CHAPTER 3

Development Connections: The Hedgerow Model

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In economic thinking, development is a teleologic process; it aims to accomplish changes that will bring the state of the world closer to some preferred state. Different development actors and agents hold different visions of the preferred state—the goal. For development to achieve its objectives, the process must be well matched to the goal.

One version of the development process will be described in this essay and given the name *hedgerow model of development.* This model is intended to be a good match for a particular goal that I will refer to as SAEJAS (socially and environmentally just and sustainable) development. Before setting out the model, it will be useful to explain what is meant by this development goal.

The goal of SAEJAS development departs from the common (though not always explicit) equation of "development" with "growth in GNP or GDP." Such growth may be an important aspect of development, but it is a means, not an end in itself—to be valued only when it is an effective means to ultimate goals. The final goal embedded in SAEJAS development is distilled from many sources, including the *Human Development Reports* of the UNDP, the 1987 report of the World Commission on Environment and Development, and work by theorists such as David Seckler, Amartya Sen, and Paul Streeten. Drawing on these sources, the goal of SAEJAS development may be analyzed into three statements: (1) Development is the use of economic means to enhance people's choices and improve human well-being; (2) Development must be especially concerned with the people who now have the poorest choice set and the most unsatisfactory quality of life; and (3) Achievements in development must not imperil the range of choices or the well-being of people in the future.

SAEJAS development differs from the standard economic focus on output growth, which has been relatively insensitive to goals (2) and (3).

SAEJAS development can include, but is not limited to, market institutions and market-oriented development. It must also recognize possible tensions between the goals of poverty alleviation and environmental preservation. It is thus broader than the concept of environmentally sustainable development.

"Unsustainable" development can occur for a variety of reasons. The best-known examples are on the physical side, where apparent successes may impose environmental strains that, in the long run, make things worse; or when new technologies may, for a variety of reasons, fail after the initial introduction. Unsustainable development on the social side is equally tragic, when gains for the poor may be reversed by powerful people who find that their interests lie elsewhere; actions that are believed, or claimed, to be taken on behalf of the poor may turn out, in fact, to help only the elite; or the social coalitions necessary to maintain the development thrust may fall apart, or may not have existed to begin with.

What does it take to achieve development that is both socially and environmentally just, and also socially and environmentally sustainable? The following propositions, which form the basis for the hedgerow model, are a distillation from myriad experiences and writings (far beyond the number of references that can be included in this essay).

1. Effective development usually must involve both the elite and the most needy within any particular society—these two groups being seen not as polar types but as the opposite ends of a spectrum that runs continuously between them.
2. The form of that involvement must include connections that allow for the free exchange of information between the two ends of the spectrum.
3. These connections must also facilitate flows of power and physical resources. It is sometimes assumed that these must be asymmetrical flows, going primarily *from* those who have the greatest access to power and other resources, *to* those who have least access. However, within this overall context, under certain circumstances there is development value in flows that are equalized by the market—where the poor either pay for what they get, or sell what they make at a market price.
4. All of these flows have the best chance of occurring when the connections are made via intermediaries—social entities who generally have less access to resources than the elite, but more than the most needy.

Not all development practitioners, at all times, would have agreed with these propositions. Indeed, since World War II, when *development* first came into wide use as a term and a concept, the theory has been peculiarly fashion-ridden, tending to lurch from one extreme to another (Meyer 1995). The top-down extreme has either emphasized planning (whether by a central government or by foreign development agencies) or else focused on big projects to build up infrastructure and other types of constructed capital: for example, big dams for hydroelectric power, or huge irrigation schemes. At other times the fashionable theories have stressed a bottom-up approach, often based upon efforts to satisfy such basic needs as nutrition, sanitation, primary education, and basic health services. Also near this pole are examples of grass-roots institutional development that emphasize small businesses and local empowerment. The propositions set forth above, on what is required for SAEJAS development, start from the assumption that successful efforts will not focus exclusively upon either one of society's poles, but must recognize that these poles are connected—and how they are connected.

The Hedgerow Model

The hedgerow model, sketched out in figure 3.1, identifies (as a first approximation) four levels of actors in society, defined in terms that indicate what the development process may mean to them. The resource-rich are grouped together as the "trunks" of the trees, which together make up a hedgerow. The resource-poor (families and individuals) are seen as the "leaves" (those who in other models are sometimes referred to as the "grassroots"),[1] while the intertwining "twigs" and "branches" are the intermediary groups that can carry resources of many kinds in both directions, between the trunks and leaves.

It should be noted that this is not a formal model as that term is generally used in modern economic parlance, where it generally refers to a formula for the mathematical or logical manipulation of symbols. Rather, the hedgerow model is offered as a more generalized way of understanding relationships and flows among the individuals and groups who are involved with development. Its function is to provide an image of how things work, one that gives a context for understanding particular events. As the development hedgerow is here conceived, it is composed of a number of trees. It is easier to start by contemplating individual trees (without, it is to be hoped, losing sight of the whole forest), and the second section of this essay will give descriptions of three such trees. For now, just to give the general idea, we will very briefly cite a few examples.

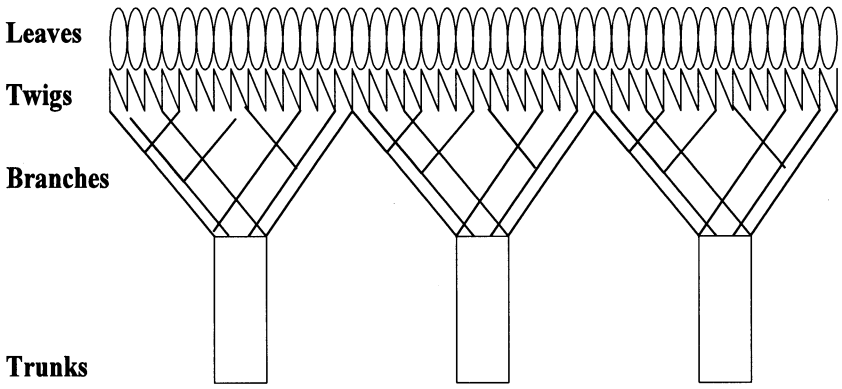

Fig. 3.1. The hedgerow model

A development hedgerow might include an international aid tree, where the trunk sends up funding from bilateral or multilateral donors to support the flow of resources, including information, through the branches (for example, international NGOs) to the twigs (which could be local NGOs, or other organized community groups) and then to the leaves—the ultimate recipients.

Other well-known examples for this model include the development trees that have been built around suppliers of microcredit, such as the Grameen Bank, or Women's World Banking (WWB). The latter can be modeled as a major branch that conduits loan funds from commercial banks, while the participating banks are bundled together as the trunk. WWB offers a partial guarantee for credit that goes to its fifty-plus local affiliates in about forty countries. As is often the case when a hedgerow model is scrutinized, it turns out to be necessary to make subdivisions within our original four rough divisions. The WWB affiliates are best viewed as (smaller) branches; the Indian affiliate, for example, is an umbrella organization of more than 100 NGOs that work with thousands of tiny thrift and credit cooperatives. Each of the latter is composed of small groups of poor, rural women (the leaves) who are the ultimate recipients of microloans. The NGOs (twigs) and the WWB and its affiliates (branches) are intermediaries that link what are commonly thought of as grass-roots women's savings groups with the banking system (Mehra et al. 1995, 20).

The examples just cited are of existing development efforts. This essay will not propose some wholly new way of doing development; instead, what it does offer that I believe to be novel—and, I hope,

useful—is a way of understanding and talking about a particular approach to development. The novelty lies, first, in an emphasis on a clearly spelled-out goal (SAEJAS development); second, on relating the form of the development effort to the particular goal; and, third, in offering a model of how things work that gives a context for conceptualizing the relationships of myriad actors in the complex process of development, and for guessing which actions are more likely to lead toward the goals of SAEJAS development. To build on this, the last part of the essay will suggest ways in which development practitioners and theorists may more self-consciously, or intentionally, make practical use of the theoretical model.

The Intermediaries in the Hedgerow Model

Given the goal of SAEJAS development, the question that the hedgerow model attempts to answer is: *What are the best ways to mobilize and deploy the resources needed for bettering the condition of the poor—in the present and in the future—given the concentration of these resources in the hands of an elite minority?* This question gives focus and concreteness to a commonsense, already proven idea of how development can work—an approach whose outstanding characteristic is *the creation of a network that constructively connects the elite portions of a society with those who have the least access to power and other resources.*

In figure 3.1 this network is schematized as numerous intermediaries who channel flows of resources and information between leaves and trunks. These are divided into two types: branches (including mid-level governments, smaller corporations, and international NGOs), and twigs (community organizations, local governments, microenterprises, delivery NGOs, "participatory appraisal" type systems, etc.). This conceptualization is rather arbitrary, intended to divide the universe of groups intermediate between the resource-rich and the resource-poor in a way that indicates the proximity of the intermediate groups to one pole or the other.[2]

A classification of development intermediaries should take account of other factors besides the issues of identification and point of view. One factor would be physical proximity; another would be size. Consider, for example, a comparison between a local government and an international NGO. The former listens to many constituencies and probably hears most clearly the voices of the local elites, while the latter might have a less equivocal commitment to the welfare of the poorest of the poor. Nevertheless, both in scale and in geographic location, in the context of the hedgerow model it will usually make sense to think of the

local government as among the twigs that are contiguous to the leaves, and the international NGO as a branch closer to the trunk.

Some other, more general points may be made about the intermediaries. They may have a special role to play with regard to information, for the intermediaries are sometimes able to piece together a worldview that can include portions, at least, of the worldviews of the two extremes. They can often act as interpreters, putting the knowledge and values that come from one extreme into language that is comprehensible at the other. This ability is also important for the creation of trust between the more widely separated extremes.

Figure 3.1 should be understood as suggesting that there is likely to be a plurality of intermediaries in most connections between the trunks and the leaves. Often the reason for this is a simple matter of scale. The elite deal in resources at a very large scale. For example, it is difficult for the World Bank to offer funds for development in amounts smaller than multimillions of dollars. If the poor are to be the final beneficiaries of a World Bank program, a series of intermediaries is usually required to break down the original loan or grant into sufficiently small portions.

All of the branches and twigs could be understood as channels, or potential relationships, in that they represent opportunities for things to flow—*in both directions.* What are the things that might flow along these channels? The major categories are: information (including ideas, values, and goals); power (i.e., the ability to influence events), along with a related though not identical resource—access, or connections; financial resources; material resources; and services.

Some asymmetry is expected in these flows. There is, by definition, a concentration of power as well as material and financial resources at the bottom of the picture—in the trunks of the trees. For SAEJAS development to occur, on the whole more of such resources must move up than down. However, when we think of the different kinds of capital that are relevant to the development process, to the familiar categories of financial and constructed capital, we must add natural, human, and social capital. Among these there is a requirement for information (related to human capital) to flow approximately equally in both directions. Also, social capital—the willingness and ability to cooperate for mutual ends—usually depends on trust, on the expectation and the reality of honest and responsible behavior, and on the ability to perceive and to value the needs and goals of others. This, too, is a valuable resource; when it can reach in all directions through the development tree, the development process is greatly facilitated.

With that said, it is usually necessary that the elite (those who control a disproportionate share of their society's resources) more or

less voluntarily agree to the ways in which the resources they control are deployed. This is because power, listed as one of the resources necessary for development, permeates the allocation and use of nearly all the others (e.g., power results from the ownership of financial and human capital; it also helps people to gain more of these resources). When the sources of power are lined up with ownership or other control over most resources, it is hard for those in greatest need of development to force the elite to hand over their advantages. A common advantage of the nonelite is their superiority in numbers: this can have the effect of force, in cases of armed revolution or in democratic voting. However, the force of numbers in a revolution is often countered by the better education and equipment of the elite (and armed revolution, in any case, rarely achieves development objectives); while the democratic advantage of numbers can be outweighed by the elite's enormously greater ability to persuade voters of positions they favor (especially through access to media). Hence it is useful, sometimes requisite, to have the acquiescence of the elite for many (though not all) development scenarios.

What the Hedgerow Model Is Not

As a model of flows that travel a considerable social distance, the hedgerow model is not about flows that take place within a restricted part of its scope. For example, consider the demand for education, credit, housing, technology or know-how, and so forth that exists at the grassroots or leaves level of society. Some of these demands are filled by closed-loop interactions among what the hedgerow model identifies as the leaves and the twigs: for example, self-help groups organized to pool savings and provide small loans (such as the ROSCAs—rotating savings and credit associations; see Bouman 1995). Important though such activities often are, they are not what this model is designed to depict.

Aside from restricted flows at the leaf-and-twig end (such as the ROSCAs), the hedgerow model is also not about flows that are restricted to the trunks and branches—such as export assistance given by the government to agribusinesses, or the relationship between the defense department and its major suppliers.

It is important to mention another subject that is not the focus of this model, namely, patron-client relationships. One could draw a schema of a patronage system in India or Russia that would look very much like figure 3.1. What, then, distinguishes the hedgerow model from a patron-client system, when the latter also channels information, power, services, and material and financial resources between the resource-rich and the resource-poor? The difference is that, *as a model of how development can*

occur, the hedgerow model is about activities that enhance the common good. In a patronage system, patrons and clients are expected to act for themselves and their families (with some reciprocal regard for the welfare of the patron or client with whom they are interacting). These actions, and the system in which they are embedded, often externalize enormous costs to the rest of society. Within a hedgerow system the common good is more broadly defined, so that there is less "external" area onto which to push costs.[3]

Finally, as mentioned earlier, this is a different kind of model from the mathematical or logical formulas common in modern economics. The function of the hedgerow model is to aid in conceptualizing the relationships of myriad actors in the complex process of development, and in providing a basis on which to judge which actions are more likely (given the actors and their relationships) to lead toward the SAEJAS goals.

Examples

The hedgerow model is intended to suggest a rich network of channels, many of them co-interacting so that resources from several different trunks may be carried via numerous branches and twigs—some of them acting in concert, while some may be quite unaware that others are working toward the same ends. In order to make this concept more concrete, three examples will be given. It should be noted that each of these examples will be described as a single, or at most a double, tree. A hedgerow, of course, is composed of many trees, whose branches, twigs, and leaves are so closely interwoven that it is nearly impossible to tell where one begins and another leaves off. However, any attempt at a full hedgerow model, though useful to have in mind, would be far too complex to depict. Only at the end of this section will we return to consider how a view of the integrated hedgerow may create a useful context for dealing with the individual trees.

Example 1: The Agricultural Extension Tree

Our first example will be a familiar one. It will be presented in a simplified and generalized form that is probably a reasonably close representation of how it has usually been seen by the actors identified with the trunks. The story will be enlivened by caveats and complications to this view.

In an agricultural extension tree (see fig. 3.2) the trunks are government departments, major research agencies, and universities. The

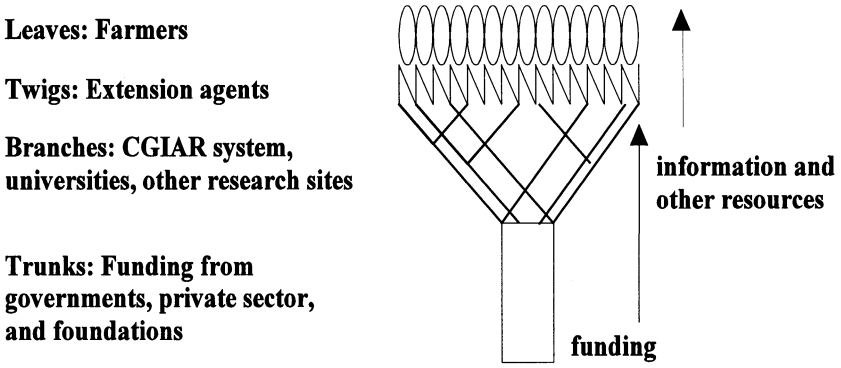

Fig. 3.2. The agricultural extension tree (simple version)

branches include regional or county extension agencies, and the twigs are the local extension agents.[4] The flows consist of money and information, which essentially move in one direction. The farmers—the ultimate recipients—receive information from the extension agents, who are trained and fed new knowledge by work coming from universities, branches of the Consultative Group on International Agricultural Research (CGIAR), and other research sites (in the United States, a major role is played by the land-grant colleges). The money to support the research and the extension services comes from governments, the private sector, and foundations.

That is the simple model of agricultural extension, which in the 1960s and 1970s was applied worldwide to promote the Green Revolution. A more realistic model—not shown here—would be somewhat more complicated. Agricultural extension in the United States, for example, arose from a complex network of farmers' associations, local agricultural societies and publications, correspondence courses, and the Grange and Farmer's Alliance movements originating in the second half of the nineteenth century. Land-grant colleges were established in the United States by the Morrill Act of 1858, which also established an extension role for the U.S. Department of Agriculture. But only with the Smith-Lever Act of 1914 did the USDA emerge as the coordinator of a systematic agricultural education and extension system including the land-grant colleges and county extension agents (Scott 1970). One might say that the U.S. extension system grew from leaves, twigs, and branches, and only in its more recent history has it been primarily characterized by flows that now originate in the trunks.

In addition, the role of the private sector in modern agricultural extension is significant. Private sector funding is related to the expectation that both the research and the extension activities will result in the promotion of increased input use by farmers. The branches and twigs may therefore include individuals hired by the private sector to interact with both the extension agents and the farmers to promote hybrid seeds, fertilizers, pesticides, herbicides, farm machinery, and other commercial products. There is also a reverse flow of money, from the farmers to the private sector (with credit institutions likely playing an intermediary role), to pay for these inputs. Also, even in the simple model there is often a money flow from the farmers in partial if not full payment for extension services.

In the view of some critics, the political power of agribusinesses has captured the modern extension system, reorienting it primarily to promote the fertilizers, seeds, pesticides, and agricultural machinery that large agribusinesses supply (Hightower 1978). Thus the needs of the trunks have come to overshadow those of the leaves. On an international scale, this has led to the heavy promotion of "modernized" agricultural sectors, and the neglect of the needs, and potential information inputs, of small farmers (Johnston and Clark 1982).

An alternative approach to agricultural extension would give primacy to the needs of small farmers and would include, among the twigs, individuals who carry out participatory rural appraisal. The important change resulting from this introduction is that the information flow now becomes two-way, with farmers' observations, as well as their needs and preferences, feeding back into the research loop. In ideal circumstances this affects the goals prescribed by the funding sources. This reorientation of flows and objectives requires new extension institutions and different kinds of training for agricultural professionals (Pretty and Chambers 1993 and this vol.). An extensive literature has emerged on "participatory research," with support for the proposition that much of developing nation agriculture is ill-served by the highly centralized, one-way flow model promoted by the CGIAR system and international development agencies such as the World Bank (see, e.g., Sumberg and Okali 1997).

Example 2: A Supply-Demand Tree

Here we will retell a story provided by Judith Tendler and Monica Alves Amorim, about a development activity initiated by the state of Ceará in Brazil. Figure 3.3 schematizes this activity, illustrating the important role of two intermediary bodies: the State Department of Industry and

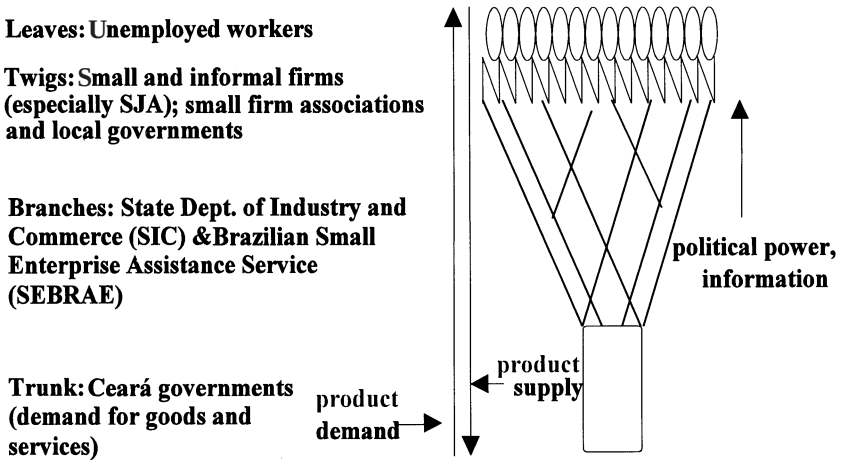

Fig. 3.3. A supply-demand tree

Commerce (SIC) and the Brazilian Small Enterprise Assistance Service (SEBRAE) (the latter being a semipublic technical assistance agency). Both of these organizations had initially been set up to render assistance to small firms, principally in the areas of credit, management training, and marketing.

Consistent with this supply-driven approach, the technicians of SIC and SEBRAE tended to characterize the problems afflicting their clients as generic to small firms—lack of access to credit, limited technical and managerial capacity, and difficulties in marketing. All this is typical of small-enterprise (SE) programs in many countries, despite a growing literature showing how the needs of firms differ markedly from one sector or subsector to another.

In the the 1980s, the government of the state of Ceará, faced with massive rural unemployment caused by a drought, "redirected some of its customary purchases—school furniture, repair and reconstruction services for public buildings, small metal grain silos—from large firms outside the state or their distributors to small firms located in the drought-stricken area" (Tendler and Amorim 1996, 412). Thus the government directed its demand toward small enterprises (twigs—some of which, however, due to the success of this development activity, grew beyond microenterprise status). These enterprises, in expanding to supply the required goods and services, employed many of the people in need.

The point of the article from which this example is taken is that (to put it in the terms of the models under consideration) a supply-demand

tree in which the leaves are at the supply end may be most effective when the trunk and branches put more emphasis on directing demand to the suppliers rather than focusing on the supply-end problems. In the more common variant of this model—what the authors refer to as the "supply-driven approach"—the flow from the trunk upward, via such branches as SIC and SEBRAE in their earlier roles, is a flow of information and credit—once again, essentially a one-way street. The unusual aspects of the Ceará situation included the fact that there was relatively little in the way of subsidy flowing up from the trunk; the major flow was a demand for goods and services. Moreover, unlike some government purchasing arrangements, the suppliers were held to high quality standards. For example,

> in the case of school furniture, each item had a metal plate with the producer's name and the number of the contract. If an item proved defective, it was returned to the producer for repair or replacement; if that producer had closed down in the interim, the association of producers to which he had belonged was contractually responsible. (Tendler and Amorim 1996, 413)

Some degree of responsibility on the part of the supplier is often assumed in transactions involving private actors, but may be missing in government contracts that are part of a development agenda. The responsibility insisted on in this case achieved a number of ends, including making the flows more equal; that is, the government gets what it pays for. A practical result of the pressure to maintain quality was that the suppliers organized to request, from local government, training programs to upgrade workers' skills. In this process the government actors, including technical advisers, were in various ways brought to the firm site (rather than a classroom) and were turned into partners with the suppliers, dealing with problems as they arose. This helped the support agencies to understand the actual needs of the small enterprises. This impetus against standardization is one of the characteristics that the authors of this study believe to be especially relevant in causing demand-driven assistance to be, in a number of respects, superior to supply-driven assistance.

Example 3: An Energy Tree

In 1995 the Rockefeller Brothers Fund (RBF) convened a conference to address the needs of some two billion people who still rely on kerosene, fuel wood, and batteries for light and power. The importance of rural

electrification for these households — 70 per cent of the population in the developing world — includes considerations of health risks from smoke and fumes, the work and school disadvantages of inadequate indoors light, and the impetus to rural-urban migration. As the RBF report on the conference states the problem:

> Household solar power systems represent a clean, climate-friendly alternative for rural electrification. . . . Solar photovoltaic units are cost-effective relative to other available energy sources, far cheaper than grid extension, and profitable for companies to provide. Model projects in several Asian countries and the Caribbean have shown that demand for these systems is high and that rural households can afford them if financing is available.
>
> Why, then, aren't private markets rushing to take advantage of the huge opportunity represented by the millions of developing world households that need and could buy these systems? (Northrop et al. 1995, 1)

The answer to this question that emerged during the conference is a good start for a description of the flows that are required if an appropriate energy tree (see fig. 3.4) is to take its essential place as part of the development hedgerow:

> Participants at the October 1995 conference analyzed the "market chain" that would be needed to deliver solar energy from producer, to distributor, to rural consumer. Currently missing from this chain, the conference report argues, are the kinds of financing mechanisms — opportunities for investment in the industry, working capital for manufacturers and distributors, and credit for purchasers — that facilitate the manufacture and sale of automobiles (for example) in the industrialized North. (Executive Summary, Northrop et al. 1995)

Focusing on the need to develop market infrastructures to handle the required capital flows, the conference considered the opportunities for developing mechanisms for financing at each of the three levels mentioned above (industry investment, working capital for manufacturers and distributors, and credit for purchaser).

Those who are unfamiliar with this issue may, perhaps, be surprised by the idea that the level nearest the leaves — purchaser credit — is an appropriate location for a symmetrical, market-based, two-way flow, rather than a one-way, aid-type flow; the question could be raised, Is

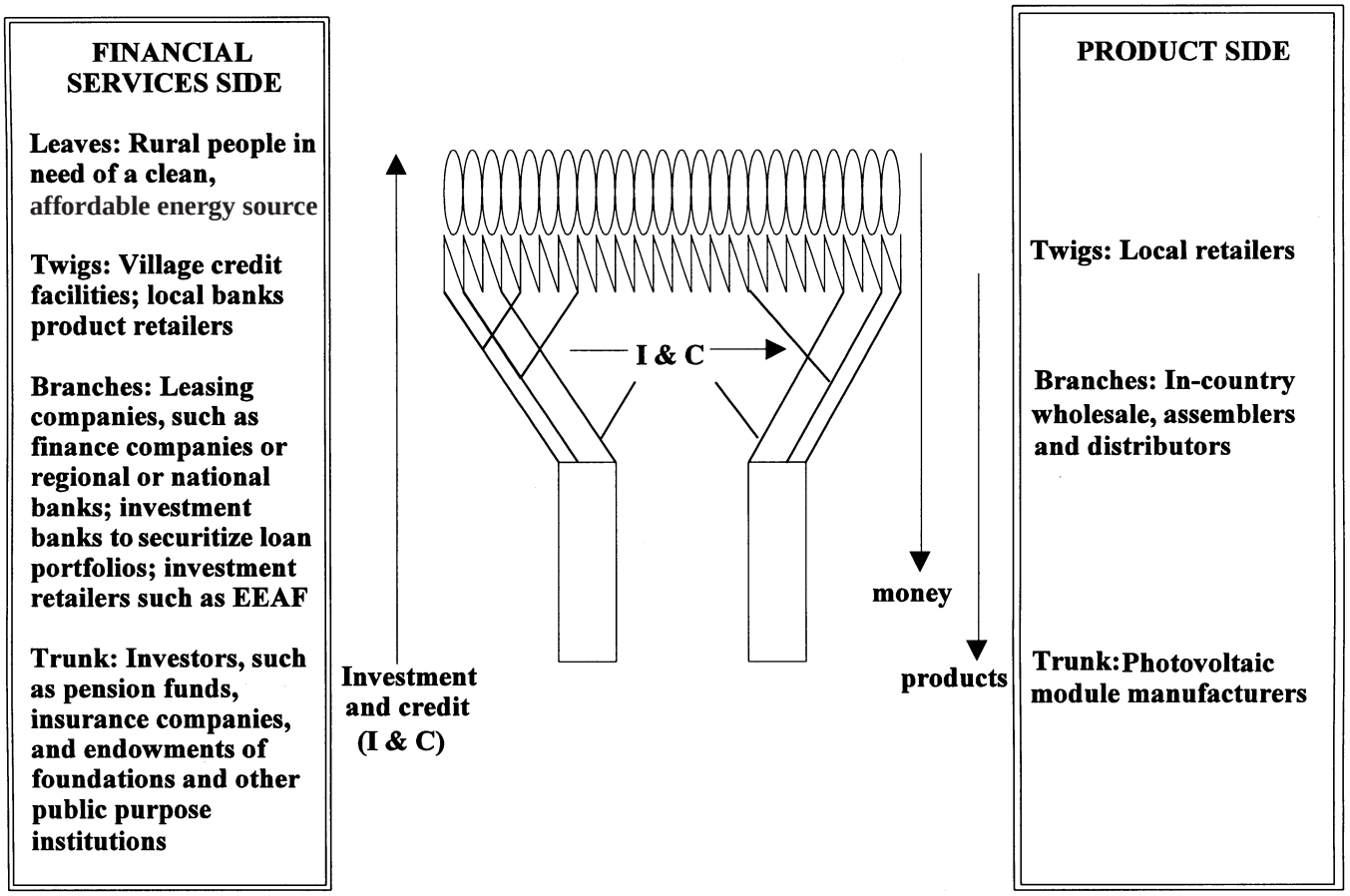

Fig. 3.4. A (projected) two-trunk energy tree

this properly considered a development activity? In answer, the conference report first confronts the reality that the amount of funding needed to achieve reasonable energy access for the more than one-third of the world's population now lacking it could not be achieved through international aid, even if all the direct aid funds likely to be available in the foreseeable future were devoted to this single task. It then presents the following argument:

> The need for purchaser credit becomes clear when one compares the purchase of a solar home system (at $350–700) by a rural household in the developing South with the purchase of an automobile by a household in the industrialized North. Both purchases represent costs equal to approximately 50 weeks of income. In the case of the car purchase, a well-established financial infrastructure links customers to manufacturers to capital markets, and a wide array of financing choices is available from banks, leasing companies and dealers. But in the SHS [solar home system] market, financing is unavailable, and a customer typically must pay the full price up front. Imagine the negative effects on the automobile industry if every customer had to pay the full cash price. And imagine the positive effects on the SHS industry if the same financing options available to car purchasers were available to solar home system buyers. (Northrop et al. 1995, 8)

The primary obstacles to achieving such financing options appear to be issues — or perceptions — about affordability and creditworthiness. Regarding the former, efforts need to be made to publicize the real cost comparison between ever-cheaper SHS technologies versus energy grid extensions to rural areas. Fortunately, regarding the latter, great strides have been made in recent decades in showing how far microcredit can extend. The leader, of course, has been the Grameen Bank in Bangladesh. More specifically targeted to our present subject is Sudimara Solar, an operation in Indonesia that both provides customer financing and distributes SHS products. It was cited as already servicing 5,000 purchasers of solar homes. In spite of a 100 percent payback rate from customers, Sudimara is frustrated by the unwillingness of Indonesian banks to pick up the credit business. "In addition to being reluctant to provide credit to individual solar purchasers, banks have generally also been unwilling to provide working capital to the SHS industry" (Northrop et al. 1995, 8).

Some organizations are beginning to step into this breach. Environmental Enterprises Assistance Fund (EEAF) is a Washington, DC-based, for-profit company that "retails" investments in renewable en-

ergy investment opportunities, including "off-the-grid" SHS companies. A variety of sources have supported EEAF, including grants from USAID, PRI (program related investments) from foundations such as MacArthur, and investments from the Swiss government and the Inter-American Bank. Several years ago the founder of EEAF wrote:

> The World Bank and its sister regional development banks . . . make energy loans to governments in very large sums—typically several hundreds of millions of dollars—and these are then handled by state-run utilities. Dishing these funds out to a wide variety of small-scale power projects is simply not within the institutional capability of these organizations.[5]

Happily, the World Bank is now actively seeking ways to do exactly what the hedgerow model suggests—to find partners that can subdivide loans into progressively smaller packages.[6] Other possible sources at the trunk of the financial services side of the energy tree include insurance companies, which "are now more interested in financing solar energy because they recognize that fossil fuel-caused climate change is having a negative impact on their core insurance businesses" (Northrop et al. 1995, 10).

Reflections

The approach that has been put forward in this essay is intended to assist in understanding specific development activities within a broader context. The broadest context for which we will reach is that which places any particular development tree within a hedgerow composed of the whole set of such trees that represent processes simultaneously aiming for the same SAEJAS goal, of socially and environmentally just and sustainable development. Before making what will be, in any case, only a first step toward conceptualizing this larger context, we will briefly reflect on our examples to show how the models depicted here can be useful in raising essential questions and clarifying our understanding of what is actually taking place in a given development activity.

How Is a Development Tree Assembled?

We will consider first the question What are the circumstances that allow the formation of a development tree, especially when it includes actors (such as private businesses) that are not necessarily development-oriented?

One obvious answer has to do with a convergence of interests. Private, for-profit interests are more likely to coincide with the common good when there is an important development-related need that could conceivably be expressed as effective demand (i.e., desire to purchase that is backed up by the ability to purchase). No market system has yet been devised that can distinguish between need and want. The distinction that markets are assumed to be good at making is that between effective demand and ineffective demand (the latter being wants that exceed the purchasing power of those left wanting). Markets respond only to effective demand, regardless of the social value of the goods being demanded, and will not supply goods or services (such as health care in poor areas) that may be urgently needed but for which the demand is not backed up by purchasing power. One interesting aspect of the SHS (solar home systems) case is that it illustrates a wide category of circumstances in which markets fail to respond even when the demand is potentially effective. Specifically, the possibility that solar energy systems could be leased or purchased (on credit) by third-world villagers has largely remained invisible to entrepreneurs, because of the absence of several significant pieces of market infrastructure.

Thus, if the market were working perfectly, figure 3.4 would depict an already existing market structure — and we would not call it a "development tree" because it would no longer be about a way of filling important, previously unmet needs, or of increasing the economic potential to fill those needs. In such a well-working-market scenario, there would be no role for the specifically development-oriented actors who are now involved (such as public-purpose organizations who make program-related investments). Like the first world market for automobiles, to which a comparison was made in example 3, the profit-driven market system would provide credit for purchasers, working capital for manufacturers and distributors, and credible financing opportunities to attract investors into this industry.

Another Look at What Activities Should Be Considered "Development"

There is more to learn from the comparison of solar home systems and automobiles. The auto industry has in several countries played a significant role as an engine of societywide economic growth as well as private profit. Conceivably, SHS production could play a similar role, providing jobs and income and fostering the development of market infrastructure. Another similarity is that both products provide important services, with transportation just a little lower than energy on a list of contemporary human needs.

However, at this time in history we cannot help but be aware of a critical difference. SHSs are environmentally benign, in that they have far less adverse impact than virtually all realistic alternatives—while automobiles have very severe negative environmental impacts. In many countries the automobile industry has received very large direct or indirect subsidies. It has, at the same time, produced massive negative externalities—costs in terms of climate change, health, accidents, removal of land from other uses, and so on, that are not borne by those who profit from making and selling cars. Thus, in terms of total social benefit, the theory of externalities (and pricing theory, as regards subsidies) suggests that in many parts of the world there is a significant overproduction of automobiles. At the same time, SHSs appear to be massively underproduced, relative both to the potential effective demand and to their social utility.

This is why an "automobile tree" might not qualify as part of our hedgerow model, even if someone were to draw a figure, similar to figure 3.4, showing how automobiles reach the final user at the end of a process whereby resources are concentrated and then progressively subdivided.[7] However, the comparison has allowed us to sharpen our understanding of when it is that private, for-profit firms are rightfully included in a hedgerow-type model: it is *when they produce a good or service that genuinely and sustainably improves human well-being, especially for those who are least well-off.*

Part of this definition refers us to a set of contentious questions: should we assume that the output of all firms is socially useful? If we think that some firms produce socially harmful products, and that, among the rest, there are different degrees of usefulness, should society treat these in some way differently? Without getting into what products should be allowed to be advertised by what media, or how, for example, tobacco production or marketing should be regulated, we may note that "development" is generally accepted to be a more value-laden concept than simple "market functioning." If we accept the goals for SAEJAS development that were set out in the beginning of this essay, then we can—indeed must—notice the differences among industries and among firms, with regard to what they produce, how, and with what impact on the people for whom development is especially intended.[8]

Where a Hedgerow Model Can Go Wrong

There will be some readers who will recognize the hedgerow model as a picture of how they have always assumed development should be done. It is hoped that, even to such old hands, it is useful to have these ideas spelled out. For those who have never made this approach conscious, as

well as for those who have, it may also be useful to note why this approach can sometimes fail:

1. The goals of SAEJAS development will not be met if *the leaves are inappropriately identified*—for example, when development efforts are directed toward groups who are relatively well able to fend for themselves, while those in greatest need are ignored.
2. Another common problem is that *the goals are improperly defined.* A common reason for this to occur is that the leaves (the presumed beneficiaries) were not consulted, and their values were not reflected in the design of goals.
3. It may also happen that *the twigs cannot make adequate contact with the leaves.* This could result from insufficient recognition of cultural or other characteristics of the leaves. As a simple example, male agricultural extension agents will likely fail to make contact with female farmers when there are cultural inhibitions about communication between women and unrelated men. Another cause for this type of failure is that the people who are slightly better off than the most needy also have their own urgent needs, and may have the ability as well as the motivation to give priority to their own needs. Thus, identification of those who can play the role of twigs is a nontrivial task. There is often a role here for committed professionals (e.g., anthropologists, sociologists, NGO personnel). It is crucial for the latter to understand the leaves and twigs in terms that include gender, ethnicity, and culture, along with simple economic interest.
4. *The resources flowing upward from the trunk may stop at the branches or the twigs.* Some use of resources by the intermediaries is inevitable and justifiable. In most successful development stories the resources devoted to the intermediaries are used to mobilize other resources—of information, skill, organizational capacity, and so forth—which then continue to flow upward to the leaves. Development failures occur when the intermediaries simply keep the resources—especially funding—while performing actions that have little or no development impact, but can persuade the donor that the funds are well spent.

There is no single solution to these problems, but they can often be ameliorated—perhaps even prevented—if development practitioners learn what is now known, and what is teachable, about how to identify different groups in a given society and how to compare their needs; how to listen to people who are different from oneself, or how to find an

intermediate listener who can communicate with both sides so as to learn about others' values and priorities; and how to offer knowledge and concepts that are useful to the recipients and are acceptable (both in content and in form of delivery) within their existing worldviews.[9]

The Whole Tree

An important element in each of the examples selected for this essay has been the presence of what we might call an *arboreal entrepreneur.* This is comparable to a business entrepreneur, whose role is that of "opportunity-spotter, resource-completer, and gap-filler."[10] In order to see the gaps and to know what it takes to complete the list of necessary resources, the entrepreneur must be able to see the world in larger than usual frames. The arboreal entrepreneur, similarly, is someone who perceives the whole potential development tree, ideally even before it exists (although it often serves well enough to have the image unfold organically, as the various parts of the tree come into the picture) and who takes some responsibility for ensuring that the right branches and twigs connect constructively with the trunk and with the correctly identified leaves.

Looking for arboreal entrepreneurs, we may consider our oldest example, the agricultural extension trees, whose development extends well back into the nineteenth century. The evolution of agricultural research and education systems in the United States has depended on many such entrepreneurs, starting with wealthy farmers such as George Washington and Thomas Jefferson, and Southern agrarian reformers such as Edward Ruffin of Virginia, who promoted agricultural innovation both at the leaf level (through correspondence with other farmers) and at the trunk level (through government institutions). Numerous innovators and proselytizers helped to spread improved agricultural methods through a twig network of agricultural associations throughout the East Coast and the South, and then to the expanding homestead agriculture of the Midwest and West.

The originators of the Morill Act of 1862, the Hatch Act of 1887, and the Smith-Lever Act of 1914 sought to expand this effort by creating the branch level network of land-grant colleges and experiment stations that would come to full fruition in the decades after World War I.[11] Extension agents were the key to completing the essential connections in this system; their training and placement was promoted by individuals such as Kenyon Butterfield, director of Michigan's Agricultural Institute system at the turn of the century. Agricultural leaders like Butterfield had most of the tree clear in their minds, and they

organized the necessary political support to institutionalize the extension network as a federal-state partnership.

On the international level, the extension model was applied to global agricultural development starting in the 1960s and 1970s. When, one by one, the major agricultural research institutes in the global CGIAR system were set up, they were seen as adding a necessary piece to what was by then a fairly well-understood tree. Early assessments of the CGIAR system recognized that it was failing to reach the truly resource-poor farmers, and a mid-course correction was instituted by Norman Borlaug and other pioneers of the Green Revolution who emphasized the role of extension trees in bringing high-yielding technologies to the village level. Since then, social and ecological critiques of the Green Revolution have given rise to a new generation of arboreal entrepreneurs who are promoting farmer participation as a counterbalance to domination by corporate-oriented trunks. Thus in a sense the modern "Farmer First" movement[12] is completing the circle that began with initiatives by individual farmers two centuries ago.

In our third example, of the energy tree, the overview role was played by a foundation, the Rockefeller Brothers Fund. In our second example the promoter was the governor of Ceará. Unfortunately, while the Ceará state government was proud of what had been achieved, it failed to capitalize in development terms on the critical element in its most dramatic success, in the district of Sao Joao do Aruaru (SJA). SJA is cited as "the classic case of a small-firm cluster or industrial district" (Tendler and Amorim 1996, 415). The state government used the SJA success in a large public relations effort to show how well it had responded to the drought crisis. This publicity unhappily "contributed to spoiling the possibility for replication, making it politically difficult to grant assistance to only a few *munícipios* at a time" (421.) The various state actors who responded to pressure for premature diffusion either were not committed to the SAEJAS development goal, or did not understand the importance of concentrating demand, or lacked enough power to withstand the political pressures.

It would be interesting to examine a large array of development projects, to assess their success in terms of SAEJAS development, and to see which of the successful and unsuccessful projects were assisted by an arboreal entrepreneur. (I have not performed this exercise; however, some relevant data may be found in a variety of places, including Tendler 1993a, 1993b; World Bank 1994; Serageldin 1995.) My hypothesis is that successful projects are more likely than unsuccessful ones to include an active arboreal entrepreneur—but that even in the successful projects this role often remains unfilled. There are doubtless cases

where the less rare talents are sufficient: where all of the necessary links can be made by individuals who perceive their own bridging roles without necessarily having a picture of the whole system. However, a more efficient use of development resources seems likely where there is an actor who possesses such an overview. Thus one of the results that may be hoped for from this essay is to validate this role and make it self-conscious—and also, perhaps, more common.

An outstanding arboreal entrepreneur, the founder of Synergos Institute, makes a distinction between the personal linkages that are created between any two types of actors (leaves and twigs, twigs and branches, etc.) and the dynamic process undertaken by an arboreal entrepreneur, who must perform the following functions:

- make sure that the ultimate recipients (the leaves) are recognized by all the other actors and that they are assisted to discover and define their goals;
- find allies who share the SAEJAS values and/or some part of the project goal;
- identify the gaps in the relevant portion of the development hedgerow (which are the missing twigs or branches?);
- identify the self-interest of each group (where do the different interests overlap?); and
- ensure that the different players are aware of one another. (In the most consciously applied version this means creating a safe space where people of different views can meet repeatedly, with a convener.)[13]

In many instances it may be easier for an arboreal entrepreneur to identify and check off these functions if he or she actually attempts to sketch in a development tree like the examples in the second section. In order to draw such a picture, it will be necessary to ask oneself:

- What are the things—material or immaterial—that are flowing between the trunk and leaves?
- Is the content as well as the direction of the flows such as to promote socially and environmentally just and sustainable development?
- Are all of the necessary players in place? That is, are the people and groups in the positions of twigs, branches, and trunk the right ones for the activity modeled in this tree? Are there any missing or inappropriate actors, so that one or more of the flows are interrupted or diverted before achieving the intended goals?

Such an exercise is not only relevant for the "arboreal entrepreneur"; any actor who is involved in a development tree could benefit from working (alone, or with other participants in the process) to identify the leaves, the twigs, the branches, and the trunk. Each one could benefit from knowing the answer to two further questions:

- Where do I, and my activities, fit into this picture?
- How does the tree that models the development activity in which I am engaged fit into the hedgerow (the larger picture of development for this region or country)?

The Whole Hedgerow

The last question introduces the final, most inclusive level of context that we will consider. Figure 3.1, you may recall, showed a plurality of trunks supporting a network of interlacing branches, connecting to another network of twigs, which interact with the leaves. In figure 3.4 we saw a case where one tree (the SHS products tree) absolutely requires close interaction with another (the financial services tree) if it is to thrive at all.[14] Going beyond the SHS example of complementary pairs of products and financial services, what other trees are required as complements if any individual project is to participate in full-scale SAEJAS development?

One thinks immediately of education: a system that usually (though not in every case) requires a concentrated source of resources and a network of branches and twigs for the transmission of material goods (schools, desks, books, etc.), as well as teaching (the transmission of knowledge and ways of thinking), if it is to spread through a whole society and assist the most disadvantaged as well as the more comfortable members. Every society needs at least one fully developed education tree; many have more than one. Another universally important tree has to do with basic life-support—the tree that provides the social safety net (see article by Molly Anderson and John Cook in this volume).

Note that, according to the terminology we have used, education trees and life-support trees would both be called *development trees* only when they represent a way of filling important, *previously unmet* needs, or of *increasing* the economic potential to fill those needs. When they are part of an established system whose effect is not growing, they are still very good things—they just don't fall into the category of *development.*

A job for the future is to fill out the description of some less obvious trees. These might include some that deal with the process of democracy, theoretically osmosing power up from the trunks where it tends to

collect (in particular places in central governments, or along with concentrations of wealth, etc.), and recycling it back toward the leaves from whence much of it was originally drawn. Others would have to do with such subjects as rights over land or water (these might have twin trunks to deal with the treatment of externalities), or the provision of a variety of kinds of health services. Many more could be imagined.

Who are the hedgerow-minders who see, and cultivate, the largest context for development, and who provide encouragement and support for arboreal entrepreneurs? The world probably has not many individuals or institutions in this category. Obviously, the UNDP (United Nations Development Programme) should be one—and, indeed, its annual *Human Development Reports* give some good overviews of how the world's hedgerows are progressing. On a national level the rare agency head may take such a view, but more commonly each agency sees only its own cone of responsibility and ignores the synergies that may be useful, and in many cases are essential, if development is to take hold justly and sustainably.

Do we need research institutes or NGOs that will identify the thriving and the ailing development trees in a particular context, and prioritize the actions that will most effectively address the health of the whole hedgerow? Is such an approach needed for industrialized as well as for third world countries? Can the job of hedgerow-minder be filled by the UN and its various agencies, or does it also require new kinds of national-level institutions such as Gar Alperovitz proposes in his essay in this volume? The questions that emerge when we come to the most general level of the hedgerow model are, evidently, more about policy than about facts. They take us beyond the scope of this essay and must, at this stage, be left as open questions, pending further grounding in conceptualizing and understanding the trees that make up the hedgerow.

Such a conclusion could provoke a reader to ask: In that case, why was this essay not simply about development trees? Why bring up the hedgerow at all? The answer is that, just as each development tree provides a context for the activities taking place at its various, interrelated sites, the hedgerow provides a context for the trees. We are better off asking questions about it than not thinking about it at all.

NOTES

The model offered in this essay draws heavily upon insights from a number of people and institutions. I have benefited greatly from the observations and experiences afforded by my relationship with the International Center for Research on

Women, Winrock International Institute for Agricultural Development, the Environmental Enterprises Assistance Fund, and the Rockefeller Brothers Fund. In addition to many individuals in those institutions, I owe a special debt for my education in this area to Peggy Dulany, president of Synergos Institute, and Roberto Mizrahe, president of South North Development Initiative. The essay has also received extremely helpful editorial and substantive input from Jonathan Harris and Peter Riggs.

1. This metaphor should not be taken too literally; any attempt to do so would run into objections that the trunk is not, in fact, a tree's main store of resources. However, it does not hurt to remind ourselves that, within our metaphor, while water and minerals are, indeed, channeled upward through the trunk, photosynthesis, the capturing of essential energy, comes through the leaves.

2. This arbitrary division can be self-validating if used as a classification scheme: for example, if an entity claiming to be a community organization in fact has a closer identification with the interests and the point of view of the resource-rich than of the resource-poor, we might be inclined to say, "this is not a true community organization—it should be classified as a branch, not a twig." However, these terms are simply descriptive. They are not value judgments.

3. This is not to say that a hedgerow system is by definition concerned with the good of "the whole system," however defined (as all of humanity, the total ecosystem, throughout all time, etc.). The hedgerow models that will be described in this essay are most often defined on a national or somewhat smaller than national level. Actors in these arenas may see nothing wrong with externalizing costs onto other nations. In the example of Ceará, discussed below, the benefit to workers in that state was to some degree offset by loss of jobs in other areas from which Ceará had previously purchased school furniture, silos, etc.

4. Among the many ways of complicating this simple picture, one would be to acknowledge that in some contexts (the following quotation refers specifically to Latin America) "most of the organizations engaging in extension prefer to deal with groups or group leaders rather than individual farmers in order to achieve the most impact with their scarce resources and elicit greater levels of participation from their clients" (Carroll 1992, 53) Thus a second level of twigs would need to be defined—group leaders—who mediate between the local extension agents and the farmers.

5. Franklin Tugwell, "Energy for Development: Institutions, Incentives, and the Misallocation of Resources," in Goodwin 1996, 243. This article gives an excellent overview of the needs and the problems addressed in the "double energy tree" described here.

6. Good examples may be found in the World Bank's support for the Participatory Provincial Partnership project in Tra Vinh Province in southern Vietnam, where the Bank's Country Director for Vietnam is attempting to explicitly tie big infrastructure projects (the Bank's expertise) to the welfare of the poor, reaching out to both the private sector and NGOs (e.g., Oxfam) in intermediary roles.

7. This does not rule out the possibility that there might be some circumstances where the other development advantages of automobile production

might outweigh the environmental disadvantages, such that an "automobile tree" could be drawn to describe a reasonable development scenario. In general, however, it increasingly appears that it is more beneficial to search for viable transportation alternatives than to continue subsidizing automobile industries.

8. Some of the issues raised here will be developed in *It's Legal But It Ain't Right: Highly Capitalized Anti-Social Activities* (ed. Nikos Passaf, in manuscript; this is projected as vol. 4 in the University of Michigan Press series Evolving Values for a Capitalist World).

9. A good discussion of the professional retraining that this approach requires may be found in Pretty and Chambers 1993.

10. This definition was offered by Harvey Liebenstein in conversation (1982).

11. See Scott 1970 for a detailed and fascinating account of the early evolution of the U.S. extension system.

12. For more extensive discussion of the "Farmer First" movement, see Pretty and Chambers 1993 and this volume.

13. Conversation with Peggy Dulany, August 1997.

14. Given the outcome of the agricultural extension tree—that is, the spread of modern agricultural techniques, with a concomitant demand on the part of farmers for purchased inputs—it should also ideally be drawn with a twinned financial services tree to be complete.

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