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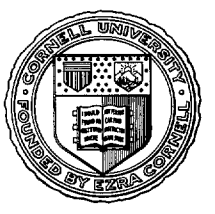
The Uses and Limitations of Information in the Iringa Nutrition Program, Tanzania

David L. Pelletier



CORNELL FOOD AND NUTRITION POLICY PROGRAM

THE USES AND LIMITATIONS OF INFORMATION IN THE IRINGA NUTRITION PROGRAM, TANZANIA

David L. Pelletier

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CCM	Chana cha Mapinduzi
CSD	Child survival and development
DIC	District Implementation Committee
IMR	Infant mortality rate
INP	Iringa Nutrition Programme
JNSP	Joint Nutrition Support Programme
MCH	Maternal and child health
ORS	Oral rehydration solution
PEM	Protein-energy malnutrition
PHC	Primary health care
SAP	Structural Adjustment Policy
TFNC	Tanzania Food and Nutrition Center
VHC	Village Health Committee
VHD	Village health Day
VHW	Village health worker
W/A	Weight-for-age
WIC	Ward Implementation Committee

FOREWORD

The Iringa Nutrition Program in Tanzania has been widely cited as one of the few community-based nutrition programs to achieve significant reductions in severe and moderate protein-energy malnutrition through an emphasis on capacity-building at local levels.

This report describes the results of a review of the Iringa Nutrition Program conducted in September and October 1989. It is one of five such reviews conducted by the Cornell Food and Nutrition Policy Program, funded by the Rockefeller Foundation, whose purpose is to understand better the organization and mode of operation of successful nutrition programs in developing countries. The other programs are in Kenya (the Embu District Growth Monitoring Program), India (the Tamil Nadu Integrated Nutrition Project), Dominican Republic (Caritas Applied Nutrition Education Project), and Colombia. The organizing principle in all of these reviews is to analyze, in particular, the role of information in program planning, implementation, management and evaluation.

The analysis of the Iringa Nutrition Program (INP) is based on a review of existing documentation and focused interviews with program-related staff (and beneficiaries) in Tanzania. The interviews took place over a ten day period, including an intensive period of five working days in Iringa Region itself. During this time it was possible to speak with program staff at the regional level and in three of the five districts that Iringa Region comprises (Iringa-Rural, Njombe, and Makete). Although the areas visited differ greatly in accessibility and agroecological and environmental characteristics, it was not possible to investigate the influence of that variability per se on program performance. Instead, efforts were directed at developing a composite picture of how the program operates through three sets of interviews at the district, divisional, ward, village and household levels (see appendix 1 for a list of persons contacted). This provided the opportunity to synthesize early observations, identify information gaps and hypotheses, and investigate them further in successive interviews.

Given the size, scope, and importance of the Iringa Nutrition Program, the prospect of comprehending, and then critically analyzing, the experience in such a short period of time was a daunting one. Nevertheless, the experience was extremely productive and allowed this report to document certain aspects of the program in much greater detail than was possible previously. Using the Iringa information system as the organizing principle of the review, and having access to a large number of people with firsthand knowledge of its operation from multiple perspectives, facilitated the effort. It is sincerely hoped that the details provided here will be useful to a wide audience and that at least some of the insights have been useful to Iringa management itself.

Finally, a note of gratitude is due to the Tanzania Food and Nutrition Centre for supporting and facilitating this review. In particular, I would like to acknowledge the expert contribution of Mr. Shagude from TFNC, who added his own knowledge and insights at appropriate times but did not allow them to interfere with his willingness and ability to elicit independent views from our interviewees.

Ithaca, New York
February 1991

David L. Pelletier

EXECUTIVE SUMMARY

The Iringa Nutrition Program (INP) is an integrated, community-based program whose ultimate objective is to reduce infant and young child malnutrition, morbidity, and mortality. It began in 168 villages in the Iringa Region of Tanzania in 1983, covering an estimated population of 46,000 children under the age of five. Information generated from within the program itself suggests that during the period 1984 to 1988, the prevalence of total underweight (weight-for-age < 80 percent of WHO standard) decreased from 55.9 percent to 38.0 percent, and the prevalence of severe underweight (weight-for-age < 60 percent) decreased from 6.3 percent to 1.8 percent. Because of the unique approach that the INP has employed along with the apparently dramatic impact it has had on child nutritional status, the INP has created much interest among donors and developing countries in the possibility of adapting the approach to other countries.

The present review was undertaken to provide a detailed description of how the Iringa approach operates, to investigate some of the reasons for its apparent success, and to make the information available to a wider audience. In particular, the review focuses on the special role played by the INP information system in problem identification, in planning and implementing interventions, in program management, and in impact evaluation. Information for the review was obtained through interviews with INP-related staff from the national through the village level, interviews with program beneficiaries, and review of existing documentation.

The INP is distinguished by four special features: (1) the unusual size and scope of program activities which are supported by higher than usual levels of external resources; (2) a broad based approach to sensitizing, educating, and training a wide range of program functionaries, support personnel, politicians, administrators, and the public, aimed at improving understanding of the social, environmental, and behavioral causes of protein-energy malnutrition and approaches for solving those problems; (3) emphasis on institutionalizing a process for problem *assessment*, *analysis*, and *action* (the "triple-A cycle"), as opposed to an emphasis on specialized services and service delivery systems; and (4) the unusual degree to which the program is built upon, dependent upon, and integrated with, the administrative infrastructure of the political party. Related to the latter is that the program has capitalized on Tanzania's socialist philosophy to gain political and popular support.

The triple-A cycle is a general concept that the program applies in many ways. It embodies such earlier notions as problem identification and problem solving, learning by doing, error-embracing approaches to development, bottom-up planning, and flexible management. Fundamental to its operation is the political concept of self-reliance, meaning that each level of society (from

households to villages and upwards) should strive to solve its problems using the resources available at that level, with higher levels playing supportive roles only as required. Although the INP has obviously made available a wide range of supports and services from above, that has not detracted from its emphasis on strengthening the capacities of villages to apply the triple-A cycle and enhance their self-reliance.

The starting point for the triple-A cycle is the village health day (VHD) held at a central village location one day each month (or at least quarterly). VHDs include growth monitoring nominally for all children under five in the village and health and nutrition education lectures and demonstrations. Weight-for-age (W/A) information collected at VHDs is used for individual follow-up of severely underweight children (< 60 percent W/A), to generate discussion at meetings of the village health committee (VHC), and to provide higher levels of management (wards, divisions, and districts) a basis for monitoring and evaluation of progress in each village. In addition to information on nutritional status, VHCs transmit minutes of their monthly or quarterly meetings to the higher administrative levels to inform them of what actions were discussed, decided, and/or implemented to reduce malnutrition. The latter information is a vital component of the information system, which (through regular supervision) ensures that villages are completing the triple-A cycle and not simply weighing children for its own sake.

The importance of the political administration system to the INP is seen in follow-up visits to severely malnourished children and in higher-level management. Soon after the VHD, the village health worker visits the household of each severely underweight child, often accompanied by one or more members of the VHC. The purpose of the visit is a combination of nutrition education, microlevel problem analysis (triple-A), and social or political persuasion to produce behavioral changes. When circumstances require – as when no progress or back-sliding is seen in the child – the composition of the team is changed as appropriate. Thus, the team may, and often does, include party officials from village, ward, and/or division levels, or extension workers from health, agriculture, or social welfare. Apart from nutrition education, then, it is clear that the visits are designed to impress upon the household the importance of improving the child's weight-for-age by implementing the actions agreed upon at those visits.

In the case of higher-level management, the ward, divisional, and district party officials use the quarterly reports on nutritional status and the minutes of VHC meetings to monitor progress at the village level. Accountability for malnutrition is built into each level of the system through standard bureaucratic procedures. Thus, the VHC must explain to and convince the ward secretary concerning its actions in each quarter; that person in turn passes the information to the divisional secretary; and the latter must answer to the district implementation committee at quarterly progress meetings. Regular visits are made to villages by officials from ward, division, and district levels to help resolve administrative and technical problems.

Although the INP information system was designed primarily to catalyze the triple-A cycle at household, village, and higher levels, there is also great interest in its potential to assist in evaluation of the program's impact on nutritional status. An important conclusion of the review is that, as a byproduct of its motivational and management roles, the INP information system

does provide some information of potential value for impact evaluation. The potential, however, is constrained by the fact that plausible impact evaluation required greater quality control, data collection, staff effort, and technical skills than do motivation and management applications of the information. Because attempts to meet the requirements for impact evaluation through substantial changes in program activities are likely to compromise the motivational and management uses of the information, it is suggested that users of the impact information should instead be made aware of the technical limitations and threats to plausibility.

Ultimately the strongest evidence for the success of the INP approach comes from an understanding of how it operates at the grass-roots level, and the most important information concerning its transferability to other settings comes from an analysis of whether and how similar processes can be developed under prevailing local conditions. Thus, it is suggested that attempts to provide solid evidence for impact by placing greater demands on the information system would be self-defeating because they would compromise other program activities and detract from an emphasis on understanding the process issues that determine impact. To the extent that UNICEF is the primary institution whose policy and resource allocation decisions require plausible evidence for INP impact, the "process" evidence for impact and the institutional conviction of its plausibility are probably sufficient in any case. To the extent that similar decisions by other institutions are involved, there may be a need to address the limitations of the present impact evidence by more detailed analysis of existing data and perhaps through more rigorous external evaluation in newly expanded areas.

Apart from its success in certain respects, the INP now faces a number of important challenges as the program matures. One is the obvious need to adapt to lower levels of external resources without compromising the strong training and supervision that have characterized the program to date. Another, now that many villages appear to have brought the number of severe cases of malnutrition under control, is the need to refocus attention, concern, and commitment on ameliorating the causes of moderate malnutrition. Given the much larger number of children so affected and the possibility that different intervention approaches may be necessary, it cannot be assumed that can be achieved through a straightforward extension of earlier methods.

Finally, decisions concerning the transferability and appropriateness of the Iringa approach to other settings must consider some of the special characteristics of Iringa (and Tanzania) that have probably conditioned the INPs success: first, strong ideological and political support for improving human welfare, second, a strong, pre-existing political administrative system on which to base the program, third, concurrent efforts greatly to strengthen regional program management, fourth, close involvement of a local research institution (Tanzania Food and Nutrition Centre), which had completed much of the early conceptual work and which assisted greatly in operational research during implementation; and finally, the fact that Iringa is one of the few food-surplus regions in the country and has a local reputation for being generally receptive and responsive to community development initiatives. It is suggested that those factors are as important, or more so, than the availability of fiscal resources as determinants of transferability and deserve equal consideration in deciding which, if any, of Iringa's lessons are applicable elsewhere.

1. INTRODUCTION

The Iringa Nutrition Program (INP) began in 1983 with funds from the Joint Nutrition Support Program (JNSP), representing a combined effort between the Tanzanian government, UNICEF, and WHO to reduce infant and child death rates, morbidity, and malnutrition. From the time of its midterm review in 1986, the INP has been considered a success from the perspective of performance in implementation and impact on child nutrition. The results of a comprehensive evaluation have recently been published showing that the prevalence of severe malnutrition (<60 percent weight-for-age, WHO standard) has been reduced from initial levels of 6.3 percent in 1984 to 1.8 percent in the same quarter of 1988, representing a 71 percent reduction in four years (GOT 1988). Over the same period, the prevalence of moderate malnutrition (<80 percent weight-for-age) has decreased from 55.9 percent to 38.0 percent, representing a 32 percent reduction. In 1987, the prevalence of both severe and moderate malnutrition in adjacent areas not served by the program was observed to be at the same high level as the program area before the start of the program.

One of the unique features of the INP has been its emphasis on institutionalizing a process through which nutrition problems can be assessed, the causes and solutions analyzed, and actions taken to reduce malnutrition (the triple-A cycle). A community-based information system centered on growth monitoring is a key instrument for catalyzing and sustaining this process at all levels, from households and villages up to district and regional levels. Another important feature is the emphasis on self-reliance, searching for solutions within the limits of resources available at each level, rather than looking toward higher levels for assistance.

The present review was undertaken to analyze how the INP information system is organized, how it might lead to nutritional improvement largely through rearrangement of existing resources at a local level, and the extent to which such an information system might be transferable to other developing-country settings and to other potential uses of the data. This report is intended to add to the already considerable (unpublished) documentation on the Iringa program by providing a more detailed description and analysis of the operation of the information system and some of the factors that appear to influence its success.

2. COUNTRY BACKGROUND

HISTORICAL CONTEXT

The present-day country of Tanzania was released from German colonial rule following World War I and in 1919 was mandated to British tutelage as Tanganyika Territory by the League of Nations. Its status between the wars as a British mandate, instead of a colony per se, had a major influence on its economic development, or lack thereof, during and beyond that period. In contrast with other parts of British east and central Africa, Tanganyika experienced little or no economic investment and white settlement. The country thus remained largely undeveloped during the period, but it also did not evolve a substantial indigenous elite with a stake in maintaining the economic status quo at independence (Karioki 1979). This fact, together with the relative absence of tribal rivalries at independence and a strong memory of exploitation by slave traders and German colonists, contributed to a nonviolent transition to nationalism in the 1950s and independence in 1961.

The uniformly undeveloped character of Tanzania at independence, the presence of a universally understood national language (Kiswahili), the absence of tribal rivalries, and the memory of earlier exploitation are said to have combined with the character of the first president, Julius Nyerere, in forming Tanzania's own socialist philosophy toward development (Karioki 1979). Encoded in the concept of *ujamaa*, this humanist philosophy emphasized not only social and economic equality, but also drew on Nyerere's view of traditional African values of communal effort and "collective social interdependence." Without pretending that inequities did not exist in traditional African societies (cf. Van Hekken and Van Velzen 1972), Nyerere's philosophy was intended to emphasize the positive aspects of African society as a basis for equity-oriented, human-centered development.

In contrast to a number of other African countries that espoused such ideas in name only, Tanzania backed up its philosophy with action, in both domestic and foreign policy, guided by numerous landmark policy statements by Nyerere. Among the most significant for present purposes have been the policy of "villagization" to facilitate delivery of social services and general economic and community development, an emphasis on primary education that has produced one of Africa's most literate societies, and the establishment of a comprehensive political administrative system with a mandate to serve the needs of the people through development. These changes were accompanied by efforts to re-socialize the masses into the "new" social and economic order, presented as a revitalization of traditional African values and behavior.

As described in the following sections, Tanzania's approach to development has not produced sustained economic growth in the aggregate, nor has it succeeded in creating equality in health status and access to health resources.

The INP experience has shown, however, that Tanzania's social philosophy and its system of political administration have provided a sound infrastructure through which improvements can, under certain conditions, be made in nutrition and health status, as well as in development generally.

TRENDS IN ECONOMIC DEVELOPMENT

The Tanzanian economy is characterized by a large, rural agricultural sector employing 75 to 90 percent of the population and a small, capital-intensive industrial sector. The economy of the former is concerned primarily with food and cash crop production; the latter is concerned with manufacturing and services, and there are few linkages between the two. Cash crop production, manufacturing, mining and, transportation are all heavily dependent on imported inputs and world commodity prices, making the economy vulnerable to numerous external shocks since the mid-1970s.

Gross domestic product at 1976 prices grew at a rate of 1.6 percent from 1975 through 1982 and remained virtually constant from 1982 through 1985. With population increasing at an annual rate of 2.8 percent over this same period, GDP per capita has experienced a net decrease of 12 percent from 1975 to 1985. Purchases of major food and cash crops by parastatals have generally shown only minor fluctuations, in part related to drought in some years. Beginning in the 1970s the country has faced a classic spiral of large fiscal deficits, high rates of inflation, balance-of-payment deficits, and erosion of the tax base, exacerbated by declining terms of trade and drought. Because of their impact on domestic production, export earnings, and reserves, those factors have restricted imports, creating acute shortages of raw material, spare parts, and consumer goods, thereby constraining domestic production further. Those trends have been fueled by a number of internal policy mistakes and external shocks, such as the war against Amin, the breakup of the East African Community, dramatic increases in petroleum prices, world recession, and falling commodity prices (VRT 1986).

Agriculture is the dominant sector, accounting for 46 percent of GDP and 75 percent of export earnings, and supporting 90 percent of the population, mostly on small holdings. From 1974 to 1984, overall crop output is estimated to have grown by only 2 percent per year (VRT 1986). The causes of this poor performance are believed to be bad weather, low producer prices, unreliable input supplies, and an inefficient (parastatal) marketing system. The real producer price of maize (the principal grain) fell from 1977/78 to 1982/83, coinciding with a fall in purchases by the marketing board. With significant increases in producer prices, and improvements in marketing as a result of structural adjustment measures initiated in 1983, this trend was reversed in 1984/85 (assisted by good weather). Nonetheless, marketing and transportation bottlenecks and input supplies remain serious problems in the agricultural sector.

In the early 1980s Tanzania acknowledged that it was in the throes of the worst economic crisis since independence and initiated its Structural Adjustment Program (SAP) (VRT 1986). The SAP includes a broad range of

measures designed to (1) increase food and cash crop production through appropriate incentives, improved marketing, and greater government expenditures for research and support services; (2) rehabilitate physical infrastructure; (3) restore industrial production through allocation of scarce foreign exchange to priority sectors and firms; and (4) restore internal and external balances through prudent fiscal, monetary, and trade policies.

Apart from its effects on smallholder agricultural output, the economic situation since the 1970s has also had discernible effects on the health sector. As a result of achievements during the 1970s, the availability of services is considered generally good, with 70 percent of the rural population living within 5 kilometers of a health facility, 50 percent of health workers being located in rural areas, essential drugs and vaccines maintained in all 3,000 rural health facilities, and comprehensive maternal and child health services available in 70 percent of these rural institutions (1988). However, the following quote illustrates the effect of the economic situation on this system:

> Throughout the whole health system there are severe shortages of vehicles, spare parts, fuel and equipment which constrains the delivery of health services. The lack of functioning vehicles makes the system of referral not work. Shortage of transport, the heavy workload of senior health staff, lack of management training and established supervisory routines contribute to inadequate management and supervision.
>
> Due to the economic crisis the government's allocation to the health sector in 1986/87 in real terms was only 30% of its 1977/78 value. The relative allocation also decreased from 7% in the mid-1970s to about 4% of the total government budget at present. (TFNC 1988, 56)

These observations are important in the context of the INP insofar as a significant effort was required simply to restore the existing health infrastructure to working order (e.g., building and rehabilitating health facilities, providing vehicles and other transportation supports for supervision, etc.). This was in addition to the community-based activities which are the focal point of the INP.

DEMOGRAPHIC, HEALTH AND NUTRITION INDICATORS

TFNC (1988) has compiled national estimates for a number of social indicators and some indication of trends since 1980. The total population in 1988 was 22.5 million, with an intercensal growth rate of 2.8 percent per annum since 1978 (Bureau of Statistics 1989). The infant mortality rate (IMR) of 111 per 1,000 live births and under-five mortality rate of 183 per thousand children place Tanzania in the "very high" group of developing countries. There is an estimated decline in these mortality rates over the period 1980 to 1985, with IMR dropping from 120 to 111 under-five mortality, and dropping from 200 to 183.

The morbidity patterns of children in Tanzania vary widely as a result of the country's ecological diversity. Based on a sample survey in one of the seven INP divisions in September 1983. Thirty-seven percent of children had experienced fever (usually assumed to be malaria), 17 percent reported diarrhea, and 12 percent reported measles in the previous month (TFNC 1988). These same three diseases are the most common causes of death, as reflected in records from a rural hospital in this same area in 1984: diarrhea accounted for 26 percent of deaths, measles for 20 percent and fever for 18 percent (TFNC 1988). It should be noted that these patterns even vary within Iringa Region itself, as reflected in information generated by the INP information system (United Republic of Tanzania/WHO/UNICEF 1988).

Although Tanzania does not have a national survey from which representative estimates of malnutrition can be derived, a large number of district and regional surveys are available for deriving composite estimates (cf. TFNC 1988). These have been summarized in table 1. Overall an estimated 7 percent of children under five are severely malnourished (weight-for-age less than 60 percent) and an additional 43 percent suffer from mild to moderate underweight (60-80 percent weight-for-age). These estimates place Tanzania at the very high end of underweight prevalence among sub-Saharan African countries (United Nations Children's Fund 1985). More detailed information on nutritional status in Iringa region appears below.

GEOGRAPHIC VARIATION IN QUALITY OF LIFE INDICATORS

As noted earlier, Tanzania has placed great emphasis on equity and levels of well-being in its approach to development, a philosophy that should be conducive to improvements in people's access to health services and in their health. One indication of the extent to which that has been achieved is derived by comparing indicators of well-being and access to services across geographic areas. Another reason for examining such differentials is to assess whether and how Iringa Region may differ from other regions in Tanzania with respect to natural resources and access to health services. Such information is useful in attempting to infer the extent to which the INP experience in Iringa may be generalizable to other areas.

Table 1 - Protein-Energy Malnutrition (Weight-for-Age) Among Under-Fives in Community Surveys in Tanzania

Principal Investigator	Year	Season	Region or District	Number of Children Surveyed	Total Underweight	Severely Underweight
Kondakis	1964		Dodoma	359	86	41
Kondakis	1964		Kilimanjaro	211	84	2
Kondakis	1964		Dar es Salaam	229	50	2
Burgess	1965		Kisarawe	603	40	not reported
Maletnlema	1967		Karagawe	399	40-50	not reported
Kreystar	1970	January	Lushoto	506	44	9
Kreystar	1973	April	Kilosa	1,401	37	1
Kimati	1975	December	Coast	165	80	7
Kimati	1976	May	Dar es Salaam	609	15	0.5
Kimati	1970	June	Tanga	656	8	3
Kimati	1976	December	Dodoma	303	16	5
Kimati	1977	May	Mbeya	1,505	21	3
Kimati	1977	June	Morogoro	2,811	36	7
Kimati	1977	June	Mwanza	917	35	7
Kimati	1977	June	Ruvuma	333	46	6
Kimati	1977	June	Lindi	535	56	7
Jansson (TFNC)	1977	January	Kilosa	211	89	3
Jacobsen	1975	September	Njombe	1,358	33-59	not reported
Ljungqvist (TFNC)	1977	October	Tarima	312	23	not reported
Ljungqvist (TFNC)	1979	March	Kilombaro	849	31	1
Ljungqvist (TFNC)	1978	August	Njombe	900	45-58	2-6
(Muhimbili)	1979	June	Iringa	391	57	6
Ljungqvist	1979	October	Iringa	1,519	43	5
Ljungqvist	1980	October	Iringa	1,759	65	6
Bantje	1979	January	Rufiji	553	56-64	3-5
Bantje	197	9December	Rufiji	321	39-57	not reported
Bantje	1980	June	Rufiji	513	39	not reported
Bantje	1981	October	Rufiji	138	41-49	not reported
Kisanga (TFNC)	1980	December	Lindi	528	41	11
Kisanga (TFNC)	1981	January	Mtwara	579	50	9
Yambi (TFNC)	1982	June	Iringa	1,705	52	4
Yambi (TFNC)	1983	August	Iringa	733	45	2
JNSP	1984	Mar.-June	Iringa	1,392	45	3
MCH/Afya	1981	September	10 Districts	1,493	36	7.5
JNSP	1984	Apr.-June	Iringa	31,126	56	6.3
JNSP	1984	July-Sep.	Iringa	32,437	47	4.7
JNSP	1984	Oct.-Dec.	Iringa	33,634	45	5.1
Program for Women and Children, Kagara		July	Biharamulo	5,536	58	10
		August	Ngara	5,731	57	7
Danlin	1985	August	Bukoba Rural (Izimbya ward)	400	27	1.5

Source: TFNC (1988).

A review of the levels of 16 indicators of quality of life across the 20 mainland regions of Tanzania shows that Iringa Region has the worst overall rank, followed by four other regions geographically removed from Iringa. Analysis of the reasons for Iringa's poor overall score reveals that it is heavily influenced by a set of interrelated demographic indicators: it is among the three worst regions for infant mortality, life expectancy, crude birth rate, crude death rate, and percent of population under 15. Iringa also scored poorly on distance to health centers, hospital bed occupancy, access to water, and access to tap water. Curiously, it scores relatively high (seventh out of 20 regions) on estimated Gross Regional Product, a figure based primarily on agricultural output.

Although the database for estimating agricultural output is generally considered to be of questionable reliability, Iringa's higher standing in the agricultural sector is confirmed by other indicators. A comparison of the 20 mainland regions with respect to their agricultural endowments in the early 1970s reveals that 29 percent of the cultivated land in Iringa Region has soils with medium-to-high-fertility (high potential) and 54 percent of the area is classified as having adequate rainfall (USAID 1978). This gives Iringa the second-highest rank for per capita availability of medium-to-high-fertility soils (2.06 ha./cap) and the third-highest rank for rainfall adequacy. In addition, the agricultural census of 1971/72 revealed that average farm size in Iringa was 1.4 ha., which was the fourth-highest average among the 20 regions. Together with Ruvuma, Mbeya, and Rukwa, Iringa is known as one of the surplus-producing areas of the country, based on crop purchases by marketing institutions, although reliable estimates of production are not available. In the late 1970s, Iringa was the largest client of the Tanzania Rural Development Bank (TRDB), receiving 31 percent of TRDB loans in 1977/78 (AID 1981).

With respect to the general concern for equity, the USAID review (1978) examined the number of regions in which an "urban bias" is evident in various indicators and the number in which a "rural bias" is evident, based on a comparison of the rural and urban areas within each region. Note that these statistics are derived from the mid-1970s and thus may not accurately reflect the situation today. There was clearly an urban bias in all indicators for which data were available; in all regions, urban areas were favored with respect to population/health worker ratios, distance to hospitals, and access to tap water. Indicators of hospital crowding and crowded housing actually favored rural areas in seven regions, with other indicators falling between the two extremes.

In summary, this section reveals that considerable variation exists among regions and between rural and urban areas in Tanzania with respect to indicators of health status, access to health services, and other aspects of well-being. In the 1970s Iringa Region was characterized by low status with respect to demographic indicators and selected health service indicators but stood high with respect to agricultural potential and aggregate production. At the outset of the INP, the region was also recognized to have strong institutional infrastructure, that being one of the stated reasons for choosing Iringa as the site for the JNSP activities (United Republic of Tanzania/WHO/UNICEF 1988).

HEALTH, FOOD AND NUTRITION POLICY

In line with its socialist ideology, Tanzania has considered good health to be a basic right of all individuals. The primary strategies for achieving it, as reflected in the development plans, has been to increase access to health services, safe water, and education. The villagization program has assisted by making it possible to provide services to the population.

During the period 1972 to 1980, the health plans stressed the construction of rural health centers and dispensaries and limited the expansion of hospitals. Although the initial goal had been for each village to have its own dispensary, mid-course evaluations showed that was unattainable. The more realistic goal of one dispensary per ward of four or five villages was subsequently adopted and largely achieved, with 93 percent of the population being within 10 kilometers of a dispensary (Yambi, Jonsson, and Ljungqvist 1989).

In 1974, Tanzania developed a maternal and child health (MCH) program within this network of static health facilities. This project involved training new cadres of MCH aides and permitting greater coverage of MCH and nutrition services. In 1983, a national primary health care (PHC) program was developed along the lines of the Alma Ata declaration. PHC committees were established from village to national levels, and training programs were developed for volunteer village health workers. These initiatives, taken at the national level, were in line with pre-existing philosophies concerning self-reliance and decentralization and were to have their most complete expression and test in the Iringa Nutrition Program, which was being planned during the same period.

Apart from the services provided through the MCH program in static health facilities, community-based nutrition activities began on a limited scale as early as 1976 (Yambi, Jonsson, and Ljungqvist 1989). These were limited in geographic coverage as well as in operational terms. Initially, teams of investigators from TFNC conducted village surveys and nutrition needs assessments, with little if any dialogue with the community, and then attempted to design intervention strategies on that basis. During the course of several years of discouraging experience along these lines, the approach was gradually modified to allow greater community participation in the process, although it was still very much dependent upon outside expertise from TFNC. These early efforts at community-based, participatory approaches provided important institutional experience and contributed to an agreed-upon conceptualization of how to proceed in the future. It was at this point that Tanzania developed its proposal for a joint nutrition support program and, with the benefit of years of experience, was able to begin immediate implementation in well-defined directions.

3. THE IRINGA NUTRITION PROJECT (INP)

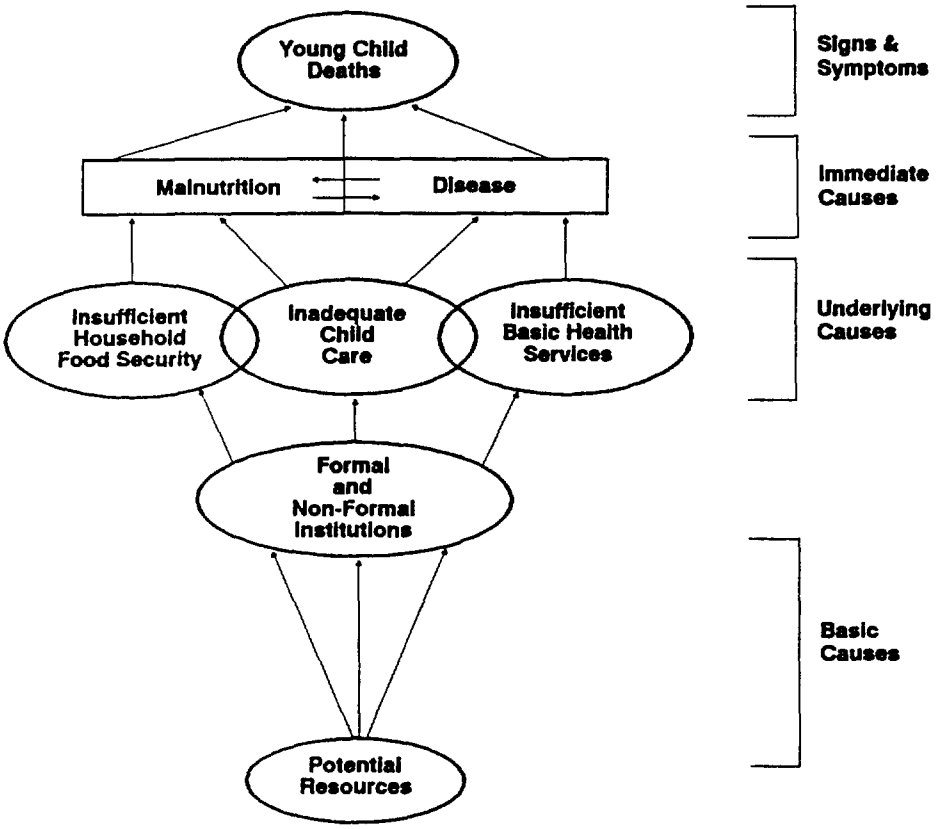
HISTORY

In the late 1970s the government of Tanzania, through the Tanzania Food and Nutrition Centre, undertook a number of surveys and related activities in preparation for developing an ongoing nutritional surveillance system. These surveys, and the ensuing workshops and discussions that they generated, were instrumental in formulating an overall conceptual framework within which the causes and potential solutions to protein-energy malnutrition (PEM) could be found (figure 1). This conceptual framework includes the immediate and contributory causes of PEM but, what was important for the subsequent INP, also places the causes of PEM within the ideological context and resource relations prevailing in Tanzania. By so doing, it emphasized that the long-term solutions to PEM, as is the case with many development problems, must come through changes in those relations and through administrative mechanisms already established within Tanzania's political system.

This background work enabled Tanzania to obtain funds from the Italian government through the Joint WHO/UNICEF Nutrition Support Program (JNSP) in October 1982 and, what was equally important, to proceed quickly with implementation of the INP beginning in March 1983. Iringa, one of Tanzania's 20 regions, was chosen as the site for the project for a number of reasons: (1) nutrition surveys had revealed a relatively high prevalence of PEM; (2) the region possesses diverse agroecological zones, which might provide a broad base of experiences; and (3) the region possesses a relatively strong institutional infrastructure, considered important to give the project a fair chance of success. JNSP funding for the project was originally supposed to end in March 1988, but an extension was granted in 1987. Funds for the extension expired in mid-1989, and the Regional Steering Committee has recently finished a reprogramming exercise in order to continue the project through greater government contributions and continued, though reduced, external support from UNICEF.

Following the midterm evaluation in 1986, and even before the final evaluation was conducted in 1988, the positive experiences with the INP were such that the Tanzanian government began expanding selected elements of the INP to areas in Iringa region not covered by the original JNSP-funded project, as well as to six other regions in the country. External support for the expansion is coming from UNICEF's Child Survival and Development (CSD) funds but is at far lower levels than received in the original JNSP project.

Figure 1 - Causes of Young Child Death



Source: GOT (1988). Reprinted with permission.

The recent changes in the level of recurrent funding for the original INP, as well as the expansion to new areas, present new challenges to what is often termed the "Iringa approach." These will undoubtedly reveal additional lessons concerning whether and how the approach can be replicated and sustained at lower levels of external support, crucial questions with which the Iringa management and outside observers have been concerned for some time. Unfortunately, the present analysis will not be able to benefit directly from these recent changes. The issues of replicability and sustainability will be addressed to the extent possible in light of the experience in the original JNSP-funded areas.

OBJECTIVES OF THE INP

The main objective of the INP, as in all the JNSP projects, is improvement of nutrition. The specific objectives, as prescribed in the JNSP directive for development of country proposals, were (1) reduction of infant and young child mortality and morbidity, (2) better child growth and development, and (3) improvement of maternal nutrition. In the conceptualization of the INP, another explicit objective was added, which was seen as an essential means by which all other objectives should be met, specifically: (4) improvement of the capabilities at all levels of society to assess and analyze nutrition problems and to design appropriate actions.

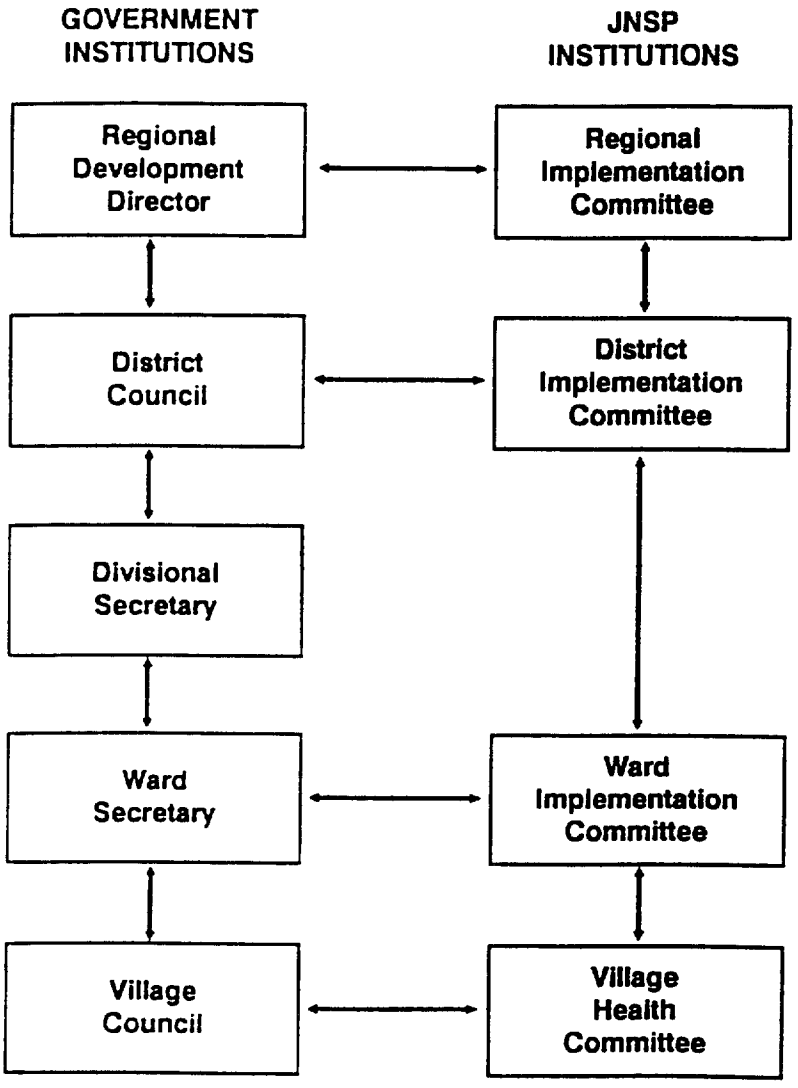
This fourth objective was considered essential for developing a sustainable and affordable approach for improving nutrition (Ljungqvist 1988). It was taken as a given that, with the level of external resources available through the JNSP, sizable reductions in protein-energy malnutrition could be achieved. But only through development of the capabilities stated in the fourth objective could the INP begin to ensure that such progress would not be lost after reduction in external funding and that the approach could be replicated elsewhere at a lower cost. Thus, the primary objective of the INP became one of developing and institutionalizing a *process* for achieving nutritional improvement, rather than an expensive delivery system for preconceived, "magic bullet" interventions.

MANAGEMENT STRUCTURE

The INP has taken advantage of the existing administrative structures in Tanzania, to the extent possible, and has added or strengthened structures when necessary. This section simply describes those structures; the operation of the structures in the context of the INP is described in the section on the information system below.

Administratively, Tanzania is organized into 20 regions. Below the level of the region are districts, divisions, wards, and villages. Villages are divided further into ten-cell blocks, each consisting of ten households represented by an elected ten-cell leader. This structure, originally established for political administration or mass mobilization, is also integrated into sectoral development efforts. At the village level, the village council is composed of the party chairman, the secretary, and all ten

Figure 2 - Interface Between Government Institutions and the Iringa Nutrition Programme



Source: GOT (1988). Reprinted with permission.

-cell leaders from the village (usually 15 to 25 such leaders, depending upon the size of the village). The village council is the forum for discussing all matters affecting village life and for making group decisions, including allocations of local resources. The other key institution at the village level, for present purposes, is the village health committee (VHC), which is composed of the party chairman, the secretary, and selected other individuals from the village. The village health workers (VHWs) assist the VHC but are not formally members of the committee.

The INP is integrated into these structures at the village level and into the corresponding structures at each higher level as shown in figure 2. The village council reports to and receives support and supervision from the ward secretary, and so on, up to the regional level. In addition to the party officials, a variety of other institutions and human resources are integrated into the INP through the INP implementation committees. Through these committees, the activities of extension workers from health, agriculture, and community development are coordinated at ward and divisional levels by the corresponding party secretaries according to local conditions and priorities. These extension staff and their supervisors are members of the INP implementation committees at each level. The committees serve as implementing bodies for decisions taken by the executive committees at the various levels.

As reflected in figure 2, the various implementation committees were established expressly for the INP to provide a mechanism to redirect resources (including the activities of sectoral extension staff to some extent) as required for nutritional improvement. Prior to the INP, there was far less coordination and direct involvement of party officials in the activities of line ministries at the ward and divisional levels; however, as at present, some input did exist at the regional and district levels by virtue of the regional and district development committees, which bring together heads of departments and politicians for regular meetings to discuss development plans and resource allocations.

Until the end of 1987, primary responsibility for overall policy and strategic planning for the INP rested with a National Steering Committee composed of representatives from the prime minister's office, line ministries, CCM[1], TFNC, UNICEF and WHO. With the expansion of the Iringa approach to other regions in 1987, this responsibility was delegated to the Regional Steering Committee. The Regional Steering Committee is composed of regional representatives from the same institutions as at the national level. All plans prepared by the Regional Steering Committee must be reviewed and approved by the Regional Development Committee (composed of regional department heads and party leaders), which has final responsibility for all development plans in the region.

In addition to those standing, multisectoral committees, the INP has received day-to-day management and support from a Regional Management Team with a full-time staff. In 1987, most management functions were decentralized to the districts. Since that time the role of the regional support team has been

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[1] *Chama cha Mapinduzi*, the political party of Tanzania.

to assist the district teams with supplies and services not available at the district level, with technical support, and with certain program policy or strategy decisions.

INTERVENTION COMPONENTS

Although the most novel and well-publicized aspects of the INP are the community-based growth monitoring and related triple-A cycle activities, one of the most impressive features of the project is the wide array of activities undertaken under a single project umbrella. Of the original 14 projects and 42 sub-projects, all but one sub-project were implemented in their entirety or in part, during the period 1984 to 1986. Following the midterm evaluation in 1986, the activities were reorganized into eight "programs," and the total number of sub-projects reduced to 31, in order to manage more effectively those that seemed most relevant in light of accumulated experience. The sub-projects that remained after the reorganization range from capital-intensive infrastructure projects (piped water, constructing or rehabilitating health centers, etc.), to supporting supplies and logistics, to training or re-training a variety of cadres, to strengthening management capabilities, establishing pilot, income-generating activities and so on. That it could implement and manage such a wide array of sub-projects, requiring a variety of technical, managerial, and sociological skills (and in a logistically difficult part of Africa), provides but one indication of the unique character of the INP. It also raises the interesting question of how so much activity originating from centralized project management could be carried out effectively without disrupting simultaneous efforts to foster community self-reliance and participation in intervention design.

Given the particular focus of this review, the majority of these sub-projects will not be discussed in detail. Instead, the following sections describe those aspects most closely related to the development, operation, and use of the information system, which is the driving force behind the INP. Nonetheless, it is important to bear in mind that this information system does not operate in isolation from other project resources and activities. Clearly, the information system in Iringa is more effective because it had a number of potential interventions available for mobilization. Thus, attempts to adapt the Iringa approach must also identify those complementary activities required; the overall project costs, logistics, and demand on higher levels for support will vary accordingly.

SENSITIZATION AND TRAINING

One of the distinguishing features of the INP is that training – which, as used here, is meant to include sensitization and education as well – is best seen as an intervention in itself, perhaps the most important intervention in the project. In effect, the INP set out to re-educate society vertically and horizontally, at all levels from regional management to villages, and from civil servants to political administrators to the public. The objective was to train each level or cadre in how to analyze the causes of PEM at their respective levels, from household to region, and how to search for solutions

using the resources available at each level (the triple-A approach). These elements were common to all who were trained through the INP. In addition, certain cadres received intensive training in the technical or administrative aspects for which they would be responsible. The emphasis on the triple-A approach in the training, as opposed to more narrow training just in delivery of program services in a top-down fashion, is one of the key elements for achieving sustainability of the INP.

In order to accomplish this ambitious task, the INP used a variety of formats, strategies, and tools. They include production of a quarterly newsletter using material from trained village correspondents; support for cultural and youth groups; showing in all villages three films, all made in Tanzania, on malnutrition; integrated training for various cadres; and implementation of the community-based monitoring system. The integrated training is described below and is followed by a section on the operation of the information system.

Crash Training

In early 1984, a crash training program was launched in all 168 villages covered by the original JNSP funding. The purpose of the crash training was to get the information system itself off the ground quickly, while the more intensive (and time-consuming) training of various cadres was taking place. It consisted of two days' training for two residents from each village in the bare essentials of operating the information system. The two residents from each community were selected according to expediency, because of time constraints, and were seen as temporary village health workers (VHWs). Many of them later actually became formally designated VHWs. That decision, however, was reached after fuller discussion within the village councils, and the ultimate decisions were left up to the village.

The crash training was conducted by members of the Regional Implementation Committee. It included instruction on how to maintain the village population and vital registers; how to weigh children, plot their weights on a chart, and advise mothers on treatment for malaria and diarrhea; and how to fill in the village summary form to be passed to the village health committee (VHC) and ward implementation committee (WIC). Members of the VHCs were also trained or oriented in the procedures, but in separate sessions from the VHWs. It is significant that in each case the crash training preceded the village campaigns described below, so that the weight-for-age data collected in those campaigns represented the very first experience with a village-level weighing exercise for the trainees.

The crash training program was very effective in establishing quickly the rudiments of the information system and giving the villages the means to identify the extremely malnourished children. It also ensured that the time-series of data on nutritional status for overall project evaluation would have all 168 villages represented from the outset, rather than being staggered in over time. Crash training was not intended to teach the VHWs nor the VHCs to treat or prevent malnutrition; that was part of the later, six-month training program for village health workers. The fact that training was brief and

supervision limited in the early stages has raised some questions about the quality of the data in the first two years of the INP, and similar problems are being observed in the recently expanded areas. Those concerns are discussed in a later section.

Village Campaigns

Following the crash training of the temporary VHWs a campaign was organized in each village, with the establishment of several stations where weighing, immunizations, education, feeding, and oral rehydration solution demonstrations were provided. On the night preceding the campaign, the first of the three films was shown, depicting the causes of PEM in Tanzanian households and villages. In addition to the services provided, the campaigns were actually tools for mass education and mobilization in preparation for later stages of the INP. They are thought to have been highly successful in raising awareness and, indeed, in creating immediate demand for some of the services. They were attended by technical officers from various sectors working in the area, as well as party officials and regional support staff. Campaigns were completed in all 168 villages within a three-month period early in 1984.

Day Care Attendants

As a result of earlier research by TFNC and confirmation during the village campaigns, which included public discussion of the causes of PEM, it was recognized early on that child care for mothers engaged in subsistence agriculture was an important need. Consequently, in the period March to June 1984, the regional management team launched another two-day crash training program – this time for village day care attendants – in order to initiate the village Day Care Center program. Day care attendants were trained in groups of 25, using a curriculum already developed by the Ministry of Health. Each day care worker subsequently received one to three months of training through either the Ministry of Social Welfare or the INP Multipurpose Training Centers.

VHW Training

The six-month training of village health workers was conducted in a staggered fashion from mid-1984 through 1987. Twenty-five VHWs received training in 1984; another 66 in 1985; another 138 in 1986; and another 107 in 1987, for a total of 336 (two in each of 168 villages). The first 25 VHWs were trained by the regional training team as part of their own training practicum in 1985.[2] The regional training team then trained three trainers from each of the six districts, who trained the 66 VHWs in 1986 as part of their own

[2] The regional training team consisted of one medical assistant, one public health nurse and one health officer from Iringa Regional Hospital, as well as specialists from other sectors as required.

training practicum.[3] Finally, once the district trainers were fully prepared (by mid-1985) they began full-scale training of the remaining VHWs. In deciding the order of training, districts generally gave priority to those villages with known problems, such as lack of dispensaries or other services.

The VHW training consists of two months classroom instruction on village-level primary health care, growth monitoring, reporting, referral and follow-up systems, and the like. This is followed by three months of experience in their own villages, during which the trainees must complete specific assignments, and a final, one-month classroom period, in which problems experienced in the field are discussed and resolved. In addition to this intensive, initial training schedule, there are a number of topical refresher seminars and courses, as required. At the time of training, VHWs are also supplied with first-aid kits,[4] scales, trousers, bicycles, and other supplies.

In principle, the training of replacement VHWs to compensate for attrition is accomplished by sending the replacements to the next available district-level training session. That has been made possible in some cases by the expansion into those areas of Iringa not covered by the original JNSP project. However, in some cases reported during my visit, replacements had not been sent for training, either because village contributions were not available to fund a portion of the training or because no spaces were available in the scheduled training sessions. In such cases, the new VHW receives approximately one week of on-the-job training, working closely with the other VHW in the village.

In at least one case that came to our attention, a village had allowed a VHW place to go unfilled since 1986, ostensibly due to unavailability of training funds. It was possibly related to a desire to save the expense of paying VHW allowances out of the village government budget. In the meantime, the village secretary had been assisting the remaining VHW. It is recognized at the regional level that funds limited for training replacements create a bottleneck in some cases.

In general, the six-month training of VHWs is an impressive undertaking and has undoubtedly contributed significantly to their effectiveness. However, the need to train replacements and the ability to sustain this level of training are problems. In the expansion of the INP to new areas since 1987, the training period has been reduced to two to three months, rather than six, with ongoing supervision intended to handle any problems as they arise. The review was not able to make any observations about the relative effectiveness of this shortened training period.

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[3] The district training teams consisted of the district-level equivalents of the regional team members.

[4] First-aid kits contain chloroquine, aspirin, iron/folic acid, eyedrops, vitamin A capsules, ointment, ORS, plasters, bandages, cotton wool, soap, and reporting forms. These are administered free of charge and replenished through the district medical office upon request.

Training of Other Cadres

In addition to those described above, a wide variety of courses and seminars for training and orientation were organized to meet the needs of numerous other cadres involved in the INP. These include one-day seminars for regional and district decision makers (members of the regional or district development committees, including sectoral department heads, members of parliament, councilors); five-day seminars for similar, ward-level parties; two-day seminars for primary health care committees at the ward, district and regional levels, to focus specifically on management of the information system; and a variety of other topical seminars for various technical specialists.

Effectiveness of Training

There was an impressive overall level of understanding on the part of project functionaries from village leadership through district and regional levels with respect to (1) the links between PEM and its immediate and contributing causes, that is, the relevance of broad-based development activities to reduction of PEM; (2) the principle of searching for solutions within the limits of resources existing at each level before requesting assistance from higher levels (which reflects Tanzania's long-established principle of self-reliance); (3) the role that each functionary is supposed to play in the overall process, as well as the roles of others, horizontally and vertically; and (4) the meaning and importance of child growth as an indicator of progress and of the need for further actions. The understanding of these points was uniformly impressive among VHWs and party secretaries at the village, ward, and division levels, as well as district and regional staff. There is clarity at each level concerning the objectives of the INP and, to a certain extent, how those objectives are to be achieved.

One area that appears weak at the village and ward levels involves the search for additional initiatives at village level. Apart from the interventions that were already in place (such as day care centers and follow-up of severely malnourished children), there did not appear to be a felt need to continue identifying village activities or projects to improve nutrition. In general, local-level creativity and initiative manifested themselves in modifications to interventions already in place or introduced from outside the area. Thus the means of compensating VHWs or day care attendants varies somewhat according to local preference, as does policy on parental contributions to the day care centers. However functionaries at these levels could not cite examples of new initiatives currently being discussed, even in cases where they had clearly identified a problem themselves. For example, one village had noticed that most cases of severe malnutrition occur among one to three year olds, who are generally excluded from the established day care centers, but a solution to this problem was not being actively sought. At these lower levels, INP workers appear capable of assessment and some analysis, but the action end of the triple-A cycle does not appear as well-developed. In part, this may result from an overemphasis on severely malnourished children, as opposed to the moderately malnourished, which tends to suggest certain actions targeted at those particular cases rather than broader actions. It also appears to lead to some complacency when the number of severely

malnourished in a village is brought under control. This issue has important implications for continued nutritional improvement and is discussed further in later sections.

4. THE COMMUNITY-BASED INFORMATION SYSTEM

OVERVIEW

The focal point of the INP is clearly the community-based, growth-monitoring activities that simultaneously serve as (1) an institutionalized mechanism for keeping village attention focused on nutrition levels, (2) an entry point for related interventions, and (3) the basis for an information system intended to motivate higher levels of government to do the same. It is important to bear in mind that all of these objectives of the information system are primarily *motivational* in nature: the growth- monitoring information keeps nutrition on the agenda in a surprisingly literal sense at all levels of government up to the region, and in the minds of mothers. As it passes from one administrative level to the next, the nutrition information and the larger information system of which it is a part, performs the vital function of building in accountability for levels of malnutrition in each village. As will become evident, in the INP those motivational uses of the nutrition information do not require the same levels of completeness, accuracy, and quality control that might be required for other uses – for example, for scientific evaluation – a point that is fundamental to properly planning and evaluating such activities.

The starting point for the information system is the Village Health Day (VHD) usually held once a month in each village. On these designated days, all mothers or caretakers are expected to gather with their children under five at a central place for weighing and to take part in lectures and discussions on health and nutrition topics. The VHDs are attended by the VHWs, the village secretary and chairman, other members of the village health committee, and those extension workers or ward-level supervisors who can fit it into their schedule that month.[5] Although most villages have VHDs every month, they are only required to report the results to higher levels one month each quarter, in March, June, September and December.

The mothers of individual children are generally not counselled immediately after the weighing session, although the children's weights are plotted on their growth charts for subsequent home follow-up and the results recorded in a simple household register. The growth chart used in the INP, based on the Harvard standard is tricolored, with green corresponding to "normal" weight (81-100% of median), grey corresponding to "moderate" protein-energy

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[5] Staff and officials from outside the village stated that they rotate their schedules in such a way that they can attend some VHDs each month and cover all the villages in their area at least every second or third month.

malnutrition (60-80% of median), and red corresponding to "severe" PEM (below 60% of median).

The simple, one-page village report submitted each quarter to higher levels contains the essential quantitative information for all higher levels of the information system (figure 3). It contains the number of children in each weight-for-age zone, presented in total, as well as broken into three age groups: 0-12 months, 13-36 months, and 37-60 months. The village report also records the number of deaths in the preceding quarter, according to the same three age groups and the presumed cause of death (fever, measles, diarrhea, cough, or other). The latter information is obtained from the village register maintained by the village health committee. Finally, the village report contains the name of the person preparing the report, the number of people in the village, and the number of children under five in the village.[6] Five copies of the village report are prepared, with one copy remaining in the village and one copy each going to the ward, division, district, and regional levels.

The quantitative component of the INP information system thus consists of the household register, the village register, and the quarterly village report derived from the other two. Compared with many other information systems, these forms or registers are simple and straightforward and, by and large, well understood by all who produce or use them. There do remain some problems. The village registers appear to be badly out of date; sometimes the information is not disaggregated into the three age groups; and staff at all levels above the village said that they always check the village reports for simple addition errors, and they frequently find some. In addition, in any given quarter there may be eight to ten villages (out of 168) from which no report is received, either because the VHD was not held or, more typically, because the report was not prepared or forwarded. In such cases, the ward secretary is supposed to follow up to obtain the report, but the system occasionally breaks down.[7]

The other essential component of the information system, and the one often overlooked in favor of the nutritional status data, is the written record of actions discussed, planned, and being taken at the village level. Those records, transmitted in the form of minutes of meetings held by village

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[6] These estimates of population size are supposedly derived from the village registers. However, these are generally acknowledged to be seriously out of date. Often the number of children weighed is precisely the supposed number in the village, or differs by one to two children, and on occasion the number weighed exceeds the number supposedly present. Moreover, the supposed census estimates often fluctuate from one quarter to the next, in line with the number of children weighed.

[7] Even these breakdowns in reporting have some useful information content, however, in that the higher levels of INP management (and the party system) now recognize this as a sign of failing leadership in the affected villages, and can thereby follow up to investigate not only the reporting problem but also the deeper leadership problems in the village.

Figure 3 - Sample INP Nutrition Status and Deaths Report Form

A.

NAME OF VILLAGE.....NAME OF WARD.....
QUARTER OF REPORTING 1, 2, 3, 4. DATE OF REPORTING.....
NAME OF REPORTER AND TITLE.....
NUMBER OF PEOPLE IN VILLAGE.....NUMBER OF MORE THAN 5s.....

B.

NUTRITIONAL STATUS

POSITION ON GROWTH CHART

age months	GREEN NO.	%	GREY NO..	%	RED NO.	%	TOTAL	%
0 - 12								
13 - 36								
37 - 57								
TOTAL								

C.

DEATHS AND CAUSES

	CAUSES OF DEATH				
Age in months	FEVERS	MEASLES	DIARRHOEA	RESPIR-ATORY INFECTION	OTHERS
0 - 12					
13 - 36					
37 - 59					
TOTAL					

Source: TFNC (1988).

governments and at higher levels, represent an equally important basis for monitoring the progress in implementation at lower levels. They are discussed in the context of the uses of the information system below.

USES OF THE INFORMATION SYSTEM

The various uses of information in projects are often categorized in terms of project design, management, and evaluation. Although those functions may be clearly distinguishable in centrally designed and managed projects, the distinctions are much less clear in the case of highly decentralized projects such as the INP. For that reason, this section describes the use of information in INP as a continuous process, rather than as discrete stages, in order to capture more accurately the essential mode of operation of the current information system. That is not, to imply, however, that all information needs in the INP have been met or all decisions made, through this information system, for clearly they have not. For instance, it is clear that many of the interventions were designed before the VHWs were trained and before the villages had the opportunity to conduct their own needs assessments (for example, day care centers, oil processing mills, high-efficiency stoves). The way in which the INP has balanced the ideal of bottom-up planning with the practical need for some degree of centralized planning is taken up in a later section.

Individual Follow-up

Following the VHD, the results of the growth-monitoring exercise are compiled and discussed by the VHC, assisted by the VHWs. The families of children in the red zone (severely malnourished) are visited at their homes by one or several members of the VHC and the ten-cell leader to investigate the nature of the problems giving rise to the child's growth failure. This is made possible because most villages have only 3 to 20 such cases in a given month. Investigations tend to focus on the immediate causes of the problem, namely, feeding practices and illness prevention and treatment. However, severe resource constraint or social problems may also be noted by the visiting team. Whatever the source of the problem, an action plan is agreed upon by the parents and the VHC members. Sometimes – for example where severe resource constraints exist – the case may be discussed by the village council in a subsequent meeting, and village resources may be used to alleviate the problem. Examples of action plans at this level may be to increase the feeding frequency of the child, to begin taking the child to the day care center for feeding (perhaps at no expense to the family), improving household sanitation and hygiene practices, or referral of the child to a nearby health facility. In any case, follow-up is possible at the next VHD when the child's growth will again be assessed and the cycle will repeat itself. Should the child not appear at the next VHD (or any child, for that matter), follow-up visits may be initiated to investigate the reasons and to try to encourage attendance and compliance with the action plan.

The activities described above represent the simplest example of how the triple-A cycle operates at the level of the individual. The techniques

employed in the assessment (growth monitoring results) and analysis (home follow-up visit) phases are fairly straightforward once the visiting members of the VHC, assisted by the VHW, have internalized a conceptual framework for the causation of PEM and understand how to operate the triple-A cycle. Their investigations with the mother explore, in an open-ended manner, the various immediate factors contributing to growth failure and work backward to the contributing factors as required. This analysis phase can be accomplished quickly and leads immediately into a discussion of the possibilities for behavioral changes within the household. By involving the parents, or at least the mother, in these processes, it simultaneously educates her about the causes of PEM and allows her to work through with the members of the village health committee the implications of various courses of action. For example, if there are good reasons why she would have difficulty increasing the number of feedings per day, the problems can be raised and dealt with through a higher-level iteration of the triple-A cycle. Eventually, an action plan that seems feasible to all parties can be agreed upon. It can be evaluated and modified as required at the next home visit.

The composition of the visiting team is undoubtedly an important feature of the triple-A cycle as conducted in the INP. It may be simply the VHW, or it may include a number of other VHC members. The composition is probably determined in part by who on the VHC has the time to visit the household, but consideration of political and social relations between the household and members of the VHC also plays a part. Thus, it may be advantageous for the VHC to choose to exploit good social relations between the household and a given VHC member to influence behavior more effectively. Alternatively, the VHC may judge that some political persuasion is required and decide to send the village party chairman and/or secretary with the village health worker. In addition, it is not at all rare for a ward secretary or someone from the divisional or district implementation committee to accompany some of these follow-up teams and, by his very presence, impress upon the family the importance of improving the child's growth. The opportunity also exists to bring in the expertise of an extension worker from agriculture, community development, or (by referral) health, when required by individual circumstances.

The above is a normative description of how the system is designed to operate at the household and village level. It was confirmed by all village and ward functionaries interviewed and, thus, is well understood by at least those people. It was not possible to determine to what extent the home visits rely on education, social persuasion and peer pressure, or political persuasion and intimidation to influence household behavior, although all are clear possibilities. It is plain from discussions that the names and situations of all households with children "in the red" are known to the VHWs and, as described below, that there is pressure from above to reduce the numbers of such children in the village. Moreover, discussions at the village and ward levels yielded consistent accounts of how the number of deaths and the number of children in the red zone have been drastically reduced since the beginning

of the program.[8] Thus, whatever strategies the INP or individual villages within the INP have adopted to improve the nutritional situation, the reports from those responsible for implementing the strategy indicate a conviction that it is working.

The above description pertains to the actions taken with respect to children in the red zone (the severely malnourished). The response for children in the grey zone is not nearly as intensive. Repeated inquiries revealed only that the parents of children in the grey zone, a far greater in number than those in the red, are summoned to the village office on a given day and given instruction en masse concerning the dangers of being in the grey zone, the importance of improving their child's growth, and the general strategies for doing so. They do not seem to receive any individual attention, and the triple-A cycle per se does not seem to be triggered unless or until they fall into the red zone. Likewise, children seen to be losing weight are perceived to be heading for the red zone, but not necessarily to be in any real danger until then. The priority accorded at all levels of the INP to children in the red zone appears to reflect a strategy adopted early on to begin with something that was simple, understandable, and addressed the needs of children in the most serious danger of death. The district and regional levels of management are well aware of the need to revise this strategy as time goes on, and it is a matter of continued discussion.

Village-Level Planning

Apart from guiding the follow-up of individuals, the aggregated nutrition information from the village health days is intended to provoke discussion within the VHC and village council concerning village-level activities to improve nutrition. These bodies are expected to define the specific actions to be taken and inform the ward and divisional secretaries of these plans in writing. That advisory serves as the basis for future monitoring by those higher levels. Each quarter, the village council is supposed to propose or revise such plans and/or show progress in their implementation.

The action plans submitted by the village council may be to continue to follow up children in the red zone, to establish a day care center (already a near-universal institution in the INP villages), to promote construction of VIPs (ventilated improved pit latrines), and so on. The information used to decide on intervention priorities consists of local knowledge concerning conditions and constraints as they relate to nutrition, mixed with the preferences of the village council as to what aspects of village life should be improved first. The process for deciding priorities involves detailed discussion by the village council and gradual consensus building, in the usual

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[8] As part of the social mobilization strategy which accompanied the introduction of the INP, children in the red were directly associated in the minds of the people with being very close to death; thus, inquiries concerning the impact of the program usually elicits comments concerning the reduction in the number of deaths and, sometimes after probing, reductions in the number of children in the red.

African fashion. There is clearly the potential for vested interests to manifest themselves in this process, as with any development project that has the potential for mobilizing external resources.[9] One of the important checks on the system is that decisions taken at the village level are reviewed at the ward and divisional levels and must be defended in meetings at those levels in INP-related discussions.

As noted above, villages are expected to identify action plans as part of the quarterly reporting system. However, a single project, such as the promotion of VIPs may take several months or years to implement fully in a village. Thus, the narrative quarterly reports are intended to reflect progress in implementation, as well as to call attention to constraints being faced (such as a need for technical advice on construction or materials). The same narrative information that accompanies the nutritional status report for each quarter is therefore used for planning, for requesting support from above, and for enabling monitoring and supervision from above. The quarterly reports on nutritional status (figure 3) serve the useful purpose of ensuring regular communication between administrative levels to monitor progress. In fact, the review sometimes gave the impression that the nutrition and mortality report (Figure 3) acts more as the cover page for the really important information contained in the minutes.

As noted earlier, in general the projects being undertaken at the village level seem to be chosen from a menu of possibilities developed in the early years by the central project management, although the details concerning implementation and how to raise the finances or labor for local contributions are left to the villages to decide. In addition, there is abundant evidence that central management is responsive to expressed needs from the villages in developing or strengthening interventions. For example, one regional official mentioned the need to develop a system for providing metal axles and wheels to strengthen an indigenous form of handcart presently made entirely from wood, as a labor-saving device for women and households generally. This responsiveness at higher management levels is one of the ways in which the triple-A approach is said to be useful at all levels of the project, that is, through an iterative, flexible process of problem identification and problem-solving, in contrast to an inflexible project management bent on implementing preconceived interventions from above.

Finally, it is relevant to note that the nature of the projects proposed and the progress shown in implementation are yet another objective indicator that the INP has provided for the political party system to gauge the quality and effectiveness of village leadership.[10] By the same token, the success of

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[9] For instance, decisions concerning who to select as a VHW or day care attendant, how much they should receive in allowances, whether funds should be made available for training replacements, whether to establish a cooperative oil-processing mill and membership policies, all have political implications.

[10] There is at least one case in which the village leadership was replaced as a result of failure to properly support INP activities, which was symptomatic of an overall leadership problem.

the INP at village level is highly dependent on the quality of village leadership and the relations between the leaders and the public. One of the most consistent comments, heard at all levels from village through regional management, is that the ultimate success of INP depends on the quality of leadership, and it appears that this is more variable at village level than at other levels.

Supervision, Support and Management

Ward Level. As is evident from the above discussion there are a number of roles in the INP for the administrative levels above the village. Ward secretaries are responsible for the following:

- ensuring that VHDs are held and that quarterly village reports are submitted
- attending some of the VHDs each month for supervision
- summarizing the growth-monitoring results and death reports for use at ward level and passing them on to the divisional secretary and the district INP coordinator, together with any explanations that may be necessary concerning unusual results or trends
- summarizing the status of action plans in each village, based on the minutes of village council meetings and on the results of the secretary's own follow-up investigations
- convening meetings of the ward implementation committee (which includes local extension workers) to discuss the quarterly results and progress or constraints in implementing the village action plans (This is often done as one agenda item at the meetings of the ward development committee, which are attended by village party officials.)
- convening meetings in specific villages to discuss reasons for poor performance in implementation or to investigate reasons for unusually high or variable numbers of children in the red zone
- accompanying VHC members in specific villages to encourage individual problem households to initiate required changes
- facilitating the mobilization of resources at ward level or higher to support actions in specific villages

It is evident from the above that the ward secretary plays a crucial role in the INP, serving as a supporter and supervisor of village plans and as a link between the village and the higher levels of administration from which needed resources might be mobilized. The ward implementation committee (WIC), consisting of all extension workers in the area, is one of the key assets available to the ward secretary for accomplishing these tasks. In some wards,

each extension worker is designated as the caretaker of one or several villages in the ward, so that each village knows that he or she is available for technical consultation in depth as required. The ward secretary can act through this caretaker in some of the tasks outlined above. Although the caretaker concept itself is not present in all wards, the general principle that the ward secretary may call upon the resources of these extension workers does hold in all wards.

In addition to the assistance of extension workers, the ward secretary receives a motorcycle from the INP to facilitate regular communication with all villages. Likewise, the divisional secretary has been provided with a small vehicle. It is widely agreed that this step has been essential and has not only improved supervision and communications within the INP, but has also improved the ward secretary's ability to supervise extension workers in his area with respect to their sectoral responsibilities.

An example of the crucial role that the ward secretary may play as a link between the villages and higher authorities was provided by one of the wards visited for this review. This example was offered when the secretary was asked to provide an example of how the INP information system has been used for more than screening of severe malnutrition cases. In the previous agricultural season, several villages had received poor rainfall and were obviously going to experience food shortages later in the year, while other villages produced their usual surplus. After discussion with village leaders, the ward secretary requested and obtained permission from district authorities to prevent the Cooperative Society (a crop marketing institution) from moving maize outside of the area that year, in order to ensure commercial supplies in the areas affected by the poor rainfall. Although the trigger for making this decision was based on local knowledge, the INP provided sensitization concerning possible nutritional effects and the information system provided the basis for having these effects evaluated at Ward or higher levels.[11]

Divisional Level. Whereas the ward secretary is responsible for the day-to-day supervision and support of the INP, the divisional secretary is responsible for supervising the wards and for liaising with district levels concerning the situation and progress in each ward. In short, the Divisional Secretary is the key link for ensuring accountability at lower levels and for demonstrating to district officials that accountability is being maintained. With the decentralization of most management functions to the districts after the midterm review, this means that the divisional secretary is the primary source of information for the district management team concerning progress in the INP.

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[11] Despite this action, a relatively high number of children were observed in the red zone from one of the affected villages throughout the preharvest season. However, these were completely eliminated following the next harvest. What the situation might have been in this village, or others affected to a lesser extent, if the action had not been taken is open to speculation. However, in light of the experience during that one year, the ward secretary has clearly seen firsthand the relationship between agricultural performance and severe malnutrition and is likely to take similar or additional steps in the future.

An example of how those functions are accomplished in the context of the information system is provided by one of the divisions visited. Each division manages the information in a slightly different fashion, but the bureaucratic principles are the same in each case. There the Secretary maintains a file containing copies of the minutes from all VHC meetings. Those records keep him informed of what is being discussed, agreed upon, and implemented in each village. He has 19 villages in his division, divided into two wards. The meetings are held at least quarterly, and more often when required. He also has copies of the village reports showing the number of deaths and the number of children in each color zone. To help him in his task of supervision, he summarizes the information in the form of a matrix, with one village per row and eight columns of indicators. The indicators are as follows:

1. Was a village report received?
2. If not, what is the reason? (i.e. VHW sick, VHD not held, VHD held but report not written or forwarded, etc.)
3. Did the VHC meet and discuss the results of the growth monitoring?
4. Was anything discussed or decided concerning improving sanitation?
5. Concerning day care centers?
6. Concerning food security?
7. Concerning pit latrines?
8. Concerning any other topics (specify)?

He uses the matrix to guide his discussions with the extension workers (village caretakers) and ward secretaries about the status of village plans, constraints, and what action, if any, is required to support or promote progress. Based on his matrix and his discussions with village caretakers, he also decides which villages he should visit personally to investigate problems and ensure progress. He forwards this summary to the district level (the INP district coordinator; copy to the district secretary) together with a similar summary of any progress made on plans proposed in the preceding quarter. In that case, the summary contains one project per row (day care centers, improved pit latrines, etc.), the names of villages undertaking activities on that project, and the status of those activities.

Accountability is built into the system through meetings of the district implementation committee and ward implementation committees, both of which are attended by the divisional secretary. At the ward level, the divisional secretary has the opportunity to investigate the progress, or reasons for lack of progress, in detail with each of the village secretaries. It is in his best interest to do this in as much detail as possible, because at the subsequent district implementation committee meeting he is questioned in a similar degree of detail by the district authorities. These are the same bureaucratic procedures used in all government projects. The difference in the INP is that, apart from monitoring progress in the implementation of activities, the information system provides an objective outcome indicator on a regular basis in the data on nutritional status, and this indicator is available to all administrative levels at the same time. It serves an important motivational and evaluative function over and above the reporting of progress in implementing activities.

District Level. With the decentralization of most authority from the region to the districts in 1987, the districts have assumed a very important role in the INP. Apart from overall supervision of progress as described above, the districts also control human and financial resources that can be brought to bear in particular divisions, wards, and villages when appropriate. They have also begun playing a role in modifying program policy to suit local needs, priorities, and politics. Finally, they play an important supportive role in supplies, logistics, and technical assistance in some areas.

The decentralization of the INP to the districts was a move which was necessary for efficient management of the INP itself, and it was also part of a larger policy of decentralization in Tanzania. Institutions such as the district development committee and the party have all assumed greater fiscal authority and responsibility for progress in development, and the INP has become an integral part of discussions at that level concerning resource allocations.

Institutionally the district implementation committee (DIC) is the locus of decisions at the district level. It is chaired by the district executive director (from the party), who is responsible for all development activities in the district. The secretariat functions are performed by the INP district coordinator. The latter is an official in a sectoral department (community development, natural resources, planning) but has full-time responsibility for the INP. The DIC also includes heads of sectoral departments at district level and key technical staff. A subcommittee of the DIC has been designated as the district task force, which is responsible for carrying out the recommendations of the DIC and for liasing with lower administrative levels.

The INP coordinator is responsible for summarizing the village reports each quarter and passing them on to the DIC prior to its quarterly meeting. He also uses these reports, along with the minutes that reflect proposed plans and progress from the meetings of the ward implementation committees, to guide his monthly schedule of visits to villages to investigate problems, which are made together with the divisional and ward secretaries as appropriate. The DIC reviews this material, questions the divisional secretaries for further details, and recommends what actions should be taken by the divisional secretary and/or the task force members.

Another use of the information at the district level is in meetings of party officials. According to one district coordinator, this is a very important mechanism for enlisting higher level party support for the INP. When village-level summaries of the number of children in each color zone are presented at such meetings it gives the party leaders the opportunity to reinforce the importance of taking these figures seriously and to reprimand lower-level officials whose areas are lagging behind. In some cases, written warnings and withholding of pay have been used, and the threat of such actions always exists. In light of the important role played by party officials at the village, ward, and divisional levels, such demonstrations of high-level support for the INP are obviously important for success.

One of the important sources of the district's power derives from the fact

that 50 percent of its development budget is obtained from development levies assessed at household level within the district (the remaining 50 percent coming through the region). Subject to review by regional authorities, these funds can be allocated to projects at the discretion of the district development committee. In addition, 17 percent of each village's development levy is nominally returned to the village for use at the discretion of the village council.

The village resources available from these sources represent a potentially important asset for the INP. This fund may be used to pay allowances to the VHWs or day care attendants, to finance training of replacement VHWs, to repair VHW bicycles, to purchase materials for village projects, to assist individual families, and so on. One example of the way in which district management can influence INP policy is that the decision was recently made in one district to return *less than* 17 percent of the development levy to those villages that were failing to provide VHW allowances (ostensibly due to poor leadership). The funds withheld from the village will be used to pay the VHWs directly from the central district budget. Although provision of VHW allowances has up until now been left as a matter for village discussion, the management in this district evidently places sufficient importance on the INP that it is willing to circumvent poor leadership in this way to ensure that the VHWs receive compensation. As noted earlier, poor leadership is often signalled in an objective way when village reports are not consistently submitted or when no progress is being made in planning and implementing village actions for the INP.

Regional Level. In light of the decentralization to district level, the regional INP support team has given up all of the ongoing management functions and even some of the program policy issues to the DICs. The remaining role for the regional support team is in overall policy decisions, such as expansion to new areas or how to adjust to lower levels of external funding; program strategy decisions, such as when or how to start putting more emphasis on children in the grey zone or showing faltering growth; and selected areas of technical backup and supplies and logistics that cannot be handled at the district level (e.g. ordering supplies from abroad through UNICEF, improving technical aspects of selected interventions). In addition, the regional support team provides overall supervision or guidance and still serves as the key link between the districts and the regional INP steering committee and regional development committee.

One of the areas of technical backup that continues to be important is in the management and improvement of the information system itself at the regional level. At present, the only computer handling of the data is at the regional level, and this primarily serves regional information needs. This is one of the important ways in which the regional team can monitor performance at lower levels: by investigating the number of, and reasons for, nonreports in a quarter or other indicators of problems. All other levels in the project use hand-processed information. With the recent expansion of the INP to all 610 villages in the region (in contrast to the original 168 JNSP villages), and the decentralization of management to the district level, regional management now sees a need to develop computer-based systems in the districts. In addition,

there are a number of inconsistencies in the present system that require regional input to resolve. This is but one example of the continued need for a strong regional support team in the INP.

5. USE OF THE INP INFORMATION SYSTEM FOR OVERALL PROGRAM EVALUATION

The above sections have dealt exclusively with the uses of the INP information system within the program itself, primarily for planning and management purposes. Another potentially important use of the information is for evaluation of the impact of the program on child death and malnutrition. In this case, the intended audience is largely outside of the INP itself, specifically, national decision makers, national and international donors, other developing countries that might benefit from the Iringa experience and the international nutrition community in general. This section (and appendix 3) addresses the question of the extent to which the INP information system can contribute to making a wider range of decisions and, as a corollary, what additional information or analysis might be required to support such decisions. As with other sections of this report, it is hoped that the considerations raised here may be of value to those directly involved with the INP itself, as well as to the larger audience interested in the design and evaluation of information systems.

EVIDENCE FOR INP IMPACT

The primary published information on the impact of the INP is contained in the 1983-1988 Evaluation Report prepared by the government of Tanzania, UNICEF and WHO (GOT 1988). The report contains a variety of details concerning progress in implementation of the many INP projects and activities, changes in nutritional status and death rates, and cost analysis. This section focuses on the evidence for impact on nutritional status, and the reader is referred to the full report for additional information on these other aspects. (Government of Tanzania/WHO/UNICEF 1988)

The primary evidence for the nutritional impact of the INP is presented in one table and three figures, as shown in table 2 and figures 4-6 of this report. All of these data are based upon the quarterly village reports derived from the VHDs. Table 2 shows the prevalence of total underweight (< 80% weight-for age) and severe underweight (< 60% weight-for-age) among all children weighed in the original JNSP areas from early 1984 through early 1988. There are marked reductions over the period in total underweight (decreasing from 55.9% to 38.0%) and severe underweight (decreasing from 6.3% to 1.8%), with most of the reductions occurring in the early periods of the program. Figure 4 shows that the reductions in severe underweight are present in each of the seven geographic divisions of the original INP area and, again, most of the reductions are seen in the early periods of the program. (The increase in Pawaga Division in the last year is attributed to poor weather and food shortages during the second quarter of 1988.)

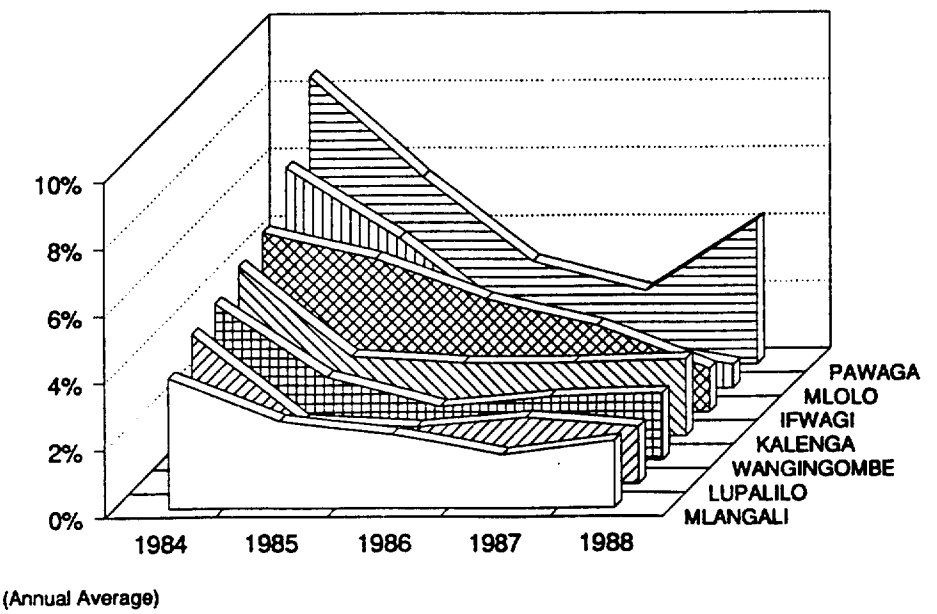
Table 2 - Prevalence of Mild and Severe Underweight

Quarter	Children Weighed	Percent Underweight Children[a]	Percent of Seriously Underweight Children[b]
84/2	30,600	55.9	6.3
84/3	26,922	46.2	4.7
84/4	29,455	44.6	4.0
85/1	34,941	46.0	4.5
85/2	35,793	44.9	3.7
85/3	39,333	41.9	2.6
85/4	36,711	39.1	2.3
86/1	33,124	40.5	2.6
86/2	33,708	40.7	2.2
86/3	36,320	39.7	2.1
86/4	42,022	39.2	2.5
87/1	41,583	39.8	2.2
87/2	39,967	39.7	1.9
87/3	37,054	37.9	1.7
87/4	36,232	37.0	1.9
88/1	32,564	37.8	1.7
88/2	33,701	38.0	1.8

Source: GOT (1988).

[a] Weight-for-age is less than 80% of the Harvard weight standard.
[b] Weight-for-age is less than 60% of the Harvard weight standard.

Figure 4 - Trends in Severe Malnutrition, by Division, 1984-1988



Source: GOT (1988). Reprinted with permission.

Figure 5 shows further that in 1987, the prevalences of severe underweight in adjacent areas of Iringa Region, unserved by the original INP, are at similar levels to those seen in the JNSP areas at the beginning of the program and at much higher levels than the JNSP areas in 1987[12]. These difference are evident in each of the five districts of Iringa Region. Figure 6 is not nearly as detailed but shows that the same overall trends are present in the prevalence of total underweight.

In order further to explore the possible effects of the program on nutritional status, a household sample survey was conducted in 36 of the 168 original JNSP villages in 1988. The survey covered 720 households with children between the ages of 12 and 35 months and was intended to permit an examination of the relationship between intensity of program participation and nutritional status. This analysis was seen as a method to expand upon the evidence for impact provided by the INP information system and thereby increasing the plausibility of the results.

Of the results shown in the evaluation report (GOT 1988), nutritional status is significantly related (p=.05) only to "mother's ability to recognize a malnourished child." It is not significantly related to the mother's understanding of a growth chart or ORS, or to use of a locally produced weaning food. The report goes on to note that a number of other potentially interesting cross-tabulations were generated, but were difficult to interpret due to small sample sizes in the suboptimal levels of the "program intensity" variables, or due to known confounding by other (unmeasured) variables. Thus the analysis of the household survey data did not add to the evidence for impact provided by the INP information system.

In the 1983-1988 Evaluation Report, this evidence (especially that derived from the quarterly reports) is taken to be "a strong indicator of the impact of the Iringa Nutrition Program on severe malnutrition" (p. 33), and "a strong indicator of the impact of the program on all malnutrition" (p. 37). Elsewhere it is stated that: "The Iringa Nutrition Program, through its initiative to mobilize villagers and officials throughout the region and to strengthen service delivery in a number of sectors whose work is relevant to nutrition, has brought about a measurable improvement in the nutritional status of infants

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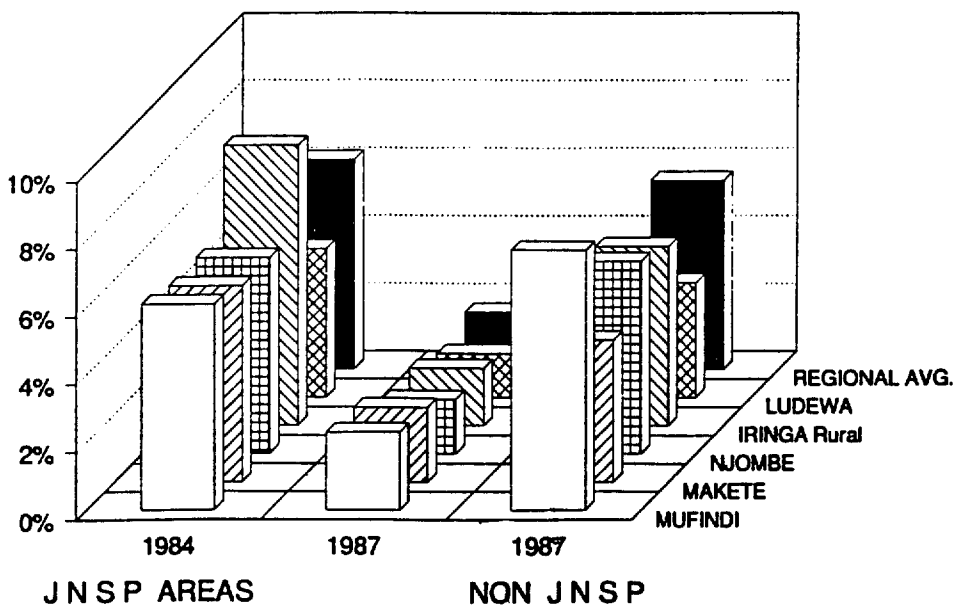
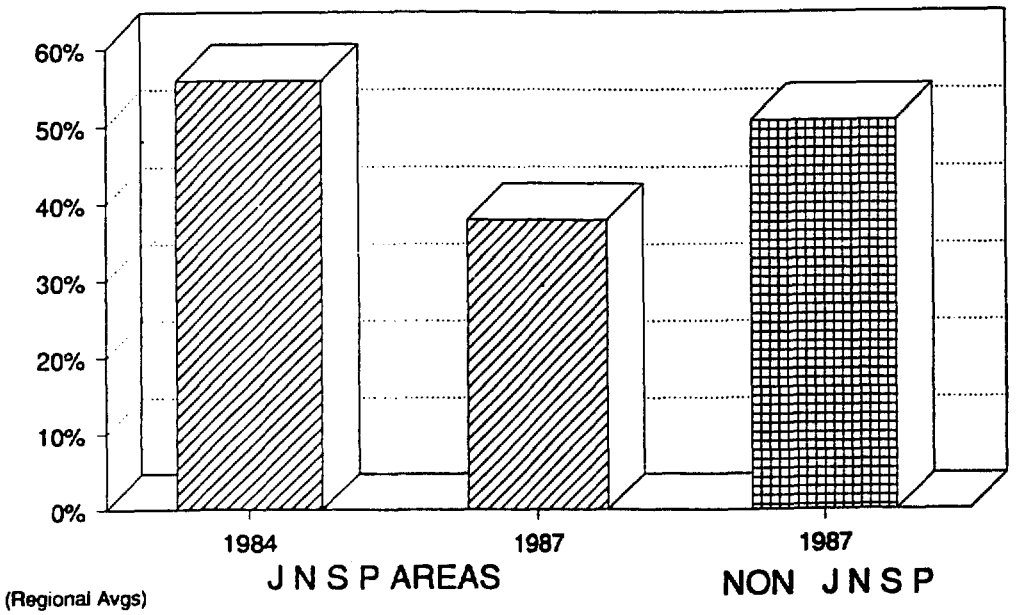
[12] The data on underweight prevalence from the adjacent areas was obtained in 1987 when the INP was expanded to those areas; it was collected in the same manner as the 1984 data in the JNSP areas, through campaigns in each village to launch the program, which included the first-ever community-based growth monitoring session in each village.

Figure 5 - Prevalence of Severe Malnutrition



Source: GOT (1988). Reprinted with permission.

Figure 6 - Prevalence of Total Malnutrition



Source: GOT (1988). Reprinted with permission.

and young children" (p. 83). The report goes on to link the reduction in malnutrition (and deaths) to activities strengthened by the INP, including the application of the triple-A cycle (p. 83).

Although the dominant, subjective impression derived from even a one-week visit to Iringa is that the INP is having a favorable impact indeed on child health and nutrition (confirming the statements quoted above from the Evaluation Report), it is important to examine carefully the extent to which those statements can be supported by an INP-type information system. In the interest of continuity, the detailed analysis of this question is included as appendix 3, and the major conclusions from this analysis are provided below.

LESSONS CONCERNING INFORMATION FOR IMPACT EVALUATION

One of the potential strengths of a community-based growth monitoring system is that, by achieving near-universal coverage of the under-five population on a regular basis, a mechanism would be available for long-term monitoring of the nutritional status of this population. The fact that such information might be generated merely as a by-product of a program that is built around the use of growth monitoring for action at the local level makes the proposition even more appealing.

The detailed analysis of the INP case (undertaken in appendix 3) has revealed that the use of community-based growth-monitoring data for impact evaluation purposes is fraught with difficulties, even when it is conducted under what might be considered the "best available approximation" to ideal conditions, as seen in Iringa. The difficulties stem from two basic sources and are compounded by a third factor. First, to use growth information for local management and motivation appears to have different requirements in terms of quality control, completeness of coverage, possible selection biases, and so on, than to use it for impact evaluation. Whereas the INP information system appears very well suited to the former, the analysis here has resulted in serious concerns regarding the latter. Second, even if the quality-control-related issues could be resolved, this analysis reveals that additional information would be required to exclude the possibility of secular trends and in order to link program activities directly to nutritional improvement. One would have to collect data on nonparticipants, before and after the program had started, and ancillary information on program participation and socioeconomic characteristics (to control for confounding). Although the INP is fortunate in having some such information already available, it is incomplete and not rigorously comparable in several respects.

The third factor that complicates the first two is the apparent difficulty of combining program management responsibilities with responsibility for evaluation. Although there are advantages to combining the two for internal management purposes, the present analysis has shown that the time and skills required for detailed impact analysis are far greater than those required for more routine management functions. It does not appear that highly plausible evidence for impact can be generated as a by-product of management-related analysis, even though some of the requisite data may be generated in that way. In light of the fact that the data themselves are fraught with many potential

problems (often subtle in nature), there is danger in underestimating the resources required for undertaking such analysis.

Ultimately, the question of how much rigor (or plausibility) is required from an information system must be answered in light of the intended uses of the information. It is clear that the INP has correctly placed greatest emphasis on the use of the information for management and motivational purposes and that the information system appears extremely well suited to that task. One of the important conclusions from the present review is that (as in so many other cases) the *validity* of the INP information system depends upon the purpose to which it is applied. A corollary is that, for social action programs (as opposed to scientific evaluation) the utility of information for influencing decisions is far more important than its validity.

6. ANALYSIS OF THE INP INFORMATION SYSTEM

From section 4 it is apparent that, as a planning and management tool, the INP information system has been well conceptualized and is generally functioning as it was intended. This section focuses on a number of issues that are important for understanding how and why the INP system has been successful in this regard and, in some cases, how it might be strengthened. These issues are important not only for understanding the INPs performance but also in considering whether and how some of the principles might be applied elsewhere.

ENABLING CONDITIONS IN IRINGA

The issue of the generalizability of the Iringa approach to other settings within Tanzania, and especially to other countries, requires consideration of those conditions in Iringa that may have been important for success and which may not exist in the same form or to the same extent in other settings. This section reviews a number of these, namely the ideological and political support, pre-existing administrative structures and capacity, management capacity, and the resources available at all levels. Of these, the latter has received the most attention in the INP (especially the question of the level of external funding); however, that question itself needs to be examined more broadly and should not overshadow the importance of the other factors mentioned.

Ideological and Political Support

One of the immediately obvious features of the INP is the fact that it is consistent with two important aspects of Tanzania's social philosophy and approach to development: the beliefs that all development efforts should be "people-centered" and that community self-reliance should be a cornerstone of development. The harmony between the INP and the prevailing ideology is, of course, no accident; the INP was conceptualized explicitly with those principles in mind in order to capitalize on them and gain strong political support. One contention of those involved with the early conceptualization of the approach is that all efforts to improve nutrition through broad-based approaches should include consideration of ideological forces in order to identify not only those elements that might be used to reinforce the project but also those that might be obstacles to success (Jonsson 1989).

An important question, but one beyond the scope of this review, is the extent to which ideological support can be enlisted for broad-based nutrition programs in those countries that do not have Tanzania's socialist philosophy. The most important principle that we derive from the INP in this regard is that

the question *must* be addressed at some stage, preferably early, in the hope that such an analysis would reveal elements of the prevailing ideology that might be capitalized upon for support, as well as institutional possibilities for sustaining that support. Moreover, the design of the program itself (not only its philosophical presentation) should benefit from such an analysis.

Ideological support may be one of the useful, if not essential, ingredients for success; however, mobilizing political support often involves more than ideological harmony. Politicians, administrators, and other influential leaders at all levels usually must see the advantages of a given activity to themselves or their constituencies before they will lend it their support. That is an issue with which the INP had to contend and which other projects should confront as well. Some observations from the INP experience are pertinent here.

Although details on these issues were also beyond the scope of this review, the impression gained is that while INP inputs such as vehicles for the divisional secretaries, motorcycles for the ward secretaries, and bicycles for the VHWs may serve a legitimate utilitarian function, they also contribute significantly to political support for the project at those levels. The danger is always present that, inasmuch as they depend on existing decision-making mechanisms, decisions such as the choice of VHWs may become politicized because of the material advantages that might be derived, to the possible detriment of the program (i.e. should the VHW be unqualified or unmotivated to perform his or her duties). That may be a particular problem in the scaling-up phase of a program, when the drive to deliver inputs, or to identify and train personnel may overrun the ability of project management to guide and monitor the distribution of project resources. Such guidance is essential to ensure that an acceptable balance is struck between "greasing the political wheels" and meeting other project objectives.

One of the surprising results of the review is that, to the extent that respondents were candid, it did not appear that the distribution of material inputs in the INP was disruptive, in the sense of creating serious jealousies or decreasing the morale of the nonrecipients. Most people acknowledged that the items supplied were necessary for project supervision or support. They were also quick to identify other areas of unmet need – for example, most extension workers in line ministries do not have a bicycle – but there were no ill feelings expressed or detected. Thus the project management's view that such inputs may be a political necessity did not appear to be disruptive to other aspects of the project.[13] That pragmatic approach is in contrast to the

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[13] There are accounts from some of the areas into which the INP has recently expanded that distribution of some of the material benefits during the training phase (i.e. living allowances) was done in way that was disruptive, at least in the short term. That is one of the reasons for suggesting that the scaling-up phase may be more prone to imbalances between political appeasement and other project objectives.

"purist" view that such action should not be necessary, and indeed should be discouraged, in programs built upon the concept of community participation.

Pre-existing Administrative Structures and Capacity

It is evident from the description of the information system (section 4.2.3) that the INP benefited greatly from the prior existence of a well-organized administrative structure, extending from regional level down to ten-cell units in each village, with recognized leaders at each level. It also benefited from the fact that this administrative system already followed the practices of holding regular meetings to discuss issues of common concern at each level *and* documenting the discussions with written minutes routinely distributed to other appropriate administrative levels.

It cannot be overemphasized that this institutionalized capacity and practice is vital to the success of the INP. It is as much a part of the INP information system as are the growth monitoring reports and reports of child deaths, although the latter are the features that capture most of the attention and effort in the literature and in efforts to develop community-based growth monitoring systems elsewhere. Experience elsewhere has shown that without some system for conducting, recording, and communicating to others the analysis and action phases of the triple-A approach, the effort may never proceed beyond the stage of data collection, transfer, and accumulation. Each time the data on the nutritional status of children moves to a higher level without analysis and action having been performed, the probability that such analysis and action can or will be performed diminishes significantly because of the difficulty of doing so from a distance. Only at the local level is it possible for people - with a modicum of assistance from someone such as the village health worker - simultaneously to perform an accurate analysis of the causes and possible solutions of their problems and martial the local social and political support for taking the necessary actions. In addition, it is only through a reliable communication system (and written records are the favored bureaucratic form) that higher levels in the management and support structure can become aware of, and respond to, the need for material or technical assistance at lower levels.

When the burden of conducting the analysis phase of the triple-A is placed on higher administrative levels (in many cases, the national level), a dilemma is created in that information that is at least semi-quantitative, pertaining to a wide range of possible contributing factors, must also be gathered and transferred. Not only would this create a tremendous strain on the administrative system, it also does not lead to the type of analysis that is really required, that being village-by-village analysis and action plans. Instead, analysis of such data from a national level would be performed at high levels of aggregation and, at most, could only examine differences between villages rather than those within villages. With only crude indicators available about the contributing factors (for example, the percent with pit latrines) it is also likely that important, subtle factors would be glossed over or missed entirely. Thus an important reason for success in the INP, and one that distinguishes it from top-down planning based on community-generated data, is the administrative capacity for local-level planning (which was strengthened by the INP and still requires more strengthening) and for

communicating regularly and efficiently with higher administrative levels from which assistance may be required.

As noted above, the basic structures and capacity for such a system were already in existence in Iringa (and in Tanzania as a whole) before the INP began, and they appear to have been strengthened by the INP. That strengthening was in the form of the establishment of some new institutions, such as the various implementation committees, and, as a by-product of the INP, the infusion of a new element of objectivity and accountability in the usual administrative channels. In addition, the notion that higher administrative levels might consult with, and play a supporting role for, the lower levels, as opposed to directing them from above, has ample precedent in Tanzania. It both reinforced, and was reinforced by the processes employed in the INP. These structures, capacities, and processes are certainly not present in many developing countries. As in the case of ideology and political support, these aspects must be subjected to careful analysis as an essential part of the conceptualization stage of planning.

Management Capacity

Apart from the pre-existing administrative structures described above, it is clear that, in order to implement a project of this size, the INP required strong management from the regional level and support from the national level. It appears that that capacity was not present locally, to the needed extent, at the beginning of the INP, but it was strengthened through the external support provided by JNSP. Thus, it is discussed here as an "enabling condition" not because it already existed but because it was made available by JNSP funds and by the active involvement of UNICEF in regional management and management training throughout the project. The INP also capitalized on the abilities of a number of senior and experienced managers and trainers from various departments in the civil service who joined, or were assigned to, the regional management team at its inception.

The issues in terms of expansion within Tanzania or into other countries are, therefore, the extent to which existing management is capable of such a project, the extent to which management capacity borrowed from other departments is a sustainable strategy for a national program, and/or the extent to which resources exist for reinforcing management quickly at the outset and then strengthening local management capabilities over the first few years of the project. The answers to these questions will be variable from one country to the next. This is yet another area requiring attention in the early planning stages.

Operational Research Capability

An important resource for the INP management team has been its close association with the Tanzania Food and Nutrition Centre, a national research institution capable of undertaking rapid, ad hoc studies on a variety of operational aspects throughout the life of the project. The INP evaluation report says that 52 such studies were executed before and during the

implementation phase, and only three of those produced results that did not have any influence on program implementation (United Republic of Tanzania/WHO/UNICEF 1988). While it was not possible to examine the experience with those studies as part of the present review, it is clear that the availability of a national institution such as TFNC and a budget to support such a program of operational research were valuable assets to program management.

Indigenous Resources

In a sense, all of the above factors or "enabling conditions" represent resources on which the INP could draw for its success. Two other dimensions of the resource question also deserve attention: the external resources available to the program through JNSP and the resources already available to households and communities.

The question of household and community resources in Iringa region is obviously quite important for a program such as the INP, which is predicated on the assumption that much of the action required to reduce malnutrition should be and can be done within households and communities. There are several ways in which Iringa may be well endowed in this regard. First, as mentioned in an earlier section, Iringa is one of the five maize surplus-producing regions in the country. This means that, on average, there may be fewer food-deficit households in Iringa than in many other regions. Of even greater importance – because there is no direct relationship between aggregate surplus and household-level surplus – is the fact that communities as a whole may be in a better position to raise the resources required to support the INP. That support may be providing allowances or training expenses for VHWs and day care attendants, providing food for child feeding at day care centers, maintaining a communal stock of food for redistribution to destitute families, being able to meet the annual development levy, and so on. In short, all of the ways in which villages are called upon to contribute to the INP (through material contributions or labor) would be enhanced by the fact that the region is, on average, a surplus-producing area. One can also presume that the marketing infrastructure for commodities and inputs is better developed than average.[14]

Another resource that Iringa is said to possess to a greater extent than other regions is a strong spirit of community self-reliance, support for communal projects, and in general responsiveness to development activities. These characteristics, which are intangible qualities, are quickly recognized by seasoned planners, program managers, and politicians. Individual villages can usually be readily differentiated by those criteria, based on their history of response to endogenous or exogenous development initiatives. These qualities clearly have a bearing on initial receptivity to a new project, such

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[14] Even the Makete district, which is very inaccessible in the wet season due to its difficult topography, reportedly does not suffer seasonal food shortages as do other areas, because the cropping system includes wheat, irish potatoes, and maize, which mature at different times of the year.

as the INP, and on its sustainability. They also influence the extent to which communal resources, such as those described above, will be used to support various aspects of the INP. The effect of not having such qualities is clear in those villages within Iringa that are said to have "poor leadership," where VHWs may not be paid, their replacements not appointed or trained, and where no public support for program activities is demonstrated by the leadership. Despite being obscure to outsiders, such intangible qualities must be recognized as a resource, the extent of which varies from one community or locality to another, and which has a large bearing on the success of a program.

Finally, although not unique to Iringa, another important resource in Tanzania that has a bearing on the INP is the high literacy level in rural areas. Widespread literacy has potential influence on the levels of understanding and the receptivity of mothers to the growth chart and its significance; it allows communities to select VHWs from a larger pool of candidates; it influences the ability of VHWs to plot, record, and tabulate the number of underweight and dying children; it enables the VHC and village council to appreciate the significance of the numbers; it ensures that the minutes of VHC meetings can be produced; and it permits villages to contribute to, and benefit from, the quarterly INP newsletter. Thus, even from such obvious advantages of a literate population, it is clear that the INP has benefited from that valuable, pre-existing resource.

External Resources

Much of the discussion of the sustainability and replicability of the INP has focused on the cost of the project and the question of whether those costs are sustainable without large external contributions. They are certainly valid issues to raise concerning the INP. As reflected in this entire chapter, however, they should not overshadow a number of other enabling conditions in Iringa and Tanzania that have contributed to the program's success. Although the others cannot be conveniently reduced to spreadsheet-style presentations, as in the case of project costs, and some of them (such as management training and support) can actually be facilitated with external funds, they nonetheless have the same potential to make the approach sustainable or not and replicable or not. Moreover, in some settings, certain preconditions, such as a community spirit of self-reliance, can actually be destroyed by a heavy infusion of external resources or the appearance that such resources are available. That does not appear to have been the case in the original JNSP villages; however, as noted earlier, some such problems have emerged in some of the expansion areas.[15]

Yet another impressive feature of the INP is the level of detail available for cost analysis. The accounting system allows breakdowns according to category of expenditure, individual project activities, and year. It also provides information on start-up, expansion, and ongoing

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[15] The experience from Embu District in Kenya provides an interesting contrast in this regard (see report by Oniango).

expenditures, so that the financial implications of replicability can be examined separately from sustainability. These are shown in highly aggregated form in Table 3.

In current dollar terms, total JNSP input from 1983 to 1987 was $3.48 million. At constant 1987 dollars, the figure is $3.87 million, largely reflecting certain capital expenditures in earlier years (e.g. for vehicles), when the dollar was stronger against the yen. For reasons mentioned in the INP evaluation report (United Republic of Tanzania/WHO/UNICEF 1988), the method thought to reflect most usefully the ongoing costs of an expanded program is to annualize constant-dollar expenditures in such a way that capital costs are distributed over their entire useful lifetime, rather than attributing the cost entirely to the time at which purchases were made. That has the effect of lowering the apparent cost of the program by about 20 percent to $3.12 million, because some of the capital items will still be in use well beyond 1987. The definition of the most appropriate methodology will vary, depending upon the purpose of the analysis and, for instance, the degree to which a need for start-up capital is a constraint. In the case of programs initiated through loans instead of grants, the interest associated with the loan would also need to be added to the figures presented here. The tables presented here are based upon the annualized, constant dollar methodology; however, one should bear in mind that the figures are roughly 20 percent lower than the nonannualized, constant-1987-dollar estimates. (The evaluation report presents detailed breakdowns according to all three methodologies.)[16]

Assuming that an annual average of 46,000 children under the age of five were served by the INP, the total cost of the project is $16.95 per child per year ($3.12 million / 46,000 children / 4 years). That figure is not particularly meaningful, however, because the capital expenses were annualized over their entire lifetime rather than over only four years. In fact, start-up costs were $14.30 per child in the original INP areas (and will not need to repeated), one-time expansion costs are estimated to be $5.30 per child covered in the expanded areas, and ongoing costs are estimated at $8.05 per year (all calculated from table 3).

As shown in table 3, of the $3.12 million expended, personnel by far represents the largest single item (39.4% of the total).[17] Of the $1.23 million spent on personnel, 34.3 percent or $421,100, represents international salaries for management support. Only 3.5 percent represents national management salaries, and 62.2 percent is for daily allowances for management

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[16] It should also be borne in mind that all of the figures cited here, as well as the estimates of cost per beneficiary provided in the evaluation report, represent JNSP inputs only. They do not include national inputs, which total TSh 47 million, or roughly $470,000. Of this, 66.3% represents village contributions (chiefly labor) and roughly $158,000 comes from district, regional, and national levels, mostly as personnel costs.

[17] Note that this does not include VHW and day care attendant allowances, which are paid by the communities and amount to roughly $77,000 over the four-year period.

staff and other personnel during training and ongoing program operation (from table 16 in United Republic of Tanzania/WHO/UNICEF 1988). In total, 52.9 percent of personnel costs (and all of the international salaries) is classified as ongoing expense during this four-year period. The figures reveal both the extent of the support provided by external management and the savings that could be realized once local staff are fully capable of such management. Daily allowances, by contrast, are primarily for local staff, including training and supervision: Such allowances are recognized as one of the material benefits accruing to program functionaries and trainees and, in the local context, are generally considered necessary costs of obtaining and sustaining support and morale. It is not clear whether this is one of the categories of expenditures that the INP made for expediency purposes, nor whether similar levels of support and morale could be obtained at a lower cost.[18]

Apart from personnel, the next-most-important expenditures were for vehicles (13.2%), local transport (12.8%, mostly for training purposes) and purchased services (17.3%), together accounting for 43.3 percent of total JNSP inputs (see table 13). Unlike personnel costs, it is difficult to see how these could be reduced without compromising training, supervision, or implementation, or without cutting down on specific intervention components.

Using an approximate exchange rate of 100 TSh/$, as suggested in the evaluation report (United Republic of Tanzania/WHO/UNICEF 1988), total national contributions to INP amount to roughly $470,000 over the four year period. That represents only about 15 percent of the funds contributed by JNSP. In addition, 66.3 percent of the national contribution is from villages, mostly in the form of labor for construction projects. Thus, the inputs from district, regional, and national levels amount to $159,227, or only 5 percent of total JNSP inputs.

This comparison is indicative of the enormous shift in resource allocation that would be required for the government to assume total responsibility for the program. It is an unfair comparison, however, insofar as the mere availability of JNSP funds undoubtedly encouraged their use for some things that the government may otherwise have paid for. One could argue in addition that start-up and expansion costs are expenses that can legitimately be covered by grants or loans and annualized over a longer period. Nonetheless, the local contribution of $159,227 from all nonvillage sources represents only 10.7 percent of JNSP-funded, *ongoing* costs and only 15.1 percent of such ongoing costs when external management is excluded. It is clear that even before adding in the cost of repaying the loans for start-up and expansion costs major increases in government support must be made simply to cover the ongoing costs of the project.

Recent discussions by the regional steering committee indicate that efforts are being made both to increase government contributions to the INP and to cut certain ongoing expenditures. The evaluation report acknowledges that in the

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[18] Once again, the approach taken in Embu District, Kenya is instructive in this regard in that the cost of training was absorbed almost entirely by the communities.

Table 3 - JNSP Inputs (thousands, constant US$, annualized), Totals

	Buildings	Vehicles	Equipment	Personnel	Local Transportation	International Transportation	Purchase Services	Technical Supplies	Other Supplies	Operations & Maintenance	Total Costs	% of Total
Year												
1983	0.0	0.0	0.0	72.4	19.5	0.0	36.4	0.0	8.1	0.0	136.5	4.4%
1984	7.2	105.3	4.6	307.6	83.3	6.0	179.1	2.1	49.7	0.0	745.0	23.9%
1985	17.8	109.4	6.3	298.2	119.2	3.6	96.1	13.9	38.3	0.0	702.8	22.5%
1986	33.9	105.1	33.0	319.0	132.3	24.8	122.0	42.3	64.0	13.2	889.7	28.5%
1987	35.0	93.2	53.2	230.9	44.1	13.9	106.1	38.9	27.7	0.3	643.3	20.6%
Total	93.9	413.0	97.1	1228.2	398.4	48.4	539.8	97.2	187.8	13.5	3117.2	100.0%
% of Total	3.0%	13.2%	3.1%	39.4%	12.8%	1.6%	17.3%	3.1%	6.0%	0.4%	100.0%	
Type of Cost												
Start-up	0.0	0.0	2.4	193.4	55.8	48.2	318.0	7.3	34.3	0.0	659.5	21.2%
Expansion	93.9	4.0	70.9	385.6	116.9	0.1	196.0	7.8	99.8	0.6	975.7	31.3%
Ongoing	0.0	409.0	23.8	649.1	225.7	0.0	25.8	82.1	53.6	12.9	1482.0	47.5%
Total	93.9	413.0	97.1	1228.2	398.4	48.4	539.8	97.2	187.7	13.5	3117.2	100.0%
% of Total	3.0%	13.2%	3.1%	39.4%	12.8%	1.6%	17.3%	3.1%	6.0%	0.4%	100.0%	

Source: GOT (1988).

interest of early implementation of the INP in the original JNSP-supported areas, external funds were sometimes used when there may have been other, albeit more time-consuming, methods to proceed had those funds not been available. In addition, areas into which the INP has expanded since 1987 (with far lower inputs from UNICEF's Child Survival and Development funds) have used a shortened training period and other measures to reduce expansion costs. For all these reasons, it is not possible to conclude from the simple comparisons made above that a program like the INP is beyond the reach of affordability for the Tanzanian government, or any other government for that matter. The Iringa "experiment" is still continuing in the original INP areas, as well as in the expansion areas, where more cost-conscious procedures are being used.

The stages through which the INP is passing are, of course, all too familiar in the life cycles of development projects. The present stage, involving a transition away from high levels of external support and expedient measures for implementation and management, is a critical stage and one that many projects fail to survive. It is worthwhile to contrast this classic approach to project implementation, which is often driven by the need for donors to have visible results in a short period of time, with the alternative represented by Embu District in Kenya, in which implementation has proceeded more slowly and with a far smaller infusion of external resources. By its very nature such an approach avoids that critical hurdle that proves insuperable for so many projects. Instead of placing upon governments the burden of adapting to the withdrawal of external resources, it challenges governments and donors to show fiscal restraint at the outset and to look for qualitatively different signs of progress in the early years. From the perspectives of donors and governments, it also presents an opportunity to spread a given level of resources over a wider area, rather than investing intensively in a single, pilot area. Now that the INP has demonstrated that something like the triple-A approach, adapted to local conditions, can be a useful catalyst for change, attempts to transfer such an approach to other settings should experiment with alternative implementation strategies that are affordable from the outset and do not jeopardize sustainability when external resources are withdrawn.

SOME AREAS FOR CONTINUED DISCUSSION AND IMPROVEMENT

Local Trend Monitoring and Feedback

It is striking to observe, at the village and ward levels, the awareness among party secretaries and VHWs of the current numbers of deaths and children in the red zone, and how the numbers differ from the early periods of the program. When questioned, those respondents can also identify seasonal fluctuations and presumed reasons for those fluctuations. In some cases, they can also identify the villages that have chronically higher numbers than others, and suggest the reasons.

Despite the obvious awareness of overall trends in deaths and severe malnutrition, there was no strong evidence that the trends were being monitored in any systematic way, nor that positive trends were being communicated back to the communities. None of the offices visited at village, ward, division, and district level (12 in all) had a chart or table on the wall displaying such

trends, although in many cases displays were present with results from functional literacy programs, the census, and other programs. In some cases, respondents said that trends could be determined from the information in the files, but it appeared they did not feel it was important to display and refer to them frequently. When asked whether some of the dramatic examples of success had been communicated to the localities (e.g. reduction in the number of severe cases from 20 down to two or three), none of the respondents reported doing so.

Both of these issues – systematic trend monitoring and positive feedback – are areas that might be strengthened to good advantage in the INP. Although there is an evident, intuitive sense concerning which villages and seasons have the most problems, there are limits to such intuition, especially once the program has operated for several years. Visual displays could help to stimulate continued problem identification and discussion at all administrative levels. At present, there seems to be a bit of complacency in some areas, insofar as marked reductions in deaths and severe PEM cases have been achieved and the current number of cases is very few. One approach to remedy this is to begin to emphasize the importance of moderate PEM cases (as discussed below); another is to encourage and support the production of visual displays showing long-term trends based on quarterly reports. Similarly, it seems that an excellent opportunity is being missed by not giving positive feedback to the communities where it is deserved to instill greater sense of accomplishment and community control over the death and malnutrition rates.

Focus on Severe Malnutrition

As noted several times, the INP has placed major emphasis on reducing the number of children in the red zone on the growth chart and associating the red zone with probability of death in the minds of people at all levels. This emphasis is reflected in the ability of village and ward functionaries to cite the number of severe cases and deaths in the last quarter and specify how numbers differ from previously. It is also clear, however, that this focus on the severe cases has been achieved through an implicit reduced emphasis on children in the grey zone (moderate cases), whose numbers those questioned generally could not recall from the previous quarterly report. In discussions on this issue, respondents repeatedly indicated that children in the grey zone are a concern only insofar as they are close to the red zone, or heading toward the red zone. This was most clear among mothers and functionaries at the village and ward levels. At the divisional and district levels, respondents seemed more aware that the moderate cases should get more attention than they have been receiving; however, this was articulated as something for future work rather than something which is being actively addressed now. Likewise, regional managers were very aware of the issue and is discussing how best to make the transition in emphasis.

It is worth stressing that emphasis on the severe cases appears to have been the result of a strategy decision made early on, one with good justification. Because of their much higher risk of death, severe cases should receive priority in any program. They are also more visibly sick, as seen by mothers and communities, which strongly motivates taking action. Finally, by

virtue of their smaller numbers and their greater responsiveness to intervention, the focus on the severe cases has allowed communities to direct their attention to a problem that is more easily soluble than reduction in the prevalence of moderate PEM. One of the most important principles of programs like this is to start with a small number of manageable tasks that the community can master and build up from that level (Korten 1980). The INP appears to be at a stage where such building should begin to take place. An important area for building is to begin emphasizing either the importance of doing something about children in the grey zone or, more likely,[19] the importance of the direction of growth rather than the absolute position.

Shifting attention in this manner has some technical implications but also goes well beyond them. First, as noted above, it is likely that moderate cases of PEM are not as responsive to the types of interventions that may prove successful with severe cases. One reason is that wasting accounts for a greater proportion of underweight among severe cases than it does among moderate cases, and is more easily reversed than is stunting.[20] This is one strong argument for focusing on the direction of growth rather than the absolute level, especially for older children among whom stunting accounts for a greater proportion of underweight.[21]

If direction of growth is used as the key indicator in the future, a second technical concern is the influence of measurement error on the results. To date, the INP has not been greatly concerned with measurement error (and for many purposes has not needed to be). Any given amount of measurement error, however, has twice the impact on estimating growth velocity that it does on estimating achieved growth. This fact, together with the fact that children in all zones of the growth chart will be subject to scrutiny, means that the numbers of both false positives and false negatives would be substantially increased in the absence of tighter quality control measures.

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[19] It is interesting to note that one district coordinator, who was well aware of the inattention to the moderate PEM cases, felt that the relative emphasis to be given to severe vs. moderate cases was not a program policy decision, but simply a matter requiring clarification in the program. When probed, he was able to articulate clearly the bureaucratic procedure he would follow to obtain that clarification at district level; however, he had not yet taken steps to do so. Similarly, other functionaries showed their awareness of the issue but were not taking active steps toward a solution. This would seem to be an area requiring action from the Regional Support Team.

[20] For instance, village-based survey data on 3,521 children in northern Malawi reveals that some wasting (weight-for-length < 80%) is present in 42.2% of severely underweight children (< 60% weight-for-age) but is present in only 6.4% of moderately underweight children (60-80% weight-for-age) (unpublished data from the Malawi Maternal and Child Nutrition Study).

[21] In the same survey from Malawi, stunting is present in 90% of underweight children over 36 months of age, but in only 13% of underweight children under 12 months of age.

As noted below, quality-control issues have not been central to the success of the INP to date, largely because the purpose of the information system has been to motivate all levels of society to take action, rather than to provide a perfect tool for patient screening or scientific evaluation. However, under a new system, the above described technical considerations may have important implications for the use of the INP information system, even if the objective is mainly to motivate mothers, households, or villages. If one of the keys to successful motivation is that the actors believe in the validity of the instrument with which they diagnose problems and measure progress, and that they see progress resulting from their actions, then the existence of much greater numbers of false positives and negatives at each weighing session may have a direct effect on motivation. That might be partly because a much higher percentage of a village population will now be diagnosed as having "a problem," partly because the solution to moderate intensities of PEM may require more difficult behavioral and societal changes, and partly because a much higher level of random "noise" in the figures may eventually become evident and decrease the credibility of the measuring tool. These potential concerns might well be handled through the same type of well-conceptualized social marketing and triple-A problem-solving that characterized the beginning of the INP, and they are raised here to assist that effort.

Quality Control Issues

As noted earlier, the INP has taken a pragmatic view of the degree to which inaccuracies in the information system should be a matter of concern. Following the general principle that the level of accuracy should be dictated by the purpose for which the information is to be used, the INP has correctly recognized that, in the present system, the motivational uses of the information do not depend critically on accuracy. That is possible because information collection and use are highly de-centralized. Errors in measurement of an individual child or in the aggregate figures from a village can often be spotted quickly and investigated before important decisions are made. For instance, the appearance of the child can be taken into account when trying to identify the severely malnourished, and, at the village level, no village secretary is chastised on the basis of aberrant figures from only one quarter.

Although the level of attention given to quality control up to now may well be appropriate for the motivational uses of the information system in the INP as presently organized, there are two important qualifications to bear in mind. One, described above, is that future decisions on defining high-risk children (e.g. severe vs. moderate PEM vs. direction of growth) should take into account the level of accuracy currently achieved or feasible in the future, since the importance of accuracy varies according to each definition. Second, even though the primary purpose of the information may be motivational, there are often secondary uses to which the information may be put, such as scientific evaluation. Thus, it should not be assumed that the level of accuracy considered acceptable for one purpose is necessarily acceptable for other

purposes.[22] In light of these two qualifications, this section describes some of the observations bearing on quality control that were made as part of this review. As with so many other observations in this review, many of these are already known to INP management; however, they may take on added significance in light of the above considerations. (Appendix 3 further examines the implications of quality control and other issues in terms of impact evaluation.)

One category of quality-control issues relates to attendance at village health days and the completeness of the reporting. Reporting frequency from villages appears to be quite good in the original 168 JNSP villages, with only eight to ten villages (5%) failing to report (or report on time) in any given quarter. However, it is much more difficult at present to determine what percent of the children in each village attended the VHD, because the village registers (containing the census counts of children) are known to be badly out of date (see section A2.1.2 in appendix 3). Moreover, the reported numbers weighed and numbers in the red zone on the growth chart are commonly observed by staff at ward through district levels to vary substantially from one quarter to the next when individual villages are compared. Such variations are not nearly as apparent when aggregated at higher levels. It does not appear that the reasons for the village-level variations are well understood, nor its implications for interpreting aggregated prevalence estimates.

A second category of issues relates to routine checks of weighing equipment and technique. At the village and ward levels (where this was assessed), there does not appear to be any awareness of, or concern for, the effects of faulty equipment or technique on the quality of the data. Except for cases of obvious damage, there are no routine procedures in place for checking the accuracy of the scale (which could be as simple as weighing the same rock before each VHD to ensure consistency). Most respondents said that the scales are occasionally checked by the District Weights and Measures Department when they happen to be in the village. One (district-level) respondent said that scales would become suspect if an unusually large percentage of children were seen in the green zone, but not so in the case of the red zone. Since no direct observations of weighing sessions were made in this review, it is difficult to comment further on issues of technique (although all respondents did say that the customary practice is to weigh children fully clothed). Direct observation would be required to examine other aspects of technique as they relate to the quality of the data.

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[22] It should also be noted that "accuracy" has several components, including precision, reliability, and dependability (cf. Habicht 1979), and that some are more important than others in a given application. In addition, these concerns are separate from, and in addition to, a number of research design and inferential concerns which become relevant in the case of scientific evaluation (cf. Habicht et al., 1984 and Appendix 3).

Other Management Information Needs

It is apparent from the interviews at various levels, and notably in the villages, that the INP could benefit from a more institutionalized management information system to support supplies and logistics, and to give feedback to villages on the status of requests made at earlier times. Such things as stationery or reporting forms, growth charts, and scales are occasionally in short supply at the village level, even when informal requests have been made. Other examples of shortages include spare parts for certain makes of imported bicycles or motorcycles, calculators at divisional and district level (for checking and aggregating village reports), and (commonly) replenishments for village first aid supplies (often reflecting shortages at district level). In some cases, villages requested advice or assistance on technical matters (fluoride content of water, collapsing pit latrines) and initial investigations were made, but no follow-through was apparent. Although such problems may seem relatively minor, they can have a significant impact on morale at the local level and in many cases can bring village initiatives to a grinding halt for want of some simple component.

LESSONS FROM IRINGA

Magic Bullets versus Process Orientation

A fundamental impression of the INP is that the key to its success does not lie in the nature of the interventions made available through the project, or even in some special properties of growth monitoring itself. The key appears to lie rather in the emphasis on developing a *process* whereby problems are identified and solutions are found (triple-A) and in correctly conceptualizing how information could assist that process in the particular context of Tanzania. Efforts to replicate INP's success, therefore, should begin with a serious examination of how a sustainable process can be developed in light of existing conditions and constraints, and what role information exchange may play in that process. That is clearly a qualitatively different approach from the search for intervention elements (in the sense of *services*) or service delivery systems, that might meet the assumed needs of diverse local populations.

In the final analysis, the INP information system serves to strengthen and broaden *communication* at and among all levels, from the village to the region. That includes communication between households, between village leaders and resource persons (such as VHWs or other extension staff), among village leaders (in the village council), and at successively higher levels. It is important to note that institutionalized mechanisms already existed for such communication (for example, village councils, party administrative channels, minutes of meetings at various levels); but the INP broadened that communication by adding child deaths, child malnutrition, and associated actions to the agendas of those meetings and those institutions. It strengthened communication in the sense that accountability was infused into the system, accountability made possible only because strong leadership and commitment to the program were demonstrated at the national and regional

levels, and an objective measure of performance was added.

The comments above have purposely been phrased in general terms, such as "communication," in order to examine the role of information in the INP from a broad perspective. In particular, if enhanced communication about child deaths, child malnutrition, and related actions is one of the keys to success, the next question is, logically, how such communication can be most effectively enhanced in a particular situation. The INP has shown that simple, regular reports of child deaths and children "in the red zone" have been effective in achieving that. In effect, the reports have been institutionalized as a catalyst for discussion and communication at various levels. They act as a focal point for discussion, which quickly brings in consideration of contributing factors and how they might be ameliorated. Obviously, the real objective of the INP is to stimulate such discussions and subsequent action.

It is worthwhile to examine in greater detail some of the characteristics of growth monitoring that might contribute to its effectiveness in the INP, and whether the same might be accomplished through other means in other contexts. First, as a social marketing strategy, the INP stressed from the beginning that children in the red zone are very near death and, by so doing, obtained complete agreement from all parties such a situation merits serious attention. Second, the weight of a child is something that can be measured repeatedly, unlike death itself, which is a relatively rare event even in a village and certainly within individual households; monitoring such rare events alone is unlikely to sustain the level of concern, discussion, and effort necessary to improve nutrition. Third, mothers and villages can see on the growth chart the evidence of improvement in their children in response to specific actions, thereby reinforcing any behavioral changes undertaken. Fourth, the ability to detect and record failed growth in a village on a regular basis permits a system of regular follow-up, using whatever combination of education, social pressure, and political persuasion is necessary to change the behavior of individual households. Finally, it is empirically within the capacity of rural villages in Iringa, once training has taken place, to manage growth-monitoring sessions on a regular basis, to understand how they are useful for guiding household and village actions, and to operate the system in their own context.

While all of the above are plausible reasons why growth monitoring may be an effective tool for promoting enhanced communication and action, it is not possible from the Iringa experience to determine which of the factors, alone or in combination, may be the most important for achieving different goals in the INP or in a different sociopolitical context. Such knowledge would be useful, for instance, for designing and evaluating the INP Food Security Card program and the associated strategies for improving household food security. It would also be useful in those settings where a *well-executed*, community-based growth-monitoring system is beyond present resources and capacities, but where other social marketing and mobilization strategies may be feasible. The emphasis here is on the ability *properly* to conceive and manage growth-monitoring-related activities, because, although the INP and a small number of other projects have been able to achieve it, there are a far larger number of projects in which that is not the case. If, as it seems to be in Iringa, the ultimate goal is to enhance communication and action on nutrition, then growth monitoring might be one of the options to consider; but it is by no means the

only one (that is, it should not be seen as a magic bullet for enhancing communication). Thus, the decision whether to try to implement or improve a growth-monitoring project in the face of serious constraints or instead to attempt a different, more viable strategy for enhancing communication about nutrition should ultimately be made in light of local circumstances. An appreciation of this difference would seem to be fundamental for maximizing the positive lessons of Iringa and applying those lessons in other contexts.

Information for Motivation versus Program Evaluation

One of the issues that this review has helped to clarify is the fundamental difference between using information to motivate action and using information for "technocratic," impact evaluation. The INP information system is clearly playing a vital role for motivational and management purposes, which is the purpose for which it was primarily intended. However, the analysis presented in appendix 3 indicates that, even under the near-optimal conditions of the INP, this information system has not thus far produced convincing evidence for impact according to scientific standards for plausibility. That statement requires qualification, however, and some important lessons emerge.

One qualification is clearly that there is no single "scientific standard" for plausibility. There is actually a sliding scale of plausibility, depending upon the nature of the decisions to be made and who is making them. Thus, issues of secular trends, selection bias, instrumentation, and the like are entirely irrelevant to village-to-district program functionaries. It is revealing that those issues were also apparently irrelevant to the regional and national decision makers who, in 1987, began expanding some of the principles from Iringa to the entirety of Iringa Region and six other regions in the country. At that time the only information available concerning the success of the INP was the trend data on nutritional status (from JNSP areas only) and the "process" information concerning implementation and acceptance of the INP.

When the decision makers are outside Tanzania (that is, global JNSP management, UNICEF/NY, other donors, and other developing countries), it is suggested here that a higher level of plausibility is required. Thus, the 1988 Evaluation Report included comparative data on nutritional status from adjacent, non-JNSP areas and attempted to link indicators of program participation with nutritional status through analysis of the cross-sectional sample survey data. While those attempts to strengthen the plausibility of impact were partially successful (notably the comparisons with non-JNSP areas), the present review has shown that a number of questions remain concerning the evidence for impact (appendix 3). Some of them could be addressed by further analysis of existing data and more detailed documentation; the reason for not doing so as part of the 1988 evaluation is probably, quite simply, limits on staff time and the desire to keep the evaluation report within a reasonable length (given all the other aspects of the evaluation, namely process data, costs, etc.). It remains to be seen whether the quantitative impact evidence presented so far will be deemed sufficiently plausible by decision makers outside Tanzania to enable them to proceed with confidence in adapting some of

the principles from Iringa to other countries.

Thus, from the perspective of decision-making theory, one of the fundamental questions highlighted by the Iringa experience is the extent to which major policy or program decisions (such as whether and where to expand) should be based on valid technocratic evidence for impact or on firm understanding and confidence in process issues. The pragmatic approach, as seen in Tanzania, is obviously to rely most heavily on the latter, although the information on gross outcome has undoubtedly played an important role within Tanzania in reinforcing the conviction that impact has occurred. It is quite possible that information on gross outcome (even with its weaknesses) may be useful in other countries as well; however, there is probably a large element of wanting to believe the evidence, that may not exist to the same extent in other countries or among other audiences outside Tanzania. In those cases, the plausibility of the impact evidence generally takes on greater importance and, once again, the distinction between the motivational uses of the information (i.e. advocacy at the international level) and the rational-technocratic uses becomes important. For motivation purposes the limitations of the impact evidence are largely irrelevant, or they are only relevant insofar as they jeopardize the outcome of decisions that may affect the project. If a system to enable rational, technical decisions is desired, it would be necessary to strengthen the evidence up to the level required for a given decision and provide enough methodological information for the decision makers (or their technical advisors) to be aware of any limitations and make decisions within those constraints.

Thus, one of the most important lessons from the Iringa experience is that, although some of the data for impact evaluation may be derived as a by-product of program activities and resources, the generation of information for technocratic impact evaluation cannot be achieved as a by-product of the program, but would require additional data, analysis, documentation, and staff resources.

A final comment: with respect to decisions about transferability, the impact of a program like the INP is obviously very context-specific. Even if the quantitative evidence for INP impact had very high internal validity, the several enabling conditions described in section 6.2 must be recognized as major contributors to that success. Given the qualitatively different, process approach adopted by the INP, as opposed to the magic bullet approach in most development activities, successful implementation depends vitally on contextual factors of a social, economic, political, and administrative nature. It would be an unfortunate irony if the success of the Iringa approach were to lead to uncritical application of community-based growth monitoring, triple A cycles, and other elements, in the same fashion that conventional approaches have been applied in settings where they did not and could not make a difference. The ultimate application of the triple A approach at the international level would be to learn from those earlier mistakes and prevent them from recurring in applying the lessons of Iringa.

APPENDIX 1: PERSONS CONTACTED

Dar-es-Salaam

Mr. Bjorn Ljungqvist, Unicef
Mr. G. Kahatano, Unicef
Dr. Mkumbwa, Unicef
Mr. W.B. Batageki, TFNC
Mr. A. Msbila, East African Statistical Training Centre (EASTC)
Mr. M. Sindato, EASTC
Mr. G.J. Makusi, Institute for Development Studies (IDS)
Dr. A.D. Kiwara, IDS

Iringa Region

Mr. J. Kinyunyu, Regional Planning Department (RPD)
Mr. Mplanga, INP Regional Support Team
Mrs. Mtalo, RPD/INP Regional Support Team
Dr. Mosha, TFNC/INP Regional Support Team
Dr. Seenappa, Unicef/Regional Support Team

Iringa District (Rural)

Mr. L.S. Mwambilinyi, District Community Development Officer/INP Coordinator
Mr. A. Kandoro, District Planning Officer
Mr. L. Kipingipasi, Divisional Secretary (Kalenga)
Mr. L. Mnyamoga, Ward Secretary (Nzihi)
Mr. B. Panzi, Village Secretary (Nyamihuu)
Mr. P. Ngailo, Village Chairman (Nyamihuu)
Mrs. M. Milimo, Village Health Worker (Nyamihuu)

Njombe District

Mr. K.R. Mbuma, District Community Development Officer/INP Coordinator
Mr. Y.H. Sasya, Community Development Officer (Njombe)
Mr. H. Nyumile, Divisional Agricultural Officer (Wanging'ombe)
Mr. L. Bakilwa, Ward Chairman (Ilembula)
Mrs. A. Muliukwa, Ward Secretary (Ilembula)
Mr. J.L. Mengele, Village Chairman (Kanamalenga)
Mr. R.S. Nzale, Village Secretary (Kanamalenga)
Mrs. R. Kambo, Village Health Worker (Kanamalenga)

Makete District

Mr. J. Masanje, District Community Development Officer/INP Coordinator
Ward Secretary and Acting Divisional Secretary (Lupalilo)
Mr. M. Mbilinyi, Village Chairman (Ihela)
Mr. A. Sanga, Village Secretary (Ihela)
Mr. D. Mbilinyi, Village Health Worker (Ihela)

APPENDIX 2: PROFILES OF MOTHERS INTERVIEWED

#1 Age 35, married, 3 children (ages 1, 5, 10 yrs.), husband temporarily away for employment; household extremely poor (purposely chosen), mother illiterate and recently discharged from nearby private hospital due to inability to pay for services; understands that red zone on growth chart is "bad" but thinks grey zone implies adequate status; treats diarrhea with local root medicine; youngest child completely immunized.

#2 Age 28, married, 2 children (ages 2, 7 yrs.), husband in residence; household has average wealth, youngest child is near red zone on growth chart (purposely chosen); mother illiterate; did not know reasons for her child's malnutrition; understood red zone on chart is bad, but believes grey zone is adequate status; treats diarrhea with local root medicine; youngest child completely immunized.

#3 Age 40, married, several children; mother randomly chosen; mother could read and had good understanding of growth chart; 2-year-old has been in green zone of chart since birth; mother understands INP well, including health/nutrition messages on feeding practices and ORS; treats diarrhea with homemade ORS; firmly believes in value of day care centers and cannot envision herself ever returning to the previous child care arrangements.

#4 Age 24, unmarried, 1 living child two months old (an earlier child died at 4 months of age); completed primary education, can read and write well; has never attended Village Health Day due to young age of her child, but has some knowledge of growth chart and ORS through discussion with and observation of other mothers; is aware of various INP activities in the village (day care, small livestock, cooking stoves) but does not seem to appreciate the links to child nutrition; plans to begin attending Village Health Days at the next session.

#5 Age early 40s, married, 9 children (2 of whom died in older childhood), youngest child is 4 years old; mother has no formal education and cannot read; is mother of village secretary; understands well the objectives of the INP and links between INP activities and child nutrition; understands growth chart well, prepares ORS at home for diarrhea; despite her knowledge of some aspects of INP she does not attend Village Health Days, but rather, sends the 4-year-old with his 19-year-old sister, thereby accounting for her limited knowledge in other areas.

#6 Age 28, married, 2 children (1.5 and 5 yrs.), can read; understands red zone on chart is bad but believes grey is adequate; could not say why her child has been decreasing in weight-for-age in recent months; knows about ORS but not how to prepare it at home; has used ORS sachets in past; not very familiar with recommended feeding practices.

APPENDIX 3: DETAILED ANALYSIS OF INP IMPACT INFORMATION

A1. CONCEPTUAL AND METHODOLOGICAL ISSUES IN EVALUATION

In order to analyze more clearly the strengths and weaknesses of the INP information system for facilitating a wide range of decisions, it is useful to distinguish the many purposes for which evaluation might be undertaken and the methodological requirements of each. In order of increasing demand for methodological rigor, those purposes commonly are (taken from Habicht et al., 1984):

1. to improve program management
2. to decide on continuation of funding
3. to decide on replication to areas with similar conditions
4. to decide on replication to areas with dissimilar conditions
5. to determine basic cause-and-effect relationships

These five roles for evaluation are distinguished from one another on the basis of the degree of plausibility required for making a decision. Decisions involving large investments of resources (including financial, institutional, and human resources), affecting large numbers of people, and entailing more uncertainties (for example, because of dissimilar conditions in unserved areas) generally place a heavy burden of proof, or require greater plausibility from an evaluation. In addition, for political reasons, decisions that cross institutional boundaries generally require greater plausibility from an evaluation than do internal decisions (for example, when one institution is considering whether to invest in a program developed by another institution).

A fundamental distinction must be made between evaluation of the "gross outcome" of a program and the "net outcome." The former refers to the overall change over time in an outcome variable among program participants, regardless of the reasons for that change. Net outcome (sometimes known as "impact") refers to the change in an outcome variable that is attributable to the program itself. Gross outcome is a fairly easy and inexpensive change to measure but has low plausibility with respect to the role of the program in causing that change. Net outcome is quite difficult and expensive to measure and entails higher levels of plausibility. For reasons of cost and difficulty, therefore, most programs resort to measuring gross outcome in the hope that that will be sufficient to assist future decisions.

Although the distinction between gross outcome and net outcome is a useful organizing principle, in fact a continuum of plausibility exists that often blurs the distinction. An evaluation can shift its position on the plausibility continuum, depending upon how, and the extent to which, it employs a variety of methodological tools. Roughly in order of increasing expense and

difficulty (and contribution to plausibility) those are:

1. collection of data on process and outcome on participants only
2. collection of data through ad hoc surveys
3. advanced statistical analysis
4. comparison groups
5. collection of before-after data
6. highly standardized measurements
7. randomized intervention
8. double-blind research designs (ibid)

Granting that full-scale integrated programs (as opposed to specific intervention elements, such as vitamin A capsules) in developing countries are not amenable to randomized intervention or blinded designs, for practical purposes the first six items on the list should receive consideration, depending upon the purpose of the evaluation. Program management decisions (as exemplified by the INP) can usually be made with data on program participants only, but higher level decisions usually require additional elements, such as advanced statistical analysis, ad hoc surveys, before-after data, and/or comparison groups.

The ultimate objective in applying these various methodological tools in an evaluation is to increase the plausibility that the observed changes in the outcome variable are attributable to the program and not to extraneous factors. Some of the factors that commonly confound an evaluation (called threats to "internal validity") are shown in table 15. The next sections examine the extent to which any of them have influenced the plausibility of the INP impact evaluation, and some of the additional measures that might be taken to strengthen its plausibility. Another set of factors must be considered in relation to the INP's external validity (generalizability or replicability), and those are examined in the final section of this report.

A2. CRITICAL ANALYSIS OF EVIDENCE FOR INP IMPACT

The purpose of this section is primarily to use the INP experience as a vehicle for highlighting methodological issues that are likely to be relevant to an increasing number of programs with similar information systems and, secondarily, to point out a number of ways in which the INP itself could strengthen its analysis of impact, using data that already exist in many cases, and which could be readily collected in others. The section is organized around three fundamental questions:

1. Are the declining trends in malnutrition, as revealed in the quarterly INP reports (table 8), real or artefactual? (i.e. gross outcome)

2. Are the trends attributable to INP activities? (i.e. net outcome)

3. Are there any additional analyses that might be undertaken to further examine the plausibility of INP impact?

It needs to be stressed that the utility of information for impact evaluation (and, thus, this section of the report) is quite distinct from its usefulness for management (and motivational) purposes. The utility of the INP information system for the latter purposes is analyzed in section 6 of this report.

A2.1 Trends in Malnutrition in the JNSP Program Areas

As reflected in table 2, the INP information system suggests that the prevalence of total underweight dropped from 55.9 percent in 1984 to 38 percent in 1988, and the prevalence of severe underweight dropped from 6.3 percent to 1.8 percent over the same period. In analyzing the extent to which those trends reflect real changes in the general population of children under five in the INP context, it is necessary to consider the potential role of measurement artefact ("instrumentation," more generally), coverage, and representativeness of the INP information system, and reporting bias. Each of these is discussed below.

A2.1.1 Measurement Artefact

As noted in sections 3.4.1.1/2, the baseline levels of nutritional status in the JNSP areas (and the adjacent areas in 1987) were measured during the village campaigns that launched the program in each village. The measurements, plotting, and recording during the campaigns were conducted by the two village residents who had received "crash training" over a two-day period preceding the campaign. As such, the baseline figures in each village and for the program as a whole represent the very first experience that those individuals had in conducting a village-level weighing session.

One possible explanation for the decline in prevalence estimates in the early stages of the program may be that the accuracy of age determination, weighing, plotting and reporting was low at the outset but improved over time. Note that such a statement does not imply that those individuals were necessarily making systematic errors in measurement. Even if the errors were random from one child to the next or from one village to the next, they would increase the variance in estimated nutritional status without necessarily affecting the mean. The result would be inflated estimates of the percentage of children falling below a given cut-off point in the early stages of the program. Over time, as technique improved (and ages were better defined for children born into the program), the variance in weight-for-age would decrease and result in an apparent decrease in prevalence estimates. That effect would be expected to be greatest for estimates of the prevalence of severe malnutrition, because the mean weight-for-age of children in Iringa is close to the 80 percent cut-off point to begin with.

A number of observations suggest that this is more than simply a theoretical possibility. First, table 2 shows that the biggest single decrease in prevalence estimates in the four years of the INP occurred between the first and second quarterly reports. In the case of total underweight, the prevalence dropped from 55.9 percent to 46.2 percent, a decrease of 9.7 percentage points, and 54 percent of the total decrease seen over the remainder of the five-year period. Similarly, severe underweight declined from 6.3 percent to 4.7 percent, a drop of 1.6 percentage points, representing 36 percent of the total

decrease in prevalence over the five-year period. It is difficult to imagine what changes may have occurred over a three-month period so early in the program to produce such dramatic reductions in malnutrition, especially since the VHWs had not received any significant training concerning the triple-A cycle at that time.

A second reason for suspecting that the baseline estimates may be inflated is that they differ from the results obtained by a TFNC research team in a random sample of villages in the baseline campaign (Papping 1984). The research team visited one out of every five villages in the campaign in order to conduct more detailed clinical exams. In addition, they extracted the weight, age, and sex of children from the log books filled in that same day by the campaign team, thereby enabling the research team independently to calculate prevalence estimates from the same data. The estimate of total underweight by the research team was 44 percent (compared to 55.9 percent in the campaign), and the estimate of severe underweight was 2.7 percent (compared to 6.3 percent in the campaign). Some of this difference may be due to the fact that the research team used WHO reference standards, whereas the campaign team used the INP growth charts, based on the Harvard standard for girls. The latter is a slightly higher standard than the former; however, it is unclear whether that would account for all of the difference between the two estimates. The other logical possibility is that errors by the campaign team in plotting weights on the growth chart may have inflated the prevalence estimates as described above.

A third reason for suspecting the baseline estimates is that a number of persons interviewed for this review commented that the campaign teams were not well trained in the technical aspects of the exercise and that that may well have affected the quality of the data. Indeed, the campaigns themselves were seen primarily as a tool for mass mobilization to launch the INP, to give the villages a flavor of what was to come, and not as an effort to collect valid baseline data. The influence of poor training was also revealed by one ward secretary who noted that abrupt changes in prevalence estimates often accompany changes in VHWs, but that the values settle down to normal values once experience is gained.

Finally, it is relevant to note that the household sample survey conducted in 1988 for the final evaluation (as reflected in tables x-x) obtained different estimates of total underweight prevalence than those reflected in the INP information system. The survey found that the prevalence of total underweight was 45.5 percent (calculated from the data in tables x-x), while the information system suggests a figure of 38.0 percent for the same quarter. In this case, the comparison is even more confounded by differences in methodology, since the survey prevalence represents children less than -2 Z-scores below the NCHS/CDC standards (which are similar to WHO standards but not identical), whereas the information system is again based on the Harvard standard for girls, as reflected in the growth charts.

These considerations suggest, first, that the data from the third quarter of 1984 may be a more reliable estimate of baseline levels than those from the second quarter of that year, although that still may not totally resolve the problem. Second, if the raw data from the 1984 TFNC research team and the 1988

household survey are still available, it would be possible to recalculate the prevalence estimates using the same, Harvard standard reflected in the growth charts, in order to derive semi-independent estimates of baseline prevalences and prevalences in 1988.[23] Such analyses should distinguish severe from moderate forms of underweight, since random measurement error should have affected the former more than the latter. The fact that a large decline is seen in the prevalence of moderate underweight suggests either that the trend is real or that it is due to some other source of artefact. Given the much stronger emphasis given to prevention of severe cases in the program (cf. section 6.1.2), one would not expect to see an impact on moderate cases without an impact on severe cases.

A2.1.2 Coverage and Representativeness of the INP Information System

The issue of coverage is important to the INP for two reasons. First, the program obviously strives to measure all children in the program area at least quarterly, and thus, coverage reflects the extent to which that objective is being attained. Second, if coverage is complete or nearly complete one does not need to worry about sampling errors and selection bias as they may affect prevalence estimates. When coverage is very incomplete, the potential exists that those covered by the program may differ in some way from those not covered, and the way in which they differ may have a big influence on the interpretation of the levels and trends in malnutrition.

As seen in table 2, the greatest number of children weighed in any one quarter is 42,022 in the fourth quarter of 1986 (coinciding roughly with the midterm evaluation), while the number in most quarters ranges between 32,000 and 39,000. The figure provided in the Evaluation Report, 46,000 children covered by the INP (which is said to be an annual average), means that the coverage usually ranges between 70 percent and 85 percent, with the maximum coverage in any given quarter being 91 percent.

One of the inconsistencies that was never resolved during this review is that the estimate of 46,000 children under five that is cited above does not agree with either the 1978 or the 1988 census results (United Republic of Tanzania 1978, 1988). In those wards in the original JNSP area, there were an estimated 49,523 children under five in 1978, and 62,424 in 1988, according to the census.[24] Using linear interpolation, that means that there would have been roughly 57,000 children under five at the beginning of the program in 1984, and 62,000 by 1988. Using the maximum number of children weighed in any one quarter of those two years, then, yields coverage estimates of only 54 percent.

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[23] This would be only semi-independent because, for the 1984 baseline, it would be based on the same set of children and the same set of weights and ages but would eliminate possible errors in plotting and tallying by the campaign team; for the 1988 survey it would provide a totally independent check on the information system prevalences.

[24] This assumes that 19.5% of the total population is under five, which is the proportion found for Iringa Region (rural areas) in 1978.

One possible reason for the inconsistency may be that the 46,000 figure may have been derived from the village registries rather than from the census. The registries were first assembled at the beginning of the program through the efforts of village secretaries and ten-cell leaders. They are supposed to be updated regularly, to provide an ongoing estimate of the total population under five, but it is widely recognized that the registries are seriously out of date in most villages.

In addition, it is important to recognize that there are a number of other known reasons for incomplete coverage as seen in the information system. First, in any given quarter, eight or ten villages may not be represented at all in the computer at regional level. That can occur for a variety of reasons, including lack of reporting, late reporting, improper reporting by some villages, or failure to conduct the VHD that month. In general, the lapses are assumed to reflect reporting problems rather than failure to hold the VHD. In any case, eight or ten villages represent only 5-6 percent of the 168 villages, and thus, a similar percentage of children under five.

A second known reason is that in some cases children may attend a nearby health center or dispensary during a given month, and therefore may not attend the VHD. Some villages recover the records from those facilities and include them in the totals from the VHD, but others do not. Assuming that this is primarily seen among infants (birth to six months) who are being taken to health facilities to receive immunizations, this might account for 10 to 15 percent of children at most. Another possibility is that underweight children are being referred to those facilities as substitutes for visits to VHDs, in which case there is the potential for selection bias as discussed below. And finally, some children (perhaps the severely malnourished) may be weighed at home by the VHW during regular home visits, instead of at VHD, which would also create the potential for selection bias in the INP prevalence estimates.

Regardless of the reasons, it appears that a significant proportion of children (30-50%) are not represented in the INP information in any given quarter, even if they are in fact being weighed through other means. The fact that a wide range of options exists to ensure regular weighing and growth monitoring should obviously be seen as an asset for primary health care. However, failure to capture the information on these children (which appears to occur in an unknown proportion of cases) and build it into the quarterly estimates from the INP information system does open the possibility for selection bias to creep into the system. In particular, if the practice of referring underweight children to health facilities became established gradually over time, and those visits were substituted for the VHD visits, one would expect to see an apparent decline in prevalence in the INP data even if the overall prevalence in the population was not changing.

An obvious means to improve on the situation would be to set up a reliable system for recovering data from the health facilities and adding them to the totals from the villages in the appropriate catchment area. In addition, a strengthened system of village registries would permit functionaries at all levels more closely to monitor and maintain attendance levels at VHDs and follow up those who do not attend.

A2.1.3 Reporting Bias

A final factor that must be considered in interpreting the apparent trends in prevalence estimates over time relates to reporting bias. As outlined in section 4, one of the impressive accomplishments of the INP is the extent to which it has mobilized the party system in a concerted effort to reduce mortality and malnutrition. In fact, the party is the backbone of the system, and in individual villages, the performance of the INP varies according to the strength of leadership. In some cases, the INP has even contributed to the monitoring and evaluation of political leadership by providing objective measures for such evaluation.

As impressive and desirable as it may be, it must be recognized that such a mobilization of political forces brings the associated danger that there may be cases in which the information system itself may become the object of political manipulation or the victim of political pressure. This does not have to take the form of blatant misreporting. It may take the form of referring mothers of underweight children to nearby health facilities for closer growth monitoring and not including them in the village totals; it may take the form of holding VHWs primarily accountable for, and put them under pressure to reduce, the number of children in the red zone; it may involve judgment calls about those few children each quarter who fall on the borderline between the grey and red zones. The are a variety of subtle ways, conscious and unconscious, overt and covert, by which the figures might be put in their most favorable light. Although no one interviewed for this review cared to discuss those possibilities in detail, the subject did elicit knowing smiles, some acknowledgement that it should be a matter of concern, and references to the importance of strengthened supervision and strong leadership.

One of the strengths of a system like the INP, as opposed to timely-warning systems when similar concerns arise, is that children's weights can be reliably and objectively measured – and remeasured if necessary. Another strength is the potential for supervision and cross-supervision, by virtue of the several extension workers and administrative staff on the job in each ward. At present, there does not appear to a requirement for a supervisor to be present at each VHD, and to identify himself or herself on the village report, in order to supervise all aspects closely. Nor does there appear to be careful monitoring of how many and which children are not attending (which relates to the lack of updated village registries). Both are areas that could be strengthened to avoid or reduce potential problems.

A2.2 Linkage Between Malnutrition Trends and INP Activities

The previous section has highlighted a number of reasons why the actual trend in malnutrition prevalence within the total population of children under five in the original INP areas may differ somewhat from what is reflected in the INP information system. In particular, the weight of the reasoning and of circumstantial evidence suggests that the decline in malnutrition may be less than that suggested when the figures are taken at face value, although it is not possible to say by how much.

It is important to bear in mind that the above considerations relate primarily to the measures of gross outcome of the INP. Another set of considerations must be taken into account in evaluating the evidence for net outcome, or the change in prevalence that is attributable to the INP itself, and not to extraneous factors. This section examines the evidence for net outcome, focusing in particular on questions of chronology, secular (historical) trends, and comparison groups.

A2.2.1 Chronology

A fundamental criterion for establishing the plausibility of causality is that the putative cause must chronologically precede the effect. In the case of the INP, the proposed cause of the decline in the prevalence of underweight is the application of the triple-A cycle at the household and village levels, together with the strengthening of overall maternal and child health services, and inputs in other sectors. While it may not be possible to sort out the relative contribution of each activity to a decline in prevalences, it should be possible in theory to show a chronological correspondence between the decline and overall program implementation, taking into account possible lag effects.

From the data available in the Evaluation Report, it does not appear that there is a chronological relationship between key INP activities and the decline in malnutrition. As shown in table 2, the prevalence of total underweight had dropped from 55.9 percent in the second quarter of 1984, to 44.6 percent by the end of 1984, and to 39.1 percent by the end of 1985. From that point on, the prevalence showed only minor fluctuations. However, (appendix 1 of the Evaluation Report URT/WHO/UNICEF 1988, p. 93) most VHWs (245 out of 336) were trained *after* 1985; only 91 VHWs (representing only 25 percent of the villages) were trained before 1985 (25 in 1984 and 66 in 1985). A similar situation emerges with respect to severe malnutrition in that its prevalence dropped from 6.3 percent in 1984, to 2.3 percent by the end of 1985, and showed only a modest, further decline to 1.8 percent over the succeeding two years. Although similar details are not provided on the chronology of training for the VHCs, party secretaries, and so forth, it is doubtful that that was completed early enough to account for such dramatic declines in malnutrition early in the program. Thus it does not seem plausible that the decline in malnutrition suggested by the INP data can be attributed to the establishment of the triple-A cycle at the village level. In general, it does not seem plausible that any mainstream INP activities could have been implemented quickly enough to effect such a change.

The one major activity that was established early enough to precede the dramatic declines in malnutrition was the inaugural village campaigns in the second quarter of 1984 and the associated village health days that followed on a monthly or quarterly basis thereafter. This raises the interesting question of whether those activities *by themselves* could have caused such a change in malnutrition prevalence. In light of the barebones nature of the crash training that the interim VHWs (and the VHCs) received prior to the campaigns, that does not seem plausible. The question is worth exploring further, however, because if indeed such changes can be achieved through such similar

crash-training programs alone, then that suggests that many INP activities (and associated expenses) may be unnecessary.[25]

A2.2.2 Secular Trends

Another possible explanation for the dramatic, early declines in underweight may be that they are, in fact, simply a continuation of trends that were already underway in the region generally. It is noteworthy in this regard that a survey conducted by TFNC in 15 villages of Iringa Region in 1979/80 revealed that the prevalence of total underweight (<80%) was 55 percent and the prevalence of severe underweight was 5.9 percent (Ljungqvist 1981) 692, 1980). By contrast, the prevalence among the random, 20 percent sample of INP villages studied in 1984 by the TFNC research team during the baseline campaigns was 44 percent for total underweight and 2.7 percent for severe underweight, providing some evidence for a secular decline. Two weaknesses of that comparison must be noted, however; first, the 1979/80 survey of 15 villages used purposive sampling of villages (and attempted complete enumeration within villages) and therefore cannot be considered representative of Iringa Region as a whole. Second, the 1979/80 survey used the so-called Jelliffe standard (which is actually the Harvard standard with both sexes combined), while the 1984 survey used the WHO standard, which is slightly lower, especially at younger ages (under two years). Thus the difference in standards could account for some of the differences in prevalences, and the difference in sampling frames could have an unknown effect on the comparison.

A second, less confounded, opportunity to search for secular trends is provided in another TFNC report (No. 824), from which table 4 has been reproduced. Those data derive from five villages in one of the seven INP divisions (Wanging'ombe), which had been surveyed in 1978 prior to a water and sanitation program. The villages were resurveyed in 1984 by TFNC, explicitly to look for any evidence of change over the intervening years. The surveys were conducted during the postharvest seasons of both years. The table shows that the prevalence of moderate underweight (60-80%) showed substantial decline in four of the five villages (in percentage points the declines were 7.5, 7.8, 12.8, and 26.0), with the fifth village showing an increase in prevalence (8.5 percentage points). The prevalence of severe underweight (<60%) remained more-or-less constant in three villages and declined substantially in the other two. The table suggests further that the prevalence of stunting may have declined as well, in which case the declines are quite dramatic and suggestive of some methodological inconsistencies between the two surveys, which may cast some suspicion on the validity of the weight-for-age comparisons as well.

A third perspective on the question of historical trends is provided by consideration of when severe droughts and food shortages occurred. Iringa (with other areas of Tanzania) was known to have had a very bad food shortage following the 1981/82 season and another bad season in 1984/85. In principle, the 1981/82 drought could have affected the early INP estimates the prevalence of underweight if the children who were under two or three in 1982 suffered

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[25] This might be explored through careful evaluation of the experience in villages into which the INP approach is currently being expanded.

Table 4 - Comparison of Nutritional Status by Anthropometry (W/A) in Villages, August 1978 and August 1983

Village	N=	Above 80% W/A	60-80% W/A	Below 60% W/A
Banawano				
1983	184	45.65%	49.46%	4.89%
1978	222	54.0%	41.0%	5.0%
Igwachanya				
1983	80	57.5%	40.0%	2.5%
1978	104	32.0%	66.0%	2.0%
Luduga				
1983	147	51.7%	45.50%	2.72%
1978	257	37.0%	57.0%	6.0%
Lyamuluki				
1983	166	60.84%	36.15%	3.01%
1978	128	48.0%	49.0%	3.0%
Uhenga				
1983	156	52.56%	46.15%	1.28%
1978	207	41.05	4.0%	5.0%

Proportion of children stunted (height-for-age below 90% H/A), % of sample

	1978	1983
Banawano	54	32.60
Igwachanya	56	23.75
Luduga	52	34.24
Lyamuliki	57	21.69
Uhenga	54	31.41

Source: TFNC No. 824. Agency for International Development. 1981. *Tanzania: Training for rural development II (621-0161).* Project Paper. Washington, DC: Agency for International Development.

unusual stunting. Assuming the catch-up growth in height did not occur (and it usually does not, under these conditions), the older cohort of children in the INP baseline data (and in subsequent quarters) would have had an elevated prevalence of underweight. As those children grew past the ages covered by the INP information system over the next year or two, the overall prevalence would have appeared to decline as well.

Consideration of the 1984/85 drought, however, suggests that that is not likely to have occurred. That drought, in principle, would have been reflected in the prevalence estimates in late 1985 and early 1986; however, the prevalences during that time remained remarkably constant, at around 40 percent for total underweight and 2.3 to 2.6 percent for severe underweight. That suggests either that the INP was completely effective in preventing adverse effects of drought on child weight-for-age, or that the INP information system was relatively insensitive to those effects. One way of investigating the latter would be to disaggregate the INP data by year and sublocation according to other known events that may have affected nutritional status and see if they are reflected in the information system (e.g. the Pawaga case in 1987/88).

A2.2.3 Comparison Groups

The questions raised above concerning the possibility that secular trends may be responsible for some of the apparent decline in malnutrition in the original INP areas could, in principle, be resolved if reliable information were available on the nutritional status of children in adjacent areas during the same period of time. Then, even if a secular trend was occurring in the region as a whole, the analysis could examine whether the presence of the INP may have accelerated the decline in prevalence as compared to adjacent areas.

As shown earlier in figures 4 and 5, information is available on the nutritional status of adjacent areas, however, this was only collected in 1987, as a result of the expansion of the INP into the areas. There is no information on the nutritional status in the adjacent areas prior to the beginning of the INP; hence it is not possible to rule out the possibility of a secular trend.

Despite that fact, the 1987 data do show that the prevalence of severe and total underweight in the adjacent areas was quite similar to that in the original JNSP-funded areas prior to the introduction of the program. Moreover, after four years of program implementation and operation, the prevalence of severe malnutrition in the original JNSP-funded areas is apparently much lower than baseline levels or adjacent areas in 1987.

In assessing the plausibility that the INP activities were responsible for producing the differences, two possibilities must be considered: first, that the prevalence of malnutrition in the adjacent areas was in fact higher in 1983/84 than it was in 1987 and that a secular trend has been present in the region as a whole. That implies that the areas chosen for implementation of the original INP had prevalences that were lower than did the adjacent areas to begin with. It is difficult to assess this possibility, because the criteria for choosing the seven original INP divisions are not clear.

The second possibility, and one that is more plausible, relates back to the issues raised in section 5.3.1. If indeed the manner of implementation of the INP information system is such that it produces prevalence estimates that are artificially high in the early quarters, and the estimates then appear to decline rapidly over time (due to improvement in accuracy and increase in selection bias), then the differences shown in figures 4 and 5 would be seriously confounded by methodological problems. Specifically, it would then be possible for the original INP areas and the adjacent areas to have had similar prevalence levels in 1984, and similar levels in 1987/88, but because the information systems in the two areas would be at different stages of implementation, there may have been some artefactual differences in prevalence estimates. Moreover, if the adjacent areas experience the same changes in the information system over time (improved accuracy of measurement but increased selection bias), one would predict that the adjacent areas should appear to show decreases in prevalence even if the interventions are having no effect. Thus, the interpretation of the differences in nutritional status between the JNSP areas and the adjacent areas depends critically on the extent to which the apparent trends in the INP information system reflect real trends (section 5.3.1).

A2.2.4 Intensity of Program Participation

Finally, as correctly pointed out in the Evaluation Report, the plausibility that the INP activities themselves were responsible for differences in nutritional status would be increased if it could be shown that variation in the intensity of program participation is related to variation in nutritional status among individual households and children. The household sample survey conducted in 1988 was intended, in part, to address that issue, and, as described in section 5.2, the analysis did not succeed in demonstrating such a relationship.

On the surface, that would seem to decrease the plausibility of INP impact on nutritional status. However, just as the evidence in favor of impact needs to be examined carefully to identify plausible alternative explanations, the evidence against impact also needs to be carefully considered. In this case a number of explanations are possible over and above those mentioned in the Evaluation Report.

First, the report notes that the survey was conducted under extreme time pressure, with inadequate training and under suboptimal conditions in general. That alone would tend to bias the analysis against finding statistically significant relationships between indicators of participation and nutritional status. Second, a number of additional steps could be taken in the analysis itself to give the hypothesis a fairer test. For instance, indicators of program participation may be associated with important socioeconomic characteristics of households, which may confound analyses relating participation to nutrition. The analysis of participation-nutrition relationships should statistically control for possible confounders, such as socioeconomic status. Given the highly clustered sampling design, it should also take into account possible systematic differences in nutritional status among villages. The possibility of age-confounding also does not seem to have been considered. The analysis should also be done using continuous

anthropometric Z-scores instead of classified (categorical) variables, in part because that opens up the possibility for using more efficient and powerful statistical techniques to control for possible confounding factors.

A2.3 Additional Analyses to Strengthen Plausibility

As is often the case in program evaluation, the INP impact evaluation could be substantially strengthened through more detailed analysis of data that already exist. In fact, it is clear from the above that the INP is blessed with having far more information than most area-based projects, thanks in large part to the involvement of TFNC. However, this ancillary information is only useful at present to *raise* questions about impact; further analysis is required in order to begin to answer those questions, going back to the original data, in some cases, to recalculate nutritional indicators with identical standards, and so forth.

Apart from the reanalysis of TFNC survey data described in earlier sections, it is clear that the plausibility of INP impact could be greatly strengthened by more detailed analysis (and presentation in an "impact report") of data from the INP information system itself. The following is only a partial list of some analyses that would be useful for assessing plausibility. In many cases such analyses may already have been performed. For dissemination to a wider audience (outside Iringa), however, they need to be described and documented in far greater detail than has been the case thus far.

1. *Trend analysis by age group.* The village reports give the number of children in each zone of the growth chart by three age groups, which makes it possible to investigate possible differential impact by age.

2. *Trend analysis by disaggregated areas.* Plausibility would be increased by consistently examining trends at division and ward levels (where sample sizes are always adequate) and by examining the *distribution* of changes in prevalences among villages at different points in time. The known differences in ecology, drought or food conditions, speed and quality of implementation, and so on, that exist between areas should be exploited in that analysis. The differences should be specified beforehand and tested with the data, however, as opposed to *post hoc*, inductive analysis.

3. *Trend analysis by severity of underweight.* It is quite plausible that the program is having a different effect (probably stronger) on severely underweight children than on those moderately underweight. All analyses should consider these two groups separately (and combined if desired) in order to establish this, and to better document possible artefactual trends in the information system.

4. *Analysis of inter village variation.* As an extension of number two above, it would be highly revealing to undertake analyses using the village as the unit of observation to understand the factors associated with good performance (impact) or poor performance. That analysis may well require collecting additional information on village characteristics; however, much of that could be obtained from the ward and division levels, given their excellent familiarity with the villages and records of village activities undertaken.

The analysis might consider quality of leadership, amount and types of village activities undertaken, other (non-INP) activities implemented, or the food situation in various years.

5. *Coverage analysis.* It is clear that the village registries badly need to be updated for a number of applications. One would be to see whether there is any association between average coverage levels or changes in coverage from quarter to quarter, and prevalence estimates. That analysis should be conducted using the village as the unit of observation, possibly grouping villages according to other characteristics (for example, those villages with known external factors that might affect prevalence estimates vs. other villages, etc.).

6. *Operational research to validate the information system.* The above sections have suggested a number of possible factors that might invalidate, or at least qualify, the use of the INP information for impact evaluation purposes (though not for internal management/motivational purposes). With the INP approach presently undergoing expansion to new areas (including new regions), a valuable opportunity is presented to evaluate carefully the information system itself. If impact evaluation is considered an important application for such data (which generally seems to be the case), then such operational research should be given serious consideration.

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