AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

1. SUBJECT CLASSIFICATION

A. PRIMARY: Science and Technology

B. SECONDARY: Industrial Development

2. TITLE AND SUBTITLE

Industrial standards; evaluation of project 910

3. AUTHOR(S)

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4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1975	80 p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS

Office of Science and Technology, Technical Assistance Bureau,
Agency for International Development, Washington, D.C. 20523

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*

9. ABSTRACT

The Industrial Standards Project 910 was an experiment to test both procedural and substantive elements of technical assistance. As an experiment, the project may not have been expected to solve a problem (or achieve a purpose) but rather to demonstrate that the type of assistance probably could solve the problem if applied on a larger scale. General conclusions and recommendations are detailed at the end of this evaluation. This evaluation of the Industrial Standards Project is based on a sampling of its extensive ramifications. The sampling was determined by reading most of the reports issued during the period and some of the general files; interviewing some of the many officers in the National Bureau of Standards and AID associated with the project; and visiting Ecuador, Bolivia, and Ethiopia. In each country there was an extensive round of interviews and in the first two visits to laboratories of the standards institutions. A bibliography and list of interviewees are included in this report.

10. CONTROL NUMBER	11. PRICE OF DOCUMENT
PN-AAB-659	
12. DESCRIPTORS	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/TA/OST
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

EVALUATION

of

PROJECT 910 - INDUSTRIAL STANDARDS

Prepared for the

Office of Science and Technology

Agency for International Development

by

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September 1975

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INTRODUCTION

For a relatively small total amount of $560,000, Project 910 on Industrial Standards has had extensive ramifications in the five years of its existence. It has given most attention to seven countries in three continents, but has also provided some services to more than 30 other countries in the form of training, advice, reference literature and standard reference materials.

Because of its ramifications, an evaluation of the Industrial Standards Project must be based on a sampling. The sampling consisted of reading most of the reports issued during the period and some of the general files, of interviewing some of the many officers in the National Bureau of Standards and the Agency for International Development who have been associated with the project, and of visiting Ecuador, Bolivia, and Ethiopia. In each of these countries there was an extensive round of interviews and in the first two, visits to laboratories of the standards institutions. A bibliography and list of interviewees is attached.

During this process, I attempted to structure my analysis along the lines of the logical framework used by AID. The first elements of this framework are that resources of people, knowledge and supplies (inputs)are marshalled to produce outputs such as training, policies, plans, and laboratories. These inputs and outputs are summarized in Chapter I.

The logical framework then posits that project outputs are expected to help achieve a purpose such as establishment of institutions for standardization and measurement services and that the successful operation of such institutions will contribute to goals of economic development and human well-being. This series of linkages rests upon hypotheses, some of which involve issues outlined in Chapter II.

Like other centrally-funded projects sponsored by the Technical Assistance Bureau, the Industrial Standards Project has an extra dimension. It was originally justified as an experiment to test both procedural and substantive elements of technical assistance. As an experiment, the project may not in itself have been expected to solve a problem (or achieve a purpose) but rather to demonstrate that the type of assistance could probably solve the problem if applied on a larger scale. Various aspects of this experimental approach are discussed in Chapter III.

Following this stage setting, specific programs are reviewed in Chapters IV through IX. None of these chapters were written until all interviewing and reading were completed, so that conclusions about one

national program could be influenced by comparisons with similar programs.

Finally, there are general conclusions in Chapter X and recommendations in Chapter XI. No matter how definite the criteria and how rigorous the handling of data, any evaluation depends upon judgments. I hope that my judgments have been balanced and that they are consistent with the facts.

I greatly appreciate the courtesies extended by many busy people, for whom this evaluation was peripheral to their main concerns. The three USAID's were all most helpful in arranging contacts with host officials and in talking with me. Especial appreciation is due four people, each of whom made himself available for several interviews involving many hours: Mr. H. Steffen Peiser, Chief of the Office of International Relations of the National Bureau of Standards; Ing. Raul Estrada, Director-General of Instituto Ecuatoriano de Normalizacion; Ing. OrlandoDonoso, Director General de Normas y Technologia in Bolivia; and Ato Zawdu Felleke, General Manager of the Ethiopian Standards Institution.

Chapter I

PROJECT ELEMENTS - INPUTS AND OUTPUTS

Surveys of National Standards Systems

A major activity of the National Bureau of Standards for the Agency for International Development has been to organize surveys of national standards systems, the principal concerns of which were listed on page 1 of the Capital Assistance Paper "Korea - Standards Research Institute":

1) Unified definitions of terms of trade and greater use of an international system of measures.

2) Calibration service for instruments and physical standards.

3) Supply of standard reference materials (SRMs) certified to represent a physical or chemical property accurately for use in calibration or for comparison of the same property in other materials.

4) Dissemination of standard reference data (SRD) about characteristics of materials for use in engineering design and measurement of material properties.

5) Harmonization of national and international standards.

6) Quality control of products.

7) Restriction of unnecessary proliferation of manufactured sizes.

8) Quality certification and information labeling.

9) Measurements for air and water pollution.

10) Safety, fire prevention, disaster avoidance.

11) Wholesomeness of food.

Other relevant services mentioned in the report on "Standardization and Measurement Services in Turkey" are:

1) Building codes

2) Import and export controls

The announcement for the workshop in September 1975 proposed that participants find their own financing.

An average of 23 different NBS experts have taken part in each workshop. In addition, NBS arranges for some distinguised outside speakers.

Regional Seminars

Two regional conferences of about 3 days each have been organized under the project. One was held in La Paz in June 1974 and the other in Singapore in May 1975. Each was attended by 10 or so representatives of standards institutions in LDC's, plus some representatives of international organizations and the NBS.

One output sought for each conference is to reinforce ideas implanted in workshops and surveys. Another is to encourage cooperation among countries. The theme of the one in La Paz was a Latin American system of metrology. The theme of Singapore was testing and certification of export products.

NBS has combined these conferences with travel for other purposes. Thus the conference at La Paz was preceded by the survey of Bolivia and followed by a two-day follow-up survey in Ecuador, two years after the first survey. The conference in Singapore was preceded by the Philippine survey.

Distribution of Literature

The NBS distributes reference literature on standards and metrology to standards institutions in LDCs in several different ways:

1) All workshop participants receive boxes of publications which are shipped to them after the workshop.

2) Survey countries receive quite complete sets of materials published by NBS, the American National Standards Institution (ANSI), the American Society for Testing and Materials (ASTM) and other leading standards organizations. Ceremonies have been held to present these sets of books (several five-foot shelves) to Ministers, with photographs and newspaper stories.

3) Individual items or sets are sent in response to requests. In fiscal 1975, most requests resulted from a circular airgram to African USAID's, although some keep coming from countries which have had participants in workshops and conferences.

The desired outputs from these inputs of literature are that the receiving countries will use the information when they set their own standards. In addition to helping the developing country, the literature may advance U.S. interest, in that standards consistent with our own may facilitate U.S. exports. (Most LDC's have also received standards literature from other countries, such as Japan, Germany, or the United Kingdom).

Distribution of Standard Reference Materials

A Standard Reference Material (SRM) is a material such as steel, rubber, glass or a chemical which has been certified to have certain specified characteristics and which can be used as a basis for comparison when testing the quality of similar materials or used to calibrate instruments. This comparative method of testing often has marked operating advantages over testing against some absolute standard. If laboratory technicians are not too skilled or instruments are not too well calibrated, measurements, spectographs, chemical analyses or other methods of testing may be inexact. But such inexactitudes are eliminated if the instrumental reading and the certified value for the reference material are made to come out the same.

The NBS contracts for the manufacture of SRM's, inspects during their processing and tests after delivery. SRM's are distributed to laboratories here and abroad on request. For LDC's, this project pays for some of the SRM's and others are sold by NBS.

Training and Visitors

The National Bureau of Standards accepts a few scientists each year from abroad who are permitted to work in NBS laboratories alongside American scientists for several months. Except for orientation and guidance provided by Mr. Peiser of the NBS Office of International Relations, no formal training is provided. Such trainees must be able to cope in English.

In addition to these "residencies", many foreign visitors come to NBS for a few hours or a few days. Mr. Peiser estimates that the total may be over 1,400 a year. Some of these visitors come as a follow-up of a survey or regional seminar and might be counted as part of the AID project. Others come on their own. NBS, as part of its own program, cultivates cooperative relationships with other countries in order to foster recognition and use of American standards and to gain supporters in international meetings on standards. The National Bureau of Standards must assure that the measurement system in the U.S.A. conforms or is precisely related to internationally recognized measures for use by science, technology and trade. NBS has many other

international involvements, especially with highly industrialized countries. Thus, Mr. Peiser's office existed before the AID project and is only partially supported by AID.

Visitors may learn about equipment and processes by visiting laboratories, may get questions answered and may receive literature. Mr. Peiser puts them in touch with the relevant NBS expert and estimates that at least 100 NBS professionals out of a staff of 1400 meet with visitors in a year.

Advisory Services

In addition to the advice proffered to visitors, in workshops and surveys, NBS provides advisory services in at least four other ways:

1) Correspondence - NBS continues to receive queries from officers in LDC standards institutions for years after surveys, workshops and regional seminars. One of the most important services given by correspondence concerns specifications on equipment. On occasion, NBS even acts as a procurement agent for an LDC institution, placing the orders, inspecting and testing the instruments. USAID's have also been invited to query NBS but few have written.

2) Advisers - In a few instances, NBS has sent short-term advisers abroad to help design a laboratory, train employees of a standards institution or to make a survey on a particular subject. NBS has also acted as a recruiting agent for long-term advisers who are financed by USAID's, OAS, or UNIDO. For some of these longer term advisers, NBS has provided backstopping services, even when the advisers were part of a contract team from another institution, such as the Illinois Institute of Technology or GE-Tempo in Korea and GE-Tempo in Ecuador.

3) Computers - NBS is the responsible agency in the U.S. Government for advising other government agencies about procurement and use of computers. This expertise is available to AID under this project to advise LDC governments. This activity started fairly ambitiously in 1972 with a special project but nearly came to a halt when the NBS expert, Dr. Ralph A. Simmons, became ill and had to retire early. Simmons visited nine countries - Nigeria, Ethiopia and Uganda in May, Turkey in July, Brazil and Colombia in August, and Korea, Taiwan, and Thailand in October. A volume in Spanish was prepared. Later, Joseph Hilsenrath made a survey on computer applications at the Ecuadorian Institute of Standardization in October 1974. His report, published in April 1975 is considered applicable to other countries. Recently, Paul Roth has become available to help

with some stateside Training, meeting visitors and perhaps conducting seminars in host countries.

4) Housing - TA/OST has used the Center for Building Technology of the Applied Technology Institute of NBS to advise and help monitor two other TA/OST projects - one with Monsanto on roofing materials and the other with Southwest Research Institute on sulfur/fiberglass bonding for masonry walls. For administrative convenience, about $30,000 of the AID/NBS project is used for this purpose. Whether the NBS services have been valuable can only be judged by evaluating these other projects.

This same subdivision of NBS is also available to advise AID/W or USAID's about technical aspects of construction projects. Like other advisory services for AID, this has been little used except for advice on building codes to reduce the effects of earthquakes on low cost low-rise housing.

TA/OST has also had a separate project with this part of NBS to do research on construction design and methods for withstanding high winds. A spin-off from the high wind project to the general Industrial Standards project was that Noel J. Raufaste, Jr., who had been in the Philippines several times for the high winds research, headed the Building Technology group of the recent Philippine Survey.

Total Project Inputs

The introduction mentioned that AID has put $560,000 into the Industrial Standards project in five years. Recently, the annual AID budgets have been about $160,000, including the $30,000 for supervision of the building research projects. These AID inputs are only part of the total. Inputs also come from three other - the NBS, host countries, and OAS.

NBS contributions include time for which no charge is made to AID. Apparently, the general practice is that NBS personnel seldom note on their time reports time which should be charged to AID unless the time amounts to several continuous days. Thus, it seems likely that uncharged time might be as follows:

Meeting visitors	400 man days
Workshop presentations	150 man days
Helping trainees	25 man days
Correspondence	250 man days
Survey preparation and reporting	50 man days
Distributing SRM's, calibrating instruments	125 man days
	1,000 man days or 4 man years

With high salaries for scientists, plus overhead costs, four man-years amount to between $180,000 and $200,000.

The other NBS contributions come in connection with the distribution of literature. The NBS literature given at workshops, on surveys, to visitors and in response to requests would probably retail at about $8,500 a year. NBS gets a discount on other literature which AID would not get averaging 25% or $3,500 for FY 1975. Finally, NBS pays about $3,000 in postage and shipping costs.

OAS paid $13,500 to NBS for the costs of its participants at the November 1974 Workshop. No effort has been made to count the OAS, UNIDO or UNDP contributions for bilateral projects related to this project. UN representatives to Regional Seminars probably spent about $2,000 in travel.

Host country expenditures for a survey consist of about one man year of time (at $3,000 to $5,000?) and internal travel of their staff on the survey ($1,000?). Host institutional budgets are not counted. In FY 1973, LDCs paid $19,802 to NBS for SRMs.

Thus total inputs look as follows:

AID	$160,000
NBS staff	180,000
Literature	15,000
OAS	13,500
UN	2,000
Host countries	25,000
	$395,500

AID inputs amount to about 40% of the total.

Although AID benefits from considerable inputs for which it does not pay, we should also note that AID has felt a certain dissatisfaction because it cannot succeed in getting NBS to provide more services, even if AID were to pay. NBS staff levels are set by the Office of Management and Budget, without regard to availability of funds. There are no employees who devote full time to this project. NBS has not yet solved the ceiling problem by contracting with retired employees or by some other method. The ceilings have prevented NBS from giving a basic course in weights and measures such as it gives State and local personnel. The shortage of people is also part of the explanation for slowness in issuing reports. Shortage of staff has also caused delays in distributing literature.

Chapter II

ISSUES - THE GOAL

The goal of efforts to help establish standards institutions in various countries is to facilitate the economic development or general well-being in those countries. An evaluation of projects concerned with standards institutions must consider the validity of the hypothesis that if an effective standards institutions exists, then more or faster development will occur or well-being of citizens will be enhanced.

Several issues involved in the consideration of this hypothesis will be raised in this chapter. Succeeding chapters on experience in several countries and with various parts of the NBS project will provide some clues to the answers. Then the next to the last chapter will draw conclusions.

Is a Standards Institution Necessary?

The broadest issue is whether a standards institution is necessary for economic development in today's world. American history throws some doubt on the nexus. Although the U.S. Constitution gave the Congress the power to control weights and measures in 1789, the National Bureau of Standards was not founded until 1901. During the intervening years, the industrial revolution had occurred and the frontier had been closed.

The NBS "Report on a Survey in Ecuador on Standardization and Measurement Services in Support of Industrialization Goals" frankly states on page 18:

> "...all highly industrialized nations...maintain one or even several supportive institutions [for standardization and measurement services]. This fact stands as the only persuasive reason for the belief that such an institution is needed in every country on the path of development. A careful analysis of the economic benefits does not appear to have been made."

After providing some examples of possible benefits, the report concludes a section on costs of a national capability in standardization and measurement services as follows:

> "The benefits can be widespread but are often difficult to assess accurately. As with any other public expenditure the attempt at an honest, realistic evaluation of proposals

> should be made by authorities from outside the standards institution. Operations that cannot promise a very large return to the nation must yield to more urgent priorities."

A special aspect of this issue of necessity is whether a central focus in the government is essential or whether some of the key functions listed in Chapter I for a national standards system can be adequately discharged by independent agencies. In other words, industries must meet certain standards of quality if they expect to compete in export markets. Perhaps adequate quality control can be achieved without the existence of a standards institution.

In this regard, Ian R. Bartky, Scientific Assistant to the Director of the Applied Technology Institute of NBS comments after his trip to Korea:

> "The National Bureau of Standards in the United States, for example, was established to meet the needs of science, industry, and commerce. In many industries in the United States, it has been found, by studies performed by NBS, that these industries do not need the high accuracies available from NBS; rather, they need advice on measurement techniques and procedures."

Are Standards Systems Too Sophisticated for LDCs?

A second type of issue concerns the sophistication involved in a standards system. The key factor in underdevelopment is not the lack of resources but the lack of management and organization. Countries like Japan, Taiwan, Hongkong, Singapore, Israel, and Switzerland do very well economically with very few resources other than their people. Other countries with resources, such as Iran, Saudi Arabia, Libya, Liberia, and Bolivia, have very low levels of living for most of their inhabitants.

A standards system involves such characteristics as great scientific precision, widespread dissemination of technical information, voluntary adherence to rules, coordination among various public and private institutions. All of these are characteristics of a well-organized, well-developed society. Perhaps a country which can make a standards system operate is already so well-developed that it no longer needs concessional assistance from other nations. In fact, several of the countries who have been clients of the NBS project are about to become graduates from AID.

Is Project 910 Consistent with AID Policy?

This consideration of sophistication also brings us to another issue - are standards projects consistent with the current AID emphais on the

rural poor? Project 910 is called "Industrial Standards". The first two survey reports, for Ecuador and Korea, included the phrase "in support of industrialization goals" in their titles. AID came to its present emphasis because of disillusionment with a thirty year record of development assistance which had succeeded in increasing production, GNP and foreign exchange but had not affected the welfare of most people. The trickle down theory of economic well-being did not work. Can standardization and measurement services be directed to help small farmers and to protect poor consumers?

Chapter III

ISSUES - THE PURPOSE

As mentioned in the Introduction, the Industrial Standards project has a dual purpose. On the one hand, it is supposed to help build institutions. Thus the August 1973 revision of the Project Paper (PROP) cites one of the conditions expected at the end of the project as:

> "a nucleus of technological capability in selected LDCs relating to standards, quality control, and metrology supported by both public and private sectors."

On the other hand, the project is regarded as an experiment. The same PROP states:

> "The purpose of this project is to develop and demonstrate a viable approach for U.S. technical assistance to LDC's in regard to improving their competence and institutionsal capabilities in the fields of appropriate industrial standards, quality control and metrology."

A demonstration or experimental project is tricky to administer and evaluate. The best way to prove that the methodology is effective is to show substantive improvement in the institutions assisted. But because the project is simply testing a procedure, it may not provide enough assistance to achieve a noticeable institutional change.

One would expect that offices staffed by scientists, such as TA/OST and NBS, would state the nature of an experiment with some precision. The usual standards for an experiment in a laboratory would include a definition of what was to be tested, a description of the methodology for testing, and a statement of the type of results sought. Apparently these laboratory disciplines did not extend to the area of a technical assistance project. At least I cannot find any written statements which go beyond the generalizations quoted above.

What I do find are early expressions of concern when the project was being proposed. Thus a memorandum on February 16, 1971 from Marjorie Belcher, then head of the Africa Bureau's Technical Division, to Henry Arnold of TA/OST commented that the Airlie House symposium confused ends and means: "If specialists meet, they want help in their field. What fields are important?"

John Kean, Program Officer for the Technical Assistance Bureau, writing on September 27, 1970, urges that purposes be presented with

presented with greater specificity, with intermediate targets, indicators of interim progress and of ultimate success. A marginal note by Henry Arnold was that this could come after Phase I of the project. Following Phase I, greater specificity was set forth only for project inputs and outputs, not purpose or goal.

Three and a half years later, the report of an Evaluation Panel on May 28, 1974 comments: "The target [of improved technological capability] was not quantified at the outset thus making it difficult to measure when the target is reached." The same report also said: "Little was said in the Review about the improved methodology for use by LDCs. The Panel would be interested in whether a methodology has been or is being developed and what it is expected to be."

Will This Project Inspire Support?

In the absence of explicit criteria, an evaluator is forced to look for implicit statements of expectations. One definition of the experiment which is evident on several occasions is to see if NBS could create enough interest in selected countries so that standards activities would get continuing support. Sometimes this notion of support seems to consist of policy commitment and funds from the LDC government authorities. Sometimes it is broader, to recognize that effective standards require participation and acceptance by various interests in a country. Sometimes the idea of support was narrower - to get external assistance for the standards activities from the USAID, UNIDO, or OAS. Thus, as late as March of 1974, Henry Arnold wrote Curt Farrar, then Acting Assistant Administrator of AID for Technical Assistance, that he expected to present the following projection to the Executive Board of the NBS (in thousands):

	FY 1975	FY 1976	FY 1977	FY 1978
TAB funding	$160	$160	$100	$100
USAID or other funding	$ 50	$ 80	$180	$250

It would seem that the experiment goes beyond a Madison Avenue effort to stimulate interest. NBS can only operate in places where some interest already exists. As contrasted with more traditional technical assistance activities, NBS is doing some unusual things. Each of these can be considered an experiment. Broadly stated, the hypothesis is that use of the inputs and production of the various kinds of outputs described in Chapter I will contribute significantly to achievement of the purpose of building more effective LDC standards institutions.

Do Surveys Succeed in Re-Directing Institutions?

One of the most interesting devices is the survey of national standards systems. This has several unusual aspects:

- Use of third country nationals as members of the team.
- Naming a host country official as survey director.
- Publicity, along with fact-finding, during the survey.
- Use of the survey as a seminar, with evening discussions.
- Exploitation of "scientific authorities" to convince host officials to adopt new policies.

Does this experimental methodology succeed in re-directing standards institutions so that they become more effective?

Can Short-Term Technical Assistance Have an Impact?

Another implicit experiment is whether short-term intermittent technical assistance, as contrasted with the more usual pattern of long-term resident advisers, can have a noticeable impact. Besides the surveys, NBS provides several other kinds of short-term assistance - Regional Seminars, follow-up visits, expert advisers, receiving visitors in Gaithersburg. A possible advantage of such assistance is that more able advisers can be found. Top-notch people who would not give up their regular work to become resident advisers welcome the stimulus of a brief trip. On the other hand, such a short-termer may not have a realistic understanding of the special problems of a developing country and may be prone to prescribe a transplant of U.S. experience. Another possible advantage of short-term assistance is that the host country is forced to make decisons and accept responsibility. Sometimes resident advisers become crutches used by the host officers who never learn to walk alone. The obverse of this is that the short-term adviser is not present long enough to explain his recommendations and to modify them if necessary.

One of the problems of technical assistance is for the advisers to win acceptability. A study some years ago for AID under the auspices of the Association of Land Grant Colleges found that a resident adviser often required as long as six months before he reached the point that he and his counterpart could jointly plan and execute a major activity. Prior to that, he progressed through various stages such as being personally accepted, being professionally accepted, doing something useful but not necessarily important to the project, doing something jointly, etc. This NBS project is experimenting whether the Workshops, together with use of third country nationals and host survey directors, can win enough acceptability so that advice is followed.

Is the NBS "Doctrine" Acceptable?

In seeking to improve capability of institutions, NBS gives lip service to the idea that there are many ways to organize standards systems and that an LDC should decide what best fits its situation. Nevertheless, there is a "doctrine" which shows in most of the reports on workshops, surveys, and seminars about the desirable institutional characteristics:

- o There should be a "focal point", a final place of scientific authority which is custodian of the primary metric standards to which all other standards trace, which coordinates all other standards organizations, and which represents the country in international standards bodies.

- o Despite this ultimate scientific authority, the standards institution should eschew regulatory activities, delegating them to other agencies.

- o Standards should be determined by a participatory process representing all interests and reaching acceptable and practicable compromises.

- o Although the above process of setting standards presumes national peculiarities, a good standards institution works for conformity with international standards.

- o A good standards institution takes full advantage of all available resources of personnel and equipment in universities, industries, private laboratories, local governments. It actively promotes a greater sense of responsibility and greater capability in other agencies.

- o Much of the financial resources of a standards institution should come from government appropriations rather than fees.

If these characteristics resemble the NBS, it is not coincidental! The experiment, then, is whether this doctrine is suitable and can be made acceptable.

Can NBS Create Useful Linkages?

A different type of experimental effort is to see whether "network linkages among LDC standards institutions and NBS for the exchange and transfer of technical information and services" can be established. The quotation is cited in the PROP as one of the conditions expected at the end of the project. "Networks" are one of the fashionable ideas of the Technical Assistance Bureau and have many different organizational manifestations. The idea is that scientific advances

come with a free flow of information, that LDCs must continue technological improvement by adapting ideas from elsewhere, that channels must be developed to supplement and replace technical assistance.

Informal linkages among standards institutions of developed countries are very much a part of the usual pattern of operation. They send each other publications, they correspond, they exchange scientists. These informal contacts are reinforced by various formal organizations such as the International Organization of Standardization and the International Electrotechnical Commission. LDC standards institutions can generally join these organizations and as the LDC institutions mature, the exchanges will become more two-way.

In view of this background for standards cooperation, it would seem that AID probably had something a little different in mind when it set a target of linkages between LDC institutions and NBS. Can NBS provide a kind of backstopping for LDC's, a place to which they can expect to turn for such services as answers to questions, specifications for equipment, procurement, literature, SRM's, recruitment? With the continuity provided by such backstopping, some of the possible disadvantages of short-term technical advisers may be overcome. Thus, the Office of International Relations of NBS may help to assure the relevance of answers prepared by any one of the 1400 experts in NBS. The significant linkage at this stage is not an exchange of information, but a channel for technical assistance. International agencies such as UNIDO and OAS may finance and recruit advisers and finance equipment. They may sponsor regional meetings. But they lack the scientific competence in their headquarters to provide the kind of backstopping which NBS might give.

Is USAID Support Essential?

This question of backstopping leads to another aspect of the NBS project which can be considered an experiment, although it has not been planned. In most technical assistance, as administered by the United States, there is a USAID Mission to support the technical adviser in a substantive way, as well as logistically. As needed, the Mission Director can deal with the Minister of the agency being advised or can go elsewhere in the host government, as to a Planning Ministry or a Finance Ministry. Thus, the USAID helps get coordination, policy decisions, and budgetary allocations. For the NBS project, some USAID's have kept hands off while others have had their own standards projects which were supplemented by the NBS project. Thus, we have a comparative situation - can NBS succeed when it is on its own?

Chapter IV

ECUADOR

Inputs

USAID's reaction is that it has had a project to help Ecuador establish a standards institution - the Instituto Ecuatoriano de Normalizacion (INEN). For this project, USAID sought help from TA/OST-NBS, the Organization of American States and UNDP/UNIDO. It coordinated these inputs and treated the whole as a package.

This view may somewhat exaggerate the USAID role. Perhaps there was a fortunate coincidence of timing. Thus, Engineer Raul Estrada, the Director-General of INEN, remembers that he visited Gaithersburg before the creation of INEN. He also recalls that USAID financed help for the first meeting of a committee of the Andean Group about standards a few days before the signing of the decree establishing INEN.

In any event, there have been significant inputs from several parties. The US AID financed half the cost ($30,000) of equipment for a National Laboratory of Basic Metrology. OAS financed the other half, transferring the money to NBS for procurement. NBS provided the head of its Office of Weights and Measures, Thomas M. Stabler, for six weeks to design a laboratory. NBS then procured the equipment for USAID and OAS, writing the specifications, inspecting during manufacture, and testing the completed instruments and physical standards before shipping them to Quito.

USAID then gave a grant to INEN to contract with Stabler, who was by then retired from NBS, to be a resident adviser for two years, supervising the construction of the vibration-proof building with controlled temperature and humidity, training the INEN staff in metrology, and also advising on the INEN program for Ecuadorian conversion to SI (Systems Internationale d'Unites) measurements, which constitute the internationally agreed metric system.

USAID also provided offset printing and IBM automatic typing equipment. It financed five other short-term experts which NBS recruited. AID/NBS financed a 10-day study in June 1974 on computer applications at INEN by Joseph Hilsenrath of the NBS Office of Standard Reference Data. A major input from USAID has been the financing of a team from GE-Tempo for a year to work on anti-earthquake building standards and codes.

Estrada has visited NBS several times, including the 1972 workshop. He was a team member for NBS surveys of Korea and Turkey and was

invited to be one for the Philippines. He attended an NBS-OAS regional seminar in Bolivia in 1974. He has requested NBS help in procurement for some equipment which Ecuador financed, has used NBS for liaison with other institutions, and has corresponded frequently with Steffen Peiser. Estrada says that one of the best helps is the friendship of Peiser.

NBS conducted a survey in Ecuador from May 1 to 12, 1972. The team included three from NBS, Peiser, Stabler, and Dr. Sanford B. Newman, Senior Program Analyst - two from Korea, one from Turkey, and several from Ecuador. In June 1974, there was a three-day review of progress by three from NBS - Peiser, Willian Andrus, Program Manager of Engineering and Housing Standards; and Dr. Yardley Beers, Senior Research Scientist of the Quantum Electronics Division, Dr. Benjamin Gutterman of the Food and Drug Administration, and directors of standards organizations in Bolivia and Brazil. Also participating were most of the INEN professional staff and its two resident advisers, Stabler and Krisnamacher.

NBS has provided standards literature and some SRMs. Two other INEN staff members have attended workshops in Gaithersburg.

UNIDO financed two years of advisory services by B. S. Krishnamacher, formerly of the Indian Standards Institution. His first year was on standards for steels, mechanical trades and construction. After a year's gap he returned to help with quality control.

The Ecuadorian government has devoted an increasing budget to the work of INEN. From 600,000 sucres, it has grown to 17 million for the current year. The recent increase will finance a growth in staff from 20 to 40 technical personnel and 70 to 120 total personnel during the year, provided that recruitment succeeds. INEN now occupies three buildings, converted from apartments, and has an analytical and materials strength laboratory in addition to the metrology laboratory. It received some help for these from OAS. Within the last two months, INEN has obtained approval for a major increase in salaries, so that it now pays the highest of any public agency and is competitive with industry. Entrance salaries have been raised from 5,000 to 8,900 sucres. Industry pays around 8,000.

Outputs

The preceding summary makes it apparent that inputs from various sources have been mutually supporting. Thus NBS, with AID/W financing, was backstopping a US AID project when it supervised the procurement of equipment and recruited advisers from outside NBS. These interrelationships make it difficult to attribute the outputs to any one set of inputs and especially difficult to assess their impact on the building of an institution. However, since this evaluation is

concerned with the AID/W-NBS project, the following comments will concentrate on its outputs.

Workshop

Estrada considers his participation in the workshop at Gaithersburg useful as an opportunity to talk to people of several countries. He says that Ecuador started from zero knowledge on what quality control was, the meaning and role of standards. The difficult task of convincing government authorities to establish and finance INEN was helped by citing experience of other countries. Estrada also feels that he obtained a better overview of standards work by hearing the heads of NBS departments and guest speakers from industry and universities. (His workshop was for only 5 days).

Survey

Citing the adage "A prophet is without honor in his own country.", Estrada says that INEN was in a critical position at the time of the NBS survey in 1972. The government doubted the need of the institute and had provided no budget for four months. Estrada had used his personal savings and magnetism to hold the staff together. The prestige of the team helped convince responsible ministers, both by oral final reports and by preliminary conclusions presented in a letter in Spanish.

US AID disagrees with this assessment of the survey. Several staff members say that the idea of a standards institution had already been accepted by the government by the time of the survey. The Minister of Commerce, to which INEN reports, was a good friend of USAID officers and had overcome his earlier skepticism and signed a project agreement. However, one staff member, Patricio Maldonado, says the other ministers became convinced about the idea at the time of the survey. He says it also served the purpose of country-wide publicity, with TV and newspaper interviews of the Turks and Koreans.

Estrada says that chambers of industries were not convinced about the necessity of standards, or at least of Ecuadorian standards, before the survey. The visit of outside experts and their questions helped "raise the consciousness" of industry. Estrada sent the survey report to chambers and was subsequently invited to meet with boards of directors, at which time there was much discussion of the facts and comments. This was a time of political instability when industry was not investing and did not expect to grow. The intentions of INEN were suspect - did it want to control? The survey's presentation of facts without politics helped INEN's image, especially when Estrada promised neutrality.

Since all that Estrada volunteered about the impact of the survey dealt with its influence on opinions, I asked whether any of the recommendations had been useful. He said that it was not possible to use them all but they were a guide.

One recommendation Estrada cited was for greater cooperation with universities. INEN now has professors on technical committees - over 400 have so served. INEN published a list of 140 possible thesis topics of interest to it. Some 60 have now been selected for INEN help by means of scientific data, reagents, and also by publishing the thesis. The thesis program included 5 students in 1973, 40 last year and 60 estimated for this year. It now reaches all 13 universities. Three of these students have come to work for INEN. Cooperation in this program has gone to the extent that INEN staff members have supervised some theses in lieu of professors and that one university actually accepted a thesis produced by a team!

The other recommendation Estrada cited was for cooperation with industries. He says that he traveled much and visited many firms. INEN now receives requests for assistance in establishing quality control and testing capabilities. In each such case, INEN insists that standards be established as a reference. Recently, a manufacturer of printers ink wanted a certificate for export. He has promised two engineers to work full time with INEN to prepare standards. Industry cooperates by making many comments on draft standards and takes them seriously enough to pay for research to check INEN or to invite experts from home offices. (The question of impact on industry will be discussed in the goal section of this chapter).

Perhaps there is a significance to Estrada's citing only two recommendations. When INEN prepared a "Revision to the NBS/AID Survey of April 1972" for the review in June 1974, it summarized the recommendations and completely omitted several, including one that the Director General should delegate some responsibilities.

Laboratory

Estrada had considered the establishment of a national system of units to replace Spanish, Indian, English and American units a first priority. Both Estrada and USAID agree that the work of NBS in designing the Basic Metrology Laboratory and in procuring the equipment for it was outstanding. It is estimated that more than 200 people were engaged in the design, construction, testing, and calibration of the instruments for NBS. The equipment was ready on time. The laboratory is now one of the best for length, volume, and mass in Latin America.

Arrangements have been made by OAS for Ecuador to provide technical assistance to Bolivia and Panama. The laboratory has received a

trainee for one month from each country and will send its laboratory chief to each country for one month. Assistance for Costa Rica is also possible. The laboratory gives classes for municipal inspectors and university professors on metrology. It calibrates industrial instruments. But Rodrigo Paredes, a former USAID staff member, commented to me that total utilization of the laboratory is slight and that INEN did not provide enough trainees to Stabler.

The experience with NBS procurement contrasts strongly with INEN's own efforts at procurement. During a recent visit to the United States, Estrada personally bought an instrument in Chicago. It was delivered with missing parts and the company refused to make any adjustments, even when Peiser contacted them. Only when Peiser wrote the Better Business Bureau of Chicago did the supplier agree to act. In another instance, an offset printing machine financed by USAID is obsolete and parts to repair it are unobtainable.

Review

The review survey in 1974 started with meetings with the vice-ministers for industry and for commerce and then consisted of two days of discussions between the visiting experts and all of the professional staff of INEN. Estrada says it was good for staff morale. He characterized the discussions as very frank, with many questions and some criticisms. Among those he cited were the loss of control with too fast growth and the need for more experienced technical people. Paredes says that the time was too short for a useful review and that most of the time was spent by Estrada brainwashing the visitors. Actually, each of the nine points in Peiser's report is a criticism and includes a recommendation, but these are so gentle and follow such effusive compliments that it is doubtful whether either Estrada or the vice-minsters realized the need for action.

SRMs and Literature

The report says that standard reference materials are so useful for industry that INEN should take a leadership position for Ecuador or even the Andean group. This statement certainly obscures the fact that INEN has done nothing with SRM's. Estrada says INEN has a small collection and that it still needs some testing equipment. He points out that SRMs can be used to check the quality of testing by laboratories, concerning which he has doubts about quality of calibration, reagents, environment, sampling, timing and training! He plans to use SRMs first for cement, for which he expects voluntary cooperation by large construction firms. Finally, however, Estrada said INEN had lost its best man on use of SRM's and needed to send people to NBS for training.

Standards literature is used as a reference when preparing Ecuadorian standards. INEN has literature from many countries. Hilsenrath proposed that they use a computer index of standards for easy reference. Estrada plans to do this, installing a terminal to a computer at the Polytech.

USAID concludes the NBS inputs and outputs have been quite useful. They are convinced that this usefulnees was enhanced by USAID commuications, coordination and continuity - that Estrada could not have benefited as much if he had dealt only spasmodiacally with NBS through the centrally funded project. On the other hand, USAID feels considerable frustration that institutionalization and impact of INEN have been slight.

Purpose

I discovered an ambivalence of opinion about the effectiveness of INEN as an institution and its status or recognition by outside observers. In many ways, this ambivalence seems to trace to the Director General. On the one hand, he is regarded as innovative, able, and hard working. On the other hand, he is criticized as having so personalized INEN that it has low productivity and low morale. Despite repeated suggestions on my part that I could spare Estrada's time by putting some of my questions to staff members of INEN, he never agreed. This contrasted with my experience in both Bolivia and Ethiopia. Various clues about the effectiveness of the institution are mentioned below.

Ecuador has an interesting organization called "Comite de Informacion y Contacte Externale" which tries to bring public and private sectors together. CICE includes representatives of four ministries - Foreign Affairs, Finance, Agriculture, and Industry and Commerce. CICE also includes 15 private organizations, such as the Chambers of Commerce, of Agriculture, and of Industry, the Associations of Exporters, of Public Accountants, and of the Press, and the Central Bank. CICE has frequent meetings to discuss such issues as new taxes, decrees on import of capital, etc. Dr. Gerardo Anker, a founder and past president of CICE, says that contact between CICE and INEN has been superficial. Estrada spoke once at CICE. Anker's impression is that INEN seems self-sufficient and that standards are not well known in Ecuador, although there is a tremendous need. He says the practice is for exporters to send customers samples but no specifications. European buyers insist on specifications. But Anker concludes by saying that Estrada is well esteemed and that his work is well done.

Paredes concludes that the various advisers have been about half wasted, partly by lack of counterparts or facilities (a common complaint of technical advisers) but partly because of difficult communications with Estrada. They could not get division chiefs to make decisions or take action, they waited a long time to see Estrada

and then he often did not implement what was agreed. Paredes says Estrada is knowledgeable and has good ideas. He did an excellent job at the beginning, despite the lack of knowledge and support by Ecuadorian officials in industry and government, but later the lack of management has hindered success. He starts many things but does not follow up and finishes few.

One example cited by Paredes was that a TVA expert prepared standards on fertilizer which were not processed for 2 1/2 years. Estrada mentioned the TVA man when I asked about his experience with non-NBS advisers. He said that the adviser suggested devising new methods for testing which would use simpler equipment. These were tested at TVA for months. Then there was a problem of translation. Now the standards are in effect.

Economist Gonzalo Baez, vice-president of the Chamber of Industry for the Quito region, says that INEN is a government agency which is accumulating experience through studies and foreign experts. Its staff consists of young graduates without industrial experience. (Estrada had volunteered to me that each division had only two or three people, each of whom had to work in a wide area and needed more experience). Baez pointed out that Estrada is an exception - he had experience in chemical companies.

Baez commented that Estrada thinks a government agency must have a certain degree of influence. Consequently, he attends meetings of a council which approves incentives for new firms under an industrial development law. Baez has doubts about the wisdom of INEN exercising such control, although he admits that setting requirements for quality in new industries may be good to some extent. Estrada says he spends about 30 percent of his time in such meetings. He says his role is to provide services, not control, to new industry. Baez concludes that INEN has not yet created confidence on the part of industry but in the near future will be a sound institution.

When Estrada told me about 30% of his time was devoted to industry incentive meetings and 15 to 20% for other meetings, I commented that I would think he would want a deputy to relieve the burden. The comment got no response.

Patricio Maldonado, the USAID Industry Officer and Acting Chief of Rural Development, says that Estrada had done outstanding work in promoting the concept of standards, and or rationalization of goods. Maldonado regards Estrada's technical ability as fantastic and says he works 16 hours a day, seven days a week. On the other hand, Maldonado thinks more progress is desirable in enforement of quality control. It was his impression that the programs are not in use. The number of industry committees has decreased from about 18 to 3 or 4 because of disillusionment with the lack of follow-up.

Estrada says he has decided to use committees only for the final revision of standards instead of having them meet before and during drafting. He says that in the beginning he was afraid to publish standards without comments. Now he thinks INEN is in a position to write and increase production safely. While I was talking with him, a telegram was delivered from an industry association asking more time to prepare comments on a proposed standard. Estrada cited it as proof of industry interest. It also seemed an indication of failure on INEN to get participation at an early stage.

It was reported to me that Estrada has forbidden INEN mail to be opened when he is away and that he is the only one who can sign checks (I watched messengers bring checks to him when we were eating at a restaurant) and consequently staff is not paid when Estrada is away. Lack of delegation was cited as a reason why people have been leaving INEN. Estrada attributes the departures to low salaries before the recent 60% raises.

The Ecuadorian standards project has been a good example of collaboration among the UN, OAS, and US AID, Maldonado pointed out. They (including NBS) have contributed to the potential for a solid, viable institution but the personal approach of Estrada may have prevented full realization of the potential.

Goal

Just as there is ambivalence about INEN's status as an institution, here is also a difference of opinion about its impact on the Ecuadorian economy. According to Estrada, there are now 190 official standards, with about 400 in process. This compares with figures at the time of the June 1974 review of 90 published, 20 waiting publication and 40 in preparation (figures rounded from a chart).

Estrada himself says that INEN has had little effect on the welfare of the general consumer. He says there has been great pressure from industry for help with quality control to make them competitive in exports. One example cited of potential help to consumers was automobile lubricants. The industry was concerned about weights and volumes (this was mentioned in the NBS survey) and sought advice from INEN. After a study, INEN recommended better equipment, calibrating it with INEN, and training employees. After two months, the industry said it was ready. INEN found much improvement, the only problem left being the quality of cans.

The chief instance of help to consumers which Paredes recalled concerned cylinders for propane gas. This was a case where home offices sent experts from Italy, Denmark, France and the United States to review proposed INEN standards, according to Estrada.

Baez says that INEN regulations almost copy those of other countries and hence are impractical for the local market. For example, bakeries do not have the equipment nor the quality raw materials to meet INEN standards. Other instances of failure to adapt to the needs of Ecuador are standards for soft drinks and construction. Baez says cement is an exception - here INEN is successful. Estrada says the cement industry has offered financing to conduct a program of inspections and training.

Baez mentioned several sources of technical assistance to industry for quality control which he thinks are more practical and have more influence than INEN. A number of firms have had volunteers from the International Executive Volunteer Service. They have helped in electrical appliances, refrigeration, textiles, dyeing, soft drinks and several mechanical industries. Branches or licensees of overseas firms have controls imposed by parent companies. This has occurred with textile firms connected with Italian, German and U.S. products, including Manhattan shirts and Jockey underwear. Other companies with Ecuador affiliates include Mitsubishi, E.N.I., Dow Chemical, Union Carbide, Del Monte, and General Tire. Such companies have a competitive effect on local firms, Baez says. A large Ecuadorian textile firm, "La International", established for 70 or 80 years, hired technicians from abroad and now sells in the U.S., Argentina, and Mexico.

Having made the preceding comments, Baez then said that the Andean Group idea of a certificate or seal of quality is a good one. For this purpose, members of the Andean pact will require some guarantees or regulations. Here, INEN could play a useful role. Estrada is rather proud of his idea that he will have INEN approve firms' processes for quality control and will then be able to give certification without having INEN test the products regularly. He admits that his approach was generally criticized when he presented it at a recent international conference.

Future

USAID is phasing out of concessional assistance to Ecuador, which now has oil revenues. However, USAID Director Harry Ackerman thinks Ecuador still needs technical advice and is trying to arrange for reimbursable technical assistance with various parts of the Ecuadorian government. USAID thinks reimbursable assistance will work only if there has been a good previous experience with bilateral assistance and if there is some arrangement for good backstopping to recruit advisers and provide continuity. USAID thinks these conditions exist with INEN and NBS and would like to have central funding of NBS continue to permit the back-up for reimbursable technical advice.

Estrada would like to arrange for some visiting experts to do training when he has recruited new INEN staff members. He would prefer that NBS people come to Quito rather than sending staff abroad because they could train more people and also train some industry personnel. He specifically mentioned the idea of training by J. Paul Cali of NBS's Office of Standard Reference Materials on use of SRM's in connection with cement standards. Estrada would also like help on procedures for testing fish for mercury, the main cause of US rejectons of Ecuadorian exports.

USAID Assistant Director Garufi suggests that if Estrada does request trainers, it might be a good idea for Peiser to visit briefly to work out details on the type of training, length of time, type of expert, etc.

Chapter V

BOLIVIA

Inputs

The General Directorate of Standards and Technology (Director Generale de Normas y Technologia - DGNT) in Bolivia has operated primarily on its own. Recently, for example, it spent about $100,000 of its own funds, (including the cost of remodeling rooms in the Ministry of Industry building) for a testing laboratory for quality control of foods.

DGNT has supportive working relationships with other Bolivian agencies. USAID commented that there are relatively good inter-agency contacts in Bolivia, with staff commuicating horizontally rather than up through the hierarchy of one agency to the top and then down the hierarchy again of the other agency. Among the agencies working with DGNT are:

National Council of Higher Education

This agency coordinates the work of nine universities. Its President, Miguel Tejada Velasquez, is a petroleum engineer who is himself greatly concerned about getting the metric system adopted in place of old Spanish and Indian systems. Ing. Tejada visited the NBS about converting to SI and is pushing the teaching of metrology in technical schools and universities. The Council has compiled a list of all facilities of university laboratories and is promoting their use by industry and the DGNT. For example, university laboratories have tested materials and have also worked on the commercial possibilities of natural resources. Recently the Council has arranged a credit of $3 million from Germany, Japan, and Hungary for laboratory improvements. The Council has been conferring with industrial leaders for several years about their manpower needs and has made two surveys of the professional job market so that it can adjust curricula and enrollments accordingly. It has just signed an agreement with the Ministry of Industry, Commerce, and Tourism to assure better coordination of training with needs. The Council has required all seniors to write a thesis and to work in firms during their last semester. Tejada reports that many professors work with DGNT, either on committees or as consultants. Some DGNT staff members also teach.

Universite Mayor de San Andreas

This University in La Paz has a Center of Scientific and Technical Documentation with sections for medicine and industry. It is set up to serve the nation and not just the university. It is a member of

the Federation of International Documentation in The Hague and coordinates with other centers in Bolivia, such as those on metallurgy, geology, and petroleum. Mostly, the Center has bibliography and it sends for desired information. It is used several times a week by staff members of DGNT.

The University also has a group of scientific institutes. Some of these are for relatively pure science such as biology at high altitudes (with French collaboration), cosmic rays (with Japanese and Russian collaboration), and geosciences (with German collaboration). However, some are also interested in applied sciences, including hydraulics (with German collaboration), metallurgy, and sanitary engineering.

Sidersa

The Steel Enterprise (Empresa Siderurgica) in the Ministry of Mines is responsible for development of a large iron deposit in southeastern Bolivia. Although it has just engaged the McKee company from the United States to do a thorough feasibility study about the gasification process, transportation, and new cities for workers, it fully expects a future operation employing at least 7,000. Its Technical Director, Ing. Javier Salinas Romero, says Sidersa is concerned now about standards for tool making and other industrial inputs, both to assure quality of imports and to encourage domestic companies. For the longer run Sidersa will be in charge of developing standards for iron and steel, mining and drilling. Finally, it will want quality control facilities.

CENACO

The Ministry of Finance is setting up a national computer center with enough capacity to serve all parts of the national government, local government, and also industry. Bolivia is spending $2.5 million for equipment. A USAID adviser from HEW, David Bernheisel, has been on the scene for two years and will be there until June helping with the feasibility study, specification, procurement, installation and training. DGNT, which how has 50,000 standards in its library, has hired a specialist to make a key word catalog for the computer. DGNT will have a terminal connecting to CENACO and can query it for read-outs about standards as well as for computations.

Patent Office

This office in the Ministry of Industry is being re-organized with experts from industry and will be linked to the DGNT, which will make information about useful processes available to industry.

In order to serve as a consultant to industry, DGNT has set out to train engineers in information systems. Two went to Canada. (The Director of International Technical Cooperation in the Ministry of Planning told me that the Ministry of Industry has been talking with the Canadian International Development Agency about a National Information Center for Industry). One DGNT staffer went to Mexico on information systems and the Director General himself, Ing. Orlando Donoso, visited the National Technical Infomation Service in the United States. Donoso explained that the Documentation Center of the University is a library while he wants an extension service.

An Argentine expert helped DGNT for a time with quality control. One DGNT staff member went to Holland for training in quality control.

From the National Bureau of Standards, DGNT has received the following:

Donoso and the then Chief of the Department of Standards have attended workshops.

NBS conducted a survey in Bolivia in June 1974.

NBS has provided standards literature.

NBS and OAS held a regional seminar in Bolivia on metrology.

Dr. Loaysa of the Minstry of Planning described a recent agreement with UNIDO (UNDP financed) for about $80,000 of technical assistance on quality control in the next two years. An expert will come early in 1976 to identify areas for concentration. He will be followed by three consultants in administration of (a) quality control programs, (b) standards, and (c) metrology who will draft a long-term project during one month. Despite these preliminaries, the budget already provides for experts in quality control in food and beverages (12 months) and in textiles (3 months) and chemicals (3 months). Donoso says that DGNT has already rejected 5 UNIDO nominations because the experts did not speak Spanish. They may have to accept English speaking advisers. Meanwhile DGNT staff spends one hour a day studying English, mustly because of the need to use standards written in English.

Outputs

Donoso says he picked up a lot of ideas at the workshop about the importance of standards, the industrial use of standards, the connections between NBS and other Federal agencies and laboratories, and the connection of these laboratories with industry. He was interested in small State laboratories and their direct relations with industry. He got ideas from other countries. Concerning metrology,

he learned about how to establish a laboratory, train personnel and contact industry. He was told not to do many things, such as buying expensive equipment.

Survey

The NBS survey served to diffuse the idea of standards to industry, NBS prestige is convincing. The survey confirmed a situation of common difficulties in industry - technical problems and little laboratory capability. It alerted industry to services DGNT can provide. Since the survey, industry has been a little bit scared, and DGNT has received 10 or more major follow-up requests.

Despite the NBS prestige, Donoso thought that it was not easy for some NBS people, who are scientists at a high level, to understand problems of LDC's and LDC industries. This provoked several comments from other DGNT engineers. One said the Korean on the team was too impressed with his own status as a governor, while the Turk was an operating type. Benjamin Gutterman of the Food and Drug Administration was most helpful and sent a bibliography afterwards. Another engineer commented that DGNT might have expected too much from the survey - that NBS could solve more problems on the spot. The survey did arouse curiosity by industry. Also, he thought the foreigners on the team learned - it educates NBS people for future assistance and third country people for their own problems. A third commented that DNT staff did not have enough advance information on the survey procedures or what effort from the host was needed. With better information on specialties of team members, better links to industry might have been established. The evening discussions were interesting, but language was a problem.

Donoso mentioned that a useful by-product of the survey was the scheduling of public presentations - to 200 people in La Paz, to several small groups in Santa Cruz, and to the Chamber of Commerce in Cochabamba. Donoso said that one outcome of the survey was the DGNT practically ceased all regular work for three weeks and examined its own role and procedures.

All four of the DGNT staff who had participated in the survey with whom I talked felt rather strongly that the delay in receipt of the survey report (it is now 15 months) had seriously reduced its impact. Donoso has edited a draft and plans to use the report as soon as final copies are received. He will send it to many industries and says it can be used in English without translation.

Metrology

As a result of the regional seminar in La Paz and a subsequent NBS-OAS workshop in Washington, OAS is about to start a project in metrology. A meeting at the National Industrial Institute in Buenos Aires in September considered details of the project. Under this project, DGNT will send someone to Ecuador for training. Donoso also hopes to use the primary standards in Quito and confine Bolivian purchases to secondary and field standards. It was interesting to hear Donoso speak about the seminar as if it were his meeting and as if the resulting network for metrology is his network. Such use of pronouns is an indication that the idea really took hold.

Purpose

The section on inputs provided an important clue to the institutionalization of DGNT. It obviously has important linkages to other agencies. Another clue was the way in which Donoso was able to make an appointment for me with General Gonzales Fuentes, the Minister, on very brief notice. True, the Minister wanted to seek U.S. help for more laboratory equipment but even that effort confirmed his statement that he considered standards important.

Ing. Tejado of the Council of Higher Education started his conversation with me by saying that Bolivia must industrialize soon or be the weakest sister in the Andean Group. He said Bolivia had been rich enough from tin and other minerals to buy, which was easier than to make. Now it must start thinking about selling products and if it does, it must set standards.

Dr. Loayza of the Ministry of Planning says that Government gives high priority to quality control for exports to the Andean Group.

In this atmosphere, DGNT has established 29 committees and 150 subcommittees on which 262 people from enterprises are serving. The committees also include people from consumer interests, government agencies, universities and sometimes other groups. The Committees participate in an elaborate process for preparing and clearing standards. First, the committee receives a rough draft of a standard which it elaborates. The resulting "first draft" is then circulated publicly, with 60 days allowed for comments. The committee then prepares a revised draft and reports to the Director General. His recommendaton, together with a report on the procedures followed, goes to the Minister who issues a Bolivian Standard. On occasion, the Minister may go to the Cabinet. Standards may be voluntary or mandatory. The latter are usually for food, health, safety, or national interest. DGNT has issued 200 standards and has 400 in process. Although it is newer than INEN in Ecuador, it seems to have established stronger links and produced more.

DGNT has also begun to issue three types of certificates of quality.. conformity to Bolivian standards, conformity to some other standard, or conformity to specifications declared by the producer. Requests for such certificates may come from either an industry or from a government purchasing agent. The DGNT takes samples of the product, mixes the samples, and sends a batch to a laboratory. If the laboratory finds conformity to a standard, a certificate is issued. If not, a second batch is sent to another laboratory. If need be, the two laboratories conduct a third test working together.

Growing out of the self-examination which started with the survey, there have come ideas about changes in the structure of DGNT. The government thinks a technical bureau is important and may be more effective if it is a little more independent of the Ministry of Industry. The plan is to establish a Council which will include some non-government representatives. This Council will set priorities and coordinate. It will also facilitate implementation because of the contact with industry.

Goal

Several times Donoso mentioned that DGNT worked with the "big companies". Standardization is regarded as more for export than consumption. Since standardization is expensive and takes many people, DGNT often uses ASTM standards. Despite this emphasis on big companies and export, some of the recent examples Donoso cited dealt with little farmers.

Recently Bolivia has produced sugar for export. This is grown on small farms. At harvest, the growers argued that they were not being properly paid for either weight or glucose by the refineries. DGNT was asked to settle the argument. It found that truck scales were underweighing by about 250 kg per truck load of about 12 tons. Although this is only about 2%, it would have amounted to $400,000 underpayment on the crop of 1,200,000 tons. DGNT also found no process calibration or statistical sampling on the polymerization. DGNT formed a committee of growers and refiners to make a handbook for the industry. A DGNT expert is now in Santa Cruz supervising the use of the handbook.

The only grain which will grow on the altiplano of 12,000 to 15,000 feet altitude is quinoa, a kind of pigweed whose seeds make a strong tasting flour which is much in demand, not only in Bolivia but in neighboring countries. Quinoa has a high proportion of protein - around 25%. Its hull contains a poison "saponine". DGNT has recently invented a new hulling process with brushes which renove the necessary minimum amount of hull. This will decrease the amount of wastage and should help the income of the poor Indians who farm on the altiplano.

The new food laboratory of DGNT has been working largely on projects of its own initiative since it opened in January. Partly, it has been testing samples of U.S. wheat shipments since the recent scandals about adulteration of our wheat exports. Another project was to test various brands of powdered chocolate bought on the market. DGNT found that although labelled as 100% chocolate, most brands contained only 50%. It called in the producers and established a committee to set standards. The probable outcome will be several grades of chocolate, with different degrees of purity and of price. The consumers will benefit, either in lower prices or in more chocolate.

Future

Acting USAID Director Massey says that the USAID has no objection to centrally funded AID activities if it knows about the activities. When I outlined the types of things NBS could do, he had no objection to any of them. His judgment is that quality control is more important than standards, although both are needed on the items for which Bolivia has privileges in the Andean Group - mining machinery, theodylites, small tractors, pneumatic drills, compressors.

The USAID is concentrating in the rural areas, with agricultural and education programs. This emphasis coincides with that of the Bolivian five year plan, although that assumes that private investment will occur in industry while public investment concentrates in agriculture. USAID looks forward in a few years to possible help with some food processing. Those industries may need quality control assistance from DGNT. Another area of more immediate interest concerns nutrition and health protection on food. Massey was much interested to learn about the new food laboratory of DGNT.

Massey commented that for the rural poor, the problem of fair weights and measures is basically one of organization to protect their own interests. This was confirmed by the experience with sugar cane, although the organized growers needed help from DGNT.

Donoso says that he looks forward to asking NBS questions about specific problems. He has no Standard Resource Materials yet but expects to request some soon. He does not anticipate sending people to NBS for training because of the necessity for them to know English. NBS training may come later. He would like to establish a relationship with NBS on metrology, perhaps for annual calibration of the Bolivian secondary standards.

DGNT would very much like NBS help with equipment purchases. DGNT recently had an unfortunate experience with the purchase of a spectrophotometer. An American firm offered the low bid. The instrument was delivered with defective parts. After some time, DGNT got a qualified service machanic from Chile. He said the machine was

obsolete (hence the low bid) and may be impossible to put in working order.

Benjamin Gutterman promised FDA training if desired. DGNT may send someone to learn about special laboratory equipment and to observe inspections of imports.

Donoso was much interested in the possibility that Steffen Peiser could obtain a computer printout about Bolivian exports rejected by the United States.

Tejada of the Council on Higher Education requested NBS help with films on conversion to the metric system. Their universities have a closed circuit TV system.

Chapter VI

ETHIOPIA

Inputs

Ethiopia has received about 6 man years of assistance in standardization and measurement activities from resident technical advisers. A Swede departed Addis Ababa after one year (1968-69) because he found little government interest or support. After a gap of a year, the government requested assistance from UNIDO and selected Vladimir Korenic, an engineer with experience in the Yugoslav standards agency, from among several nominees. Korenic has been in Addis Ababa since. He is a general adviser, who helped draft the organic legislation for the Ethiopian Standards Institution (ESI), has advised on organization, trains new employees, and sits as a member of technical subcommittees.

Mostly under UNIDO auspices, nearly all of the 30 or so professional members of ESI have received short-term training (two to six months) abroad, in Sweden, Holland, India, the Soviet Union, and Japan.

Recently, UNDP agreed to finance a UNIDO proposal to help with a laboratory on quality control. A total of $700,000 U.S. will be made available starting in 1977, about half for laboratory equipment and the rest for advisers. An Ethiopian architect-draftsman on the staff of ESI has prepared fairly detailed preliminary plans and UNIDO is now recruiting two short-term advisers, one to review the plans and the other to advise on the administration of a quality control center. ESI now purchases testing services from university and highway department laboratories. The National Resources Ministry, which supervises all recently nationalized industries, has also requested UNDP-UNIDO to supply some foreign managers for some of the industries.

Other nations have supplied sets of their standards literature. ESI has standards from 14 countries, including standards in English from the International Organization for Standardization (ISO), Britain, Canada, India, South Africa, Israel, Japan and Germany (only 2,000 standards in English) and in other languages from France, Sweden, Yugoslavia and the Soviet Union. Except for the French, these non-English standards are simply curiosities in the ESI library.

From the United States, inputs have been of several kinds. The General Manager of ESI, Ato Zawdu Felleke, was included in the original symposium in 1971 at Airlie House. He also was invited to the November 1974 workshop. Two staff members, Ato Mekonnen Betru, Acting Head of the Administration Division, and Ato Negussie Abebe,

Metrologist, were guest worker-trainees for about 4 months in metrology.

The then head of the NBS Office of Weights and Measures, Thomas M. Stabler, spent two weeks in Ethiopia in June 1972 and prepared a report on a "National Program of Metrology for Ethiopia". This visit was requested by UNAID. This year ESI has a budget of $100,000 for a metrology laboratory. Last year it spent $20,000 purchasing secondary standards from a U.K. firm. U.S. firms did not respond to ESI inquiries and ESI did not request NBS help. The U.K. firm did not comply with the specification to have the exact weight of the standards certified.

Literature donated by the United States had included three annual sets of volumes from ASTM, current standards from ANSI, a full set of NBS bound volumes and some special reports, various reference books and journals (including some 224 volumes recently requested by ESI in response to a circular airgram - of which about 25 had been received to date).

Finally, the NBS has received fairly frequent correspondence from the General Manager. He and Ato Assefa Sahle Medhin, head of the Engineering Standards Division (and perhaps other ESI staff members) did graduate work in the United States under USAID participantships in earlier years.

Outputs

Workshops - General Manager Zawdu Felleke said that he found the Airlie symposium came at an opportune time. ESI had prepared its basic charter but had not yet begun operations. He understood better the concept of the role of a national system of standards, the necessity for cooperation with producer and consumer interests and with other government agencies, the function of both optional and compulsory standards. He still remembers the sessions with pleasure. When I commented about the intensive schedule of 5 days and evenings, he responded, "Yes, but we had a spirit."

On the other hand, Zawdu Felleke thinks the November 1974 workshop was better done. He appreciated the greater opportunity for discussion and particularly cited insights gained from other participants and from visiting testing laboratories as benefits.

Training - The two worker-trainees, Mekonnen and Negussie, have mixed reactions about their experience in the United States. They had apparently expected a six-month stay (the 1972-73 Annual Report of ESI records nominations for 6 months). The daily cost at a Gaithersburg motel consumed too much of their diem allowance so they moved to Washington. This not only meant spending 1 1/2 hours commuting (city

bus to the Department of Commerce, then NBS shuttle bus) but also shortened the work day a half hour at each end. Peiser was out of the country when they first arrived and no one adequately oriented them on the program or their obligations. One of them mentioned that they were in an American home only once.

As to the training itself, it was a miscellany: brief periods in Gaitherburg interspersed with a short course in Richmond, Virginia, for State and local weights and measures officers; a short course in Norman, Oklahoma, on petroleum measurements; a convention in Detroit of scale-masters, an assignment to the Maryland Weights and Measures Unit at Maryland University, visits to scale-makers in Toledo and Columbus, and the National Conference of Weights and Measures. Both said that not all of it was relevant. But both say that they have used some knowledge which they learned. Negussie had received three years education in Germany about metrology eight years previously. He was glad to be updated and to see some different applications and equipment. He expects to use still more knowledge when ESI finally gets a metrology laboratory.

Mekonnen had apparently hoped for more about program management but says he has helped plan staffing and assignments for weights and measures and has known about equipment to purchase for their weights and measures work. Both men, as they summed up their reactions, had pleasant memories of the total program. Mekonnen's written report in the ESI newsletter comments about the integrity of inspectors, the quality of supervisors, and the working conditions of the inspectors.

Metrology - Stabler's report strongly urged that Ethiopia get a metrology laboratory to house primary national standards of mass, length, and volume and to calibrate other public or private instruments and standards. The recommendations resemble those he made for Ecuador. I was told that his authoritative recommendation has been cited as a major element of the justification for the budget allocation which has now been made three years later. As an amateur, I am not at all sure that I accept the necessity for such insistence on a high degree of accuracy for Ethiopia. It would seem that instead of being the beginning of a program, a laboratory is the sophisticated culmination. Much can be done to improve market fairness and general accuracy of commercial and industrial measures with use of secondary or field standards. Stabler's recommendations differ from NBS recommendations for Bolivia and Turkey. USAID had hoped for help to farmers. Stabler argued that weights and measures were unimportant until the entire agricultural marketing system changed. Stabler made no recommendations for interim action by Ethiopia, which has been endeavoring to train inspectors and establish a systematic field program in the ensuing three years. The definitive study of the weights and measures situation in Ethiopia, with its many local

systems, has been made by a professor whose volume can be purchased from the University.

Literature - The standards literature provided by the United States is used whenever new Ethiopian standards are drafted. The practice is to compare standards from several countries and adapt them to Ethiopian needs and technology. The librarian, Ato Makonnen Deressa, is preparing a card catalog of the 60,000 standards possessed by ESI. He regrets the fact that ANSI does not use the Universal Decimal Classification (UDC) recommended by ISO.

In general, NBS inputs have produced about the outputs to be expected, but these have not been very important in the total process of developing ESI. Probably the most important U.S. input was earlier participant training of two top ESI officers.

Purpose

After five years, the Ethiopian Standards Institution appears to have become fairly well "institutionalized". Since the formation of the Provisional Military Government a year ago, technocrats have come into their own. Directors General can now make decisions and are under pressure for results.

The ESI staff (30 professional, 70 support) is small, but growing. It is quite well trained. ESI is nearly self-supporting from fees charged for inspections and testing of products covered by compulsory standards. In addition to a small operating subsidy from the government budget, it has now received an appropriation for a metrology laboratory. Land has been selected for this laboratory, and for a combination office building-quality control laboratory. The Weights and Measures Division has inspectors working out of three field offices.

Representatives of six ministries - health, public works, mines, finance, communications, agriculture - and of the Chamber of Commerce and university sit on the Standards Board chaired by the Minister of Industry. Implementation of standards on coffee, pulses, and hides has been delegated to boards responsible for export of these commodities. The National Resources Ministry has requested ESI engineers to serve on special teams investigating production problems of nationalized industries.

ESI faces two major problems. One is that producers do not yet generally understand the purpose of standards. Consequently, they do not contribute as much to the work of technical subcommittees as they ought, so that standards issued are not always well adapted to Ethiopian technology. Although ESI engineers are well trained and

spend about half their time visiting producers, they lack practical experience and also encounter difficulties getting data.

The other problem is the legal requirement for any government regulation to be issued in the Amharic language. This language has no vocabulary for much modern technolgy, so that finding ways to translate an English language standard is a very difficult and time consuming operation. The four linguists on the ESI staff do not have technical training. They must work closely with the engineers who drafted the standards in English but who are often not native speakers of Amharic (which may be the language of 20 to 25% of Ethiopians). The Amharic version of a standard is not used by industries or laboratories but will only be used in court cases, of which none have yet occurred. At present, ESI has published 108 standards but has another 400 or so in the process of being translated and printed. Several years ago Zawdu Felleke sought special permission to issue standards only in English but was told this would be unconstitutional. He has now concluded that ESI would not be wise to make itself an exception. Besides, as education becomes more widespread, (at present perhaps 15% of school age children are in school) and as national consciousness grows, Amharic will increase in importance.

Goal

Standards now influence the quality, and hence the income received, on three important Ethiopian exports.

For coffee, which accounts for 60% of exports, the standards are voluntary. This approach was used because quality of Ethiopian coffee was adversely affected at the time the standards were issued by drought and by a disease. While ESI and the Coffee Board wanted to encourage better sorting into 8 grades and thus raise average prices, they recognized that they should not forbid export of low quality coffee which might be the only source of income for some growers. Before standards, coffee exporters were interested in their own margin rather than in the national concern of total foreign exchange earnings. The Coffee Board has persuaded exporters to install cleaning equipment and to do grading, thus creating some employment. The Extension Service and the exporters have made progress in persuading growers to pick coffee when it is mature.

For hides and skins, a compulsory standard was used because it was concluded that farmers would change their practices on how they dried hides only if they were unable to sell the poor ones. I got mixed reactions on the degree of compliance but a general statement that Ethiopian hides now compete with those from Kenya in European markets (60% of hides go to Europe).

Compulsory standards for haricot beans have forced the importation of U.S. machinery for cleaning and sizing. Graded beans sell for $100 (Eth) per quintal (about 100 kg) compared with $30 before.

ESI started with exports because this was what the government stressed and it was necessary to convince officials about the importance of standards. Also, implementation agencies existed. More recently, ESI has begun issuing some standards to protect consumers. Local industries sell about 90% of their product locally, so the impact of quality control is for consumers.

The most important consumer protection has been in edible oils. People were complaining about high acidity and bitter taste of the products from many new factories (there are now about 30 factories). Now the quality is better, although it is likely that the price is higher as producers pass on the cost of ESI inspection fees.

To date, other consumer protection has been in building materials, which are marketed mostly in Addis Ababa, Asmara and two other cities. Black iron sheets imported from Japan are corrugated and galvanized for roofing in Ethiopian factories. ESI rules have resulted in fewer but more accurate gauges and more uniform zinc coating. Now the consumer can have more confidence in what he is buying and has a longer lasting product. Other building items now under control are bricks and cement blocks (made locally) and electrical cables and sockets (imported). The electrical standards not only assure uniform sizes and enable importers to reduce stocks but also reduce fire hazards.

Weights and measures inspectors operate out of three cities. They confiscate many illegal weights and check scales against a variety of working standards from various contries. ESI has not striven for very tight accuracy, in view of the training of its inspectors as well as the untraceable accuracy of its standards. It doubts that it could stand a court challenge. It would like more accuracy in scales at ports, especially for coffee exports.

Stabler pointed out that farmers must sell immediately after harvest because they have no storage facilities. After going to market, they must accept what they can get because they cannot easily return home with the product. In this system, scales do not really determine what a dealer pays or a farmer receives. Nevertheless, USAID thinks ESI has had some benefit for farmers in protecting them from cheating by middlemen.

Thus, it is apparent that ESI has had some impact on the economy of Ethiopia in terms of increased foreign exchange earnings, consumer protection on quality of edible oil and roofing, and fair weights for

some consumers and farmers. Enforcement has probably been spotty. When draft standards now ready for textiles, pharmaceuticals, chemicals, and various processed foods and beverages are translated and issued, the impact may increase. In the future, ESI plans to cut down on the preparation of so many new standards and do more research and testing. It will also be studying the process of quality control in industry and report to the Ministry of National Resources what is needed.

Future

Zawdu Felleke thought a survey of the standards situation in Ethiopia by a team organized by NBS would be useful in the near future. As a result of nationalization in the last year, there are new managers of industries who could usefully be alerted to considerations of quality control and standards. * Also, Government agencies are being reorganized and officials are changing under the Provisional Military Government. He would also appreciate the opportunity for ESI staff to spend two weeks with experts from NBS and third country standards agencies. He said he would write Mr. Peiser to propose that Ethiopia be considered for a survey. Earlier, Richard Cobb of USAID had thought a survey would be premature because there is too much to distract the Ethiopian Government. Nationalized industries have dropped in production. Land reform will become meaningful only as peasant associations function. The options as to how ESI fits into industry and agriculture are not yet clear enough for a survey team, Cobb feels.

It occurred to me that perhaps one or two of the Division chiefs of ESI might be invited to a workshop in Gaithersburg, especially if another is held before a survey in Ethiopia. I thought particularly of Ato Assefa, head of the Engineering Standards Division. (I did not meet the head of Biological Standards).

Several African countries have finally decided to form an African Regional Standards Organization (ARSO). Ghana is hosting an organizational conference starting September 18, 1975. Representatives are expected from Nigeria, Liberia, Kenya, Sudan and Ethiopia and perhaps others. ESI recently was visited by the head of the new Kenyan standards agency and expects to have staff members visit. Also the librarian of the Tanzanian standards agency spent a month with ESI. After dragging its feet for years, the Economic Commission for Africa secretariat has now evinced interest in ARSO and prepared some documents for the Ghana meeting. Ato Zawdu thought that

* Government industries will include mining, steel, cement, petroleum, large textiles, leather, rubber, pharmaceuticals, tobacco, glass, point and electricity. Mixed government and private ownership will prevail in fertilizer, non-metallic fabrication, meat canning, plastics and civil engineering. Private ownership will continue in food canning, quarrying, bricks, dairying, metal products, small textiles, artifacts, restaurants, and commerce.

a survey team might include one or two Africans. He also was interested in the possibility of a second regional conference to follow up the Ghana meeting which might be held when some of the foreign members of a survey team could attend.

If NBS ever holds special weights and measures training courses, I believe Ato Yohannes Afework, head of the Standards Implementation Division of ESI, could benefit. He is now responsible for "programming" work of the weights and measures inspectors and confessed he knew little about programming. Although Negussie commented that NBS lacked experience in training, he thinks another ESI metrologist should go to NBS.

Beyond this possible future assistance, ESI would like to continue to be able to ask questions of NBS and to receive literature from time to time. Several people specifically mentioned to me that they would like various reference works on building technology, electrical engineering, textiles, etc. for background to answer questions in technical subcommittees. If NBS does not buy technical references for donation, the ESI would like lists of books from which they could select. Both the librarian and the head of the documentation division (which translates into Amharic) would like more dictionaries of technical terms (they now have one on electricity and electronics).

I think ESI could benefit greatly from NBS assistance in procurement as they equip a metrology laboratory this coming year and a quality control laboratory in 1977. They lack catalogs and do not know what to specify. Even more serious, as they found with their recent purchase of weight standards, they cannot be sure of getting what they order. Whether ESI would be willing to buy in the States and whether NBS would be able to serve as a go-between, I do not know.

USAID is quite happy to benefit from centrally-funded AID activities. They originally requested NBS help in metrology. While I judge they were disappointed in the Stabler report, they expect that several years from now ESI can be useful in both quality control and weights and measures for two large grain marketing and storage projects sponsored by the World Bank and with some U.S. inputs. In the meantime, USAID keeps some contact with ESI and is willing to backstop NBS with cables and with arrangements to send trainees. It reports that NBS is very good about keeping the USAID informed.

Chapter VII

KOREA

Inputs

In 1961, the Republic of Korea enacted the Industrial Standardization Law and a Weights and Measures Law. In 1962, an Export Goods Inspection Law was passed and in 1967 quality inspection and marking were made mandatory for certain products. During this period, NBS had several guest workers and trainees from Korea. In October-November 1967, four years before the TA/OST-NBS project, NBS did a survey of the national standards system in Korea at the request of the USAID and the National Industrial Research Institute (NIRI), which then was responsible for standards. A three-man team headed by Dr. Forrest K. Harris and including H. Steffen Peiser and Ronald K. Eby was in Korea for four weeks after nine days in Japan. The team visited about 50 industries, laboratories, and government offices.

That same year, President Lyndon Johnson donated a set of primary standards for length, mass and volume while on a visit to Korea.

UNESCO (UNDP) helped establish a Fine Instruments Center to provide competence and training in the correct use, maintenance and recalibration of scientific and industrial instruments. Grants amounted to $1,950,000. This center had foreign resident advisers. In 1970, Mr. M. C. Probine, Director of the New Zealand Standards Laboratory, precision measurements in South East Asia for UNESCO. Korea was included in this survey.

Korea was surveyed again by NBS for ten days in June 1972 under the current project. The team included Ing. Estrada of Ecuador and Engineer Yucesoy of Turkey. Eby and Peiser repeated from the 1967 group and were joined by Dr. Thomas D. Coyle of NBS. There were seven Korean members representing seven different agencies - Science Museum, Bureau of Standards, Bureau of Weights and Measures, Industrial Research Institute, Planning Office of Ministry of Science, Institute of Science and Technology, and Fine Instrument Center. Also in 1972, Ralph Simmons surveyed computer utilization in Korea in October. For two weeks in May of 1973, Ian R. Bartky, Scientific Assistant to the Director of the Applied Technology Institute of NBS, made a follow-up visit for the 1972 team.

A Korean participated in the Airlie House Symposium and two Koreans were in the first Workshop before the 1972 survey. Three Koreans have been in subsequent workshops and some of them have participated in surveys of other countries. In July 1973, T. W. Mears visited Korea to advise on a program for standard reference materials.

The USAID has had projects which relate to standards work. There was a resident Physical Science Adviser, Dr. Newman Hall. The strategy of AID in Korea has been to support the government commitment to science and technology with assistance for science policy planning, manpower development and creation of an institutional framework for research. Highlights have included:

- Grant and loan funding of approximately $9 million of the Korean Institute of Science and Technolgy, including advisers from the Batelle Memorial Institute and the Illinois Institute of Technology.

- Loan funding of $6 million for post-graduate engineering education through the Korea Advanced Institute of Sciences.

- Hundreds of fellowships for post graduate study in the United States.

- Partial funding of a workshop on science policy coordinated by the National Academy of Sciences.

- Advice and equipment for quality control in various export industries.

As this report is being written, USAID is negotiating two loans with Korea. One is $5 million for Seoul National University's post-graduate Center for the Natural Sciences. The other is $5 million for a Korean Standards Research Institute, a new agency which would consolidate several agencies. The loan includes the following (in thousands):

Primary equipment	$2,942
Calibration vans (2)	270
Computer terminals (2)	88
Environmental controls equipment	250
Library books and equipment	100
Staff training	780
Overseas recruitment of Koreans	270
Contingency	300
	$5,000

To prepare the staffing and equipment plans, USAID financed a contract with GE-Tempo. When the Capital Assistance Paper was being prepared, H. Steffen Peiser of NBS and John Fry of TA/OST went to Korea to assist.

The Korean Government is also seeking loans from other donors for provincial inspection and testing organizations and for various specialized industrial testing laboratories.

Outputs

The 1967 survey report by NBS ended with an appendix containing an agreement to establish a sister relationship between NIRI and NBS. Under this agreement, the two institutions would collaborate in support of international programs of standards and measurement practices, would exchange experiences and publications, and would consider other ways to strengthen the relationship after the report was published. Among the other ways suggested by the NBS team in its report were training at NBS, NBS visits, advice on planning and acquiring physical standards and laboratory equipment. Apparently the relationship did not develop to any extent, although one example of an exchange was a Korean adaptation and translation within six months of a 1974 NBS publication on "Energy Conservation: Program Guide for Industry and Commerce." Energy conservation is crucial for Korea, which has been hard hit by rising oil prices so that its merchandise imports cost $550 million more in 1975 than in 1974 and its exports failed to grow.

The essence of the 1967 recommendations were that several agencies should be consolidated into a quasi-governmental institute which could pay salaries above the government civil service scale. The Korean Institute of Science and Technology was doing this and had succeeded in persuading expatriate Koreans to return.

> The UNESCO survey in 1970 by Probine had suggested that:
>
> "...early consideration be given to setting up a national standardizing laboratory with responsibility for precision measurement in all fields at the national level....if Korea is to achieve its industrial targets it will need to be done sooner or later..."

The 1972 NBS survey quoted Probine and said "The present survey report concludes that the time has now come." Referring to its 1967 survey, the next NBS team commented:

> "The recommendations made then and the underlying logic are similar to....the present survey report. In the intervening time, apparently neither USAID or the Republic of Korea was willing to recommend high priority to implementation."

The 1972 survey went into some detail on the organization and functions of an Office of Industrial Promotion. It also urged special measures to achieve higher staff compensation.

Less than a year later, Dr. Bartky found that the reorganization which combined the Bureau of Standards and Bureau of Weights and Measures into a National Industrial Standards Research Institute which was part of an Industrial Advancement Administration that was also responsible for quality control assistance and inpsections "Appears to be an exceedingly effective approach to the problem of management of these resources for industrial growth." At the same time, he found that almost no technicians were available for measurement and calibration services and that even if they were available, it would be impossible to retain them due to low government salaries. Bartky also criticized a draft document requesting AID support for metrology because it was not based on adequate planning. Probably what Bartky should have recommended was what eventually happened, namely that a team was brought to Korea (GE-Tempo) to do more detailed planning, with precise staffing plans, equipment lists, etc.

In any event, three years after the NBS survey, the Capital Assistance Paper could state:

> "The National Industrial Standards Research Institute (NISRI) which is currently charged with the responsibility or lower educational qualifications."

The primary standards given by President Johnson were stored in another agency (KIST) rather than NISRI.

Thus one could conclude that NBS, through intermittent contacts, had had little impact over a period of 8 years, except that Korea was finally agreeing to the original recommendation for an organization enough removed from the government to pay higher salaries.

Purpose

The degree of institutionalization for Korean standards is hard to judge from the Capital Assistance Paper. Thus, although the proposal in the loan paper sounds like those in the 1967 and 1972 survey reports, the paper states that "GE-Tempo has concluded that the existing standards system is basically well-organized and well-coordinated. However, metrology standardization is the least adequately performed function..."

What one senses is that Korea had put its attention on industrial research to develop products and to improve methods and on quality control to increase exports. For some reason, neither the Koreans nor the Americans had pushed for the national standards, particularly in metrology, which would provide precision references to undergird such quality control. We seem to have here a country which is more sophisticated than others discussed in this paper and probably more than any other except Brazil. Unlike Bolivia and Turkey, Korea now

needed precision but had been unwilling to make the bureaucratic-political decision to create exceptions to the government pay scale in order to get it.

The incentive for action in the past year has come because of a Korean decision, backed by a World Bank Economic Mission in 1973, to increase the share of heavy and chemical industry in total manufacturing output from 35 to 51% and in manufactured exports form 27 to 65%. It was felt that such industry required higher standards than had been necessary for exports in lighter industries such as textiles, wigs, and ceramics. The Country Team's Development Assistance Program for Korea calls for concentrating available resources on those activities that assure a higher level technology.

Goal

Despite the institutional problems touched on in the preceding sections, Korea's economic progress has continued at a rapid pace. Exports had climbed from $55 million in 1962 to $256 million in 1966 to $1,676 million in 1972 to an estimated $4,500 million in 1974 and 1975. In order to achieve this growth, a coordinated campaign had been essential which included credit, new products, sales campaigns and various schemes for production inspection and quality guarantees. (Described in "Expanding Exports - A Case Study of the Korean Experience" written by Amicus Most and issued by AID in June 1969)

Nevertheless, the Capital Assistance Paper reports that the number of foreign buyer claims against Korean products rose from 286 in 1973 to 614 in 1974 and the number continued to rise in 1975. The estimated value of the 614 claims was $2,169,000. During the past five years, 30,000 instruments a year (approximately 10%) have failed government inspections and been disqualified from sale. GE-Tempo estimated that promotion of reliable measurements might save industry $110 million annually.

Future

The Capital Assistance paper says that Korean officials responsible for the establishment of the new Korean Standards Research Institute would like the National Bureau of Standards to be the one U.S. organization which orchestrates all of the foreign services required:

- Development of course materials, presentation of courses, and scheduling of customized training programs.
- Short term consultant services in building design, organization of metrology functions in basic disciplines, and guidance on overall program management.
- Preparing detailed equipment specifications and procurement.

NBS is preferred because of past contacts, because of its reputation for scientific expertise and because its role and functions parallel those proposed for KSRI.

Peiser was in Seoul in April and foresaw some problems. First, some of the consulting services and many of the training services could not appropriately be offered by NBS and NBS might not be able to undertake the administrative burden of recruiting and contracting. Second, NBS would need a loan-funded program coordinator, perhaps a Korean living in the United States. An alternative to total reliance on NBS would be an agreement for NBS to provide those services which it can do most effectively and a separate contract with another organization for the remaining services, including the "packaging" of training courses.

All of the above assumed a loan of $5.3 million, with $300,000 for U.S. consultants and $780,000 for staff training. The loan is now reduced to $5.0 million and Korea is planning to receive technical assistance from UN sources. What the role of NBS will be is therefore more uncertain.

Chapter VIII

TURKEY

Inputs

In the 1950's and early 1960's, the Turkish Standards Institution (TSE) received a good deal of AID local currency. Consequently, in 1972, the USAID welcomed the suggestion for an NBS survey, according to Marjorie Belcher, who was then Assistant Director of the USAID and later Acting Director and is now Deputy Assistant Administrator of AID for Technical Assistance. USAID thought of the survey as a 10-year follow-up and was glad to reactivate a continuing relationship. The team consisted of five from NBS, officers from Ecuador, Korea, and Thailand and three Turks, two of whom had attended a workshop.

Belcher reports that NBS went out of its way to be courteous. The USAID was kept informed of contacts and letters were addressed through USAID. Simpson, who made a survey on computers, was also very courteous.

NBS has also provided standards literature and reference materials.

Outputs

The report of the Turkish survey is more thorough and is twice the length (70 compared to 35 pages) of either the Ecuador or Korea reports. (More recent surveys in Thailand, Bolivia and the Philippines still lack completed reports). Perhaps it is unfortunate that the Turkish members of the team withdrew from participation in writing the report with the intention of optimizing its objectivity. Consequently, they were not committed in advance to the findings and recommendations and the team had to explain more in writing.

Belcher thinks the most important aspect of the survey was recognition by NBS that the TSE was not likely to become what had first been visualized.

However, she also believes the report was too tactful. She says that the TSE should have recognized that it had a long way to go, but did not so recognize after receiving the report. Belcher wonders if the third country members of the survey team handicapped efforts to be frank. She commented that an organization must want advice and have some possiblity of applying it before NBS comes in. She wonders how TA/OST and NBS picked countries for a survey - was it previous association? In retrospect, she concludes that NBS might have been wiser to look at Turkey and then discard it as a survey country.

Peiser and E. L. Brady, Associate Director of NBS for Information Programs, both characterize the Turkish situation as one of the least successful NBS ventures. Nevertheless, Peiser thinks the report served some purpose. He cites a modest calibration laboratory started by TBTAK (The Scientific and Technical Research Council of Turkey) at Marmora. It was under construction at the time but was recommended by the survey as a focal point rather than TSE. Peiser also cites other negative recommendations as being useful, namely that TSE should encourage private laboratories instead of setting up its own chemistry laboratories in three regions to test export samples and that TSE should eschew a packaging laboratory. In other words, Peiser sees the survey as looking at national needs, not at a single institution, as Belcher seemed to do. Finally, Peiser says the report's analysis of the TSE's enabling legislation with its formula for government subsidy which took no account of inflation may yet have influence. The board of TSE has petitioned the government for a change and the Minister of Industry has agreed to support a change.

Belcher says that Simmons also tried to balance being cooperative with being critical. The Turks had problems with both hardware and software in computers. Although the Middle East Technical University approved purchases, it was not achieving rationalization of computers. More than a report was needed to have an impact. The government continues to buy computers without coordination.

Purpose

Since the survey, little has happened to improve the institutional situation. The president of TSE has become President of Middle East Technical University (of which TSE is an affiliate). Belcher says that TSE at present is both too sophisticated and too narrow.

A major problem for TSE is that it is non-governmental and is threatened by TBTAK which has government funds and contacts and a laboratory. The survey team had observed "At first sight the TBTAK mission in science and technology seems so all encompassing that one wonders if any technical role remains for other agencies."

Goal

Belcher comments that a country which wants to increase exports, especially to Europe, needs recognized criteria for quality control. Turkey needs improvement for fruits and vegetables, where spoilage rates are disgraceful. Turkey will have trouble in the Common Market because its industrial efficiency is very poor.

Future

Assuming AID policy would have permitted, continuing contacts between NBS and a Turkish institution, financed by a TAB project, might have been useful after the bilateral AID program terminated. Now, however, international political considerations make this seem unlikely.

Chapter IX

OTHER PROGRAMS

Thailand

A Survey was conducted in 1974, only tentative conclusions have been distributed but no final report has been issued. The Thai Industrial Standards Institute (TISI) is part of the Department of Science in the Ministry of Industry. The Chief of this department was to head the survey. Just before the survey, he want to Europe and appointed the head of one of the bureaus in the department, rather than the head of TISI, to act in his stead. This has complicated clearance of the report. The situation was further complicated by an organizational overlap in the Thai Government. An Applied Science Research Institute in the President's Office has a standards sub-unit and is a member of ISO and IEC. The Asian Institute of Technology health laboratory had authority for health standards.

Despite the lack of a report, Peiser feels that some results have already come from the survey. The UN policy was to wait for requests. Conversations by NBS with the UN in Bangkok paved the way for requests which have increased UN support fo TISI, including transfer of the health standards responsibility. TISI has started more work on adapting standards to Thai needs. NBS warnings about poor quality of some products have started some remedial action.

Workshops on Standardization and Measurement Services

For the workshops held in 1972-74, some 44 participants came from 30 different countries:

Asia	Latin America	Africa
* India	* Argentina	Ethiopia
Indonesia	Bolivia	Ghana
Iran	Brazil	Kenya
Israel	Chile	Nigeria
Korea	Costa Rica	
Malaysia	Ecuador	
Pakistan	Guatemala	
Philippines	Honduras	
* Sri Lanka	Jamaica	
* Taiwan	* Mexico	
Turkey	Panama	
* Vietnam	Peru	
	Trinidad & Tobago	
	* Venezuela	

Of these 30 countries, nine marked with an asterisk no longer receive U.S. technical assistance, three (Malaysia, Jamaica, and Trinidad-Tobago) have never received it, and five (Korea, Turkey, Brazil, Ecuador, and Nigeria) are about to "graduate".

It is evident from the list of countries that the workshops are no longer related primarily to preparation for surveys of national standards systems. Since the first workshop, attendance has included four additional people from the three countries first surveyed and participants from two countries subsequently surveyed - Bolivia and the Philippines. There was also a participant from Brazil, for which there is a bilateral science and technology loan under which NBS has been hired to give some technical advice. It is interesting that no one has attended from Thailand, although it has been surveyed.

The November 1974 workshop, which had 9 Latin American participants financed by OAS, served as a kind of follow-up on the regional seminar held in Bolivia the preceeding May. The Latin group spent the last day together after their trip around the United States and prepared a resolution about an InterAmerican System for Metrology and Calibration (SIMYC). OAS now has proposals from nine countries for a million dollar project to help bring this system into realization. Alfredo Fontes, Chief of the Technical Unit on Studies and Analysis at OAS, told me he hoped a planning meeting in Buenos Aires would settle on work on basic measurements in four or five countries and on industrial metrology (heat and sound) in another four or five countries. Fontes looked forward to NBS offering a seminar on basic metrology like it does for employees of State and local agencies, together with a visit to a State laboratory. He looked to Ecuador and Brazil for training at a higher level. Fontes also hoped for short term training of Latin experts and short term NBS missions in Latin America.

Although he thought the workshop was well done and heard good comments about it, he does not anticipate additional sessions like it. If SIMYC functions, it will have a Council meet periodically. Also, OAS now supports technical meetings by COPANT to prepare standards which will facilitate trade and accelerate economic integration. OAS also provides assistance to national standards institutions in the form of equipment and in a four month training course held in Mexico every second year.

As a result of the cooperation with OAS, the attendance at the fourth workshop was twice as large as usual. This was an exception to Peiser's self-imposed limitation on attendance in order to facilitate discussion and simplify visits to laboratories in other cities. Although the larger workshop apparently worked satisfactorily, the announcement for the workshop in September 1975 again set limits on

attendance. It now (September 17) looks as if the attendance starting next week will be about eight or nine. For about half of these participants, USAID's have requested an exception to the announced policy of self-financing and TA/OST has acquiesced. However, it is evident that there is some demand for the workshops since some participants will be self-financed and others were able to obtain USAID endorsement.

Standard Reference Materials

In the first two years of the program, AID had purchased about 1,000 SRM's at a value of approximately $37,000. Of the eligible countries, nine received nearly two-thirds of these SRM's. In FY 1974, three countries, Burma, Brazil and the Philippines, requested and were furnished SRM's valued at $6,755. In addition, other countries made individual requests for small amounts of SRM's. NBS stated that by the end of 1974, the SRM output would show an increase of about 20%, mostly because of direct orders from LDC's. It concluded that AID fund support could be reduced.

In the previous year, FY 1973, NBS made 3,495 sales of 5,533 different SRM's for a total of $258,985. A small portion of these sales went to LDC's which were AID clients, as follows:

	Sales	SRM's	Value
Africa			
Liberia	2	2	58
Other (excl. South Africa)	16	38	1,448
	18	40	1,506
Asia			
India	69	71	3,812
Korea	8	8	532
Philippines	23	47	2,204
Thailand	8	8	268
Turkey	1	1	35
	89	135	6,851
Latin America			
Brazil	99	123	6,000
Colombia	5	5	220
Dominican Republic	16	24	895
Honduras	5	13	353
Nicaragua	1	1	57
Venezuela	39	94	3,920
	155	260	11,445
Total	282	435	19,702

Although these one-year total sales to LDC's are less than some of the sales to individual, developed countries, they are more than half of the gifts over a two-year period.

In the three countries I visited, the general idea of SRM's has not yet caught on. Not much testing is yet occurring, either in government or industrial laboratories, and not much of this testing uses SRM's. One the other hand, Mears' survey in Korea about SRM's found that seven chemicals of working standard quality were imported and used by the Yong Nam Fertilizer Co. from American firms and that the Korean Oil Company obtained standard materials from Gulf Research and Development Company. These were two of the three laboratories he visited.

In view of the lack of knowledge about SRM's and their potential value, AID suggested and partially financed a general publication on their purpose and use. In November 1973, this was predicted to be ready in December. Monograph 48 on "The Role of Standard Reference Materials in Measurement Systems" was actually published a year later. Such slowness in publications is fairly typical of NBS. Thus the NBS monograph recommends as a source of information to all SRM users the "Proceedings of the 6th Materials Research Symposium, Standard Reference Materials and Meaningful Measurements." The Symposium was held October 29 - November 2, 1973 but was still in press in January 1975.

Now that the AID-inspired book has been issued, it has proved quite popular for American and advanced country industries but has received little LDC attention, I am told. I can understand this. Although it is clearly written, it is so technical that it would discourage the amateur. I doubt if many LDC government officials or industrialists would get beyond the first few pages of Chapter 1, which deals with the characteristics for a precise measurement process and sounds impossibly precise for an LDC. Not until Chapter 2 do we learn that "basically, SRM's have three possible uses."

In 1973 and 1974, UNESCO had a Dr. T. Plebanski of Poland on duty at NBS to study "A Model for the Introduction and Maintenance of an SRM System for Countries of Medium Industrial Size." I do not know whether his product was of any use.

Standards Literature

The program of distribution of literature appears to go in spurts, depending on offers made by AID/NBS. In May, 1971, a circular airgram went to USAID's in 25 countries offering standards of the American National Standards Institute and the American Society for Testing and Materials and selected publications of NBS. This led to requests of

$9,900 in FY 71 and $11,900 in FY 72 (excluding $4,000 each for literature distributed by Peiser and for administrative costs.)

In May 1972, a circular went to 15 African countries. Five asked for literature costing $6,000. During 1974, letters were sent to 26 of the U.S. institutions which generate standards literature (out of several hundred possible institutions) requesting lists of publications suitable for LDC's. Some 18 of these institutions supplied lists or catalogs which NBS sent to 25 countries in December. Most distribution in 1975 and early 1976 was in response to this publicity. The 1975 figures tabulated as follows:

Country	Source	Amount
Bolivia	ABMS, ASTM, JCPDS, NBS	$ 157
Brazil	ASTM, NBS	3
Colombia	AGMA, AISC, ASTM, AWS, AWWA, CRSI, EIA, IEEE	1,414
Ecuador	NBS, US Govt	50
Indonesia	IEEE	20
Jamaica	ANSI, AWS, AWWA, CRSI, EIA, IEEE, US Govt	2,255
Jordan	NBS	-
Korea	NBS	-
Pakistan	JCPDS, NBS	125
Paraguay	NBS	-
Philippines	NBS, UL	2
Singapore	NBS	-
Sri Lanka	NBS	-
Sudan	ANSI (complete set)	7,500
Thailand	NBS	-
Trinidad	NBS	-
Uruguay	AWS, SAE	230
Vietnam	ANSI, ISA, NBS	730
	Subtotal	13,118
For stock	ANSI (complete set)	7,500
	Total	$20,618

The process of distribution is a burdonsome one. After NBS receives a request, it purchases the desired items. Sometimes these are sent to the LDC when they are received. On other occasions NBS waits until it has a complete package for a country. In either case, NBS must package the items. One staff member departed shortly after the December offer was sent. When another staff member took over in April, there was a backlog which took all of his time. By

August, this staff member was spending about 30% of his time on literature distribution. NBS arranges membership for LDC standards institutions in ASTM, so that they can receive the annual set of volumes directly.

In the spring of 1973, Charles B. Phucas of the NBS Office of Engineering and Infomation Processing Standards, visited five countries to survey their experience with literature. Except for Kenya, where literature had not yet been delivered by USAID and standards legislation had not yet been enacted, he was told by each country that U.S. standards were consulted when national standards were being developed and that the literature was available in libraries for consultation by private firms. Turkey, Pakistan and Colombia sometimes used U.S. standards or ASTM test methods when testing products for quality certification. Turkey and Pakistan mentioned use of Special Publication 300 volumes for calibrating their own laboratory instruments. The Philippines and Colombia requested additional literature by name. Considering that this trip was for a single purpose, it is disappointing that it did not provide more information on the amount of literature received, the frequency of consultation, the number of standards issued using U.S. literature, etc.

Chapter X

CONCLUSIONS

General

1. Standards make a positive economic and social contribution in two of the three countries visited. In Ecuador, the idea of standards is endorsed to the extent that the government has recently approved large increases in salary rates and budgets. In other countries reviewed briefly, Korea has made tremendous progress in quality control while Turkey has not. That standards are necessary is demonstrated by Turkish problems competing in the Common Market.

2. Metrology, on the other hand, seems less important if it is considered to require a national laboratory with primary standards and high precision in tracing from field to reference standards. Bolivia and Ethiopia have had some impact for citizen welfare in weights and measures without such precision. Not until after 15 years of marked economic progress does Korea consider it necessary to assure traceability and precision.

3. Unsophisticated countries like Ethiopia have been able to develop and use standards. The degree of sophistication in the type of standards and in their implementation can vary greatly. Most countries are still adapting standards from abroad with too little modification and too little participating in their formulation. Although countries may do only fairly well with the complexities of a standards system, they need not wait until "graduation" to start.

4. Rural poor have benefited from standards on their products and from weights and measures enforcement. Standards have applied to agriculture as well as industry. Ordinary consumers have also benefited. Thus activity in the standards area can be consistent with current AID policy. However, the emphasis in countries reviewed has been on industrial exports. The rural poor have benefited when they were organized to seek help.

5. The concept of standards is new enough that it seems essential to organize so that strong leadership can be exercised in a single focal agency. Without that, as in Korea, Thailand and Turkey, progress has been spotty. On the other hand, the focal agency must be willing and able to enlist cooperation of other agencies and cannot hope to meet its responsibility alone. And strong personal leaders must have courage to delegate.

Role of NBS

6. The contribution of Project 910 to institution building has been marginal, although in some cases an important margin. The role of other donors has been more important - USAID's in Korea and Turkey, UNIDO and UNESCO in Ethiopia, Thailand, and Korea. Only in Ecuador did NBS play a very important role as coordinator and backstopper for USAID, UNIDO and OAS inputs. Although Bolivia has received little assistance from others, its progress in standards seems due more to its own efforts than to NBS advice.

7. The NBS role will probably continue to be limited by its own choice, although it is trying to get the personnel ceiling restrictions loosened. Examples of NBS policy are the first reaction to Korean overtures that full responsibility as U.S. backstopper would not be "appropriate". Similarly, the NBS contract is for a very small portion of the large Brazil project. Along with this policy of self-restraint has gone a willingness to provide significant amounts of resources without AID reimbursement.

8. Despite its limited activities, NBS is highly regarded and is welcome. This attitude stems from the qualifications of NBS personnel and the objectivity of their approach, the impressive display of resources at Workshops, and the meticulous conscientiousness of backstopping services. All countries reviewed except Turkey have specific ideas about future help from NBS. This overall esteem does not mean that all activities have been equally effective.

9. USAID's have no complaints about central funding of this project nor about relationships with the NBS. They will be glad to have both continue. For graduating countries, NBS can be a source for continuing linkages. For some other countries (Bolivia and Ethiopia are examples) USAID's may provide limited support for standardizations and measurement activities in the future when agriculture production or marketing projects progress.

11o. On-the-scene coordination and policy support by USAID does not appear essential. It was lacking in Bolivia and Ethiopia (there was neutrality, not opposition), where progress and NBS influence look good. It was present in Ecuador and Korea where the picture is mixed. Other factors, such as local leadership and legislation appear more important for success with technical assistance than USAID coordination. Perhaps the lack of USAID help in preparing a host country for a consultant visit or in following up on his recommendations explains the slight impact of some NBS specialists.

11. Influence of NBS shows in the rather unusual pattern of operation, for LDC agencies, of enlisting and using the resources of other governmental agencies, universities and industries and in the participatory procedures to develop standards. On the other hand, all

the LDC standards institutions have disregarded advice to leave regulation and inspection to others.

12. H. Steffen Peiser is an important factor in NBS relationships. He has provided the continuity to bring considerable cohesion to a group of scattered activities. His personal concern, broad scientific and cosmopolitan background, and his diplomatic manner inspire people and institutions to seek his assistance and follow his advice. In both continuity and interest, he is ably supported by his supervisor, Edward L. Brady. But Peiser needs more staff to which he can delegate more. He works too many hours and is always behind.

13. No evidence of special NBS efforts to persuade LDC's to steer their standardization and measurement activities in the direction of agriculture, small business, rural poor or general well-being was found. (I have not seen agendas for the current Workshop, nor have I seen reports on the last three surveys.)

Creation of Interest

14. Other donors are expanding their role. This is true of UNIDO in Bolivia, Ethiopia, Thailand and elsewhere and of OAS in several countries. Either bilaterally, or in cooperation with UNIDO, half-a-dozen other countries offer training courses. A number are willing to lend for various types of laboratories.

15. The increase of donor interest in support of standardization and measurement activities is hard to trace to this project, with the exception of the new Latin American activities in metrology. The major bilateral project in Brazil is outside this project and the bilateral loan in Korea would probably have eventuated anyway. Increasing UNIDO activity may have been indirectly inspired by LDC interest from NBS workshops and regional seminars but seems primarily a reflection of a growing program of a relatively new agency.

16. Regardless of cause, the creation of interest is now general enough that this project could terminate unless other, more persuasive, reasons for continuation are adduced.

Surveys

17. Surveys have succeeded in increasing academic, industrial and governmental understanding of and support for the concepts of standardization. They have helped host country standards officials to think about their organization and procedures.

18. Naming a host survey director and including third country national have both increased the practicality and acceptability of survey recommendations.

19. Delay in completing reports has reduced the impact of surveys. Reports are used and would be more influential if received sooner.

20. Tactfulness and compliments have probably been overdone in some reports. Consequently, some critical recommendations have had little influence.

21. Follow-up on surveys has been inadequate. Subsequent visitors from NBS have often been so specialized that they have dealt only with their assigned topic, such as computers or SRM's. Bartky in Korea said that a tentative request for additional assistance was premature but offered little help. Peiser in Ecuador was only there two or three days.

Metrology

22. Over-elaborate metrology laboratories in Ecuador and Ethiopia were recommended, compared with Bolivia and Turkey. The Ecuadorian laboratory is becoming useful as a regional center and the one in Ethiopia may eventually serve the same purpose, but this is serendipity.

23. Weights and measures training for State and local officers, the one training course in which NBS has specialized, has not been adapted and given for overseas use because of NBS failure to circumvent artificial restrictions on personnel ceilings.

24. NBS backstopping on procurement has been well done and is very useful, since standards institutions have encountered problems with their own procurement.

Workshops

25. Workshops have become less definite in their aims than were the original symposium and first workshop. They create a respect for NBS and receptivity to subsequent advice. They influence the thinking of officials about the concepts of standards systems. Personal contacts among participants may help future international collaboration on standards, although this is tenuous.

26. The larger workshop in November 1974 worked well enough that the self-imposed size limitation appears unnecessary.

27. Country representation at workshops has included a number which are peripheral to AID interests and has not been directly related to other parts of the project.

Networks

28. The Latin American regional seminar has resulted in steps toward a metrological association, which may be useful if both OAS and NBS give it attention.

29. A regional organization is beginning in Africa with no direct US influence. Attendance of participants from four of the countries at workshops may have helped indirectly, although ARSO also includes two or three other countries.

30. So many international conferences now occur and various UN commissions are so prone to sponsor them that special sessions organized by NBS are suspect. Three day sessions boost morale and provide a communications channel about available technical assistance and backstopping. However, their organizing takes a great deal of time for an agency like NBS which is behind in meeting its commitments.

31. The most useful linkage activity is NBS support of country efforts through answering questions, providing reference books, advising on equipment, discussing problems with visitors, recruiting and briefing consultants, helping with procurement.

Other

32. Two-week consultations by specialists have often had little impact. Some of the NBS specialists have too little background about LDC's to adapt. Some reports are sketchy because the expert apparently thought his time limit was more important than completing his task. Experience with consultants generally is that their recommendations should be completed and discussed before their departure.

33. Training at NBS is not generally well-suited to needs of individual LDC personnel. It is a sink or swim proposition, with no specific effort to make a relevant adaptation to the individual's needs and with little orientation. (Do NBS trainees go to the Washington International Center when they arrive?)

34. Standard Reference Materials have been little used. When used, the user either is a laboratory charging a fee or an industry making a profit. Users seem quite willing to buy SRM's, recognizing that NBS has performed a very important service by procuring and certifying them. The NBS Monograph 1498 on the role of SRM's was not a good promotional pamphlet.

35. Distribution of standards literature is only partially technical assistance. It is commercially important to the donor, as other donors recognize. All countries have several sets of standards from various countries. Our literature probably gets more use than others

because of the testing methods included in ASTM standards. Reference books would serve more of a teaching function than standards volumes.

36. The consulting services on computers and construction techniques have been little used. Various offices in AID/W are often disappointed when USAID's fail to use reference centers, publications and other informational devices, forgetting that USAID's are understaffed and are primarily concerned with programming and implementation, not with finding answers. USAID's have also been discouraged from asking questions by the generally poor record of AID/W in answering promptly and relevantly.

Chapter XI

RECOMMENDATIONS

1. A centrally-funded project for technical assistance to standards institutions should be continued at about the same or at a somewhat larger scale, but with modifications in some of the activities.

This overall recommendation reflects the conclusions that standardization and measurement activities do contribute to economic development and general well-being and that they can benefit the rural and urban poor. It further takes into account the esteem for NBS and LDC desire for its services.

Although other donors are providing increasing amounts of assistance in this field, the United States should not withdraw because we have unique capabilities. Two of the major donors, UNIDO and OAS, are funding and recruiting agencies without specialized headquarters staffs comparable to NBS. Their assistance can be made more effective if the NBS is available in a supportive, rather than competitive, role. Maintaining a US response capability will also be useful to some bilateral USAID programs in agriculture, health and nutrition and will facilitate USAID efforts to play a coordinating role for economic development strategy. Moreover, a continuing U.S. presence in the standards area will serve our national interests. These advantages can be purchased reasonably, for about $0.2 million annually, partly because NBS does not charge AID for all the services it provides.

Centralized funding should continue because it is administratively much easier for the kind of services to be provided. For individual Missions, the amounts may often be too small to justify a separate project. Without technical support funds, USAID's might have to engage in prolonged negotiations with host governments on funding agreements. In some instances, NBS should continue to provide incidental technical assistance to countries which no longer receive bilateral aid.

The recommendation on scale of funding reflects the apparent growing desire for NBS help and some specific recommendations below on methods of operating.

2. TA/OST and NBS together should sharpen their statements of project policies and objectives - what do we want, why, where and when? These more specific project plans should include ways of assessing progress, with pre-determined indicators.

Similar recommendations have been made since before this project began and have been resisted. Yet I am convinced that if the two agencies can discipline themselves to go through the painful process of

thinking out their aims, they will find that future operations are facilitated because they will have criteria for directing their efforts. They can then decide what requests to honor and what to decline, what type of participants and advisers to choose, what topics to include in workshop and survey agendas, etc. Perhaps the process will not be too painful, since many of these aspects have been implicit.

One reason why explicitness is now essential is that this project can no longer be considered as an experiment. Now satisfactory progress cannot be attributed because interest is expressed or support is forthcoming. Rather results must be judged by substantive changes which occur in countries, either in the form of changes in standards institutions or changes in the operation of LDC economies.

For an experiment, supervisory attention of TA/OST and NBS were on certain tasks - the Resources Support Services Agreement (RSSA) was in terms of nine activities. For a continuing project, we must move beyond this concentration on delivery of inputs and production of outputs and begin to think at the purpose and goal levels. Periodically, an assessment of progress may lead to modifications in the type of inputs provided and outputs produced, but will seldom lead to major changes in purpose of institution-building or goals of certain facets of economic development. The RSSA should reflect the purpose and goal and provide some flexibility in inputs and outputs within the limits of resources provided.

The limits of resources, partly because of AID budgets and partly because of NBS self-restraint, are another reason for explicitness. NBS should have a basis for choice as to what it will do. The sound basis will be the evident relationship of its actions to institution building and economic development rather than to the convenience or interests of NBS.

It has been suggested that this report should be so written that it can easily be the basis for the next PROP. I am hesitant to do this alone but will be happy to participate in planning discussions if so desired. My hesitancy is grounded in the same thinking which undergirds the participatory approach to devising standards - they are meaningful only if accepted by those to whom they apply. A PROP should be more than a funding document. It should be a guide to future action which is fully understood and supported by the agencies involved. The re-casting of this project should be a matter of professional pride for both agencies.

Some suggestions about the shape of the continuing project are in the following recommendations.

3. NBS should seek to influence standards institutions to devote attention to activities which will have a direct benefit for rural and urban poor, for small farmers and businesses.

There seems no reason why this project should be justified as an exception to general AID policies and emphases, which rest on sound justification and painful experience. NBS can influence attitudes by the agenda of workshops and surveys and by the type of advisers provided. On occasion, it may accept some requests for help and refuse others, depending on the area in which they fall.

4. The NBS "doctrine" of a good standards institution can provide a basis for selecting what NBS will do for institutions.

On the basis of surveys and of information gained from visits, conferences and correspondence, NBS can tell what the weaknesses of different national institutions are. NBS can then offer, within limits of its resources, to provide certain kinds of services. The prescription should not be the same for all countries. Neither should the NBS response be left entirely to the happenstance of requests from LDC's or other donors.

5. The NBS should free itself from administrative restrictions and routine, so that it can provide responsive "backstopping" services on a custom-made basis. Some relief from personnel ceilings is essential.

The most important services NBS can provide are those which use (a) use NBS's unique abilities, and (b) relate directly to an LDC need.

The Office of International Relations in NBS will need more staff so that it can spend more time to:

- o prepare reports promptly
- o recruit and orient advisers for short-term (but not limited to two-weeks) assignments (from inside or outside NBS).
- o arrange for other parts of NBS to answer questions relevantly and to provide specifications and inspect equipment for LDC's
- o arrange tailer-made training and orient trainees
- o visit LDC's to plan assistance and on follow-up
- o attend international conferences arranged by other donors.

Whether these staff needs require more AID funding will depend on the savings from eliminating less essential activities. NBS should not fritter away its time giving away literature or SRM's on a request basis, organizing general regional seminars or conducting workshops for non-target countries. If the Monsanto and Southwest Research

projects are finished, $30,000 will be available for other uses. If they continue, perhaps a way can be found to included these supervisory costs in the projects.

A major element of this recommendation is the relief from personnel ceilings. Probably some direct increase is necessary. But surely NBS and AID together can devise ways to contract for services on occasion in order to obviate this artificial handicap.

A possible useful procedural device for making NBS available for services beyond those in the centrally-funded project would be to amend the Resources Support Services Agreement (RSSA) so that USAID's may issue task orders with funds to NBS without having to make separate agreements with their host government and with NBS. Then USAID's can order such services as a consultant or a participant or equipment for some related project in science or agriculture, for example.

6. A carefully planned informational campaign about NBS services should be conducted after the project re-orientation has been planned.

If NBS is to be responsive, others must know of its potential. Airgrams are not a sufficient means of doing this. Readership for them is poor and they are soon buried in files. Besides airgrams do not reach two most important audiences - LDC's and other donors.

The information campaign should include attractive pamphlets (not Monograph 148). It should also include attendance at conferences. The need for dissemination may be a reason for a last NBS regional seminar, in Africa. Probably the most effective mechanism is the Workshop. Agenda and participants at a large Workshop could do much to launch a re-vamped project.

Appendix I

INTERVIEWS

Quito

Ing. Raul Estrada, Director-General of Instituto Ecuatoriano de Normalizacion

Dr. Gerardo Anker, Past President of Comite de Informacion y Contacto Externale, importer, consultant of Anthony Gibbs, Ltd.

Econ. Gonzalo Baez D., Vice-President of Camera de Industriales de Pichincha

Ing. Rodrigo Paredes, Vice-President of Commandata, Inc., former project officer for INEN at USAID

Harry Ackerman, Director of USAID

Romo Ray Garufi, Assistant Director of USAID

Patricio Maldonado, Acting Chief of Rural Development, USAID

La Paz

Dr. J. Siles Salinas, Rector of Universite Mayor de San Andres

Javier Vasqez A., Deputy Director, National Center of Scientific and Technogical Documentation, University MSA

Sra. Susanna Alioso de Sanuco, National Center of Documentation

Ing. Orlando Donoso, Director General of Normas y Technologia

Ing. Jose Paredos Oblitas, Quality Control Division, DGNT

Ing. Freddy Quezada Rendon, Chief Department of Standards, DGNT

Ing. Jose Cortex, Chief of Laboratory of DGNT

Gen. Victor Gonzales Fuentes, Minister of Industry, Commerce, and Teurism

Maj. Ing. Carlos Morales, N.P., Director General of Empresa Siderurgica (Sidersa)

Ing. Javier Salinas Romero, Technical Director of Sidersa

Mr. Armando Loayza, Director of International Technical Cooperation, Ministry of Planning

Ing. Miguel Tejada Velasquez, President, National Council of Higher Education.

Mr. Park Massey, Acting Director, USAID

Mr. Owen Lustig, Program Evaluation Officer and Acting Program Officer, USAID

Mr. Robert G. Johnson, Chief of Human Resources Division, USAID

Mr. David H. Bernheisel, Adviser in Computers, USAID

Addis Ababa

Ato Zawdu Felleke, General Manager, Ethiopian Standards Institution

Mr. Vladmir Korenic, UNIDO Adviser to ESI

Ato Mekonnen Betru, Acting Head of Administration Division, ESI

Ato Negussie Abeba, Metrologist, ESI

Ato Assefa Sahle Medhin, Head, Engineering Standards Division, ESI

Ato Johannes Afework, Head, Standards Implementation Division, ESI

Ato Makonnen Deressa, Librarian, ESI

Ato Doniachew Worku, Head, Publication and Documentation Division, ESI

Burton Gould, Acting Director, USAID

Richard Cobb, Acting Agriculture Officer, USAID

Ephram Hagos, Economic Analyst, USAID

Washington

Henry A. Arnold, Director, Office of Science and Technology, AID

John C. Fry, Deputy Director, OST, AID

Marjorie Belcher, Deputy Assistant Administrator of AID for Technical Assistance and formerly Assistant Director and Acting Director of USAID Turkey

Rudolphe H. Ellert-Beck, Officer-in-charge for Korea, AID

Alfredo Fontes, Chief, Technical Unit on Studies and Analysis, Organization of American States

Edward L. Brady, Associate Director for Information Programs, NBS

H. Steffen Peiser, Chief, Office of International Relations, NBS

Paul Roth, Computer Adviser, Institute for Computer Science and Technology, NBS

Charles C. Raley, Special Assistant, OIR/NBS

Noel Raufaste, Jr., Assistant to Director, Center for Building Technology, Institute for Applied Technology, NBS

Joanne Mejeur, Administrative Assistant, OIR/NBS

Amalia Galindo, Secretary to Director General of Standards and Technology, Bolivia

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