and unrest and violence dominate our decaying cities and our illustrious universities. (14)

In June 1972, the Stockholm Conference under the auspices of the United Nations, agreed to have world program on ENVIRONMENT.

The environmental crisis wake up the people to reality. Everybody talked of environment, environmental pollution, environmental quality, environmental planning, environmental approach and in one of these days, you will hear environmental squatting.

In August 1972, just two months after the Stockholm Conference, the International Geographical Congress in its 22nd Congress in Montreal, Canada further discussed environment within the context of the Commission of Man and His Environment. For three days of the seven day Congress, I was recipient in the discussion in the programming of the Commission of Man and Environment. (15)

ENVIRONMENTAL STUDIES: THE FIFTH TRADITION OF GEOGRAPHY

In 1971, Dr. Peter P. Mason and Dr. Michael W. Kuhn of the University of California at Sta. Barbara, presented the fifth tradition of geography with a question mark. (16) This presentation was made after Dr. William D. Pattison's Four Tradition of Geography in 1964. (3)

The five traditions of geography today are as follows:

1. Earth Science Tradition — the concept of the planet earth in the solar system.
2. Spatial Tradition — the concept of space and reality.
3. Area-Studies Tradition — concept of regional studies.
4. Man-Land Tradition — concept of man and his relationship to land and soil and other physical and cultural elements.
5. Environmental Tradition — concept of geography within the context of the four traditions.

According to Mason and Kuhn, "The concept of environment is so vague and open to interpretation that a major stumbling block to the development of environmental education is the general diversity in views as to definition. Definition varies from discipline to discipline and within discipline. Just what is "environment" may never be resolved among the various fields of study. This road block should not be allowed to interfere with or deter interdisciplinary communications regarding environmental studies. Many disciplines, indeed most disciplines, have some stake in environment."

In addition, "environment studies is goal oriented. As such it is an information system which seeks to synthesize the products on particular problem. Environmental studies are consumers of the fruits of academic research; academic disciplines on the other hand have no such goals, hence no intellectual constraints and are producer of basic research. The products of environmental studies programs are generalists."

"Environmental studies is well-suited to undergraduate education in the liberal arts tradition which is intended to broaden the intellectual horizons of the individual. In the case of environmental studies, the focus is on the habitat of man and man's interaction with his environment. Study is intended to increase awareness and sensitivity. Environmental studies is at least as good a preparation for coping with contemporary physical and social environment as the traditional undergraduate majors. In the same sense, environmental studies would seem to be an excellent preparation for employment in a broad spectrum of profession."

In Environmental Tradition, the best thing that happened in the Philippines was the workshop on Education and Training needs for the Philippine Environmental Program in May 27-31, 1974, under the joint sponsorship of the National Science Development Board (NSDB) and the National Academy of Science (NAS) of USA.

The four basic recommendations of the workshop were:

1. To strengthen existing education and training for environmental professionals and technicians, emphasizing interdisciplinary approaches to environmental planning and problem solving.
2. Begin environmental training program which are not now offered in the Philippines but for which there is a need.
3. To develop new kinds of environmental training programs which stress conditions and needs in the Philippines and maximize benefit/cost ratios of the trainings.
4. To develop greater awareness on the part of the public, especially businessman, and industrialist, of the physical, social and economic consequences of environmental damage.

The proceedings and recommendations of the workshop have been submitted to the Office of the President, the National Economic and Development Authority and other appropriate agencies of the Philippine government for their consideration. These proceedings have been made available to the educational institutions, local government and industrial sectors.

At one time in 1976, Commissioner Lesaca and I were speakers at the ECHO Seminar/Workshop of the Cavite City teachers on Environmental Education. We distributed a number of copies of these proceedings. I believe there are still some copies at the NPCC office.

SUMMARY AND RECOMMENDATIONS

If we must be knowledgeable in environment, the Ministry of Education and Culture must bring back geography education in elementary, intermediate and high school levels. And if possible, increase the geography courses in colleges and universities. In no time the people will understand the importance of environmental education, thus help maintain our environmental quality.

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THE EVOLUTION OF THE SOCIO-ECONOMIC APPROACH TO FOREST OCCUPANCY (KAIÑGIN) MANAGEMENT IN THE PHILIPPINES

by

GEOFFREY A. J. SCOTT¹

INTRODUCTION

The Philippine people today have arrived at a crossroad in their relationship with the natural environment. The adverse effects of forest exploitation by loggers at the rates of the 1950's and 60's have fortunately been realized and measures are already being taken by the Bureau of Forest Development (BFD) to control virgin forest destruction and regulate loggers through sustained-yield forestry practices (Arañez and Baggayan, 1978). The reforestation of areas previously denuded is now also a priority of the BFD with 78,425 hectares being planted to trees in 1978 alone (Editorial, 1979). One major source of forest destruction which is proving very difficult to cope with, however, is clearing caused by kaiñgineros (Dalisay, 1972; Vergara, 1976). Not only is forest being destroyed due to kaiñgin making but soil erosion is accelerated and the hydrologic characteristics of major watersheds are being rapidly altered (Uichanco, 1971; del Castillo, 1973; Sims, 1975; Duldulao, 1978). Government officials and researchers alike realize that these kaiñgin-related alterations must be controlled so that losses of valuable top soil can be reduced, water supplies for hydroelectric and irrigation projects be assured, siltation of these projects be prevented, valuable lumber resources be more wisely used and as little hindrance as possible be placed in the orderly economic development of the country (Fontanilla, 1979).

The practice of kaiñgin is as old as Philippine Agriculture itself and, contrary to what some of the literature might suggest, even the more traditional kaiñgining practices of the non-Christian tribes is having its adverse effects on the environment (Hilario, 1970). While attempts to control kaiñginero activities have been underway for more than a century they have met with little success due to the unfortunate notion that the problem was merely a legal one. Kaiñgineros have almost totally ignored every kaiñgin law passed so that today due to the increasing number of kaiñginero families and the decreasing size

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of upland forest in which they operate, their influence on the remaining forest is in fact escalating. Serna (1972) reports that a decade ago kaiñgineros were responsible for some 26 percent of the total annual forest destruction, a value which translated into 53,000 hectares per year. The Department of Natural Resources (1976) reported that the total forest area declined 2,961,000 hectares from 1969 to 1974 due to kaiñgining, logging and land reclassification, while Sanvictores and Faustino (1978) estimate that the present annual rate attributable to kaiñgineros alone has risen to 80,000 hectares, Rebugio (1976) gives a value of 90,000 hectares per year. Although forest destruction is by no means unique to the Philippines (Tamesis, 1960) it is a problem which depends for its solution, not on the abstract theories of forest conservation imported from elsewhere, but on research and its application carried out right here among the kaiñgineros themselves.

Policy makers responsible for protecting the Philippine environment now appreciate that upland forest conservation depends, not on punitive laws, but on the success of introducing socio-economic modifications to the kaiñgin system. Vital is the development of cropping practices and patterns and agro-forestry techniques which will not only be socially acceptable and economically rewarding to the kaiñginero, but will also encourage him to remain permanently in the same place, not expand his existing kaiñgin into the public forest, and indirectly stem accelerated run-off and soil erosion. The kaiñginero has his own culture, socio-economic constraints and will power. He is, or strives to be, his own master, and his contempt for laws which threaten his very existence is absolute. Barring compulsory resettlement it is he who will eventually decide if kaiñgin forest destruction and its related effects is to continue unabated or be subject to control.

A BRIEF HISTORY OF ATTEMPTS TO CONTROL KAIÑGINING

The history of induced deforestation and soil erosion resulting from the practice of kaiñgin agriculture in the Philippines is fairly well documented (Nano, 1939; Rayos, 1965). Recognized in the early colonial period as a major problem the Spanish instructed all forest officers in 1867 to allow no timber cutting without a permit. The 1889 Royal Decree of the King of Spain, known as the "Definitive Forest Laws and Regulations", prohibited kaiñgining entirely and imposed stiff fines for their violation. Found inadequate to protect the public forests the American Administration passed the 1901 "kaiñgin law" (Act No. 274) which included stiffer fines and prison sentences. This was followed by a series of American and Commonwealth laws attempting to limit kaiñgining and channel agricultural development only into soils suited to this type of ecosystem modification. Problems resulting from kaiñgining continued despite these laws (Gillis & Sulit, 1972) and recommendations at that time that a system of organized "forest-colonizing" be set up

(Pflueguer, 1929) went largely ignored. As San Pedro (1939) pointed out, stiff laws were simply not a deterrent as the kaiñginero would simply sit out his 5-15-day jail sentence and then return to his kaiñgin. The punitive system does not work, simply because most "Kaiñgineros are really victims of social injustice and economic destitution. They troop to the forest, the department of last resort" (Umali, 1970:14).

In the decade before the second world war increases in kaiñgining were limited due to the fact that forest guards were quite feared. But the second world war did much to encourage kaiñgining again as laws lapsed in the face of the need by resistance group and others to grow food in areas not controlled by the Japanese. Even areas carefully reforested before the war were not spared from wartime kaiñgining (Corales & Cerna, 1950). Conditions remained much the same following the war and kaiñgining continued to increase due to natural population increase and a general relaxation of anti-kaiñgining laws during Mag-saysay's successful attempts to take away popular support from the Huks. But kaiñgining was still recognized as a menace by many and so additional laws and penalties, such as the 1963 "Revised Kaiñgin Law" (Republic Act No. 3701), were introduced in a failing attempt to dissuade the kaiñgineros from what Fernandez and Evangelista (1952) described as "a national arson." It became clear, that differences between law and practice were widening and forest destruction continued (Garcia, 1960, Gill, 1960, Gulcur, 1968) due to the simple reality that kaiñgineros considered family and survival first and had, understandably, little appreciation for the concept of the national welfare (Ganapin, 1978). In fact on the 1960's kaiñgining escalated, particularly in Mindanao, fanned by the ease with which kaiñgins could be prepared in areas selectively logged (Arañez & Baggayan, 1978).

Government recognition of this ineffectiveness of these laws led to the 1963 "Kaiñgin Council Meeting", in which, for the first time, interdisciplinary agencies gathered to discuss the problem. This meeting is of importance because it was here that general consensus was first reached that the problem should no longer be considered either technical or legal but a socio-economic rooted one (Calanog, 1977). This meeting was followed by the 1965 "National Conference on the Kaiñgin Problem" which listed control recommendations (including forceful resettlement) and emphasized that effects directed towards understanding the kaiñginero and his link with the land were necessary. With the idea of managing kaiñgineros in mind the "Kaiñgin Management and Land Settlement Regulations (Forestry Administrative Order No. 62, 1971)" were drawn up to embody the basic government policy towards kaiñgin management. However, as Postrado (1972:21) emphasized at the time, all of this would be for naught if "a thorough and comprehensive study conducted on the sociology, economics and dynamics of kaiñgin" was not made first. The same year the Bureau of Forest Development (BFD) was

established by combining the functions of the Bureau of Forestry, the Reforestation Administration, Parks and Wildlife and the Southern Cebu Reforestation Project which was phased out. This "amalgamation" was designed to allow for the smoother coordination of controls over the lumber industry, reforestation and kaiñgin management or forest occupancy management as it was now coming to be known.

By 1975 it became so apparent that the number of kaiñginero families and their distaste for punitive measures were increasing that the "Revised Forestry Code of the Philippines (Presidential Decree No. 705) was passed legalizing kaiñgining for those already practicing it before May 19, 1975. PD No. 705 essentially recognized the reality of the situation that instead of having all kaiñgineros occupying the land illegally, and therefore distracting all government activity, they should now be more receptive to the government's efforts to manage them. This law also required that kaiñgineros became sedentary and not spread out beyond the boundaries of their existing kaiñgin areas, and mandated the BFD to implement kaiñgin management projects. By March 7, 1979, when BFD Circular No. 14 detailed "Additional Guidelines in the Implementation of the Forest Occupancy (kaiñgin) Management Program," 19 projects were already underway in various parts of the Republic with five new projects slated to start before 1980. At the same time eight studies were being performed by the Extension Division of the College of Forestry (UPLB-DNR-PCARR Project No. 238) in five other kaiñgin areas in an attempt to find out the "tools" (such a leadership qualities, occupational skills, etc.) that kaiñgineros possess and at the same time maximize the use of such skills to enhance forest conservation (Duldulao, et al. 1977).

RECENT ATTEMPTS AT INTRODUCING SOCIO-ECONOMIC IDEAS TO FOREST OCCUPANCY (KAIÑGIN) MANAGEMENT

The task of introducing socio-economic modifications to the kaiñgin system is fraught with difficulties. These problems include the fact that kaiñgineros are of different origins, the ways in which kaiñgins are initiated vary, and crop preferences and environmental limitations of soil, topography and climate are considerable. Beattie (1969) suggests there are at least three kinds of kaiñginero: 1) the nomadic kaiñginero, usually non-Christian; 2) the permanent-home kaiñginero who shifts his kaiñgin; 3) the immigrant Christian kaiñginero forced by circumstance to practice kaiñgining. Maturan (1976) lists three basic types of kaiñgin initiation: 1) the virgin forest kaiñgin; 2) the second growth kaiñgin; 2) the logged-over kaiñgin. Combining these variations with that of cultural cropping preferences and environmental limitations and it can be seen that developing solutions to fit the needs of the individual kaiñginero is fraught with difficulty. Despite these problems attempts are already underway to alleviate the problem of kaiñgining on the environment.

Two broad approaches are now practiced in an effort to manage the environmental effects of kaiñgineros. These are the 1) resettlement and 2) settlement, approaches. If resettlement is considered necessary attempts are first made to locate suitable lands that are alienable and disposable outside of the public forest. An example of this would be the resettlement of Mt. Makiling kaiñgineros at Sampaloc, Quezon. The second approach, is that of encouraging the kaiñginero to remain permanently in the location he presently occupies. An example of this would be the kaiñgin management program at Norzagaray, Bulacan. A variation of this second type is where the kaiñgineros are required to move within the public forest virgin itself but to settle permanently on soils more suited to their agricultural needs. An example of this is the settlement of kaiñgineros in the Pantabangan Dam watershed in Nueva Ecija.

Both the settlement and resettlement approaches attempt to take the "shift" out of shifting cultivation by encouraging the kaiñginero to settle permanently in one place and accept new agro-forestry techniques which will make him economically self sufficient. Both of these approaches have their merits and limitations and while out of necessity they are presently being practiced, research continues to find better ways to make kaiñgineros accept management ideas.

The Resettlement Approach. — This is perhaps the most expensive way to solve the problem due to the large number of kaiñginero families involved and the fact that not all kaiñgins are created by forest dwellers. Figures as the exact number of kaiñginero families involved are difficult to determine due to, 1) the different interpretations of what is required to qualify a person as a kaiñginero, and 2) due to the problem of locating them in the field. Recent estimates, however, indicate the numbers to be somewhere between 300,000 and 600,000 families. While Llapitan (1977) gives the precise figure of 379,372 families (based on the 1972 partial census of the Bureau of Forest Development), Sanvictores and Faustino (1978) give 380,000 families occupying an effective kaiñgin area of 2.3 million hectares. A low figure of 120,000 was given by Pollisco (1972) nearly a decade ago, while in 1978 he has revised this figure upwards to 600,000 (Pollisco, 1978). As it presently costs the government P23,000.00 to resettle one family (Duldulao, 1978b) the expense of resettling all of these people is clearly prohibitive. Resettlement also has the difficulty of having to ensure a better life for the kaiñginero, overcoming his strong ties for the land and finding suitable areas for resettlement. There is also the problem of performance by the resettlement committees set up to administer such projects. These committees are frequently composed of members from different government agencies and, as in the case of the Mt. Makiling kaiñgineros resettled at Sampaloc, slow committee decisions have frustrated the kaiñgineros to the point they have openly expressed dissatisfaction and

the desire to return to their former kaiñgins (Manipol, 1979). The Sampaloc settlers, caught between a conflict in laws which on the one hand permit them to resettle (Executive Order No. 494) on the other prevent them from cutting down trees to prepare gardens, are understandably frustrated.

One of the principal reasons resettlement projects meet with little success is due to the kaiñgineros link with the land. This conclusion has been reached independently by Maturan (1976) in his studies among the Bukidnons in Negros Oriental, and by Duldulao (1975) among Mount Makiling kaiñgineros. Duldulao (1975) found that while the Makiling kaiñgineros were well aware of the effect they were having on the forest, and were considerably receptive to innovations related to soil conservation provided they brought economic benefits with them, some thirty percent of the kaiñgineros interviewed said they would not accept any alternative to shifting cultivation and only four percent would agree to forced relocation. Responses such as these underline the problems facing those entrusted with educating the kaiñgineros as to more conservation oriented agricultural practices (Pollisco, 1971).

The Settlement Approach. — This approach requires *in situ* forest occupancy management. While this permanent settlement may occur in the traditional kaiñgin area itself or close by in another, more suitable portion of the same public forest, its success depends on whether or not, 1) the remaining forest is protected, 2) agro-forestry (or agro-silviculture) techniques are adapted, and 3) the kaiñginero forsakes his shifting habit. It would appear from early attempts at forest occupancy management that in the absence of sound socio-economic studies on the individuals involved, the most success is achieved where, 1) the kaiñginero is not a traditionalist, and 2) where the profit motive is great. The Doña Carmen Pulpwood growing project on PICIP concession land in Surigao del Sur is one notable success (Lorredo, 1974).

Unfortunately most areas in need of forest occupancy management are distant from the economic advantages of modern forest industries and new agro-forestry techniques must be evolved to suit them. One such area is the Angat river basin beset with serious flood due to increased run-off as a result of deforestation following a long history of logging and kaiñgining. Forest occupancy management plans for the area first suggested total resettlement, but such an idea was fortunately dropped in favour of "individual rehabilitation" (Calanog, 1977). As with the Pantabangan watershed the practice has been to introduce interplanting of agricultural crops with trees in the hope of reducing run-off and soil erosion (Regadio, 1977). It has been estimated that at the present rates of erosion the Ambuklao and Binga Hydroelectric dams in Benguet will be filled with sediment by the years 2073 and 2021 respectively (Llapitan, 1977). Some success has been achieved,

however, in attempting to protect the remaining forest and introduce agro-forestry techniques to the kaiñginero.

Protecting the remaining forest. — Three important problems are involved here: 1) kaiñgining by people who live outside the forested area; 2) preventing an increase in kaiñginero families; 3) limiting the cutting of new kaiñgins.

One way to limit the impact of kaiñgining is to restrict the practice, as is the intent of PD No. 705, to true kaiñgineros only. The term "speculator kaiñginero" is applied by Duldulao (1978a) to people from outside the public forest who have absolutely no need to practice kaiñgining but with only the profit motive in mind, employ others to do the actual work. Unfortunately no specific laws have yet been formulated which could help prevent this speculation while at the same time allowing traditional kaiñgineros to practice legally. Also of concern are the activities of landowners forced by circumstance to supplement their income by keeping kaiñgins in nearby uplands. Like those born to kaiñginero families their activities are those of necessity and must be considered separately from the speculators. While PD No. 705 now forbids people who were not practicing kaiñgining before May 19, 1975 from legally becoming a kaiñginero the realities of an expanding population have resulted in a steady streams to the forest. So constant is this desire to find land that the forestry district of Southern Palawan (Region 4AD6) arrested over 400 violators in 1978 alone (Mr. R. Dorando, personal communication, 1979). By the year 2,000 AD the Philippine population will probably be between 80 and 100 million—twice the present population — so pressure as the public forests will continue. Salita (1978) suggests that perhaps one of the best ways to benefit the economic growth of the country would be to control the population growth. Such controls would certainly be an advantage in forest occupancy management.

As forest industries are directly the major beneficiaries of the forest they too have a responsibility to keep kaiñgineros from becoming established and help manage those already there. Some 70,000 to 80,000 hectares of public forests are selectively logged annually and these areas, serviced by trails, and an average 30-32 percent clear-cut (Uriarte, 1978; Cacanindin et al., 1976) act as magnets to the landless in search of a place to form. The costs of maintaining sufficient forest guards to keep out these land hungry people but some large concessioners have found this expense as a necessary one to prevent their selectively logged areas from being totally clear-cut. The magnetic attraction between selectively logged areas and lowlanders is often so great that armed conflicts have occurred between the Free Farmers Federation (FFF) in Mindanao and forest guards (Editorial, 1971). Some concessioners such as the Zamboanga Forest Managers Corporation and the Nasipit and Aras Asan Timber companies in Mindanao have even intro-

duced agro-forestry techniques to kaiñgineros in their forests, and a discussion of these and other agro-forestry practices follows.

Agro-forestry or agro-silviculture. — Replanting cut-over forest is clearly an obvious and practical method of reducing the effects of kaiñgining in the public forests (Laudencia, 1972; Generalao, 1977; Rimando, 1977; Ordinario, 1978a, 1978b) particularly as the tree forest cover of the Philippines is less than 30 percent.² In this regard the Ministry of Natural Resources reported that 1978 was the first year ever when the area reforested exceeded that clear cut through kaiñgining and both legal and illegal logging. This is clearly a marked improvement in the national reforestation program, particularly of the replanted seedlings have a high success rate. Previous experience indicates, however, that constant attention must be given these reforested areas of the seedlings are not to succumb to competition or fire. Of the 1978 reforestation total over 20,000 hectares were replanted by the private sector and much of this is due to forest industries encouraging kaiñgineros on their concessions to practice agro-forestry. Agro-forestry (or agro-silviculture as it really should be called) can be defined as the intensive development of the forest land by devoting that portion which is suitable for agriculture to the production of farm crops and raising of livestock on the remainder, which is marginal or sub-marginal, to tree farming (Pollisco, 1975). Sanvictores and Faustino (1978:7) are quite adamant when they say that, "agro-forestry is the only logical and happy compromise between the conflicting pressures of demands on the same unit of land for agriculture and forestry purposes."

To some extent agro-forestry is a modified version of the Burmese *taungya* system of Kenya's *shamba* system. The difference here is usually that lumber species are replaced by fast growing species such as *Albizia falcataria* (used for pulpwood) which can be harvested in six to eight years. This then allows the kaiñgineros to remain permanently in the one area and not move on as the other two systems require. Large scale application of the true *taungya* system would probably not work here in the Philippines because of the desire to keep the kaiñginero settled and because of greater pressure on the land. The *taungya* system is similar to the "Tree Farm Lease Agreement" of President Magsaysay which proved only to aggravate the problem (Festin, 1972). An experiment in agro-forestry perhaps closer to the *taungya* system than any other in the Philippines is the "Family Approach Reforestation Program" near Malaybalay, Bukidnon. Here, each

² Published figures for the vegetation cover of the Philippines vary from 43.8% (Nablo, 1968) to less than 20% (Eckholm, 1976). Bruce (1977) gives the value of 30% while official figures give 42%. Much of these differences may be partly due to the method of data collecting, variations in the definition of the word "forest", and confusion between the terms "forest" and "forest land". Based on an analysis of 1976-78 LANDSAT imagery (band 5) and ground verification in Luzon, Samar, Leyte, Mindanao, Bohol, Negros, Panay and Palawan, I tentatively suggest that the true closed forest cover of the Philippines is closer to 25%.

family plants five hectares to Benguet pine (*pinus kesiya*) with agricultural crops between the seedlings. When the area is no longer suitable for crop they must move to a new area and start again. Silliman University in Negros Oriental have also given 300 squatter-kaiñgineros the task of permanently reforesting 3,000 hectares on their 5,418 hectares of University property, but in return each family gets three hectares for his own agricultural use (Editorial, 1970).

Forest concessioners in Mindanao provide a number of good examples of success in introducing kaiñgineros to agro-forestry. The Nasipit Lumber Company in Agusan have successfully grown *anabiong*, *gubas*, *tulo*, *hinlaumo* and *ilang-ilang* (Tamesis, 1969), while the *Albizia fal-citaria* (Moluccan sau) and *Eucalyptus deglupta* (*bagras*) pulpwood species grown by kaiñgineros on PICOP concession land in Surigao del Sur is perhaps the best known example. The PICOP pulpwood plant requires 430 tons of wood per day so kaiñgineros within 100 kilometers of the factory are in a position to benefit from this "economic incentive." The Aras-Asan Lumber Company of Surigao del Sur also reports success in increasing the well being of kaiñgineros on their concession land by improving rice production and planting fast growing tree species (Sanvictores, 1969). Not all agro-forestry projects are designed to grow softwoods, however, Rimando (1977) outlines three basic types of agro-forestry now practiced by forest industries: 1) second growth managed on a sustained-yield basis, selection cutting system; 2) second growth forest converted into a tree farm unit, clear cutting system; 3) bare land turned into a tree farm unit, clear cutting system.

The radical suggestion has been made that kaiñgineros should grow only fruit trees and the crops that would fit below them, and not to concentrate on traditional crops (Carlos, 1977). The idea here is that instead of growing most of their own food they simply buy it with money obtained from selling the fruit. The BFD have already introduced orchard planting in their attempts to rehabilitate the Angat watershed in Bulacan. Research by the Iloilo National College of Agriculture (INCA) in Panay has also shown that growing coffee under a shade crop of giant *ipil-ipil* (*Leucaena leucocephala*) can be profitable. For their forty hectare experimental plot their 1976 net income from coffee was P147,608 and from giant *ipil-ipil* firewood, P2,500 (Pusung, 1977). Encouraging kaiñgineros to adapt fruit tree growing has obvious environmental benefits as these trees not only give the soil the protection needed but also commit the kaiñgineros to a settled way of life.

The "Forest Occupancy (kaiñgin) Management Program" of the BFD has also made considerable progress in introducing agro-forestry to the kaiñgineros who live in the public forests outside logging or pulpwood concessions. One of their earliest projects was to deter traditional kaiñgining on the critical watershed slopes above the Binga and Ambuklao dams in Benguet. Today this area has been greatly

altered to vegetable growing on relatively level terraces. With heavy doses of fertilizers these terraces produce good crops of potatoes, onions, carrots and cabbages, but this terracing method is not generally applicable as soils elsewhere are rarely as deep and as easily terraced. This project has been so successful in encouraging the kaiñinero to terrace that erosion continues due to the fact that these slopes are giving away almost completely to terraces. Most of the original Benguet pine cover is now gone, and I noted in March 1979 that terraces were even appearing in Mount Data National Park.

Nineteen management projects have been started by the BFD in the last six years and are to be found in practically all regions under their jurisdiction (Table 1). These original management projects applied to selected portions of the public forests in the districts selected and participating kaiñineros have been issued with permits. These permits are for one year and can be renewed four times. After this five year period if they are deemed by the BFD to be practicing sound agroforestry kaiñining they are issued with renewable twenty five year leases. Because of the considered successes of these projects, and the desire to quickly bring all kaiñineros into the management program, the BFD have, effective March 7, 1979, authorized these existing projects to be expanded to cover the whole districts in which they are found. Five new projects scheduled to start during 1979 will also apply to the whole forestry district in which they are located (Table 1).

An alternative strategy to individual kaiñineros practicing agroforestry in their old kaiñins is to encourage them to become involved in co-operatives producing such products as wine, carvings, furniture and handicrafts. De los Santos (1978) recommends that in such areas trees planted should be of the type used by these cooperatives so that participants have a reason to protect their source of raw materials. According to Calanog (1978) such a "bayanihan" or "samahan" (co-operative) approach has great potential and the Forest Research Institute (FORI) have plans to pilot test two such projects involving 100 kaiñinero families each over a five year period. In Zamboanga del Sur the Zamboanga Forest Managers Corporation have already established a co-operative-like venture by organizing kaiñineros into "seldas" or working family groups. Presently these groups (of seven families each) are planting *agaho* (*Casuarina equisetifolia*, Moluccan *sau*, giant *ipil-ipil*, rubber, *yemiane* and *kaaton* (*Anthrocephalus chinensis*) as well as growing their own food (Araneta, 1978).

ON GOING RESEARCH INTO THE SOCIO-ECONOMIC APPROACH TO FOREST OCCUPANCY MANAGEMENT

It is freely admitted that the kaiñin problem is still a major one. Forest occupancy management projects, while presently being implemented, do not have all the answers to the questions posed by kaiñin-

eros. To help alleviate some of these problems on-going research is being conducted by the Forest Research Institute (FORI) and the Upland Hydro-Ecology Research Program and Forestry Extension Department, both of the College of Forestry at the University of the Philippines at Los Baños, Laguna. FORI maintains research stations throughout the country and its principal concern in relationship to the *kaiñgin* problem is to determine which tree species are best for planting in disturbed upland habitats, and which herbaceous and arboreal species are most suited to protecting the soil from erosion.

Forestry Extension is presently conducting eight major research projects in five *kaiñgin* areas. These *kaiñgin* settlement projects are separate from those sponsored directly by the BFD and includes Atok, Benguet; Diadi, Nueva Vizcaya; Balatan, Camarines Sur; Buhisan, Cebu City; Malabog, Bunawan, Davao City. These sites are intentionally widespread so as far as possible results will be representative of *kaiñgining* throughout the country. The research projects hope to evaluate the acceptance and success of terracing, intercropping, livestock raising, fruit tree growing, sericulture, Christmas tree growing (with firewood and pulpwood production) as well as maximizing leadership qualities and economic control methods (Duldulao et al., 1977). The success of the project lies in the results which can then, hopefully, be used nationally by the BFD.

The upland Hydro Ecology Research Program has two major research sites. The first is at Puting Lupa on the slopes of Mount Makiling, and the second is in the Pantabangan watershed in Nueva Ecija. The Puting Lupa site is particularly interesting for it is here that the difference between the abstract theories of conservation methods and the realities of *kaiñgining* are being put to the test in an attempt to find the best cropping patterns and cover crops that will be both acceptable to the *kaiñginero* and yet protect the soil from run off and erosion. The Puting Lupa watershed consists of secondary forest, plantation, *cogonales* and *kaiñgins* of different ages (UHRP, 1978). Some 200 erosion plots are constantly monitored for run-off and topsoil losses, and five flumes gauge sediment and discharge at different points along the stream draining the watershed. Constant monitoring of *kaiñginero* activities, planting, cropping and crop selection habits is also maintained in order to gauge the relationships between erosion and set *kaiñginero* customs. New cropping sequences are also being introduced to gauge not only their degree of control on soil erosion but their general acceptability to the *kaiñginero*. Experiments with fodder cover crops are also being conducted in the hope of increasing *kaiñginero* incomes through rearing penned cattle and goats. Integrating these sociologic, economic and hydro-ecologic studies is already giving valuable insights on how each cover type, cropping sequence and crop type relates to soil erosion, run-off, biological productivity and *kaiñginero* income. Of equal

value are the insights this integration is giving to the acceptance by kaiñgineros of innovation. The ultimate goal of this research is to promote sustained yield agro-forestry where plantation and cropping is so practiced that run-off and topsoil losses are minimal, economic returns to the kaiñginero are maximized and there is some degree of balance between family food production and cash cropping.

CONCLUSION

It is recognized that the socio-economic approach to forest occupancy (kaiñgin) management is still in its infancy, however, the very fact that it is being attempted shows concern by government and researchers for the preservation of the upland resources of the Philippines. While it is appreciated that punitive measures are not the answer, the introduction of socio-economic changes to the kaiñgineros way of life is also fraught with difficulties due to the independent nature of the kaiñginero and his different attitudes towards life. It is only by conducting research among kaiñgineros that answers to many these problems will be provided, and it is only through the education and "re-direction" of the kaiñginero that the development of truly environmentally-sound kaiñgining practices can be evolved.

Introducing socio-economic change to the kaiñginero who occupies the land legally is one problem, but another and equally important problem is the prevention of additional landless low-landers from taking up the practice. In March 1979 I had the opportunity to study kaiñgining in the hills south east of Bagabag in Nueva Vizcaya. Here a perfect example of the magnetic attraction of recently selectively logged areas for kaiñgineros is seen and a perfect retrogressive succession from virgin dipterocarp forest to *cogonale* can be examined. The loggers provide thinned stands and trails along which kaiñgineros come. Slashing the undergrowth and burning over to prepare kaiñgins inadvertently kills the remaining trees. After a series of kaiñgins the area gives way to trailing bamboo and then *cogon* (*Imperata cylindrica*). Ranchers quickly take lease on the resultant grasslands and the destruction is complete. It would appear that the only remedy for this problem is either the total cessation of logging (which in some areas would not be practical) or the strict enforcement of PD No. 705 by forest guards and logging concession guards, and a concerted effort to control population growth or provide alternative sources of employment. The task is enormous and the funds presently provided to those agencies entrusted with the protection of the forests are simply inadequate to do a good job. Despite these drawbacks, however, the gradual acceptance by the general public that traditional kaiñgining is bad for everyone is being brought home, and the dedication of those involved in trying to introduce socio-economic changes to the kaiñgin system may well prove sufficient to protect large areas of the still remaining forests of the Philippines for future generations.

TABLE I
FOREST OCCUPANCY (KAIÑGIN) MANAGEMENT PROJECTS
OF THE BUREAU OF FOREST DEVELOPMENT.¹

Forest Region	Arbitrary Number	Location	Province
Reg. 2, D-7	1	Lagawe	Ifugao
Reg. 2, D-9	2	Maddela	Quirino
Reg. 3 D-1	3	Iba	Zambales
Reg. 3 D-2	4	Tarlac	Tarlac
Reg. 3 D-3	5	Caranglan	Nueva Ecija
Reg. 3 D-6	6	San Fernando	Pampanga
Reg. 3 D-7	7	Norzagaray	Bulacan
Reg. 3 D-8	8	Balanga	Bataan
Reg. 3 D-9	9	Pantabangan	Nueva Ecija
Reg. 4A D-1	10	Mamburao	Occ. Mindoro
Reg. 4A D-3	11	San Jose	Occ. Mindoro
Reg. 4A D-5	12	Roxas	Palawan
Reg. 4A D-6	13	Puerto Princesa	Palawan
Reg. 5 D-4	14	Virac	Catanduanes
Reg. 5 D-7	15	Daet	Camarines Norte
Reg. 11 D-7	16	Nabunturan	Davao del Norte
Reg. 11 D-8	17	Mati	Davao Oriental
Reg. 4-1	18	Real	Quezon
Reg. 4A D-6	19	Puerto Galera	Or. Mindoro
Reg. 8 D-3	20	Borongan	Eastern Samar
Reg. 1 (Dagupan)	21	Mount Data Nat. Park	
Reg. 9 D-1	22	Dipolog	Zamboanga del Norte
Reg. 5 D-7	23	Sorsogon	Sorsogon
Reg. 11 (Davao)	24	Mount Apo Nat. Park	

¹ Projects 1-19 are presently in operation. Studies 18 and 19 are combined BFD — MAB — UNESCO projects. Projects 20-24 are to commence in 1979.

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CRITERIA FOR SHAPING SPATIAL PRODUCTION SYSTEMS

by

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This paper attempts to focus attention on some general questions concerning the purpose of a spatial production system. These issues tend to have been overlooked in geography, where the perspective in recent years has stressed the geometry of spatial form rather than the wider social context within which production takes place. The broader view required may take us well beyond the conventional bounds of geographical or spatial analysis, but production systems are not, of course, exclusively spatial phenomenon. A narrow, single-disciplinary perspective may indeed divert attention from some of the more important aspects of reality, simply because they are usually thought to be the province of another branch of knowledge. Such is the case with respect to much of the subject matter of this paper.

SOME DEFINITIONS

Writing to a given title, like an examination question, invites some initial scrutiny of the terms involved. Thus the meaning of "criteria," shaping and "spatial production system" require some rough definitions, before proceeding further.

Criteria. — We take to refer to some measures of performance, with respect to the outputs of the system. The *Oxford English Dictionary* defines a criterion as a principle or standard that a thing is judged by. This raises questions at two different levels — that of the general purpose or objectives served by a spatial production system, and the specific indicators that might be devised to establish how far such objectives are met. The bulk of the paper will be devoted to these questions, and their economic organization (or mode of production).

The word *shaping* implies deliberation or conscious action — i.e., planning. We will therefore argue within a framework that assumes some element of planning of economic activity, though not necessarily complete central planning by government.

The term *spatial production system* is taken to mean an inter-related set of production units occupying a segment of geographical space. This

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implies that the internal integration of the system is somehow more important than its external links, i.e. with other such systems — otherwise it is hard to justify bounding the system spatially. We must also assume that the spatial arrangement of the units within the system has a bearing on performance, though to isolate this particular characteristic may give it undeserved prominence by comparison with the technical or transformational efficiency of production. The term "production" will itself be considered very broadly: the tendency in both western and Marxian economics to view social services as "unproductive" seems to make an unduly rigid distinction between two different types of human activity that ultimately serve the same end — the satisfaction of human needs and wants in the general process of social reproduction. Social services contribute directly to material production through the maintenance of a labor force at a particular physical and cultural level.

GENERAL WELFARE CRITERIA

A production system, "spatial" or otherwise, has to satisfy immediate human needs and wants. This is true of any mode of production — pre-capitalist, capitalist or socialist. Human survival needs must be met, otherwise life will cease. The surplus produced over and above what is sufficient for survival serves to satisfy "higher" needs or wants, or to enhance future production possibilities via investment. Production takes place by the application of human labor on nature, via certain instruments (capital) and within a certain societal structure or organization. The survival or reproduction of a society at its present level of technology, or development of the productive forces makes a demand on the surplus beyond physical survival needs.

The most obvious criterion of performance of a production system is, of course, its survival capacity. If it exists, then it has been successful by this criterion. The people have been kept alive, or a particular level of living has been maintained. Economic systems that might be regarded as primitive by modern standards may be quite successful by the survival criterion. They may have achieved a harmonious relationship between man and environment, by a long historic process of trial and error. Our contemporary production systems may, in fact, be less conducive to long-term survival. Pollution may threaten the life-supporting capacity of land, sea and air. The high-energy technology that we take for granted today depends on finding alternatives to fossil fuels and no system of production based on non-renewable resources can last forever.

Once continuity of life is assured (or appears to be) attention may turn to the standard of life. The criterion of performance of an economic system thus becomes the quality or standard of life that it generates. Other possible criteria relating to inputs, such as minimization of cost or resources used, have meaning only in relation to what is produced,

i.e., the outputs. The volume of private profit generated by an economic system sometimes advocated as a performance criterion under capitalism, is relevant only if private profit is regarded as more important than the general standard of living, or if profit maximization necessarily maximize social welfare (a point to which we shall return.)

The concept of quality of life or standard of living is most readily grasped in the abstract. It can in fact be considered as analogous to social welfare as conceptualized in the welfare branch of neo-classical economics, with some modifications to accommodate the spatial nature of our production system.

Suppose that a production system occupies a segment of geographical space j (there being 1, 2,, n such systems in the national economy). The standard of living or social well-being (S) could be written in either two ways:

$$S = f (Q_1 Q_2, \dots, Q_m) \quad (1)$$

where Q is the quality of a particular good or service available to the people ("bads" such as noise or pollution having a negative sign) and f is an undefined function which can be read as "is dependent on" or

$$S = f (U_1 U_2, \dots, U_k) \quad (2)$$

where U is the general level of well-being, satisfaction or "utility of the individual inhabitants of territory j , or of groups in the population — perhaps defined by place or sub-area of residence.

The individual, group or place utility function will have the same form as the general territorial living standard equation, i.e.:

$$U = f (q_1 q_2, \dots, q_m) \quad (3)$$

where q is the quality of goods (or bads) and service going to that individual or group.

Thus the standard of living in the territory to which spatial production system relates depends on how a particular collection of goods and bads is distributed among the population. This condition itself contributes to the general welfare of the larger (regional, national or world) system, of which the territory in question forms part (i.e. to which it has external links). Thus the general level of welfare (W) can be written as follows:

$$W = f (S_1 S_2, \dots, S_n) \quad (4)$$

as well as by the more conventional formulations in which welfare is a function of goods available (Q) or of individual utility levels (U).

In their general, undefined form, expressions (1), (2) and (4) have minimal ethical content. All they assume is that the standard of living depends on who gets what goods and services where — a value judgement that should command fairly general acceptance.

In order to adopt any or all of these expressions as criteria in shaping the development of spatial production systems, they must be fully defined. This requires a decision as to what the goods to be

produced are, and how much there should be of each. It also requires decisions on how much each individual (group or place) is to get. Such decisions are necessarily normative, ethical and related to some conception of social justice, unless it can be shown that there is a unique combination of goods uniquely distributed that maximizes the attainment of some higher goal.

One such higher goal already mentioned is the survival capacity of the system, without which questions of distributive justice become irrelevant. Another possibility is its growth capacity. The growth criterion raises ethical as well as scientific difficulties, however. If it can be shown but a specific combination and distribution of goods at present maximizes growth potential, so that at some time in the future there will be a higher standard of living than could be attained by any other present situation, there must be some compelling reason why the present generation should pay a price for the greater comfort of the future generation, as is implied if the optimum with respect to a growth objective differs from that reflecting current popular preference. The same problem could appear to arise in the allocation between consumption and accumulation or investment. Welfare comparisons through time inevitably involve ethical considerations.

To be more specific, the development of performance criteria from the abstract conception of living standards outlined above requires a definition of standard of living in general and with respect to individual (group or place) entitlements. The contributory elements to standard of living can be identified fairly easily: food, clothing, shelter, health, education, security, etc. But their relative importance can vary historically, culturally and geographically. It is a matter of judgement, ethical as well as scientific. On the scientific side are questions of minimal standards required to keep people alive and at a level of education and skill conducive to the role of their labour in the process of production. On the ethical side are questions of how to make choices where there is no clear scientific guidance, e.g. between greater expenditure on education or medical care, which can involve balancing increased literacy against increased health, in a situation where there is no common unit of value such as money or labour time. Which people in which places should get how much of what also involves both scientific and ethical questions — again, unless it can be shown that there is unique distribution that alone ensures survival or some other agreed higher objective. The attainment of a present optimal situation with respect to living standards may require inter-personal (or area) differentiation for example to provide incentives for people to work in specific occupations or places. But there is often also an element of equity in the differentiation — people in particular arduous or important jobs in certain places might be held to *deserve* more goods or services than others. This combination of functional necessity and social justice seems to charac-

terize reward systems under both capitalism and socialism, though with different objective consequences.

What can be achieved — the level of living can be generated is of course constrained by resources and technology (or the level of development of the productive forces). A specified standard of living can be attained with maximum efficiency measured by resources used (in units of cost, labour time or whatever). Alternatively a given level of inputs can be made to generate the highest possible standard of living, or maximum outputs. Criteria for evaluating the performance of an industrial system must have some reference to resources and the transformation process.

It is as part of the resource constraint or transformation efficiency that the internal arrangement of a spatial production system becomes relevant. Different location patterns will have different production capacities from the same volume of inputs or resources committed, and can attain the same output from different input levels. The reasons should be obvious; they relate to the traditional location factors of input assembly costs and costs of serving the market. Thus there will be an optimal internal spatial organization of production, the achievement of which will have a bearing on the standard of living that can be generated. But it is important to recognize that this aspect of efficiency is closely related to technique (input combination) and scale (volume of output) both of which are themselves dependent to some extent on the location of the production unit. Criteria of *locational* efficiency inevitably involve assumptions as to scale and technique, as well as specification of the required structure of outputs. It is the mutual interdependence of all these conditions that makes the optimal planning of a spatial production system so difficult in practice.

THE MARKET COMPETITION FRAMEWORK

The extent to which spatial production systems can be deliberately shaped to achieve specific objectives depends on the prevailing method of organizing the productive process (or the mode of production). Let us consider the opportunities for such an approach under the type of free-market competition generally assumed to operate in the capitalist system. In so doing, we shall learn something of the limitations of planning directed towards specific performance criteria, within the type of economies operating in North America, Western Europe and most of the so-called Third World.

The great convenience of a free-market economy is that location, allocation and distribution decisions are made without recourse to collective planning. What comprises the standard of living, or the welfare problem described above, is solved by individual consumers expressing their preferences for different goods and services, and the reactions of

private producers who put their capital at risk. The perfect market mechanism, working perfectly uses the least possible quantity of resources, allocates them to the production of what the people say they want and distributes the outputs in a manner that implicitly rewards all contributors (labour and the owners of resources) in accordance with the "value" of their inputs. The outcome can thus be made to have the appearance of popular, almost democratic sanction.

It is now generally recognized that this conception of a market-regulated capitalist economy is greatly at variance with reality. Its perpetuation (albeit in a modified form) in western economics textbooks and courses serves more of an ideological than a scientific role. The formal association of a social welfare optimum with a profit, maximizing free-enterprise system is clearly in the interests of those who gain most from such a system and dislike the prospect of some alternative (e.g. socialism). But more crucial to the present discussion is the fact that some important assumptions of the neo-classical model, such as free factor mobility and perfectly competitive markets, are inconsistent with the nature of a *space* economy.

The task here is not to mount a rigorous critique of neo-classical economics. However, the issues raised are relevant to how the development of spatial production systems under capitalism might be shaped by the adoption of performance criteria. If such planning is to succeed, the first requirement would appear to be to abandon the simplistic model of perfect competition, as not only discordant with reality but quite unattainable in practice. Planning strategies that assume otherwise, and rely on public intervention to make the market system work more "perfectly", are doomed to failure. Government planning must recognize the way the capitalist system actually operates. And of particular importance in the contemporary age is the extent to which the multitude of individual entrepreneurs of traditional economic theory have been replaced by giant multinational corporations, trying the world capitalist economy together into a system of interdependency quite different from that of the traditional competitive model.

The increasing dominance of the multinational corporations has important implications for the concept of the spatial production system under capitalism. The conventional view is of some territory or region within a nation, where a set of private production facilities are linked together by input-output relationships so that the whole somehow functions together in an integrated fashion. The economy is seen as self regulating, apart from government support of infrastructure and the occasional need for public "intervention" when certain problems arise (e.g. local unemployment, monopolistic tendencies). A more realistic view would be of a series of *over-lapping* "spatial" systems with inter-regional and transnational links as well as local ones. Each of these systems comprises one integrated multinational corporation, these macro systems

would overlay the relics of the original local and regional systems of relatively small-scale independent producers, themselves penetrated by tentacles of the multinationals (Fig. 1). This is the distinction between what Galbraith has termed the "planning system of major (often monopoly) corporations and the market system" of small producers still responsive to market forces.

The multinational systems certainly function as highly planned entities. They often control (through ownership) sources of inputs and markets for outputs and operate in close cooperation with government. Contrary to the single-minded dedication of the swash-buckling entrepreneur of traditional economic theory, the multinational corporation may be motivated more by market domination, long-term security or even the attainment of sheer size (and the accompanying political power) than by strict short-run profit maximization. But whatever the criteria of performance of such system, they do not include the maximization of the living standards of the people. Public attempts to "intervene" at the local or regional level, in pursuit of welfare objectives run into the intractable problem that the multinationals simply do not operate at that spatial scale. Just as there is a conflict between the private profit motive and consumer welfare, so there is a fundamental contradiction between the emerging spatial structure of contemporary capitalism and the public planning of territorially defined production systems guided by welfare criteria. The institutions and forces affecting living standards in particular localities and regions are, quite literally, beyond public control.

CENTRAL PLANNING

A centrally planned socialist economy should have the capacity to overcome the problems that render impotent much government spatial development strategy under capitalism. The abolition of private ownership of the means of production eliminates the conflict between profit seeking and the public welfare, and also the antagonistic class relations between labor and capital. Central control of the economy should ensure that the overall welfare objectives is attained subject of course to an element of human error in plan design and implementation. Specific criteria of performance can be established, in the form of attainment indicators with respect to regional living standards and their contributory elements, as in the welfare functions (1) and (4) above. Interpersonal distribution is effected through collective provision of social services and a wage that can be used to satisfy individuals preferences with respect to consumer goods and certain personal services. The territorial production system, as an element within the wider economy, is shaped by criteria relating to its required contribution to the national production system, to the living standards of the local people, and to the imperative of social reproduction.

Some of the differences between the western capitalist perspective and that of socialist planning can be explained with reference to Fig. 2. This simple model shows the production of goods and services contributing to the state of well-being of the population, as outputs are distributed and consumed. The western perspective stresses the individualistic nature of consumption, with human "being" or satisfaction as the ultimate end, subject to the state of the labour force having some effect on level of production in the next round. Socialist planning places much more stress on this "productivity" effect, or on the structure of consumption contributing to state of well-being as itself a contributor to planned social reproduction and growth of future outputs. The focus is on the feedback effect — on the continuity of the system — rather than on the satisfaction of the existing population's needs and wants as ends in themselves.

But how are the necessary decisions made and plans designed in practice? This is a source of some confusion to western scholars unfamiliar with the theory and practice of socialist planning, even with some guidance from relevant literature. In an economy that is not generating much of a surplus, the problem may not be too difficult. The labour force must be kept alive, fit and suitably trained and must reproduce itself, seed for next year's sowing must be put by: machines must be repaired or replaced. The disposition of such small surplus as remains after these basic needs have been met may be determined by fairly obvious requirements, e.g. for a new industrial sector or improvements in housing. But as the surplus grows the question of choice between alternative uses becomes more difficult. In a competitive capitalist system the market (with all its imperfections) guides resource allocation decisions. Under central planning, they are said to stem from objective laws of socialist development.

Viewing the problem from a (deliberately provocative) western perspective it is extraordinarily difficult to see how any "objective" laws can fully define a social welfare function and thus provide a firm "scientific" basis for the establishment of criteria for shaping spatial production system. A socialist perspective will stress the historically and culturally specific nature of the concept of standard of living, and the fact that individual tastes and preferences are not autonomously given (as tends to be assumed in neo-classical welfare theory). It will also direct attention away from narrow, pecuniary definitions of living standards such as income per capita, towards social criteria and distributive aspects. But socialist "theory" can hardly make truly objective and scientific decisions as to how much of the surplus product should go to housing as opposed to health care for example, or to overcoats as opposed to television sets. In theory, the level of development of the production forces carries with it a specific set of needs, with respect to consumption of materials, cultural and social benefits. Clearly, a certain

level of physical well-being and mental development will be required on the part of the labour force, with respect to the role it must play at a particular stage in the development of an economic system and its technological basis. But it is hard to see how much a concept can generate a "correct" allocation of resources between housing and health care, much less between overcoats and television sets. The final decisions must be to some extent arbitrary — value judgments on the part of those who manage the economy. The degree of arbitrariness must be especially great in the realm of those consumer goods that most closely reflect individual whims and fancies, in the absence of any clearly articulated set of consumer preferences to provide signals for the planning of production. But it is probably greatest in what is usually described as defense expenditures can anyone, in the east or west, really believe that the size of the defense budget in the USSR or the USA is arrived at scientifically, rather than the political power of the prevailing military — industrial complex?

Perhaps Marxist-Leninist theory serves, to some extent, as a means of *post facto* rationalization of otherwise rather arbitrary and unscientific decisions, just as western economics serves as a mask for the exploitative reality of the capitalist system. Perhaps both socialism and capitalism, as actually practised have similar difficulties over what political scientists describe as legitimization — appearing to serve the needs and will of the people in a situation where the truly scientific basis for such a function is lacking or incomplete. There may even be a similarity with respect to the validity of the "spatial production system" as an object of development planning, in circumstances where so much of the decision making process is concentrated in central government offices or big-business board-rooms. Perhaps there is some analogy between the overlapping production systems of the multinational corporations under capitalism (Fig. 1) and those of competing ministries under socialism. Under both systems critical decisions with respect to what happens in a particular region or locality are made elsewhere, up the (spatial) control hierarchy of some gigantic bureaucracy — public or private. It is an open question just how much contribution people at the bottom (outer) end of the hierarchy can actually make in this process. Does someone else somewhere else know better what is best for them?

CONCLUSION

This paper has drawn attention to what appear to be some fundamental problems arising from the idea that an object termed a spatial production system can be shaped with rational deliberation, by specific criteria that measure attainment of welfare objectives. If the general tone of these observations is somewhat negative, it might at least serve to balance undue optimism, as to what can be achieved by the planning

of spatial production systems, which seems too difficult enough under socialism and quite futile under capitalism. The discussion might also help to guide empirical research in this field, where it is very difficult indeed to offer a case study of a single spatial production system that says anything useful about anything other than the individual case in question.

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