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A WORD FROM THE HONOREE: RURAL DEVELOPMENT RECONSIDERED

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RURAL DEVELOPMENT RECONSIDERED: SOME EMERGING NICHES FOR POPULATION STUDIES*

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INTRODUCTION

It is no exaggeration to say that practically every development-oriented document produced nationally and internationally refers to *population* as an "inevitable given," quite often as a denominator to which other factors have to *adapt* or *cope with.* For several decades, rural-urban classifications of population seem to have sufficed, and we occupied ourselves with either rural or urban development. In the process, we often criticized economic and social development policies as being urban-biased and often against agriculture and the rural sector. A higher incidence of poverty in rural than in urban areas has made rural poverty a continuing concern. Poverty has been attacked, made the object of strategies, tackled, crushed, warred upon, gender analyzed and alleviated, eradicated, and made the occasion for people participation and empowerment, but *poverty* remains as tenacious as ever. With growing urbanization and increasing demands on development from the reduction in the suffering brought on by the trilogy of poverty, unemployment and inequality, and with the added requirement of environmental conservation and sustainability, the rural-urban framework seems to be an oversimplification. It fails to capture the fundamentals of our natural

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resources which in recent years have considerably appreciated in value even as we recognize threats to their sustainability. In the meantime, rural development is losing its salience as environmental issues grow in rural settings.

This paper is an attempt to identify some of the emerging population-relevant rural scenarios which require a more creative degree of understanding of complex interactive determinants and consequences both at the micro and macro levels. Now more than ever, environmental concerns are directing us to a common future — a global village at the time location-specificities are called for to improve goodness of fit between a problem and the proposed solution. The following scenarios which are illustrative rather than exhaustive and definitive have emerged with little or no input from the scientific study of population. Hopefully they will become part of your research agenda:

1. Population factor in environment-development fora;
2. "Silent" population functions in ecosystem dynamics;
3. Population increase and changing resource base;
4. Agricultural intensification, labor supply and fertility behavior;
5. Health-agriculture-environment linkages;
6. Diversified livelihood strategies and rural-urban interactions;
7. Disasters and the rural community; and
8. Common heritage of mankind.

The Population Factor in Environment-Development Fora

To give us ideas of how population was presented in recent development fora, we cite some quotes:

> "The UNFPA State of World Population Report 1992 titled "A World in Balance" says that a slower and more balanced population growth can be advanced by ending absolute poverty, improving health and education, and raising the status of women." (ENHR Forum 1992)

"Rapid population growth can exacerbate the mutually reinforcing effects of poverty and environmental damage...Agricultural stagnation in Sub-Saharan Africa is a particularly clear example of the mutually reinforcing nexus of poverty, population growth and environmental damage. The slowly evolving intensification that occurred in the first half of this century was disrupted by the sharp acceleration of population growth in the past four decades. Low agricultural productivity, caused mainly by poor incentives and poor provision of services, has delayed the demographic transition and encouraged land degradation and deforestation which in turn lowered productivity...The only lasting solution to the diverse problems caused by rapid population growth lies in policies that will improve human skills, increase productivity and thus, incomes. Improving education for girls may be the most important long-term environmental policy in Africa and in other parts of the developing world." (World Bank 1992: 7-8)

"Poverty, environment, and population can no longer be dealt with — or even thought of — as separate issues; they are interlinked in practice and must be linked in policy formulation...Unless poverty is alleviated, there is little chance that we will be able to stabilize world population." (World Commission on Environment and Development 1992)

"The most favorable economic environment for releasing the constraints on crop and animal productivity and for achieving sustainable adaptation to the resource and enviromental constraints that will impinge on LDC (least developed countries) agriculture is one characterized by slow growth of population and by rapid growth of income and employment in the nonagricultural sector...The importance of favorable growth in the nonfarm economy is particularly important for the landless and near landless workers in the rainfed upland areas which have been left behind by the advances associated with the seed-fertilizer-water technology of

the last quarter century. Rapid growth in demand arising out of higher incomes, rather than from population growth, can generate patterns of demand that permit farmers in these areas to diversify out of staple cereal production and into higher value crop and animal products. It may also permit the release of some of the more fragile lands from crop production to less intensive forms of land use." (Ruttan 1993)

"The interlinkages between poverty, population growth, and environmental degradation are many and complex. In a long-term perspective, there is no doubt that world population must be stabilized if the efforts to protect the environment are to be successful." (SAREC 1992: 12)

"There is a need to define and assess the carrying capacity of the earth at all scales; to find acceptable ways to slow population growth; to reduce overconsumption; and to examine alternative consumption patterns and lifestyles." (ASCEND 21, 1992: 10)

"Rice is the basic food of nearly half the people on earth, most of them concentrated in Asia. Expanding populations and intensifying rice production are highlighting the extent of the food-resources-environment conundrum." (IRRI 1992: 2)

"The uncontrolled population surge has been blunting the gains in rice production." (Roque 1993)

In the Chapter on Rural Development and the Environment, the SAREC Annual Report 1991/92 provides one clue as to why rural development in a general sense has lost its "development appeal." The report says —

"An increase in food production and natural resource management are decisive factors in promoting improvement in developing countries. In the 1980s it became increasingly evident, particularly in Africa, that advances in agricultural and resource utilization did not meet the requirements of growing populations. Accelerated

> environmental degradation made both national governments and donors turn their attention to environmental issues. The World Commission on Environment and Development in 1987 presented the concept of sustainable development. This basic concept highlights a number of problems concerning food production and natural resource management in developing countries." (SAREC 1992: 33)

Balisacan's assessment offers yet another clue as to why the passion for rural development does not seem to be as intense as it was in the 1960s, 1970s and even early 1980s.

> "The record for the nearly half-a-century of rural development in the Philippines was dismal in relation to East Asian and many other developing Asian countries. This was not due to the absence of rapid agricultural growth in the Philippines or to the lack of direct employment generation programs in rural areas. While agricultural growth faltered in recent years, the agricultural sector in the Philippines performed remarkably well vis-à-vis other developing Asian countries from the second half of the 1960s to the early 1980s, the height of the so-called Green Revolution period. Direct employment generation programs were also popular instruments of development policy over the last 4 decades. However, during this period, the ranks of the unemployed and underemployed continued to swell; real wages persistently fell. The incidence of rural poverty remained high and seemed substantially unaffected by the rapid agricultural growth then taking place. Distribution of income became less egalitarian. The farm-nonfarm rural linkages expected to be induced by agricultural growth were simply weak or nonexistent. What went wrong?" (Balisacan 1993)

These quotes from leading development institutions and authorities lead us to three observations:

1. It seems that neither population growth nor poverty is perceived as directly susceptible to policies and interventions, but both bear directly on environmental damage. That food production must keep pace with population growth is an adaptive response, and its adverse impact on environment emerges as an accepted fact. What has happened to the proactive, more direct approach to slowing down population growth such as family planning? Does it not work anymore? Or has the Pro-Life–Pro-Choice debate so politicized the issue that we can no longer deal with the problem squarely? Or have we forgotten where babies come from?

2. Even if absolute poverty were to end as envisioned by UNFPA, could population growth be mitigated without some form of family planning including the vigorous promotion of natural family planning? Even the World Bank's analysis of poor agricultural performance in Africa, attributed to the sharp acceleration in population growth and its pinning of the blame on low agricultural production for delaying the demographic transition, shows a roundabout reasoning which gets us nowhere. If we "improve human skills, increase production and income, and improve education for girls," would population growth automatically slow down? What is the process by which this comes about? If this is well-known to population experts, why do development-environment fora seem so immune from it?

3. Perhaps one of the reasons for rural development's declining importance in development debates is its ill-defined, broad, and comprehensive but amorphous nature which makes performance indicators more elusive for analysis. For example, positive agricultural growth and improved health and education are usually passed off as positive achievements as such and not accounted for as

manifestations of rural development. Are we not asking too much of rural development to simultaneously address equity, growth, poverty reduction, employment generation, participation, empowerment, environmental conservation and sustainability? Small gains in each of these components must count so we can move on from there. Meanwhile, rural development will probably continue to disaggregate itself into its many components such as food production and natural resource management, etc., because that is how funding will be provided. This is not necessarily bad because rural development probably needs a more clearly defined problem to focus on for which we can have more operationally identifiable "handles." Furthermore, when rural development program inputs fail to have a positive impact, it might be due to insufficient magnitude, persistence, and intensity of implementation or even to "leakages" in program resources.

However, sustainable development is potentially as intractable as rural development and could suffer the same fate. It, too, must find its own operationalization and measurable indices.

"Silent" Population Functions in Ecosystem Dynamics

Partly as a response to criticisms levelled against the green revolution as having bypassed resource-poor farmers in less favorable growing conditions and partly because of the failure in adopting many experiment-station-generated agricultural technologies, new approaches to agricultural research were invented. Along with the recognition of local heterogeneity and location-specificity came "farmer-first-and-last," farming systems research (FSR), on-farm research (OFR), farmer participation, diagnosis and design approach (D&D), agro-ecosystem analysis, rapid rural appraisal (RRA), user's perspective with agricultural research and development (UPWARD), etc. Agricultural research currently takes place within the framework of particular ecosystems usually preceded by a diagnosis or characterization phase which includes not just environmental but socioeco-

nomic variables as well. For example, research at the International Rice Research Institute is —

> "structured into integrated projects within *eco-system* based programs for irrigated, rainfed lowland, upland, deepwater and tidal wetland rice systems. A cross-ecosystems program seeks to develop new tools and acquire new knowledge that links changes at the rice genome level to the plant and crop system and to the major ecosystems where rice is grown. Project planning is based on diagnostic analysis at the farm level and on socioeconomic analysis of demands and trends in labor, land, and capital. (IRRI 1992: 33)

In the case of the International Council for Research in Agroforestry (ICRAF), its research activities are grouped within six projects based on ecoregions that are representative of ICRAF's three priority agro-ecological zones: the *humid tropics* of West Africa, Latin America and Southeast Asia; the *sub-humid* highlands of East and Central Africa, and the Plateau of Southern Africa; and the *semi-arid* lowlands of West Africa. The rationale for their program on characterization and impact says—

> "Whether farm households choose to adopt particular improved agroforestry technologies depends upon the needs of these households and a set of biophysical and socioeconomic potentials and constraints. Needs, potentials and constraints such as climatic risk, soil fertility, governmental policies, degree of integration of farmers in the market, and *rapidly changing demographic patterns induced by health problems such as AIDS* vary across the major land-use systems in priority ecoregions."

The characterization of major land-use systems will provide the essential framework for assessing the extent of resource degradation and for obtaining baseline data for subsequent evaluation of the environmental and socioeconomic impacts of agroforestry adoption (ICRAF 1993).

The agroecosystem analysis popularized by Conway and associates emphasizes six systems properties. Of these, *productivity* and *sustainability*

are of the greatest concern; *stability, equitability, autonomy,* and *solidarity* are also of interest. Population size and composition are mentioned as extremely important factors in determining the impact of the social system on the ecosystem. Examples show this impact coming mostly through labor availability (SUAN et al. 1990).

A more recent development is the *landscape ecology* approach to the study of sustainable agriculture and natural resource management in the tropics. *Landscape* indicates the appropriate scale which emphasizes interactions *between ecosystems*...The landscape is the niche with human beings as inhabitants, and more significantly, as manipulators of the component ecosystems. In this way, these end-users become the *lifescape* that is superimposed into the landscape" (University of Georgia consortium 1992, and Bellows 1993).

Obviously, this *landscape-lifescape* is much more complex than focusing on one ecosystem alone. A premilinary characterization of the Manupali Watershed in Bukidnon from the top to the bottom of the landscape shows seven ecosystems composed of (1) *primary forest* with cultivated incursions on ridges, (2) *forest margin* becoming a zone of agricultural expansion, (3) *high grassland* and *lower grassland* with 20 percent cultivation, (4) *permanently sloping maize lands,* (5) *flatter river valley and lowland rice,* (6) cultivated lake bottom and margins, and (7) *lakeshore with settlements around* (University of Georgia consortium 1992 and Bellows 1993).

It is reasonable to assume that the role of the population in each ecosystem from irrigated lowland rice to the different ecosystems in the landscape approach will differ although there is no doubt that patterns will emerge. Although, at the abstract level, the degrading effect of population on the environment seems so well-accepted intuitively, it is curious that in actual research programs, population variables are minimal and largely unspecified. The empirical evidences as per ecosystem category would help very much in designing technologies and estimating the carrying capacity, preferable with the participation of local resource-users and decision-makers.

There is the question of what population parameters to take into account in (1) the characterization of different ecosystems, (2) the generation or

selection of relevant technologies, and (3) the eventual assessment of impact. There are virtually no inputs from population experts in these research programs. Curiously, but not unexpectedly, the only population parameter which has been specified in some of these ecosystems-oriented research is *women* or *gender* concerns — but only because of affirmative action initiatives. And even then, the integration of gender was often a little bit awkward. If the population-environment interaction is going to be accounted for only in the arithmetic division of resource-use products over population, the dynamics of how population pressure bears on the fragile state of our natural resource will always be a "black box." We cannot blame agricultural or even ecological researchers for this relative "silence" of population in their research projects. They have enough complex problems to deal with on their own.

The initiative should come from population experts. Is it possible to design research projects which will actually test population-environment interactions at an ecosystem level of sufficiently large scale so that such interactions can actually be observed, modelled and measured?

Population Increase and Changing Community Resource Base

Mellor (1989) argues that "the historical answer to problems of low-potential areas has always contained a major element of migration which, in turn, depends on good performance in the high-potential areas and their urban enclaves."

The traditional migration routes monitored by demographers are rural-urban, urban-rural, rural-rural, and urban-urban. Within the rural-rural route, there are more significant routes to look out for such as upland to lowland, lowland to upland, coastal, mountain, etc. In other words, environmental concerns tell us that migration from one resource base to another is even more important.

In a study of population pressure in the uplands, Cruz (1986) estimates that about 29 percent of the total Philippine population and 55 percent of the migrant population for the country reside in the uplands. We seem to be in a situation where there is no escape from the problem of the low-potential

areas because that is where millions of people are. Their survival often depends on subsistence production in these very areas. One suspects that this "moment of truth" is not peculiar to the Philippines.

To provide concrete illustrations, we cite cases of population increase and changes in land-use patterns in specific communities. Delorino's (1988) study of the Macagtas Watershed Area of Northern Samar, reports 188 households in 1975 with a total population of 977. In 1980 there were 248 households with a population of 1,337. Land-use trends were 50 percent forest in 1952, 75 percent planted to coconut with only 3.4 percent secondary forest in 1979, and 82 percent coconut and no more forest in 1987. The entire watershed area is titled, tenanted coconut land owned by private individuals. Estimates of erosion rates in the watershed increased from 28 t/ha per year in 1952 to 45 t/ha in 1979 and further to 53 t/ha in 1987. The change in land use changed the vegetative cover as well as cultivation practices (Delorino 1988).

Another watershed study by Pasicolan (1988) shows that the yearly average rate of forest transformation to other land uses between 1953 and 1979 was 23 ha/year and 60.5 ha/year from 1979 to 1987. From 72 percent forest in 1953, the area has become 68 percent grassland in 1987. In the meantime, as much as 61 percent of households are full-time fuelwood gatherers while 34 percent are part-time and 5 percent are occasional gatherers. The selling of firewood is a year-round activity, and 91 percent of the people have no regular employment. Bigger household income, larger household size and more man-days increase the level of fuelwood production. Distance from the gathering site is not a limiting factor for them. Fuelwood gatherers have a high degree of awareness of the consequences of their activity and would prefer farming to firewood production if the land they used to farm had not lost its productivity. Alternative job opportunities are hard to come by. In the meantime, there are 1,000 households in the lowland of this watershed dependent on rice production. This is the so-called high potential area. The lowlands' continuing viability depends on the stability of the low-potential upland. They are not independent of each other. It is usual for resource economists to examine both on-site and off-site costs.

For an illustration of the damage done by the lowland to the upland, de los Angeles (1988) studied a group of erstwhile lowlanders cultivating a watershed area in Luzon. Over a short three-year period, yields went down from an average of 27 cavans (sacks) per hectare in 1978 to 14 in 1979 and only 9 in 1980. The lowlanders in search of land to cultivate brought their lowland cultivation practices to the upland, thus creating rapid resource depletion.

Fabro's (1990) historical analysis of farm diversification in a 296-ha upland community of 182 families with a population of 1,000 also found a history of farm fragmentation. A typical example found was a one-family farm of 16 ha parcels that had been subdivided among 24 families. More than 70 types of both annual and perennial crops were reported to have been planted by farmers from the early 1920s to the present. In the trial and error process to determine what crops or crop mixes would best fit their ecology, some 20 traditional crops, notably rice and corn, were gradually replaced before being finally dropped by the farmers for reasons of low/declining productivity, high risks and the comparative advantages offered by alternative permanent crops. At present, highly diversified farms have about 33 to 44 types of crops plus two to four types of livestock in an average area of 2.61 ha From 22 to 32 types of intercrops plus two or more kinds of livestock in about a hectare of owned or partly-owned land comprise the farming system of moderately diversified farms. Less diversified farmers have only 12 to 21 intercrops and one or more types of farm animals. Smaller farms have a higher crop density and land-use intensity. Backyards and home lots are intensively utilized for traditional vegetable crops. The available spaces between the permanent crops are devoted to ginger, cassava, and other root-crops (Fabro 1990).

Even the coastal areas have not been spared from population pressure. Lim (1989) reports three fishing municipalities of San Miguel, Bay, Camarines Sur which increased from a total of 1,336 households in 1977 to 2,342 in 1980. The majority of the fishermen were no longer fishing in the area they used to frequent five years ago. Fishing effort became more intense over a longer period of time, farther distances were negotiated and less catch

was made. A migration survey of the Bay area's 22 fishing communities showed that 16 experienced net in-migration from 1959 to 1979. Migration from the areas was associated with higher education, larger family size, and the acquisition of more skills.

Quite interesting is the Hayami et al. (1989) report on the "Transformation of Laguna Village in the Two Decades of Green Revolution." Among their findings are (1) average population per hectare of rice area increased from 1.8 persons in 1903, to 3.8 persons in 1966 and further to 8.9 persons in 1987; this was paralleled by increases in the economically active population per hectare from 1.7 persons in 1966 to 5.6 persons in 1987; (2) total population in the village increased from 393 in 1966 to 549 in 1974, 644 in 1976, 698 in 1980, and 816 in 1987; the increase in the total number of households largely paralleled the growth in population; it increased from 66 in 1966 to 95 in 1974 and further to 156 in 1987; (3) one consequence of the strong population pressure on land was the increase in the number of landless laborers with no farm to operate even on rental basis. The share of landless households in the total number of households increased from 30 percent in 1966 to 50 percent in 1976 and further to 66 percent in 1987; and (4) average farm size declined from 2.3 hectares in 1966 progressively down to 1.7 hectares in 1987 (Hayami et al. 1989).

These community-level case studies are being cited to provide a backdrop for so-called community-based resource management where the definition of the community revolves around natural resources such as lakes, rivers, watersheds, etc. Hopefully, they also provide real-life concrete illustrations of natural increase or migration consequences in a manner that touches the community's life. The hard fact of life, however, is that *we might be able to do more about natural increase than about in-migration.*

Agricultural Intensification, Labor Supply and Fertility Behavior

It has often been argued that farm families have more children because of their need for labor, not to mention support for parents in their old age. But as the 1991/92 SAREC Annual Report says —

> "Numbers mean different things depending on specific situations. On the global level, growing numbers are perceived as constituting a threat to the environment. In many rural communities in Africa, exactly the opposite is true. Too many mouths to feed and too few hands to help till the land." (SAREC 1992: 12)

The irony of a high rate of population growth vis-à-vis labor shortage at the local level is not easy to comprehend. In some rice-growing areas in the Philippines, for example, labor for rice production sometimes has to be paid in advance in order to ensure that farm help will be available during times of need. In Laos, villagers consistently mention the lack of labor as a constraint to the intensification and expansion of production. The main response indicates the need to have more children (SUAN et al. 1990: 123).

Adalla (1992) observes that an aging farm labor force makes labor-intensive agricultural practices such as rapid composting and integrated pest management "automatically undesirable" technologies. Parents as well as their children regard farmwork as less than a white-collar job. Their dream is to get a college degree and work outside the farm. Those who fail to finish schooling prefer to work in factories or to be tricycle drivers than farm workers. In other words, working in the farm is not always a preferred occupation. Findings to reinforce this observation come from a study done by the Philippine Business for Social Progress of three poverty groups: small lowland rice farmers, upland farmers and sustenance fishermen. When asked if they would encourage their children to go into farming or fishing, only about a half replied in the affirmative (Philippine Business for Social Progress 1992).

Systematic studies of the phenomenon of "many people but short of labor" are badly needed to lend further empirical support to largely anecdotal observations. One such effort is Servano's study on the "Impact of Crop Intensification on the Economic Value of Children." Her findings are as follows:

> "Contrary to the usual expectation that increasing cropping intensity would increase labor requirements, both family and hired

labor use declined for adults as well as for children. The latter was due to (1) less participation of children in operations such as land preparation where tractor replaced animal power, planting where direct seeding replaced transplanting and threshing, and blowing where machines replaced conventional techniques, and (2) the planting of two or more rice crops which eliminated the planting of other crops utilizing children's labor."

"Reliance by parents on children for old-age support did not decline with the shift from semi-intensive to intensive farming. Moreover, more parents in the intensive area found their children better able to provide them with their material needs. Also, these parents felt they had invested a lot in providing them with higher education; thus they had higher expectations of being taken care of in return."

"The perceived cost of children in terms of the burden in providing them with a higher level of education was not affected by crop intensification. No matter how much it costs the parents to educate their children, it could not be interpreted as a burden especially if incomes had been rising due to higher crop yields. The general rearing costs of children was not felt to be a great burden by intensive farmers."

"As for the time cost of childbearing to mothers becoming higher in intensive farming areas, no strong confirmation could be had. Both groups of mothers tended to conduct their market activities close to their homes, suggesting that they could work and care for their children at the same time. The perceived benefits of children tended to be associated with cropping intensity. On the one hand, work participation particularly in the farm declined in intensive areas; on the other hand, reliance on children in terms of monetary support and parents' old-age security did not decline. With the perceived benefits from children increasing overall and

> the perceived costs having a fairly weak association with crop intensification, high fertility may still be a rational proposition, even in the area of high cropping intensity." (Servano 1983)

The choice between labor-saving and labor-absorbing technologies is not a simple one. Even in the argument to relieve women of their drudgery, sometimes one woman's drudgery is another woman's livelihood. What is more important, although often more difficult to do, is to generate productive employment. Whether this absorbs or saves labor can be a secondary issue. In the case of labor use for environmental conservation, the returns to labor are usually delayed returns and may therefore be a negative incentive.

Health-Agriculture-Environment Linkages

Since health and specific diseases coexist with certain aspects of agriculture and forestry, whether ecologically or seasonally, there is a lot of common ground for productive interactions between the health-agriculture-and-environment research communities. In the search for a better fit between disease patterns and control programs, health researchers have developed something analogous to the agriculturist's agroecosystem. For example, in 1990, the Institute of Medicine Malaria Study Committee reported on a Paradigm Approach to Malaria Control which identified *nine major malaria paradigms: forest, highland fringe, irrigated agriculture, urban, desert fringe, African wet savannah, seasonal vivax, seashore/coastal,* and *Indian village type.* Seven variables have to be examined with respect to each paradigm level of endemicity, population characteristic (social, economic, behavioral), health infrastructure, malaria control tools (vector control, drugs, information, education, communication, and surveillance), and development projects such as dams and road building.

Very illustrative of the linkages mentioned in this section of the paper is the Proposal for a Research Project on Rice Ecosystem Management for Human Disease Vector Control, the main objective of which is to "create a knowledge base for the development of farmer-operated rice ecosystem

management methods for the control of human disease vectors which will contribute to minimizing the human vector-borne disease hazards associated with irrigated rice ecosystems, to a reduction of the use of chemical insecticides for vector control and to an improved healths status of rice farming communities. These diseases considered in the Asian context are malaria, schistosomiasis, and Japanese encephalitis (IRRI et al. 1992).

Mott (1989) cites the state of schistosomiasis which has often been assumed as a rural disease. The changing global demography requires a reconsideration of this assumption. He presents the case of urban schistosomiasis in Brazil which he says is the cumulative outcome of local transmission and the migration of infected persons from the rural endemic areas that may culminate in permanent transmission.

Blas et al. (1987: 110) report a general prevalence of infection in the three environments (poblacion, coastal, and inland), with the highest prevalence rate inland. The prevalence in respect of age, sex, occupation, and environment followed a pattern explainable on the basis of opportunities to contract infection.

Maiga's (1988) findings on the consequences of schistosomiasis among peasant farmers of Niger show that they measure the harmful effects in terms of financial expenditures. Diseases adversely affect production because the farmers' weakened physical resistance could lead to their dismissal from work. Ninety-five percent believed that diseases affected their self-sufficiency in food or the security of their food supply. As a matter of fact, poor health topped the farmers' list of obstacles to their economic growth and well-being.

It is not just coincidence that labor demand and food scarcity peak at the same time as malaria transmission. Tudor-Silva et al. (1988) report that although labor mobilization for vector control created an ideal environment for educating the community about malaria transmission and control, the peak demand for communal labor (*shramadama*) is also the peak demand for agricultural labor in Sri Lanka. Furthermore, Mwabu (1988) found out that "the rise in the value of time in the wet season raises time costs of medical services and thus, other things being equal, the rate of their

utilization falls. The drop in utilization rates impairs the program's ability to control diseases and again its effectiveness falls.

A different connection between agriculture and health is revealed in Rola's (1988) study on pesticides, health risks, and farm productivity which found no correlation between pesticide expenditures and yields suggesting the overuse of pesticides by farmers. Most farmers believed that reducing the use of pesticides would reduce yields. And although practically all of them knew that pesticides were hazardous to health and the environment, they continued to use them in the belief that chemicals were necessary for maintaining an economic level of production. However, to minimize exposure to the hazards of pesticide poisoning, more and more farm operators hired labor to do the spraying. Those hired were younger people from poorer landless farm labor groups that were poorly paid themselves.

But there is something relatively new on the horizon: the phenomenon of human-assisted migration of plant pests and diseases and, of course, the potential adverse impact of AIDS in agricultural production, particularly in Africa.

Diversified Livelihood Strategies and Rural-Urban Interaction

The economic situation in many developing countries is such that in order to survive, households have to find several sources of income; but since households differ in resource base, they also differ in livelihood strategies. As Nabarro (1984) put it in the case of farm households —

> "Farmers who have substantial deficits innovate out of desperation and those who have surpluses innovate by choice."

An example of coping mechanisms of the rural poor in Benguet and Mountain Province shows the following: (1) looking for employment either as farm laborers and/or wage earners in nonfarm activities, (2) husbands leave their wives to do the farming while they work elsewhere, (3) raising livestock for sale and selling part of their own produce even if such is not sufficient to meet household requirements, (4) engaging in weaving and other handicrafts, (5) expenditure-reducing activities such as not buying

expensive clothes and food, (6) foregoing leisure, (7) eating without viand, and (8) relying on credit (Consolacion and Francisco 1989). Besides these, there are diversification of agricultural practices including mix of commercial and subsistence crops, planting crops of different maturity periods, niche shifting, land shaving, relying on intra- and interhousehold patterns of assistance, and participating in different kinds of work groups and social networks which provide social safety nets, etc. (Castillo 1990).

Between rainfed and irrigated villages and between ethnic groups in the same village, there are differences in patterns of household income. Furthermore, the role of farm income in the total family income is also declining. Philippine data in 1971 showed that while about 57 percent depended on it as a *main* source of family income, in 1985, this figure is only 23 percent. In other words, farming affects more families as a *partial* rather than as a main source of livelihood. This trend is not peculiar to the Philippines (Castillo 1993). David and Otsuka (1992) likewise report that—

> "The share of rice income is generally less than 50 percent even in favorable areas, implying that income from non-rice and nonfarm sources are generally important, even in typical rice-dependent villages in 7 Asian countries.... The profitable opportunities for planting other crops and employment in the nonfarm sector greatly reduced the income gap across production environments."

A less-recognized phenomenon is that rice farmers are net purchasers of rice. For example, 64 percent of households in an irrigated, two rice-crop village and 72 percent of households in a rainfed, one-rice crop village, both in Sta. Barbara, Pangasinan, buy rice from the market particularly in the months of August to October when prices are higher (Paris 1987).

The rural-urban impact of new rice techonology is expressed in general terms this assessment made by IRRI (1993: 6).

> "The reduction in production costs associated with the adoption of modern varieties allowed farmers to accept lower unit prices for bigger rice harvests.... Lower prices transfer some of the gains

> realized through modern technology from rice producers to rice consumers. This is an important contribution to alleviate the poverty of rural landless and urban poor who spend a much larger proportion of their incomes for rice than do those with higher incomes. As net consumers of rice, small and marginal farmers — the largest population group in most Asian rice-growing countries — also benefit."
>
> "Urbanization also affects rice consumption. When income levels are low, urbanization increases the consumption of grain. But as incomes increase, rice consumption reaches a relatively high level. Beyond that income level, food habits change, and the demand for grains, particularly rice, ceases to grow."

With these trends, there is the observation that in peri-urban and urban areas, particularly low-income ones, urban agriculture is not a strange component of the urban landscape. (Mazingira Institute 1992; Mackel and Siebert 1992).

Another very significant source of income in many developing countries is labor migration, be it rural to urban or to another country. Balisacan's (1992) estimates based on various rounds of the family income and expenditure surveys in the Philippines show that the *share* of rent, remittances, gifts, support, assistance, and relief in *total household incomes* swelled from only 17 percent in 1961 to 32 percent in 1985 and 27 percent in 1988. The proportion of households *mainly dependent* on these income sources rose substantially from about 5 percent in 1961 to 19 percent in 1985 and 16 percent in 1988. Finally, the proportion of families reporting remittances, support assistance and relief *as a source* of income increased from 22 percent in 1961 to 88 percent in 1985.

The relationship of rural-urban migration to farming in Thailand is shown by Padermchai and Shinawatra (1992). The authors found migration to be very high in the age group 16-30 years but higher among women (40-43 percent) than men (30 percent). The proportion of migrants returning home, however, was higher for males (26.4 percent) than for females

(6 percent). While male migrants found such urban jobs in construction, factories, and hotel and restaurants, more than 50 percent of the female migrants found themselves in the entertainment business, often in the sex trade. Since this job for women is better-paying, remittances from female migrants are higher than from males. What is the impact of such out-migration?

> "Migration causes labor shortage... higher wage rates, and adoption of mechanization; but farm households enjoyed increases in income from remittances especially from female migrants — even if they have lower education and less skills than the males" (Padermchai and Shinawatra 1992).

Although changes in land-use systems take place everywhere, land conversions are more dramatic in urbanizing and industrializing areas. In one Philippine province where rapid changes are taking place, the rate of conversion is highest in sugarcane and rice. From 1988 to 1990, a total of 675 hectares of rice lands (most of them irrigated) and 722 hectares of sugar lands were converted into industrial and residential uses. Cabanilla (1991) argues that such conversions render past public investments in rice and irrigation useless and that rice production is pushed farther away from consumption centers. The 675 hectares of converted rice lands which were cropped 2.3 times a year meant foregoing the production of 6.208 MT of rough rice. It also meant the opening up of new irrigated rice lands farth away with increased transport costs and irrigation investments. The e tremely low returns from rice and sugarcane farming compared to the pri of the land for nonagricultural uses have certainly contributed to the conversions. Ironically, many of the farmers who sold out were rece beneficiaries of the land reform program which, theoretically, was suppos to benefit land-tillers. Provided such farmers used their monies profitabl land conversion could have brought them instant wealth which they ha never had before. However, the loss of land in the absence of alternati employment opportunities made them very vulnerable to unemployme and to being reverted to poverty with no more land to return to.

But in terms of the concept and measurement of rural development performance, Balisacan's (1993) recent analysis opens up a whole new set of issues which deserve serious consideration by all population experts. His analysis points out that the "usual indicators of intertemporal rural poverty and income distribution are technically flawed." The criteria for defining *urban areas* include population density, *infrastructure* (network of streets either at parallel or right angle orientation), and, regardless of population density, at least *six establishments* (commercial, manufacturing, recreational and/or personal services) and at least three of the following: town hall, church or chapel with religious service at least once a month, a public plaza, part or cemetery, a marketplace where trading activities are carried on at least once a week, and a public building such as a school, hospital, puericulture center or library. Given these criteria for urban areas and the thrust of rural development programs which aim precisely to acquire these elements in the criteria and to encourage nonfarm sources of income (another urban criterion), *success in rural development automatically leads to urban classification.* In other words, the *end goal of rural development is urban development* based on the definitions.

As Balisacan points out —

> "...the physical area of the *rural sector* is, almost by definition, shifting over time. As population grows and/or economic activity expands, an initially rural area will be classified as urban, sooner or later. While this may not be a problem for purposes of measuring, say, urbanization trends, it tends to create a systematic downward bias on rural performance indicators. Suppose, for example, that rapid sustained agricultural growth in some regions leads to a similarly rapid expansion of nonfarm employment and incomes. This induces urbanization, thereby reducing the physical size of *rural areas.* To the extent that household incomes rise faster in urbanizing areas than in non-urbanizing areas, poverty incidence in geographically expanding urban areas tends to fall relative to that in contracting rural areas. This is particularly so if there are con-

straints to the movement of labor from the slow to the rapidly growing areas, or if there are considerable lags to such movement. Thus, while the growth stimulus is initially rural-based, the gains in poverty reduction are registered as urban-based. The data, as reported, would seem to suggest that rural development programs, even if they are successful in spurring rural income growth and reducing rural poverty, do not matter much."

Balisacan (1993) shows that these definitions make a difference in rural poverty measures by the use of Constant Rural Areas (CRA):

"The CRA estimates show a significant reduction in rural poverty from 1985 to 1991. Head count poverty fell from 56 percent in 1985 to 48 percent in 1988 and 41 percent in 1991. The poverty gap and the distribution-sensitive indices reveal the same pattern. The usual Family and Income Expenditure Survey (FIES) shows less significant reduction, with headcount poverty falling only from 59 percent in 1985 to 52 percent in 1991. In contrast, the CRA estimates show continued progress being made in rural poverty alleviation, with the poverty gap falling from 18 percent to 15 percent during this period. The discrepancy is in the shifting of urban-rural areas arising from reclassification of villages."

These findings suggest that the shifting in the classification of urban and rural areas fails to credit rural development gains to rural areas. When rural development succeeds, high performing rural areas automatically become urban as per definition. This looks like a no-win situation for rural development — where it is regarded as just a route to urban development and "NIC-hood" (newly-industrialized country status). If rural development is to have a value in and of itself, we must develop new indicators of "rural-hood" perhaps based on the state of our natural resources which is more "permanent" than population density, infrastructure, establishments, and nonfarm sources of income.

Disasters and the Rural Community

Besides natural calamities such as volcanic eruptions, floods, typhoons, earthquakes, tornadoes, cyclones, droughts, etc., around the world today, there are innumerable social conflicts – ethnic, racial, political, religious— which often result in population displacements. While print and broadcast media are almost always on-site to report on these happenings, not enough population studies are on hand to follow up the consequences of such events on the human population, let alone the environmental impacts.

An example of a natural event is the eruption of Mt. Pinatubo on July 14, 1991 which is regarded as the greatest volcanic disaster in terms of human impact since the Krakatau eruption in 1881. The U.S. Department of Interior reported that the fine particulate matter which Mt. Pinatubo ejected into the stratosphere will have global ecological impact and that the massive destruction of communities as a result of volcanic mudflows, lahars and floods will have a serious impact on Philippine society for many years to come (Lockwood and Janda 1991).

Ladrido-Ignacio (1992) argues that the magnitude of the disaster, while measurable in and of itself, is more dramatic in the intensity of its human consequences. In addition to the physical aspects, psychosocial stresses are generated following a disaster. The displacement of individuals and families to new settlements or geographical areas, the housing of people in over-crowded camps and evacuation centers for indefinite periods, inactivity, the lack of recreational and productive activities, and unemployment, rendering people dependent on others for daily subsistence, cause a general disruption of the social organization and the breakdown of traditional social supports. Significant psychosocial stresses are also experienced by disaster workers particularly if they themselves have been affected by the disaster but need to immediately overcome their own reactions and help other victims. A further aggravation is that most disaster victims have been living in socially disadvantaged conditions even before the disaster. Disaster management, therefore, needs to integrate a psychosocial dimension which involves the victims themselves so that they can be transformed from victim to survivor.

There is also a case for man-made disasters, a good example of which is the displacement of 35,000 people in Southern Negros (part of a Philippine province) who are among an estimated 1.3 million refugees from the war between the government and rebels. Since no agency keeps track of the movements of these refugees, floating populations of people try to survive sometimes with and often without support from international, government, or private relief agencies (Torres 1993: 1, 12).

Similar events are replicated in Eastern Europe, Africa, Cambodia, etc.

One war site which has been studied at some length is Cambodia, particularly with respect to the impact on rice production there. Paris et al. (1992), citing the results of other surveys, report the following:

> "Prior to 1969, Cambodia was a net exporter of rice with annual export of rice peaked at around half a million tons in the mid 1960s. However, during the 1975-79 Khmer Rouge regime, rice farming was disrupted because of the relocation of people and the loss of lives of up to 2 million Cambodians. Since 1979, most rice farmers have returned to their pre-1975 villages (not usually to the same fields) and they gradually achieved advances in rice output despite the major problems of lack of water, poor irrigation, low seed stocks, insufficient inputs, implements, draft animals and shortage of human resources. The heavy loss of population in the 1970s and the continuing need for army conscription has resulted in the heavy involvement of women in agricultural production. Women, who constitute 64 percent of the adult population also head some 35 percent of the households.

The Common Heritage of Mankind

Our Common Future, Earth Summit 1992 and *Agenda 21,* two proposed global environment and development programs, both point out our interdependence within this planet as highlighted to a degree by the ashfall from the eruption of Mt. Pinatubo which transcended political and geographical boundaries. Global warming, albeit difficult to observe, is another manifes-

tation that we are in a global village. However, of all the common heritages of mankind, plant genetic resources (PGRs) seem to be the most universal and most tangible, besides being easy to collect. And unlike hills, mountains, oceans, rivers, and plains, PGRs are *moveable.* They can be removed from their center of origin, transferred and used elsewhere, and even patented for the exclusive profit of someone remotely connected with their origins. Intellectual Property Rights (IPRs), Plant Breeder's Rights and even the emerging concept of Farmers' Rights are a challenge to the concept of common heritage of mankind, particularly because many poor countries are rich in genetic diversity and indigenous local knowledge regarding a wide range of plants, many of which are little known and underutilized. All these have appreciated in value even as threats to their existence are increasingly being recognized.

At this point, we should ask, *what is the impact of population increase, population diversity, and population movement on the state of PGRs? What is the role of PGRs in achieving food production goals to meet population needs in favorable as well as unfavorable environmental conditions?*

Worede and Mekbib (undated) argue that the dynamics of traditional cropping system should be understood before they are replaced with modern agriculture. They cite the following practices in a center of diversity:

> "In Northern Ethiopia, particularly in the drought-prone areas, wheat and barley are grown in particular mixtures. In favourable years, farmers will get yields of both crops, and in poor years, they will mainly reap barley. The mixture of landrace populations consists of genetic lines which complement each other. They are all adapted to the region in which they have evolved, but differ in the mechanism through which they express traits such as drought or pest resistance. The mixtures of both crops are kept together for the coming planting season, but during consumption the two are used separately for different food preparations."
>
> "In the Gonder area of northwestern Ethiopia, farmers plant more than six crops together in their backyards, including maize,

faba bean, sweet sorghum (used for chewing the stalk like sugarcane and for chicken feed), cabbage, tomato, potato, pumpkin, and bottle gourd. Most of these backyard activities are the responsibility of women. In the southern and central part of the country, the farmers focus more on perennial crops. A highly diversified range of crops and trees used for fencing materials are planted. These crops mature at different periods making maximum use of scarce land and labour resources, minimizing weeding problems and maintaining soil fertility."

The authors likewise describe the exchange of seeds and planting materials among farmers. Through networks, exchange in local markets, and interregional exchange, farmers get to know where to locate new supplies of seeds when traditional landraces become degraded.

For this and other reasons, IPRs, Plant Breeders' Rights and even Farmers' Rights will be inimical to these established traditions which have ensured the continuing supply of seeds on a shared, reciprocal, and exchange basis. PGRs might be the last of our common heritages that are still being shared — but perhaps not for long, if present inclinations are pursued.

RURAL DEVELOPMENT RECONSIDERED

The population factor in the environment-development fora has often been treated as inevitable given other factors to which we have to adapt or cope with. It seems that neither population growth nor poverty (both of which bear directly on environmental damage) is perceived as directly susceptible to policies and interventions. Even as research and development efforts begin to adopt an ecosystem framework, the population functions in the ecosystem continue to remain silent in a "black box." Population increase and a changing resource base dramatically illustrate the inadequacy of rural-urban categories in describing migration patterns. Population movement from one resource base to another is too important to be buried within the classification of rural-to-rural migration. The connections between

agricultural intensification, labor supply, and fertility behavior deserve further scrutiny with respect to the nature of these connections. The simultaneity of a high rate of population growth with labor shortage in particular ecological settings must find better explanations than the seasonality of demand and the desire to bear more children. The arguments for or against labor-saving and labor-absorbing technologies are probably much too simple particularly when returns to labor might be delayed in the case of environmental conservation or rehabilitation programs.

Although health and specific diseases coexist with certain aspects of agriculture and forestry, whether ecologically or seasonally, the health- agriculture-environment research communities have yet to productively interact. Diversified livelihood strategies of rural households blur the rural-urban distinctions. Urban employment contributes to agricultural development while the latter reduces food costs to the urban population. Some urban functions spill over into rural areas and drastically change land-use patterns. Natural as well as man-made disasters have a profound impact on rural communities, but after all the media hype, the human consequences frequently recede into oblivion.

As we reaffirm the value of the common heritage of mankind, proprietary interests lay claim on pieces of this inheritance. As we modernize agriculture, we will continue to lose genetic diversity which is one cornerstone of sustainability.

Furthermore, Pingali's (1992) cross-sectional analysis yields correlations between environmental degradation (measured by an index of deforestation) and poverty indicators. Although he reminds us that correlations do not attempt to establish causality, the results show the following:

- The percentage of population below the poverty line is directly related to the level of deforestation.
- The net migration rate is inversely related to the level of deforestation. Regions with high levels of degradation experience population out-migration while regions with low levels of degradation experience population in-migration. Unemployment rates tend to be higher also in the regions with lower degradation

because of in-migration. The capacity to absorb migrant labor from other regions may have been exhausted.

- Regions with higher levels of degradation have a higher age dependency ratio. These are also the regions with a higher dropout rate from elementary schools, implying that young children are substituting for adults in the workplace.
- Infant mortality is also positively related to deforestation.

As a consequence of the criteria used for classifying communities as rural or urban, any place which succeeds in rural development acquires an *urban* status. Curiously, while we define what is *urban*, we do not define what is *rural*. It is a residual category — that which is not *urban* is *rural*. Although places can change from rural to urban, and from agriculture to industry, the reverse does not occur. Even urban blight undergoes urban renewal. There is a process called urbanization, but not ruralization. Does this mean that the ideal state of affairs is *urbanhood?*

Because rural communities have a natural resource base, and if environmental degradation is associated with rural poverty (including its health and education dimensions), then it stands to reason that agriculture and the management of natural resources should be the central concern of rural development, and indicators to this effect must be developed. A sustained, renewed, and productive natural resource base will not automatically qualify a community for urban status. Instead, such qualities should be the essence of *rurality* in rural development. Obviously, population, institutions, equity, participation, etc. will come into the picture, but growth and income increases will be very inadequate — even misleading — indicators of rural development.

Obviously, much rethinking needs to be done along this line, but I invite population experts to find new niches beyond aggregations of people broken down by age, sex, rural or urban, whether they are practitioners of contraception or not.

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