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DUALISM, SECTORAL PLANNING AND INTEGRATION OF
THE MODERN INDUSTRIAL AND DISPERSED TRADITIONAL SECTORS*

by

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Introduction

The issues of technological, sociological and regional dualism are familiar to all development economists and planning officials. In most developing countries, as emphasized in the First Meeting of the Consultive Group on Appropriate Technology (Vienna, 23-25 November 1977), the benefits of progress in the modern-industrial sector have been largely confined there, with no spread to rural-dispersed sectors. Thus economic development in most developing countries has tended to be of an enclave nature with benefits (reflected in employment and income generation) accruing only to a small segment of the overall population. At the same time, there is a continuance, if not an intensification, of poverty and social alienation among the peoples of the rural and "non-modern" urban sectors. It must be emphasized, that on a purely economic level, the problem of dualism is most importantly viewed in the context of dual income structures, and the resultant marked dual living standards between the two sectors, as broadly

*The author gratefully acknowledges the assistance of Charles Cox, (Engineer-Agricultural Economist) President, Indamer Company, Lansing, Michigan, U.S.A.; and Subbiah Kannappan, Professor of Development Economics, Michigan State University, East Lansing, Michigan, U.S.A.

defined.¹

Despite a growing understanding of the nature of sectoral non-integration (a lack of coordination and market communication between modern-industrial and the rural and non-modern urban fringes) little has been accomplished on a micro-planning level to aid in a solution to such problems. Basic needs of the larger community remain unfulfilled. These basic needs range from the individual family requirements of the excluded peoples (food, clothing, housing, etc.) to infrastructural public goods requirements such as transport, medical care facilities, educational facilities, sanitation and water purification facilities, etc. This does not represent an intended neglect of such needs by authorities and decision makers in the modern-industrial sector, but rather a lack of perception of an effective system for sectoral integration.

This lack of perception of an effective sectoral integration system is rooted in two factors. The first factor relates to "biases" introduced by certain imported notions of modernization and industrialization which result in the adoption of technologies, production systems, consumption patterns, etc. which may fulfill certain narrow requirements of the modern-industrial sector but are entirely inappropriate when generally extended to the larger economy. The second factor is the lack, on the purely scientific level, of a new, pragmatic, conceptual planning model.

¹The usual preoccupation with notions of unemployment and underemployment often obscures the real issues in dualism - widely disparate income levels, consumption levels, etc. between the two sectors. Also consideration of social dualism and class alienation must not be excluded from our consideration. We must also recognize that, the "rural" sector, as traditionally defined (usually referring to village level social and economic systems) may experience, in general welfare terms, higher standards of living than the "excluded" populations of the urban "fringe."

Such a model must first be "notional" in the sense that it is broadly applicable to the common problems of dualism faced by most developing countries. The foundation of such a model must be directed toward "perceptual" changes in the minds of decision makers, reorienting them away from the aforementioned biases and in the direction of planning notions based on sectoral integration.² Equally important, "The New Planning Model" must be designed with a maximum number of "sets" and "subsets" that effectively (on the subgeneral level) allow for adaptation to particular national circumstances (factor endowments, class structures, etc.). Such a model, on all levels, must be sectorally-oriented, i.e., it must allow, initially, for clearly defined "targets" for each sector. These targets are not traditionally or randomly defined, but rather defined within the spirit of the integration scenario previously identified.

Thus all potential "solutions" for problems of dualism and non-integration will fail if they are not an integral part of an overall, innovative, sectorally-oriented general development plan. This point is especially relevant to the present issue of "appropriate" industrial technology (appropriate being a much abused term). What is "appropriate," insofar as technology is concerned, depends upon the targets defined for each sector and the specialized role that each sector can play in the overall development effort.

²Such perceptual changes must involve due recognition of factor price distortions introduced by previous developing country governmental policies, as well as general inclinations to view modernization within the constraints imposed by developed country preoccupations, resource endowments, political goals, etc.

Such an innovative plan implies a laying aside of traditional notions of the universal appropriateness of agricultural development schema for dispersed sectors, and the general appropriateness of "labor-intensive" production processes for all sectors of developing economies. What is appropriate, again, depends on the targets defined for each sector and sub-sector.

Thus, the discussion in this paper focuses upon the respective roles of the dispersed sector (of which the traditionally defined "rural" sector is a subset) and the modern-industrial sector within a pragmatic sectoral planning schema. The role of the modern sector must be innovative in the sense that it does not serve as a hindrance or detriment to the development of the dispersed sectors, but rather plays a new constructive role in sectoral integration with due attention to its own exclusive role as the vanguard sector. Product specific market potentials are outlined for the dispersed sectors, focusing on their potential roles in the integrated planning system. These sectors are redefined as the "decentralized" sectors, which implies new constructive interlocks with the modern-industrial sector. An appendix is attached which offers several brief examples of specific product lines that may be efficiently and profitably allocated to decentralized production.

Intra-sectoral trade relations are also discussed, as well as trade linkages which extend from the decentralized sectors to foreign markets. Subsequent sections discuss project specific issues that must be analyzed in order to determine project specific input needs (including supply sources for technological knowledge and know-how). The final section identifies several general policy issues relevant to profitable and efficient industrial development of the decentralized sectors.

Sectoral Planning

As a prelude to a general discussion of sectoral planning certain "cobwebs" must be cleared away. Semantic preoccupations are still reflected in existing literature. Such notions as "urban" versus "rural" exclude, taxonomically, other fringes (in many countries) where poverty is at its worst. One need only visit the urban slums of Rio de Janeiro, Calcutta, Manila, etc., to be convinced that the problems of poverty are not confined to the rural village level. Thus, the symptoms of non-integration spill over into urban areas. The urban/rural dichotomy may be inappropriate for dealing with the problems of non-integration. A more appropriate term to substitute for "rural" would be "traditional-excluded." Such a term implies dispersion and separation from the nexus that constitutes the modern-industrial core in developing countries.

The Modern Industrial Sector

Recognizing the dangers in generalization, one may safely advance that the modern sector in developing economies must continue to expand and develop rapidly to meet basic needs for goods that must necessarily be produced in large scale (i.e., inherently capital intensive), concentrated production systems and processes, to provide basic intermediate inputs for internal markets and certain products for export (based upon potential comparative advantages in goods markets, exploitation of local national resource endowments, etc.). Not to be overlooked is the "learning experience" involved in development of modern sector industrial processes and systems; including scientific and technical training and know-how accumulation, the accumulation of managerial expertise, and the

building of entrepreneurial ability. Thus developing countries should not necessarily isolate themselves from global interdependence and trade patterns. The modern sector must not be isolated from the "mainstream" which carries the most recent developments in technological knowledge and know-how necessary for them to execute their role as the vanguard sector in international relations moving toward the New International Economic Order.

This point is especially relevant to large or relatively advanced developing countries (such as India) that already have significant levels of industrialization and the necessary supportive infrastructure. Thus, where possible, emphasis must be given continued development, in such nations, of national capabilities in minerals exploitation and refinement, metal products, machinery (including electrical and transport equipment) and a wide range of "intermediate" industrial inputs. Exports of these manufactured products have increased significantly from such nations and could bring them to the threshold of a major industrial trading power in the next decade. It must be emphasized, however, that development of the modern sector must be planned and tracked with primary attention to the development of domestic capability and self-reliance in national markets (insofar as "rational" within a long-run cost benefit calculus) as well as due attention given extra-national trade, building upon local resource endowments, and drawing inputs from foreign markets as required (again, with due recognition of long-run cost benefit calculus). This implies the need for a "national" orientation in development planning for the modern sector with emphasis upon cost-benefit considerations and trade-offs regarding project selection and development, as well as selection of foreign technology and bargaining strategies with foreign suppliers of

technology of every variety.³

Quite aside from considerations of international market relations, there must be close linkages established (through innovative central government guidance) between the indigenous modern sector and the excluded fringe sectors. On a planning level, production capabilities and systems must be expanded and modified (in certain subsets of overall industrial systems design) so as to provide needed intermediate inputs (and planning guidance) for the excluded-decentralized-traditional sectors. Such efforts include provision of appropriate physical capital (means of production) as well as technology suitable for unifying, on a relatively small scale, these capital requirements with traditional talents and skills that may already exist in the excluded sectors. In the latter case (the case of "appropriate" technology for the proposed decentralized sectors) innovative directions must be taken, away from professionally preconceived notions of the usefulness of "vintage" technologies, in the direction of a synthesis of useful technologies and systems, utilizing the best of previously recognized technologies and systems, in combination with the most recently available technologies and production systems, which together, satisfy the needs for efficient production in the proposed decentralized sectors.

³For a discussion of cost-benefit trade-offs in technology importation and development see: Joseph D. Peno and Harvey W. Wallender III, A Contingent Approach to Technology Policy Proposing a Cost/Benefit Analysis, Monograph Seven in the series Transfer of Technology: The Future of Regulation. Council of the Americas, New York, New York, 1977. For an excellent discussion of issues in building local technological infrastructure (based on the principle of self-reliance and national development) see: Rana K.D.N. Singh, "Technological Development and Self-Reliance," "Selection and Acquisition of Foreign Technology," and "Contractual Aspects of Acquisition of Foreign Technology," Brazil Training Workshop on Policies and Negotiations Concerning Transnational Corporations, Rio de Janeiro, Brazil, 10-21 April 1978.

Thus the modern sector, on the planning level, must provide vanguard international trade and political leadership (with due concern, within a long-run cost/benefit framework, for building indigenous capabilities) and it must also play a pivotal role in a new scheme of domestic integration based on production, trade, and social linkages with the decentralized sector.

The term decentralized sector, in the present context, implies a structural change. It no longer implies "excluded" sectors, but sectors, within the overall planning scheme, that are designed to be decentralized. This implies new constructive linkages between the existing modernized sector and the proposed decentralized sectors. Such linkages, once formed, imply dynamic transition to integration, the eradication of dualism (as traditionally conceived), and the inclusion in the development process of the "excluded."

The modern sector faces unique problems. It must deal with external trade relations, political problems, and problems in technological development planning, (which implies, on a negotiating level, dealing with a broad range of external suppliers of technology). Prominent among such suppliers, of course, are the classes of dominant multinational firms. Dealing with such entities involves central governments and ancillary entrepreneurial classes. Central governments and local entrepreneurs are faced with decisions relating to optimal joint-bargaining strategies for technology importation through various modes, which involve considerations of, again, cost/benefit trade-offs between direct foreign investment of the wholly owned variety, majority vs. minority joint-venture arrangements,

licensing, etc.⁴

Quite aside from these international pressures, internal indigenous pressures are placed upon central governments and entrepreneurs in the modern sector from the "alienated" masses in the dispersed sectors. Such pressures range from the burdens placed on the public budget arising out of the need for supplementary support mechanisms that are extended on a "non-market" basis in an attempt to relieve relative "welfare" problems, to certain political and social pressures that lead to political instability.

In summary, the role of the modern sector in a sectorally integrated planning schema is significant. It must be capable of meeting the challenge of being the innovative link between international markets and the entirety of the national economy. Its greatest challenge is in creatively adapting or synthesizing technologies and production systems to its own needs and offering leadership to the decentralized sector in doing the same. It must also provide leadership in the promotion of new enterprise organizational systems for the decentralized sectors. Insofar as the modern sector provides such leadership, its role is that of a vanguard sector, not merely an intermediary between the international and national economies.

The Excluded (dispersed-traditional) Sectors

In determining the role for the excluded sectors, traditional notions

⁴For discussion see: Rana K.D.N. Singh, Ibid. Also see Peno and Wallender, Ibid. Also see J. D. Peno, "Multinational Corporate Behavior in Host Country High Level Manpower Markets: The Implications for Technology Transfer and Foreign Investment Control in the Less Developed Host Country" in D. Germidis, ed., Le Transfert Technologique Par Les Firmes Multinationales, Volume II, Centre de Developpement de l'Organisation de Cooperation et de Developpement Economiques, Paris 1977.

of simple "agricultural specialization" must be relegated to a "subset" of a more diversified and comprehensive schema for development of such sectors. Purely agricultural planning schema are not the focus of the discussions in this convocation. Our concentration here is upon industrial production possibilities for the excluded sectors, as well as upon trade and linkage potentials between the excluded-dispersed sectors and the modern industrial sector. With this in mind, three market potentials seem ripe for investigation and development in the excluded and dispersed sectors (including importantly, what is traditionally defined as the rural sector). These include: (1) the provision of "rural-traditional wage goods" employing "traditional skill-intensive" techniques in small scale plant installations; (2) provision of intermediate industrial components and services for both the decentralized and urban industrial sectors, employing "skill-intensive" techniques and small plant scale; and (3) provision of agricultural services and intermediate processing and production inputs for the agricultural sector (including machinery maintenance). It may well be that the development of capabilities to produce such a range of goods and services in the excluded sectors will not only contribute to the development of such sectors (bringing them into a constructive milieu as a decentralized, partially self-supporting sector) but also contribute valuable inputs on a least-cost/efficient basis to the modern sector and, potentially, identify for the decentralized sector an active role in foreign trade.

It should be understood that there may be trade-offs between long-run development considerations for the decentralized sectors and notions of "pure" efficiency in the short-run sense. It is understood that certain concepts of pure productive efficiency ("cost minimizing" and profit-

maximizing") may have to be subordinated, in certain decentralized product lines, to more long-run social and economic objectives such as: local infrastructural development, more equal income distributions, and certain indirect contributions to real income and structural change that project development in these sectors will bring to the overall development effort.⁵

The latter suggestion represents a modification of the traditional infant-industry argument which would, with proper updating, be applicable to planning for the decentralized sector. Importantly, however, it may also be true that the decentralized sector can provide the goods and services, specified above, on a more efficient basis (i.e., at lower overall cost in terms of developmental resources) than could the centralized, modern industrialized sector. Thus, the often mentioned "trade-offs" between long-run development considerations and short-run notions of efficiency may be moot issues. There may be no need to deal with trade-offs in this context, since the criteria for meeting the goals of structural change, infrastructural development, and rising income levels in the formerly excluded sectors may not be at variance with traditional notions of economic efficiency and profitability - depending upon specific product lines (taking into consideration process and engineering details on scale, equipment, labor requirements, etc.). Investigation of this latter point most certainly must be empirical (on the most specific engineering, process, and project specific levels).⁶

⁵A fuller examination of certain elements of such a cost-benefit calculus is more appropriately reserved for discussion at the Convocation.

⁶This point is further elaborated on in the following section on Production Functions. Further detail on the product specific level is provided in the attached appendix. Certain innovative organizational structures at the decentralized enterprise level, including franchising schemes extended from the modern industrial to the decentralized sectors, will be discussed at the Convocation.

Let us now investigate certain fundamental characteristics of the aforementioned product lines.

Rural wage goods: Rural wage goods may be broadly defined as goods that meet basic household needs in the dispersed sectors (i.e., cleansing materials, clothing, cooking utensils and equipment, adequate housing, furniture, certain consumer durables, etc.). Such goods are viewed as being in accordance with traditional tastes and existing budget constraints. These goods are seldom available from the modern-industrial sector on an affordable basis. Indeed, the processes of "modernization" in the modern-industrial sector has brought not only imported technologies and production systems that are inappropriate for the proposed decentralized sector, but has also brought imported "tastes" inconsistent with the "tastes", basic needs, and budget constraints of the excluded-traditional population. This is especially true at the rural, village level.⁷

It is important to recognize that the demand for such goods within the rural-traditional-dispersed sectors is likely to be quite significant — even more so as incomes rise within these sectors. Although, in some purely theoretical discussions, the demand for locally manufactured goods and certain locally provided services have been viewed as declining as rural or traditional incomes increase, certain empirical studies do not support this view.⁸ The income elasticity of demand is thus one of the

⁷The term "rural" in rural wage goods can be interpreted as "low-income" or, alternatively, "appropriate."

⁸For discussion of the relative "income effects" associated with such goods (referred to as "Z" goods) where the view is that such goods are "inferior" goods (in which case less goods are demanded at higher income levels - preference being given to goods produced in the local modern sector or imported from abroad) see: Stephen Hymer and Stephen Resnick, 1969, "A Model of an Agrarian Economy with Nonagricultural Activities," The American Economic Review, 59(4): 493-506.

critical factors in analyzing the demand in traditional-dispersed sectors for the products of small scale industry within the same sector (rural wage goods). In this context, both the magnitude and sign of the income elasticity of demand coefficients for small scale industrial products are of importance. Existing empirical evidence on demand elasticities undertaken in a number of studies reveal that the "rural" income elasticity of demand for most such small industry products is strongly positive. These results indicate that such products are not "inferior" goods, but rather that the demand for such products should increase strongly as real incomes in rural-traditional-dispersed sectors increase.⁹ Thus an actual and potentially expanding market could exist for such goods at the local level, as well as at the international level where certain traditional handcrafted goods are considered "luxury" items in developed countries.

Evidence indicating low capital requirements, considerable latitude for factor substitution (with emphasis on skill-intensive labor inputs) and considerable rates of economic profit for such industries offers additional support for the need for their encouragement and promotion.¹⁰

⁹For evidence on income demand elasticities which support the argument that the demand for "rural wage goods" should rise as real incomes increase see: C. Liedholm and E. Chuta, "The Economics of Rural and Urban Small-Scale Industries in Sierra Leone," African Rural Economy Paper #14, African Rural Economy Program, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1976. For additional evidence see: Philippe Leurquin, Le Niveau de Vie de Populations Rurales du Ruanda-Urundi, Institut de Recherches Economiques et Sociales (IRES), Publication of Lovanium Universite de Leopoldville, Louvain and Paris, Editions Naruvelaerts, 1960.

¹⁰For one limited example see C. Liedholm and E. Chuta, 1976. The author of this paper, in cooperation with other rural development specialists and engineers, is presently involved in accumulating additional and more concrete evidence on these points. (Details to be discussed at the convocation.)

All programs to increase standards of living in the dispersed sectors must also take into consideration the provision of complimentary (in terms of living standards) "public goods" whose production must rise to compliment individual family consumption of rural wage goods. Such public goods include improvements in water pumping facilities and purification, irrigation systems, drainage systems, sewerage systems, and the provision of energy requirements. To whatever extent feasible, such public goods should be produced and maintained within the dispersed sectors. Intermediate inputs into the production and maintenance of such goods could be considered as closely related to the provision of rural wage goods - the objectives being the building of local infrastructures, raising of local standards of living, and relieving pressures on the modern sector (all within the developmental cost/benefit calculus, aforementioned).

Intermediate industrial components for the decentralized and urban-industrial sectors: Here the emphasis is upon the production of intermediate industrial components that are efficiently producible within the rural sector for rural sector needs (as required in the production of rural wage goods and rural public goods) as well as specialized intermediate industrial components that are "exportable" to the indigenous modern sector at low comparative cost, and perhaps also exportable abroad. Production systems that provide these goods should be based upon the same notions of the utilization of human traditional skills and factor endowments in small scale production installations as discussed before. One likely product line is components' manufacture requiring manual dexterity, patience, and pride in craftsmanship that is generally lost to large scale machine technology systems (including certain electronics component manufacture and all other products which require a high degree of human

supervision and dexterity).

Quite aside from such universal engineering considerations (which are applicable within developed countries as well as developing countries within such component manufacture) there may exist new opportunities for efficient, profitable, small scale intermediate goods manufacture (and services provision) based upon technologies and small-scale processes which are wholly inappropriate to developed countries who are already committed to large scale marketing and manufacturing systems, and specific product lines, where emphasis is placed upon replacement rather than maintenance. The failure of the developed countries to adapt such technologies, production, and service processes, is partially explained by their relative factor endowments; and, importantly, by certain aspects of industrial organization which, historically, preclude small scale enterprise and the associated technology. That is not to say, however, that these small scale productive processes and technologies are not efficient, nor does it imply that they are in any sense "vintage." In the research departments of certain large "market dominant" firms in developed countries, certain technologies and processes are consistently discarded since they cannot be integrated into existing large-scale production systems (i.e., produced in capital-intensive systems) and would result in product lines which are inconsistent with developed country tastes and notions of replacement rather than maintenance.

Examples of such possible intermediate goods product lines (efficiently producible in small scale installations) include metals casting of several varieties, industrial ceramics products, fiber materials (useful for cable, mats, ropes, cargo handling webbing, etc.), leather goods for industrial purposes (welder's gloves and leggings, power trans-

mission belts, flaps used in hand pumps, and all types of seals in chemical industries), and hot air engine manufacture - with solar reflectors. Certain of these intermediate goods represent inputs into decentralized small scale industries and are producible within the same sector; certain are exportable to the modern sector and even abroad.¹¹

Not to be overlooked are certain intermediate industrial services which fit quite nicely into the schema of small scale production in the decentralized sector. One good example would include certain spray metal processes, adaptable to small scale service enterprises, using known (but sophisticated) small scale equipment and materials. Trucks, equipped with such metal spraying equipment, could tour textile factories, etc. converting worn machinery parts into "reconditioned" parts that are more durable than new ones. The idea here is on constant maintenance rather than replacement, which is most applicable to "closed-loop" decentralized production systems. Such "constant maintenance" industrial equipment services may represent an alternative to more expensive components replacement, and provide the basis for profitable small scale industrial service industries.¹²

Provision of agricultural services and intermediate processing and production inputs for the agricultural sector (including machinery maintenance): Close interlocks are possible between rural industrial enter-

¹¹For selected specific product line examples with engineering detail see the attached appendix. Further elaboration to be provided in conference discussion.

¹²Such services, as well as certain of the aforementioned products, are based upon "composite materials technology" which is known in developed countries, but is infrequently used since the majority of these composite techniques have yet to be designed for production or implementation in large scale capital-intensive systems.

prises and the agricultural sector (defined, in the narrowest sense, as those enterprises responsible for the planting, cultivation and harvesting of agricultural products). The decentralized industrial sector may provide, on the basis of local small scale enterprise, certain products; crop processing and storage services; and machinery maintenance services that are appropriate to innovative collective and/or consolidated local farm systems. The production and provision of such products and services should be based upon the same business organization and production principles as outlined for the "rural wage goods" and "intermediate industrial component" product lines - i.e., such products and services should originate within small scale enterprise, employ skill-intensive techniques with low physical capital requirements, and operate subject to the principle of constant maintenance versus replacement as regards capital equipment.

Examples of agricultural services would include soil testing and hybrid seeds development, etc., as well as machinery maintenance (utilizing the coating processes originating from small scale "touring" enterprises). The provision of processing equipment (e.g., village grain dryers and drying services provided in the decentralized sector and serviced in accordance with the principle of constant maintenance) also represents a potential market for the decentralized sector in the area of agricultural processing equipment and services. Insofar as direct production inputs into planting, cultivation, and harvesting, the provision of simple, low horsepower farm machinery; steel plow shares [and/or steel (pre-drilled) plow share shoes for wooden implements]; irrigation pipe deriving from local ceramics industry development; etc., seem promising for market development for decentralized small scale industrial enterprises. Perhaps in no other previously discussed area does the principle of self-reliance

seem more appropriate than here.¹³

The principle of local supply and maintenance of required agricultural inputs and services may not only be more efficient for the agricultural sector, but might also generate local "multiplier" effects as regards incomes and local trade systems and linkages. Such trade systems (which would generate more local disposable income) would contribute to the development of markets for rural wage goods. Also, importantly, local farmers would be able to have a direct input into the design and construction of farm implements manufacture as well as inputs into (in the purely market sense) the provision of consumer goods in accordance with local tastes and budget constraints.

Inter-sectoral Trade Relations

Sectoral planning, as generally discussed in the preceding sections, should clearly imply certain inter-sectoral trade relations. The directions of such trade relations should begin (in the interest of developing the decentralized sectors) with linkages established, initially, within these sectors. Thus, local trade, based upon progressive local development, should be encouraged. The objective here is to build, on the decentralized level, production and decision making abilities.

To the extent that such endeavors are successful, the decentralized sectors will play a new pivotal role in the overall development effort: (1) through the principle of "local" self-help, living standards should

¹³ On a more sophisticated level, such self-reliance implies an integrated "closed-loop" within the previously excluded sectors - which maximizes the mechanics and mentality of self-reliance on a micro scale, and minimizes "dependence."

rise and welfare burdens be lessened on the modern industrial sector; (2) on a more advanced level, trade patterns may be developed between the decentralized sectors and the modern industrial sector (the decentralized sector providing the modern industrial sector with valuable, low-cost intermediate industrial inputs); and finally (3) the unique resources and capabilities of the decentralized sector (as fully brought to fruition within the principles of decentralized sectoral planning) can, in the final stage, contribute to the overall fulfillment of the national objective - the emergence of the developing country (nation state) as a viable international trading entity which draws upon their own national human and organization endowments.

Much basic empirical work is needed, at the outset, in order to effectively plan and promote new schemes of intra-sectoral and inter-sectoral trade. Empirical studies (at the local level) must be undertaken to establish the local income elasticities of demand for the products of the decentralized sector (i.e. locally produced rural wage goods). Such studies should be specific to each developing country.¹⁴

Detailed empirical studies are also required to determine demand and production potentials (unrelated to purely local consumer goods markets and income levels) for other products produced in the decentralized, small scale sectors. Such studies should focus on possible forward and

¹⁴ Within the new planning system proposed here, efforts might also be taken to constructively alter demand patterns at the local level. Such efforts would involve "demand management." These demand management programs should be directed toward education and incentive systems designed to increase local consumption of locally produced goods and services.

backward linkages between intermediate goods manufacturers in the decentralized sector and other producers within the same sector, including those engaged in the production of agricultural and non-agricultural goods. Also research should be done on potential linkages with the modern industrial sector and foreign markets.

All results of empirical examinations of present linkages must be interpreted, however, as, in part, reflecting past decision making as regards rural development. The results could also reflect the recent enculturation of certain biases associated with imported notions of modernization. Thus, care should be taken to interpret such empirical findings with an eye to the potentials for new, efficient forward and backward linkages between all sectors. Such new potentials must then be supported through investigation of innovative pilot production systems appropriate for the success of local enterprise (including manpower training and development, development of entrepreneurial capacity, managerial expertise, etc.). Such empirical studies thus become an input to innovative program development for the decentralized sectors.

The modern sector must play a pivotal role in this structural transformation process. Such a role must not, however, be "dominative" to the extent that the modern industrial sector (and its decision makers) squelch local initiatives and fail to recognize (given possible "biases") potentially promising trade patterns.

Production Function and
"Alternative Process" Analysis
For the Decentralized Sectors

The planning and market reorientation schemes discussed above must be based upon a clearer understanding of existing small-scale enterprise

structures and alternative production processes (including intra-enterprise organizational and management systems). What is initially required is an "audit" of existing small scale enterprises in the decentralized sector to determine their basic production structures, including working capital, production equipment, labor inputs (both quantitatively and qualitatively - in terms of skill requirements) as well as building design and scale.¹⁵

Estimates of the levels and variations in market demand should also be obtained, as well as data on relative profitability of various enterprises. In particular, engineering "process" analysis should be undertaken to determine the capital and/or labor intensity of existing processes within such enterprises, and the amount of output and employment generated per unit of capital employed in each process.

Employing this basic data on existing, indigenous, small scale enterprise, production engineering studies should be undertaken with a view to developing new processes, employing (if necessary) more recent technologies - the goal being more efficient production processes and overall systems suitable for decentralized, small scale industry.¹⁶

¹⁵Careful gathering of input-output data for such small scale industries could allow the application of traditional production function analysis which would indicate the presence of returns to scale, marginal productivity estimates for various inputs, and elasticities of input substitutions.

¹⁶This involves innovative production engineering and "activity" analysis. The author of this piece is at present working closely with a rural development-production engineering team to develop innovative processes and organizational systems for decentralized industry. Such activity analyses must be interpreted, however, within a long-run development plan based upon considerations of social and economic "structural change requirements" that could, on the specific project level (in the short run), be at variance with traditionally interpreted "minimax" notions in activity analysis. Thus the long-run (developmental-social) cost-benefit calculus (as previously discussed) must prevail where deemed appropriate. Such a

On a policy level, emphasis should be placed upon the combining of "traditional sector skills" with "minimal-optimal" inputs of physical capital (which embodies certain technology) and required inputs of "disembodied" pure technical knowledge and know-how, in such a way as to provide new processes and plant organization systems that increase the efficiency of small-scale enterprises, improve the quality of products, and "tap" more effectively the local manpower and skill endowments of the excluded-traditional sectors. Such endeavors involve consideration of optimal (or feasible) factor substitution possibilities, financial and real capital requirements, efficient scale of operations, level of technological knowledge and know-how required, required equipment maintenance (with emphasis on possibilities for "constant maintenance" rather than replacement), production line skill requirements, and managerial skill requirements.

A more comprehensive audit should be taken of traditional skills and resources (including historic perceptions of local market opportunities and organizations) to determine potential, but yet un-tapped human resources in the dispersed sectors.¹⁷ Such traditional skills and resources may not be reflected in present small scale production enterprises. Thus, the audit process must be extended to include an assessment of human capital capabilities of those that have been "excluded" even within the dispersed

long-run cost-benefit calculus must also necessarily take account of certain developing country aspirations as regards "political dependency" and "self-reliance".

¹⁷The so-called "rural sector" (or more appropriately, the excluded sectors) are often viewed as populated by totally unskilled, unsophisticated, "unmonetized unemployables." In actuality, the dispersed sectors, in certain developing countries, might contain "pools" of un-tapped and misunderstood talent that is centuries old - and extremely useful and productive in innovative systems of decentralized planning. We need not belabor the point that the process of industrialization has created a type of alienation from work and an eroding of basic traditional skills. If nothing else, the isolation of the dispersed and excluded sectors may have preserved certain of these virtues and talents.

sectors (for local cultural reasons as well as reasons of imported biases which have "seeped" to the dispersed sectors).

Supply Sources of Appropriate
Technology - Selection in Accordance
with Sectoral Goals and Targets

The problem here is simply stated: from where will the "appropriate" technological knowledge (including complete systems), know-how, and required physical capital inputs (which "embody" certain technology) be derived or obtained. Technology requirements and potential supply sources must be determined and evaluated within the context of the special needs of the modern-industrial and decentralized sectors. Thus, to repeat, what is "appropriate" depends upon the goals and targets defined for each sector. As regards imported technologies, emphasis should be given optimal cost/benefit choices across the entire range of external suppliers. Such a range of external suppliers include: 1) general educational facilities (foreign); 2) multinational firms (of both the dominant and non-dominant classes); 3) consulting and/or engineering firms; 4) firms that specialize in equipment sales and supplies; 5) inter-governmental technical assistance; and 6) technical assistance from international organizations (United Nations, etc.).¹⁸

The special needs of the modern sector, given its goals as previously

¹⁸ For a contingent approach to technology importation, emphasizing the need for cost/benefit analysis of importation from each of the aforementioned classes of suppliers see: Joseph D. Peno and Harvey W. Wallender, III, A Contingent Approach to Technology Policy Proposing A Cost/Benefit Analysis.

For a discussion of special problems regarding transference of pure technical knowledge (and especially know-how) from the class of dominant, oligopolistic multinational firms see: J. D. Peno, "Multinational Corporate Behavior in Host Country High Level Manpower Markets: The Implications for Technology Transfer and Foreign Investment Control in the Less Developed Host Country."

defined, could involve negotiation with foreign suppliers of technology for purchase (according to a multiplicity of terms, conditions and prices, both implicit and explicit) of the most recent "leading-edge", large scale technology, processes and systems. All such trade relations should be based (from the standpoint of the developing country) upon careful cost/benefit assessments of conditions imposed (both market and political) by each foreign supplier of such processes and systems. Maximum emphasis should be given to "selective importation" with a view to developing subsequent adaptation of such processes and systems to local requirements and factor endowments in the modern sector. Emphasis should also be given development of indigenous capabilities - building upon imported technology systems. Such systems should be viewed as an "input" into technology adaptation and development programs geared to meet national objectives.

The primary focus of this paper has been upon the decentralized sectors. Special types of technological knowledge and know-how, as embodied in certain specific production processes and general enterprise organizational systems, are required for the development of the decentralized, small scale sectors. Certain of these technologies may be imported through the aforementioned channels. As already suggested, many specific production processes (small scale-relatively labor intensive) are continuously discarded in the research and development departments of large scale enterprises in developed countries. It is urgent that such processes enter the trade nexus in technology.¹⁹ The same applies to

¹⁹More complete discussion to be provided within the context of the conference proceedings, with emphasis upon potential developing country demand for such technologies which could channel these technologies into international trade.

certain product lines that are (or have become) inappropriate to developed country notions of "replacement" rather than "maintenance."

It is especially important that maximum emphasis be placed upon self-reliance in the decentralized sector. Thus, imported technologies should again be considered as inputs into local innovative adaptation.

Quite aside from importation of technologies, innovative research and development efforts should be encouraged within both the modern-industrial and decentralized sectors. Such efforts should draw upon the learning experiences of enterprise managers and entrepreneurs in each sector.

Generally, as regards the technological needs of both the modern-industrial and decentralized sectors, the principle of building national self-reliance should again be paramount. Thus, national capabilities must be developed on all levels for adapting imported technologies to national needs in all sectors. On a comprehensive national level, this should involve: 1) establishment of specialized research and development centers for "screening" and adaptation of imported technologies in accordance with their "fit" to national and intra-national sectoral needs; 2) institutional and political arrangements should be formulated to facilitate trade between developing countries in adapted and imported technologies, and innovative processes and systems derived from common local enterprise experience; and 3) developing country centers should be established (on a regional basis) for information and support in bargaining with foreign suppliers of technology.

General Policy Issues

Certain general policy issues are immediately and obviously derived from the foregoing premises. On a general level, effective national political routes to sectoral planning must be established (by nation-state). Assuming a national commitment to the planning efficacy of certain decentralized market and political structures (which could also be applicable to systems of decentralized state socialism) certain concrete policy issues may be identified:

- A. Clearly defined roles must be established for the modern-industrial (centralized) sector.
- B. Clearly defined roles must be established for decentralized sectors.
- C. Based on the principle of building national self-reliance, mutual and interlocking political and market relationships must be developed between the modern-industrial and decentralized sectors (which after establishment imply constructive, national political and economic interlocks between the centralized and decentralized sectors, which operate in symbiosis to produce a unified national, political and developmental front).
- D. In the interest, on the micro-scale, of developing decentralized capabilities, certain studies must be undertaken of existing entrepreneurial and other human resource capacities within the existing dispersed and excluded sectors. Given such understanding, programs should be adopted which muster local entrepreneurial talents, and skills. Such innovative programs should be a primary focus of conference discussion.
- E. Government directed policies should be adopted (with modern private sector participation, where applicable) to further develop entrepreneurial abilities within dispersed areas with emphasis upon education in "risk evaluation" and promotion of "risk taking."
- F. On a concrete level (given understanding of local human resource potentials) certain credit policies (broadly defined) should be discussed which would

encourage local enterprise development.²⁰

- G. On the same specific level, technical and managerial assistance should be extended to dispersed sectors to build and expand upon existing human capital endowments.
- H. National policies on taxation, import duties, etc. should be geared to maximize incentives in the decentralized sectors, insuring that local efforts are duly rewarded. Such concepts extend beyond purely pecuniary considerations to issues of local hegemony and control which are, in and of themselves, rewards.
- I. On a general level, technology importation systems must be directed toward self-reliance on all levels.
- J. Local inputs into required technological research and development should be maximized (including inputs from the village level).
- K. National research and development centers should be established to "screen" and synthesize foreign technology imports with local research and development outputs.
- L. Regional centers should be established to disseminate innovations to other developing countries (both imported and locally "produced").
- M. Certain pilot projects should be undertaken, building upon known successful enterprises in the dispersed sectors. Such projects should be experimental, and also be developed and "tracked" with a view to subsequent replication.

These policy issues are offered for discussion in Convocation proceedings (to be adapted and amended as appropriate).

²⁰Such policies should encourage self-finance as well as improved access to credits through the formal financial system at the modern national level for local entrepreneurs.

Concluding Remarks

The term "self-reliance" or, alternatively, "self-help", has been repeatedly employed throughout the foregoing discussions. The Indian term Swadeshi is richer, and more all-encompassing, than the terms self-help or self-reliance. In a modern-extended form, it is suggestive of autonomous, indigenous, innovative developing-country planning schema.²¹ In connection with such a re-interpretive approach to Swadeshi, three general planning principles may be identified.²² The first of these principles identifies the need for developing international trade potentials with emphasis upon comparative advantage. However, the focus of such trade policy should be upon enhancing developing country resource endowments on all levels. Such an approach involves cost/benefit considerations which extend beyond traditional trade theory (but still encompass it).²³ The second principle involves improvement of the general bargaining position of developing countries through information exchange and collaborative action as regards foreign trading partners, foreign investors, etc. (for example, OPEC type arrangements, trade and regional groupings, collabora-

²¹For classic discussions of Swadeshi see: M. K. Gandhi. Cent Per Cent Swadeshi or the Economics of Village Industries. Navajivan Publishing House, Ahmedabad, 1948; and J. C. Kumarappa. Swadeshi (The Moral Law of Self-Reliance). Rajesh Press, Delhi, September 1968.

²²These principles were originally suggested to the author by S. Kannappan (April 1978).

²³Details to be provided in Conference discussion. Such considerations also extend to regulatory policies relating to direct foreign investment, the goal being optimal and profitable capital and technology flows for the developing country.

tion and assistance to accelerate technology flows, intra-developing country transfers, etc.). The third principle goes to the core of the term Swadeshi, which is known to be deeply rooted in village level development schema in India. In modified form, the term Swadeshi need not imply autonomous village development, independent of modern notions of economic efficiency. Rather, in the broader sense, Swadeshi implies a type of development for decentralized sectors (based upon maximum/optimal levels of self-reliance) that integrates quite well with overall national developmental programs, and does not violate the laws of efficient planning. Thus, the traditional notions of Swadeshi might possibly be merged with notions of relative efficiency, (or even profitability) insofar as "village" programs are developed that increase the economic value of the flow of goods and services from national endowments through management of national final demand and tastes.

In conclusion, the development of the dispersed-traditional sectors may pose no contradiction to the laws of efficient production and distribution (broadly defined) at the national and international levels. In modified form the term Swadeshi may be large enough to encompass all of the arguments offered above.²⁴

²⁴The world-wide interest in the contemporary Chinese development experience, and the revival of certain Gandhian ideas in Indian planning are relevant to this final point.

APPENDIX

Product Specific Examples -
Small Scale, Decentralized Industrial
Enterprises

On the product and engineering process specific levels certain product lines should be researched and developed for production in the decentralized sector. Initially, such product lines should be defined by trade pattern, i.e., whether they are products intended for trade within the decentralized sectors; intended for trade between the decentralized sectors and the centralized modern-industrial sector; or intended for trade internationally.

Subsequently, within product lines, defined by trade category, engineering-process specific studies must be undertaken to determine:

- A. initial capital requirements, including physical (machine, building, etc.) and financial capital
- B. optimal efficient scale of operations
- C. level of technological knowledge and know-how required
- D. production-line skill requirements (with emphasis upon maximum use of already existing, local traditional skills)
- E. level of entrepreneurial ability required for overall planning, production management, and market exploitation
- F. materials supply factors (with emphasis upon maximum use of local inputs)
- G. required maintenance (with emphasis upon maintenance systems that are adaptable to local provision through locally operated production service enterprises employing, to a maximum extent, locally produced inputs into industrial maintenance services)

Process specific information on three product lines which are appropriate for the three trade patterns defined above follow:

- A. Burned Building Brick. This is a construction material that can be produced in the decentralized sectors for consumption within the same sectors. The physical and financial capital requirements for such a product are modest. The optimal scale for efficient production of this construction input can range from the "cottage industry" level to larger scale plants. The emphasis here, however, is on efficient production of such an input in small-scale installations, using labor-intensive methods. Such installations have proven to be efficient. The technology (in terms of both machinery requirements and pure technological knowledge and know-how) is readily available and easily disseminated. (A manual for production in small scale installations is available from Volunteers in Technical Assistance, Mt. Rainier, Maryland U.S.A.) Production line skill requirements are minimal in small scale installations, and materials (clay), as well as equipment could be provided within the decentralized sector. Machinery maintenance services can also be provided locally as such machinery only requires nominal maintenance given its simple design.

Burned building bricks offer one example of a "rural wage good." Such products can be purchased by local households for obvious household construction requirements. Importantly, such a product line could be expanded (through learning experiences - with appropriate inputs of more large scale production machinery) to larger scale commercial operations capable of exporting to the modern sector.

- B. Metal Recoating Services. Metal recoating services can be provided by the decentralized sectors to both the modern-industrial sector and to certain decentralized sectors (especially the agricultural sector, as previously defined) for refurbishing worn machinery parts. Beyond local employment potentials, this service, if developed, provides a vital input into both the modern-industrial and local agricultural sectors (based upon the principle of constant maintenance rather than replacement).¹

¹"Replacement" often involves considerable "down-time" while new parts are ordered and delivered. Such recoating services minimize down-time and lay-offs of personnel.

The physical capital requirements for a variety of metals recoating services are modest - a truck equipped with coating equipment and a metal grinder and several workers can tour dispersed areas providing the service. Larger scale organizations can provide the same service to the modern-industrial sector. The technological knowledge necessary for delivery of this service is readily available, and can be effectively utilized by anyone with basic welding knowledge. The necessary raw materials for such metal coatings (steel, nickel, tungsten, etc.) may, however, have to be imported from the modern-industrial sector, or, possibly, from abroad. Maintenance, however, of required small-scale equipment can be provided locally in most developing countries.

- C. Jojoba Seed-Derivatives. Jojoba seeds (annotated in UNIDO publication, "Co-operative Programme of Action on Appropriate Industrial Technology" Report by the Executive Director, April 1977) can be grown and initially processed in the agricultural-dispersed sectors and the derivative, jojoba oil, exported to the modern indigenous sector within developing countries for use within that sector, as well as exported abroad. Jojoba oil represents a product that establishes critical linkages across all developing country sectors (implying certain inter-sectoral cooperative enterprise arrangements). The jojoba is a shrub that grows in arid regions (origin - Sonora desert of the United States) which produces a seed that is approximately 50 percent, by weight, a colorless, odorless, oily liquid that can be used as a lubricant in machinery subjected to extreme temperature and pressure (such as high speed turbines) for which the only other known source is scarce sperm whale oil.

The local requirements for jojoba plant and derivative oil production include arid land (which is usually generally unsuitable for other crops), hybrid seeds and initial processing systems. The machinery for initial processing is, fortunately, the same as used to crush and extract oils from cotton seeds, cashews and groundnuts. This processing machinery may already be "in place" in the dispersed sectors if such crops are already locally grown and processed. However, the processes and machinery requirements for secondary (or final) processing of the derivative oil is more sophisticated and, perhaps, for efficiency, should be located in the modern industrial sector (or in concentrated

regional installations).²

The skill requirements in crop production and initial processing are minimal. Opportunities exist for designing initial crop production and processing systems which are relatively labor-intensive.³ Crop production, however, must be rather large scale (in order to extract the required derivative oils). Thus, such a crop lends itself more to larger scale cooperatives or consolidated farm systems.

Existing technology for processing the derivative oil is readily available (i.e., is available from the "common fund" of general knowledge regarding oil extraction). Likewise, primary and secondary equipment design and maintenance is also widely known. However, additional research is needed in the area of hybrid seed development to obtaining consistent maximum seed production and accompanying derivative oil outputs.

The product lines discussed above are not advanced as conclusive product line policy areas that are universally applicable to all developing countries. Rather, the above product line specifications are offered as suggestive of the "audits" that should be made, by potential product line, to fulfill certain process-engineering informational requirements (as enunciated A through G in the beginning of this appendix) as well as intra- and inter-regional trade possibilities. It is obvious that there are, in examination of the foregoing product-lines, certain "gaps" in informational

²The secondary or final processing of the derivative oil requires the use of certain solvents and large scale machine systems. Such systems are usually geared to output levels that are beyond local area capabilities or demands. Thus such final processing systems should be centrally located to process oils from many dispersed regions.

³Jjoba plant cultivation is not "seasonal" in the usual sense. Thus such cultivation (and initial processing) does not bind certain labor force categories to the land on a seasonal basis. This point is intriguing, and merits further discussion within conference proceedings as regards purely agricultural development schema.

requirements (according to the A through G enunciation). Such gaps represent a challenge for development of these specific product lines. It is to be expected that other proposed product lines to be investigated will also exhibit certain "gaps" which must be filled through careful empirical investigation.

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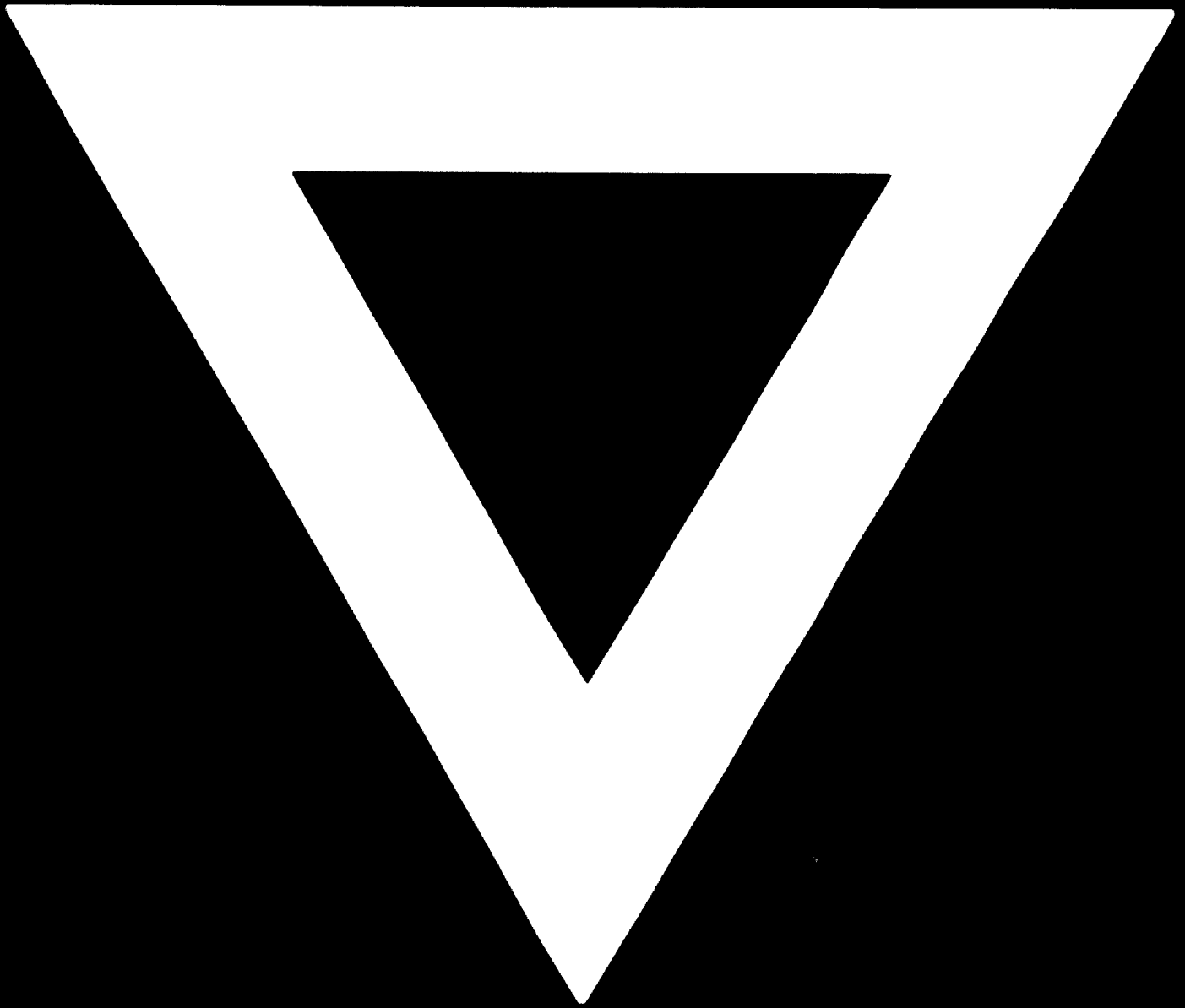
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