
Nutrition Information Systems for Implementing Child Nutrition Programs

Nancy Mock and John Mason

Abstract. *Nutrition information systems (NIS) provide the information needed for planning and implementing nutrition investment programs. This paper develops a framework to analyze NIS in the study countries. Existing NIS elements in the study countries are reviewed, making recommendations for improvements. Key findings include the need for national household probability surveys that are synchronized among countries and repetitive over time, including information related to both general and micronutrient malnutrition; simplified, routine program information systems that include information use from the household level up, and that take advantage of emerging information technologies; operations research and training for effective growth monitoring and promotion programs; and evaluation research, especially within the first five years, to guide the development of cost-effective country programs. Advocacy and substantial investments in capacity building will be required to ensure that staff from the community level up are able to function effectively in an information culture.*

The Role of Information in Improving Nutrition

Nutrition information systems are an essential component of national investment programs aimed at reducing the incidence and prevalence of malnutrition in Asia. Yet the status of nutrition information in Asia remains problematic at the regional, national, subnational, and community levels. In this Project, information will be needed to support the overall strategy and programs, as presented in the country reports and summarized by Mason, Hunt et al. (2001). It is therefore crucial to clearly identify the information required to support effective design and management of country programs, and to build the capability needed for generating and using this information. The basic approach of the country programs is to implement large-scale community-based nutrition programs, while at

Nancy Mock and John Mason are professors in the Department of International Health and Development, Tulane University School of Public Health and Tropical Medicine, and the Tulane Payson Center for International Development and Technology Transfer, Tulane University.

the same time expanding micronutrient deficiency control programs (Mason et al. 1999). The policy environment will be addressed when possible, and policy constraints identified, so that program designs take these constraints into account.

Information is the critical link in the assessment–analysis–action (Triple A) cycle that the United Nations Children’s Fund (UNICEF) advocates as the basis for programs (Jonsson et al. 1998). Information should support decisions at all organizational levels of country programs, from the household/individual to the national level. The UNICEF Information Strategy has laid out a typology of systems and analyses for generating action, stressing that progress requires reliable information, actual decisions, and their implementation on this basis (Jonsson et al. 1998). The analysis presented below uses the UNICEF Information Strategy to develop a framework for studying NIS across regions. In the present context of the seven study countries and their strategies, we consider the information, data, and decision needs for program design, program management, policy making, and crisis management.

Program Design

Program design, as assessed in the country reports and by Mason, Hunt et al. (2001), involves consideration of coverage, intensity (i.e., level of application of resources), targeting, and program content (Mason, Hunt et al. 2001, Tables 2.1, 4.1, 4.3). The first three require straightforward results from a few measurements, although they usually require a large sample. Deciding on program content requires more advanced analysis, including small-scale but in-depth studies. The latter information explores relationships, especially between underlying causes and malnutrition as presented in the UNICEF framework (UNICEF 1990), and takes context into account. The sources of data currently used in relation to key policy and program decision needs for country programs are summarized in Table 1. In general, the approach suggested here is to strengthen these data sources where possible, while building capacity for more applicable analysis and consumption of information. Most of the study countries have intermittent national surveys, although these have limitations for which recommendations are made below. Similarly, most existing country programs have some form of on-going data collection, and many are collecting growth monitoring data. Enhancing the quality and use of this information is crucial. The absence of adequate data for evaluation research, including formative research related to nutrition and community-based programs, is a major constraint to the design of country programs. This is true in the areas of low birth weight reduction, anemia, and care of young children. Addressing this information gap should be a high priority.

Table 1: Potential Data Sources for Different Decision Making Purposes

	National Sample Surveys	Data Derived from Growth Monitoring	Program-derived Monitoring data	Evaluation Research	Sentinel sites
Program Design	✓✓	×	✓	✓✓	×
Program Management	×	✓✓	✓✓	×	×
Policy Making	✓✓	×	×	✓✓	✓ ¹
Crisis Management	×	×	✓	×	✓

Notes: ¹In the social lab sense.

× = Limited utility

✓ = Useful

✓✓ = Very useful

The types of indicators appropriate to program design are illustrated in Table 2. These indicators are grouped into three categories: outcomes, process, and context. Outcomes refer to population level changes in behavior and health/nutrition status, usually the immediate causes and consequences within the UNICEF conceptual framework. While most of the outcome indicators are commonly included in data collection systems, one indicator, low birth weight, deserves particular attention. Poor maternal nutrition, as reflected by low birth weight, represents a major constraint to child nutrition and development in this region. In many areas of Asia, the prevalence of low birth weight is in excess of 30 percent, and highly correlated with the prevalence of underweight among under-fives (ACC/SCN 1992). Therefore, strategies to address intrauterine development are a prominent feature of the country programs, and low birth weight should be included as a key outcome indicator within the NIS framework.

Processes refer to the host of program-related activities such as targeting, intensity of services, coverage, quality of services, etc. These indicators track the efficacy and efficiency of transforming inputs to outputs. Finally, context indicators reflect basic and underlying causes which may not be directly targeted by country programs, but which represent either important constraints or mediating influences on the results of country programs. Thus, program design decisions require analysis of outcome variables in relation to causal factors, whose change can be the aim of intervention. This must be seen in the light of contextual factors—for example, many interventions that interact with context, such as education or women's status, only have an impact on certain groups (e.g., the educated) or under certain conditions, such as when women are empowered (Jonsson 1995). In order to be effective, interventions must be targeted to take this into account, the context itself must be changed by other policy measures, or strategies must be designed in light of the

contextual constraint. Often the latter two approaches are used together. In the short run, interventions are designed around the problem, while policy measures are under development.

Table 2: **Illustration of Indicators for Different Purposes, with Potential Sources**

	National Sample Surveys	Data Derived from Growth Monitoring	Program-derived Monitoring Data	Evaluation Research	Sentinel Sites
Program Design	Outcome Process Context	(Outcome)	Process	Outcome Process Context	
Program Management		Outcome	Process		
Policy Making	Outcome Process Context			Outcome Process Context	
Crisis Management		Outcome			Outcome

Notes:

Outcome: anthropometry (low birth weight; underweight, stunting, wasting, usually in preschool children), hemoglobin, night blindness, serum retinol, goiter, urinary iodine (TSH), sometimes mortality rates behavioral/care: breastfeeding practices, complementary feeding, immunization, use of health services.

Process: numbers/ratios of mobilizers to facilitators, distribution of supplies (e.g., VAC), number of visits, training, budgetary data, targeting, access to services, environmental factors like water and sanitation.

Context: education/literacy, women's status, participation, decentralization, urban/rural, ecology.

Program Management

Program management requires regular data on program implementation, and this is usually derived from routine program data collection. Measuring outcomes over time using growth monitoring data is a high priority, but should only be promoted if it is useful in supporting community-based actions. It should be feasible to build on growth monitoring by capturing selected growth monitoring results. Program management information does not itself show the net effect attributable to program activities. Impact evaluation, including cost-effectiveness analysis, entails more complex and less common evaluation research, typically involving probability surveys and comparison groups. For this reason, evaluation research is treated separately here.

Policy Making

Policy making requires information that addresses causality, and that demonstrates the consequences of various policy options to policymakers. Information needed for policy making is broader in terms of time and space than that required for program design. Large-scale surveys that are national in coverage and can be disaggregated are frequently used. Survey programs that permit analysis of trends through time are especially useful. This information is often complemented with smaller-scale, in-depth studies, focusing on the causal analysis of particular issues, for example, potential impact of changes in agricultural policy on the nutritional status of children. Another information element that is central to policy analysis is evaluation research, although policymakers may often ignore this requirement.

Policies may address important contextual factors directly. Priorities identified from reviewing the country studies were women's status, social exclusion, community organizations, political commitment, and literacy/education (Mason, Hunt et al. 2001, ch. 3). These must be assessed, analyzed, and acted upon. Common policy concerns in the study countries relevant to nutrition were food subsidies and poverty alleviation programs. The needs here are also referred to in Tables 1 and 2.

Crisis Management

Crisis management in this analysis refers to economic crises (e.g., similar to Indonesia), natural disasters, such as droughts or floods, which are common in many of the study countries. Near real-time information is critical for preparedness and adequate response. Timely warning of threats to child nutrition and development that emerge during a crisis, together with adequate preparedness and supply management, will enable Asian countries to protect the gains achieved by country investment strategies. In addition, this type of information is often useful for identifying vulnerable groups for targeting purposes. Additional information that can rapidly be drawn upon to monitor these emerging problems may also be needed, such as sentinel site surveillance—gathering selected data in specified at-risk locations. For example, in Bangladesh, food prices and nutritional status (underweight) are collected on a sample of vulnerable areas that are more likely to show nutritional deterioration before others. It should be noted that this differs from “sentinel community surveillance”, as used in some Asian countries (e.g., Nepal, Pakistan), where selected villages implement in-depth and longitudinal data collection with close local participation to foster village decisions. This latter technique is not specific to crisis management.

Another concern is that these emerging problems may not be governed by national boundaries, but may take on a regional character. Therefore, regional food security mapping and early warning systems may need to be strengthened. The Food and Agriculture Organization (FAO) Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) program is a global program that includes a national information-strengthening component. The possibility of collaboration with FIVIMS to develop a regional crisis monitoring program should be explored.

In the next section, the data sources and related indicators are described in more detail, with suggestions as to how these may be developed. Different sources vary in their usefulness for the four categories of information needs. In addition, data sources have different characteristics, such as timeliness, suitability for targeting, and data quality, which suit them to particular needs for planning (see Annex 1).

One feature of the Project's investment plans is the integration of micronutrient considerations with those concerning general malnutrition. This approach is relatively new, and for this reason, data needed for planning and monitoring large-scale micronutrient interventions are sparse. For example, there are virtually no national surveys estimating hemoglobin levels at more than one point in time, let alone comparable repeated surveys. Potential data sources are well established (Table 3, Annex 2), illustrating another area where applying known methods should yield important dividends.

Table 3: Some Nutrition Information Components in the Study Countries

Country	DHS	MICS	LSMS	Other	MIS	GM	Sentinel
Bangladesh	1996 (district level)	Annually		Salt surveys Goiter surveys		BNIP community-based, partial coverage	HKI
Cambodia		MICS merged with socio-economic status (key provinces)				Community-based models only on small-scale basis	
PRC		1995 (urban/ rural)		Numerous special studies combining ses and nutritional data			Seven Province repetitive survey program (collects anthropometry and dietary consumption)

Table 3. (cont'd.)

Country	DHS	MICS	LSMS	Other	MIS	GM	Sentinel
India	1992-93 (state level) 1997-98	State level annually		Numerous surveys, but not including ses and nutritional data	ICDS program MIS (extensive data system)	Village-based service delivery model	
Pakistan	1990-91 (province)	1995 (province)	1991-95 (province)	Numerous small scale and household budget surveys		Facility-based, small scale community-based (HANDS, Aga Khan, etc)	
Sri Lanka	1987,1993 (province)			Nutrition and health surveys (1993, 1995) Serum retinol	Growth and birth weight surveillance	Facility-based, UNICEF and small scale community-based (PNIP)	
Viet Nam		1996 (province)	1994 (region)	Blindness/PEM 1994 (province) Anemia 1995 (province) Food consumption, 1988	PEM reduction program tracks underweight status of beneficiaries	Facility-based, small scale community-based	Food and nutrition surveillance program tracks nutrition and diet in selected areas

Notes:

DHS = Demographic and Health Surveys

MICS = Multiple Indicator Cluster Surveys

LSMS = Living Standards Measurement Surveys

MIS = Management Information System

GM = Growth Monitoring

Status and Opportunities for Development of Nutrition Information Systems

The Asian region is relatively rich in nutrition relevant data that can be used to build nutrition information systems in support of country programs; a notable exception being the area of evaluation research. Among the areas providing opportunity for improvement, the following were identified: data quality; appropriateness and adequacy of indicators; depth and relevance of analysis; and presentation, dissemination, and use of information. In each of the sections below, these issues are illustrated and suggestions are made for improving them within country information strategies. Table 4 summarizes priority indicators that should be considered in country programs.

Table 4: List of Suggested Indicators at the National Level

Outcome	Process	Context
Anthropometry		
- % stunting ^a	- % women receiving antenatal care	- % females literate
- % wasting ^a	- % pregnant women receiving prenatal care (≥ 1 visit)	- % female headed household
- % underweight ^a	- % vit A coverage (0.5 - 6 years)	- % adult females completed primary school
- % low maternal BMI (< 18.5)	- % vit A coverage (breastfeeding mothers)	- % women working outside home
- % LBW (< 2500 g)	- % TT2 coverage, women	- % families owning land
Micronutrient Status		
- % anemia ^b	- % measles immunization coverage	- % families functionally landless (< 0.5 ha)
- % low serum retinol ^c	- % safe water coverage ^f	- ecological zone
- % low urinary iodine ^d	- % latrine coverage ^f	- urban/rural status
- % hh consuming adequately iodized salt (as determined by test kits)	- % target women attending program	- food prices by region
	- % regularly attending program ^e	- % women in elected government
	- mobilizer/facilitator ratio by region	
Caring practices		
- % exclusive breastfeeding (0-6 mos)	- mobilizer/population ratio by region	- % communities with development budget
- % initiating breastfeeding within first hour	- % workers who successfully growth monitor ^h	- % communities with active development committees
- % timely complementary feeding (6-9 mos)	- % communities experiencing micronutrient stock-outs ⁱ	- % communities with females on development committees
- % 6+ mos. receiving more than 3 meals/day	- % communities experiencing vaccines/drugs stock-outs	
- % adequate illness management skills ^e	- % births assisted by trained attendants	
- % women consuming 100 iron tabs during last pregnancy	- % salt labeled as iodized which is found to be iodized at levels between 20 and 40 ppm (through market testing)	

^a Stunting, wasting, and underweight refer to moderate and severe forms of malnutrition in children under 5 (below -2 SD of the NCHS/WHO reference).

^b Iron Deficiency Anemia (IDA): hemoglobin levels below 12 g/dl for nonpregnant women and children 6-14 years, 11 g/dl for pregnant women and children 0.5-5 years.

^c Vitamin A Deficiency (VAD): serum retinol levels below 0.70 um/l.

^d Iodine Deficiency Disorder (IDD): urinary iodine levels below 50 ug/l.

^e Illness management defined as: ORT use during diarrheal episode; continued feeding during illness; treatment seeking during ARI.

^f These are either process or context measures, depending on whether they are being addressed by the program.

^g Attending > 80% of recommended visits.

^h Workers are able to identify and communicate information related to child growth.

ⁱ Refers to stock-outs of individual micronutrients (vitamin A, iron, iodine).

Information Derived from National Household Probability Surveys

Throughout the region, a variety of household survey programs collect nationally representative data on nutrition outcomes and contextual factors. The multi-donor supported Demographic and Health Surveys (DHS), UNICEF-supported Multiple Indicator Cluster Surveys (MICS), and the World Bank-supported Living Standards Measurement Surveys (LSMS) are illustrative (see Annex 3). The DHS and LSMS tend to collect detailed information on population and health, and socioeconomic status and household food access, respectively. The MICS surveys were originally designed primarily to measure outcomes reflecting the goals of the World Summit on Children. Most countries also have some form of income and expenditure survey program, which is implemented in an ad hoc or routine manner. These surveys are useful for analyzing household food security and its determinants, and for assessing resource control by women.

Referring to Table 3, one or more DHS surveys have been conducted in four countries, and MICS have been conducted in all but Sri Lanka. Pakistan and Viet Nam have each undertaken LSMS during the past five years. In India, Sri Lanka, and Bangladesh, some repetitions of DHS or MICS have been established. The UNICEF office in India is planning to conduct state-level MICS annually through its current programming cycle.

Most countries have also undertaken nationally representative special surveys, or have instituted nutrition survey programs (Sri Lanka). These surveys have typically focused on general undernutrition, although in Sri Lanka, a survey of vitamin A deficiency (serum retinol) was recently conducted, and in Viet Nam, large-scale surveys on blindness and anemia that can be disaggregated to the provincial level have been done. Localized goiter studies are common, and data on household salt iodization is becoming increasingly available at the national level (DHS and MICS). Bangladesh has undertaken three nationally representative goiter surveys. However, methodological differences mean that these survey estimates cannot be compared over time. Most countries also have some form of a budget and expenditure survey program. Only in the case of Cambodia was this survey (one round) linked to health and nutrition data (MICS).

Several constraints limit the usefulness of existing results for planning and evaluating country programs. First, no countries are yet able to regularly and reliably monitor trends in nutritional status and other nutritional outcomes (Mason, Hunt et al. 2001, Table 1.1). Where attempts have been made to collect two or three surveys over time, survey quality and noncomparability of survey design limit comparisons, as illustrated in the case of Sri Lanka, whereby three survey rounds showed a pattern of anthropometric change that was difficult to interpret. Also, systems of surveys like MICS and DHS have not yet been institutionalized.

Demographic and Health Surveys tend to be of high quality and comparability, although the nutritional elements of DHS are not always as rigorously assessed as demographic and health data. In MICS surveys, the data quality is variable, in part due to the decentralized nature of MICS design and implementation. In several cases, substantial errors in age reporting and noncredible distributions of behavioral variables have been noted. These problems could be solved with improved capability, perhaps initiated with increased technical assistance and training.

Micronutrient outcomes are currently only measured as a part of special purpose surveys in a few countries. The addition of the basic biochemical indicators of micronutrient status could be included as part of the DHS or MICS in the study countries. The use of blood spots to estimate certain micronutrient deficiency indicators may be applicable to whole samples; in other cases, additional modules (blood or urine samples) may be used for a subset of the sample. Other information gaps include the lack of large-scale surveys that include any measures of household food security/consumption, especially those linked to nutritional outcomes. This severely limits the extent to which household food security and consumption patterns can be analyzed in relation to child nutrition. As a result, the relative importance of household food access, caring practices, and access to environmental/health services is not known.

Similarly, in-depth policy and program relevant analyses of large-scale surveys are rarely available, and hardly used in either policy making or the country reports (Mason et al. 1999, Ch. 3). One illustrative exception is the People's Republic of China (PRC), where multiple variable analysis and stratified regressions of a large health and nutrition survey were used to identify local risk factors for nutrition (CAPM/ERI/SPC 1998). One of the more useful elements of an in-depth analysis is the assessment of interactions to identify those who might or might not benefit from nutritional interventions, which is a key aspect of developing targeting strategies (Mason, Hunt et al. 2001, Table 3.6). Assessment of interactions helps to identify the minimum package of interventions needed in order to effect significant nutritional change. For example, multivariable modeling of the PRC data suggest that, without sanitation improvements, the result of direct investments in nutrition may be modest.

In summary, national sample surveys are a critical element of the Project's nutrition information strategy. While all country programs may not require a budget line in support of these, it is critical that the Project's partners advocate for collection of nationally representative data that include maternal and child anthropometry, biochemical indicators (vitamin A, iodine, and anemia), and intermediate outcome and key contextual factors, preferably within five-year intervals. As much as possible, these efforts should be synchronized across countries to permit comparability. Capacity building is one of the key ways to proceed.

Data Derived from Growth Monitoring and Promotion and Community-based Monitoring Programs

Growth monitoring and promotion (GMP) programs can provide data for monitoring at the household, community, and subnational levels. Table 5 describes the role of GMP in the Triple A process relating to the individual child's growth, identifying discrete steps in the assessment–analysis–action cycle, and illustrating common problems encountered in achieving each step. The literature evaluating the effectiveness of GMP as a strategy to enhance nutrition shows mixed results (Pearson 1994, Ruel 1995, Pelletier 1995, Griffiths et al. 1996). However, there is general agreement that, while growth monitoring as part of facility-based health services may often be ineffective, community-based GMP can work when mobilizers are adequately resourced, trained, and supported. Again this depends on context—in areas of high illiteracy for example, growth monitoring may not be effective. Operational research is needed to identify appropriate strategies for monitoring at the local level, and continued development of appropriate technologies is needed.

Table 5: **Assessment of Growth Monitoring and Promotion as a Triple A Process**

Stage	Assessment of GMP
1a. Decide what to assess	All GMP programs assess child growth.
1b. Assessment	Child growth is measured by weighing the child more than once. Intervals between two weighings often too long; accuracy of scales questionable; difficult to weigh a young child.
1c. Communicate information to analyst	Often the health workers did not explain the growth chart; did not believe that the mother could be the analyst.
2a. Obtain information by analyst	Health worker normally the analyst.
2b. Analysis	Many health workers have limited knowledge about the causes of malnutrition, therefore weak or no analysis.
2c. Communicate information to user	Very little explanation, most often standard messages to the mother about diet, breastfeeding and control of diseases.
3a. Obtain and understand information, by user	Few mothers understand growth retardation and how to interpret the growth chart.
3b. Decide on action	Mothers' actions are results of traditional practices more than a result of the advice of the health worker.
3c. Produce information for re-assessment	In some cases mothers do not return to the next GMP session, which delays any reassessment.

Source: Jonsson et al (1998).

Growth monitoring and promotion is widely practiced in the region through the health service system, although the most impressive examples of large-scale growth monitoring, in India and Viet Nam, are implemented by ministries other than health. In Viet Nam, growth monitoring is a component of primary health care, as well as the National Protein Energy Malnutrition (PEM) Control Program, where it is used to target supplementary food and nutrition counseling. In India, a national network of community centers, constituting the service delivery structure of the Integrated Child Development Services (ICDS) program, also uses growth monitoring to target additional food and counseling to severely malnourished children. Staff GMP skills are stronger in southern India, where educational levels are high, and in the catchment areas of ICDS programs that are supported by Private Voluntary Organizations (PVOs). In these areas, program providers receive adequate supplies and support. However, beyond targeting special care to severely malnourished children, growth monitoring data is not widely used for ICDS program management. In Pakistan, despite the provision of GMP through an extensive community-based network of “lady health workers”, GMP coverage remains less than 20 percent. By and large throughout the region, growth monitoring has problems typically noted in the literature, such as variable data quality, inability of workers to properly interpret growth curves, and limited analysis, animation, and counseling skills (Pearson 1994, Ruel 1995, Pelletier 1995). These problems are often due to the related issues of poor motivation and capacity, and inadequate access to resources and services.

Community-based GMP, on the other hand, is mainly used by smaller scale UNICEF-supported programs, those supported by international PVOs, and a few pilot or regional studies supported by the World Bank or the Asian Development Bank. Of note among the PVO programs is the use of growth monitoring within the Hearth Model (Government of Viet Nam 1998). Save the Children Foundation (SCF) USA developed a high impact community-based nutrition program that relied on growth monitoring for program management. At the local level, mothers of children who grew well (positive deviants) were recruited (rewarded) for their performance, and were utilized as mobilizers. They conducted growth monitoring, counseling, and nutrition demonstrations. Performance, in terms of good growth, was a key element in the management strategy of the program at both village and program levels. This program seemed to achieve dramatic reductions in moderate and severe malnutrition, although the cost per beneficiary was quite high due to the high cost of maintaining a revolving fund for hens. However, SCF/USA advocates the use of positive deviants, together with regular growth monitoring, as a strategy to successfully link assessment, analysis, and action.

UNICEF supports GMP in the region in a variety of ways. In India, UNICEF provides equipment and training inputs to the ICDS system. In Sri Lanka and PRC, UNICEF is supporting integrated nutrition programs, using growth monitoring data to monitor nutrition improvement. The Community Action and Social Development

program in Cambodia attempts to incorporate growth outcomes into the decision framework of community development committees by training newly formed village development committees in the use of growth data. However, this program is too new to be evaluated.

Growth monitoring is also a key element of effective pilot and regional programs supported by the World Bank and the Asian Development Bank in India and Bangladesh. The Tamil Nadu Integrated Nutrition Project (TINP) was one of the first growth monitoring activities to emphasize growth faltering, as opposed to attained nutrition, as a strategy to target interventions. This program, and its various expanded successors, has been associated with reductions in the level of severe undernutrition.

Aside from these smaller-scale donor supported activities, there is little systematic summarization and use of growth monitoring data beyond the local level. District and provincial officers are either not systematically summarizing or using this information for monitoring and performance evaluation. Most of the large-scale national programs collect and summarize growth data, but these data are rarely utilized for decision making at any level of organization, and feedback from supervisors to their program staff is uncommon.

Mobilizers need adequate resources to support GMP components if growth monitoring is to be effective. Growth monitoring data can be successively summarized and used for performance monitoring by program managers at the national and subnational levels, guiding program corrective actions and management decisions. Growth monitoring provides a convenient source of outcome information that should be incorporated with other information elements to form the basis of a strong management information system that can be used from the household to the national level.

Finally, operational research is required to determine cost-effective approaches to GMP in areas where literacy levels are low, or where access to support and supervision are difficult.

Because growth monitoring provides only limited information about nutritional outcomes, and little about specific deficiencies and causes, some carefully selected additional information should be collected as a part of community monitoring. Outside of the study countries, the most successful programs that link growth monitoring to the larger array of community development inputs are supported by broader community-based monitoring systems (ACC/SCN 1992). In Asia, Thailand's experience with Basic Minimum Needs Indicator monitoring (see Annex 4) illustrates how communities used a series of simple questions to measure the developmental progress of households. These covered eight basic areas, ranging from survival inputs to measures of community participation and spiritual development. UNICEF supported integrated development strategies in Iringa, Tanzania (Yambi et al. 1989) that also relied on the collection and use of basic development information at the village level. This model is being piloted in Cambodia and Viet Nam. Table 6

illustrates some of the types of information that can be collected at the community level as part of the country programs.

Table 6: List of Suggested Indicators at the Community Level

Outcome	Process	Context
Anthropometry		
- number of children with low weight for age ^a	- # children without VAC	- village committee active
- # children faltering ^b	- # children not completely immunized	- village committee has budget
- # pregnant women without adequate arm circumference (MUAC < 22.5 cm)	- # women and children served	- women on village committee
- # nonpregnant women with low BMI (BMI < 18.5)	- # eligible households not reached	- village committee has development plan
- # newborns LBW (< 2500 g)	- # women not attending GMP sessions	- village has primary school
	- # children not attending GMP sessions	- #school age girls not attending school
		- village has adequate access to water
Micronutrient Status		
- Night blindness present in community	- # women who cannot implement GMP /nutrition education messages, i.e., women taught to add meat to the diet, but who cannot afford to do so.	- # HH without latrines ^c
- Goiter present in community	- # days without VAC supplies	- # HH without safe water within one half hour ^c
- # HH without iodized salt	- # days without Fe/Folate supplies	- #HH with no land access who have no major source of income ^c
- # pregnant women not consuming at least 1 Iron/Folate tablet/week		- #HH living below poverty line
Caring Practices		
- % mothers not exclusively breastfeeding	- # months no immunizations available	
- % children 6+ months not receiving complementary foods	- materials or equipment not adequate	
- % children 6+ months not receiving more than 3 meals/day	- # days no iodized salt available	
- % mothers not adequately managing childhood illnesses	- any cases of measles in community	
	- any cases of diarrheal disease in children less than six months	

Notes:

HH = Households

^aRefers to moderate and severe underweight status in children under 5 (below -2 SD of the NCHS/WHO reference).

^bRefers to child not gaining weight in two or more successive weighings.

^cThese are either process or context measures, depending on whether they are being addressed by the program.

Program-derived and Community-based Monitoring Data

In most large-scale programs, monitoring of coverage and program intensity uses information mainly in the form of process data such as budgets, expenditures, and staffing. However, the information collected is not analyzed adequately or used for management decision making at the national and, particularly, the subnational levels. Moreover, even when extensive data is collected and reported upward, data quality is often variable and little feedback is provided to program managers. A

recent review found these problems to be widespread throughout the region (see Annex 5, Wysocki et al. 1990). In most cases, managers at various levels of the organization have discretionary resources, but not an information culture. Although information technology could enhance the analysis and use of information at the sub-national level, it is not widely used in the region. An example from the Philippines shows how monitoring information, combined with information technology, could support management decisions both vertically and horizontally within country programs (see Annex 6).

Usually, NIS does not feature monitoring program outcomes such as nutrition and behavior changes because relevant data either are not collected or not used. For example, the ICDS program collects and summarizes data from growth monitoring as discussed above, but this information is not yet widely used by the management system. Use of growth monitoring data is not a feature of large-scale programs in the study countries, although other Asian countries, such as the Philippines, Thailand, and Indonesia, have effectively monitored and used outcome data.

While quality of care is a major focus of management information systems in the population and health sectors, it is underemphasized in the nutrition sector. Even at the international level, nutrition lags behind the population and health sectors in developing and disseminating methods and tools for program quality assurance and quality monitoring. One exception is the area of breastfeeding promotion, where tools have been developed for monitoring national breastfeeding promotion programs (Griffiths and Anderson 1993). Tools such as the Situation Analysis (Miller et al. 1997) and Lot Quality Assurance Sampling could play a role in monitoring the quality of nutrition programs.

Cost accounting that permits efficiency analyses to be undertaken is very uncommon, except among some small-scale, donor-supported programs. An absence of cost data is a major obstacle to developing effective country strategies (Horton 1998).

Monitoring systems should be a key feature of country programs. Simple indicators of coverage, intensity, and quality of program implementation should be included, together with basic outcome indicators. Information use and feedback should be encouraged by the incorporation of performance incentives within the management structure of the program. Program staff should receive continuing in-service training in the analysis and use of information, so that an information culture is fostered. Finally, microcomputers and software tools should be used at the sub-national level, at least at the regional and provincial levels (for example, Viet Nam, Cambodia, Sri Lanka, Pakistan, Philippines). In India, PRC, and Bangladesh, depending on state capacity, lower level use can be envisioned.

The strategy to accelerate nutrition improvement that emerges from the country reports is summarized by Mason, Hunt et al. (2001). This envisages massively increased numbers of locally recruited field workers (mobilizers) and supervisors

(facilitators), greatly enhanced coverage of community-based and micronutrient programs, and often related application of substantially more resources per head (intensity). These factors will need to be monitored as the programs are implemented, with an early and continuing feature being training. These systems and their development will need to be explicitly included in country plans, including budgets. Training, staffing, suitable equipment, and judicious operational research must be provided. For the most part, this work builds upon existing experience in the countries.

Micronutrient programs will, in part, be integrated with community-based programs, but others, especially fortification, will have a different structure and distinct monitoring needs (Mason, Hunt et al. 2001). These are quite well understood, and should be applied as an integrated part of programs as developed. A particular case is the assessment of iodine content of iodized salt, which can be readily done at the community and household levels.

Evaluation Research

Evaluation research should be a feature of the early phase (first five years) of implementation of the country programs. Sample surveys that assess population needs and establish baseline measures, together with some form of comparison groups, will be required. This research can be used to identify cost-effective strategies that can feasibly be scaled up to national coverage. At that point, adequacy evaluation resulting from routine monitoring will be sufficient for many policy and management purposes.

The evaluation of impact is technically demanding, time-consuming, and expensive. It requires some form of before and after measures on groups having varying and known levels of program exposure. Ideally, impact and cost-effectiveness evaluations should be undertaken as a first stage in the design of a large-scale program, and should be carefully selected, adequately resourced (separately from the program budget), and scientifically rigorous. However, evaluation research is the weakest element of nutrition information strategies in Asia and elsewhere. There are virtually no rigorous impact/cost-effectiveness evaluations of community-based nutrition programs. Impact evaluations of large-scale nutrition programs in the study countries are not sufficiently rigorous to demonstrate attribution. Even adequacy evaluation, through outcome monitoring, has not been a key feature of large-scale programs. Exceptions are to be found in Universal Salt Iodization (USI) programs, where systematic assessments over time have contributed to perhaps the most successful nutrition initiative in the region. While UNICEF and other donor-supported programs typically allow for some form of baseline and follow-up survey, comparison groups are rarely included, and even valid before-after comparisons are unusual. In addition, survey questionnaires tend to exclude nonprogram factors, which limits the ability to control for confounding factors and assess interactions. Outcome

information should include biochemical markers of micronutrient status, as well as anthropometric measures.

At the regional level, several important policy questions that affect the design of country programs need urgent attention. Examples are (as noted earlier): the role, if any, of supplementary food in community-based programs, and the relative roles (and effectiveness) of community-based vs. facility-based programs. Regional studies are needed to address these issues as soon as possible.

Finally, impact evaluations of micronutrient programs should be planned. Much of the required information can be pulled from process data (VAC distribution, salt iodization levels), because the mechanisms and links to biological effects are relatively clear. Nonetheless, some evaluation relating the interventions causally to biological outcome (i.e., impact evaluation) should be included. It is unwise to assume that well-established interventions are always contributing to reducing deficiency, especially as circumstances change, and in light of the growing knowledge of interactions among nutritional deficiencies and the complexity of human biochemistry. Evaluation designs can be crafted from DHS or MICS survey programs where the area of coverage is large.

Sentinel Surveillance

Sentinel surveillance refers to a data collection strategy using a purposive sample of communities or service delivery sites in order to detect changes in context, program, and/or outcome variables. Typically, sentinel strategies are used to obtain continuous data on populations of particular interest. For example, they may be groups that are particularly sensitive to innovation, such as early adopters of family planning innovations, or they may be of interest because they are the least likely to benefit from an innovation, such as remote, illiterate populations. However, sentinel surveillance is often used loosely to denote strategies that employ some form of purposive sampling.

Among the study countries, sentinel surveillance has been used only in Bangladesh, PRC, and Viet Nam (INFS and University of Dhaka 1998, CAPM/ERI/SPC 1998, Government of Viet Nam 1998). In these countries, surveillance systems have been designed to collect food and nutrition-related data in selected regions of the country, using repetitive sample surveys. It is not clear if the information generated by these programs is being used. This may reflect concerns about the representativeness of the areas selected, data quality, analysis that does not address policy and program decision needs, and lack of a dissemination strategy. Perhaps more importantly, information needs for national level decision making were not assessed when designing these programs.

Sentinel Community Surveillance (SCS) is a particular application of the approach piloted by UNICEF in several countries, including Nepal and Pakistan.

Sentinel Community Surveillance involves longitudinal monitoring in a large number of villages, combining quantitative and qualitative data-gathering techniques. Qualitative techniques are used to gain an in-depth knowledge of community needs and causes of undernutrition. The potential of SCS in making community actions to improve child nutrition possible is not yet clear. In addition, SCS is resource-intensive and remains largely externally funded, raising serious questions about the sustainability of this approach.

Sentinel surveillance approaches have been used most effectively in the Asian region and elsewhere for two purposes. First, when there are no other data collection strategies available, such as in countries affected by complex emergencies, sentinel surveillance may provide the only in-depth information about the status and determinants of child health and nutrition. Secondly, sentinel site approaches have proven effective for monitoring and responding to problems that emerge after calamities such as drought, other natural disasters, and economic collapse (Tucker et al. 1989).

Sentinel surveillance is not a significant component of the nutrition information strategy, as put forward in the country reports, nor do we suggest increasing that priority. In selected areas that are prone to natural disasters, countries should adapt their monitoring systems to include the contextual information needed to address natural or economic threats. As discussed earlier, regional food security monitoring also should be pursued.

Constraints Analysis

Many of the key elements of nutrition information systems to support country nutrition investment plans are already in place. However, there are no examples of NIS that effectively cover the range of information needs identified in the first section of the paper. In addition, various problems already noted limit the effective use of nutrition-related information in the region. While the previous sections note many specific problems, this section focuses on analyses of environmental factors affecting the efficacy of NIS. Within the UNICEF Nutrition Information Strategy, “environmental success factors for nutrition information strategies” include: perception of the problem (malnutrition); demand for information: capacity building; resources for action; and resources for information strategies (Jonsson et al. 1998). Throughout much of the region, these factors are actually constraints to the effective development of NIS.

Perception of the Problem

Overall, perceptions of the problem and demand for nutritional outcome information are relatively weak in the region. At all levels of organization, outcome

information is not consistently available and nutrition objectives are usually not part of performance criteria for policymakers, program managers, or mothers. This is partly due to the fact that in much of Asia, in contrast to regions such as Sub-Saharan Africa, undernutrition remains an invisible threat. Many Asian leaders are unaware of the magnitude of nutritional deficiencies and their impacts. In fact, even within the nutrition sector, many leaders believe that undernutrition is more prevalent in Sub-Saharan Africa than it is in Asian countries. Another reason for the perception problem is the absence of an “information culture” among nutrition sector personnel and the communities they serve.

Demand for Information

Changing management incentive structures, advocacy activities, and training will all be required to achieve adequate levels of concern and demand for information. In order to mainstream nutritional considerations at the national level, advocacy activities utilizing presentation tools such as PROFILES should be used to raise awareness of the socioeconomic importance of nutrition among finance and planning ministries. In Bangladesh, for example, PROFILES was effectively used to convince national planners and finance executives to commit to a large national nutrition program.

Opportunities to incorporate nutritional indicators into national development plans should be taken wherever possible. Cambodia, PRC, and Viet Nam are examples of countries where host country institutions and donors have catalyzed this process. In these countries, the prominence of the nutrition problem, as well as the clear need to systematically assess and monitor nutrition and its causes, is more generally understood and is being addressed.

At the program and community level too, management incentive systems should be designed to enhance information demand. As has been discussed earlier, positive and negative incentives can be built in to program management, based upon changes in general and micronutrient nutrition outcomes. This enhances the linkage between assessment, analysis, and action.

Capacity Building

Capacity building for information management also needs to be strengthened in all countries of the region, even those that are recognized as having strong research capabilities. However, the types of institution building and training needs vary considerably among countries. Several countries, including Bangladesh, PRC, India, Philippines, and Sri Lanka have strong survey research capabilities, however, few are experienced in the collection and analysis of information related to micronutrient status. More importantly, few institutions have the multidisciplinary training required

to analyze the surveys in sufficient depth to inform program planning and design, and policy analysis. Evaluation research skills are similarly lacking in all countries and in need of strengthening through training.

Most public institutions are weak in the area of management information systems. Indeed, approaches are frequently dated and little advantage is taken of the array of communication and information technology tools now available. Enhanced use of information technologies for NIS has particular potential at the sub-national (not community) level.

Another information technology tool that is particularly important to improved information use is Geographic Information Systems (GIS), which can be used for food security mapping, mapping of program implementation and coverage, and analysis of the determinants of malnutrition. Geographic Information Systems skills should be enhanced at the national level in most countries. Cambodia provides an exceptional example of how GIS can be used for program targeting and evaluation. The United Nations interim government actually established a digitized geo-referenced database that permits information to be mapped down to the village level. Donors and Ministry personnel are now using mapping and resulting analytical products regularly for program design and management purposes. The success in Cambodia, a country with limited public infrastructure, demonstrates the appropriateness of this technology across the region.

In most countries, large-scale training will be needed in the area of community-based monitoring. Most often, this will require a fresh approach, as traditional GMP methods have placed little importance on analysis and information use. Also, as GMP will focus on preventive and early identification of growth faltering, community workers and their supervisors will require different interpretive and analytical skills.

Finally, it is important that focal point institutions be identified to support NIS in each country. These institutions will have widely varying needs for capacity enhancement. For example, in PRC, multisectoral analysis and decentralization of information technology skills should receive priority. Cambodia, at the other extreme, remains a postwar reconstruction country, with limited national level capability, and thus larger investments in institutional development, combined with creative public-private sector partnerships, will be needed.

Resources for Action

Discretionary resource control is one of the most important motivational tools for the use of information. The most successful community-based nutrition programs in the world are those for which budgetary decentralization (of national program or project) is combined with nutrition information. The Iringa regional program in Tanzania and the national socioeconomic development program of Thailand provide

excellent examples of how information made effective use of resources at the local level possible. In most cases, nutrition programs are not linked closely to funded community development programs, resulting in lost opportunities to effectively mobilize community resources for nutritional improvement.

However, most Asian countries are undergoing the process of budget decentralization at various paces and in various forms. In fact, the decentralization process remains a confusing mosaic in many countries. In some cases, national development programs are being decentralized, while in others, specific programs such as poverty alleviation initiatives are being managed at the community level. Where possible, donor resources can facilitate this process (for example, the UNICEF area development programs in some countries, and the multidonor supported village development councils program in Cambodia). In addition, training activities to enhance resource utilization through assessment and analysis can be synchronized with the process of decentralization to both guide this process and to simultaneously leverage development resources in support of nutritional improvement. One example of an opportunity is to provide training in the use of growth monitoring data to the *panchyats* (local government) in India. These bodies are now being tasked with increasing responsibility in managing the ICDS program resources.

Resources for Information Strategies

Nutrition information systems must be adequately financed. Many country investment plans did not include line items corresponding with needed inputs. Across the region, adequate financial resources for NIS are not provided for. Equipment, supplies, logistic support costs, training, and supervision should all be budgeted. Evaluation research, MICS, GMP/community monitoring, and national probability surveys are important elements of NIS. However, in many cases, resources currently dedicated to information collection activities could be used more efficiently and could greatly reduce the costs to country investment plans. A careful review of data sources, information flows, and information needs should be conducted in each country as more detailed country programs are designed.

Recommendations for Improved NIS in Asia

At the regional level, there are several needs that, if addressed, could increase the power of NIS as a management tool to improve nutrition. These needs include cross-national comparative research, the support of regional information systems, advocacy activities related to the cost-effectiveness of nutrition investments, and capacity-building to promote an information culture throughout the region. Partnerships among donors, such as UNICEF and the Asian Development Bank in the case

of this Project, are an innovative approach to developing a regional NIS dimension. UNICEF's field presence, together with its well-articulated Information Strategy, provides continuity of support to countries. The ADB provides an important regional policy dimension, together with the potential to adequately fund programs.

At the regional level, policy and program research addressing key questions related to the design of community-based programs is critical. It is also important that national household survey programs, frequently financed by donors, are used more effectively to examine regional dimensions to food security problems and comparative progress of countries in reducing nutrition problems. For example, regional interventions might focus on advocating or supporting the addition of micronutrient indicators and maternal nutrition, synchronizing data collection across countries, linking socioeconomic and nutrition-related surveys, and ensuring adequate timing of data collection rounds. Regional crisis monitoring might also be supported, possibly in conjunction with on-going global programs. Regional initiatives to support capacity-building related to NIS are also recommended, especially in the area of information technologies.

At the country level, systematic assessment of information needs and information status should be undertaken, using the framework outlined in this paper. Data sources in relation to decision needs should be evaluated at the national, subnational, and local levels, identifying areas that require strengthening and strategies to improve them. In this way, more effective linkages between the various survey programs, management information systems, GMP programs, and evaluation research initiatives can be achieved. This is essential in order to develop an effective NIS component in country investment plans. National planning authorities, such as National Planning Commissions or Ministries of Planning, should work with line ministries to undertake such an assessment, together with resource institutions that may have particular strengths in NIS. This process might be facilitated through or linked to the UN-led Common Country Assessment and the UN Development Assistance Framework.

In conclusion, while NIS is a key element of a nutrition investment program, most country studies undertaken by the Project undervalued the importance of this component. This is consistent with a general finding in the region that the nutrition-related sectors do not have a mature information culture. There are significant opportunities for improving the quality, effectiveness, and efficiency of existing data sources; for leveraging information technologies; and for filling information gaps in a cost-effective fashion.

**Annex 1: Data Sources in Relation to Certain Characteristics of
Required Information**

Source/ Characteristics	Routine Reporting Systems				National Probability Surveys
	Large-scale Programs	Sentinel Site	School (Census)	Growth Monitoring	
Timeliness (Delay Approximation)	1-3 m	1m	6-12 m	Varies	1 year
Associations/Causality	(+)	+	+	-	+++
Fineness of (Geographical) Targeting	Med (e.g., district)	Med (e.g., district)	High (e.g., village)	High	Low-Med (e.g., province) (depends on sampling)
External Validity	Low	Med	Med	Low - Med	High
Comprehensiveness of Variables/Factors Considered	Low	Low	Low	Low	Med-High
Data Quality	Low	Low-High	Med	Low	High

Source: Adapted from Mason (1992).

Annex 2: Data Sources for Assessing Micronutrient Deficiencies

Data Source/Type	Iodine	Vitamin A	Iron
Food Balance Sheet	Not available	Useful for national trends	Useful for national trends; look at animal source iron (as bioavailability varies greatly by source)
Food Consumption/ Food Frequency Surveys	Not very important; Estimate goitrogens, especially casava	Useful; include frequency in diet of e.g., dark green leafy vegetables	Useful; include absorption inhibitors (e.g., phytate) & enhancers (e.g., vit C)
Clinical Signs -preliminary assessment -prevalence surveys	Goiter existence, from casual reports useful first step Goiter classifications and rates essential (often from schools)	Case-finding, needs expert scouting Eye signs important; large sample needed	Not really necessary Not very reliable
Biochemical Tests	Casual urine samples for iodine concentration	Serum retinol estimates in blood samples; distributions; dose responses	Hemoglobin and /or hematocrit in capillary blood samples
Clinic Records	Goiter reports if available	Eye lesions may be noted, but not very specific	Anemia if recorded may usefully be complied
Schools	Survey point for goiter surveys	Not most sensitive age group	Not usual (not most at-risk group)
Control Programs -examples	Salt iodization: quality control and surveillance	Supplement distribution, through PHC, immunization, may be monitored	Ferrous sulphate tablet distribution through health system: monitor as for essential drugs

Source: Adapted from Mason (1992).

**Annex 3: Internationally Supported National Probability Surveys
Relevant to the Project**

Type of Information	DHS	MICS	LSMS
Nutrition and Health Status	Anthropomorphic (child- weight/height, height/age, and mother-BMI) infant/child mortality, vitamin A capsule coverage, sometimes household salt iodization, rarely anemia	Child anthropometry- (weight/age, height/age, weight/height, MUAC), vitamin A capsule coverage, household salt iodization	Sometimes anthropometry of all household members
Care Factors	Breastfeeding, complementary feeding, illness management	Breastfeeding, complementary feeding, some illness management	Maternal time allocation
Accessibility of Services	Coverage-prenatal care, immunization, FP, water and sanitation	Immunization, water and sanitation, FP	
Household Food Security			Household consumption
Contextual Factors	Maternal literacy, basic socio demographics	Maternal literacy	Detailed socioeconomic data

Notes:

DHS = Demographic and Health Surveys

MICS = Multiple Indicator Cluster Surveys

LSMS = Living Standards Measurement Surveys

Annex 4: Basic Minimum Needs (BMN)

Eight groups of BMN indicators were originally developed to be used by villagers themselves as well as local government officials as tools for problem identification, analysis, goal setting, and action program implementation. The indicators below were developed into checklists as a way to determine problems and their priorities as a basis for planning intervention activities as well as to monitor and evaluate their results.

- I. Adequate Food and Nutrition
 - 1. Proper nutrition surveillance from birth to five years and no moderate and severe PEM
 - 2. School children receive adequate food for nutritional requirements
 - 3. Pregnant women receive adequate and proper food, and delivery of newborn babies with birth weight not less than 3,000 g

- II. Proper Housing and Environment
 - 4. The house will last at least five years
 - 5. Housing and the environment are hygienic and in order
 - 6. The household possesses a hygienic latrine
 - 7. Adequate clean drinking water is available all year round

- III. Adequate Basic Health and Education Services
 - 8. Full vaccination with BCG, DPT, OPV, and measles for infants under one year
 - 9. Primary education for all children
 - 10. Immunization with BCG, DPT and typhoid vaccine for primary school children
 - 11. Literacy among 14-50 year old citizens
 - 12. Monthly education and information in health care, occupation, and other important areas for the family
 - 13. Adequate antenatal services
 - 14. Adequate delivery and postpartum services

- IV. Security and Safety of Life and Properties
 - 15. Security of people and properties

- V. Efficiency in Food Production by the Family
 - 16. Growing alternative crops or soil production crops
 - 17. Utilization of fertilizers to increase yields
 - 18. Pest prevention and control in plants
 - 19. Prevention and control of animal diseases
 - 20. Use of proper genetic plants and animals

- VI. Family Planning
 - 21. Not more than two children per family and adequate family planning services

continued next page.

Annex 4. (cont'd.)

- VII. People Participation in Community Development
 - 22. Each family is a member of self-help activities
 - 23. The village is involved in self-development activities
 - 24. Care of public properties
 - 25. Care and promotion of culture
 - 26. Preservation of natural resources
 - 27. People are active in voting
 - 28. The village committee is able to plan and implement projects

 - VIII. Spiritual or Ethical Development
 - 29. Being cooperative and helpful in the village
 - 30. Family members are involved in religious practices once per month
 - 31. Neither gambling nor addiction to alcohol or other drugs by family members
 - 32. Modest living and expenses
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Source: Kachondham et al. (1992).

Annex 5: Weaknesses in Information Support Systems for Monitoring and Evaluation of Health and Nutrition Strategies

Identified Weakness	Brief Annotation on Existing Situation Contributing to the Weakness
1. Importance accorded to information support is more nominal than substantive	<ul style="list-style-type: none"> – Although information support systems exist in most countries, they are not invested with sufficient resources. – Information support systems are still thought of in a vertical and detached manner even by health program managers. – No systematic review is done by decision-makers, program managers and health personnel at different levels, to identify the set of information items needed by them.
2. Weakness in organizing, coordinating, presenting, and using information	<p>Multiplicity of systems of data collection and dissemination of information exist even in the same program areas, with no clear-cut and identified demarcation of responsibilities. This has led to the following situations:</p> <ul style="list-style-type: none"> – duplication of information collection and dissemination, – dissemination of conflicting information on same items from different official sources, and – noncomparability of information on the same items over a period of time, making it impractical to assess changing health situations.
3. Difficulties in identifying and collecting information of a dispersed nature needed for construction of indicators	<p>This weakness applies particularly to specific indicators such as health expenditure, local health care, etc. Health budgeting or expenditure occurs at so many levels and at so many locations that the problem of identifying and enumerating the instances becomes a stupendous task in itself. Similarly, in the absence of a clear understanding and definition of what constitutes “local” health care, the construction of this indicator in a uniform and comparable manner becomes difficult.</p>

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Annex 5. (cont'd.)

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| 4. Too “central” a connotation attached to the problem of information support | The question of weaknesses in information support is so well recognized and so often repeated that it has become somewhat rhetorical. Also, solutions for improvements to and strengthening of information support systems are too often attempted at the central level, notwithstanding the actual need for information support systems to be built from the most peripheral level in a “bottom up” approach. |
| 5. Conventional methods of collating and presenting information do not help in identifying areas for collective action | The two most important factors contributing to this weakness are: <ul style="list-style-type: none">– Most information collection and dissemination is done in a retrospective rather than prospective fashion– Most information collation and dissemination is done in a highly aggregated fashion, shutting out the possibility of identifying trouble-giving areas or components. |
| 6. Technical and operational difficulties in collection of information including lack of adequate resources | |
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Source: Wysocki et al. (1990).

Annex 6: Data for Decision Making in the Philippines' Early Childhood Development Project

Information systems can be used to identify populations to be targeted for assistance, assist in decision making about the nature of services required, support advocacy to create demand and local ownership for nutrition programs, and provide the basis for assessing impact and sustainability of the program.

The Philippine Early Childhood Development Program provides an excellent example of an integrated information system that effectively uses microcomputer-based information technologies at the subnational level. Enabling conditions include decentralized resource management to local governments and a ten-year investment program for childhood development that mandated the development of local programs.

Census data and agency service statistics were combined to rank municipalities according to the severity of the problems facing children (e.g., high population ratios for each school, health facility, or day care center, or high rates of malnutrition and school dropout) and the number of children needing targeted services in health, nutrition, and early education. Some 170 municipalities (11%) were targeted in three regions in southern Philippines. These areas represented over half of the nation's at-risk children.

Local cost sharing was an element of the national program, and fiscal data on municipalities was used to develop a set of sliding scale cost-sharing rules. Each municipal plan is tailored to the children's health, nutrition, and educational profile. Unless the mayor and municipal council agree to balance all the needs of children and provide appropriate integrated services, national subsidies will not be forthcoming and the municipality will not participate.

The third important use of information is for advocacy, social mobilization and local empowerment. Several methods of data analysis and presentation link nutrition, health and developmental indicators. These include community data boards relating minimum basic needs to child development; creation of community plans for accessing child development funding; and integrated planning and budgeting that links resource use to development outcomes.

The vertically integrated system permits the Council for the Welfare of Children (CWC), to identify problem areas in reaching program goals. From the barangay (village) captain to the CWC Director and the President's Cabinet Office, data is the key to planning, managing, and sustaining a highly devolved program that is viewed as a model for accountable governance for children. Microcomputer-based software enhances the decision-support qualities of the information system by permitting easy integration of outcome, process, and context data and easy-to-interpret graphical output.

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