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**GEOGRAPHICAL VIEWPOINT**

**APPROPRIATE TECHNOLOGY: PHILIPPINE SETTING\***

by

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In the book which has achieved a unique status immediately after its publication, *Small is Beautiful: Economics as if People Really Mattered* by E. F. Schumacher, 1973, I quote the first paragraph of Part I, Chapter I, as follows:

"One of the most fateful errors of our age is the belief that the problem of production has been solved. Not only is this belief firmly held by people remote from production and therefore professionally unacquainted with the facts — it is held virtually by all the experts, the captains of industry, the economic managers in the governments of the world, the academic and not-so-academic economists not to mention the economic journalists. They may disagree on many things but they all agree that the problem of production has been solved; that mankind has at last come of age. For the rich countries, they say, that the most important task now is "education for leisure" and for the poor countries, the "transfer of technology" (1) unquote.

*Population, Environment and Technology:*

All over the developed and developing countries, including the Philippines, there are three popular areas of concern and interest during the last seven or ten years, namely: population, environment and technology.

The National Population Welfare Congress staged in November 20-21, 1978, reported that the world population has slowed down a bit. Records showed that the 3.01 percent annual rate in 1960-1970 went down to 2.78 percent in 1970-1975. Thus some newspapers were moved to ob-

\* Prepared for the Techno Forum, Technology Resource Center, Ministry of Human Settlements, December 13, 1978.

serve that there was no cause to worry about the population explosion although we are producing three babies a minute, or an increase of 1.5 million a year. On the other hand, the Multi-Year Human Settlement Plan predicts that between 1978-2000, the Philippines is expected to have 78 to 84 million people, a tremendous increase over the 1977 population of 44.4 million. (2)

In France, the teacher resorts to a riddle to teach school children the nature of exponential growth.

A lily pond, so the riddle goes, contains a single leaf. Each day the number of leaves doubles — two leaves the second day. Four leaves on the third, eight on the fourth, and so on. "If the pond is full on the thirtieth day, "the teacher asks," at what point is it half full? Answer: on the twenty-ninth day. (3) By the way, the Twenty-ninth Day! accommodating human needs and numbers to the Earth's Resources is a book supposed to have been published in March 1978 by W.W. Norton and Company, 500 Fifth Avenue, New York, NY 10036 USA.

This riddle explains partly the Malthusian Theory. The global lily pond in which four billion of us live may already be at least half full. Within the next generation, world population could double, thus filling the "pond" entirely. If this doubling of population materializes, a great majority of countries will face ecological, economic and political stresses that may well prove unmanageable. (3) What can we do? Perhaps a certain kind of technology can help us — *Appropriate Technology*.

In environment, the International Conference on the Survival of Mankind: The Philippine Experiment, September 6-10, 1976 demonstrated our deep concern on environment quality and environmental degradation. Notwithstanding the fact that the government about ten years ago established the present National Pollution Control Commission, our environment has shown degradation in all sectors.

The earth's primary biological systems — oceanic fisheries, grasslands, forests and croplands — are being stressed to their limit as population increases. These systems are affected by pollution. Worldwide, the impact of pollution on biological systems is perhaps most evident in fisheries. Only somewhat less serious than oceanic pollution, air pollution which adversely affects crop production, is now a serious problem facing many industrial countries. The relationship between pollution and productivity of biological systems needs in depth study. Controlling pollution is one thing minimizing and living along with, it is another thing. (3)

The third area of concern is technology. Many people believe that this magic word is the answer to man's Utopian dream. With the advances of technology that began with the splitting of the atom and culminated with the landing of astronauts on the moon, science and

technology seemed capable of doing almost anything. However, the promised abundance of energy and food has not materialized. Instead, the last ten years have been marked by hunger, inducing rises in death rates and energy cost. It is believed that technology's future contributions in moving towards a sustainable economic system may lie largely in a re-orientation of scientific as well as the system of application of technological results. (4)

#### *What is Technology?*

What are the attributes of technology? RW Behan defined technology as "simply the value-neutral methods and means (as tools) by which we transform naturally occurring substances, forces and services into usable commodities and experiences." There is technology in the wilderness as there is technology in nuclear power generation. One uses fissionable materials, reactors and turbines; the other uses horse, pack saddles, back pack, instimatic camera and pretty landscape." (5)

The technology in the wilderness is an expression of the appreciation of nature in the raw. To appreciate the beauty and grandeur of Taal Lake and Taal Volcano as seen at Tagaytay Ridge on a bright sunny day on the horse back with instimatic camera is indeed a wonderful and healthy experience.

The technology in nuclear power generation or in the manufacture of cement will give an observer an awful experience as he looks down into the neighboring areas affected by the fallout of these technological operations. Perhaps the reasons for our concern in these areas of population, environment and technology are because they are inter-related to each other.

#### *Resources and Technology:*

A resource is any naturally occurring substance useful to man. A resource is more than just the tangible substance. It is also defined by the *utility* we perceive in the *substance* and by the *technology* of transforming the potential of the substance into the actuality of satisfaction.

This is the functional concept of natural resource conservation that leads to the equation:  $R = f(ust)$

A resource is the function of utility, substance and technology. The substance factor for all practical purposes and orthodox mind is fixed, finite and limited.

But the utility factor and technology factor are not limited at all. We find new uses for and new ways to use many substances at all times and for many old substances, too. Natural resources as functions rather than inventories are not the least bit limited. (5)

*Transfer of Technology:*<sup>1</sup>

What is transfer of technology? The best way to explain this term is to give a case history of the subject.

After the World War II, US Army surplus equipments such as tractors, bulldozers, graders and whatever you can name them were piled up and transferred to the Philippine government. At that time, technical people in agricultural engineering field had just organized the Philippine Society of Agricultural Engineers. Immediately, enterprising agricultural engineers went to action about farm mechanization. The farm machinery dealers, agricultural engineers and sugar cane planters all agreed that sugar cane production would be mechanized. Indeed it was done as far as plowing the fields and cultivating the rows of young sugar cane plants. But harvesting of the canes is up to now still done by the laborers.

Can corn harvesting in the Philippines be mechanized as the Americans do in the Corn Belt in United States? A friend and I discussed this subject in November 1940 while we were at Cornell University, Ithaca, New York. I was then taking special subjects in soil physics and soil fertility while he was finishing his Ph.D. in agricultural engineering.

In 1947-48, while working in the Lasedeco Settlement areas in Koronadal and Allah Valleys, Cotabato, Mindanao, this friend of mine was able to procure a corn harvester and demonstrated its feasibility in the harvesting of corn by this machine. To make the story short, the corn picker could not pick the ears of corn; on top of this, the machine bogged down and had to be pulled out of the wet and soft sandy soil by the carabao.

Corn harvester or corn picker is the product of American Technology. Its manufacture was programmed with the specific variety and hybrid of corn, the soils and climate of the Corn Belt Area of United States. When brought to the Philippine soils and climate, and variety of corn that is not established, the corn picker could not pick the ears of the corn because the variety and hybrid were not programmed for the machine. On top of this, the soil is sandy and when wet is soft, thus it cannot sustain the weight of the machine to enable it to perform the normal operation. This picture of operational failure was without mention of the intrusion of this kind of technology to our culture and attitude. This was my experience as Administrator of the Irrigation Service Unit, Department of Agriculture and Natural Resources and Project Director of the USOM-PHILCUSA Pump Irrigation Program in the Philippines during the years 1952-1960. You cannot bring or transfer to our people especially the farmers a 20th century technology to our

<sup>1</sup> Refer to UNDP paper that says: Imported technology is not advisable for us. Daily Express, Monday, November 27, 1978.

18th century culture and attitude and expect the farmers to adopt the whole system overnight. This has to be presented to the farmers systematically with soft hand and kind heart and with paternal attitude. The *technology per se* has to be accompanied with a number of components to make the system go. This system is now called *Appropriate Technology*.

#### *Appropriate Technology:*

Indeed there are many meanings of the Appropriate Technology, as many as there are experts on this subject from developed countries who tried to bring the concept to the developing countries and even to the emerging countries.

According to Ken Darrow and Ric Pam: "Appropriate Technology is a term that represents a particular view of society and technology." It suggests that technology is neither neutral nor does it evolve along a single path. It recognizes that different cultural and geographical groups will have (6) different technologies that are appropriate to their circumstances; that technological self determination is essential to cultural identity (and political independence). It suspects that the only wise technologies are those that seek to accommodate themselves to the biological environment within which they are used; it is called among other things, "Environmental Appropriate Technology."

Darrow and Pam continues: "The term appropriate technology" implies that there is such a thing as *inappropriate technology*. As suggested there is a need to develop appropriate technologies not only among those people on the planet who have too little, but equally among those people that have so much that they are extraordinarily wasteful. It is significant that appropriate technology is not one more fashionable remedy to be recommended to the people of poor countries by the people of rich countries. Not only are many of the most committed advocates of appropriate technology members of rich countries who are working for a more human-scale technology to fit their own conditions, but the very origins of the movement come from the Gandhian tradition of local production for local needs."

#### *Historical Background of Appropriate Technology in the Philippines:*

Long before the developed countries conceived the term appropriate technology, the Filipino technologists have been already practicing the application of technological technique in food production and in other of man's endeavor.

#### *First National 100 Cavans per Hectare Rice Contest:*

In 1952, the Soil Science Society of the Philippines (I was President of the SSSP that year) conceived the program for 1953 the First Nationwide 100 Cavans per Hectare Rice Contest in Rice Production. The idea

was to raise the national average of 28 cavans per hectare to 100 cavans. (7)

The purposes of the contest as indicated in the rules and regulations were:

1. To arouse the interests of all farmers in the country in increasing their rice yields through proper land tillage, soil water management, use of better rice varieties and control of weeds, pests and diseases, with the end in view of attaining self-sufficiency in rice and reducing its costs production in preparation for the export market.

2. To help establish model rice units in rural communities which will serve as examples to farmers in their respective areas.

3. To eventually demonstrate the need for crop diversification and the feasibility of livestock farming in the Philippines.

(These are some of the components in the system of Appropriate Technology.)

One of the natures of the contest was to allow any contestant to give his *one hectare entry* any kind of land tillage; to apply any kind of fertilizer, insecticide amendment or soil conditioner to improve its fertility and texture; and protect it against pests and diseases; in other words to *baby* his entry. (This is another component of the system in Appropriate Technology).

The most important component of the system was to select the President of the Society for the year 1953 to lead in the program.

Don Vicente Araneta was elected President. He had the prestige being a businessman, a farmer (being owner of Grassland Farm in Bulacan and Maapag Farm in Bukidnon) and Director of Araneta Institute of Agriculture.

The first contest started April 15, 1953 and ended April 14, 1954.

The Society, in implementing the contest, requested the cooperation of the Bureau of Plant Industry, Bureau of Soils, Bureau of Agricultural Extension and various other service organizations, like the Rotary Clubs, Lions, and the Junior Chamber of Commerce. (This is also one of the components of the Systems of Appropriate Technology.)

Donors for prizes to the winners were in cash and agricultural equipment from practically all the machinery dealers of the country.

To make the story short, the contest was a success. President Mag-saysay declared the first week of May 1954 as National Rice Week and distributed prizes to the winners in the Rice Contest. (8)

#### *Major Winners of the Contest:*

1st prize —

Mr. Pedro Villanueva, Narvacan, Ilocos Sur  
Yield on his one hectare land — 163 cavans  
17 gantas  
3 chupas

Prize — farmall cub tractor — P3,545 —  
donated by IH (Phils.) Inc.

2nd prize —

Mr. Antonio Vera, Barrio Carolina, Naga City  
Yield on his one hectare land — 105 cavans  
6 gantas

Prize — Gibson Model — D Tractor with implements —  
P3,416 donated by the National Merchandising Corp.

3rd prize —

Mr. Jose S. Mercado also of Barrio Carolina, Naga City  
Yield on his one hectare land — 83 cavans  
23 gantas

Prize — 16" x 14" G.A. Propeller Pump — P3,000  
donated by G.A. Machinery Inc.

There were also regional winners for Luzon, Visayas, and Mindanao.

This concept of appropriate technology was taken over by the government during the time of President Magsaysay and the succeeding administrations.

The results of the 100 Cavan per Hectare Contest became the inspiration of Mr. Colin Hoskin, a well known Manila Realtor. He organized a non-stock, non-profit organization known as *Samahan ng Masaganang Kakanin* (SAMAKA) which was incorporated and registered in the government. During the year 1954, Mr. Hoskin conceived a system of a Homesite Farming that can be applied to his Paradise Farm Subdivision of one hectare lot. Today this SAMAKA Guide is one of the recommended source materials for appropriate technology. While it is reported as published in 1973, this was published in 1954.

#### *Storey Agriculture:*

The Volunteers in Technical Assistance Philippines, Inc., known as VITAPHIL, INC. for short, is a non-stock, non-profit technical organization engaged in providing technical assistance to people — farmers and small entrepreneurs free of charge.

This was organized with the assistance of VITA-US in August 1968. In their desire to internationalize technical volunteerism, the Philippines was the first VITA organization outside the United States.

In 1969-70, we ventured to assist small farmers who are taking care of coconut land in upland Cavite provinces like the towns of Silang, Amadeo, Mendez and Alfonso.

We know the quality of the soils of this area and the climate of the region. We saw the poor farmers live with little share of the coconut products that are harvested. We felt their hardships in living in a fast developing area. With all these perceptions we have about these tenants-farmers, we in VITAPHIL developed a concept and device to provide them with appropriate technology to increase their productive capacity.

We developed a concept of Storey Agriculture in a small area like

one hectare coconut land. This is based on a land that has a permanent crop like coconut. (1) In between the coconut trees we plant a semi-permanent crop like papaya that last 4 to 5 years; (2) Between the coconut and papaya we plant a yearly crop, that is pineapple; (3) Between the coconut trees, papaya and pineapple we plant a 45 to 60 days crop of vegetable.

All of these four crops in one hectare of clean agriculture, the application of fertilizers and the care given to the cultivation of these crops were maximized. The application of fertilizers to the pineapple plants provide also plant nutrients to the other crops like papaya, coconuts and vegetables.

This concept of Storey Agriculture gives the farmer a handsome yearly net income from P3,500 to P4,000 where he used to get few pesos from the coconut trees. This is one case of Appropriate Technology where machines and tools are not involved but taking care to the plants and see that no grasses or weeds grow in the system.

#### *Rainbook Appropriate Technology:*

What "appropriate technology" adds to technology is the question "what is appropriate?" That question requires that we get into the intricately interconnected web that links everything together — where a small change in something seemingly far removed can allow big changes in what you've concerned with.

Rainbook's comprehensive view extends the range of meanings of appropriate technology.

"Appropriate technology... is not merely a question of machines and too's, but of the nature of all the *conceptual, organizational, political, physical, and spiritual* tools and techniques which we bring into play by our actions." (9)

In any program of resource development, it is therefore, necessary that we should start first with a concept, then organize, study the physical aspect of the program and the political and spiritual aspects of the program and be sure that they form an interconnected web that links everything together.

#### *Masagana 99 Program:*

The Masagana 99 is one of the agricultural strategies adopted by the government which has become the most successful program of the government which transformed our country to a rice-exporting one.

I would dare to say that the forerunner of the Masagana 99 was the First Nationwide 100 Cavan per Hectare Contest by the SSSP in 1953. This agricultural strategy established the fact that we can produce rice to as much as 163 cavans per hectare in the Philippines provided all the components of appropriate technology system go.

In the comprehensive view of appropriate technology, let us examine the components of the system of Masagana 99:

1. It has the same objective and concept of the First Nationwide 100 Cavan per Hectare Contest conceived in 1953.

2. Masagana 99 has the whole governmental agencies supporting the program.

(1) The Land Reform Program giving the farmers the ownership of the land he cultivates.

(2) Financial assistance from the government and private lending agencies.

3. Technologically, results of researches in agriculture were made available to the farmers.

(1) HYV — High Yielding Varieties of rice to all regional areas.

(2) Control of pests and diseases.

4. Markets, storage facilities and harvesting and price supports.

5. The Masagana 99 has the spiritual tools and complete political support of the government.

In sum, a Masagana 99 where all the tools and techniques were brought into play by our actions — all systems go became the most comprehensive and most successful program within the context of appropriate technology.

Like the landing of astronauts on the moon where all systems go — Masagana 99 success in producing rice — is a good example of Appropriate Technology.

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- (9) *Rainbook: Resources for Appropriate Technology* by Editors of Rain Magazine, Schocken Books 1977, 251 pages including index (US\$7.95) paper-bound.

SUGGESTED READINGS IN APPROPRIATE TECHNOLOGY (VITA NEWS):

1. *Small is Beautiful: Economics as if People Really Mattered* by E.P. Schumacher (297 pages, 1973) The Theory and Economic Justification of Appropriate Technology as seen by the man who founded England's Intermediate Technology Development Group. Price is £1.80 from ITDC 9 King Street, Convent Garden, London WC2 8HN England, U.K. (US\$2.45 plus postage from Whole Earth Truck Store, 558 Sta. Cruz Avenue, Menlo Park, California 94025 USA.
2. *Appropriate Technology Sourcebook* by Ken Darrow and Ric Pam of Volunteers in Asia (304 pages, 1976) an extremely helpful guide to practical books and plans for village and small community technology. The sourcebook described 375 publications and give price/ordering information. Price is US\$4.00 with additional airmail postage, from VITA 3706 Rhode Island Avenue, Mt. Reiner, Maryland 20822 USA.
3. *A Handbook on Appropriate Technology* by Brace Research Institute and Canadian Hunger Foundation (200 pages, 1976) a useful collection of articles on the Concept and Practices of Appropriate Technology, one dozen actual case studies of Appropriate Technology projects carried out in the Third World with designs and drawings of implements and tools, a glossary, catalogue of tools, extensive bibliography and lists of groups and individual working at Appropriate Technology (US\$2.50 to third world countries) from Canadian Hunger Foundation, 75 Sparks Street, Ottawa, Ontario K1P 5A5 Canada.
4. *Rainbook: Resources for Appropriate Technology* by Editors of Rain Magazine; Schocken Books, 1977, 251 pages including index (US\$7.95 paper bound) Appropriate Technology in hardware is only part of the picture printed by Rainbook. This marvelous combination of catalogue, philosophy review, and how-to-manual includes section on communication, health and economics, as well as shelter, agriculture and energy.
5. *The SAMAKA Guide to Homesite Farming*. Book of 172 pages, 1973. US\$3.00 surface mail; US\$4.00 airmail from SAMAKA Service Center, P.O. Box 2350 Manila, Philippines.
6. *Lecturer on Socially Appropriate Technology*, edited by Robert J. Congdon (235 pages, 1975) twelve lectures discussing the prospects and problems of Appropriate Technology; including selections on specific subjects (agricultural tools, buildings, energy, etc.) economic and social criteria for determination of the most appropriate technology in any given situation and technology transfer. Price is US\$6.00 plus postage from Tool, Mauritskade 61a Amsterdam, The Netherlands.
7. *Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries* (306 pages, 1976) now available to serious researchers and development agencies in the Third World from the Commission of International Relations, National Academy of Sciences, 2101 Constitution Avenue, NW Washington DC 20418 USA. This outstanding report describes the state-of-the-art and short term (five years) prospect for solar, wind, hydro, photosynthesis and liquid bio-fuel energy. Its selection and descriptions of technologies provide a solid over view of alternative energy sources. It does not include methane, nor does it contain plans for constructing any of the devices described.