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RURAL HEALTH PLANNING: WHY SEASONS MATTER

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This paper argues that in many tropical rural environments the wet season is the most difficult and critical time of year, especially for the poorer people, women, and children. The wet season spoken of here refers to the period from the onset of rains until the harvest. This is often the time when morbidity and mortality are highest, when people are most incapacitated by sickness, when rural health services are least likely to be effective, and when urban-based officials are least likely to observe what is happening in rural areas. The seasonal dimension is important in determining medical research priorities, and in planning and administering preventive and curative health programs. Seasonal analysis presents an opportunity for improving health care at the times when it is most needed.

The main argument is presented in the form of eight propositions:

1. Most of the very poor people in the world live in rural tropical environments of marked wet-dry seasonality.
2. Malnutrition, morbidity, and mortality all peak during the wet season.
3. The economic costs of sickness and weakness are concentrated in the wet season.
4. The poorer people, women, and children are especially vulnerable to hardship, malnutrition, sickness, and death in the wet season.
5. It is during the wet season that sickness is most liable to make people permanently poorer.
6. Rural health services are liable to be least effective in the wet season.
7. Urban-based professionals are liable to underperceive seasonal deprivation and underestimate morbidity in the wet season.
8. Research priorities and rural health programs are unlikely to reflect the seasonal priorities of the weaker rural people.

The critical reader will recognize that there are exceptions to most, if not all, of these statements; but exceptions are no reason to reject them if they apply widely. If the thesis presented in this paper is generally incorrect, then it should be demolished without delay; but if it is correct, then the practical implications with which the paper ends deserve to be taken seriously.

These eight statements are not generalizations with universal validity; environments vary, and each should be examined separately. Nevertheless, the evidence so far assembled suggests a seasonal scenario in which many factors are adverse during and just after the rains.

In this scenario:

For agriculturalists in the tropics, the worst times of year are the wet seasons, typically marked by a concurrence of food shortages, high demands for agricultural work, high exposure to infection especially diarrhoeas, malaria and skin diseases, loss of body weight, low birth weights, high neo-natal mortality, poor child care, malnutrition, sickness and indebtedness. In this season, poor and weak people, especially women, are vulnerable to deprivation and to becoming poorer and weaker.

1. Most of the very poor people in the world live in tropical environments of marked wet-dry seasonality. Climatic seasonality in the tropics has been defined and measured in several different ways.<sup>2</sup> One distinction is between unimodal (single peak) and bimodal (double peak) patterns of rainfall, with their associated patterns of agriculture. Another approach developed by R.P.D. Walsh distinguishes relative seasonality (the degree of contrast in relative terms between the rainfall of different times of the year) and absolute seasonality (the length of the dry period).<sup>2</sup> Using Walsh's classification system to eliminate areas like Kerala and the Congo basin which have low relative and absolute seasonalities, the rural populations subject to marked climatic seasonality in Africa, south of the Sahara, have been estimated at about 220 million, and in the Indian subcontinent at about 600 million.<sup>3</sup> With the addition of other areas, including parts of Central America, South America, and Southeast Asia, it seems likely that the total rural population living in tropical environments of marked climatic seasonality

is over one billion. This must represent a high proportion of the very poor people in the world.

2. Malnutrition, morbidity, and mortality all peak during the wet season. In pastoral areas of very low rainfall, the most critical times of the year are usually toward the end of the dry season; but the great majority of the rural people in tropical rural environments of marked climatic seasonality are small farmers and laborers, who gain their livelihood mainly from cultivation. For them, the rains are often a lean or hungry period of physical stress when shortages of food combine with energy demand for agricultural activities.<sup>2,4</sup> Food is at its scarcest, most expensive, least varied, and least well prepared at these times of the year.<sup>5</sup> Resistance to disease is lowered, and it is precisely at this time that exposure to infection is often most pronounced and when morbidity is highest. While there are local variations and exceptions, it is common during tropical rains for there to be a rise in the incidence of diarrheas,<sup>6,7,8,9</sup> malaria,<sup>10</sup> skin infections,<sup>11</sup> guinea worm disease,<sup>12,13</sup> and dengue fever. Other diseases may also be prevalent at these times, as is cholera in parts of Bangladesh.<sup>6</sup> Not only is morbidity high at these times, but death rates in tropical countries usually peak during or just after the rains.<sup>14</sup> The wet season is not just the hungry season; it is also the sick season.

3. The economic costs of sickness and weakness are concentrated in the wet season. The labor requirements of tropical agriculture in areas of marked climatic seasonality are often sharply peaked, especially for activities such as land preparation, transplanting, weeding, and harvesting. For farmers, the areas they can cultivate and the yields they can obtain depend on adequate and timely labor inputs. Especially when seasons are short, yields are very sensitive to timely land preparation and sowing: in Machakos District in Kenya, Luning has estimated that a delay of five days in cultivation leads to a 20 to 30 percent loss in crop yield. Failure to carry out an operation in a timely manner can mean loss of a crop. In the words of a Gambian village woman to Margaret Haswell, "Sometimes you are overcome by weeds through illness or acci-

dents."<sup>15</sup> With small farmers who have to rely on family labor, and for whom that labor limits area or yield, incapacity through illness means a smaller crop or no crop at all.

Such incapacity is most obvious in diseases which are epidemic during and just after the rains, as is the case with malaria and guinea worm disease. The effects of malaria have long been recognized. Thus, B. H. Farmer, in his classic study of the Dry Zone of Ceylon, wrote:

In addition to its effect on the death-rate and on the ability of the Dry Zone population to maintain itself, malaria induced mental and physical inefficiency in its victims. The incidence of fever was unfortunately highest during the rainy season . . . just when the stricken cultivators should have been busy with their . . . main paddy crop and with their chenas (dryland cultivation). It is not surprising that general debility and seasonal fever helped, with other factors, to produce low crop yields.<sup>16</sup>

The major reduction in malaria in the Dry Zone was, he considered, "a true revolution."<sup>16</sup> Another dramatic example of loss of production through incapacity is presented by guinea worm disease. Belcher and others considered, on the basis of a study in rural Ghana, that this was the major preventable cause of agricultural work loss. They reported that:

The highest attack rate was in adult male farmers, with 3 out of 4 affected in some villages. Disease which occurs at a slack period would have little impact on agricultural output, but guinea worm disease coincides with the two peak agricultural periods. Untreated farmers were completely disabled for over 5 weeks, and few households succeeded<sup>12</sup> in finding alternative labor sources so that a major crop was lost.

They concluded that:

Because guinea worm disease is seasonal, coinciding with peak agricultural activities, and few alternative labor sources are available for the incapacitated farmer, a marked reduction in agricultural output occurs.<sup>12</sup>

The diarrheas may be somewhat more varied in their seasonalities than either malaria or guinea worm disease, and their effects are less dramatically visible. But they are so widespread, with an estimated three to five billion infections per annum in the world, that it seems likely that they contribute very substantially to losses in production.

Infections of the skin also tend to be less spectacular, but bacterial and fungal infections are most prevalent during the rains, and skin diseases are often the prime reason people visit health facilities. They affect how time is utilized in the family and they too have direct and indirect economic costs.<sup>11</sup> Indeed, it is not just those diseases that have pronounced peaks during the agricultural season, but all diseases whether they peak or not, which weaken or incapacitate at this time, that are liable to affect production. Moreover, it may often be the interaction of several adverse factors, of which a specific disease is but one, which reduces work. Margaret Haswell has observed of a village in the Gambia, "persistently poor feeding and lowered resistance to disease adversely affected the quality of work of some farmers."<sup>15</sup> The economic cost in terms of production foregone is often the outcome of interactions of malnutrition, high energy demand, low immune response, and combinations and sequences of morbidity.

It cannot be emphasized too strongly that, in economic terms, where labor is seasonally constraining, the cost of work lost through weakness and sickness is itself sharply seasonal. Charles Elliott has observed, considering the capacity of family labor, that "if acute sickness strikes during a period of excess capacity, its economic cost is zero."<sup>18</sup> While this will not be true when the acute sickness has a lingering or permanent effect, or when payments to cure the sickness lead to loss of productive assets or of needed working capital, the point does deserve to be put this dramatically. The economic cost of not being able to work when no less work will be done as a result is zero; and conversely, the cost of not being able to work during the season of cultivation is high when labor limits production. The cost of sickness can change with a change of farming technology. The watershed technology developed by ICRISAT would, in certain villages under study, shift many farms from having a surplus of family labor year-round to having sharply peaked labor scarcities. With this change, the low or nil current economic costs of sickness would rise sharply for short periods. If sickness was prevalent at those times, the economic returns to effective health

services would rise with the change in farming technology.<sup>19</sup> Unfortunately, the cost of not being able to work is usually lowest when food is relatively abundant after harvest, and when morbidity is low; and the cost of not being able to work is highest at precisely the time when food is scarcest and when morbidity is high.

4. The poorer people, women, and children are especially vulnerable to hardship, malnutrition, sickness, and death in the wet season. Twelve separate assertions are implied by the three subjects and four conditions in this statement. Not all of these can be substantiated directly. Some might require an extensive search and analysis of secondary data. The argument which follows is partly a priori, and partly based on suggestive, but not always direct, evidence.

Perhaps the least debatable assertion is that seasonal malnutrition and poverty go together, and that for many of the poorer people, seasonal low nutrition is combined with high energy output in agricultural activities. Variations in body weight give some indication: Chowdhury and others found in Bangladesh that landless mothers had a lower average body weight, and greater variance seasonally around the mean, than did mothers in families with two acres of land or more.<sup>6</sup> Schofield cites evidence from Nigeria,<sup>21</sup> Iran,<sup>22</sup> and Colombia<sup>23</sup> that poorer people are less nourished than those who are better off. She has written that "the very poor do more physical work and get less food, and the short- and long-term effects of seasonal variations around an already low level are thus worse for poorer families."<sup>20</sup>

Mortality is also higher among poorer people. This is notoriously so during famine, and is illustrated by McCord's much-quoted finding for Companyganj in Bangladesh in 1975 in the sequel to the floods of 1974.<sup>25</sup> He found that the crude death rate was three times higher among landless families than among those with three or more acres of land, while the differential increased to five times for deaths of children aged one to four years (86.5 per 1,000 among landless families compared with 17.5 per 1,000 among families with three acres or more).<sup>25</sup> Perhaps more remarkable is the finding of Durham (personal communication)

that, in a rural area in El Salvador, the child mortality rate for children of females born between 1915 and 1945 was about 38 percent among landless families compared with about 11 percent for families with two hectares or more. Now, besides being higher among poorer people, mortality is also seasonal: Dyson and Crook, on the basis of extensive comparative analysis, have concluded that "death rates in tropical countries do typically peak during or just after the rains."<sup>14</sup> The question then arises whether seasonal peaks in mortality disproportionately represent poorer people, women, and/or children.

The evidence available is suggestive. McGregor and others, for example, found a heavy concentration of infant deaths in a Gambian village during the three months of the rains.<sup>9,26,27</sup> Becker and Sardar, analyzing data from Matlab Thana in Bangladesh, found that the age groups with the most marked seasonality of death were those in which the overall risk of death was high: these were "children in the first month and first year of life, and people aged 44 and above. Within these age groups families which are landless seem to be the most vulnerable to sharp fluctuations in deaths, perhaps reflecting their very precarious financial position in slack months prior to harvest."<sup>9</sup> Given the interactions among poverty, malnutrition, morbidity, and seasonality, it would indeed be surprising if this were not the case.

Part of the difficulty in writing about seasonality is the multiple linkages which operate at the worst times. This can be illustrated by considering some aspects of women and children.<sup>5,20,27</sup> Lactating women often stop breast-feeding with the onset of the rains, anticipating hard work, but increasing the risks for their weaned children at the time of peak exposure to infections. Women may be discriminated against within the family in the allocations of food. Even pregnant women, who would be expected to gain weight, have been found on average to lose weight in the middle of the rains,<sup>9</sup> and children have been found in Bangladesh to lose weight on average during part of the rains.<sup>24</sup> During the rains, women often have exceptionally heavy work loads, which leads to stress and to the neglect of child care and of domestic activities generally.

Schofield lists effects of reallocating female labor time during this period of crisis:

Cooking practices change, especially where quick, easy-to-prepare meals (usually of the nutritionally poorer staples such as cassava) are produced once a day or in bulk and vitamins are destroyed by food kept simmering in the pot. Intra-family distribution of food is affected, where the children are asleep before the daily meal has been prepared and women have no time to either prepare special infant foods or effect the proper distribution of available foods. Food gathering may be inhibited so that some types of foods (e.g., green leafy vegetables) are suddenly excluded from the diet. House-cleaning, essential in overcrowded and insanitary conditions, may be inhibited. Fuel and water collection is constrained by lack of time. Finally mothers devote less time to the care of their children who are often left in the charge of other siblings or elderly grandparents.

A further adverse condition for mothers and children is the tendency for births to peak in the late rains and at the time of harvest. There is evidence for this from widely scattered environments including Bangladesh, Guatemala,<sup>30</sup> most states in India,<sup>14</sup> Nigeria (personal communication, Richard Longhurst), and Senegal.<sup>31</sup> The concurrence of late pregnancy with hard work, poor nutrition, and high exposure to infections during the rains and around harvest is, to say the least, unlikely to be optimal for either mothers or babies. Rowland and others have found in the Gambia that birth weights during six months including the rains averaged only 2.7 kg compared with 3.0 kg for the other six months. The prognosis for those children was also poor: over a four-year period, 82 percent of all deaths in the first three years of life were accounted for by births during a six-month period including the rains.<sup>9</sup> Rowland and his collaborators have written, in summary, that "many adverse factors operate mainly during one period of the year, the rainy season. The mother who produces her child at this time will have suffered more weight loss herself during pregnancy, producing a smaller child who then gets less breast milk."<sup>9</sup> If it is widespread for late pregnancy and birth to peak at a time of year which is difficult for the mother and which offers a poor prognosis for the child, this is yet another way in which tropical seasonality accentuates the stress and risks of the vulnerable.

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5. It is during the wet season that sickness is most liable to make people permanently poorer. There has been rather little empirical study of the detailed processes whereby rural people become poorer. These processes entail events of impoverishment when assets are diminished or debts incurred. The contingencies that give rise to these are obvious to the people concerned, but few studies are known which have analyzed the contingencies that provoke the sale or mortgaging of land, livestock, jewelry, utensils, or tools, or the negotiation of loans. These contingencies can be classified provisionally as social transactions (bride-wealth, dowry, etc.); ceremonies (weddings, funerals, etc.); legal--litigation, compensation, and fines; consumption (alcoholism, etc.); failures of enterprises; famine; and sickness. Downward spiraling debts are not primary causes, but are triggered by these other factors.

A distinction can be made here between ways in which tropical seasons keep people poor, screwing them down cyclically in their poverty, and ways in which tropical seasons may help to make people poorer, forcing them down against a ratchet which may be irreversible. Mild or brief sickness may merely reinforce the cyclical screw, although the poorer people are, the more serious it is likely to be; but acute or prolonged sickness is more likely to force a ratchet, to be a contingency which impoverishes permanently.

The relative significance of health ratchets in processes of impoverishment can be expected to vary according to the levels of other contingencies, the degrees of poverty, the incidence and seriousness of disease, the availability and efficacy of curative facilities, and the direct and indirect costs of treatment. The severe and irreversible effects of even quite a short illness can be illustrated by the example of a landless family in the Philippines, the Sumagaysays. Tiyo Oyo, the head of the family, was stricken by a mild form of cholera for a month, and had to be taken to a hospital. Tiya Teria, his wife, handled the crisis. Antonio Ledesma reports:

The week's stay in the hospital cost the family ₱120, with food not yet included. Another ₱130 had to be provided to buy dextrose

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when Tiyo Oyo was in a critical condition. Fortunately, one of the drugstores in Pototan agreed to provide a guarantee for the Sumagaysays in the hospital. To cover the expenses, Tiya Teria had to sell their carabao (buffalo) for ₱330 to another small farmer. . . . The carabao was already in full working condition, and under normal circumstances could have been sold for more than twice the amount received by the Sumagaysays. Moreover, with the carabao, Tiyo Oyo would still have been able to plow other farm parcels for ₱10 a day instead of working as a pure manual laborer for the current wage rate of ₱6 a day. . . . In that sense, parting with the carabao meant parting with their last capital investment in farming. Buying a new carabao today would be unthinkable with the current market value of a working carabao estimated at ₱1,000-1,500.<sup>32</sup>

One may note, in this example, what may be common: the high cost of treatment, the need for cash at short notice to meet it, the distress sale of an asset at much less than its normal market value, the reduced family earning capacity as a result of the sale, and the impossibility of ever regaining the asset. A short illness can make a family permanently poorer, as it did with the Sumagaysays.

The incidence of such health ratchets is difficult to assess. An illustration can be drawn from a microstudy by David Parkin in a coastal area of Kenya. He has written:

Natural or man-made misfortunes, of which the greatest is sickness, strike into the lives of men and their families with a suddenness which defies resistance or delay. Cures must be sought, sometimes at great expense, from a range of traditional doctors, whose various techniques are applied until success, or death, ensues.<sup>33</sup>

Parkin found that sickness was a common reason for selling land, being given or implied as a factor in 14 out of 58 transactions.<sup>33</sup> He concluded that "bridewealth demands, sickness, and death . . . are the main factors prompting men to dispose permanently of their palms and lands." Similarly, in Bangladesh, sickness appears to be a common factor leading to the impoverishment of families, and especially of women whose husbands have died after an illness during which the family's assets have been sold seeking treatment and cure. One may speculate about how many millions of families, each year, are made permanently poorer by the costs of sickness and treatment; and how preventable this may be.

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These examples do not indicate the seasons when the illnesses occurred. They might have been at any time of the year. But there are reasons for supposing that ratchets from sickness are most common and are most commonly precipitated during the lean and vulnerable season of the rains. It is not just that the incidence of disease is often greater at that time, but perhaps it is more that other factors interact to make sickness more damaging then. During the agricultural slack season, after harvest, families have more resources to meet the costs of treatment and transport, travel is relatively easy, the labor of the sick person, and of those who take the person for treatment has low opportunity cost, the climate is usually healthier for recovery, food is adequate and more varied, and time can be spared to care for the sick person. In contrast, during the busy and lean agricultural season, families have fewer resources to meet costs of treatment and transport, travel is more difficult, the labor of the sick person and of those who take the person for treatment has high opportunity cost, the climate is less healthy for recovery, food is often scarce and less varied, and time is harder to spare to care for the sick person. Thus, in the lean season of the rains, it is likely that there will be longer delays before treatment (if any), sickness will last longer, and the costs, direct and indirect, will be much higher. Sickness during the rains and before harvest is therefore much more likely to lead to irreversible impoverishment. Not only is the incidence of sickness higher, it is also more damaging. More than at other times, sickness in the wet season will make people poor.

6. Rural health services are likely to be least effective in the wet season. In order to prevent and treat sickness, to reduce mortality, to reduce the economic costs of sickness, to help the poorer people, women, and children, and to prevent people being made poorer by sickness, rural health services should be most effective during the times of greatest need, typically in the wet season.

This is, however, when they are likely to be least effective. There are many reasons:

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- a. The demand for medicaments will be high, but supplies are often on a flat-rate monthly basis. At these times, then, if there is any shortage, more people will go without treatment. (If there is an unofficial inducement paid for treatment, this may seasonally rise to reflect the excess of demand over supply, discriminating further against those who find it hard to pay.)
  - b. The supply of medicaments may be interrupted by problems of transport during the rains. Supplies to meet emergencies will be harder to get through than at other times of the year.
  - c. Standards may fall because supervisors visit less due to transport problems.
  - d. There will be less specialized treatment of serious cases, either on the spot or through referral, because of transport and other communication problems.
  - e. Mobile services may not be able to operate, or may be able to operate only in good roads.
  - f. Health staff may take leave, or devote less of their time to health work, in order to fulfill the competing demands of their own agricultural activities. This may apply especially with village primary health care workers.
  - g. Health staff (especially primary health care workers who may be subject to many of the seasonal stresses) may themselves be sick at these times of year.
  - h. Rural people may be less able to reach or afford to take up health services during the rains.

7. Urban-based professionals are liable to underperceive seasonal deprivation and underestimate morbidity in the wet season. If the six preceding propositions are largely correct, one would expect a bias in rural health services, both preventive and curative, to emphasize the wet season, paying special attention to those diseases most prevalent and incapacitating at that time and to the populations most vulnerable. Informal evidence collected so far suggests, however, that this is rarely the case. To take but one example, it seems odd, in a world so dominated

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by economists, that health services should not be concentrated on the period when they are most cost-effective in preventing the loss of agricultural production; or that, in a world increasingly informed by sociologists and social anthropologists, and in its rhetoric at least concerned with rural poverty, health services should not be concentrated on the times when sickness is most likely to impoverish. Either the propositions are false or exaggerated or there must be strong reasons why their implications are not pursued. If such reasons exist, then the six propositions gain in credibility.

There are, indeed, eight biases which seem to operate so that professionals underperceive seasonal deprivation and underestimate seasonal morbidity during the wet season:

a. Professional and personal biases. The training and life experiences of medical practitioners point them away from rural poverty and seasonality. Professional training may be influenced by experience and needs in highly industrialized rich countries in temperate climates where food shortages are rare, urban living provides little contact with rural seasonality, and harvest, the main agricultural labor peak, comes at a healthy time of the year. In Third World countries, the urban bias of medical practitioners needs no comment. Many are trained away from rural life and find urban work most professionally satisfying, most remunerative, and most convenient. Personally and professionally, and except for a small but distinguished minority, doctors are not exposed to and do not appreciate the significance of rural seasonality.

b. Biases of accessibility. Areas visited by urban-based professionals tend to be those that are more accessible, i.e., urban, peri-urban, and regions near large cities (which tend to be the more prosperous). Sometimes this is described as "tarmac bias." Ssenyonga has observed in Kenya how services are concentrated along good roads, how the better-off people buy up plots there and build good houses, and how the poorer people move back out of sight.<sup>34</sup> But accessible and visible areas and people are among those least affected by seasonality.

c. Seasonal bias. Rural visits by urban-based professionals have

their own seasonality. Epidemiologists may visit during the rains. But for urban people generally, the rains are a bad time for rural travel because of floods, mud, broken bridges, getting stuck, damaging vehicles, losing time, and enduring discomfort. In some places, roads are officially closed. In the South Sudan, there is a period of about two months after the onset of the rains when roads are impassable, but there is not yet enough water in the rivers for boat travel to be feasible. Many rural areas are quite simply inaccessible by vehicle during the rains. The worst times of year are then not seen. But once the rains are over, urban-based professionals travel freely. The dry season--when disease is diminishing, food stocks are adequate, body weights are rising, ceremonies are in full swing, and people are at their least deprived--is the peak period for rural visits and rural surveys. For example, a manual for assessing rural needs warns about the unexpected in rural surveys and says, "Once, the jeeps needed for transporting the interviewers were recalled for a month during the few precious months of the dry season."<sup>35</sup> Even spot nutrition surveys are sometimes carried out after the harvest.

d. Visibility bias. When visits are made during the rains, attention is attracted by what is going on in the fields, in which those who are fit or least sick, and perhaps least poorly nourished, are working, to the neglect of those who are in villages and homes, the ill, the underfed, the young children, and the aged. The sick and hungry then go unnoticed.

e. Contact bias. Those contacted are likely to be those who are less adversely affected by seasonality--the better off rather than the poorer, people on regular salaries rather than people depending on agriculture, farmers rather than laborers, people with access to off-farm employment rather than those dependent solely on cultivation, men more than women, those in project areas rather than those outside, users of services rather than nonusers, those who go to meetings rather than those who stay at home, those who go to market (who have something to sell, or something with which to buy), not those who do not go because they have

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nothing, those who are alive, not those who are dead. Those most affected by adverse seasonality are precisely those least likely to be encountered.

f. Snapshot bias. Urban professionals' exposure to rural life is often in the form of snapshots, selective views at one point in time, without a sense of change over time. Processes of impoverishment, such as seasonal health ratchets, can easily go unperceived.

g. Disciplinary bias. Professionals brainwashed and blinkered by their training often have tunnel vision. They cannot see sideways. They see adverse seasonal effects, if at all, in terms of their own preoccupations, to the neglect of others that interact. A doctor may observe seasonal patterns of morbidity, but not of indebtedness. An economist may note seasonal changes in wages, but not in the incidence of malaria. For rural people, the true multidisciplinary interactions are obvious. But professionals have been trained away from being able to see them, and have been so educated that they are often neither able nor willing to learn from rural people.<sup>36</sup> Professional insight into the multiple interactions of adverse seasonality is one of the main casualties.

h. Statistical biases. There are two sorts of statistical bias which fail to illuminate or which understate the incidence of sickness during the rains. First, even in places in which surveys are conducted throughout the year, analysis of the data tends to be aggregate. Only if time, patience, money, and interest are adequate, will analysis also be on the much more time-consuming seasonal basis, which is, therefore, liable to neglect. Second, there are many reasons why sick people do not appear in statistics. A sobering example, permitting a grotesque underestimate of a seasonally crippling disease, is presented by Belcher and others.<sup>12</sup> In their study of guinea worm disease in Ghana, they observed that attendance at modern health facilities was low because of distances involved, increased pain with motion, and greater reliance upon traditional medicines. They found that "few infected persons attend medical clinics (less than 1 percent in this study) so that its incidence

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is greatly underestimated."<sup>12</sup> More generally, during and just after the rains, there are many factors, alone or combined, which can be expected to reduce the proportion of the sick who get to health posts or clinics or hospitals and appear in the statistics: difficulties and discomforts of travel (impassable roads, mud, flood, rain, etc.); shortages of cash; the high cost of loans during the lean season; the high cost of time and energy required to get sick people to treatment during food shortages and agricultural activities;\* the high cost of waiting for treatment;\*\* multiple undernutrition and sickness in the same family; delays in treatment, leading to greater incapacity, greater pain, and greater difficulty in movement; and sheer physical weakness and exhaustion in both the sick and their helpers. Not only do these statistical warps understate morbidity and its seriousness, but they also reinforce and interact with the other biases, making it even more difficult for professionals who are trained to use statistics to appreciate the extent and seriousness of seasonal morbidity.

When these eight biases are taken together, and seen to be interacting with and reinforcing one another, it is no mystery why the seasonal dimensions of health and poverty are not more prominent in health programs.

8. Research priorities and rural health programs are unlikely to reflect the seasonal priorities of the weaker rural people. Not only are those seasonally most vulnerable and most in need liable to be unseen by those who make health policy, but they are also precisely those--the poorer people, women, children, the indigent, and the sick--who are politically least influential. The interests most likely to bear on

\*Consider, for example, the social and economic cost to a poor family of persuading the able-bodied, at the time of peak activity, to carry a sick person to a clinic for treatment, if indeed they could so persuade anyone.

\*\*See for example Cole-King. "Patients frequently have to wait long hours at out-patient facilities: if they have to travel any distance, and a visit to a health centre may take a whole day, the loss of a day's work may be a significant cost to patients."<sup>13</sup>



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ture, between which the linkages are strong. One approach would be to require health and agricultural staff jointly to conduct seasonal analysis to identify linkages among health, nutrition, and agriculture, especially as they apply to those most adversely affected, and to gear their subsequent programs and priorities to seasonal needs. Such joint analysis might be especially valuable at the district or block level, and might feed into and be complemented by workshops on seasonality, involving both health and agricultural staff, at both higher and lower levels.

#### Health Services

Seasonal analysis has implications for the design and operation of health services. Some of the more obvious are:

- a. Stocking clinics and health posts with drugs on a seasonal basis to meet seasonal demands, especially in preparation for the rains;
- b. Priority for seasonal prevention and prophylaxis against diseases which incapacitate during the rains. Malaria shows what can be achieved for low cost and with enthusiastic public support (for example, seasonal antimalarial chemoprophylaxis combined with other preventive measures, in Raigarh District, Madhya Pradesh, where, in two years, an incidence believed to be about 95 percent has been brought down to almost nil, with poor people prepared to pay for their pills);
- c. Priority for seasonal curative facilities for those sicknesses, especially diarrheas, malaria, skin infections, guinea worm disease, and dengue fever, which tend to be most prevalent during the wet season;
- d. Caution in introducing mobile clinics, since these may at any time be unable to reach the more remote people who are often poorer and more vulnerable to adverse seasonality;\* and since during the rains, precisely when they are most needed, they may be confined to tarmac roads or even garages;

\*This is partly an inference from Dasgupta's comparative analysis of 126 Indian villages.

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- e. Encouragement of day care facilities during the rains for the children of mothers who work in the fields;
  - f. In family welfare programs, discussion of the best and worst times of the year to give birth. (A desire to control the season of birth may be an incentive to embark on fertility planning);
  - g. Concentrating preventive and curative health services in areas in which costs (in production foregone, suffering, and impoverishment) of sickness in the sick and hungry season are highest;
  - h. Concentrating health education in the agriculturally slack season when people have more time, their time has a low opportunity cost;
  - i. Seasonal staffing (in timing vacations, in shifting staff from one area to another) in order to meet local seasonal needs. However, this may pose administrative difficulties. It has been tried in Matlab Thana in Bangladesh:

The seasonal nature of diarrhoeal diseases in Matlab has prompted the CRL hospital to shift staff between periods of strong and weak service demand. Preventive work and non-seasonal curative services, such as family planning, may be undertaken during non-epidemic periods. It should be stressed however that this increase of staff efficiency may be achieved only at the cost of increased program complexity. Shifting of staff work requires more training, supervision and other program support services.

- j. Recruiting primary health care staff who are less, rather than more, dependent on agricultural activities so that they will be less distracted from health work at the times of most need.

#### Research

Research comes last because enough is known already, or enough is easily knowable through local seasonal analysis, for health services to be geared to seasonal needs. All the same, there are long-term implications for research:

Resources for research on tropical diseases of the wet season. The case presented in this paper should justify more, rather than fewer, resources for research on tropical diseases. The present global figure

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of about \$60 million is so derisory as to be difficult to credit.<sup>17</sup> The benefits of reducing the incidence and severity of sickness in the wet seasons include agricultural production raised and health ratchets of impoverishment averted as well as suffering and death avoided. The argument applies to all tropical diseases which permanently incapacitate or weaken, or which prevail (even if they do not peak) during the wet season; but it applies most strongly to those which have a tendency to be most prevalent during the wet seasons (diarrheas, malaria, skin infections, guinea worm disease, dengue fever, etc.). It is a question whether these priorities are a part of medical thinking. Of the diseases chosen for the WHO Special Programme for Research and Training in Tropical Diseases, only malaria commonly follows an agricultural seasonality. It is difficult to understand how the diarrheas, the major killers of children, and the diseases with by far the highest incidence, also often coinciding with the rains, could have been omitted from this program.

Microlevel investigations to identify seasonal incidence and linkages. Two forms of research seem needed. The first is simple and cheap and could be widespread. It would rely heavily on the knowledge of rural people. Its objective would be to identify the relative importance of sickness among other factors in deprivation and to understand better the processes of impoverishment. It would involve both counting as carried out by Parkin<sup>33</sup> in Kenya, and case studies like that written up by Ledesma<sup>32</sup> from the Philippines. It could be conducted by careful interviews using recall. Besides its value as a contribution to knowledge, this approach might also be a useful part of local-level seasonal analysis in rural planning.

The second is more complex and expensive. It involves analysis across the range of disciplines to identify seasonal interactions at a different level. It would represent a deepening of the microlevel work done in, for example, the Gambia and Bangladesh, by adding on more of a socioeconomic component; and in other cases where there is a good base of socioeconomic data and understanding, it might entail adding on a biomedical component. The objective would be more fundamental research in

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the rural environment in order to learn more about the etiology and transmission of disease, and linkages between socioeconomic and biomedical factors. From this research, it should also be possible to learn more about the relationships among morbidity, mortality, age groups, socioeconomic categories, and seasons. Data are often broken down by some of these categories, but rarely if ever by all of them. What, for example, is the incidence of diarrhea among newly weaned infants of poor parents in the wet season?

Practical action research. Implementability is critical. Good ideas which are not implementable are bad ideas. What is needed is a research and development process: developing methods of seasonal analysis and intervention which are simple, manageable, replicable, and effective, and which involve the rural people as partners. The analysis is the easier part; it is translating the findings of that analysis into viable prescriptions, and those prescriptions into effective action, that presents the greater challenge. It is here that a different sort of research--engaged action research and evaluation--is required. The test of seasonal analysis is not whether it provides intellectual excitement, but whether it will in practice make things better for vulnerable rural people at the times they find worst.

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