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The Gandhian Approach to Swadeshi or Appropriate Technology: A Conceptualization in Terms of Basic Needs and Equity*

J.I. (HANS) BAKKER

Department of Sociology and Anthropology
University of Guelph
Guelph, Ontario
N1G 2W1 Canada

Abstract *This is an examination of the significance of Gandhi's social philosophy for development. It is argued that, when seen in light of Gandhi's social philosophy, the concepts of appropriate technology (A. T.) and basic needs take on new meaning. The Gandhian approach can be identified with the* original *"basic needs" strategy for international development (Emmerij, 1981). Gandhi's approach helps to provide greater equity, or "distributive justice," by promoting technology that is appropriate to "basic needs" (food, clothing, shelter, health and basic education). Gandhi's social philosophy (Erikson, 1968; Roy, 1985) has been neglected by most development specialists, with only a few exceptions (e.g., Chambers, 1983; Charles, 1983). This analysis attempts to draw out some aspects of M.K. Gandhi's background and his thinking about* swadeshi (i.e. *local self-reliance and use of local knowledge and abilities) and* swaraj (i.e. *independent development that leads to equity and justice). Gandhi's ideas, which emerged out of an "Indic" meta-cultural background, are based on an emphasis on equity. Gandhi's syncretic Indic background includes a belief in what Bateson (1972), writing about Bali, Indonesia, has called the "steady state." Development activities should be carried out in a phased manner that does not disturb the beneficial aspects of dynamic equilibrium, but that does promote "positive development." A.T. is particularly useful within the context of a basic needs approach to international development because use of A.T. is probably more likely to lead to equitable growth. The "economic growth" strategy, utilizing "advanced technology" (or even "high tech") exclusively, has caused unemployment and has not led to effective "trickle down," much less "high mass consumption." In many developing countries the poorest 20% of the population are worse off in 1990 than they were in 1980. By making use of the "advantage of backwardness" (Veblen, 1966) and viewing development in terms of long-term impacts, a basic needs*

approach using A.T. is more likely to lead to a positive impact on third world food systems than a pure "economic growth" strategy.

Keywords: appropriate technology, basic needs, swadeshi, swaraj, Gandhi, India, Indonesia, steady state, equity.

"The key to the role of technology lies in the definition of appropriate technology from an economic, social and environmental point of view." (Prof. John FitzGibbon, School for Rural Planning and Development, University of Guelph, at the Guelph-Wageningen Meeting, October 21-25, 1989.)

"Among both supporters and opponents of the use of modern technology, we find that the choices are often presented rather simplistically. That is, we can either continue to use modern technology or we can abandon it. Both groups appeal to this claim in support of their perspectives. Each group argues by way of a dilemma . . .

In each argument we are presented with a false dichotomy. Clearly, to argue that we have only two choices, namely either to retain or abandon technology, is to accept a fallacious premise ... we can retain some technologies and abandon others, and, the way in which a technology is deployed can also be influenced through our choices. We are not in the position of having to choose between the 'brave new world' and life under conditions that prevailed in the stone age or before." (Prof. F. Hurnik and Prof. Hugh Lehman, reprinted from the *Journal of Agricultural Ethics* in the *Ethics and Technology* conference book prepared by J. Nef, J. Vanderkop and H. Wiseman (eds.) *Ethical Choices in the Age of Pervasive Technology* Toronto: Wall and Thompson, 1989: 76-77.)

"True economics is the economics of justice. People will be happy in so far as they learn to do justice and be righteous. All else is not only vain but leads straight to destruction. To teach the people to get rich by hook or by crook is to do them an immense injustice." (M.K. Gandhi, *Selected Works of Mahatma Gandhi* (Ahmedabad: Navajivan, 1969) vol. IV p. 73.)

"Swadeshi is that spirit in us which promotes the use and service of our immediate surroundings to the exclusion of the more remote . . . In the domain of politics, I should make use of the indigenous institutions and serve them by curing them of their proved defects. In that of economics, I should use only things that are produced by my immediate neighbours and serve those industries by making them efficient and complete where they might be found wanting." (M.K. Gandhi, *Collected Works of Mahatma Gandhi* (Delhi: Government of India, 1964, vol. XIII, p. 219.)

"Even *Swadeshi* like any other good thing can be ridden to death if it is made a fetish." (M.K. Gandhi, 1969: Vol. VI, p. 338.)

Introduction

This paper puts forward definitional and theoretical considerations concerning "appropriate technology" and the "basic needs" approach to development. In the literature on rural and agricultural development there have been a number of fashionable terms that have come and gone. Two such terms are A.T. and basic needs. However, these concepts have been dropped without ever having really been tried. Often the terms have been criticized out of context, without any real awareness of their meta-cultural roots in Indic civilization and Gandhian social philosophy.

This paper explores aspects of the meanings of those two terms for integrated rural development. It is argued that in the light of Indic values and Gandhian ethics these concepts are still meaningful. Aspects of the same set of meta-values can also be found occur in the Judeo-Christian-Islamic cultural setting (Kung, 1986). For example, Lewis Mumford points out (1966: 267) that the technologies developed in Benedictine monasteries during the Middle Ages were widely disseminated and "le travail Benedictin" became a byword of zealous efficiency. Generally, however, at least since the Industrial Revolution, there has been very little concern with ethical principles comparable to those advocated by Gandhi, principles based on a belief in the fundamental importance of "justice" (Dhar, 1988; Singh, 1987). Gandhi's approach deserves further theoretical and empirical study.

Generally, the Gandhian approach to development is one that stresses "equity" (i.e. "justice" in distribution and exchange). Gandhi's concept of "development" *(swaraj)* is based on a notion of "community" and an ethic of "justice for all." The roots of the Gandhian approach are located in what is here called the "Indic meta-cultural tradition." The Gandhian approach has an important bearing on the original formulation of the "basic needs" approach to international development (Emmerij, 1981). In this paper it is assumed that a basic needs approach (which can be traced back as due, in part, to Gandhi's *swaraj)* goes hand in hand with the concept of "local self reliance" *(swadeshi).* Many writers have made this basic point (see e.g., Sethi, 1985; Diwan, 1985; Prasad, 1987). But it has still not had an impact in the industrialized North. That may be because Gandhian thought is part of a complete worldview and it is a worldview that is quite alien to a culture oriented to economic growth and "progress."

In general, the concept of *swadeshi,* in turn, implies A.T.; and, *swaraj* implies a basic needs approach to development. [1] It is all part of one "meta-cultural" package, or at least one "paradigm." That paradigm is quite different from the underlying beliefs held by most social scientists in the industrial countries. Its basic ethical assumptions need to be discussed.

There are many difficulties involved in constructing a more general theory as to what levels and types of technology would be most appropriate to maintain or introduce in developing regions or countries (Datta, 1986). Defining "appropriateness" in a general manner is extremely difficult because it is hard to specify the context in advance. An appropriate technology has to be feasible and implementable. But, more than that, it has to achieve the goals that have been set.

Often the unthinking use of relatively advanced technology has unanticipated

consequences which do not contribute to equity and true development. For many people the term A.T. simply means "primitive technology," but that is a basic misconception. That is one reason that the term "intermediate technology" has been introduced.[2] There has been very little systematic thinking about A.T. and basic needs among development professionals and economists (Wiles, 1979).

There are many causes for the lack of systematic thinking about the effects of technological change on international or regional development. For one thing, our thinking tends to be limited by disciplinary specializations and it is difficult to think in general, systemic terms (Buckley, 1968). Thus, macro economists tend to think in terms of aggregate economic growth, often without considering distributional or equity issues carefully. Many sociologists do not think comparatively; they often tend to examine social change in terms of their own cultural values. Also, we are all blinded by our cultural background into making implicit ethical assumptions about suitable levels of consumption (Smelser, 1976), regardless of disciplinary specialization.

Furthermore, we may be hindered by our historical context (Mumford, 1966) and not perceive factors which later generations may see more clearly. Thus, for example, the well-known economist Walter W. Rostow (1971) did not consider A.T., equity issues or welfare issues and "basic needs" when discussing economic growth in his 1950s "non-Communist Manifesto."[3] Rostow did not consider important factors that are central to his own discipline (cf. Diwan, 1985). He also did not succeed in taking a philosophical approach and conceptualizing systemic problems of maldistribution in a more general manner.

In this paper the Gandhian concepts of *swadeshi* or "local self help" and *swaraj* or "development" are emphasized. Gandhi's use of the concept of *swadeshi* helped contribute to articulation of the concept of A.T. and Gandhi's *swaraj* has had an impact on the "basic needs" approach. It is hoped that a more rigourous philosophical discussion of A.T. and basic needs can help to call attention to key problems (Singh, 1987).

While the importance of exploring the ethical dimensions of problems related to food systems has not been widely recognized, the topic is extremely important. For a large and significant part of the human family "basic needs" (i.e. health, food, clothing, shelter, education) are not being met. The World Health Organization, for example, has indicated that each year, in the "developing countries," 14.5 million children under the age of five die from *preventable* causes.[4] Life expectancy in the developing countries has improved and has risen to an average of just under 60 years, but that is still considerably below life expectancy in the developed countries, which has reached 73.4 years. Citizens in developed countries constitute 20% of world population but consume 80% of world resources. Contributing to the lower life expectancy are significant problems of famine, hunger, malnutrition and "food in-security" (Bakker, 1990a). Lack of secure access to nutritious food also tends to exacerbate health problems. Thus, deaths from hepatitis B, diarrheal diseases, tuberculosis, and malaria are often nutrition related. In the world's poorest 42 countries the average per capita annual income is US$ 220.

We need to explore proper ways "Science and Technology" can be used worldwide

for promoting agricultural food systems that can be regarded as "good" and beneficial for "the poorest of the poor."[5] Equity issues are an important aspect of development. Economic growth and development that does not provide basic needs for the poorest segments of the population is not ethical development.

Organization of This Paper

This paper is organized as follows. First, the introduction points out that Gandhi has been underrated as a social philosopher[s] His ideas have not been critically assessed by scholars and experts concerned with the effects of technology on economic growth and agricultural development.[7] For example, his ideas overlap to a certain extent with those of Veblen and even Marx, but have received far less attention from scholars. Second, the socio-cultural and experiential roots of some of the ideas in the "Indic" civilization of India and Indonesia are presented, particularly with reference to Gandhi's cultural background and Bateson's notion (1972) of the Indonesian island of Bali as a "steady state." The concept of the "advantage of backwardness" is introduced at this point. Third, in order to make the discussion of A.T. and basic needs more rigourous, key terms such as "agricultural technology," "system," "food system," "impact," and "positive impact" are briefly defined. To answer the question: "What is *appropriate* technology?" we have to establish a more rigourous set of definitions and also a conceptualization of the definitional context (Lutz, 1985). Then, fourth, three major theses are presented. These theses are an attempt at using the contextual knowledge presented in order to translate the concepts of *swadeshi* and A.T. into contemporary terminology. By making Gandhi's implicit ideas more explicit the strengths of A.T. within the context of a basic needs approach can be brought into clearer relief. The final, fifth, section of the paper deals with some propositions which could be subjected to empirical testing. Such empirical investigations would require a multidisciplinary approach to the issues.

Another strategy for writing a paper on Gandhi and A.T. might have been to write about the details of A.T. development work in Gandhian ashrams in India (see Bakker, 1982b). One could then compare the Gandhian ashrams in India with the relative absence of such an approach elsewhere. For example, it would be useful to compare the Gandhian approach and the development strategy that has been promoted by the government of India (see Diwan and Lutz, 1985; Wiles, 1979). It would also be possible to make comparisons within the framework of Indonesian development policy and practice.8

However, such an approach may have less relevance than a more general, abstract conceptualization of the key issues. Discussion of the details of the Indian or Indonesian cases is more likely to benefit area experts. The intention here is to draw out general principles. Some empirical propositions (P-1 to P-15) are stated at the end of the paper, but there is no attempt to test those hypotheses here. They are put forward as speculative hunches and extrapolations from past experience.

The Gandhian approach to development has universal applicability. However, in making general ethical statements it is important to remain aware of the origins of Gandhian ideas in a specific cultural context. That is why the second section of this

paper will go into some detail concerning Gandhi's cultural background in western India and traditional Indic civilization, as reflected in Geertz's analysis of nineteenth century, pre-colonial Bali.9

Prolegomena

This paper, therefore, is a kind of "prolegomena" to further theoretical and empirical research. It attempts to build on the work that has been done by a few individuals (see, e.g., Schumacher, 1973; Shepherd, 1988; Sethi, 1985) and groups (see, e.g., Diwan and Lutz, 1985). I attempt to establish a general framework for understanding. In the process I also hope to get rid of some common misconceptions concerning Gandhi and A.T.

The paper as a whole is intended as a clarification of the term "appropriate technology," especially with respect to the basic needs approach to agricultural development and development generally (Emmerij, 1981). I am maintaining that there is a category of "technology" that is "appropriate" and another category of "technology" that is "not-appropriate." Hence, the major burden of the philosophical aspect of the argument concerns setting a context. By making the complex factors that come into play clearer we will be able to understand A.T. more clearly. Before we can fully comprehend what can be said to constitute A.T. we need to look at the concept more rigourously. That will help us to discuss the usefulness of A.T. more rationally.

I believe that if we are going to discuss the relationship between "ethics" and "technology" we have to speak in fairly general terms, albeit with concrete cases in mind. When we use general terms, however, we should attempt to be clear and precise. Empirical investigations must involve work with disaggregated, regionally-specific data. But the underlying paradigmatic concerns which guide such research must also be carefully worked out (see, e.g., Lutz, 1985; Handa, 1985; Diwan, 1985). The crux of the matter is that I believe that we should continue to talk about "appropriate technology" or A.T. (Canadian Hunger Foundation, 1979) when we talk about "rural development" (Chambers, 1983) and "agriculture," even though it has lately become unfashionable in academic and development circles to do so. [19] Gandhi's concept of *swadeshi* (Bakker, 1987) and his "radical liberal" (Myrdal, 1972) or "radical conservative" (Devanesen, 1969) "basic needs" approach to "integrated rural development" are central to a clear understanding of A.T.

Unity in Diversity

It is not possible here to discuss details concerning the differences and similarities between different social structures and cultures in the Indian subcontinent and the Indonesian archipelago. The national motto of Indonesia is "unity in diversity" *(Bhinneka tunggal ika)* and the archipelago certainly lives up to that slogan. The diversity of Indonesia becomes clear, for example, by reading the anthropological research on the Wana of Sulawesi, the Punan of Borneo, the Kantu and Maloh of Kalimantan Barat, the Siberut of Sumatra Barat and the Ngadha of Flores in Dove (1988). The Indian subcontinent is similarly diverse.

Detailed knowledge of the diversity of Indonesia as a nation-state and the similar diversity of India as a nation-state has convinced me that it is very difficult to make accurate generalizations. [11] The two nation-states are so varied that in many respects talking about either of them is similar to attempting to generalize about all of "Europe" or "America."

However, it is still worthwhile to mention the "cultural" roots of Gandhi's social philosophy (Devanesen, 1969; Erikson, 1968; Roy, 1985), particularly his idea of *swadeshi.* The concept of ecologically and systemically appropriate levels of technology could probably be traced to Hindu-Buddhist philosophical ideas. Perhaps, therefore, the concept of A.T. may be "culturally" even more relevant to South and Southeast Asia than to Africa (Kassas, 1989) or Latin America. [12] In some respects the nature of ancient "complex" societies in South and Southeast Asia may lend itself more to the A.T. notion.

Here, however, I am mainly interested in drawing out some abstract and general aspects of the question. In part this paper is an exercise in "the sociology of economic life" (Smelser, 1976) from a Gandhian or perhaps Neo-Gandhian perspective. I suppose it is in part a question of the relationship between "values" and "food production" (Thompson, 1989; Lappe and Collins, 1986), if those two terms are broadly conceived.13

The current governments of Indonesia and India, which are not necessarily "traditional" in terms of ecological and systemic thinking, do *not* include A.T. as a central aspect of their development strategies. [14] There is no country in the world where A.T. as a philosophy of development work has been tried out systematically on a large scale. I believe that if more of the money spent on "defence" and "security" by countries of the developed and developing world were spent on the investigation of different types of A.T. and their applicability then the results would be quite significant.

At present most development experts and academics do not think about A.T. but about "technology transfer," meaning the transfer of sophisticated new developments in technology from the developed to the less developed world. The literature on "diffusion of innovations" basically takes a "technology transfer" approach. For a technology transfer approach to work, however, there has to be very rapid economic growth. Otherwise there is no "trickle down." The well-known economist Louis Emmerij has argued eloquently (1981) that the "basic needs" approach to development - which is here considered to be closely associated with the Gandhian approach - has tended to be co-opted through a series of "mystifications" and "perversions" of the original idea. Originally, when the basic needs approach was first introduced in economics in the late '60s, the idea was that a *redistribution of assets* was necessary. In other words, in the short run (i.e. one generation) equity needs are as important as efficiency criteria. You cannot let 20% of the people of the world experience hunger on the basis of the hope that eventually economic growth will trickle down to them. A realistic assessment of the scale and types of growth that are likely to be achieved must accompany general strategies for development.

However, in the '70s and '80s the basic needs approach was translated by foreign donor agencies into a series of ad hoc charitable rural and community development projects to help "the poor" in scattered regions. The basic needs approach has not re-

placed conventional economic growth models which emphasize a "technocratic" approach that promotes a certain kind of "efficiency" in the modern, industrial sector but ignores equity issues (Emmerij, 1981; Diwan and Lutz, 1985). Often, however, *real* efficiency and equity are compatible (Lappe and Collins, 1986:67-94).

In order to improve distribution among the poorest 20% of the population economic growth models which promote a technology transfer approach tend to *assume* an annual growth rate of more than 10% in each geographical subregion of the developing world. For example, if minimum diet estimates established by the FAO are to be achieved for the bottom 20% of the world population then population growth would have to be held to a minimum and economic output would have to increase 10 to 15% every year. During the '80s economic growth has not reached a level adequate to increase access to basic needs. (Economic growth rates of 2 or 3% are considered good.)

In fact, the lowest 20% of the population has worse access to basic needs (i.e. food, clothing, shelter, health and education) in 1990 than in 1980. Hence, Stephen Lewis, former Canadian Ambassador to the United Nations, has called the '80s a "lost decade" for the developing world.15

Self-help?

Gandhi believed that the best strategy for rural development is a self-help approach he called *swadeshi.* One significant aspect of *swadeshi* was translated (in the 1960s) as Appropriate Technology. A.T. is no longer a popular term; it is no longer fashionable. But it contains the crux of a valuable insight into the working of natural and human ecosystems. This paper attempts to underline some aspects of the continued relevance of A.T. and raises questions that it would be heuristic to investigate theoretically and empirically. I would like to see development policy decisions move away from reliance on a "technocratic" and conventional "growth model" approach and towards "appropriate technology" and the original "basic needs model" approach.

I. Gandhi as a Practical Theorist

Within Ethics, as a subfield of philosophy, there are many different thinkers and viewpoints. For example, some philosophers who specialize in ethics emphasize "Pragmatism" while other philosophers emphasize "Idealism." Some philosophers believe that "action utility" is a sufficient criterion, while others emphasize "goal utility." I will not - by and large - attempt to clarify such labels here. Instead, I will simply report on *one* "social philosopher's" views: those of Mohandas Karamchand Gandhi (1869-1948). However, I shall try to translate those views into a more general and up-to-date terminology that may be more meaningful for practioners, private scholars and academics (see Lutz, 1985). Gandhi's language is usually very clear, but it is also a language which is not geared to the types of discourse usually found in universities and research institutes. Gandhi did not write for an academic audience and he often relied on the context of the situation to clarify the holistic meaning of his thoughts (although, see Diwan, 1985).

Hence, it is not altogether surprising that Gandhi receives relatively little mention in social science literature dealing with social change. For example, two leading textbooks on "social change" (Lauer, 1982; Vago, 1989) do not mention Gandhi at all! Gandhi is never discussed in courses on the history of social thought as a theorist. He is not mentioned in the leading introductory textbook in "economic sociology" (Smelser, 1976). If he is mentioned at all it is merely as a person who had a role in historical events, like Robespierre or Stalin, Martin Luther King Jr. or Ralph Abernathy. Few economists take Gandhian ideas seriously.16

Economic development is viewed in aggregated, macro terms as a vicious circle which has to do with low productivity and lack of economic growth. Distributional issues are generally viewed by macro-economists as secondary to increasing productivity. Lack of development is viewed as a lack of supply of the factors of production, particularly capital. The lack of supply of capital is viewed as a problem of low capacity to save, which is in turn a reflection of low levels of real income. The low level of income is seen as a function of low productivity. Hence, there is a vicious circle. Advanced technology is viewed as a solution to the problem because it increases productivity and hence should encourage further saving. However, when profits from urban-based enclave industries go to elites the members of those elites forget all about macro-economic theory and fail to invest their savings. Instead, a significant portion goes to overseas accounts and other non-productive uses (e.g., Robison, 1986, for Indonesia).

My awareness of the root principles of the alternative Gandhian way of conceptualizing the issues by emphasizing basic needs stems, ultimately, from my work on the Gandhian approach to development in India (Bakker, 1980, 1982a, 1982b, 1985a). My work in integrated rural development planning and evaluation in Indonesia has tended to substantiate my belief in Gandhian ethical values (Bakker, 1985b, 1987). [17] Those experiences have been very useful to me personally.

However, those Gandhian ethical ideas need further elaboration and clarification. In particular, more thought should be given to the social scientific implications of Gandhian axioms (see Lutz, 1985). Erikson's psycho-historical work on Gandhi (1968) is a great contribution, but much work still needs to be done. [18] Shepherd (1988) has summarized some of the examples of social change activities that have been inspired by Gandhian ideals and it is clear that the Gandhian approach still remains very much an alternative movement.

I believe that Gandhi has been generally underrated as a development thinker, even though his insights are based on a significant mix of theory and praxis. [19] I believe, for example, that it is incorrect to view Gandhi as purely or essentially a "religious" thinker and merely a religiously-inspired political leader. He was certainly not merely "religious" in the narrow sense of someone who is guided solely by orthodox traditional religious views first and foremost. As we shall see below, religious influences *were* important in shaping his perspective (Devanesen, 1969); but, he was also influenced by many secular perspectives. If he was (and continues to be) an important religious thinker it was in the same sense in which Tenzin Gyatso, the winner of the 1989 Nobel Prize for Peace, can be considered a religious thinker (Gyatso, 1988). Similarly, he was "religious" in the same sense as the late Thomas Merton

should be considered primarily a religious thinker rather than a peace activist, poet, essayist or ecumenical humanist. That is, Gandhi wore his religious views well, without forgetting practical, everyday human concerns. In most respects he was not dogmatic or intolerant.

Moreover, in addition to being a pragmatic theologian he was a down-to-earth lawyer, politician, development "planner" and "researcher" who spent the greater part of his life organizing "constructive work" activities in rural villages.[20] That is, Gandhi was an effective leader in practical development activities, at the grass roots level.

Gandhi was also, of course, one of the principal leaders in the *national* independence movement which led to the creation of India and Pakistan as nation-states. That is, he did not only work at the local level.[21] There have been many popular expositions of the exploits of the man many people in India called a "Mahatma" ("great soul"), but often such popular accounts are not based on scholarly historical study. On the other hand, there are also scholarly studies which have helped to provide a revisionist view of the independence movement and Gandhi's political role in it (see, e.g., Brown, 1972, 1977; Pyarelal, 1956; Hunt, 1976; Erikson, 1968).

The independence movement in the Indian subcontinent had widespread ramifications around the world. It served as an example of the dismantling of traditional colonialism and thus helped to facilitate the breakdown of colonial relationships as they had existed before World War II. This was no mean feat. Gandhi certainly contributed in a significant way to the nationalist movement in India, particularly as a charismatic politician who was able to capture the "hearts and minds" of a segment of the inhabitants of the subcontinent for significant periods of time. He was a thorn in the side of the British Empire in India, but he also helped to provide the British with a rational way out of an impossible situation. His leadership qualities were based on a solid theoretical understanding of certain key "sociological" issues concerning politics, economics, and "collective behaviour."

Gandhi was faced with practical problems in a complex social and natural-environmental system called the Indian subcontinent. Some of the natural conditions were beyond human control, but many of the systemic problems in the subcontinent in the 1930s were within human control. The nature of the tie between the subcontinent and the British Empire was such that Gandhi believed the inhabitants of the subcontinent would be better off if they were citizens of a politically independent country. In a booklet, published when he was 40, entitled *Indian Home Rule* (1909) — and translated as *Hind Swaraj — he* developed a conceptualization of independence (i.e. *swaraj)* which was not restricted to political independence. He was not merely concerned with breaking away from Great Britain. He also had an ideal.

It was this ideal that he called independence or *swaraj.* Swaraj involved not only political independence but also what we now call "development." Swaraj, for Gandhi, was economic, cultural and social development as well as political independence. For Gandhi the concept of *swaraj* meant that India should undergo a major structural transformation. However, he believed that such economic, political and cultural change should be gradual and "evolutionary." The key to successful "home rule" would be "self-reliance" (i.e. *swadeshi).* That is, although he advocated political rev-

olution through non-violent means, he also advocated a gradual series of economic, political and cultural reforms that would eventually result in a structural transformation. He believed that each step along the way should be completely integrated and balanced so that the essential *harmony* of the natural and human ecosystems would not be harmed. (He also wanted to keep the natural and human ecosystems in balance.) Hence, he believed that development should be something that does not cause unemployment and poverty. This is discussed by Myrdal (1972). For Gandhi the process of political independence and economic, political and social development *(swaraj)* required a phased process of social change which would minimize the costs of the disruptive aspects of change to individuals and households. Such a process is premised on the maximization of local self-reliance and indigenous technologies and takes advantage of existing strengths. Above all, social change should not be based on a strategy of change at any cost. Bigger is not necessarily better.22

The Advantage of Backwardness

As stated, for Gandhi a key aspect of the concept of "development" *(swaraj)* is "local self help" and "self reliance" *(swadeshi).* Working to utilize local resources in the best way possible would eventually mean that true development would occur. Such local self help is not heavily dependent on outside influences. It is not dependent, for example, on the introduction of advanced technologies. On the other hand, such improved technologies as can be incorporated into the local agricultural or manufacturing system, *without* significant negative side effects, should be utilized. Gandhi was not opposed to the proper use of technological innovations.

One aspect of Gandhi's theory of *swadeshi* that has not been mentioned very often, but which deserves further study, is the concept of "the advantage of backwardness." There is always a disadvantage in taking the lead in the adoption and widespread use of a radically new technological innovation. No matter how seemingly appropriate the innovation may be at time-1 it can quickly become clear at time 1 + n that it is, in fact, inappropriate. Gandhi understood that appropriate technology did not necessarily mean copying the latest fads or newest innovations. His emphasis on *swadeshi* encouraged an approach to the adoption of new technologies which was integrated with the social, economic and cultural systems in existence in a given region. Real development, he argued, should be gradual. Otherwise it is likely to disrupt the livelihoods of many of the people it is ostensibly supposed to help.

For many social scientists the notion of the advantage of backwardness is primarily associated with the writings of Thorstein Veblen (1857-1929). Thus, for example, Veblen points out (1966) that the introduction of gas lights in London became a disadvantage when electric street lighting was discovered and developed. In Berlin there had not been any gas lights to speak of, so the city could become electrified more easily than London. Berlin experienced the technological advantage of adoption of a new technology without having to replace a technology that had existed before. London, on the other hand, paid the price of taking the lead. The lighting system was obsolescent but could not be replaced without a large capital input. Berlin avoided the "penalty of taking the lead."

The concept of the advantage of backwardness was not discovered by Veblen, however, but has been discussed by many writers both before and after him. Gandhi, who wrote after Veblen, independently rediscovered the same basic principle.23 Gandhi was optimistic about the long-term possibilities of economic, political and social development in India. His optimism was rooted, in part, in his belief that not everything that characterized economic development in Europe (particularly England) was worth emulating. Also, he realized that India had a potential advantage over Great Britain in that it could borrow the new technologies that were suitable *after* having had the opportunity to observe the British experience. The society which industrializes first can be at a disadvantage because of the costs involved in changing to a new infrastructure.

Many writers become pessimistic about the opportunities available for development in the "less developed countries" (LDCs). However, it may be that development is not merely a matter of "cumulative causation." Perhaps it will be possible for some nation-states to take advantage of their relative backwardness in their development efforts, particularly if the use of A.T. becomes more and more sophisticated. What is new is not necessarily best; but, just because a technology is old does not mean that it is better.

The kinds of possible technological innovations that may face us in the future in the areas of biotechnology, communications technology, transportation technology and agricultural technology may radically change the general contours of the world (Villoldo and Dychtwald, 1981).

For Gandhi, development meant expanding the capacity for providing basic needs for the poor. He believed that the poor could help themselves out of their poverty if they were given a chance to do productive work. Generally speaking that meant that technological innovations should only be introduced in a gradual way. Technological innovations should not be imported as a package from abroad. Gandhi's use of the portable spinning wheel in his civil disobedience campaign against the textile mill owners was a symbol of this system, which he called *swadeshi,* or self-help.

Gandhi and Marx?

Thus, there may be some overlap between Veblen's concept of the advantage of backwardness and Gandhi's concept of *swadeshi* and A.T. Moreover, a careful and sympathetic reading of Gandhi's works might reveal that his insights are not so far from those of Karl Marx (Bakker, 1982b). That is particularly true when we consider Marx's ideals in terms of their Hegelian roots (MacGregor, 1984). [24] Marx's ideals and Gandhi's ideals have a much greater degree of overlap than is generally recognized; they both accepted very similar end goals.

Naturally there are significant differences. Marx and Gandhi differed greatly on the means that they advocated for accomplishing their democratic and egalitarian goals. Also, Marx was much more evidently a scholar and had a better articulated grasp of classical British Political Economy.

However, when it comes to the conceptualization of planned change and agricultural development there may not be all that much that separates the two thinkers

(Charles, 1983). That may surprise many people. However, there are at least as many commonalities as there are differences.

Both Gandhi and Marx were holistic, "systems" thinkers, for example. They were both concerned with understanding the "totality" rather than simply gaining specialized knowledge of one aspect of reality, however important that aspect might be in and of itself (Jay, 1984: 1-80). Gandhi's conceptualization, like that of Marx, is "systemic." That is, both Marx and Gandhi conceptualized the problems of capitalist factors of production and changes in the relations of production in a highly sophisticated fashion. They were interested in the totality of capitalism and modern industrial society.

Of course, Marx was a student of Classical Political Economists like Adam Smith and David Ricardo and accepted many of their axiomatic assumptions, such as the labour theory of value and the value of exchange relations between countries with different initial natural endowments.25

Gandhi did not systematically read Smith, Ricardo, Mill or any of the other Political Economists and Utilitarian thinkers. He relied on other sources of information for his insights concerning capitalism, imperialism and exploitation. He relied heavily on John Ruskin's critique of British Political Economy (Rosenberg, 1979; Hunt, 1982). He was, however, as critical of capitalism and Classical Political Economy as the ideology of laissez faire capitalism as Marx was.26

It would be useful to have more scholarship devoted to Gandhi as a thinker rather than Gandhi as a charismatic political and religious leader. [27] The work done by Fritz Schumacher (1962, 1973) is a step in the right direction and is reflected in the very helpful analysis found in Chambers (1983) and Charles (1983).

II. The Context: Indic States

Gandhi's views were shaped by a cultural context. Although he was a syncretic thinker he nevertheless tended to follow in the Hindu-Buddhist tradition. Following up on ideas discussed earlier by Max Weber (1958, 1976), the well-known German ecumenical theologian Hans Kung has differentiated three major "streams of thought": Semitic, Chinese and Indic. The Semitic meta-culture has points of overlap with the other two streams (e.g., Christian mystics, Jewish wisdom literature); but, there are major differences (Kung and Ching, 1989). Gandhi's universal theory of *swadeshi* and A.T. is based, at least in part, on a utopian image of the ideal society that has specific historical roots.

Gandhi's meta-cultural background is "Indic." Although influenced by European ideas and ideals (see Bakker, 1980), Gandhi's meta-cultural insights were the product of an ideological perspective quite different from the "Western" or "Semitic" worldview. That "Indic" ideological image is based on a notion of society as characterized by a certain kind of "dynamic equilibrium."

Even though Gandhi was a political radical and activist, his social philosophy is premised on a conservative view of society as a functionally interdependent system. But his conservativism about the social structure was matched by a radicalism when it comes to equity. Gandhi wanted a stable society, but not at the cost of fairness.

He emphasized again and again that a good society is one that considers the needs of the "poorest of the poor." The poorest 20% of the population should not suffer deprivation of basic needs. Gandhi's radical conservativism stresses "justice" above material goods.

It is not possible in this brief discussion to review more than a little basic background information concerning the ideals of Indic civilization as understood by Gandhi. However, a few details concerning Gandhi's syncretic "Hindu" (i.e. Vaishnava, Buddhist and Jainist) religious background in western India (i.e. Kathiawad in Gujarat) — and ancient Hindu-Buddhist ideas in general — will help provide a context for Gandhi's conceptualization of *swadeshi.* Appropriate technology (A.T.) cannot be fully understood and properly evaluated without some notion of Gandhi's Indic background, particularly some information about the notion of a "steady state." That will help to set the abstract remarks in this paper in a historical and comparative context.

While Gandhi is usually discussed as if he had emerged suddenly, as a unique human being without any social background, that is not the case. Gandhi was a product of his cultural background. An excellent (but, unfortunately, little known) study by Chandran D.S. Devanesen entitled *The Making of the Mahatma* (1969) makes it clear that Gandhi can be understood as a product of his time and place, particularly the religious and political ferment that accompanied British missionary and colonial expansion. (See also Hunt, 1976 and Roy, 1985.)

Gandhi was a son of the region in India where he grew up, not of India as a whole. That region is known as *Kathiawad* (and is in the present state of Gujarat). It remains a relatively cosmopolitan trading centre. It was a place which was influenced by many different cultures, including Islamic and Christian traders. However, Gandhi's home region was particularly influenced by Hindu-Buddhist and Hindu-Jainist thinking. Kathiawad is "the home and heartland of Jainism in India" (Devanesen, 1969: 29). But it also had a range of religious groups, a spectrum "from Sun-worship to the strict monotheism of Islam" (Devanesen, 1969: 33). It was also influenced by Protestant missionaries.

Gandhi did not grow up as an "Indian." He grew up in a unique family in a sleepy little port town called Porbandar, in Kathiawad, in Gujarat, Western India. "Gandhi's father, Karamchand, began his career in the service of the Porbandar State *as* personal accountant and letter-writer to Rana Khimaji" the ruler *(Rana)* of Porbandar (Devanesen, 1969: 114). Karamchand Gandhi became the "Prime Minister" *(Dewan)* and held that post for twenty-eight years. His fourth wife, Putlibai, who was twenty years younger, bore Karamchand his youngest child, who was named Mohandas Karamchand Gandhi! Karamchand died in 1886 as a pensioner of the ruler of the Rajput state in Rajkot, Kathiawad. Hence, Mahatma Gandhi's youth was spent in Porbandar and Rajkot, Kathiawad.

While no one can be explained simply as a product of their cultural background, most of the more than three thousand biographies that have been written about Gandhi tend to ignore the social, economic and political circumstances of his childhood and early manhood. The Kathiawad period of Gandhi's life (1869-1888) is usually ignored. Yet, Gandhi thought of himself as a Kathiawadi long before he became

an Indian nationalist. For example, when he was feted in Bombay on his return to India in 1915 he was dressed as a Kathiawadi.

The British did not enter Kathiawad until 1808 and did not establish effective control until 1862; "Gandhi's boyhood, therefore, was passed in a region just beginning to feel the full impact of British rule . . ." (Devanesen, 1969: viii). Prior to the 1860s the only forms of transportation in Kathiawad were horses, camels, elephants and bullock carts (Devanesen, 1969: 135). There were no banks. Gandhi's provincial background in "semi-feudal" (i.e. "patrimonial-prebendal," see Weber, 1958) states produced a forceful blend of conservativism and radicalism. The significance of the fact that Gandhi's cultural background was Kathiawadi lies particularly in the religious traditions which influenced Gandhi's outlook.

The Gandhis belonged to the Vaishya caste of the Modh Banias, a merchant caste. "The martial Rajput aristocracy and the pacific Bania oligarchy lived in a kind of dialectical tension with each other; . . ." (Devanesen, 1969: 27). The Gandhis were Vaishnavas, worshippers of Vishnu. They were particularly attracted to the devotional faith *(bhakti)* of a fifteenth century Brahman named Sri Vallabha, who advocated worshipping Vishnu in his incarnation as Krishna, particularly in his form as a giver of bliss *(Ananda-swarupa).* That devotionalism of the Vallabh sect sometimes degenerated into hedonistic eroticism, however, so a counter movement, the Swaminarayan sect, was led by an early eighteenth century religious leader, Sahajanand, who advocated stringent sexual purity.

Gandhi experienced conflict as a result of disagreements between the more hedonistic Vallabh sect and the more ascetic Swaminarayan sect. Later the British influence added yet another dimension to the dialectic.28

Therefore, Gandhi was a product of the historical confluence of many cultural forces, but Hinduism was a key aspect. The Hindu, Buddhist and Jain influences of Gandhi's youth led him in a particular direction ideologically. Since we cannot discuss all of the aspects of Indic civilization that are relevant to an understanding of Gandhi's cultural background [29] it is useful briefly to consider Bali as one fascinating case. Bali is a useful example because it represents a case study of the essence of the Indic meta-culture and civilization that influenced Gandhi's thinking on *swaraj* and *swadeshi.*

Bali: a Steady State System

Classic Indic civilization does not exist any longer. However, we can get an inkling of what the classic Indic civilization that influenced Gandhi was like by looking at the island of Bali. Bali is one of the last remnants of pre-Islamic and pre-Christian "Hindu-Buddhist" civilization in the Indonesian archipelago and in the world." What we know about "Hindu society" in Bali in the nineteenth century is directly relevant to an in-depth understanding of Gandhi's image of a society in functional, dynamic equilibrium.

Bali is one of the few places on earth where pre-capitalist values of harmony, ecological balance and cultural integration can still be seen to be at work in a significant manner in the agricultural system. Outside the tourist areas of Bali, particu-

larly outside the Kuta and Sanur beach areas, one can still get a sense of the pre-colonial, Hindu culture of Bali of the nineteenth century and earlier. We do not have very accurate accounts of the meta-cultural beliefs dominant in Gandhi's Kathiawad, but we do have a very full record of the culture of pre-colonial Bali.

The example of nineteenth century, pre-colonial and early colonial Bali is known to many through the excellent work of Clifford Geertz (1982). Particularly relevant here is his work on the ecology of the Balinese *dadia,* the main unit of political organization, and the *subak* or irrigation society. The *subak* and the *dadia* function together to provide a system in dynamic equilibrium.

Bali is one of the most interesting examples of "sustained development" around. The island supports a large population on relatively little land through intensive farming practices. Yet, ironically, the traditional Hindu-Buddhist ideological worldview *(Weltanschaaung)* of the Balinese is not geared to the notion of "sustainability." Instead it is based on the concept of the inevitability of decline. The Balinese ideology is that their society has been in steady decline since it was founded by invaders from Java in 1343. [31] The origin myth is based on a notion of fourteenth century Java as a utopian society.

Ever since the mid-fourteenth century (circa 1352 C.E.) Bali has been what Gregory Bateson calls a "steady state" society (1972). For example, Balinese art tends to be preoccupied with "balance" and people do not easily become "imbalanced" in everyday life. While the belief in religious trance may be a safety valve for the general balance found in Balinese music, drama and art forms, the culture is generally quite different from the meta-culture of Judaeo-Christian-Islamic or Greco-Roman-British civilizations. Bali is a Hindu-Buddhist social system that is in harmony with its natural environment; it is an example of a non-Cartesian "steady state" system. According to Bateson (1972), Bali is a region of the world that has been in a homeostatic balance, an ecological and cultural "dynamic equilibrium." Hence, as a society Bali does not benefit or suffer very much from the "Cartesian dream" (Davis and Hersh, 1986). It has not been influenced by dualistic thinking about mind and body or by ideals of human progress. [32] That is, the Balinese do not think in terms of the mind/body split or progress and advance. Perhaps it is the emphasis on historical decline that has made it possible for the culture as a whole to promote a steady state system. But this is also a product of the Indic meta-cultural value system that also strongly influenced Gandhi's ways of thinking.

That system has been centred on the hamlets and the attendant irrigation societies. Classical Hindu Bali, like most Indic states, is not a modern "urban" civilization (Weber, 1958). "The hamlet *[banjar]* shaped the everyday social interactions of a collection of neighbors into an harmonious pattern of civil attachments; the subak [irrigation society] organized the economic resources of a group of peasants — land, labor, water, technical know-how, and, to a rather limited extent, capital equipment — into an astonishingly effective productive apparatus" (Geertz, 1982: 50). Also very important in the social ecology of Balinese village life was (and is) the temple congregation *(pemaksan).*

Geertz's analysis (1982) of the pre-colonial Balinese social and agricultural system (or, *negara)* provides a wealth of detail and a very complete set of scholarly ref-

erences. The main point I wish to make, however, is that the well-documented "steady state" of Balinese society — significant living remnants of which can still be seen — is the kind of society that Gandhi had in mind when he proposed his ideas on *swaraj* and *swadeshi.*

Modern India and Indonesia

It is highly likely that Gandhi would have been very discouraged by many of the changes that have taken place in India since the Independence Movement. Since Gandhi's death in 1948 India has moved further and further away from Gandhian ideals, even though major political parties seek to align themselves with Gandhi's popular charismatic appeal among the peasantry. Of course, many factors have contributed to the situation in India today, including external forces outside of the control of Indian planning commissions and parliaments.

Indonesia is also committed to a type of economic development that concentrates on the modern sector, technology transfer and an absolute growth strategy. There are many indications, however, that this "trickle down" strategy has not worked, despite remarkable economic growth. The Indonesian elite has not always reinvested all of its economic gains back into the country. [33] There are many rural development projects but they are not necessarily benefitting the poorest of the poor. Despite many statements concerning equity and distribution of the benefits of development there is still a very large segment of the Indonesian population which does not reap the benefits of "modernization." There are very many development projects which help scattered local groups, but there is no national "basic needs" approach to development that utilizes a strategy of appropriate technology. Gandhian ideas are not perceived as significant by most Indonesian development planners. Most development strategies in Indonesia tend to run counter to the Indic, precolonial and pre-Islamic "Hindu-Javanese" (i.e. Hindu-Buddhist) worldview of the Balinese.

Therefore, the Gandhian approach has to be spelled out in more detail. We cannot simply rely on Indian or Indonesian examples. The case study approach will not help us very much if we are interested in the ethics of using A.T. to accomplish the goal of providing basic needs. In order to help begin to "translate" Gandhian ideas for development experts and scholars it will be useful to turn now to definitions of some key terms.

III. Definitions of Key Terms

One way to phrase the general question that I am concerned with is: "What has been the impact of agricultural technology on third world food systems?" [34] This discussion of Gandhi, *swadeshi* and *swaraj* is a partial response to that general question. The impact of agricultural technology has been counterproductive to *swaraj,* in part because the technology used has often not been appropriate to the situation. There was too much reliance on advanced technology brought in from outside and too little "self reliance" on local technological improvements and local initiatives *(swadeshi).*

The general question is difficult to answer, however, because it is stated in an extremely broad manner. In order to be able to move beyond an impressionist answer we must examine the general question in more detail. We must break it down analytically. We must know precisely what we mean by "agricultural technology." We must also have a good operational definition of "food systems" and the "third world." Furthermore, we must settle on exactly what is meant by "impact." Although it may seem a bit pedantic to take this approach, it is important, nevertheless. Too often the discussions of issues of this sort are clouded by vague use of terms. Analytical rigour will help to get us off on the right foot in researching the issues. Hence, we shall begin with some nominal and, in some cases, more clearly "operationalized" definitions.

1. Agricultural Technology

Agricultural technology refers to all aspects of technology in agricultural production, processing, distribution, storage and exchange. Often the term is used in a more restricted sense to simply cover technology used for agricultural production. But, production is obviously only one aspect of the question. That is made evident by the term "food system."

2. System

The term "system" is used here in the neutral sense that has been explained by Hall and Fagen (Buckley, 1968:81): "a system is a set of objects together with relationships between the objects and between their attributes." A system can be more or less entropic or "ordered." That is, it is not necessary to assume at the outset that anything we call a "system" is characterized by a particular degree of order. The relationships between "objects" in a system can be highly disorderly and unpredictable. Similarly, the relationships among all of the "attributes" of objects within a system can be more or less random. Mathematical equations that attempt to describe "dysentropic" systems can not be said to capture more than a fragment of the system characteristics.[35] Systems are subdivided into "sub-systems." We can also talk about "sub-subsystems," etc.

A system that is in a balanced "dynamic equilibrium" can be called an "ecological system" or "eco-system"; it is "dysentropic." In other words, when there is balance and a relatively "steady state" then "entropy" has been overcome. A "steady state" system, therefore, is an eco-system that has developed at a relatively advanced level of organizational complexity.

3. Food system

In line with the above definition, it is important to point out that what is meant by a "food system" is a combination of "natural" and "wo/man made" systems. A food system, therefore, is not one system, but two (or more) interrelated subsystems. Neither subsystem of the food system is entirely "random" (entropic) in most of the

cases we are interested in; the food system as a whole (including natural and wo/man made) is characterized by stochastic *and* non-stochastic processes. Such a system is extremely difficult to map.

Mathematical models, for example, cannot be said to be completely "isomorphic" to anything as complex as either the natural or "non-natural" aspects of the food system, or even sub- or sub-subsystems of such a complex system. That is true for any nation-state, much less for all nation-states in the world at any period in historical time. Thus, for example, recent attempts to model irrigation systems on the island of Bali have met with considerable difficulty due to the complexity of those agricultural systems.

4. Disciplines

A sense of the complexity of "food systems" can be obtained once we start to think about the number of different disciplines involved in the study of such complex systems in various ways. At a minimum the "food system" includes within the "natural subsystem" a host of "mini-systems" that are studied by such disciplines as crop science, animal science, food science, nutrition, horticulture, agronomy, botany, biochemistry, environmental biology, applied microbiology, plant pathology, weed science, apiculture, land resource science and a host of other "natural/biological sciences."

Similarly, at a minimum, the "non-natural sub-system" of the "food system" involves a host of "mini-systems" such as agricultural economics, rural sociology, cultural (social) anthropology, history, home economics, geography, political science, rural extension studies, rural planning, regional planning, macro and micro economics, and a host of other disciplines and subdisciplines.

Both in the natural/biological and the social/cultural/behavioural sciences there are also, of course, many competing meta-paradigms, major paradigms, paradigms, research theories and propositions. Hence, we shall consider only those social aspects of the food system that are contained in the propositions stated and it is obvious that much that could potentially be of great importance is left out of detailed consideration. Nevertheless, for our purposes it is sufficient merely to emphasize the social factors of food production, processing, distribution, storage and exchange in the definition of the food system, with the assumption that "natural/biological" factors are equally important but can be temporarily left out of consideration for the purposes at hand.

5. Third World

The term "third world" is intended here as a neutral "ideal type" construct. It does not have any explicit or implicit value-connotation or ideological meaning, even though, of course, it is based on a loose analogy with the "third estate" in France during the time of the French Revolution of 1789-93. [36] Here the term is used in a neutral sense. It means no more, or less, than "developing countries," "less developed countries," (LDCs) or "South" as general labels.

In general we can begin to operationalize the term as relating to all of those "nation-states" that have been identified by the World Bank (IBRD) as recipients of project assistance for agricultural and rural development, including:

> Algeria, Argentina, Bangladesh, Belize, Benin, Bhutan, Brazil, Burkina Faso, Burundi, Cameroon, Central African Republic (CAR), Chad, China (PRC), Colombia, Cote d'Ivoire, Cyprus, Ghana, Guinea, Hungary, India, Indonesia, Kenya, Lesotho, Madagascar, Malawi, Malaysia, Mali, Mexico, Morocco, Nepal, Niger, Pakistan, Philippines, Senegal, Sri Lanka, Sudan, Tanzania, Togo, Tunisia, Uganda and the Yemen Arab Republic (World Bank, 1988: 111-116).

It is clear that when we discuss "third world" nation-states our range of historical vision is relatively limited. We are mainly concerned with countries that became independent since World War II. Nevertheless, the geographic regions that those nation-states now occupy were in existence long ago. Any analysis of "food systems" in such countries must be made with an awareness of pre-independence historical factors. Such factors would have to include the history of colonialism, where it is relevant, and the pre-colonial era as well. (For countries that were never colonized the long-term historical background is also very important, of course.) All so-called "third world" nation-states were "developing" (and "underdeveloping") long before political independence.

6. *Impact*

An impact is a significant structural change which involves more than merely seasonal or cyclical fluctuations in production, distribution or exchange. It is a result, an end, a goal. Hence, a real impact on agricultural production at the nation-state level would have to be a fairly long-term result, a "trend" rather than a "blip." Long-term here means a trend seen over a minimum of ten years. Even a ten year trend can be suspect, of course. However, it is rare for any researchers to explore long-term historical trends systematically. An exception in this respect is Fernand Braudel (1973).

To a certain extent "world systems theory" has been grounded in historical materials (e.g., Wallerstein, 1974, 1979, 1980); but, Wallerstein has been justifiably criticized for using historical materials simply to buttress pre-conceived, reified models (Stinchcombe, 1982; Bakker, 1985c). It is interesting, in this respect, that "food" does not appear in the index of Daniel Boorstin's justifiably famous book (1985). Wallerstein draws much of his inspiration from Braudel, a thinker who gave agricultural trends a great deal of attention.

7. Positive Impact

I am making a distinction between two major categories of "technology." The question therefore hinges on the definition of. the key term "appropriate." The statement

could be considered tautological if "appropriate" was considered to mean "positive", as in "appropriate technology is positive technology."[37] But that is not what I mean. I am conceptualizing the concept of "positive impact" in a slightly different manner. A positive impact is the result of use of A.T.

For one thing, a positive impact is not necessarily equivalent to an appropriate impact. In fact, a positive impact may be one that "jars" a "system" and in that manner may be regarded by many observers as inappropriate to the existing "dynamic equilibrium" of the system. It may create a significant change in the way in which the system is ordered. It might, for example, change a system from a relatively more ordered to a relatively less ordered "dynamic equilibrium" (It might also, of course, change a system from a relatively less to a relatively more ordered "dynamic equilibrium"!) Hence, when we use the term "appropriate technology" we must keep in mind that the most appropriate use of technology may involve a positive impact that does not necessarily *appear* to be the most positive to observers who do not see the larger ramifications. In the long run that technology which is most likely to provide basic needs for all segments of the population-including the lowest 20% — has the most "positive impact." The technology used (i.e. "the means") leads to a specific result which is considered to be "positive" (i.e. "the end").

8. Positive development

Clearly, the term "positive" is an ethical term. It is value-laden. Saying that something is positive indicates that it has certain characteristics which you deem favourable in some respect. The reason I am using the term "positive" at this point is to allow for a certain degree of freedom of definition. Clearly, a further specification of the term "positive" is needed. However, that can only be done when we have a clear notion of what systems we are talking about. A result can be judged "positive" only with reference to some set of values.

We can clarify the problem by pointing out that "development" is conceptualized in three distinct ways: "integrated rural development," "structural transformation," and "economic growth."

a. First, speaking generally, there is a "Liberal" view of development which is "project-oriented" development. It involves a geographical region within a nation-state receiving some new inputs (e.g., livestock, new seed varieties, irrigation, soil and water management, gender workshops) and, if successful, making a small-scale change in the quality of life of a group of people.

If we think simply of small-scale "integrated rural development" projects in small rural communities then obviously development is relatively "a-historical." In sociology we often refer to such conceptualization as a "Structural-Functional" analysis. In anthropology the "Functionalist" perspective has tended toward such an approach.

b. Development seen from a large-scale perspective, however, is something entirely different. Hence, if we conceptualize development in terms of a Neo-Marxian and/or French Structuralist perspective as a process of the articulation of capitalism in a world capitalist system then the term "development" has an entirely different mean-

ing. In the second meaning of development we are concerned with large-scale, macro-level "structural transformation" from a Pre-Capitalist Mode of Production to a Capitalist Mode of Production (e.g., from Feudalism to Capitalism). It is a historical conceptualization of long-term economic development and social change.

c. Economic growth models constitute a third view of development. They have tended to be concerned with transfer of modern technology in order to promote increases in national production (e.g., increased G.N.P. or G.D.P.). They have generally ignored sociological and anthropological aspects of the problem, both in terms of macro-level "structural transformation" and in terms of micro-level "integrated rural development." Economists have been concerned with the macro trade-off between "efficiency" and "equity," but they have tended to underestimate the extent to which urban-based, advanced technology has promoted inequities. The result has been a "two sector" or "dual economy" approach, with urban, capital-intensive, high labour productivity enclaves and a worsening of the distribution of goods and services, particularly in rural areas.

The value premise put forward here is that equity issues should be considered basic to *any* development strategy. Regardless of whether the conceptualization is in terms of integrated rural development (IRD), structural transformation or economic growth, the goal should be equity. Any use of technology which leads to a widening of the gap between rich and poor is not a technology which is likely to lead to "positive impacts" (e.g., the fulfillment of basic needs), hence it cannot be said to be "appropriate."

9. *Appropriate Technology (AT.)*

Appropriate Technology is any type of technology that has a "positive impact" on "basic needs" and tends to lead to "positive development." The concept of A.T. is usually discussed with special reference to the development needs of the "third world," but a technology can be considered appropriate or inappropriate according to any economic, political, cultural or social context. The term A.T. is preferred over the alternative term "Intermediate Technology" because it is not clear whether intermediate technology is always appropriate. Moreover, the idea of a technology being "intermediate" assumes a clear cut differentiation between less and more advanced technologies, which is very difficult, if not impossible, to determine. Similarly, because A.T. has become standard, the term "holistic technology" is not used here. However, see Dhar (1988) for a conceptualization of what holistic means in this context.

10 . Science and Technology (S&T)

It should be clear that the discussion concerns *all* forms of technology, even though the emphasis here is on agricultural technology. Moreover, I also have in mind what is generally called "Science and Technology" (S&T). However, since it is not customary to speak of "appropriate S&T" I will not use that phrase. Nevertheless, what is said hereabout "technology" is also true of "science," at least in general. The boun-

daries between science and technology are not clearly definable. However, an emphasis on A.T. should not be used as an excuse for ignoring pure scientific research. The long-term implication of attempting to define research agendas in the natural and social sciences simply on the basis of a priori concepts of usefulness or appropriateness would be devastating. It is not possible to legislate pure science; it is not always possible to foresee the impact, positive or negative, of scientific discovery (see Boorstin, 1985) or, for that matter, technological innovation (Mumford, 1966).

11. Basic Needs

Basic human needs are food, clothing, shelter, health and education. These basic needs are recognized by various U.N. documents. The "basic needs approach" in economics (and social science generally) is an *overall* strategy of development which promotes basic needs for all segments of the population (Emmerij, 1981). Thus, an economic growth strategy which leaves the lowest 20% of the population worse off is not a basic needs approach, no matter how many accompanying piece-meal efforts involve basic needs (Lutz, 1985). Gandhi's intuitive notions concerning *swaraj* and *swadeshi* anticipated the original impetus behind the modern basic needs approach (Schumacher, 1973; Diwan and Lutz, 1985; Charles, 1983; Chambers, 1983; Shepherd, 1988).

Comment on Definitions

Of course, any of these terms could be defined in a different manner. Nevertheless, these are reasonably adequate definitions. They are useful to help clarify somewhat more precisely what is meant in the statement of the central thesis and in the analysis of the general question that we are concerned with when we discuss the impact of agricultural technology on third world food systems. Like all definitions, however, they should be taken as approximations rather than absolutes. A dogmatic approach to these issues is not heuristic. The ideas, however, flow from a cultural context which is quite different from our Judaeo-Christian-Islamic and Greco-Roman-British meta-cultural background.

IV. Major Theses

Having briefly reviewed the context which gives rise to these thoughts about Gandhi as a social philosopher concerned with development issues, particularly in Indonesia and India, I would like to put forward three major theses.

The first major thesis (T-1) concerns the value placed on the concept "appropriate technology." The assumption is made that appropriate technology is more likely to have a positive impact on third world food systems than other forms of technology.

The second major thesis (T-2) emphasizes the importance of recognizing "basic needs." The "basic needs" approach is considered in terms of three ethical assumptions or "axioms."

The third major thesis (T-3) is a value premise but also leads to testable propo-

sitions. It is that use of appropriate technology is correlated (or, "associated") with a basic needs approach that leads to more equitable third world agricultural development.

Thesis One: A.T.

The statement that "appropriate technology is more likely to have a positive impact than technology that could be considered not to be "appropriate" hinges on the extent to which we are willing to define appropriateness in terms of positive impact. It is the positive impact of the technology which defines it as either appropriate or not. To a certain extent we are dealing with a statement that seems to be true by definition. The general thesis or question statement is that:

> T-1: Appropriate technology is more likely to lead to a positive impact on third world food systems than non-appropriate technology.
> t(nA, A) - - - - > t(nP, *P)*
> (nominal) (nominal)

The thesis may sound tautological, but I would like to argue that it is not. I do not believe that I have commited a logical fallacy in putting forward this thesis. Impact *(P)* is viewed as the "dependent variable" and A.T. (A) is seen as the" independent variable." Use of A.T. is likely to *lead to* a positive impact.

The logic of a tautological statement is: *"P* is *P"* (Fisher, 1970: 31-34). Hence, one could say that the thesis is merely that "appropriate technology is appropriate technology". But, obviously, I am saying something more than that (i.e. A is likely to lead to *P).*

The issues are complex and depend in part on how one conceptualizes a system, sources of change, patterns of change, duration of change, spheres of change, duration of change, and reactions to change (Vago, 1989). Yet, any assessment of the costs and benefits to a system or sub-system must examine all of those factors. Too often we discuss strategies for change before we are clear on what is changing, why, how, when, and to what extent.

If we think in terms of "dynamic equilibrium" in a "cybernetic system" or "ecological system" then it is obvious that the inter-relationships between sub-systems and sub-subsystems is so complex it would be foolish to begin to tamper with the system without a great deal of detailed knowledge. Even when we think we understand an ecological unit we often find out we have had only the most superficial understanding. Economics as a discipline tends to be rather myopic in its concentration on only a very limited range of variables to describe a complex human system that is not necessarily well mapped by those variables, no matter how sophisticated the mathematical or statistical models used.

But economics is not alone in that regard. All of the social sciences, in their striving to be "scientific" in the more positivistic sense, have tended to be reductionistic and have introduced unwarranted simplifying assumptions. All too often the factors which are dismissed as *ceterus paribus* prove to be far more significant than was

originally assumed. That is particularly true of social systems such as institutions and organizations. The nation-state is one of the most complex and misunderstood social systems. The world has barely begun to be studied as a social system and is constantly shifting and changing. Hence, any kind of intervention in the system is likely to have all kinds of unanticipated consequences.

For that reason it is useful to distinguish between the "appropriate technology" used to achieve a certain goal (i.e. the means) and the actual goals achieved (i.e. the ends).

Thesis Two: Basic Needs

It is at this point that I would like to introduce a second major thesis of this paper. It appears on the surface to be a largely definitional thesis, axiomatic rather than empirical. However, I believe it is not entirely tautological.

> T-2: A "positive impact" is one that provides "basic needs" for "all" human beings within a "system", including the "poorest of the poor."

This axiom was carefully considered by the thinker I am mainly concerned with here: M.K. Gandhi. It has several associated concepts which may be considered to be like "axioms"38:

T-2: A-1: All human beings within a "system," even the "poorest of the poor" are equally deserving of equal access to at least a subsistence level of the basic needs of food, clothing, and shelter. (This is the principle of *sarvodaya,* or "unto the last," "putting the last first" – Chambers, 1983).

T-2: A-2: Basic human needs take priority over other aspects of the maintenance of any system.

T-2: A-3: Until the basic human needs of the poorest of the poor have been met the system cannot be said to be functioning well.

These are moral and ethical statements. It could also be argued that there are certain categories of human beings who are "expendable." That seems to have been the logic of the development of capitalism during the early stages of the Industrial Revolution. It seems, for example, to be what concerned Karl Marx when he argued that under a Capitalist Mode of Production labour is treated as an alienable "commodity." The existence of child labour in coal mines can be cited as an example of the logic of labour as nothing but a reified commodity. The important role of prostitution in London during the nineteenth century could be cited as another example. Historical investigation of the enclosure movement in an earlier era would probably reveal a definition of human needs that placed greater value on other aspects of a rapidly changing ecological system. Charles Dickens' novels are full of examples of callous exploitation where basic human needs were not taken into account. It was Gandhi's reading of John Ruskin's indictment of capitalism that inspired Gandhi to develop the concept of *sarvodaya.*

Equity

Of course, in examining "basic needs" utilizing a Gandhian *swaraj* principle (Shepherd, 1988) we are concerned with "equity" or "justice." We are positing the humanistic value of individual human rights and assuming that some kind of "distributive justice" can be established as an ideal. Philosophers have debated the concept of justice and have not agreed among themselves what justice is.

Kohlberg (1975) indicates that the liberal and rational tradition of philosophy has claimed that an adequate morality is "principled." John Rawls' *Theory of Justice,* for example, has impressed many people as a moral philosophy that makes judgements in terms of universal principles. It might be worthwhile for a philosopher to consider the similarities and differences between Rawls and Gandhi. (See Haksar, 1986.) Certainly such complex distinctions as those between "equal justice" and "proportional justice" or between "exchange" and "distribution" would have to be more clearly operationalized before we could claim to have a theory of equity in the abstract.39 Similarly, it is difficult to conceptualize the "veil of ignorance" in any but the most abstract manner. A discussion of Rawls' theory of justice goes beyond the confines of this paper, of course. I mention him only to make the point that philosophical interpretations differ and the problem of "justice" or "equity" is not a simple one.49

Of course, problems of equity are not difficult to answer in a straightforward manner if we are satisfied with merely rhetorical answers. Often such general, metaphorical statements will take us a long way toward a good answer. Lenin's formulation: "From each according to his ability, to each according to his needs" is a fairly good one. It certainly indicates that some people who cannot provide for themselves should be helped. It also tends to assume that obligations are proportional to the degree to which anyone is in a position to benefit from things as they are. It is also close to Gandhi's admonishment to always deal with complex situations of equity and make decisions in such situations based on the impact such decisions will probably have on the "poorest of the poor."41

But both conceptualizations are still far from clear and simple when we attempt to apply them to complex systems. That is, if I encounter a poor wo/man who needs food I would not hesitate to give that person food; but, if children are starving in Eritrea it is not clear who should provide the food, where it should come from, and how it should be transported and distributed. A systematic, systemic solution is very difficult. Yet, that should not prevent us from attempting to find such a solution. I believe that when we discuss the ethics of the use of technology we should, therefore, search for technological solutions that are "appropriate" to the circumstances. They should be technologies that provide for the opportunity for change that is likely to lead to "equity," especially for disadvantaged groups, and especially in terms of such basic needs as food, health, and shelter.

Thesis Three: Development

However, it is precisely the point that I want to make that "appropriate technology" can be considered appropriate in many different respects and not only on the basis

of criteria which have to do with economic growth. Technology is appropriate for reasons other than those which concern G.N.P. Considered as an empirical proposition we could refine T-1 by rephrasing it in light of T-2 to read:

T-3: There is a measure of association between the degree to which "appropriate technology" is utilized in any nation-state and the degree to which there is agricultural development that benefits the poorest 20% of the population by improving their access to basic needs.

T A - - - - - - > T *D*

(ratio) (ratio)

Hence, the dependent variable, "agricultural development" *(D)* can be defined as one form of positive development impact. Such development occurs if it provides "basic needs" for all people, in urban as well as rural areas. However, it must help the poorest 20% as well as those who are already somewhat better off. It must be a part of a true "basic needs" approach (Emmerij, 1981).

Obviously any form of agricultural development which did not help to promote the basic need of "food security" could not be considered a very "positive" form of development, according to this definition. There are many cases where agricultural development has *not* benefited the poorest 20% of the population, even though the richest farmers and segments of the urban middle class have benefitted.

V. **Can A.T. Be Rescued?**

In the literature on rural and agricultural development there have been a number of fashionable terms that have come and gone. Emmerij (1981) indicates that "basic needs" is a term that has been, in turn, denounced, mystified and perverted. A new term is often introduced by a prominent individual (e.g., McNamara, Brundtland) and given prominence by foreign donor agencies or large institutions that control funding for pure research, applied research, applied agricultural development, rural development, integrated rural development (IRD), and so forth. Hence, for example, the term "sustainable development" has now been co-opted by all kinds of groups.

Often the introduction of a new term in the development literature will mean that older terms are discarded. Such changes in terminology do not necessarily mean any kind of progress, however. It may merely mean that in-groups are more likely to receive funding for projects because they use the right catch phrases. Donor agencies fund those "in the know."

Of course, some older terms are simply dropped. That would be true of "Europeanization," for example, which was dropped in favour of "Westernization" and, eventually, "Modernization." On the other hand, in the process of rejecting older terms it is often the case that the terms are criticized. Thus, for example, some historians refer to a "Euro-centric" bias, with the implication that this is justification for dropping the descriptive term "Europeanization" when speaking of eighteenth or nineteenth century "colonial expansion overseas." Similarly, the term "appro-

priate technology" has been criticized, explicitly or implicitly, as a concept which basically serves as an excuse for the passing off of outdated technology to unsuspecting peasants in LDCs, often at high cost in terms of foreign personnel.

Hence, it is important to state clearly that appropriate technology is not simply "outdated" technology. It is also not simply the earliest or simplest possible technology. It is not "primitive technology." Gandhi was not opposed to technological change. However, he *was* opposed to technological innovations which benefited some to the detriment of the basic welfare of others.

As stated, Appropriate Technology (A.T.) is a concept that is associated with the writings of M.K. Gandhi, one of the main leaders of the Indian independence movement. When Gandhi advocated the use of the spinning wheel in India in order to break the power of the British-owned textile factories he was not advocating that people adopt the simplest technology merely in order to return to a romanticized past. He was not a precursor to the more naive aspects of the so-called "back to the land" movement. Gandhi was well aware that technological innovations can have an impact on people's lives which is positive in that it provides greater opportunities for productive labour and/or reduces the burdensome aspects of physical work. Gandhi was not a Luddite who advocated rejecting all new technology.

That clarification is needed because A.T. has been severely criticized. Hence, in light of the criticisms that have been made of the use of the concept "appropriate technology" it is important to explore the concept systematically. Here it has been treated as an "ideal type" concept (Weber, 1949) which stems from the Gandhian concepts of *swaraj* and *swadeshi* (Schumacher, 1973; Roy, 1985).

Additional Propositions

Having provided nominal and, in some cases, operational definitions of key terms and stated three major theses, it is possible to make a series of additional propositional statements. These propositions cannot be derived from the theses in any straightforward, rigorously logical manner. But, they are closely related. Each proposition is, in principle, amenable to empirical test.

P-1: Agricultural technology has had a causal impact on food systems such that the degree of appropriateness of the technology has influenced the equity of the systems.

P-2: The impact of agricultural technology has not been the same in all regions of the world.

P-3: The impact of modern technology has tended to be more appropriate to the needs of those nations which were already developed at the end of WWII and less appropriate to third world, less-developed countries (LDCs).

P-4: The impact of agricultural technology on food systems in the third world has been both positive and negative, but has generally be negative with respect to the basic needs of the poorest 20% of the population.

P-5: = P-4, but with respect to impact on production

P-6: = P-4, but with respect to impact on processing

P-7: = P-4, but with respect to impact on distribution
P-8: = P-4, but with respect to impact on storage
P-9: = P-4, but with respect to impact on exchange
P-10: the impact of agricultural technology on food systems in the third world is likely to continue to be mixed, but will continue to have negative effects for the basic needs of the poorest 20% of the population.
P-11: = P-10, but with respect to impact on production
P-12: = P 10, but with respect to impact on processing
P-13: = P-10, but with respect to impact on distribution
P-14: = P-10, but with respect to impact on storage
P-15: = P-10, but with respect to impact on exchange

Empirical Investigation

The propositions stated above are stated on the basis of intuitive judgements, based on an awareness of the current literature (e.g., Wiles, 1979; Smelser, 1976; Shepherd, 1988). They are not empirically-based propositions resulting from detailed investigations. Nevertheless, in the absence of complete and accurate information I would like to put them forward for consideration as reasonable guesses. They are propositions that would probably receive nodding agreement from most experts on rural development or agricultural development.

Since there is no opportunity within the confines of this paper for investigating in any detail the empirical evidence that can be found to investigate the propositions stated, it is useful to point out what a thorough investigation of empirical material would involve.

Of course, there is a vast literature on various aspects of the propositions stated above. Some writers accept a body of empirically-based research materials as authoritative and write as if their propositions concerning the impact of agricultural technology on third world food systems have been "proven" by the "data." However, apart from the fact that there are philosophical grounds for believing that a scientific proposition cannot ever justifiably be said to be "proven," it is rare for commentators on the issue of food systems in the third world to provide a complete set of empirical materials. A thorough investigation would have to cover macro- as well as micro-level phenomena.

One useful approach within the social sciences is the emphasis on the "world economy." One of the best analyses of the "totality" (Jay, 1984: 1-80) of factors involved in the complex interplay of economic, political and cultural factors is Eric Wolf's excellent book: *Europe and the People Without History* (1983). Wolf's work is, in turn, based on Braudel (1973), Wallerstein (1980) and many others. He even incorporates insights from Rostow (1978), who is usually thought of as a writer in a totally different tradition (see Hopkins and Wallerstein, 1982). Wolf's emphasis on the complex interdependence of factors related to development is a heuristic approach to the comparative study of agricultural development in the third world. A thorough study of the "world economy" is necessary to be able to place the complex forces of "social change" into a holistic perspective (Vago, 1989).

The propositions stated above would also require detailed empirical investigation for each of the nation-states that have been identified as "third world" (developing, less developed, South, etc.). Disaggregated statistics at various levels of political, economic, social and cultural organization are necessary. Hence, the empirical propositions would require expertise in various disciplines, including "area studies."

Moreover, even if the empirical material were thoroughly reviewed at the nation-state level it would still be important to examine the regional, district, sub-district, "block" (i.e. village-cluster, *desa)* and village-level variations *within* nation-states. It would also be important to have detailed empirical materials on hamlets and sub-groupings within villages and hamlets (e.g., tribes, lineages, clans, stratification clusters, housing clusters such as Indonesian *kampongs,* and households). Then, too, we would need data collected through the study of individual attitudes, opinions, perceptions, and behaviours. In other words, to really study the propositions in depth would require more than a few summary descriptive statistics. Yet many writers have made reference to summary descriptive statistics gathered at the nation-state level for one year as if they validated sweeping general arguments. Such arguments may be true, but they are definitely *not* substantiated by the evidence that is put forward to substantiate them! Even long-term statistical information does not "prove" a paradigmatic position (e.g., Rostow, 1978).

Conclusion

This paper is a conceptual foundation, a "prolegomena" to further theoretical and empirical work. I have offered some background on Gandhi and "Indic" meta-cultural themes, tentative definitions of key terms and some suggestions for research. Some of the empirical materials that help to provide answers to the questions raised here in so far as they pertain to the basic need for food — particularly issues of food security related to food production, distribution and exchange — can be found in Bakker (1990a).

This paper can help to provide the basis for a discussion of the importance of the Gandhian "basic needs" approach to development, particularly the impact of "appropriate technology" on "food systems." I have argued that Gandhi needs to be taken seriously as a social philosopher and that his views on *swaraj* and *swadeshi* should be taken as a context for the proper evaluation of the usefulness of A.T.

I believe that too often we develop new technologies and use them regardless of considerations of "appropriateness." We do so in part because of disciplinary specialization, which blinds us to the complexity of food systems. The plant pathologist and the geneticist conceptualize food systems quite differently. The political scientist and the economist also conceptualize food systems quite differently. Hence, what is needed is more interdisciplinary theorizing and research within the natural/ biological sciences and within the social/cultural/historical sciences. It might also be possible, in some rare instances, to have at least "multi-disciplinary" research between selected natural and social sciences. The ultimate ideal would be to develop an integrated social science perspective that assists in establishing a picture of the human "totality" (Jay, 1984: 1-80), as many thinkers have attempted to do in the

past. Gandhi, in many ways, made a contribution to such a well-rounded picture.

Partially as a result of specialization into different disciplines, however, there is a stubborn refusal among development scholars and experts to conceptualize "appropriateness" in more philosophically-inclusive and nuanced terms. Gandhi had a more or less intuitive understanding of appropriateness in terms of his conceptualization of *swadeshi,* but he also had his intellectual blinders. He sometimes, for example, used rhetoric which tended to suggest an over-romanticized version of the historical past in the Indian sub-continent in terms of such things as village-level egalitarianism and democracy. Furthermore, he was often somewhat dictatorial in the manner in which he introduced new ideas to his immediate followers at ashrams like Sevagram. He did not necessarily believe in Ivan Illytch's "conscientization" approach to participatory planning and implementation.

Nevertheless, Gandhi's thinking was clear and to the point. He understood that rural development had to be solidly based on an integrated, gender-sensitive approach which did not force technological innovations on systems which were not yet ready for such innovations. He realized that too rapid change in the use of certain types of technology in rural villages would likely lead to disruption rather than improvement. What is required is a sophisticated approach to economic, political and social development that keeps the ethical requirement of equity in the forefront. Such an approach utilizes technology appropriately. That is, agricultural technology is used not only to increase economic output but also to improve the distribution of resources required for basic needs. The objective of development strategies should be "the satisfaction of an absolute level of basic needs for the entire population, including the poorest segment" (Emmerij, 1981: 157).

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Notes

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1. A.T. is to basic needs *as swadeshi* is to *swaraj.* A third important Gandhian ethical ideal, in addition to *swaraj* and *swadeshi* is *sarvodaya,* or "service to all." Gandhi's concept of *sarvodaya* is based in part on his reading of the British essayist, critic and reformer John Ruskin (1819-1900). See Hunt (1982: 413) and Rosenberg (1979: 229-272). The *sarvodaya*

principle, which is also an aspect of the "basic needs" approach to development, is discussed by Lutz (1985).

2. The term "intermediate technology" assumes a continuum between a low and high levels of technology. An *appropriate* technology can be anywhere along that continuum. Sometimes the most appropriate technology is "high tech."
3. Rostow's famous book was written in the late 1950s and first published in 1960. He acknowledges that it was "a tract for the times" (Rostow, 1971: xiv). Rostow did not attempt to disaggregate economic growth into "the sectors and sub-sectors within which new technologies are actually absorbed efficiently into an economy" (Rostow, 1971: ix). His "statement of values" makes it clear that he believed "high mass consumption" was just around the corner for many developing countries.
4. "More than 8,000 children die each day because they are not immunized; almost 11,000 a day die of dehydration caused by diarrhea; and about 8,000 a day die of pneumonia." *Toronto Star* April 30, 1990: A14.
5. Under the leadershiup of Dr. Sergio Trindade the United Nations Center for Science and Technology for Development (UNCSTD) in New York has made food security issues a significant part of its agenda, but UNCSTD's budget is very limited.
6. Gandhi is not mentioned by Rostow (1971). Rostow believed in the 1950s that India (and China) had already reached the "take-off" stage of economic growth and that Indonesia was only a decade behind.
7. However, see Diwan and Lutz (1985) for interesting work by A.M. Huq and others on "welfare criteria" and other aspects of Gandhian economics. Lutz (1985) presents a set of basic axioms concerning non-violence *(ahimsa).*
8. To my knowledge no such comparative study exists for agricultural development. However, see Bakker (1987) for an attempt to compare India and Indonesia with regard to health care delivery systems.
9. My own field work has been mainly in Bihar and Tamil Nadu in India and in West Java and Southeast Sulawesi in Indonesia. However, I believe that the conclusions that I have reached on the basis of that field work experience have wider applicability.
10. For example, the Gandhian approach to development and A.T. does not figure prominently in the program of the annual meeting of the Association for International Agricultural and Rural Development (AIARD) in Washington, D.C., June 12-14, 1990.
11. It may seem somewhat pedantic to use the term "nation-state" so frequently rather than simply to say "society," "country" or "nation." However, see Tivey (1981) on the relatively recent character of the "nation-state." While Bali is a "nation"; it is not-and never has been - a "nation-state." It is useful to remember that Germany only became a nation-state in 1870, even though the German language unified a large geographic region with many principalities, etc., long before that
12. However, see the work on rural poverty in Africa by Ghai and Radwan (1983) and the more general treatment of income distribution and poverty in Ahluwalia, Carter and Chenery (1979).
13. In a recent volume (Bakker, 1990a) a range of approaches to the topics is presented. As one reviewer stated, the articles included in this edited volume encompass everything "from reductionist monoculture to dialectical polyculture!" However, my own basic concern is with equity issues, particularly distributional equality of basic needs.
14. There is one Gandhian ashram in Indonesia; it is located on Bali and is run by a woman who is known *as* Ibu Oka. She is the wife of a former Governor of Bali during the Suharto period, who has died. She has translated Gandhi's *Autobiography* into *Bahasa Indonesia (i.e.* the Indonesian national language). See Oka, 1975.
15. See article titled "World Ignores Dying Kids Lewis Says" in *The Toronto Star,* May 2, 1990: A22. Lewis is quoted as saying that: "It is almost beyond human comprehension that at the state of our contemporary knowledge . . . we should be willing to countenance such a collective international abomination."

16. The exceptions prove the rule. Thus economists like Schumacher (1973), who was directly influenced by the Gandhian movement, or Emmerij (1981), who has tried to promote a "basic needs" approach to balanced growth, are not as influential in economics as writers like Rostow (1978). The Diwan and Lutz book (1985) is unknown to most professional economists and development experts.
17. Those papers are referenced in their complete form in the bibliography. Since they were printed in *Gandhi Marg* and *Transnational Perspectives,* journals to which not many people in North America have access, I have taken the liberty of putting them together as a draft version of the book I would like to write on Gandhi, with the tentative title: *Towards A Just Civilization: The Gandhian Perspective on Human Rights and Development.* Guelph: University of Guelph.
18. Compared to the detailed attention given to the works of Marx, Engels and Lenin it is surprising that Gandhi has received relatively little systematic academic attention. A romanticized version of the Gandhian myth, as found in Sir Richard Attenborough's epic film, seems to be as much as most people are willing to bother about. However, in my opinion, a thorough scholarly work on Gandhi, comparable to the work done on other classical theorists in social philosophy, has yet to be written.
19. See the excellent, detailed biographical work by Pyarelal (1956), Gandhi's long time secretary. One of the few books that makes Gandhian arguments and has been accepted by development specialists is Robert Chambers' *Rural Development: Putting the Last First.*
20. A reading of Brown (1972) will quickly convince most people that Gandhi was very much a practical politician, in addition to whatever else he may have been.
21. Eventually, of course, the independence movement led to the creation of Pakistan and then the bifurcation of Pakistan and Bangladesh. There were many unanticipated consequences that neither Gandhi nor the other independence movement leaders foresaw.
22. Note, however, that small is not necessarily better, either. Schumacher's famous book *Small is Beautiful* (1973) received its title from the publisher. The book does not argue that small or primitive is always best; it simply argues that we need to consider equity as well as efficiency.
23. Gandhi read many British writers, especially John Ruskin, but he does not seem to have been directly acquainted with Veblen's work. Nevertheless, there is a good deal of overlap between Veblen's iconoclastic populism and Gandhi's concern with the well-being of the masses.
24. Hegel's "communist ideal" was based in part on a conceptualization of "totality" that may have been influenced by Hindu-Buddhist ideas, filtered through the work of Schopenhauer. Marx's "communist ideal" was strongly influenced by German Idealism, including the works of Kant, Schopenhauer and Hegel (MacGregor, 1984).
25. **Marx, of** course, has been criticized by writers like Brenner (Alavi and Shanin, 1982: 54-71) for his over-reliance on Smithian assumptions. A useful comparison of Mandan and Gandhian paradigms which concentrates on the inefficiencies in "centralism" is presented by Handa (1985).
26. Gandhi claims in his *Autobiography* that reading John Ruskin's *Unto This Last* opened a "window of understanding" to the essential weakness of Classical Political Economy, but he probably had been prepared for Ruskin's critique of capitalist ideology and nineteenth century capitalism by his period of study in London (Hunt, 1976).
27. The journal *Gandhi Marg,* published by the Gandhi Peace Foundation, New Delhi, is an excellent source of both Indian and non-South Asian thinking about Gandhi. There are only a few non-Indian scholars, like James Hunt (1976) and Mark Shepherd (1988), who are actively working on Gandhi. Judith Brown's analysis (1972, 1977) is seminal. Martin Green's work (1986) is also stimulating and provocative.
28. Gandhi's attitudes toward sexuality were ambivalent; see the excellent discussion and critique by Erikson (1968), where the importance of these ideas for Gandhi's non-violent civil disobedience is discussed.

29. See the references to articles by Bakker, particularly 1982b. Also, note Bakker (1990a), particularly chapters on Indonesia by Franz von Benda-Beckmann and on Sri Lanka by Sarah Southwold-Llewellyn. An excellent overview of India's attempts at development planning is provided by Frankel (1978). Weber's work on Indic civilization (1958) remains important.
30. Tibet, prior to 1950, was another example, but the conflict between Tibet and the People's Republic of China has changed everything. An interpretation of the teachings of Tsong Khapa (1357-1410), one of the founders of the the Gelugpa sect and Vajrayana Buddhist philosophy and the "steady state" system of classical Tibet generally is discussed by Gyatso (1988). A modern scholarly overview of Tibetan "Buddhisms" is presented by Tucci (1988). Also see Snellgrove and Richardson (1968).
31. "In 1343 the armies of the great Javanese kingdom of Majapahit are supposed to have defeated, near Pejeng, those of 'the king of Bali,' a supernatural monster with the head of a pig. In this surpassing event the Balinese see the source of virtually their entire civilization, even of themselves, as, with but a handful of exceptions, they regard themselves as descendants of the Javanese invaders, not the ur-Balinese defenders" (Geertz, 1982: 14).
32. Of course, Bali is not a utopian society either. The myth of Bali has been explored by Boon (1977). Bali today is strongly influenced by the nation-state of Indonesia. The Republic of Indonesia has been characterized by an elite dominated by a group of leaders whose roots are in the military and who believe a Neo-Classical "economic growth" approach to development will be the most successful.
33. Richer groups are saving but they often take their savings out of the country. Furthermore, richer groups tend to have a pattern of consumption that is concentrated on luxury commodities not produced locally. The use of large-scale, sophisticated, capital-intensive technology in the modern urban sector tends to benefit the elite and middle classes. See Robison (1986) for one controversial interpretation of different classes and capital-owning groups in Indonesia.
34. A draft version of this paper was presented at the Ethics and Technology Conference held at the University of Guelph October 26-28, 1989. For an overview of the conference see Bakker, 1990b.
35. Recent work on the mathematics of "chaos" has indicated the extent to which "entropy" and "dysentropy" are matters of perspective. See Frank and Stengos (1988) for a good survey of the literature, particularly as it pertains to non-linear economic time-series. There are patterns in systems which, on the surface, may appear quite irregular. There are higher order periodicities in systems which at first appear to be mere noise.
36. The "first estate" consisted of clerics and the "second estate" was the aristocracy. There was a great deal of overlap between the first and second estates in France in the eighteenth century. Many clerics were also noblemen. The "third estate" included everyone else, from the richest member of the bourgeoisie to the poorest urban worker.
37. Fischer (1970: 31) makes it clear that not all statements that sound like tautologies are necessarily tautologies. Thus, for example, when President Calvin Coolidge said: "The business of America is business" he was using the term business in two different senses to maintain implicitly the proposition that the primary concern of U.S. society *as* a whole was capitalist business enterprise. However, on another occasion Coolidge said: "When people are out of work, unemployment results" and Fischer indicates that then the taciturn American President *was* being tautological! One can dispute the first statement, but not the second. The unemployment quote is "true by definition."
38. These are not syllogistic "axioms" in the technical sense. Instead, they are merely statements which are loosely connected to the major thesis. They are part of an interrelated set of assumptions which I am attempting to further specify analytically. Compare Lutz (1985).
39. Note, for example, the distinction made by medieval theologians between *catallactic justice* and *distributive justice.* Catallactic refers to exchange; it implies that a "just price" has been given. Such a concept is central to definitions of "usury." "Distribution was to an

astonishing extent neglected by modern Western economists until very recently" (Wiles, 1979: 419-21). Haksar (1986) has contrasted Rawls and Gandhi on the limitations and strengths of civil disobedience, but does not discuss development.

40. See Walster, Walster and Berscheid (1978) for an illuminating survey of literature on the psychological and social psychological aspects of "equity." I have stayed away from a discussion of *sarvodaya at* this point. See Lutz (1985) and Roy (1985).
41. Gandhi was asked by his constructive workers in Sevagaram Ashram in Wardha for a *talisman* that they could carry with them for good luck. He thought about it and decided not to give them a physical object that they would reify as a charm. Instead, he admonished them to always make decisions based on the effect those choices would have on the poorest of the poor.

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