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**AGRICULTURAL SUSTAINABILITY:
PROVINCIAL PERCEPTIONS IN PAKISTAN**

**Proceedings of a series of provincial workshops dealing
with the topic of
Agricultural Sustainability and Natural Resource Management:**

1990s and Beyond

Organized by the Government of Pakistan and USAID/Pakistan

prepared

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EXECUTIVE SUMMARY

Pakistan's agriculture represents the country's single most important sector measured in terms of contribution to gross domestic product, source of exports earnings, and provision of employment. However, despite this importance, there are a growing number of natural resource and environmental issues which threaten both the sector's past growth and its potential to sustain growth into the future. These include: salinization and waterlogging of soils, desertification, deforestation, and accelerated soil erosion.

Underlying these issues are pressures associated with meeting the demands of a rapidly growing population, including the provision of food, fuel, and land. It is clear that a reassessment of the agricultural sector and the development of new strategies to maximize the sector's potential is required for Pakistan to continue to meet the population's basic needs into the turn of the century, let alone improve their well-being.

In response to these issues the United States Agency for International Development (USAID/Islamabad), in collaboration with the Government of Pakistan, sponsored four, two day provincial workshops over a one month period in May 1990. These were held in Peshawar, Karachi, Faisalabad, and Quetta. The principal objective of the workshops was to obtain provincial perspectives on the critical human and environmental and natural resource management issues affecting the future of agricultural sustainability.

This represented a first step in a process which would lead to a national conference designed to obtain consensus on the critical issues affecting agricultural sustainability. In turn this information would be used by USAID and other donors to assess the degree to which these issues were being addressed in ongoing and planned programs and projects.

The methodology employed in the workshops was based on the "scoping session." Participants, representing a broad range of the country's agricultural subsectors, were brought together to identify, prioritize, and analyze critical issues affecting the sector and relevant to their respective provinces. Once issues were identified and prioritized in plenary session, multisectoral discussion groups were formed for purposes of issue characterization and development of implementable solutions.

The results of the discussion groups' analyses and recommendations were summarized in papers which make up much of the body of the present document. In addition, attempts were made in each workshop to define the concept of agricultural sustainability in terms relevant to the respective province. These served both as working definitions which facilitated the issue characterization process but will provide a basis for developing a broader definition for the national conference.

A total of 18 issues were identified and characterized from the workshops. These were "collapsed" into 10 basic issues and grouped under three broad issue categories, -- policies and institutions; natural resources and productivity; and farmers, the environment, and human welfare -- as follows:

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General Issues in Agricultural Sustainability in Pakistan

Policies and Institutions

1. Lack of long-term planning
2. Lack of support for agriculture
3. Marketing, middlemen, and pricing policies
4. Role of the private sector

Natural Resources and Productivity

5. Water: salinity, waterlogging, saltwater intrusion, diversion, and availability
6. Rangelands: livestock, rangeland management, lack of development and technology in barani lands
7. Soil erosion

Farmers, the Environment, and Human Welfare

8. Pest and pesticide management.
 9. Environmental monitoring, education, and legislation.
 10. Conservation and development,
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The issues were analyzed within the context of the provincial definitions of sustainability. The objective of the analysis was to identify what aspects of agricultural sustainability were not being met as determined by the range and nature of the issues. Definitions of agricultural sustainability were broken down into five elements: objectives; processes/systems to reach the objectives; specific approaches recommended for achieving the objectives; beneficiaries; and time period.

The analysis revealed that agricultural sustainability was not being achieved due to the failure to meet the dual objectives of improving productivity/profitability and conservation and enhancement of the natural resource base. This was largely attributable to the failure in approaches of meeting basic human needs, equitably and practising sound, natural resources conservation.

A number of themes were identified which cut across both issues and workshops. These were classified under: constraints; linkages; lack of planning and/or coordination; inequity and lack of empowerment; corruption; inefficiencies; and need for technical inputs. In addition, major omissions, or what was not heard in the various workshops, was

described. These were identified as: lack of emphasis on underlying "driving forces" contributing to the issues; overemphasis on the public sector as the source of solutions to the issues; and subsectors which were not well represented in the process.

In conclusion, this document represents a fair account of the views of the average man in the street and the man in the field who have a vested interest in Pakistan's agricultural sector; serves as a means to support growing awareness of the concept and issues associated with agricultural sustainability; and provides the basis for moving to the next step in the process, the national conference.

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CHAPTER I

INTRODUCTION

Agricultural Sustainability

Defining the concept of agricultural sustainability is a complex and perhaps impossible task, since no single definition may be appropriate for the range of conditions, processes, needs, and solutions that characterize the global agricultural sector. Sustainability implies the achievement and/or maintenance of a level of output over time. Limiting the concept to agricultural sustainability provides some relief in facilitating the identification of the producers and the nature of the outputs.

However, in narrowing the concept to the agricultural sector, a number of questions are raised which must be considered:

- * What is the relationship between inputs and outputs and what is their combined effect on determining sustainability?
- * Is the return associated with output equitably distributed among the producers or is it limited to only a few?
- * What are the implications of inequitable distribution on sustainability?

Adding further complexity to the task is the increasing awareness that sustainability, agricultural or otherwise, can not be determined by simple input/output models. There exist a range of externalities which affect sustainability, for example, the prices of commodities on world markets; food needs of a growing population; and the undesirable effects of extra-sectoral policies "spilling over" into the agricultural sector.

One externality of particular concern is a deteriorating natural resource base and its effects on agricultural production. The situation is becoming so severe that it not only threatens to undermine the sector's ability to meet the basic human needs of a growing world population, let alone improvements in the quality of life, but the continued achievement of existing production levels.

There are also critical questions of time and space. Are existing practices and technologies, which may be considered sustainable in the present, sufficient to sustain the needs of a population ten years hence? Just as important, should "sound" agricultural practices in one locale, which adversely affect agricultural production elsewhere, be considered sustainable?

These and other issues are illustrative of both the enormity and complexity of the task. However, the resolution of the task is critical for the well-being of the vast majority of the world's population. In recognition of this need, the United States Agency for International Development (USAID/Pakistan), in collaboration with the Government of Pakistan (GOP), has taken the first step towards defining the concept and preparing

practical solutions for the achievement of agricultural sustainability in Pakistan. In recognition of the complexity of this task, the GOP and USAID have started the process by seeking the opinions of a range of individuals at the provincial level who represent critical subsectors which, in toto, comprise the country's agricultural sector. The remainder of the paper provides the background and results of the initial step in the process.

Background

Pakistan's agricultural economy represents the country's single most important sector measured in terms of its contribution to gross domestic product (29 percent), source of exports earnings (90 percent), and provision of employment -- 54 percent of the total labor force. The significant role of the sector, present levels of agricultural production, and underlying cropping patterns have been largely determined by a combination of human adaptation to and modification of the country's land and water resources and constraints. Of the total national area of some 87 million ha, some 80 percent is classified as arid/semi-arid lands through which flows one of the world's great river systems, the Indus.

It has been the modification of this natural system, through the construction of one of the largest irrigation networks on earth, which has provided the modern basis for and initial growth in the sector. This has been supplemented by the contribution from those areas where sufficient rainfall occurs to support rainfed agricultural production. More recently, the availability and application of packaged inputs derived from "green revolution" technologies have played an increasingly important role in achieving higher agricultural production levels, while expansion into new agricultural lands has levelled off.

Despite the importance and early growth in agriculture, there are an increasing number of natural resource and environmental issues which threaten both the sector's past successes as well as its potential to sustain growth into the future. Examples of critical issues include:

- * Salinization and sodicity of soils, estimated to affect some 12 million ha of formerly agriculturally-productive lands.
- * Waterlogging of soils which has been calculated to result in some 40,000 ha of irrigated lands lost to production each year.
- * Wind and water erosion estimated to affect some 16 million ha of land to date.
- * Desertification resulting in reductions in livestock carrying capacities estimated to range from 10 to 50 percent of land-use potential.

The sources of these and other issues affecting the continued growth in the agricultural sector are numerous, diverse, and complex. Nevertheless, there remains little doubt that the most significant "driving force" behind the need for sustained growth in the sector, and source of the related issues mentioned above, is the country's high rate of population growth. Pakistan's population, estimated to be 35 million in 1947, has now

surpassed 100 million and is projected to grow to 146 million by the year 2000, based on an estimated growth rate of 3.1 percent per year.

The present growth rate is directly contributing to the increasing gap between basic food needs and the ability to meet these needs through domestic agricultural production, a situation which is undermining the obtainment of the critical national priority of food security. In addition to "driving" an accelerating demand for increased agricultural production, the country's growing population is a proximate cause of a number of adverse impacts undermining the sector's ability to maintain present production levels. Examples include:

- * Land fragmentation resulting in smaller, less efficient and less productive farming operations.
- * Growing demand for fuelwood, projected to increase from 19.7 to 30.7 million m³ over the period 1985 to 2000, placing increased pressure on the country's scarce forestry resources and contributing to accelerated soil erosion, sedimentation, and their ensuing effects on efficiencies in irrigation water distribution.
- * The conversion of agricultural lands associated with urban expansion and a population projected to double from 30 to 60 million over the next 15 years contributing to loss of productive lands, water pollution, a diminishing rural labor pool, and other factors inhibiting the ability to maintain present production levels.

The economic costs associated with mitigative measures adopted in response to a deteriorating natural resource base represent a severe drain on the public budget. These include costs associated with:

- * The installation of tubewells and tile drainage systems.
- * Dredging and construction of new dams in response to decreasing life expectancies in the nation's existing impoundments.
- * Irrigation water subsidies.
- * Increasing imports of basic staples.

Despite the problems and underlying driving forces, there exist a number of opportunities for increasing agricultural production levels through the development and application of economically --sound and environmentally-- sustainable technologies applicable to the situation in Pakistan. Moreover, there is a significant and largely untapped pool of local knowledge, some of which extends back to the Moenjodaro and Harappa periods, which can serve as a source to adapt these technologies to local conditions.

In addition to existing technologies and local knowledge, a third element which must

be recognized in the development and implementation of these approaches is the number of constraints which characterize the sector in Pakistan. These include:

- * The generally low yields in the country's major crops.
- * The lack of formal education at the local level.
- * The low capacity in a number of the country's key agricultural institutions.
- * The presence of well-documented, widespread corruption and abuses of power, both political and economic, in the sector.
- * The feudal nature of much of the farming sector and rural society.
- * The inequitable distribution of land and capital required for inputs and the continued inability to enact effective land reform.

Only by recognizing and adjusting to these and other constraints, which impede the implementation of technically and socially-sound technologies in the agricultural sector, can a strategy achieve its desired objectives.

Provincial Workshops

The foregoing provides a brief and illustrative, albeit incomplete, list of the issues, driving forces, and constraints which must be addressed in the development of successful approaches to achieving sustainable agricultural development in Pakistan. However, even in such a cursory form, the enormity of the task is clearly recognizable. In recognition of the nature, magnitude, and complexity of the issues USAID/Islamabad, in collaboration with the GOP, sponsored a series of four, two-day provincial workshops over a one-month period in May 1990. These were:

Province	City	Date	Local Sponsor
NWFP	Peshawar	May 6-7	NWFP Agricultural University
Sindh	Karachi	May 13-14	P and D Department
Punjab	Faisalabad	May 19-20	University of Agriculture
Balochistan	Quetta	May 30-31	P and D Department

The provincial workshops were to serve as a first step in a process leading to reaching consensus on critical issues, needs for research, and other actions in the field of sustainable agriculture which could be addressed through the USAID mission agricultural portfolio. The next step in the process will occur in a national conference, scheduled for

the last quarter of 1990 in Islamabad.

The principal objective of the workshops was to define the critical human and environmental and natural resource management issues pertaining to the future sustainability of agriculture in the respective provinces. In addition, there were a number of secondary objectives. These were to:

- * Provide a forum to promote both multidisciplinary and cross-sectoral discussion of critical issues affecting the sector.
- * Develop "implementable" solutions.
- * Lay the foundation for a continuing process promoting multidisciplinary and cross-sectoral approaches to address issues affecting agricultural sustainability.
- * Develop and refine a "scoping" methodology suitable for the achievement of the previously identified objectives.

Workshop Methodology

The methodology adopted for the conduct of the workshops was based on the concept of the scoping session used by USAID and other donors in conducting environmental assessments of development projects. Specifically, the scoping session is used to raise key environmental issues of concern through open discussion in a public forum.

While certain elements of the methodology evolved over time, the four workshops shared a common structure and approach. This entailed an initial inaugural session which preceded the formal opening of the workshop. In this session, short presentations were made by the USAID representative, the workshop chairman, and the chief guests -- in two cases the provincial chief ministers.

Following the inaugural session, the workshops opened with an initial plenary session in which opening comments were made, participants introduced themselves, and brief technical papers on selected aspects of agricultural sustainability were presented by the facilitators. This was followed by a preliminary discussion on the concept of agricultural sustainability and the formulation of a definition(s) appropriate to the respective province. Following the discussion, participants nominated issues which were considered to be significant in affecting the achievement of sustainable agricultural production in the province. From an initial long list of issues, approximately one third were identified to be of sufficient concern to be key issues and serve as topics for the workshop discussion groups. The prioritization of issues took place through written ballots.

Once the issues were identified, discussion groups were formed to begin the task of issue assessment. Each group selected its own chairman and secretary. Guidelines were provided in the form of an outline and illustrative example useful for framing the issue. Each group was required to prepare a five-page summary paper to be submitted to the chair and become part of the workshop record.

When all groups had completed their tasks, the conclusions and suggested recommendations were presented to the rest of the participants in a second plenary session. Following each presentation, ample time was provided for comment. All comments were noted and duly recorded. In some cases, where opinions differed from the proposed recommendations or groups felt that other issues were of significant import but were ignored as a result of the prioritization process, written comments and/or papers were forwarded to the chair and made part of the record.

Following the discussion group presentations and summary statements by the facilitators, the workshop participants returned to the initial discussion of sustainable agriculture for further consideration, refinements, and in some cases, additional definitions. Where more than one definition existed, these were voted on and the one receiving the most votes was adopted by the workshop as the most applicable to the province.

The following four chapters represent the proceedings of the provincial workshops. It is the editors' opinion that these written accounts represent an accurate summary of the workshops. Generally, discussion group reports have been included with little or no modification. Where changes have been made, these were minor and only addressed questions of syntax and not content. In some cases, such as prepared papers and general discussion from the floor, content was summarized by the editors for purposes of brevity. Full documentation is available through USAID/Islamabad in written, audio, and video formats.

Key Caveats

The proceedings which follow should be read in context, since they represent the perspectives of a wide cross-section of Pakistanis -- farmers, fishermen, businessmen, bureaucrats, researchers, academics, and development practitioners. They do not represent the views of experts, nor do they reflect the latest technical thinking on natural resource issues. Rather, they represent the point-of-view of the concerned, and sometimes involved, layman.

The mix of participants at each conference differed: in NWFP, there were academics, researchers, and technicians; in Sindh, bureaucrats, businessmen, farmers, fishermen, and academics; in Punjab, academics, researchers, farmers, and businessmen; and in Balochistan, the vast majority were farmers, with several businessmen. Some had thought a lot about agricultural sustainability, others were undoubtedly thinking about it for the first time. This is all reflected in their reports, based on two hours of discussion with their fellow participants.

CHAPTER II

THE NWF PROVINCIAL CONFERENCE

Executive Summary

Definition of Agricultural Sustainability

The following three definitions were proposed by participants:
Continued agricultural production with economic returns for covering the socio-economic needs of the farming community without causing deterioration of the natural resource potential of the province, together with safeguards against environmental hazards -- keeping in mind the prevailing farming systems.

To apply all the inputs for production within a range of safe limits so that productivity is optimized and damage to the environment is minimal as per the local conditions.

Improving the productivity for the general welfare of people along with maintenance and enhancement of natural resources with the aim of striking a balance between basic human requirements, productivity, and the environment.

In light of what came out of the various discussions and the fact that the conference was aiming for a broad definition of sustainability, it is proposed that the third definition be accepted as the conference definition of sustainability in NWFP.

Issues and Solutions

In brief, the following key issues and their possible solution were discussed:

Issue No.1: Soil Erosion and Degraded Lands

Principal solutions proposed: dissemination of appropriate agricultural technology at the farm level; upgrading of the educational level of extension staff; reforestation and range development through direct involvement of the local people; and on-farm water management.

Implementation should be through increases coordination and consultancy of the concerned agencies.

Issue No.2: Lack of Long-Term Planning

Principal solutions proposed: provide broader training for line agencies in solving cross-sectoral problems; establish P and D field-level offices supported by sufficient staff to work with implementing agencies; create pressure groups to encourage longer-range planning; and allocate more financial and personnel resources for planning.

Issue No.3: Family Planning, Poverty, and Unemployment

Principal solutions proposed: mass education with emphasis on family planning; free access to family planning information and birth control options; and improvement in agricultural production.

For implementation, the following is proposed: replicate family planning programs successful elsewhere; introduce a system of incentives to encourage smaller families; and involve religious leaders.

Issue No.4: Environmental Monitoring, Education, and Legislation

Principal solutions proposed: widespread dissemination of environmental education; more effective use of land-use planning; collection and evaluation of baseline information on the existing quality of air, water, soils, and vegetation; development of pressure groups to protect people's environmental rights; and compliance by industry in observing international standards for the control of environmental pollution.

Principal actions proposed: develop an action plan, which should be prepared at the grassroots level; establish a program to monitor the progress made; and involve the mass media.

Issue No.5: Marketing and Middlemen

Principal solutions proposed: proper methods and processes be used to standardize and grade commodities; proper rules, regulations, and byelaws should be framed and implemented; institutionalize associations of consumers and producers; provide reasonable infrastructure, transportation facilities, and marketing intelligence.

For implementation, the government should initiate and pursue different projects and specialized and authorised institutions should come forward to implement them. Existing laws should be enforced.

Issue No.6: Lack of Technology for Barani Areas

Principal solutions proposed: provision of a sound and viable institutional management base; improvement of agricultural production; development of livestock farming; and encouragement of economic diversification.

Issue No.7: Conservation and Development

Principal solutions proposed: develop public awareness; enact laws which ensure conservation of resources; provide feedback; and keep the planning/implementation wing away from the political wing.

In terms of action and implementation, the following is proposed: develop a national strategy and general commitment; define targets of conservation, monitor the impacts of development activities on the natural resource base, and evaluate the results; and enact laws and enforce them.

Issue No.8: Lack of Adequate Extension Services

Principal solutions proposed: strengthen the linkages between farmers, extension workers, and researchers; provide adequate resources; and develop the appropriate technology.

For implementation, the following is necessary: viable project formulation and effective administrative policies.

In terms of action, planners and policy-makers should take the lead -- either with national resources or the assistance of external donors.

Issue No.9: Land Tenure and Land Fragmentation

principal solutions proposed: undertake proper land consolidation; enact the proper legislation and create the infrastructure necessary for its enforcement; introduce proper land use based on land capability; and provide adequate financial resources.

In terms of action, local Union Councils, through their chairmen and members, should prepare a proper action plan which should be made part and parcel of the district and provincial development plans.

Issue No.10: Livestock Production and Nutrition

Principal solutions proposed: increase the production per animal; establish model farms for livestock and poultry; provide financial incentives to farmers; develop a processing facility for broilers, eggs, milk, and meat for marketing; and establish village-level producer organizations.

For implementation, the following is necessary: creation of a separate ministry for livestock at the provincial level; strengthening of existing training, research, and outreach facilities at NWFP Agricultural University; allocation of appropriate funds; and deregulation of prices of livestock and poultry products. In terms of action, the NWFP government should take the initiative in implementing these solutions.

Introduction

The North West Frontier Province (NWFP) Conference was held in Peshawar on May 6-7 and attended by approximately 60 people, drawn primarily from the NWFP Agricultural University and the provincial government. The conference itself extended over two days and was divided into four sections, The first was the inaugural session which was

opened by the Chief Minister for NWFP, Mr. Aftab Ahmad Khan Sherpao. Introductory comments were made by the chairman, Dr. Abdul Rehman Khan, Vice-Chancellor of the NWFP Agricultural University in Peshawar, and also by Dr. Ronald Senykoff on behalf of USAID.

In his address, the Chief Minister pinpointed the most serious environmental issues confronting the province: deforestation, overgrazing, soil erosion, and the resulting decrease in the province's agricultural production resources.

When combined with rapid population growth, this has put more pressure on the natural resource base. The crucial link between population and the natural resource base is that of food security: can the country feed its people? In the case of Pakistan, population is growing faster than overall agricultural production. In addition, indications are that productivity of basic grains is stagnant, if not actually declining. In the case of NWFP, the problem of population pressure on the natural resource base is exacerbated by the presence of the Afghan refugees. This will call for both technical and political solutions.

The Chief Minister emphasized that there is an increasing global awareness of the problems of the environment, the natural resource base, and sustainable development, and the need to incorporate these elements into national economic planning in a more realistic way. Equally important, however, is the increasing recognition of the crucial link between environmental degradation and rural poverty.

The Chief Minister concluded his remarks by charging the participants to come up with a list of priorities, of what they thought are the key issues to be addressed in order to achieve agricultural sustainability in NWFP, and to develop practical solutions to the problems identified.

In his remarks on behalf of USAID and the Government of Pakistan, Dr. Senykoff emphasized that the time for philosophical discussions about the environment is over. The time has come for action, before it is too late. Mankind presently faces a challenge of the most serious kind -- how to improve economic life while operating on a finite resource base. The global environment in which we now live is a setting of interconnectivities and growing dependence, ranging from the Balochistan Province to the upper reaches of the Amazon River in Brazil. Snow that falls high on the peaks of the Himalayas and reaches the Arabian Sea via the great Indus River may some day fall heavily as rain and cause erosion of the denuded tropical forest soil of the Amazon Basin.

According to the speaker, our sustainable future can be planned through the blending of agricultural and economic

production needs with natural resource development. Economic development, like industrialization or production increases, cannot be stopped solely on environmental concerns. On the other hand, development cannot continue without seeking ways to enhance rather than diminish the integrity, diversity, and long-term productivity of both the managed agricultural ecosystems and the surrounding natural ecosystems.

The participants were encouraged to identify the key issues constraining agricultural sustainability in NWFP and to come up with practical solutions, both multidisciplinary and multi-dimensional. By so doing, participants could develop awareness and commit themselves to timely actions to address these problems. The conference marked the beginning of a dialogue and a process, to continue up to and beyond the national conference scheduled for later this year.

Key Sustainability Issues

The second part of the conference concentrated on defining the key sustainability issues for NWFP. The facilitators discussed several definitions of sustainability and also presented brief technical papers on various aspects of agricultural sustainability. In the discussion that followed, it was pointed out that NWFP presents a great challenge, since it is 90 percent agricultural, with little industry, large families, and a variety of crops. About 70 percent of Pakistan's natural forest is located in NWFP. Semi-arid conditions are prevalent and research is needed on ways and means to cultivate the rainfed barani areas.

Participants were asked to identify what they regarded as the key issues in the province. A list of 23 issues was completed and participants voted on the top ten. This is summarized in Table II - 1. On the basis of further discussion and the persistent demand from one group to discuss livestock problems, ten topics were identified as priorities and served as the basis for discussion. These have been listed in Table II - 2.

Table II - 1
Sustainability Issues in NWFP

Issue	Votes	Place
Erosion and degraded lands	29	1
Lack of long-term planning	26	2=
Family planning and demographic growth	26	2=
Environmental monitoring, education, and legislation	24	4=
Marketing and middlemen	24	4=
Need for technology for barani areas	23	6
Poverty and unemployment	19	7=
Conservation and development	19	7=
Lack of adequate extension services	18	9
Land tenure and land fragmentation	17	10
Potential for economic diversification	15	11=
Rangeland management	15	11=
Refugee pressures	14	13
Increase in livestock production	13	14=
Urban migration	13	14=
Inequitable distribution of wealth	12	16=
Lack of credit facilities	12	16=
Lack of nutritional consciousness	11	18=
Urban planning and zoning	11	18=
Urban pollution	10	20
Lack of empowerment in barani areas	9	21
Security and empowerment	7	22.
Biogas and solar potential	7	22=

Table II - 2
Discussion Issues in NWFP

Soil erosion and degraded lands

Lack of long-term planning

Family planning, poverty, and unemployment

Environmental monitoring, education, and legislation

The role of marketing and middlemen

Lack of technology for barani areas

Conservation and development

Lack of adequate extension services

Land tenure and land fragmentation

Livestock production and nutrition

The Discussion Groups

For the discussion of specific issues, participants chose the groups which interested them most. Each group elected a chairman and a secretary. The chairman was responsible for directing the group, and the secretary for preparing a brief written report, following an outline prepared by the facilitators. At the end of the discussions, the chairmen reported back to the conference in plenary session. Their reports and relevant comments from the floor follow.

Discussion Group No.1: Soil Erosion and Degraded Lands

Issue

Of the 1.8 million ha. of total cultivated area in the NWFP, some one million hectares are rainfed, most of it eroded, while the remaining 0.8 million consists of irrigated lands. Salt is estimated to affect .014 and .5 million ha. of the irrigated and non-irrigated lands respectively. The primary source of the issue is attributed to poor water/soil and fertilizer management and lack of technical know-how.

Socio-economic costs associated with issues include:

- * Degraded soils and low crop productivity
- * Poor crop husbandry
- * Poverty and poor health
- * Poor infrastructure
- * Lack of agro-based industries
- * High unemployment
- * All the society in the area and the government is receiving poor taxes/revenues.

Constraints

The principal constraints include:

- * Lack of technical know-how
- * Poor extension service
- * Lack of credit facilities for reclamation of soils
- * Lack of organic manure
- * Lack of suitable/adaptive crops
- * Poor cropping patterns
- * Poor fertilizer efficiency/availability
- * Overgrazing and deforestation
- * Water losses from water channels/water reservoirs

Solutions

Proposed solutions are:

- * Dissemination of agricultural technology at the farm level, including training of growers.
- * Upgrading of the educational level of extension staff and regular updating of their knowledge.

- * Credit facilities should be enhanced and provided on soft terms to farmers for the purchase of required inputs.
- * Green manuring should be encouraged.
- * Burning of organic matter, such as dung, should be discouraged.
- * Recycling of household wastes, such as farmyard manure and compost manure.
- * Proper crop husbandry should be adapted in the troubled areas.
- * Reforestation and range development through direct involvement of the local people.
- * Anti-erosion practices should be adapted.
- * On-farm water management needs streamlining and strengthening.
- * Proper drainage and use of chemical amendments and biological practices.

Implementation

Implementation of the above recommendations should be through increased coordination and consultancy of the concerned agencies.

Commentary

In the discussion that followed two points were emphasized: first, the possibility of multiple cropping strategies and, second, the role of various tillage techniques.

Discussion Group No.2: Lack of Long-Term Planning

Issues/Causality/Constraints

Lack of emphasis on long-term planning and long-term benefits is due to political instability. This is also coupled with the lack of internal resources or misuse of these resources. There is no proper integrated approach or intersectoral approach in the process of planning and actual implementation.

External driving forces like the World Bank, the International Monetary Fund, and other international donors influence the planning process in the short term. There is no long-term commitment on the funding side for a development program. There is no proposition or provision for the NWFP out of the national exchequer. On top of this, NWFP has been subjected to the huge influx of Afghan refugees which has disturbed the planning cycle in relation to the other provinces.

The presence of the Federally Administered Tribal Areas (FATA) has definite ramifications for the NWFP government in terms of resource allocation and planning/management operation.

The Planning and Development (P and D) Department at the provincial level has been charged only with budget allocation and no interaction at the field implementation level. P and D has not been entrusted with dedicated, skilled personnel. Rather posting of professional managers is not considered a glamorous career.

Solutions/Actions/Implementation

Four solutions are proposed:

- * The actual implementation or interventionist recommendations are for a broader training for line agencies in cross-sectoral problems including: economic, social and environmental issues impacting on project selection; prioritization; location; and the like.
- * P and D needs to establish field-level offices supported by sufficient staff to work with implementing agencies. The same should be organized by the planning cells of each line agency.
- * Create pressure groups or activists from the general public to encourage longer-range planning to address difficult issues and promote increased understanding and awareness of same.
- * Pull more financial and personnel resources into proper planning and mandate it for a longer perspective. Review the present status of the planning process in NWFP by an experts' group and support improvements and modifications. This is particularly needed to improve the amount and quality of data. Planning requires good information.

Commentary

There were no comments from the floor.

Discussion Group No.3: Family Planning, Poverty, and Unemployment

Issues and Causes

Insecurity and cultural sensitivity in the NWFP context contribute to the desire for large families, viewed as a source of additional manpower. Lack of knowledge and lack of acceptance also affect family planning. Religious beliefs contribute to this process, since Islam forbids abortion. The demographic increase in the population of Pakistan will lead to a disaster. No proper formal or informal education is imparted to the public by either the government or private sector institutions.

Poverty is directly related to overpopulation and inequitable distribution of the country's resources. Unemployment is a direct consequence or end-product of improper family planning and/or the poverty level in our society. Lack of development opportunities in both public and private sectors also lead to unemployment and poverty.

Civil unrest, robbery, burglary, thefts, and many other social evils will be costly, in both economic and social terms, for our society -- leading to a general decline in the quality of life. The economic costs are incalculable. No one is the winner -- rather everyone is the loser in this process.

Constraints

There are five major constraining factors that must be considered:

- * Total lack of education for mothers.
- * Preference for male issue -- reinforcing the upper hand already enjoyed by men in Pakistani society. This lust for male children always leads to overpopulation, since married couples with only daughters will continue to have children until they produce one or more sons.
- * Male-dominated society,
- * Lack of positive leadership in either family planning or job creation.
- * Political pressure groups who oppose family planning.

Solutions

The solutions to this issue hinge on the importance of education, cultural change, and improvements in economic wellbeing:

- * Mass education with emphasis on family planning.

- * Free access to family planning information and birth control options.
- * Technical education to improve productive capacity.
- * Later marriages.
- * Discouragement of polygamy.
- * Improvement in agricultural production through technology and education, and expansion of the private sector.
- * Provisions for recreational facilities.

Implementation

The following elements are proposed:

- * Replicate family planning programs that have proven to be successful elsewhere under similar conditions.
- * Introduce a system of incentives to encourage couples to have smaller families and discourage them from having larger ones.
- * Involve religious leaders in the educational and outreach components of family planning.
- * Introduce a code of ethics which will discourage luxurious living and the ostentatious demonstration of wealth in such social customs as feasts, marriages, and receptions.
- * Encourage the private sector to expand and invest in more job creation.

Actions

Two actions are necessary:

- * Mobilization of the general public to eliminate evils in all walks of life -- supported by government actions.
- * Emergence of strong leadership to inculcate social pressures to encourage family planning, employment generation, and the elimination of poverty.

Commentary

One commentator suggested that forced sterilization should be considered as an option. A second commentator pointed out that people should not blame religion, since they do not know the texts sufficiently well. As a result, people hide behind religion. A third pointed out that it is really the lack of education that should be blamed.

Discussion Group No.4: Environmental Monitoring, Education, and Legislation

Issue

There is a growing concern about the degradation of environments all over the world. The NWF Province is no exception to the problem of environmental issues. This province has become home to several million Afghan refugees who have contributed to the overall environmental situation. Environmental issues include deterioration of our natural resources, particularly the quality of water -- drinking, irrigation, and ground water. Soils, crops and air are all degrading at a very rapid rate.

The reasons for this degradation include population density, lack of socio-economic and hygienic education, and lack of awareness among the rural and urban masses. There is no proper planning for housing and townships. As a result, poor drainage, blocked or non-existent sewerage systems have created an extremely unhealthy environment. Wastes (solid, liquid, and gases) are directly disposed of into agricultural lands, drains, and orchards. There is no regulatory control over the disposal of city wastes.

Similarly, all sorts of industrial wastes/byproducts with unknown chemical, physical and biological consequences are unscrupulously disposed of into our rivers. Use of agricultural chemicals (fertilizers, pesticides, and herbicides) could be Potentially dangerous for human and animal health. The number of vehicles which emit unleaded gas fumes has increased tremendously. Unleaded gasoline contains lead which is extremely toxic beyond certain levels. In light of these issues, there is a risk to human health, animal health, and to our ocean resources (fish industry). There is a great possibility of skin diseases, heart problems, and dysentery.

All these problems have created social, economic, and political problems both in rural and urban society. The society as a whole will suffer tremendously from these environmental problems.

Causality

There exists draft environmental legislation but it remains unimplemented. Other causal factors include: population density; poor drainage/no sewerage; lack of overall planning and landscaping.

Constraints

The chief constraints include: lack of leadership at both the national and the grassroots levels; lack of environmental education; lack of resources for proper development; lack of political support; no motivation by the media; lack of awareness for human health concerns.

Solutions

The following solutions have been proposed:

- * Environmental education can be promoted through: more effective use of the media (newspapers, radio, and TV); integration as part of the curriculum at the school level; and incorporation as part of the role of social and religious organizations.
- * Land-use planning can be promoted through: the preservation of fertile agricultural lands from construction of houses, industries, and large scale townships wherever possible; the provision of adequate drainage/sewerage systems in urban and

rural areas; proper garbage collection and disposal systems; and the promotion of a well planned landscaping, afforestation, and house gardening program.

- * Collection and evaluation of baseline information. A thorough survey is needed to evaluate the existing quality of air, water, soils, and vegetation in light of the known standards. Concentrations of lead, calcium, copper, zinc, nitrates in water, soil, and plants must be determined and compared with the standard values for human health and for food chain purposes.
- * Introduction of unleaded gasoline.
- * Population planning will help to keep the environment clean.
- * Development of pressure groups to protect people's environmental rights.
- * Industries should be forced to observe internal standards for environmental pollution.
- * Recycling of city/industrial wastes is a necessary measure.
- * Research projects should be encouraged to evaluate environmental issues.
- * Judicious use of fertilizers, pesticides, and insecticides.
- * Formation of a task force to clean streets, parks, and ponds.
- * Standing waters should be disposed of.

Action

The following five actions are proposed:

- ' Obtain financial allocation.
- * Develop an action plan. This should be detailed prepared at the grassroots level, and incorporated into district/provincial plans.
- * A monitoring program should be established which monitors the progress towards achieving the plan's goals and objectives.
- * The mass media should be brought in to support the plan and promote increasing awareness.
- * Finally, the task force should be created.

Commentary

The comments from the floor supported the major recommendations. The importance of public awareness was emphasized, through environmental education and the mass media. Attention was drawn to the responsibilities of industrial groups in helping to reduce emissions from cars and motorbikes. While there is a lack of resources at the government level to implement these recommendations, it is important to form pressure groups which will lobby to obtain political support and the necessary resources.

Discussion Group No.5: Marketing and Middlemen

Issue

The uncertainty on the part of the producers for a fair or good return for his produce is a major constraint on the development of agriculture in NWFP. The market itself is an issue because most of the markets are imperfect, i.e. they are not regulated. Proper byelaws and regulations are not followed.

Middlemen are an issue because they over-exercise their powers and exploit consumers and producers. Though the middleman is an important tool of the marketing systems, his excesses sometimes are intolerable.

Socio-economic costs include certain wastages which take place in the production process, standardization, grading, and packaging. When produce is wasted, all the resources used for its production also go to waste and hence a social cost is incurred. Due to the high rise in the price of certain goods, some people are not able to buy these goods and hence it is a social cost. Due to high prices, sometimes the goods are not sold and may become waste. According to our group, the end producers and the ultimate consumers are losers and all others lying in between are more or less gainers.

Causality

Four factors should be considered:

- * The driving force underlying the problem is the greed of the middlemen and those intermediaries who have entered in the marketing system in an enormous number unnecessarily.
- * Unavailability of proper commodities at the proper time and place.
- * Inflexible marketing system for positive changes -- the market is "sticky."
- * Lack of knowledge regarding information about prices and commodities.

Constraints

Chief constraints affecting the market include:

- * The rigidity of the market
- * Unavailability of proper infrastructure
- * Excess of middlemen and intermediaries
- * Lack of standardization and grading of commodities
- * Lack of rules, regulations, and byelaws
- * Lack of associations on the part of producers and consumers
- * Lack of preservation factories and cold storage facilities
- * lack of proper transportation -- particularly refrigerated transport
- * Lack of proper institutions in the marketing system to tackle the problems of producers and consumers
- * Lack of marketing intelligence

Solutions

Possible solutions are:

- * Break the rigidity of the market through creating an awareness among the producers and consumers regarding a flexible or more perfect marketing system. They may be pursued to realize for themselves the benefits which they may get out of this change or flexibility.

- * Proper infrastructure is very important for the improvement of marketing and to control the losses of commodities.
- * Control the number of middlemen in the market as well as check on their excesses.
- * Proper methods and processes should be used to standardize and grade the commodities so that the producers receive reasonable returns for their produce.
- * Proper rules, regulations, and byelaws should be framed and implemented properly.
- * Institutionalize the associations of consumers and producers through the proper representation of both, to protect their rights and to run the system smoothly.
- * The public sector should guide and the private sector should be encouraged to build preservation factories and cold storages.
- * The public sector should provide a reasonable infrastructure and the private sector should be encouraged to provide year-round transportation.
- * A well planned communication campaign should better disseminate information regarding the marketing structure. The main sources of media (e.g. TV, radio, newspaper, and pamphlets especially printed for this purpose) can be of great help.

Implementation

The government should initiate and pursue different projects, but it is not always the duty of the government to implement them. Therefore, the institutions specialized and authorized should come forward to implement such projects. Local, provincial, and federal governments should enforce the existing laws.

Action

The government should take the first step on the demand of the public through their MNAs and MPAs (representatives) for the purpose of achieving sustainability in the marketing system and procedures. The action should be taken as soon as possible.

Commentary

In the discussion that followed, the role of planning in avoiding a market glut was emphasized. The need for both market intelligence and cold storage facilities was strongly supported.

Discussion Group No.6; Lack of Technology for Barani Areas

Issue

The North West Frontier Province is blessed with a variety of soil and climatic conditions. The majority of the area, estimated to be some 66 percent of the total cultivated area of the province, is rainfed, with low fertility. There is an estimated one million hectares out of a total 1.8 million hectares suitable for potential cultivation. Farming practices among the majority of small farmers are antiquated and the rural population is generally illiterate and poor.

There are three principal agro-ecological zones:

- * Northern Zone: Comprised of Malakand and Hazara Divisions, a high rainfall area (500 - 800 mm per year) but with an irregular and erratic distribution pattern. Critical issues include: runoff and erosion problems, deforestation, and hillside crop production.
- * Central Zone: This zone, which includes the Mardan and Peshawar Divisions, is characterized by lower rainfall (350 - 450 mm per year). The barani areas are contiguous with the irrigated lands. However, technologies for the rainfed areas are not available.
- * Southern Zone: This is a low rainfall area (less than 250 mm per year) in which the Kshat and D.I. Khan Divisions are located. The evapotranspiration rates are high and most of the land remains uncultivated. Monocrop cultivation is practised when rains are received. In addition, rod kahi irrigation is practised. This involves the collection of rainwater in large tanks to be used according to need.

The farmers bear the brunt of the costs associated with the lack of development of these areas. They are extremely poor with a very low standard of living with few alternatives to farming, which is not remunerative. Even if technologies were available to the farmers, their adoption would be problematic due to the associated risk involved.

No strenuous efforts have been made in terms of appropriate institutional support and allocation of adequate resources for the development of specific production technologies for barani areas.

The socio-economic situation can be changed by maximizing the area of cultivation with oil seed crops (e.g. sunflower and groundnuts) which will serve to provide a high income to the farmers, as well as a great degree of savings in foreign exchange. Another possibility is to develop land for pulses and cereals production in the area.

Driving Forces

The principal forces are small landholdings and high population pressure.

Constraints

There exist a number of constraints to maximizing the development of the barani areas. These are:

- * **Soil Management:** Absence of sound soil management practices together with inherent soil conditions have contributed to poor soils. These include: natural wind and water erosion; accelerated runoff and growing water losses, partly due to the absence of moisture conservation practices; and low soil fertility.
- * **Biological Constraints:** Chief biological constraints are the prevalence of low-yielding crop varieties in the barani areas and the insect pests problem.
- * **Socio-Economic Constraints:** Chief among the socioeconomic constraints are the absence of: input availability; credit facilities; effective linkages among farmers -- primarily associated with extension and research; and small, fragmented landholdings impeding the use of mechanical farming practices. Other constraints include poverty, illiteracy, and political exploitation. There is also illiteracy and ignorance/unawareness of available technologies. There is also a large rural to urban migration.

Solutions

Solutions to the problem of the development of the barani areas are:

- * Provision of a sound and viable institutional management base.
- * Improvement of agricultural production through:

intensification of research on barani agriculture under the ongoing as well as new programs to be implemented with a sizeable contribution from national and international agencies strengthening of agricultural extension services in terms of manpower, mobility, and communication equipment provision of land levelling and soil conservation equipment and practices, particularly erosion - mitigation strategies supplementing irrigation facilities through installation of tubewells for the exploitation of groundwater resources construction of small dams for harnessing torrent-related runoff small irrigation schemes for utilizing spring water and perennial streams wherever possible.

* **Development of livestock farming through:**

improvement of range lands through the introduction of improved fodder varieties suited to rainfed conditions expanded implementation of artificial insemination programs for cattle and introduction of improved breeds of sheep and goats, a specific asset of barani areas

introduction of rotational grazing

establishment of feed mills

extension of tree cover on private, community, and state lands.

Diversification: The establishment of agro-based industries throughout the barani areas.

Commentary

During the discussion, the importance of soil capability classification was underlined, together with the importance of different tillage patterns for different soil types and agro-ecological conditions.

Discussion Group No.7: Conservation and Development

Issue

There are three major components:

- * Land: deforestation, erosion, desertification, salinity, and waterlogging; construction and industrialization causing land loss, land pollution from industries, and decrease in vegetative cover.
- * Water: pollution from industrial use; mismanagement resulting in overuse, salinity and waterlogging, construction of dams, and wastage as water goes from rivers to the sea unused.
- * Air: industrial pollution, decreasing rainfall, deforestation, greenhouse effect, smoking, emissions; effects of use and disposal of non- degradable products and aerosols.

Causes

There are various causes of the present situation:

- * Rural development and industrialization: land cleared for housing; roads built; air, water, and land pollution.
- * Deforestation: soil erosion and decreasing rainfall.
- * Ecological imbalance: acid rain, greenhouse effect, salinity, and water logging.
- * Poverty and unemployment: increased stripping of local resources.
- * Population growth: more people for fewer resources.
- * Construction of large dams.
- * Lack of relevant policies and legislation.
- * Lack of incentives world-wide for the need to conserve resources.

Constraints

Among the major constraints are the following:

- * Lack of public will.
- * Lack of legislation: it has been approved but not implemented.
- * Lack of awareness of: the need to conserve; ways to conserve; rewards for conservation; and the interrelationships between various aspects of conservation.
- * Lack of appropriate/relevant planning which includes all of the stakeholders in the identification of problems and the preparation of strategies.
- * Insufficient resources: conservation is expensive -- personally and nationally -- and rewards are longterm.
- * Lack of sufficient, technically competent manpower to advise, plan, implement, and sustain programs.
- * Lack of empowerment of qualified technical specialists.
- * Political constraints.
- * Lack of information, particularly the capacity to closely monitor what is happening to the natural resource base.

Solutions

There are six proposed solutions:

- * Develop public awareness through the media and throughout the educational system.
- * Enact laws which ensure conservation of resources.
- * Generate funds.
- * Provide training and manpower.
- * Keep the planning/implementation wing away from the political wing.
- * Provide feedback which allows appreciation of the need to conserve.

Action and Implementation

- * Develop a national strategy and general commitment through: public pressure from interest groups; identification of technical experts; and resource allocation.
- * Gather baseline data through field surveys which conform to international standards.
- * Define targets of conservation based on baseline data and national and international standards.
- * Enact laws and enforce them, particularly the prevention of contrived misuse.
- * Implement development programs.
- * Monitor the impacts of development activities on the natural resource base and evaluate the results.
- * Revise the entire program as needed: general policy, resources, manpower, laws, and strategies.

Commentary

There were no comments on this presentation.

Discussion Group No.8: Lack of Adequate Extension Services

Issue

The following reasons could be assigned to lack of adequate extension services in the NWFP:

- * Lack of mobility for extension workers.
- * Poor job promotion opportunities.
- * Poor staffing pattern.
- * Financial and budgetary constraints.
- * Lowly status of agricultural extension workers in the government hierarchy.
- * Absence of incentives, recognition, and awards.
- * Lack of job-oriented training -- technical as well as in-service.
- * Weak linkages between the researcher, the extension agent, and the farmer.
- * Poor communications between extension agent and the farmer: lack of knowledge, qualifications, and confidence mean the agent has nothing to offer. Likewise, the agent has little feedback for the researcher.
- * No job description and no accountability.

The lack of adequate extension services results in the following:

- * Adoption of technology is poor and hence farm income is low.
- * Yield take-off is low.
- * Ignorance/unawareness by the farmers of the latest technical developments.
- * Lack of a regulated marketing system.
- * Untimely and costly input supply.
- * Exploitation by the middleman.
- * Absence of farm-to-market roads.
- * Lack of crop zoning, resulting in unplanned production.

In this case the winner is the middleman and the losers are the farmers, the extension workers, the researchers, and the nation as a whole.

Causality

The major driving forces are the following:

- * Low yields per unit area.
- * Socio-economic constraints of farmers.
- * Ignorance, poverty, and hunger.
- * Agricultural extension is a neglected field in the high forums of government.
- * Lack of representation in the policy/decision forums.

Constraints

The following are the constraints to providing good extension services to farmers: lack of accountability; absence of job descriptions; shortage of funds; and high ratio of farmers per extension agent.

Solutions

The following five solutions are proposed:

- * Strengthen the linkages between farmers, extension workers, and researchers.
- * Provide adequate resources to support the extension service.
- * Strengthen the training facilities.
- * Expand the Training and Visit (T and V) System.
- * Develop appropriate technology for small farmers.

Implementation

Two components are proposed:

- * Viable project formulation.
- * Effective administrative policies based on the recommendations of the experts.

Action

Planners and policy-makers should take the lead for implementation -- either with national resources or the assistance of external donors.

Commentary

There was no comment on the presentation.

Sustainability

The following definition was proposed by Discussion Group No. 8:

Continued agricultural production with economic returns for covering the socio-economic needs of the farming community without causing deterioration of the natural resource potential of the province, together with safeguards against environmental hazards -- keeping in mind the prevailing farming systems.

Discussion Group No.9: Land Tenure and Land Fragmentation

Issues in Land Fragmentation

- * Land painfully broken into small fragments not easy to manage due to small size.
- * Scattered pieces, separately located.
- * Boundary disputes.
- * Difficult to maintain same crop rotation in a large enough area.
- * At the village level, no crop protection and extension activities can be executed.
- * Waste of time and energy in transferring inputs and outputs from scattered fragments.
- * Population pressure.

Issues in Land Tenure

- * Ownership tenure is fixed and cannot be changed.
- * On the death of the owner, the land is split amongst the heirs -- leading to fragmentation.
- * There is no lower limit to the size of land holding.

Causality

- * Traditionally, everyone wants to own land.
- * Because of the inheritance laws and the fact that there is no lower limit on the size of land holding, fragmentation is inevitable.
- * Lack of off-farm employment opportunities forces people to stay on the land, even if they are underemployed.
- * Due to lack of financial resources and alternative arrangements, no land transfer through purchase is possible.

Constraints

- * Inheritance laws.
- * Traditional and cultural attitudes in favor of retaining land.
- * Lack of cooperative farming.
- * Lack of integrated planning for proper land use.
- * Population pressure.
- * Lack of rural industries and value-adding enterprises.
- * Lack of education.

Solutions and Implementation

- * Proper land consolidation should be undertaken.
- * Cooperative farming should be introduced at the village level to serve as a model.
- * Proper legislation should be enacted and the infrastructure necessary for its enforcement created.
- * Proper land use for integrated plans should be introduced, based on land capability.
- * There should be a commitment from the government to provide adequate financial resources to obtain the optimum.

Action

The local Union Councils, through their chairmen and members, should prepare a proper action plan, including annual work plans, which details the target financial allocations and the mechanism for monitoring and evaluation. These plans should be put into action and made part and parcel of the district/provincial development plans,

Commentary

There was no comment on the presentation.

Sustainability

The following definition was proposed by Discussion Group No. 9:

To apply all the inputs for production within a range of safe limits so that productivity is optimized and damage to the environment is minimal as per the local conditions.

Discussion Group No.10: Livestock and Human Nutrition

Issue

Livestock production and nutrition is an issue for two reasons: first, because of the lack of protein in rural diets; and, second, because of the failure to optimize productivity. Livestock husbandry in NWFP is not as developed as in other provinces. As a result, production and availability of milk, red meat, and poultry suffer. Unlike many other countries, poultry meat is more expensive than beef in Pakistan, particularly in NWFP.

This situation results in certain social and economic costs, including: malnutrition and greater susceptibility to disease; low productivity of labor; and low returns to the producer. On one level, the losers are the poor, since they cannot afford to buy or consume more meat, milk, or eggs. On another level, the whole nation loses, since the long-term sustainability of agriculture is at stake.

Causality

The reasons for this situation stem from the low priority accorded livestock production by the government, both provincial and national, and the low status enjoyed by livestock producers. This is exacerbated by the artificial prices established by the government for animal products, together with the lack of education and training in the rural community.

Critical Factors

The constraints to improved livestock production are as follows:

- * Poor management of animals and other resources.
- * Low genetic potential of animals.
- * Lack of land, feed, and capital resources.
- * Lack of an appropriate marketing system.
- * Pressure from Afghan refugees and their livestock on local resources.

Solutions

There are various ways in which to address this issue, including the following:

- * Increase the production per animal.
- * Provide education at school and through extension.
- * Creation of a separate cadre for Livestock and Poultry Production Service, in addition to the existing animal health services.
- * Establishment of model farms for livestock and poultry.
- * Creation of a poultry research and development institute in NWFP.
- * Provision of incentives to farmers, such as credit, tax concessions, and exoneration from import duties.
- * Development of a processing facility for broilers, eggs, milk, and meat for marketing.
- * Establishment of village-level producer organizations on a cooperative basis for production and marketing.
- * Provision of assistance to the Afghan refugees in order to relieve pressure on local resources.

Implementation

Four steps are necessary to implement these proposed solutions:

- * Creation of a separate ministry for livestock at the provincial level.
- * Strengthening of existing training, research, and outreach facilities at NWFP Agricultural University.
- * Allocation of appropriate funds through federal and provincial governments and donor agencies.
- * Deregulation of prices of livestock and poultry products to promote production on a commercial level.

Actions

The NWFP government should take the initiative in implementing these solutions.

Commentary

In the discussion that followed, several points were emphasized. A question was raised about the primordial role attached to the government in addressing this issue. In response, it was pointed out that, because the government had neglected this sector in the past to the point of discrimination, it was now time for it to make amends and take the initiative.

A further question was asked about the presence of pressure groups in the province who might take some initiative themselves, while at the same time lobbying the government to become more involved. Because livestock production is such a high-risk operation in NWFP, there is very little investment. However, one member singled out the activities of the Aga Khan Rural Support Programme in Gilgit as an example of what can be achieved in terms of creating viable organizations at the village level.

A final point was made emphasizing the close relationship between malnutrition and poverty.

Agricultural Sustainability

The following definition was proposed by Discussion Group No. 10:

Improving the productivity for the general welfare of people along with maintenance and enhancement of natural resources with the aim of striking a balance between basic human requirements, Productivity, and the environment.

Comments from the Chair

In his closing comments, the Vice-Chancellor pointed out that there was little integration in the old concept of self - sufficiency. From the perspective of NWFP, it is necessary to pursue comparative advantage and build on the province's strengths vis-a-vis the rest of the country. This is true for crops, fruit, and also livestock. Half of the province is rangeland and, at present, there is no one agency responsible for proper land use on these rangelands.

There is considerable potential for the marketing of fruit and vegetables, particularly if a central market is established and marketing intelligence is made available. The availability of refrigerated freight cars would enable local producers to take full advantage of the seasonal variations in production.

There is also a need for policy intervention with current prices. Both wheat and meat prices are subsidized to keep prices low so that those of modest means can afford them. In practice, however, what this means is that the rich eat more.

The pressure on the natural resource base has increased human, livestock, and wildlife populations have all increased. A sustainable population level and a sustainable production level go hand-in-hand.

In their closing comments, the facilitators briefly mentioned three preliminary conclusions they had drawn from the discussions:

- * **First:** The presentations were strong on the technical solutions, but weak on implementation and action to be taken.
- * **Second:** The fact that there was no comment whatsoever on the report dealing with lack of longterm planning was ominous. In a sense, all the reports presented were a form of planning.
- * **Third;** Lacking was any discussion of the political dimension, perhaps based on the unjustified assumption that somehow, in spite of evidence to the contrary, the government would be responsible for most of the changes recommended.

In his concluding comments, the USAID representative underlined two points:

- * We must continue the dialogue and move forward and look towards the national conference.
- * We have to do something ourselves and go forth from here and develop our awarenesses further.

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Discussion Group No.10: Livestock and Human Nutrition

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CHAPTER III THE SINDH PROVINCIAL CONFERENCE

Executive Summary

In brief, the following key issues and their possible solution were discussed:

Issue No.1: Waterlogging and Salinity

Principal solutions proposed: lower the water table to a safer level through the installation of main drains, laterals, and farm drains; introduce salt-resistant crops and trees which will draw up the water; encourage livestock production which needs fodder crops with minimum water requirements; involve farmers; and design projects which correspond to the capability of the implementing agency.

Issue No.2: Planning and Development

This group addressed a total of no less than 14 separate issues -- ranging from lack of planning to the grassroots level and shortage of marketing facilities lack of fish harbors, and the slow implementation of development projects.

Principal solutions proposed: planning should be done at the local level; projects should be problem-oriented; establishment of marketing centers; provision of the basic facilities of life; expansion of the present fish harbors and construction of new fish harbors; and the establishment of an implementation unit or committee.

For implementation and action, the following is proposed: local involvement in project design and implementation; the establishment of local committees to run the marketing centers; and the provision of credit for the establishment of small, agro-based industries.

Issue No.3: Water Diversion

Principal solutions proposed: check on water-use corruption; imPlement effective on-farm water management; training program for farmers; and strict enforcement of irrigation department laws.

Issue No.4: Lack of Financial Support for the Agricultural Sector

The solution proposed requires that credit facilities should be made easily accessible to the farming and fishing communities. The interest rates of commercial banks, the ADB, and other loan agencies should be reduced and, if possible, should be eliminated completely -- especially for the small farmers and fishermen.

If this solution is to be implemented, then policies with regard to supervised credit facilities should be framed and strictly implemented. These programs should also be monitored and evaluated through commercial banks, cooperatives, and other credit institutions like the ADBP, especially in the subsectors of fisheries, forestry, livestock, and crops.

Issue No.5: Salt Water Intrusion

Principal solutions proposed: cultivation of salt-tolerant crops; cultivation of Fodder crops; raising forage grasses and shrubs; afforestation; and the preparation of integrated land use plans which are technically feasible, economically viable, socially and politically acceptable, administratively manageable, and ecologically sound.

These solutions must be initiated by the federal and provincial governments through the local councils.

Issue No.6: Urban Expansion

Principal solutions proposed: reduce high rates of population growth through education and birth control measures; and reduce migration of people from rural Sindh, other provinces, and other countries; development of agriculture; and maintenance of law and order.

Issue No.7: Marketing of Commodities and Price Controls

Principal solutions proposed: establish price controls on farm inputs; institute farmer representation on the Price Commission; provide better marketing and storage facilities; and establish incentives for agro-based industries.

Additional Issues: Fisheries

Principal solutions proposed: maintain perennial water supplies for commercially important species requiring estuarine conditions for breeding; develop hatcheries; require the registration of fishing boats; replace the fish auction system with a system of licenses to be awarded only to professional fishermen; and provide credit facilities for the fishing sector.

Additional Issues: Small Farmers

Principal recommendations made: hold future conferences at the village level; make credit more easily available to the real agriculturalists; make distribution of irrigation water more just; make agricultural inputs tax-free; and form committees from the Union Councils to the district level to implement land reforms.

Additional Issues: Poultry

Principal suggestions made: develop a local breed of Poultry; strengthen the centers producing local vaccines; establish more scientific institutions to help the farmers in terms of training and diagnosing the diseases; provide incentives to enhance the productivity and quality of the product; and provide technical assistance in assessing the farm plan prior to sanctioning of land/loans.

Introduction

The Sindh Province Conference was held over a two day period, May 13 - 14, in the Pearl Continental Hotel in Karachi. The conference was attended by some 80 individuals representing the academic, private, public, and small farmer agricultural subsectors. The conference was structured in a similar manner to the NWFP Conference, with the exception that the number of sessions were reduced from four to three to provide for additional time for the discussion groups.

The inaugural session was opened by an introductory address by the conference chairman, Mr. Fazullah Qureshi, Additional Chief Secretary (DEV), Government of Sindh. In his address he noted the mismanagement of Sindh's natural resource base, citing examples such as water shortages, deforestation, loss of mangrove forests, waterlogging, and salinization to substantiate his point. He noted particularly the harmful environmental effects associated with forest conversion to agricultural lands and the resultant impacts of river flow, erosion, and siltation.

A second issue highlighted was the effect of uncontrolled urbanization and industrialization on environmental quality. A third issue raised was the absence of a policy on population growth. Attempts at achieving food security would be in vain until population growth was slowed. He concluded by noting the broad spectrum of subsectors represented in the Conference that would be responsible for diagnosing the problems and prescribing solutions to relevant issues in Sindh. These should be presented in an action plan for the upcoming national conference. In fulfilling their task participants should keep in mind that a balance must be struck between pure conservation and mismanaged development of Sindh's natural resources.

The chairman's comments were followed by brief comments from Dr. Ronald Senykoff on behalf of USAID who, in turn, was followed by the keynote speaker, Mr. Aftab Shahban Mirani -- the Chief Minister of Sindh. He began his address by noting critical environmental issues affecting Sindh Province, stating that rapid population growth has exacerbated these issues resulting in negative impacts, particularly on food security, a situation which if not corrected, can only get worse over time. Despite a growing awareness of the need to manage the natural resource base to ensure food security, he noted that Pakistan still has to import food, partly as a result of mismanagement.

He emphasized the dual economy of Sindh, characterized by a rural economy half of whose population is living below the poverty line without access to water, electricity, and other basic human needs, and a massive urban population which is suffering from water shortages, blackouts, poor transport and other problems, which he attributed to mismanagement.

Addressing agriculture, he noted recent declines in cotton and rice production levels -- despite the fact that pesticide use was on the increase. He concluded by charging the participants with coming up with a list of key issues and solutions to achieve sustainable agriculture in Sindh.

First Plenary Session: Discussion of Agricultural Sustainability and Listing of Key Issues

Papers Presented by the Facilitators

Subsequent to the inaugural ceremony and refreshments, participants moved directly into the workshop's first plenary session. Following opening remarks and personal introductions, brief presentations were made by the facilitators.

Discussing briefly the concept of sustainability, one of the facilitators noted the two critical challenges in development in the 1990s are protection of the environment and the reduction of poverty. He noted that 40 percent of the world's population, some two billion people, of which the vast majority are rural and live in Africa, Asia, and Latin America, depend overwhelmingly on agricultural activities and the existing natural resource base for their daily subsistence. Land was described as the provider of last resort and the crucial relationship between rural impoverishment and environmental degradation was emphasized.

This relationship was subsequently used to examine several current definitions of sustainability. The definition favored by the Brundtland Commission refers to the maintenance or enhancement of resource productivity on a long-term basis. But such a definition fails to note the importance of the quality of life of the people involved.

A second definition, one attributed to a researcher at the World Resources Institute, emphasized the roles of responsibility and stewardship in sustainable development.

A third definition, stemming from FAO's most recent **State of Food and Agriculture** report, dealt more specifically with the natural resource base emphasizing the environmental, technical, economic, and social aspects of the concept.

The presentation concluded by noting that in essence, sustainable development incorporates improvements in both the natural resource base -- production with environmental protection -- and human welfare.

The second facilitator took a different tack, suggesting that another approach useful for considering the concept of sustainable development was to examine non sustainable land and water-use practices which negatively affect agricultural production. Two examples were discussed -- the improper use of pesticides and poor management practices associated with watersheds. Regarding the former, environmental issues associated with pesticide use were noted. Concern over these issues was cited as the major reason for the development of integrated pest management (IPM) technologies which are increasingly being adopted by countries around the world. Indonesia was cited as an example where there existed a national level commitment toward IPM.

Issues associated with watershed management were discussed with specific reference to Sindh -- emphasizing the interdependencies of watershed processes and the downstream effects associated with poor management practices in upland areas.

The presentation concluded by noting that most nonsustainable land and water-use practices had recognized technical solutions. However, each issue also came with its own set of socio-economic, institutional, and political aspects which also must be addressed in order for the technical solution to have its desired effect. Finally, special mention was made of the need to consider local knowledge in thinking about sustainability and a list of critical questions was presented for the groups consideration in the subsequent discussions.

Open Discussion and Comment

The floor was then opened for comments and a general discussion on sustainability in the agricultural sector. The first comment made note that the fishing subsector is often ignored within the agricultural sector. A specific issue mentioned was the decreasing quantities of freshwater reaching the coast, attributed to the construction of a barrage and diversion of water for irrigation purposes. This has affected coastal estuarine conditions and resulted in reduced populations of several commercially important fish species.

Two sets of comments from participating small farmers noted that critical issues affecting their community were crop losses attributed to insects, low rainfall, the absence of water for drinking purposes much less agriculture, and the need for the government to address these issues.

A representative from the livestock industry noted that this subsector has traditionally been ignored in Sindh, illustrated by: the absence of any program to replace depleted stocks slaughtered for market; high interest rates of 15 percent charged by the Agricultural Development Bank for loans to replenish stock; the absence of technical assistance to help producers breed higher quality stocks; and the fact that donor assistance goes to officials rather than breeders.

A general comment was made that a reassessment of sector priorities is required. Focus should be shifted to agricultural research and education, emphasizing national economic development issues. The output derived from this new emphasis should then be combined with extension to meet the needs of the country. This should be autonomous and efficient, and free from bureaucratic bottlenecks.

Initial Definitions of Sustainability

Two general definitions of agricultural sustainability -- one general and the other specific, were proposed during the first plenary session:

Definition No.1; Agricultural sustainability is achieving and maintaining the quality of life in developing countries.

Definition No.2: Sustainability is affordable agricultural inputs, available in a timely manner, fairness in the distribution of irrigation water, fairness in tax collection, and non interference by the government in the marketing of agricultural commodities.

It was agreed that the group would return to these definitions in the second plenary following the discussion group session.

Identification and Prioritization of Issues.

Following the general discussion a total of 31 issues were identified as affecting agricultural sustainability in Sindh. Of these 31 issues, the top ten were identified as priorities through a process of written ballots submitted by the participants. These are presented in decreasing order of number of votes received in Table III-1

It was decided that personal security, while a significant constraint to agricultural productivity in Sindh, was beyond the scope of the workshop. Moreover, given time constraints and the number of participants in the workshop, it was decided to reduce the number of issues from ten to seven. The actual issues discussed are listed in Table III-2.

The Discussion Groups

Based on the experience derived from the previous workshop in NWFP, the process of discussion group formation was modified for Sindh. Rather than allowing potential group participants to select the issue of their choice, participants were assigned at random. This had the dual advantages of ensuring even size and broad mixes of sectoral and technical disciplines in each of the groups. With this exception, the procedures remained the same. Each group elected a chairman and a secretary. The chairman was responsible for directing the group and the secretary for preparing a written report following suggested guidelines. The chairman was responsible for presenting the group's conclusions and recommendations during the second day of the workshop in the final plenary session.

The seven discussion group reports and relevant comments from the plenary are provided below. In addition, several unsolicited written comments/papers which were passed to the chair during the workshop have been included for the record and follow the seven papers.

Table III - 1
Sustainability Issues in Sindh Province

Issue	Votes	Place
Waterlogging and salinity	40	1
Personal security	23	2
Planning and development	22	3
Water diversion	21	4
Lack of financial inputs	20	5
Salt water intrusion	18	6
Urban expansion	17	7=
Ag marketing/commodities/pricing	17	7=
Role of the private sector	16	9=
Institutional constraints	16	9=
Technology generation for arid areas	16	9=
Communication constraints	15	12=
Food security	15	12=
Taxes on agriculture	15	12=
Pest and pesticide management	13	15=
Lack of institutional support for women	13	15=
Livestock and poultry development	13	15=
Deforestation, watershed management, and soil erosion	12	18=
Demographic pressure on barani lands	12	18=
Lack of agribusiness development	10	20
Overfishing	9	21
Land tenure relationships	8	22=
Accountability/equitability	8	22=
Natural forest management and preservation of biological diversity	7	24=
Information needs for effective planning	7	24=
Present pricing and impact on environment	7	24=
Credit in kind to small farmers	7	24=
Rangeland management/desertification	6	28
Critical habitat loss -- particularly mangroves	5	29
Adequate electrical power for small farmers	3	30=
Crop management and zoning	3	30=

Table III - 2
Discussion Issues in Sindh Province

Water logging and salinity

Planning and development

Water diversion

Lack of financial inputs

Salt water intrusion

Urban expansion

Agriculture marketing/commodities/pricing

Discussion Group No.1: Waterlogging and Salinity

Causes of Waterlogging and Salinity

There are three major causes:

- * Rising water table
- * Seepage of water from canals
- * Excessive irrigation

These in turn lead to: poor germination; lower yields; crop failure; and abandonment of land. Thus crop production becomes unsustainable. The lesser gradient of the land means that Sindh suffers more than other provinces.

Remedies and Solutions

Prevention of Waterlogging and Salinity

The remedy is to lower the water table to a safer level, about two to three meters. The projects should aim to install a main drain, laterals, and farm drains. This can be done either by installing tile drains, which are capital-intensive with low running costs, or by sinking tubewells, with a lower capital cost, but higher maintenance and recurrent costs. The group was opposed to tubewells, since they are less efficient and return salts to the soil, due to the ineffective disposal of saline water.

There are already many drainage projects in Pakistan, for example the Salinity Control and Reclamation Project (SCARP). Experience has shown that the very large-scale

drainage projects are very difficult to manage due to:

- * Shortage of money
- * Lack of qualified staff
- * Poor performance by contractors
- * Poor management

Hence, projects should be designed to correspond to the capability of the implementing agencies. Where possible, they should be labor-intensive, using local material and local labor.

More Efficient Water Distribution

The crop water requirements should be determined for different ecological zones, and proper irrigation scheduling should be introduced. This will avoid over irrigation and inequitable distribution, leading to a rise in the water table.

Additional Steps

The following additional steps should be taken:

- * Involve farmers: what are their views?
- * Introduce crops which are resistant to salt. In this way, yields and production can be maintained even when the water table is high.
- * Introduce trees, such as bamboo and Eucalyptus, which will draw up the water.
- * Discourage the cultivation of "water-loving" crops. For example, replace a crop like rice, which has high water requirements of 70 ac inches, with jute, which requires only 30 ac inches.
- * Encourage livestock production, which requires fodder crops with minimum water requirements.
- * Encourage the cultivation of crops like dates and lucerne.
- * Carry out research into low-cost techniques, such as "dry drainage".

Commentary

During the discussion, the group was asked to clarify what it proposed to do about salinity and how it intended to modify the irrigation schedule. The question of

measurement was raised on both counts. One commentator clarified the distinction between waterlogging and salinity: whereas all waterlogged soils are saline, all saline soils are not necessarily waterlogged. In addition, one should distinguish between mechanical and biological methods of reclamation.

The group responded that capital-intensive projects are really the responsibility of the government -- as is research. Improved on-farm management is important, and cost-sharing can be introduced with users for the installation of farm drainage. The group did not consider any problems that may originate upstream in the Punjab.

Discussion Group No.2: Planning and Development

Introduction

Our group discussed a total of 14 separate issues related to planning and development. In order to simplify matters, we discussed each issue individually and have done the same in presenting the results.

Issue No.1: The Problem

The problem is lack of planning at the grassroots level.

Limitation

At present, planning is done at the top by people who do not know the nature of the problems faced by the people.

Solution

Planning should be done at the village level, where local people should be involved and asked to participate.

Implementation

The projects prepared by local people at their level will be owned by them. As a result, they will cooperate with the implementing agency in execution of the project.

Immediate Action

A small committee comprised of local people should be formed as the project is being prepared. It will be responsible for implementation and execution, under the supervision of the executing agency.

Issue No.2: The Problem

The problem is that projects are not problem-oriented.

Limitation

At present, the projects prepared at the top do not coincide with the problems of local people.

Solution

The projects should be problem-oriented -- problems which are faced by the farmers and for which immediate solutions are needed.

Implementation

The projects should be site specific so as to get solutions for local problems. Solving local problems means providing people with the necessary technology which, when used by them, will increase their farm productivity.

Immediate Action

The end-users or clientele of the technology should be involved in implementing the project proposed for their problems.

Issue No.3: The Problem

The problem is lack of facilities for marketing agricultural commodities.

Limitation

At present there are no marketing centers where agricultural commodities can be sold. Instead, they are purchased by the middle man who does not pay an appropriate price for the product.

Solution

Establishment of marketing centers by the government.

Implementation

The marketing centers shall be held responsible for the purchase of the agricultural commodities at the floor prices fixed by the government. In this way, the role of the middle man will be minimized.

Immediate Action

Small committees, representing local people, should be established to run the marketing centers.

Issue No.4: The Problem

The problem is lack of storage facilities for perishable agricultural commodities.

Limitation

Due to the non availability of cold storage facilities, surplus agricultural commodities, particularly the more perishable, turn rotten, forcing the producers to operate at a loss.

Solution

Construction of cold storage facilities.

Implementation

The surplus commodities may be stored and preserved in cold storage for which farmers may be asked to pay a nominal fee.

Immediate Action

Three steps are necessary:

- * Construction of cold storage facilities at the town level without further loss of time.
- * Training of farmers in the preservation of perishable commodities.
- * Provision of chemicals for preservation of "agricommodities".

Issue No.5: The Problem

The problem is rural-urban migration, the movement of the population from the villages to the towns.

Limitation

Due to the non availability of the basic facilities of life, such as roads, health, light, transport, education, and job opportunities, the people migrate from the villages to the towns.

Solution

Provision of the necessary basic facilities of life.

Implementation

Government may plan and launch such projects by which villages are provided with the necessary, basic facilities of life, without which villagers would migrate.

Immediate Action

Preparation of projects at lower or village level for provision of facilities.

Issue No.6: The Problem

The problem is the uplift of rural women folk.

Limitation

At present, there are no adequate programs or projects for the uplift of women.

Solution

Establishment of small industrial units at the village level.

Implementation

Small industrial units may be established where training facilities for women may be made available to train them to undertake some work.

Immediate Action

Three steps are necessary;

- * Establishment of small industrial units
- * Provision of training facilities
- * Facilities for marketing the produce

Issue No.7: The Problem

The problem is the lack of appropriate prices for agricultural commodities.

Limitation

At present the prices of inputs are enhanced at higher rates, whereas the prices of agricultural commodities are not raised at the same rate and pace.

Solution

Enhancement of prices of agricultural commodities and bringing them at par with international prices,

Implementation

The prices may be fixed periodically at the international level.

Immediate Action

The prices of main crops like wheat, cotton, and rice should be fixed at a par with international prices.

Issue No.8: The Problem

The lack of educational facilities in the villages.

Limitation

At present, education facilities in the villages are meager or negligible. This results in uneducated youth.

Solution

Construction of schools, at least primary schools, for both boys and girls, but separately.

Implementation

Declaration by the government that education up to primary level is compulsory for all children, both male and female.

Immediate Action

Two steps are necessary:

- * Construction of primary schools for both girls and boys.
- * Provision of facilities for teachers to impart education to children in these schools.

Issue No.9: The Problem

The problem is lack of fish harbors.

Limitation

At present, there are very few fish harbors which are being utilized beyond their capacity. This results in the decay of fish, incurring a loss for the fishermen.

Solution

Two solutions are proposed:

- * Construction of more fish harbors.
- * Expansion of the present fish harbors.

Implementation

More fish harbors means better facilities for fish which, in turn, will render better prices for the fishermen.

Immediate Action

Two actions are proposed:

- * Expansion of the present fish harbors.
- * Provision of better sanitary conditions in the existing fish harbors.

Issue No.10: The Problem

The problem is disposal of industrial waste.

Limitation

At present, industrial waste is disposed of in Lyani Nala, which ultimately ends up in the sea. This affects fish production, due to the production of toxic materials and gases.

Solution

Construction of suitable plants for disposal of industrial wastes.

Implementation

Industrial wastes should be disposed of through such waste plants, where toxic materials and poisonous gases are trapped.

Immediate Action

Industrial wastes should first be treated with chemicals that will nullify the effects of poisonous materials and gases before being disposed of.

Issue No.11: The Problem

The problem is lack of livestock development.

Limitation

Livestock development is ignored in Sindh. No help or subsidy is given to the livestock man by the government.

Solution

Salvation of livestock in Sindh by establishment of Livestock Development Boards.

Implementation

The government may constitute Livestock Development Boards, composed of local people, so that proper planning for development of beef and milch animals may take place.

Immediate Action

Two steps are proposed:

- * Provision of loans on soft terms by the government.
- * Encouragement of the private sector to invest more in the livestock sector.

Issue No.12: The Problem

The problem is deforestation and lack of development of forest wealth.

Limitations

At present, the trees are cut indiscriminately in the rural areas.

Solution

Scientific planning for increasing forest wealth.

Implementation

The government may prepare plans or projects for planting more trees, so as to enhance forest wealth in rural areas.

Immediate Action

The government may provide samples of various trees free to the inhabitants of rural areas for planting in waste lands, and along roads, canal banks, and farm boundaries.

Issue No.13: The Problem

The problem is lack of credit facilities.

Limitation

Very meager or negligible credit facilities exist at present for the establishment of agro-based small industries. As a result, the growth of such industries has been hampered.

Solution

Provision by the government of adequate credit facilities on easy terms and conditions for the establishment of small, agro-based industries.

Implementation

The provision of credit facilities will help in the establishment of more units, which will dispose of the rural art material/handicrafts at reasonable prices. This will aid in elevating the socio-economic life of the rural masses.

Immediate Action

Provision of sufficient credit facilities.

Issue No.14: The Problem

The problem is slow implementation of development projects.

Limitation

After the approval of development projects, the same are not implemented in the spirit in which they were prepared. As a result, appropriate benefits cannot be derived, due to the late completion of such projects.

Solution

The establishment of an implementation unit or committee.

Implementation

The establishment of such a unit or committee, with local representation, will help in the timely completion of development projects.

Immediate Action

The committee should be constituted with local authority for implementing the project. The committee shall be constituted simultaneously with the approval of the project.

Commentary

A variety of comments and suggestions were offered. The point was made that planning and development are divorced and, consequently, reiterating a point made by the group, projects should be formulated in terms of local needs and requirements. In addition, planning is a philosophy, which presently has little relation to reality. As a result, there is a need for a closer relationship between planning and implementation, with more attention paid to monitoring in order to improve the process.

However, another commentator pointed out that, in fact, the government plans very well and it is implementation that is weak. Planning should be part of sector analyses and that policy is 75 percent of planning. In addition, planning is presently over centralized, there is no coordination with local Chambers of Agriculture, and there is no accountability on the part of government departments.

The importance of revising pricing structure and policy was reiterated. According to one commentator, 1989 prices for agricultural commodities were 42 percent of those prevailing in 1976, 13 years ago.

Some of the small farmers present were asked for their views on local participation in planning and they emphasized the need for an accurate, updated soil survey on which to base realistic planning. They expressed their keen desire not only to participate in such a survey, but also at other levels of the planning process.

Discussion Group No.3: Water Diversion

Nature of the Issue

The following characteristics of water diversion in Sindh have to be considered:

- * The Indus Basin Treaty
- * Inter-provincial distribution of water
- * Effect of dams and barrages on the distribution of water, including estimations for the Kalabagh dam
- * Inter-Sindh irrigation system
- * Rain water use
- * Flood waters and flood damages

Underlying Driving Forces

The critical forces that underlie water diversion include the following:

- * Climate and weather conditions
- * Constraints against the treaty
- * Sindh Tas Treaty
- * Chasma link canal
- * Distribution of water from barrages and canals is not proper
- * Politics and corruption
- * Lack of knowledge of water management, specifically: land levelling; crop requirements; water courses; and cropping intensity

Critical Constraints to Solutions

There are four major constraints;

- * Lack of implementation of the law
- * Lack of sense of responsibility
- * Illiteracy about the use of water in agriculture
- * Inadequate funds

Solutions

The following solutions are proposed:

- * To get adequate supply of water from the sources
- * To get water as per requirements of the province
- * Efficient working and proper maintenance of barrages and canals
- * Check on water-use corruption
- * Effective role of on-farm water management
- * Educational programs for farmers in the proper use of water
- * Strict implementation of irrigation department laws
- * Development of catchments for excessive water during floods

- * An independent canal which should work during flood seasons for Thar
- * A canal/catchment for Kohistan area with special reference to the good agricultural lands in Dodis District
- * Use of underground sweet or brackish water for agriculture or potable purposes

Implementation of Solutions

These solutions can be implemented by the following means:

- * Open negotiations with Bharat through some international forum to provide more water.
- * Federal government may ensure required supply of water to Sindh.
- * Check corruption in irrigation and related departments through the creation of committees consisting of members from the judiciary, representatives of the area, and members of the water users associations.
- * On-farm water management may play a greater role.
- * Irrigation and agriculture departments may conduct one week courses on proper and judicious utilization of water as per basic concepts of different crops.
- * Detailed professional studies may be carried out to establish catchments for rain water and its further distribution in Kohistan and Thar areas.
- * Use of marginal, brackish water for agricultural crops.
- * Use of water from L.B.O.D. for irrigation purposes.

Commentary

Several important points were made in the discussion that followed:

- * Who are we talking about when we refer to lack of responsibility? Who are the people involved?
- * One way to make more water available would be through the forced melting of glaciers, but the idea of sustainability implies leaving something for generations to come. Would this be compatible with sustainability and would it be compatible with the teachings of the Quran.

One of the problems underlying water diversion has been the recommendation to plant certain crops with little consideration of their water requirements. In the future, crop selection should be adapted to water availability.

Discussion Group No. 4: Lack of Financial Support for the Agricultural Sector

Issue Characterization

Proper financing is the prerequisite for sustained development of the agriculture sector. The rural masses of Sindh engaged in agriculture have no sound financial foundation and therefore the investments are always inadequate, resulting in low productivity and the degradation of land resources. Proper investment in agriculture is imperative whether it be in crops, livestock, or fisheries. Inadequacies of financial resources are causing environmental problems. A vicious circle of low investment and low productivity has been created in Sindh which hampers proper development of agriculture and prevents it from reaching the sustainable stage.

Driving Forces

Lack of proper financial institutes requires immediate attention and strategies for establishment of such lending agencies in the province. The loan procedures of commercial banks and the Agricultural Development Bank (ADB) are not only cumbersome and time consuming, but also involve lots of illegal practices, which always increase the cost of production of various agricultural commodities. The loan procedures for fishing are even more difficult as commercial banks and the ADB do not mortgage the boat and nets and, therefore, ask for some other property to serve as collateral, which poor fishermen never possess. Due to inadequate credit agencies, the poor farmers and fisherman are falling into the traps of greedy loan agents who charge very high rates of interest, unimaginable in the modern economy.

Inhibiting Factors

Agriculture is an uncertain business open to the vagaries of nature, with a very high risk factor. This makes the investment risky and the rate of return uncertain. The lending agencies hesitate in providing adequate investment and always undervalue the crop resources of farmers. The same happens with the fishing and livestock sectors. This is particularly true for the small farmers and fishermen. The influential big landowners even obtain credit from government agencies and commercial banks for nonproductive purposes. In contrast, the small farmers and fishermen do not get credit to meet their genuine needs.

Proposed Solutions

The solution to the problem requires that credit facilities should be made easily accessible to the farming and fishing communities. The interest rates of commercial banks, the ADB, and other loan agencies should be reduced and, if possible, should be eliminated completely -- especially for the small farmers and fishermen,

Implementation of Solutions

Financial resources for agriculture should be maximized, keeping in view the importance of agriculture -- not only for its sustainable development but also as an essential element of human survival. Resource allocation for investment in agriculture is to be maximized, even by sacrificing other sectors with these financial resources. Even assistance from international donor agencies should be accessible credit in rural areas of preliminary financial resource base continued and strengthened from the community. This will no doubt need of the farming community. he utilized for easily the province. Once the is established, it may be savings of the farming the motivation and education

Immediate Proposed Actions

Policies with regard to supervised credit facilities should be framed and strictly implemented, and also monitored and evaluated through commercial banks, co-operatives, and other credit institutions like the ADB, especially in the subsectors of fisheries, forestry, livestock, and crops.

Commentary

Various commentators elaborated on the recommendations made by the group. Among the more relevant points were the following:

- * If credit is to reach the small farmer, it should come interest-free and without the requirement for collateral.
- * Given the uncertainty of agricultural production in Sindh, crop insurance should be required of those receiving credit.
- * Given the different agro-ecological zones in Sindh, credit conditions, requirements, and availability should be tailored to local conditions.
- * Given the complexities of the land tenure situation, there is a need to carefully define who should qualify for agricultural credit.

Discussion Group No.5: Salt Water Intrusion

Issue Characterization

This issue is not only of a great concern to the agriculturalists but much of the population as a whole, since the impact of salt water intrusion is affecting the entire socio-economic and cultural setup of the people of Sindh. As a result, the soils, the base of agriculture, are, due to pollution, losing their fertility; drinking water is getting salty; and more and more land is going out of cultivation.

Underlying Driving Forces

Since the province is geographically surrounded by the sea on one side and the mountains on the other, eventually there is a natural tendency for the ground water to become saline, due to the hydraulic pressures from the sea. Other underlying driving forces are:

- * Faulty canal irrigation systems
- * Inadequate provision of drainage systems
- * Side seepage from the canals
- * Poor water management on farms
- * Extreme aridity

Inhibiting Factors

Factors inhibiting solutions to the problem include:

- * Proper information and data about ground water resources, quantity-wise as well as quality-wise, are lacking.
- * Technical know-how about the use of saline water on different kinds of soils and for different crops is available, but not disseminated.
- * Financial constraints.
- * Lack of infrastructure such as roads, electric power, fuel, and machinery.

proposed Solutions

Solutions suggested by the groups are:

- * A hydrological survey to identify, classify, and delineate groundwater resources from the user's point of view, using three classes defined by salt concentration : 0-699 ppm, 700 - 1499 ppm, and greater than 1500 ppm.
- * Cultivation of salt tolerant crops.
- * Cultivation of fodder crops.
- * Raising forage grasses and shrubs.
- * Afforestation.
- * Livestock watering points, especially for the Tharparkar desert.

Implementation of Solutions

These solutions must be initiated by the Federal and Provincial governments through the local councils.

Immediate Proposed Actions

To the make agriculture sustainable in the area, the following steps are proposed:

- * Preparation of integrated land use plans which must be:
 - technically feasible
 - economically viable
 - socially acceptable
 - politically acceptable
 - administratively manageable
 - ecologically sound.
- * Selection of crops and plants which can be grown successfully with salt water.

Commentary

In the discussion that followed, two relevant points were made. The first emphasized the importance of integrated landuse planning in order to effectively incorporate several of the recommendations made. A second point underscored an earlier recommendation made by the discussion group, the productive role that salt-resistant crops can play in combating saltwater intrusion.

Discussion Group No.6: Urban Expansion

Issue Characterization

Urban expansion is a serious issue in Sindh. The province has the highest percentage of urban population in the country. Sindh has 40 percent, in comparison with the next largest province which has 25 percent. The most serious source of urban expansion is caused by the people coming from foreign countries like India, Bangladesh, Afghanistan, Iran, Burma, and other provinces in the country. It has resulted in ethnic conflicts, and the fervour is increasing with time.

The insecurity of life in rural areas of the province and weakening of agriculture have accelerated the migration of the poor into urban areas. Already the facilities are inadequate for the populations of the cities. New population in the cities will aggravate the situation.

Urban expansion gravely disturbs agricultural lands near the cities.

The problem of urban expansion can be solved only with changes in existing policies and the adoption of new policies. The problem cannot be solved immediately and it will take some time for policies to have an effect.

Underlying Causes

The underlying causes identified by the group are:

- * High birth rates
- * Migration of people from other provinces of the country
- * Migration of people from other countries
- * Migration of people from the rural areas of the province

Migrants as a percentage of the population of Sindh are estimated to have increased from five percent in 1947 to 40 percent in 1990.

Proposed Solutions

The group identified the following solutions to the problem of urban expansion and its effects on sustainable agriculture:

- * Reduce high rates of growth in the population through:
strengthening of institutions working for population planning in the cities of Sindh
social education birth control measures

- * Reduce migration of people from other provinces of the country through:
 - enactment of laws to regulate inter-provincial migration
 - repatriation of the people to their places of origin
 - changes in employment policies of the federal government causing the migration to Sindh
 - changes in location policy of industries in Sindh to discourage the concentration of the population in a few cities.
- * Reduce migration of people from other countries through establishment of organizations to check settlement of illegal migrants in the province.
- * Reduce migration of people from rural areas of the province to the urban centers of Sindh through:
 - development of agriculture in the provinces provision of adequate facilities for education housing, electricity, telephone, and other needs maintenance of law and order in the rural areas.

Immediate Proposed Actions

The proposed actions are:

- * Restoration of law and order in the rural areas
- * Solve the problem of agriculture in the province
- * Changes in location policy of industries in the province
- * Changes in the employment policy
- * Enactment of laws to regulate inter-provincial migration in the country
- * Establishment of an organization to check the settlement of illegal immigrants in Sindh particularly
- * No further issue of domicile/permits to non locals in the province

Inhibiting Factors

- * Political: Since Sindh has no autonomy, it cannot adopt policies to control the migration in the provinces.
- * Financial: The province has no adequate financial resources to invest in the rural areas to provide facilities to discourage the migration from rural areas to the urban centers.

- * Institutional: Inability of government organizations to address the problems of: agriculture; rural areas; urban centers; and law and order in the rural areas.
- * Lack of political will of the present government to address this issue.

Commentary

Several important points were made in the ensuing discussion. Among the more relevant for agricultural sustainability were the following:

- * There is a need for a short-term policy to check migration into Sindh from other regions of Pakistan and also for a long-term policy to check illegal migration from neighboring countries. However, as one commentator pointed out, free movement within Pakistan is guaranteed by the constitution.
- * The role of government is very important in checking migration and assuring law and order. This would provide sufficient security for people to return to rural areas and engage again in agricultural activities. Non governmental organizations (NGOs) can play an important role in this process.
- * Historically, urban migration and industrialization have helped absorb excess rural labor and created a large urban demand for agricultural products. In the case of Sindh, however, care must be taken to distinguish between industrial expansion and abnormal migration.

Discussion Group No.7: Marketing of Commodities and Price Controls

Issue Characterization

The Price Commission is a federal entity. The support prices are fixed on the basis of prices in Punjab. Cotton, the major crop in Sindh, is harvested earlier than in Punjab. The Price Commission fixes the price 25 - 30 days after the Sindh cotton is harvested.

The Price Commission should announce the prices well before the sowing of the crop. For wheat, the support price support should be announced in July. For cotton, it should be announced in January.

The cost of input or expenditures for the crop along with the inflation index should be considered before fixing the price support. Incentives for the farmer must also be considered, especially in case of essential commodities.

Wheat is an essential commodity. For the last several years, Pakistan was importing wheat on a large scale from the international market on a cash basis. The amount of wheat purchased is always more than a million tons. The price paid is around \$200 per ton or Rs 5000 per ton in local currency.

An additional amount of about \$50 per ton is spent on shipping and handling of imported wheat. This comes to RS 250 per maund. This much money we are paying to foreign farmers to buy this wheat. If the government pays one half of this amount in local currency to Pakistani farmers, about Rs 125 per maund, local farmers will grow more wheat and Pakistan will not suffer a wheat shortage.

Presently Pakistan imports edible oils worth more than one billion dollars per year. The hybrid seed of sunflower is sold to the growers at Rs 3280 per maund. But at the time of purchase, the government buys at Rs 210 per maund from the farmer. Because of this low support price, the government has to spend more than a billion dollars annually on the import of edible oil.

The cost of growing cotton has gone up over the past several years. The cost of pesticides has gone up 450 percent in the last few years, and the cost of fertilizer has gone up more than 100 percent, while the cost of raw cotton has remained about Rs 300 per maund.

The problems are:

- * Inadequate communication and transportation facilities.
- * Inadequate storage facilities.
- * Lack of export opportunity.
- * Tella tax/local council tax.
- * Lack of agro-based industries.
- * Adjustment and fixing of price supports need to consider increases in cost of seed, fertilizer, and agricultural equipment before being finalized.

Solutions

Solutions identified by the group are:

- * Price controls of farm inputs.
- * The inflation index of the input price should be considered before fixing the support price.
- * The progressive farmers need to be represented on the Price Commission.
- * Provision of better marketing facilities.

- * To provide facilities for packaging of agricommodities at the time of harvest.
- * To provide facilities for the export of agricommodities.
- * To abolish the tella tax on all agri-commodities and farm inputs.
- * Revenue tax incentives for agri-commodities exporters.
- * To establish agro-based industries,
- * To provide refinancing schemes for agri-commodities export.
- * To provide facilities for farmers to construct silos for grain storage.
- * To provide training for farmers in post harvest loss and reduction of perishable crops.

Commentary

In the discussion that followed, several key points were made:

- * There is a need: to establish a relationship between supply and demand for agricultural commodities; introduce crop zoning; and to announce floor prices before sowing begins.
- * A Price Commission should be established at the provincial level to recommend fair prices for farmers. Farmers, particularly progressive ones, should participate in this commission.
- * Checks should be introduced to control the middlemen, who already make lots of money off the producers.
- * wholesale markets must be located near large cities.

Unsolicited Reports

Fisheries

The following recommendations were submitted by the Sindh Progressive Mallah Organization (Mallah Muhammad Arab, Chairman) in support of the Sindh fisheries sector:

- * The fisheries sector should be regarded as part of the agriculture sector.
- * Consideration should be made to maintain perennial water supplies required for commercially-important fish species requiring estuarine conditions for breeding.

- * The development of hatcheries is required for the protection of fish and the growth of "hila" and "palla."
- * The fish auction system in Sindh should be abolished and replaced with a system of licenses to be awarded only to professional fishermen.
- * Registration of boats should be required.
- * Credit facilities in the fisheries sector should be made available, particularly for the purchase of boats, nets, and allied activities.

Small Farmers

The following suggestions were forwarded by the Sindh Progressive Agriculturalists Association (Mr. Yar Mohd Shah) and shared by a number of small farmers who attended the workshop. These were:

- * As the socio-economic, soil, and climatic conditions in the various parts of Sindh are quite different, it would be worthwhile to hold future workshops on the smaller levels in the various districts of Sindh so as to get a broader variety of suggestions from the rural population and include them in the policy-making and planning for agricultural development.
- * The system of granting loans to the agriculturalists by the banks should be made easier. The real agriculturalists should be given these loans on easy terms and low interest rates, instead of giving them on the basis of bribes and favoritism.
- * Water distribution should be made on the basis of "justice." A meter gauge system should be adopted because the landlords at the front end of the water courses take away more than their fair share and the "tailenders" suffer very much. As a result, millions of acres of land remain uncultivated.
- * Agricultural implements, fertilizer, and pesticides should be made free of tax. If not, some other suitable methods need to be adopted where the agriculturalists be given these things tax-free, according to their landholdings. Afterwards, these implements can be sold in the open market.
- * Introduce modern techniques of agriculture and implements to the real agriculturalists in every district of Sindh and the use of model farms be Prepared to demonstrate the use of techniques and implements.
- * Formation of committees from the Union Councils to the district level to implement land reforms.

- * Small agro-based industry be established in various parts of Sindh based on the crops/raw materials produced in the areas. More sugar mills be stopped in Sindh because they are a cause of waterlogging and salinity.
- * Cold storage be established at the taluka level to stop the wastage of fruits and vegetables. This will give food prices to the agriculturalists and save them from the cruel clutches of the middleman.
- * Agriculture should be practised as an industry. Agriculture is the backbone of the economy. Government should come forward to help and support this by declaring it as an industry.

poultry

Recommendations regarding the poultry subsector were submitted by Shafqat Fatima Rehmani (Project Director, Poultry Vaccine Production Centre, Korangi Karachi). The following problems were identified:

- * No distinction between small and big farmers. As we know, all big farmers run the poultry farm as a side business. There are some farmers whose source of income is only poultry farming and, if they face continuous loss, they close their farms whereas the farmers who run poultry as a side business can compensate the financial loss easily. The government sector and loan agencies should distinguish such things prior to sanctioning the loan/land to the poultry farmers. Indemnity should be paid only to those who really need it.
- * Planning and designing of poultry farms. The government sector should realize the importance of the technical expertise needed to design/plan the poultry sector. Therefore, prior to sanctioning the land for the purpose, technical experts should recommend the construction plan, to avoid the future unseen problems for the farmers as well as the industry. For example, presently in poultry estates all farms are attached wall-to-wall and the diseased birds/dead birds thrown to other farms next door, serving to spread the disease. Therefore, the government should ask the farmers to fix the incinerators to dump their dead/culled/discarded birds and material.
- * Lack of Training and Diagnostic Centre. The Province of Sindh does not have enough training institutions/centers to train the people/farmers. Therefore, it is necessary to train the people who should not invest their money until they have some knowledge/training experience in poultry farming. The government agencies should make some sort of terms and conditions prior to sanction the land/loan facility to the applicant.

- * The country is importing day-old chicks from all over the world so all the breeds available anywhere in the world are available in Pakistan, Similarly, viruses and diseases are present and we are importing the vaccines of different diseases, irrespective of their need. Due to the import of live virus vaccines, the disease exists but unfortunately we don't realize the importance of diagnostic kit to diagnose the disease. And we don't have the diagnostic lab equipped with sophisticated equipment to diagnose the disease present at the farm. No one can give recommendations. Therefore, it is important that the government should put more emphasis on establishing a diagnostic laboratory to solve the disease problem in the poultry industry. A recent example of Rs 320 million loss in the broiler industry during 1986-1988 was due to the non-availability of the diagnosing facility in the country.
- * Incentives to the technical experts. During the establishment of a scientific center/organization neither the donor agency nor the government agency considers the strengthening of that institute. The result is that after a certain period the scientific institute becomes an office of clerical people. To avoid such a tragic thing, it is necessary that the government should give some incentives to their technical staff so they shouldn't quit their job. It is very important for the smooth running of any research/production center that their trained staff should stick with their job.
- * Problems of taxation and the middleman also exist in the poultry industry.

The following suggestions were forwarded:

- * Technical experts should assess the farm plan prior to sanctioning of land/loans.
- * More scientific institutions to help the farmers in terms of training and diagnosing the diseases.
- * Epidemiological studies to carry out the etiology of the disease.
- * Emphasis should be given to develop a local breed and to strengthen the locally-produced vaccine centers.
- * Technical experts from institutes/organizations should provide incentives to enhance the productivity and quality of the product.

Additional Thoughts on Sustainability

The following were additional suggestions for increasing sustainability of agricultural production put forward by Mr. Kabir Ahmed Nizamani:

- * Provide subsidies on agricultural inputs to the farmers (fertilizers, pesticides, and other agricultural commodities).
- * Maintain a minimum price support which should be fixed after consideration of costs of inputs and inflation.
- * Address waterlogging through construction of drains to the seas and tax deduction for losses.
- * Provide subsidies on electric power supplies needed for tubewells and lift pumps-
- * Farm to market roads,
- * Support prices should be announced well before crop sowing (i.e. July for cotton and January for wheat).
- * Agribusiness courses should be taught in agricultural universities.
- * Provision of storage facilities.
- * Increase in export opportunities.
- * Abolish the tella tax on all agricultural commodities and inputs.
- * Establishment of agro-based industries.
- * Facilities for transport of agricultural commodities.
- * Establish a pesticide potency checking system in every district.
- * Provide for a fair and timely availability of irrigation water supply,

Comments from the Chair

One of the facilitators proposed a number of themes which occurred through several presentations for consideration in reopening the discussion of sustainability. These were:

- * **Linkages:** examples of this included:

insecurity and declining agricultural productivity contributing to urban migration resulting in both negative and positive effects on agricultural sustainability

poor land use practices contributing to deforestation, accelerated erosion, downstream sedimentation, and its effect on water distribution
positive adaptations to issues such as waterlogging, where farmers grow water-tolerant grass species which can be used as fodder for increasing populations of livestock.

- * **Balance:** Examples included;

ensuring the required amount of freshwater reached the sea to safeguard human coastal ecosystems

taking a cautionary approach to the development of glacier systems for new sources of fresh water.

- * **Farmer Participation:** A number of cases were cited where this was a /proposed requirement. These included:

farmers on the Price Commission on-farm water management incorporating the small farmer into the planning process.

- * **Increased Efficiency:** This was a theme which was supported in recommendations for:

improving irrigation water distribution better timing for the scheduling of agricultural inputs
increased need for accountability and eradication of corruption.

Sustainability Reconsidered

Once each of the discussion groups had reported back and their recommendations had been discussed, the conference returned to the theme and definition of agricultural sustainability. Participants were asked whether they still preferred either one of these definitions, in light of what had been discussed and proposed. If they did not, then they were asked to propose alternative definitions.

Everyone spoke and the following additional definitions were proposed:

Definition No.3: Sustainability is a concept dealing with developing a system of farming, which may achieve, maintain, or improve productivity in the agricultural sector.

Definition No.4: Sustainability is the continuous generation of knowledge and technology to match the changing configuration of social needs and effective instruments of implementation of this knowledge into action.

Definition No.5: Sustainability of agriculture means that, as a farmer within existing circumstances of soil and water, he/she should be able to mold cropping patterns to make a comfortable living in years to come.

Definition No.6: Sustainable agricultural development may be defined as an integrated process of development which should add to increased productivity and resource enhancement, without contributing to the degradation or destruction of existing natural resources. This process, which may be termed development without destruction, should leave the natural resources intact and improved for our future generations.

Definition No.7: Agricultural sustainability is socio-economic optimization with biological and environmental stability.

Definition No.8: A sustainable agricultural system for Sindh is one that can be maintained, based on a mix of appropriate and timely government interventions and market forces. It is one which meets the agricultural and food production needs of the population at reasonable cost, while at the same time providing rural people -- in particular small, resource-poor farmers -- with a fair and reasonable standard of living, both now and in the future. In achieving this, the process must not be environmentally harmful.

Definition No.9: Sustainability is affordable agricultural inputs available in a timely manner, fairness in water distribution, fairness in tax collection, fairness in disbursing loans, fairness in providing facilities to meet the basic needs of the peasants, and non interference by the government in the marketing of agricultural commodities. This will be achieved through sincere, honest, and effective measures for implementation of policies supporting agricultural sustainability, thereby achieving and maintaining the quality of life in developing countries without devastation of their natural resources.

In the accompanying discussion, several additional important points were made:

- * Given the present political situation in Sindh, the need for protection and security in rural areas should be included.
- * Emphasis should be placed on the health of the physical environment, bearing in mind the variety of soils and the availability of water.
- * Sustainability of agriculture rests on the sustainability of the country. Without peace, there is no sustainability. Only when the budgetary allocation for agriculture is increased significantly can we talk seriously about sustainability,

- * Given that the population is presently increasing at a rate of 3.1 percent annually, what will be the situation in 2010, when the population will have almost doubled? There is a great need for conservation of the existing resource base.

Bearing these comments and reservations in mind, a composite definition of agricultural sustainability in Sindh reads as follows:

Sustainability is defined as achieving and maintaining the quality of life for all rural people, both present and future. This can be achieved through various ways, the most relevant of which are: imposition of the rule of law guaranteeing protection and security; satisfaction of basic human needs in an equitable manner; and increased productivity and natural resource enhancement which should leave the environment improved for future generations.

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Mr. Kakur Ahmed Nizamani
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CHAPTER IV THE PUNJAB CONFERENCE

Executive Summary

In brief, the following key issues and their possible solution were discussed:

Issue No.1: Waterlogging and Salinity

Principal solutions proposed for waterlogging: horizontal drainage; vertical drainage; lining of canals and water courses; cultivation of water-tolerant crops; and planting of water-tolerant trees.

Principal solutions proposed for salinity: prevention of salinization through lowering the water table, improving soil structure, and planting perennial vegetation; reclamation of salt-affected lands through leaching saline soils with good quality irrigation water and adding amendments, such as gypsum, to sodic soils, before leaching; and management of salt-affected soils through screening of salt-affected crops, planting of salt-tolerant trees, and appropriate cultivation techniques.

For implementation, the following is proposed: strengthen and expand the role of the Water Management Department; strengthen and expand the Forest Department; strengthen and expand ongoing research on the selection of salt-tolerant varieties and strains; and reintroduce a meaningful and sizeable subsidy for gypsum.

issue No.2; Pest and Pesticide Management, including Integrated Pest Management

Principal solutions proposed: the Government Act must be obeyed; the authorization to distribute pesticides must be given only to qualified companies with trained manpower who observe field applications; training in pesticide use and application should be given to farmers; and the number of pesticides imported should be reduced to 20.

Issue No.3: Marketing, Middlemen, and Pricing Policies

Principal solutions proposed: establish a greater number of marketing centers; explore the possibilities of running mobile marketing units; fix producer prices at international rates; and provide liberal credit facilities to small farmers. For implementation, it will be necessary to; enforce existing legislation; introduce new legislation directed at the small farmer with less than 10 hectares; and strengthen the agricultural extension service.

Issue No.4: Lack of Education for Farmers

Principal solutions proposed: the provision of facilities for both vocational and secondary education; the provision of training in different skills to enable people to find alternative means of employment; the use of mass communication media to effect the openness of society; and the implementation of structural changes in the Agriculture Department.

For implementation, the following steps should be followed: introduction of a decentralized education system; implementation of compulsory education for children up to Grade 10; and the introduction of policy changes in the educational system.

Issue No.5: Deforestation, Watershed Management, and Soil Erosion

Principal solutions proposed for deforestation: improvement of catchment areas; levelling of eroded lands; introduction of water-harvesting and water conservation methods; and introduction of new tree species suitable to the ecology of the area.

Principal solutions proposed for watershed management: introduction of perennial cover into the watersheds; encouragement of mulching and minimum tillage practices; and provision of technical assistance in tree management.

Issue No.6: Underdevelopment of Barani Areas

Principal short-term solutions proposed: availability of inputs; making cooperatives more effective; consolidation of holdings; and adaptations of conservation techniques.

Principal long-term solutions proposed: develop an effective extension service, link roads, and electrification; initiate crash research programs to develop drought-resistant and crops; develop a crash program for conservation of soil due to water and wind erosion.

For implementation, the following steps are necessary: demonstration of proven technologies; availability of inputs at farmers doorsteps in time; building of small dams for water storage and soil conservation; and development of link roads.

Issue No.7: Lack of Inputs and Credit for Small Farmers

Principal solutions proposed; timely supply of quality inputs at the farmer's doorstep; research on the optimal use of chemical inputs to minimize waste, protect the environment, and increase productivity; develop an integrated system of using chemical inputs, farm manure, and organic wastes for

improving farm productivity; establishment of training facilities for small farmers; and provision of interest-free loans be arranged for small farmers under a simple procedure to avoid fictitious loaning.

Issue No.8; Livestock Production, Rangeland Management, and Desertification

Principal solutions proposed for livestock production: introduction of high-yielding mulch and beef cattle; provision of soft loans to small farmers interest-free; and development of indigenous, high-producing stock.

Principal solutions proposed for rangeland management: utilization of the soil according to its land capability; application of conservation practices by application of chemicals/emulsions for surface stabilization; introduction of drought-resistant varieties of grass; and provision of alternative means of livelihood among the native People.

Principal solutions proposed for desertification: stabilization of sand dunes through application of chemicals or the growing of some vegetative cover; development of water points for human and animal consumption in desert areas; construction of roads so that desert areas should be made easily accessible; and development of wildlife, by providing exclusive habitat to the species already existing in the areas.

Introduction

The Punjab conference was held in Faisalabad on May 19-20 and was attended by approximately 80 people, drawn primarily from the University of Agriculture, with representatives from local businesses and the farming community. The conference itself extended over a day and a half and was divided into four sections. The first was the inaugural session which was opened by the Provincial Minister for Food, Mr. Gol Hameed Kokri. Introductory comments were made by the chairman, Dr. Abdul Rehman, Vice - Chancellor of the University of Agriculture in Faisalabad, the institutional sponsor of the conference, and also by Dr. Ronald Senykoff on behalf of USAID/Islamabad.

In his opening address, the Minister emphasized that agriculture is the backbone of the Punjabi economy. Since 1960, agriculture has undergone key structural changes in the areas of technology, policies, and credit. As a result, farmers have benefited from the green revolution and increased yields of wheat, cotton, rice, sugar cane, vegetables, and fruits. Researchers and scientists have done well in Punjab.

Nevertheless, there remain certain constraints inhibiting the sustainability of agriculture, including: financial constraints, salinity, decreasing soil fertility, water loss, insecure marketing systems, and a dwindling land resource base technology which depends on external inputs will lead to environmental pollution and lack of sustainable farming systems.

The population of Pakistan will reach approximately 150 million by the year 2000.. The question is how to achieve sustainable agriculture without encroaching upon the environment, while at the same time ensuring safety for the future. This will include ecological, social, and economic aspects, as well as innovative conservation and production practices, working towards a pollution-free technology.

In his welcoming comments, the Vice Chancellor underlined that the conference was really dealing with the survival and preservation of our present ecosystem. Man's innate curiosity, his power of reasoning, and his need to satisfy human needs, has made him master of the environment. Unfortunately, however, he has abused this privileged position, resulting in: industrial pollution; ruthless deforestation; loss of biological diversity; soil erosion; waterlogging; and salinity. But nature cannot be pushed around for too long. Sooner or later nature will cut man to size and bring him to heel. This is how nature hits back. What is required is a sustainable environment for posterity.

In his comments on behalf of USAID, the USAID representative emphasized that the time for philosophical discussions about the environment is over, that this conference marked the beginning of a dialogue and a process, to continue up to and beyond the national conference scheduled for later this year.

Key Sustainability Issues

The second part of the conference concentrated on defining the key sustainability issues for Punjab. The facilitators discussed several definitions of sustainability, described in more detail in the Sindh Conference report. This was followed by a presentation of a technical paper on agricultural sustainability by Dr. Tahir Hussain, Soil Science Department, University of Agriculture, Faisalabad.

According to Dr. Hussain, sustainable agriculture must be productive, profitable, conserve natural resources, protect the environment, produce safe and nutritious food, and protect human health. But this all requires that we address the issue of environmental and social sustainability in our agricultural system.

Conventional agriculture, particularly that using "green revolution" technology, is dependent on unlimited use of synthetically made fertilizers, pesticides, growth regulators,

livestock feed additives, high yielding varieties of seeds, and mechanization. This high-input technology has an adverse effect on the agroecosystem, resulting in the destruction of wildlife, bees, beneficial insects, and useful soil micro organisms. Overall, this results in the following:

- * Development of pests which are resistant to insecticides.
- * Ecological damage, such as soil erosion, salinization, waterlogging, and degradation.
- * Impoverishment of indigenous genetic resources -- threatening the health of both farmers and consumers.

Alternative systems for achieving agricultural sustainability already exist. Among the more promising, Dr. Hussain identified:

- * **Low-Input Agriculture:** Characterized by limited application of synthetic chemicals and the use of integrated nutrient management and integrated pest management techniques.
- * **Ecological:** Refers to principles and processes that govern the natural environment.
- * **Regenerative:** Implies the ability to recreate the resources that the system requires.
- * **Organic:** Non-use of synthetic chemicals and the use of naturally occurring elements, such as compost, crop residues, and dung.
- * **Nature Farming:** Non-use of synthetic chemicals and the use of effective micro organisms (EM), both synthetic and lymogenic.

The concept of agricultural sustainability in Pakistan is not so much a new idea as a synthesis of ideas originating from various sources. It needs continuous modifications and refinements to counter the economic pressure on our farmers and the increasing concern over agriculturally related environmental problems. Although its roots go back much further, sustainable agriculture, as an explicitly formulated

concept, is young and it will take time to explore its ramifications and to understand fully its basic principles. To fulfill its full potential, it needs greater intellectual rigor.

In the spirited discussion that followed, several important points were made:

- * Low-input agriculture cannot sustain the annual increase in population, presently running at 3.1 percent. Since the scientists already have the solutions, the problem is really one of management.
- * The sustainability of 90 percent of the farming community is the key issue. The key problem to be addressed is that of soils management.
- * When talking of sustainability, we want to know is the farming system is efficient and what its future is. There is a need for a more equitable distribution of resources for the poor and the need to develop technological packages for small farmers.
- * The problem really lies with implementation. There are lots of good policies and plenty of planning capability, but implementation is lousy.
- * According to the farmers present, their key problems involve: water distribution and availability; lack of credit; availability of inputs and information on their proper application; and lack of infrastructure, particularly roads.
- * According to the ladies present, key issues include: the relationship between the environment, pollution, and the food we eat; the proper utilization of waste products; and the need to educate women, who comprise 47 percent of the rural population, in health and nutrition issues.

The conference came up with the following five definitions of agricultural sustainability:

Definition No.1: A system of agricultural management that meets increasing food demands associated with growing populations.

Definition No.2: Management of the natural resource base to enhance agricultural productivity and ameliorate the damage already done.

Definition No.3: A system which complements soil constraints and cropping patterns and increases productivity.

Definition No.4: An agricultural system sufficient to sustain the population into the future by incorporating new, environmentally sound technologies which are transferred to small farmers.

Definition No.5: A system which is productive, profitable, preserves the natural resource base, and protects the environment.

Participants were then requested to identify what they regarded as the key sustainability issues in Punjab. A list of 25 was completed and participants voted on the top eight. This is summarized in Table IV - 1.

The Discussion Groups

The first eight issues formed the basis of the discussion groups, to which participants were randomly assigned in order to achieve a representative cross-section of views and opinions. Each group elected a chairman and a secretary. The chairman was responsible for coordinating the group, and the secretary for preparing a brief, written report. At the end of the discussions, the chairmen reported back to the conference in plenary session. Their reports and relevant comments from the floor follow.

Discussion Group No.1: Waterlogging and Salinity

Issue No.1: Waterlogging

Waterlogging occurs when the level of the water table interferes with normal plant growth due to producing anaerobic conditions in the root zone. As water remains standing in the root zone, air is depleted and oxygen is not available for the plant roots.

Causes

There are three principal causes:

- * Seepage from canals and water courses
- * Hard pans in the soil below the soil surface
- * Lack of drainage

Table IV - 1
Sustainability Issues in Punjab

Issue	votes	Place
Waterlogging and salinity	55	1
Pest and pesticide management	52	2
Marketing, middlemen, and pricing policies	48	3
Lack of education for farmers	37	4
Deforestation, watershed management and soil erosion	34	5
Underdevelopment of barani lands	34	5
Lack of inputs and credit for small farmers	33	7
Livestock production, rangeland management, and desertification	28	8
Water diversion	27	9
Natural forest management and biological diversity	25	10
The impact of urban expansion on land use, water use, and public health	24	11
Information needs for effective planning	23	12
Post-harvest losses	20	13
The role of the private sector	19	14
Inefficient extension service	19	14
Lack of high-yielding seed varieties	17	16
Overall decline in water quality	17	16
The role of NGOs and local organizations	15	18
Lack of rural infrastructure	15	18
Demographic growth and resource conservation	14	20
Lack of recognition of the role of women in agriculture	13	21
Search for appropriate farming systems	12	22
Development and management of arid lands	12	22
Inheritance laws and land fragmentation	11	24
Institutional constraints on small farmers	5	25

Proposed Solutions

The following five measures can be taken:

- * Horizontal drainage
- * Vertical drainage
- * Lining of canals and water courses
- * Cultivation of water-tolerant crops
- * Planting of water-tolerant trees

Issue No.2: Salinity

There are three categories of salt-affected soils:

- * Saline Soils: where the concentration of salts is so high that it interferes with plant growth and water percolation.
- * Sodic Soils: where sodium is dominant, destroys the soil structure, and interferes with plant growth and water percolation.
- * Saline Sodic Soils: where both salinity and sodicity are present.

More than 20 million hectares of land are affected by salt in Pakistan.

Driving Forces

The following factors have to be taken into consideration:

- * Land is lying under arid and semi-arid conditions. ie. most of Punjab
- * Shortage of good quality irrigation water
- * Underground brackish water
- * A few pockets of fossil salinity outside the command area
- * Uneven distribution of salts in soil
- * Uneven land
- * Fallow land

Proposed Solutions

Prevention of Salinization

There are three ways to achieve this:

- * Lower the water table by reducing seepage of water from canals and water courses by sinking tubewells and constructing drains.
- * Improve soil structure by increasing the rate of downward water movement to avoid temporary waterlogging.
- * Keep soil covered under perennial vegetation, i.e. trees, shrubs, and grasses.

Reclamation of Salt-Affected Lands

There are two ways to achieve this:

- * Saline soils can be reclaimed by leaching with good quality irrigation water -- in this way excess salts are leached down from the root zone.
- * Sodic soils can be reclaimed by adding amendments, such as gypsum, and then leaching with irrigation water.

Management of Salt-Affected Soils

Under this solution, salt-affected soil is not reclaimed, salinity is accepted as a given, and crops are grown under existing conditions, with the following variations:

- * Screening of salt-affected crops and varieties.
- * Planting of trees which can tolerate salinity
- * Introduction of special crop-sowing and management methods under salt-affected conditions

Proposed Role of Institutions

The following seven steps are proposed:

- * Strengthen and expand the role of the water management department for lining canals, distributaries, and water channels.
 - *Reintroduce a meaningful and sizeable subsidy for gypsum and facilitate its distribution by various government agencies and NGOs.

- * Strengthen and expand the Forest Department so that it can undertake massive afforestation along canals, distributaries, and water channels.
- * WAPDA should charge a flat rate for tubewells.
- * Introduce a new, appropriate farming system through agricultural extension which caters to socio- economic needs, but also provides perennial crop cover for the soil.
- * Strengthen and speed up the research by the Agricultural University and the Agricultural Research Institute on the selection of salt-tolerant varieties and strains.
- " Assure attractive local markets for agricultural and forestry products through the support of both the Agricultural and the Forestry Departments.

Commentary

In the discussion that followed, the following comments and clarifications were made:

- * How are these solutions to be implemented? No one institution can handle all these proposed activities.
- * There is a need for the state to provide subsidized fertilizers and gypsum.
- * Only the government can provide tubewells as, for example, under SCARP, which only operates on a small scale. The SCARP tubewells have completed their life and the need now is to supplement with amendments.
- * The Command Watershed Management project is already implementing some of these proposed solutions, with farmers working together as group to reclaim the land, farmer by farmer.
- * Work on water course improvement should be strengthened.
- * The easiest solution is to plant trees.
- * Salt-resistant trees and crops are perhaps the solution, but only limited research has been undertaken and proven technological packages are not yet available.
- * There is a lack of information, on the part of both farmers and scientists, about possible solutions.

- * There is not enough water for irrigation -- shortage of water is the real problem.

Discussion Group No.2: Pest and Pesticide Management, including Integrated Pest Management (IPM)

Issue

Pests are a serious problem of our agriculture. It has been estimated that production can be increased 10 to 15 percent with effective insect/pest control. In recent years, the problem has been aggravated by the following:

- * Use of fertilizers in an unbalanced amount
- * More and more pressure on cultivated land

Out of a total production of nine million bales of cotton in Pakistan, the province of Punjab produced 7.5 million -- thanks to effective pest management. It is estimated that Punjab consumes 80 percent, Sindh 15 percent, and NWFP and Balochistan five percent of the total pesticides imported. Due to the severe nature of the problem, pest management becomes an essential part of our agricultural system.

Inhibiting Factors

The following factors inhibit the use of pesticides:

- * High cost of pesticides
- * Uneducated farmers
- * Ineffective laws regarding the use of pesticides
- * Lack of guidance for the farmers

Proposed Solutions

Pesticide use should be encouraged, but with the following precautions:

- * Companies manufacturing pesticides must be directed to employ trained manpower who must observe field applications.
- * Pesticide-detoxifying medicines must be provided in rural dispensaries so that any emergency can be tackled immediately and properly.
- * When an area is going to be sprayed, it must be demarcated and a continuous watch kept to avoid the occurrence of any accidents.

- * The Government Act must be obeyed.
- * The authorization to distribute pesticides must be given only to qualified people with technical knowledge of pesticides and their application.
- * The distributors should supply pesticides only to those farmers who have been adequately informed about their use and application.
- * Seminars to educate farmers must be held and the dangerous aspects of pesticides must be broadcast through TV, radio, and press.
- * Only about 20 pesticides should be imported -- in place of 300 as at present.
- * Research must be intensified to control pests without the use of pesticides. Biological control may not have the dangerous side effects.
- * Pesticides should be called by their generic name.
- * The Agricultural Pesticides Ordinance of 1971 must be enforced in its true spirit and the federal government should provide the forum for the implementation of the solution through the provincial agriculture departments. Amongst other things, the ordinance states that: " If, at any time after the registration of the brand of a pesticide, the Central Government is of the opinion that the registration has been secured in violation of any of the provisions of this Ordinance or the rules or that the pesticide is ineffective against pests or hazardous to vegetation, other than weeds, or to human or animal life, the Central Government may, after giving to the person on whose application it has been registered an opportunity of being heard, cancel the registration."

Commentary

A spirited debate ensued in which farmers, professors, and pesticide distributors participated. Among the more pertinent points and recommendations were the following:

- * According to the pesticide distributors, they employ specialists who understand agriculture and agricultural problems and go from village to village advising on proper application. They have fixed priorities, and the cotton areas are most important. Certificates are issued to dealers and safety measures are enforced. Seminars and workshops are organized. In addition, toxicological information is provided on the labels.

- * According to the farmers, dealers do not have training in pesticide use and application. Often, the pesticides available are outdated and have lost their potency. Usually pesticides are provided only to the big farmers. All pesticides are imported and there is a high mark-up. There is a need for regulation. Dealers are paid on a commission basis. Technical assistance has no relationship with pesticides. There is a need for better labelling and explanation, particularly in a country where illiteracy is high.
- * According to the professors, DDT is still produced here and used in various pesticides. In addition, the local hospital recommends its use as a delousing agent. No research has been conducted on pesticide use in Punjab. Nevertheless, pesticide use will grow in order to facilitate increased production. Hence, there is a need for: research priorities; synthesis of results; local manufacture of pesticides; integrated pest management; and training at various levels in pesticide use and application.

Discussion Group No.3: Marketing, Middlemen, and Pricing Policies

Issue

The produce is sent to the market directly, or through a middleman, as the farmer pleases. There is a Market Committee Act of 1939, which demands selling of the produce through an open auction, Payment is required to be made within a short, prescribed time, but this is not being implemented strictly. The Pricing Commission is federal, whereas the Market Commission is provincial. Neither has any direct liason with the other.

The funds of the Market Committee are received from the sale of the farmers produce and could be utilized for the improvement of their lot. But these funds are not being used for their betterment.

The prices of the inputs supplied to the farmers are very high -- international prices, whereas the prices of the produce are fixed at awfully low rates. The middlemen furnish lots of reasons for reducing the prices of the commodities.

Underlying Forces

Under the present communication system, the markets or sale centers are mostly out of reach of the farmer. Under the present socio-economic conditions, most of the small farmers have to sell their produce at relatively lower prices to meet some of their urgent needs. Many barter their produce within the village, which fetches the lowest returns.

The Marketing Act of 1939 is not being properly followed. The lack of infrastructure and transportation facilities in the rural areas aggravate the problem further.

The existing price policies are entirely in the government's own interest. Since the small farmers are not consulted, they operate at a loss.

Agencies like PASCO start procuring too late, often from their favorite dealers who supply the commodity at reduced rates and of inferior quality.

The low purchasing power of the farmers adversely affects the application of inputs, resulting in the low, poor quality of produce.

Factors Inhibiting Implementation

There are three major factors:

- * Lack of awareness
- * Lack of financial capacity
- * Lack of transportation facilities

Proposed Solutions

Four actions are proposed:

- * Establish a greater number of marketing centers within five to seven miles of each other.
- * Explore the possibilities of running mobile marketing units to reach inaccessible places.
- * Fix producer prices at international rates.
- * Provide liberal credit facilities to small farmers, thereby increasing their purchasing power.

Implementation

The following should be done:

- * The existing legislation regarding marketing procedures should be strictly followed.
- * There is a dire necessity to frame new legislation, particularly for the small farmers with units under 10 acres.

- * The agriculture department, specifically the extension wing, should recruit squads to supplement existing staff and meet the increased requirements to assist small farmers and make their operations viable.

Commentary

In the discussion which followed, several additional points were made:

- * The markets should serve as the pivotal point for both marketing and inputs. Wheat, rice, and cotton are given priority and little attention is paid to perishable crops, such as fruits and vegetables,
- * The farmers must be involved in the Market Committees and a percentage of the revenue from sales should be left at the disposal of the village.
- * Since the poor are in the majority, there is a need for reasonable prices in the interests of human welfare.
- * There is a need to introduce an income tax on agricultural production, particularly for medium and larger producers, although it is impossible to impose a tax on the larger producers at this time.
- * While it is true that there is a strong possibility of inflation if producer prices are increased, we have to consider that community which is voiceless. What can be done?
- * With the prices they presently receive, farmers cannot cover their costs. In the case of some commodities, they have to wait a long time for payment.

Discussion Group No.4: Lack of Education for Farmers

Issue

Five characteristics have to be considered. These are:

- * Lack of formal education
- * Lack of awareness of operating system and procedures
- * Familiarization with appropriate technology
- * Rigidity of traditional practices
- * Psyche and social behavior

Underlying Driving Forces

There are three major forces. First is the lack of formal education, a combination of socio-economic constraints and inadequate facilities. The second is the closed nature of Pakistan society. And third is the extreme poverty prevailing in rural areas. As a result, while people are conscious of population growth, additional children are viewed as a source of labor and income generation.

Proposed Solutions

The following possible solutions are offered:

- * The provision of facilities for both vocational and secondary education.
- * The education and training of the younger generation in the villages in systems operations and civics.
- * The use of mass communication media to effect the openness of society.
- * The implementation of structural changes in the Agriculture Department.
- * The introduction of incentive systems.
- * The provision of easy credit facilities at the farmer's doorstep.
- * An increase in procurement prices for farm products.
- * The introduction of rural-based industries.
- * Provision of training in different skills to enable people to find alternative means of employment.

Factors Inhibiting Implementation

Three major factors should be considered:

- * Lack of sufficient capital.
- * Syllabi of the whole educational system are inappropriate and need to be changed.
- * The existing feudal system in rural areas prevents change.

Implementation

Three major factors should be considered:

- * Introduction of a decentralized education system at the district level.
- * Implementation of compulsory education for children up to Grade 10.
- * Provision of scholarships for education and summer jobs for students in private industry.
- * Creation of part-time jobs for students in urban areas.
- * Addressing the major policy constraints of the government as they affect rural education.
- * The need for a continuous legislative process at both provincial and federal levels.

Immediate Actions

Two actions are proposed:

- * The introduction of policy changes in the educational system -- immediate legislation is needed.
- * The creation of an open society through administrative decisions.

Commentary

In the ensuing discussion, a farmer pointed out that education was necessary to break the vicious cycle of poverty. At the present time, they cannot afford to educate their children. With better prices for their produce, then farmers can afford education. There is also a need for them to organize. A professor pointed out that the emphasis should be on children's education. There should be a definite rule from the government that all children go to school. This is very important, a must, a religious duty.

Discussion Group No.5: Deforestation, Watershed Management, and Soil Erosion

Causes of the Problem

- * Socio-economic and indiscriminate logging of the forest for: fuel; timber; illegal and unauthorized cutting of trees; grazing; and political bribery.
- * Natural: fire; floods; landslides/storms; and pest infestation.

- * Poor protection and management of newly planted forests.
- * Lack of effective afforestation.
- * Colonization.
- * Non-involvement of the private sector.

Solutions to Deforestation

The following are proposed as practical solutions:

- * Planned improvement of catchment areas for development of effective watershed systems and construction of check and small dams. This would be addressed and implemented by the government, i.e. WAPDA and the Forestry Department.
- * Wherever possible, levelling of eroded lands to be taken up to control erosion. The land lying fallow may either be used for raising orchards, growing forestry, or cultivation of amenable crops. This would be addressed/implemented by the Agency for Barani Areas Development (ABAD) and the Soil Conservation Department.
- * Introduction of new tree species suitable to the ecology of the area. This would be the responsibility of the Forestry Department.
- * The existing laws should be implemented and, where some deficiencies exist, these should be changed suitably by the government.
- * Involvement of the private sector with the provision of incentives provided by the government.
- * Water harvesting and water conservation measures should be introduced in microwatersheds. This should be the responsibilities of WAPDA, the Soil Conservation Department, and ABAD
- * Post-planting care should be provided by the Forestry Department, the local government departments, and other public institutions.

Solutions to Effective Watershed Management

The following are proposed:

- * Land-use patterns of watershed areas should be changed in the form of orchards, forestry, and range management (perennial cover), and special attention given to the cultivated areas in respect of terracing, proper land

levelling, and maintaining continuous cropping patterns. This should be the responsibility of the government, Forestry Department, and ABAD.

- * Because of the restrictions imposed on the residents of the watershed area, they should be given compensation in the form of cheaper inputs like electricity and interest-free loans for the development of cottage industries.
- * In farm forestry, aftercare is necessary. For example, every year a plantation campaign is launched but survival of newly planted trees is not monitored.
- * Use of mulching and minimum tillage practices should be encouraged.

Commentary

In the discussion that followed, two valid points were made:

- * Forest officers may steal the trees themselves. Hence, there is a need to enforce existing legislation.
- * LOW-input technologies, such as minimum tillage, zero tillage, and the use of stubble as mulches, can help address soil erosion.

Discussion Group No. 6: Underdevelopment of Barani Areas

Issue

The barani area constitutes about 25 percent of the total cropped area, of which 20 percent produces 10 percent of the total wheat cultivated in Pakistan. The production of wheat per unit area is half of the irrigated area. Barani area also supports sorghum and maize crops. A number of important fruit crops are also grown. The potential for improvement is tremendous, but the area is characterized by poor, uneven crop growth.

Underlying Driving Forces

- * Lack of water. In most of the area the precipitation is low and is not well distributed over the year. Moreover, the available moisture and water are not fully utilized.
- * Low fertilizer use due to a host of problems, for example, financial constraints and lack of proven technology.

- * Erosion
- * Non-availability of high-yielding, drought-resistant varieties.
- * Non-availability of watersheds
- * Fragmentation of holdings
- * Absence of link roads
- * No use of pesticides due to lack of moisture.
- * Farmer awareness

Inhibiting Factors

- * Lack of commitment on the part of extension workers and lack of appropriate training to resolve problems.
- * Demonstration of technology showing benefits is not available.
- * Government policies relating to socio-economic structure of the area.
- * Lack of research efforts and data base.
- * Ill functioning of cooperatives.

Solutions

The group discussed thoroughly solutions to the proposed problem and has divided them into two, depending upon the nature of the solution.

* Short-term:

create farmer awareness availability of inputs making cooperatives more effective consolidation of holdings adaptations of conservation techniques.

* Long-term:

development of effective extension services development of link roads and electrification initiate crash research programs to develop drought-resistant crops develop marketing infrastructure to cater to local needs supported by effective legislation

develop an extensive program for watershed management by constructing small and medium-size dams
develop a crash program for conservation of soil due to water and wind erosion.

Implementation

- * Demonstration of proven technologies through research, extension, and private enterprise coordination.
- * Enforce legislation for consolidation of holdings.
- * Make available all required inputs at farmers' doorsteps in time.
- * Cooperative reorganization for better farmer participation with fullest awareness.
- * Building of small dams for water storage and soil conservation through self-help basis.
- * Development of link roads.

Commentary

In the discussion that followed, several important points were made:

- * Farms in the barani are much smaller than in the irrigated areas and the problems there can be multiplied by a factor of two or three. The problems are ignored, so the communities send their men overseas. Soil fertility is the limiting factor.
- * The barani areas can benefit from low-input technologies, such as deep tillage, mulch, and water catchment.
- * The major problem is water-use efficiency and the need for water-harvesting techniques, as well as for drought-resistant crops.

Discussion Group No.7: Lack of Credit for Small Farmers

Issue

With the ever-rising costs of agricultural inputs and low commodity prices, which are beyond the farmer's control, profitable farming has become an uphill task. An average small farmer, who constitutes the large majority in the Punjab, is in a real squeeze. He very often grumbles about his stagnant yields due to untimely or non-availability of agricultural inputs and a consequent dwindling of profits. Thus, there is a need to identify solutions that should help offset the effect of ever-rising prices of

agricultural inputs, provide low - cost technology to small farmers for profitable, productive and sustainable agriculture, while arresting soil depletion and protecting the environment,

Any farming system which is not producing at its best efficiency will be forced to end up i@ a loss. The best route would be to update crop production technologies and exploit agronomical potential through innovative ideas by making effective use of all agricultural inputs.

Solutions

To achieve the above goals, the group suggested the following points be included in the recommendations:

- * Timely supply of quality inputs at the farmers' door steps.
- * Research carried out to avoid indiscriminate use of agricultural chemicals, to minimize waste, and to protect the environment.
- * Efforts be made to develop an integrated system of using farm chemicals, farm manure, and organic wastes for improving farm productivity
- * In order to generate funds for purchase of costly inputs, interest-free loans be arranged for small farmers under a simple procedure to avoid fictitious loaning.
- * Agro-based industries be set up in rural areas to generate income for purchase of farm inputs.
- * Low-priced small tractors, with a proper set of implements, be made available at the village level for rental.
- * Research be carried out to find ways of improving efficiency of agricultural inputs to get all benefits possible @rom each kilogram of seed and farm chemicals.
- * Need to set up training facilities for small farmers for using right mix of fertilizer, insecticides, and other farm inputs.
- * The establishment of markets at each level where inputs can be supplied to farmers and payment be received by selling these commodities.

Commentary

In the ensuing discussion, both favorable and critical comments were offered:

- * When short of money, farmers may resell their fertilizer in order to survive.
- * It is basically a question of survival for small farmers -- they should show their strength and pressure for change.
- * The issue of interest-free loans is a political one.
- * More detail is required on agro-business. Realistically, how can such an industry be established in the villages?
- * The politicians have a responsibility and should respond accordingly.

Discussion Group No.8: Livestock Production, Rangeland Management, and Desertification

Livestock Production: Inhibiting Factors

- * Lack of veterinary service facilities
- * Lack of improved breeds
- * Shortage of feed and fodder
- * Low prices of livestock products
- * Lack of scientific management
- * Marketing problems
- * Lack of storage facilities for byproducts
- * Absence of appropriate extension services
- * Absence of modern technology for artificial insemination
- * Shortage of high-yielding mulch cattle and meat production

Solutions

- * Introduction of high yielding mulch/beef cattle
- * Provision of soft loans to small farmers interest-free
- * Development of indigenous, high-producing stocks

- * Incentives for small farmers to raise animals
- * Develop industry in poultry, quail, rabbit, and turkey
- * Implementation preferably be done through private sector
- * Construction of all types of equipment for livestock and dairy production to be done locally

Rangeland Management: Inhibiting factors

- * Lack of information on soil and water resources of the rangelands
- * Lack of infrastructure facilities
- * Relatively harsh natural conditions

Solutions

- * Evaluation of soil and water potential of the areas
- * Utilization of the soil according to the land capability of the area
- * Provision of road facilities and other human needs
- * Marketing facilities
- * Application of conservation practices and measures needed to stabilize surface materials (sand dune stabilization)
- * Introduction of drought-resistant varieties of grass and research programs
- * Construction of dams where possible
- * Enforce some legislation to avoid overgrazing
- * Provision of alternative means of livelihood among the native people
- * Provision of interest-free loans

Desertification

Issue

It may be defined as areas going out of production. Three causes have been identified in Pakistan -- salinity, Waterlogging, and erosion. To some people desertification means a process of the past that has resulted in existing deserts.

Inhibiting Factors

- * Lack of money
- * Lack of data particularly on existing deserts
- * Lack of development feasibility reports.

Solutions

- * Stabilize sand dunes through application of chemicals or by growing some vegetative cover.
- * Prepare feasibility reports of different desert areas and prioritize for development.
- * Develop water points for human and animal consumption in desert areas.
- * Construct roads so that desert areas should be made easily accessible.
- * Develop wildlife, by providing exclusive habitat to the species already existing in the areas.

Commentary

In this discussion, the following points and clarifications were made:

- * According to the farmers, there is a lack of resources for the purchase of livestock. Good animals are very expensive, beyond the reach of small farmers. In addition, there is no extension service to provide training and assistance.
- * A lot of rangelands have been converted to crops. As a result, the remaining range is low potential with little potential for livestock production. Graziers should receive assistance in finding other forms of productive employment.

Comments from the Chair

In his closing comments, one of the facilitators noted that certain underlying themes had emerged from the discussion group presentations. There were a number of issues which were directly associated with either existing environmental constraints or man's failure to recognize these constraints in his modification of the environment. Examples cited were: water loss associated with high evaporation rates; poor soils; and waterlogging associated with inadequate drainage.

However, more emphasis was given by the groups to socioeconomic constraints and their effect on agricultural sustainability. Examples cited included: inadequate subsidies for fertilizer and gypsum; education and training constraints, for example in the application of fertilizers and pesticides; inequitable distribution of land and capital; and corruption. This led to the issue of lack of empowerment of the small farmer, as exemplified in their failing to receive their fair share of irrigated water; pesticide assistance limited to the big farmers; lack of adequate infrastructure needed to market their production; and poor access to education.

Another theme was inadequate coordination with examples of: technicians not talking with the field extension agents regarding pesticide applications; poor timing in supplying required inputs needed for the growing season; lack of institutional coordination in addressing critical issues, such as salinization and waterlogged soils; and failure to get the results of agricultural research out to the small farmer.

A final theme was lack of information and lack of research. Specific examples included: need for more information on salt-tolerant species; development and use of bio-pesticides; and the need for the development of high yield variety (HYV) technologies for barani lands.

The summary concluded with a synthesis, albeit incomplete, of a number of tasks recommended by the discussion groups and classified by sector. These were:

* **Government:**

increase irrigation capacity
accelerate the lining of irrigation canals increase horizontal drainage
promote the development of bio-pesticides and other on-toxic
substitutes for pesticides increase reforestation activities
strengthen institutions with emphasis on extension services.

* **Private Sector;**

reforest private lands
increase efforts focused on the small farmer in the proper use of
pesticides
develop agro-industry as an alternative source of employment for the
small farmer.

* **Academic Sector:** Emphasize research on salt tolerant crops and grasses.

- * **Farmers:** Develop and adopt community-based approaches to forestry and on-farm water management.

The facilitator concluded with a brief philosophical Statement, noting that any effective strategy which attempted to address the range of issues discussed over the previous two days would have to be: national in scope, with commitment in terms of resources, policies, and institutional coordination; emphasize community-based approaches to agricultural development and natural resource management; and address the critical underlying issues of empowerment, land reform, and equitable access to resources and markets.

In his concluding comments, the USAID representative reiterated three points to the participants:

- * We are concerned about our future and that of our children and our ability to provide food, shelter, and water.
- * Our future depends on action -- taken by everyone in this room.
- * Let us sit and take decisions together -- from the highest level to the field.

Definition of Sustainability

The final act of the conference was to vote on the three definitions of sustainability, distilled from the original five:

No.1: A system of agricultural management that meets increasing food demands associated with growing populations by incorporating new, environmentally- sound technologies which are transferred to small farmers,

No.2: A system of natural resource management which enhances agricultural productivity by complementing existing soils constrained cropping patterns, while ameliorating the environmental damage already done.

No.3: A system which is productive, profitable, preserves the natural resource base, protects the environment, contributes to improvements in human health and welfare, and can be maintained over time.

Definition Number One received 25 votes, Number Two zero votes, and Number Three 41 votes.

A Final Word

After the formal conference was completed, several professors from the University of Agriculture, who had played an active and constructive role throughout, stayed to discuss some additional, relevant issues at some length, At their request -- and this

reiterates many similar points made informally during both the NWFP and Sindh conferences, the following statement is included here as part of the record:

We are here together to discuss the improvement of conditions of small farmers. The most important factors which are destroying this improvement are listed below and I would request the facilitator to point out these factors in detail. Unless these factors are taken into consideration, all the work we have done in these two days will be a wastage of time and the expense of a huge amount of money. These factors are:

- * Eradication of corruption
- * Employment of government officers on merit rather than on recommendations or bribery
- * Uplift of justice

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CHAPTER V

THE BALOCHISTAN PROVINCIAL CONFERENCE

Executive Summary

Agricultural Sustainability

Definitions of agricultural sustainability were proposed by three discussion groups. These were;

To utilize the natural resources of water, soil, and climate for the benefit of the human race and to conserve them for the sake of future generations.

The land should be used in such a way that by cultivating improved varieties and proper use of fertilizers the soil should give best yields every year without harming the potential of the land.

First, stability in prices and a fair return to the farmer; and second, practical steps/solutions to ensure the sustainability of agriculture in Balochistan.

In the second plenary session, the majority agreed that the first definition be adopted as most relevant to Balochistan.

Issues and Solutions

The following issues and solutions were identified:

Issue No.1: Water Availability

Principal solutions proposed: increase efficiency of water use through rehabilitation of dams and karez systems, and the cementing of water courses; application of new technologies, such as drip systems; increase capture of water through check dams and percolation galleries; enforce the rules governing use of ground water resources; provide required inputs and alternative power sources, such as windmills and solar energy; and reduce contamination of drinking water supplies.

The public sector should be charged with expanding the energy supply (WAPDA), solar energy development (PCSIR), and wind power development (PCSIR). The private sector should be involved with well development and economic expansion.

Issue No.2: Marketing, Middlemen, and Pricing Policies

The chief recommendations proposed: provide farmers increased access to loans; promote the formation of cooperatives; develop the required infrastructure to market produce -- roads, cold storage facilities, and rail; reduce the tax burden on required agricultural imports; develop new export markets; expand existing public dissemination of commodity pricing; and increase training for farmers.

Issue No.3: Pest and Pesticide Management

Recommendations forwarded: the government should take on the responsibility for pesticide distribution; distribution should be expanded to the more remote rural areas; pesticides need to be monitored for quality and date of expiry; there needs to be increased public awareness regarding the hazards of pesticides; farmers should be trained in the application of pesticides; and the terms of pesticide loans should be eased by the ADB.

Issue No.4: Lack of Electricity

Recommendations provided by the group could be broken down into remedial, expansive, and, alternative actions to address the deficit in electricity issue. Remedial actions include the rehabilitation of small hydropower dams. Expansive recommendations include the construction of new dams for hydropower generation and expansion of the national grid to rural areas. Alternative energy generation, primarily in the form of solar and wind energy-generations systems, was recommended. Other recommendations were: to provide the necessary means to develop alternative energy sources; and provide interest-free loans to farmers for the purchase of generators to avoid the hazard of "brownouts."

WAPDA, in cooperation with the private sector, was identified as the primary institution which should implement these recommendations.

Issue No.5: Lack of Agro-Based Industry

Proposed solutions were confined to recommendations for the construction of: grading and packing units for fruit and vegetable production; juice, syrup, squash, and fruit - canning

industries; vegetable canning and dehydration plants; oil producing factories; a rice husk mill in Nasirabad; sugar factories; chips/biscuit factories; and a fish - canning industry in the coastal area.

Implementation of these recommendations would be through cooperative ventures between the private sector and the farming community.

Issue No.6: Livestock Production and Range Management

Principal solutions proposed for livestock production: increase access to livestock health-care facilities; increase channels to get livestock and livestock byproducts to the market; develop water supplies for livestock; enact controlled grazing systems; and reduce the effects associated with overgrazing.

Principal solutions for rangeland rehabilitation included: increased use of water-spreading technologies; development of forage and fodder banks; increased research on rehabilitation technologies; and training farmers in sustainable rangeland management practices.

A cooperative effort between the public and private sector was recommended for implementing health care measures. Similarly, the public sector, together with local farmers' organizations, was thought to be the best means to implement controlled grazing strategies. A joint effort between the Department of Agriculture and appropriate research institutions was recommended for the proposed research priorities.

Issue No.7: The Role of the Private Sector

The following solutions were proposed: the private sector should provide the farmer access to cold storage facilities; increased cooperation between the government and the private sector is required; the government should stop the smuggling of fertilizer; import taxes on required agricultural machinery should be waived; and where possible, the government should allow the private sector to provide the needed inputs and services needed for agricultural production.

Issue No.8: The Need for Research and Appropriate Technology

A number of solutions were proposed: better management skills are required in both rainfed and irrigated agriculture; water-harvesting trials should be promoted as an alternative technology suitable for rainfed agriculture; extension services need to be more comprehensive and effective; and there is a need for better leadership on the part of the extension teams.

Issue No.9: Excessively High Interest Rates on Loans

The group suggested that: interest on loans should be completely eliminated; loans should be based on the price of land as valued in the present market; loan procedures should be simplified; repayment of loans should be "linked" with the farmer's annual crop production; differences in loan availability between farmers in rainfed and irrigated areas

should be eliminated; and aid programs intended to benefit farmers should endeavor to involve them in the distribution of aid and loan monies.

Issue No.10: Lack of Financial Support for Agriculture

The following principal solutions were offered: loan procedures should be completed in the shortest possible time; loans should be interest-free; the terms and conditions for the granting of loans should be simplified; the loan should be allowed to be repaid in easy installments; crop prices should be ensured; the loan agencies should provide technical services to the borrower in order to ensure the most effective use of the loan; and the property needed for collateral should be correctly assessed according to the existing market rates.

Introduction

The Balochistan provincial conference was held in Quetta on May 30 - 31 and was attended by some 150 people, the vast majority of whom were farmers from the area, with a sprinkling of local businessmen. The conference itself extended over two days and was divided into four sections. The first was the inaugural session which was opened by the Provincial Minister for Agriculture, Syed Saeed Ahmad Hashmi. Introductory comments were offered by the Chief Secretary for Balochistan, Mr. S.R. Poonegar, and also by Dr. Ronald Senykoff on behalf of USAID.

In his address, the Minister called upon the agricultural experts to disseminate the technical know-how they have learned within and outside the country so that local farmers can reap better crops. He said that, despite scanty rainfall and limited water resources, Balochistan had sufficient potential to develop agriculture. What is needed is modern methods of irrigation, on-farm water management, and the economic use of agricultural inputs. If Balochistan is to achieve progress and prosperity in the future, he maintained, it would be through some form of green revolution. He concluded by saying that he hoped the farmers of the province would benefit from the deliberations of the conference.

Earlier, the Chief Secretary pointed out that 80 percent of the population in Balochistan is involved in agriculture. While the provincial government has allocated the maximum resources for the development of agriculture and irrigation, poverty has not been eliminated. The incomes in rural areas are far below the poverty line and the quality of life has not improved over the past 20 years. Yields are low, agricultural inputs are not scientifically applied, the latest technologies have not been adopted, and proper markets have not been developed. In Balochistan, the most precious resource -- water -- has been misused and mismanaged.

According to one western economist: "In the modern society, poverty is far more a social condition than an economic problem." According to the Chief Secretary, this may also be true for Pakistan. There is evidence to show productivity decreases as farm size increases and owner-operators are more productive than tenants and sharecroppers. In Pakistan, cultivators own 55 percent of the total number of farms, while owners-cum-tenants occupy 19 percent, and tenants 26 percent of the farms. If Pakistan wants to increase production, the government must genuinely transfer land to the tillers. Past land reforms have been designed and implemented in a half-hearted manner.

Equally important is the training of farmers to increase farm productivity. There is considerable scope for increasing land-use intensities on most farms. Expanding, improving, and quickening the transfer of technology to farmers is the key to improving the productivity of agriculture. The Chief Secretary emphasized that the foundations for agricultural development are education, training, and competence -- rather than capital investment, provided government relaxes all controls on farmers and farm prices.

He concluded by making two important points: first, the government cannot give everything free; and second, that some of the problems in the agricultural sector are of Balochistan's own making -- "It is the problem of political will, rather than one of economics."

In his welcoming comments on behalf of USAID, Dr. Senykoff stressed that the time for philosophical discussions about the environment is over. The time has come for action, before it is too late. Mankind presently faces a challenge of the most serious kind -- how to improve economic life while operating on a finite resource base. According to the speaker, our sustainable future can be planned through the blending of agricultural and economic production needs with natural resource development.

The participants were encouraged to identify the key issues constraining agricultural sustainability in Balochistan and to come up with practical solutions, both multidisciplinary and multidimensional. By so doing, participants could develop awareness and commit themselves to timely actions to address these problems. The conference marked the beginning of a dialogue and a process, to continue up to and beyond the national conference scheduled for later this year.

own set of socio-economic, institutional, and political aspects, which also must be addressed in order for the technical solution to have its desired effect.

Participants were asked to identify what they regarded as the key issues affecting agricultural sustainability in the province. A list of 30 issues was completed and participants voted on the top ten. This is summarized in Table V - 1.

Discussion Groups

The first ten issues formed the basis of the discussion groups, to which participants were randomly assigned in order to achieve a representative cross-section of views and opinions. Each group elected a chairman and a secretary. The chairman was responsible for coordinating the group, and the secretary for preparing a brief, written report. At the end of the discussions, the chairmen reported back to the conference in plenary session. Their reports and relevant comments from the floor follow. In addition, two unsolicited written comments from participants have been included for the record.

Discussion Group No. 1; Water Availability

Issue

There is no big river in Balochistan. Drinking and irrigation water is obtained from rains and snowfall. Karez and tubewells are used to bring the underground water to the surface for utilization. During the last few years, water from rain and snowfall has been scarce, while hundreds of new tubewells have been installed for irrigation and drinking water. This has resulted in the drying-up of the karez systems. Where active karez still exist, they have become increasingly inefficient due to non-maintenance.

Table V - 1 Sustainability Issues in Balochistan

Issue	votes	Place
Water availability	52	1
Markets, middlemen, and pricing policies	45	2
Pest and pesticide management	40	3
Lack of electricity	39	4
Lack of agro-based industry	38	5
Livestock production, rangeland management, and desertification	37	6.
The role of the private sector	37	6.
Need for more research and appropriate technology	36	8
Excessively high interest rates on loans	35	9
Lack of financial support for agriculture	34	10
Lack of government support for agriculture	31	11
Natural forest management and conservation of biological diversity	29	12=
Deforestation, watershed management, and soil erosion	29	12.
Lack of appropriate training for farmers	27	14
Absence of marketing infrastructure	26	15
Lack of sources of energy	24	16
Information needs for effective planning	23	17.
Ban on import of fruit from Iran	23	17=
Underdevelopment of barani lands	22	19
Removal of bottlenecks on exports	21	20=
Absence of quality seed	21	20.
Lack of storage facilities for crops	20	22=
Lack of proper planning for agricultural development	20	22.
The role of NGOs and local organizations	15	24.
Demographic growth and resource conservation	15	24.
Absence of quality control on exports	15	26
Excessive costs of transportation	14	27
Modernization of fisheries	13	28
Poor quality of water for both drinking and irrigation	9	29
Absence of proper land titling and registration	7	30

Solutions

Luckily, Balochistan has sufficient underground water reservoirs which, if properly and carefully maintained, could meet the needs of the province. The following measures are suggested for improvements in water availability:

- * To check the wastage of water:
 - provide for the cementing (tiling) of water channels avoid the excessive use of water use the latest irrigation techniques, e.g. sprinklers, water drip/trickle technologies.
- * To check the flow of water outside productive boundaries:
 - through the use of check dams delayed action dams the repair and cleaning of old, damaged dams.
- * Increase the underground reservoirs by the establishment of percolation galleries.
- * Provide for the proper maintenance of existing karez.
- * Formulate rules and regulations regarding the use of underground water resources.
- * Provide the required financial, mechanical, and technical support for the development of drinking water supplies through:
 - supply water through pipe lines in distant areas use of solar energy and windmills the use of solar energy to convert salt water into sweet water.
- * Artificial rains (cloud seeding).
- * In the areas of Nasirabad, drain waters need to be separated from canal waters because the latter is being used for drinking purposes in low-lying areas.

Constraints

The following are the obstacles inhibiting the effective implementation of the aforesaid measures:

- * Absence of a master plan for the development of water resources in the Province.
- * Scarcity of natural resources, finance, and technical know-how.
- * A paucity of experts.

Implementation

The suggested measures could be implemented with the help of the following organizations:

- * Government Organizations:

WAPDA for electricity supply and installation of transformers
PARC for artificial rainfall (cloud seeding) PCSIR for heating up water through solar energy and use of solar energy for electricity, cold storage for processing plants, and for "sweetening" saltish water
PCSIR and PCAT for the development of windmills to provide the energy needed to lift up water.

- * Private Sector:

loans for the construction of tubewells assistance with the implementation of big development programs similar to the activities of the Agha Khan Foundation projects in the Northern Areas
cleaning of karez by traditional organizations.

Action

For the above-mentioned steps, the following priorities are suggested:

- * Work on dams: the construction of new dams and the repair and maintenance of both old and new ones.
- * The proper use of underground water resources for: drinking and irrigation; and the formulation of rules and regulations for the use of these resources.
- * Use of solar energy and windmills for: lifting underground water and sweetening salty water.

- * Involvement of the private sector in the installation of tubewells and in the repair and maintenance of dams and karez.

Last Words

The use of local technology and technical skills in the proposed development projects will facilitate the establishment of the confidence of the local people, resulting in an accelerated speed of development.

Commentary

Several participants underscored the need for repair of many older dams. Similarly, tubewells were in need of repairs and many were presently in a state of disuse. Another point was made that there were areas in Balochistan where there was clear evidence of the existence of ground water near the surface, but the resource was not being developed. In response to this situation, the Province was in need of a proper water survey. Areas that were mentioned included Salmoni, Punji, and Adangi.

In response to a question concerning existing knowledge of the underground water resources in Balochistan, the discussion group chairman noted that WAPDA had completed a groundwater survey in the late 1960s and that there is information on critical recharge/discharge rates.

Another participant mentioned that a large dam located some 40 miles from Quetta, near Pishin, was silted up, a situation which was attributed to floods and sediment from the adjacent hills.

A comment was made that it made little sense to invest monies in the development and renovation of existing karez systems as a falling water table, due to increased demand, made them obsolete and tubewells were the only solution.

Another participant complained of the quality of the water from irrigation canals originating in the Punjab. Water was too saline and it was believed to be the cause of declining production in irrigated areas in Balochistan -- from 60 to 20 maunds per acre. He then asked a rhetorical question: Was this situation due to bad luck or bad planning?

A written comment from Discussion Group No.4, which dealt with the lack of electricity issue, indicated that the World Bank had started a project with the intent of dredging the Khushdil Khan Dam (Pishin), but due to unknown reasons the project was abandoned. The dam was described as very old, irrigating a vast area within the Pishin District. The water derived from the dam was cheap for the farmers and thus it should be given due attention.

In a second written comment by the same group regarding the rehabilitation of defunct karez systems, it was noted that costs were estimated to be about Rs 300,000 -- resulting in the irrigation of some 300 acres of land and making a whole village self-sufficient in agricultural production and providing enough revenue to maintain the system into the future. Since the water level is falling from day to day, it is recommended that, in the rehabilitation/development of new karez systems, they be modified to adjust to a falling water table.

Group No.2: Marketing, Middlemen, and Pricing Policies

Issue(s)

The specific marketing problems identified by the discussion group are:

- * Farmers do not receive the market price for their crops.
- * There are no godown and/or cold storage facilities available to store production.
- * Roads and transport facilities needed to get the produce to the market are lacking.
- * There are no cold storage facilities in the market.

Issues associated with middlemen are:

- * Middlemen offer prices that are too low for agricultural produce.
- * There is no consultation with the farmers in the setting of prices.

An issue identified with agricultural pricing policies is that the government should fix the prices of commodities.

Recommendations

The following suggestions were recommended by the discussion group members:

- * Farmers should be given loans for fertilizer and pesticides.
- * Cooperative societies should be formed on a District/Division basis.

- * Roads/transport facilities need to be constructed and supplied so that farmers can market produce.
- * Cold storage facilities should be made available to the farmers.
- * There should be no taxes on imports of agricultural inputs associated with increasing production.
- * There should be more publicity of commodity prices through radio, TV, etc.
- * There should be import restrictions in Balochistan on commodities produced in other provinces.
- * Expand the search for fruit and vegetable export markets in other countries.
- * The government should direct companies like PASSCO to pay reasonable prices for onions, paddy, and wheat.
- * Farmers should be sent to foreign countries to become more familiar with export markets.
- * High quality seed is required by the farmers.
- * Increase the export of commodities to other provinces through the creation of a national rail logistical cell.
- * A four to six percent commission should be fixed for services rendered by any commission agent.

Commentary

In response to a question regarding the role of cooperatives in implementing some of the proposed solutions, the chairman of the discussion group noted that cooperatives have been effective in other sectors and there should be ways to find their successful application in the agricultural sector to ensure that the farmers receive the full benefit of their production. However, one participant underscored the point that agricultural cooperatives had failed once before. This was countered by the point that cooperatives had never been properly explained to the small farmer, and to this day they still don't understand the concept. A third participant noted that the government has already suggested cooperatives need to be redesigned and this suggestion must now be followed up.

A point was made that the national Price Commission has no Balochi representative and prices are presently fixed without any means for Balochistan to influence the decision.

Another line of discussion regarded the means to facilitate the direct export of agricultural production by the farmer to overseas markets and thus eliminate the middlemen. This was countered by the concern that proper export licenses were required to prevent smuggling, particularly produce. A compromise was suggested by a third participant who proposed that export licenses should be assigned at the provincial rather than national levels. In response to a question regarding who should be given the export license -- the producers or the landowners, one participant suggested an organization such as the Provincial Agricultural Chamber of Commerce.

Group No.3: Pest and Pesticide Management

Recommendations

The following recommendations were presented:

- * The supply of pesticides to farmers needs to be monitored to ensure the date of expiration has not been passed prior to the transaction -- to prevent the selling of impotent/ineffective pesticides.
- * The supply of good quality seed needs to be ensured for the farmers.
- * The Agriculture Department needs to launch a public awareness campaign at the level of the District and the Union Council, addressing the toxic effects and remedies for the spraying of pesticides.
- * Farmers should be trained by extension personnel on how crops and fruits trees should be sprayed.
- * A committee of farmers should be formed which would monitor the prices of pesticides.
- * Agricultural machinery and loans on easy terms should be provided by the Agriculture Department and the Agricultural Development Bank, respectively.
- * Aerial spraying should be conducted following sufficient publicity through the media for purposes of avoiding human health hazards.
- * Farmers should be supplied the recommended insecticides/pesticides following proper screening by the Agriculture Department.
- * A monitoring program is required to check if field assistants/beldars (junior assistants) are on duty and in the area to which they have been assigned.

- * There is also a need to provide stores at the Union Council level to enable farmers to get the pesticides /insecticides on time and at reasonable prices.
- * There is the need for introducing new modern technologies to check population growth.

Commentary

One participant noted that a licensing system was needed for the selling of pesticides, since at present anyone can sell anything. Another participant recommended the removal of the middleman from the pesticide business and suggested that all transactions should occur between the government and the farmer, a system which was in use at one time.

In response to a question regarding how many people in Balochistan actually applied pesticides, it was noted that use was primarily confined to the orchard-growing areas of the province -- outside of this subsector use is rare.

Group No.4: Lack of Electricity

The Causes of Insufficient Electricity

The following reasons were suggested for the short supply of electricity in Balochistan:

- * Excessive loadshedding.
- * Lack of electric generating resources in Balochistan.
- " Lack of correct planning by the government.
- * Lack of sufficient development priority given to the province by the national government due to the small population.

Solutions

The following suggestions were presented by the discussion group:

- * Provide the means for developing alternative energy sources, e.g. solar energy and windmills.
- * Thermal (hydro) power plants should be installed in places where sufficient water resources exist, e.g. Loralai, Bolem, and Zhob.
- * Small, multiple-purpose dams should be constructed in the province for purposes of providing both irrigation water and electricity.

- * The private sector should be encouraged to development and produce electricity.
- * In areas of sufficient wind, the government should install windmills.
- * Small, delayed - action dams should be constructed to increase the underground water levels, and old karez systems should be rehabilitated to save/reduce electric use needed for tubewells.
- * Farmers should be provided interest-free loans for purchase of generators to avoid losses in agricultural production associated with load shedding (brownouts).
- * The national power grid line should be extended to the rural areas of Balochistan.
- * WAPDA should issue bills in time so they can be paid, and all past accumulated bills should be forgiven.

Implementation

The following institutions should be responsible for the implementation of the above points:

- * WAPDA should encourage private sector organizations to develop and produce electricity which, in turn, could be purchased directly from them.
- * Private organizations should be contracted to develop and manage solar energy plants and windmills.

Commentary

In response to a question about the importance of electricity to agricultural production in the Balochistan, the discussion group chairman noted that, unlike other provinces which depended heavily on perennial surface water for their agriculture, the province was dependent on electrical tubewells to meet its water needs.

Group No. 5: Lack of Agro-Based Industry

Issue

The lack of agro-industry in Balochistan is a critical problem because the province is producing fruit and vegetables in surplus quantities, for example, apples, cherries, grapes, apricots, lemons, plums, dates, peaches, etc.

Reasons

During the last few years, the farmers have been unable to sell their produce -- particularly onions, potatoes, and selected other crops -- due to very low prices in the market. In the case of perishable produce, major problems are the long distances, poor roads, and high transportation charges which contribute to significant losses of produce. One estimate was 75 percent of total production.

In the case of exports, grading is very essential and only Grade I can be exported. The remaining produce/crops should be utilized in the agro-industry.

Solutions

The discussion group proposed the construction of the following:

- * Grading and packing units for fruit and vegetable production at the divisional level.
- * Juice, syrup, squash, and fruit-canning industries in the province.
- * Vegetable-canning and dehydration plants, especially for onions.
- * Oil-producing factories.
- * A rice husk mill in Nasirabad.
- * Sugar factories at the divisional level.
- * Chips/biscuit factories
- * Fish-canning industry in the Province's coastal area.

To establish the above agro-industries, farmers are more than willing to take an active role in the development of the subsector, if initial financing could be made available interest-free with a grace period of eight to 10 years.

Commentary

One participant noted that the provision of agro-industry, particularly the canning industry, was critical to Balochistan due to the seasonal variation in domestic markets. For example, produce from Balochistan is only purchased elsewhere in Pakistan over a two to three month period out of the year. During the remaining months of the year, demand in the other provinces can be met locally.

A second participant noted that a canning unit was lying idle just outside of Quetta and asked why it was not in operation. No response was forthcoming.

A third participant suggested that an easing of export restrictions and policies would stimulate private sector investment in agro-industry.

Group No.6; Livestock Production and Range Management

Balochistan is a province where an estimated 93 percent is rangeland. Livestock, mainly sheep and goats, is the major industry and economic activity of Balochistan.

Livestock

Problems .

The following problems were identified as affecting the livestock subsector:

- * Livestock, especially sheep and goats, carry many parasitic diseases which can result in epidemics causing 15 to 20 percent mortality during the winter months of November to March.
- * There is no proper disease treatment or health care in most of the villages.
- * Proper medicines are not available for various livestock diseases.
- * There is no regular marketing system for livestock.
- * There are no proper facilities for processing and marketing the byproducts of livestock. For example, there is no regular market for wool, nor are there wool - processing facilities nearby in any of the livestock areas.
- * The unavailability of sufficient forage and fodder for the livestock results in poor productivity.
- * There is a lack of clean drinking water for livestock, resulting in outbreaks of disease due to the drinking of contaminated water.
- * Nomadic flocks bring diseases and contribute to forage shortages.

Proposed Solutions

The following solutions were recommended by the discussion group:

- * Proper health care in response to different parasitic diseases should be provided to the owner of the livestock flocks, especially during the critical periods of disease outbreaks.
- * Proper medicines and vaccines should be made available through creating more livestock health-care centers.
- * Proper marketing and processing facilities for livestock byproducts, such as wool and leather, should be made available in the vicinity of the flock owners.
- * Additional clean watering points should be provided for flocks and herders.
- * The owners of nomadic flocks from Afghanistan, which bring various parasitic diseases and also cause damage to the ranges in Balochistan, should be discouraged.

Range Management and Rehabilitation

Problems

The following problems were identified by the group:

- * The ranges are overgrazed by the nomadic and local flock owners. The shrubs and trees from these ranges are cut for fuelwood, contributing to the degradation of rangelands and the disappearance of native grass and shrub species throughout Balochistan.
- * Severe soil and wind erosion problems are aggravating the problems associated with overgrazing and depletion of the province's precious natural resources.
- * There is no regular range management and grazing system.
- * Severe forage and fodder shortage problems due to overgrazing occur during the period October to March.

Proposed Solutions

The following solutions to rangeland management were identified:

- * There should be a regular, controlled grazing system for the flocks which will help control overgrazing and ensure continuous forage availability for the livestock.

- * An improved water-spreading system should be developed for efficient use of flood water -- necessary for the regrowth of native species of grasses and shrubs in these rangelands.
- * The creation of forage and fodder banks should be encouraged for the supply of forage during critical deficit periods. Moreover, they will also reduce some grazing pressure on the range.
- * Rehabilitation of degraded ranges should be done through the planting of productive exotic grasses and shrub species, using flood-water spreading techniques. This would be implemented by the relevant government departments such as the Arid Zone Research Institute (AZRI), PARC, and the Forest and Agriculture Departments.
- * Appropriate training in range management, range rehabilitation, and flood-water spreading should be arranged for proper utilization of the precious resources essential for the sustainability of this fragile ecosystem. These training courses should be organized by government departments such as Agriculture, Forestry, PARC, and AZRI.
- * The owners of irregular nomadic flocks, which cause considerable damage to the range, should be totally discouraged and localized grazing systems should be encouraged.

Immediate Proposed Actions

The following proposed actions were recommended:

- * The Livestock Department, Government of Balochistan, should ensure that medicines and vaccines, together with sufficient livestock assistants, are available through the veterinary hospitals and dispensaries.
- * The private sector should be encouraged to establish livestock medicine and vaccination clinics in the rural provinces to meet health-care requirements.
- * Some government agencies, such as the Forest, Soil Conservation, Agriculture, and other departments, should help ensure forage availability through range rehabilitation using improved water-spreading and water-harvesting techniques.
- * The government agencies, along with the local farming community, should encourage controlled grazing systems in various localities for regular forage availability and proper establishment of these ranges.

- * Research and development of very productive forage and fodder species should be carried out on a priority basis for the rehabilitation of the depleted and degraded fragile lands of Balochistan.
- * Some credit facilities for the purchase of medicine, and vaccines should be made available to farmers and herders on a priority basis to meet the needs of their livestock.

Commentary

In response to the question of the advisability of transforming nomadic herdsmen into sedentary farmers as a possible solution to overgrazing, the chairman of the discussion group noted that nomadic flocks bring diseases that are uncontrolled, the herders come as they please, overgraze the lands, and debase the fodder resources. It would be better if the local landowners, with assistance from the government, would come up with a system which could make this practice less destructive.

This stirred a lively debate. One participant noted that these nomadic patterns have been occurring over thousands of years and, if diseases are presently more common, it was probably due to improper use of pesticides on agricultural lands. He noted that experts should study this issue.

Another participant noted that these migratory patterns have been going on for thousands of years and things have been going all right. Degraded lands were the fault of concerned parties in the Forest and Livestock Departments, and they were not in the room. It was their responsibility to advise/prohibit flocks from crossing borders. The speaker personally wouldn't let other people use his grazing lands, but noted that the problems affecting the livestock sector did not originate across the border, but rather within Balochistan. There was no system Presently in place to remedy these problems

One participant said that it was not the nomadic tribes that were destroying the lands but the government, as custodian of the lands, through its failure to manage and control the use of pasture and forested lands.

The topic turned to diseases again. One participant asserted that pesticides were responsible for infirm livestock citing the destruction of lungs, liver, and other internal organs as evidence. A second participant cited the difficulties in obtaining proper medicine to treat these diseases. A third suggested the use of mobile vaccination units for rural areas which are not serviced by established veterinary facilities. Another promoted the role of the private sector in meeting this need through the establishment of clinics, following a pattern set by medical doctors, where they work for the government during the day and work for themselves at night.

Group No.7: Role of the Private Sector

Issue

The private sector is critical to the farmer in providing both direct inputs, such as fertilizers, pesticides, and agricultural machinery, and indirect inputs, such as provider of transportation, role as a commission agent, and source of seed imports, required for production.

The sector has done a lot for the farming sector, but due to the non-availability of cold storage and better market facilities, export facilities, and many other hurdles,

Productivity for the farmer has not improved. This is largely due to problems created by the government sector. However, the private sector is also increasing the price of its products daily and, in the absence of a check from the government side, the monopoly of agricultural inputs will continue.

Solutions

The following solutions were suggested by the discussion group:

- * The private sector should provide the farmer access to cold storage facilities.
- * The government should cooperate with the private sector.
- * The government should stop the smuggling of fertilizer, which is creating problems for the farmers.
- * Import taxes on agricultural machinery should be waived.
- * The government should encourage the private sector.
- * The private sector is very sharp, rapid, and useful. It also gives us everything on time. In contrast, the government sector always adopts a bureaucratic approach which costs the farmer much time. So the private sector can better serve the farmer. Wherever possible, the government should allow the private sector to provide the needed inputs and services needed for agricultural production, due to its increased efficiency.

Final Thoughts

One thing more -- the Agricultural Department is responsible for the illiteracy of farmers, They are not giving the proper guidelines farmers need for the adoption of modern technology and research, e.g. how to properly use pesticide spraying.

Commentary

One participant noted that there existed a vast development potential for the private sector in Balochistan and all that was needed was some nominal organization. He noted there even existed a role for the private sector in agricultural research, such has occurred elsewhere, in Sindh and Punjab. All that was lacking was the political will.

Group No.8: Need for Research and Appropriate Technology

The Issue

More research is required in both rainfed and irrigated agriculture. There is a firm belief that irrigation costs are escalating and that, in the near future, revenue associated with increased agricultural production derived from water pumping will no longer be able to pay off its associated costs. The solution lies in applying appropriate technologies and the results from applied research.

Solutions

A number of solutions were proposed by the discussion group. These were:

- * Better management skills are required in both rainfed and irrigated agriculture.
- * Farmers would like to see water-harvesting trials as an alternative technology suitable for rainfed agriculture.
- * Farmers realize that information about on-going experimental technologies is not reaching them as it should. Extension services need to be more comprehensive and more effective. They feel very strongly about the role and need for the government to improve on extension services.
- * There is a willingness on the part of farmers to participate in demonstration experiments that show technical and economic feasibility. But there needs to be leadership on the part of the extension teams.

Commentary

One participant noted that the key was to promote the transfer of basic agricultural technology to the farmer. A second identified water trickle systems as a technology that was needed by the farmer and which could be implemented through a system of subsidized rates.

Group No.9: Excessively High Interest on Agricultural Loans

The Issue

Balochistan is an underdeveloped province, having conditions entirely different from the rest of the country. Given these rough climatic and living conditions, it is an atrocious act to put the additional burden of interest on the farmers. Moreover, loans are granted most typically using the underlying farmland as collateral. The value of these lands is assessed using survey figures that are some 50 years old, a practice which is unfair to the small landholder. Similarly, there is a difference in loans fund available for farmers of irrigated lands and those farming rainfed areas. If anything, it should be the latter who receives the most monies as he is faced with the greatest difficulties in farming his lands.

Moreover, aid monies, provided by national and international donor agencies and which are administered by different federal and provincial organizations, never reach the farmer. They are more likely to be distributed among political dignitaries.

Solutions

The group suggested that:

- * Interest on loans should be completely eliminated.
- * The loan should be based on the price of land as valued in the present market.
- * The procedure for loaning should be short and easy.
- * The loans granted to the farmers of Balochistan should be repaid according to their crop production. In case of certain natural calamities destroying the crops of farmers, the loan installments for the affected year should be waived by the government.
- * There should not be any difference in the amount of loans granted to farmers of rainfed areas and irrigated areas.
- * The farmers should be provided Rs 200,000 loans only for his land preparation and agronomic practices.
- * The passbook system of agricultural loaning should be eliminated.
- * The old, unpaid loans should be made interest-free, keeping in mind the hard conditions and poverty in the Province, and their collection provided for through easy installments.

- * Branches of the Agricultural Development Bank should be opened in the more rural areas of the province, for example in Kohlu, Barkhan and Bugti Agencies, where the farmer is striving for existence under the worst socio-economic conditions and constraints.
- * Installation of tubewells, generators, and the supply of tractors and bulldozers should be administered by the government itself.
- * Aid programs intended to benefit the farmer should be properly announced through the mass media so that the farming community can be aware and represented during the distribution of aid and loan monies.

Commentary

One participant noted the pitfalls associated with the inability to pay interest on time, citing an example of a Rs 3,000 loan which grew to Rs 15,000 and is now resulting in the threatened seizure of the collateral, his land.

Group No.10: Lack of Financial Support for Agriculture and Conservation of Natural Resources

The Issue

The conservation of forests and the management of rangelands are required to control the erosion of land which consequently creates sedimentation in the water stream causing hindrances and wastage of water. Financial support from the government is required to purchase seed, forest nurseries, agricultural implements and equipment, such as bulldozers, tractors, and sprayers.

The group reached consensus on the following points:

- * For better agricultural development, the presence of forests is necessary because the rate of rainfall increases, which helps in underground water recharging
- * For raising new forests, financial support is required to purchase nursery seedlings, construct water channels, obtain bulldozers to level the land, and build fencing to protect the seedlings from animals.
- * After reforestation, finance is required for agricultural development, that is, for purchasing good quality seed, fertilizer, pesticides, machinery, tubewells, and sprayers. In the absence of electricity, diesel-operated tubewells are required.
- * Agricultural loans are provided by the banks on very difficult terms and conditions and their limit per farmer is very much restricted. The farmer has to mortgage his land to get the loans and even then he has to give five to

10 percent of the loan as a commission to the concerned officer. Another serious problem inhibiting the obtaining of loans is the absence of title on non-settled lands. In tribal areas, most of the land is without paper so it can't be used as collateral to get the loan. So a majority of the farmers are refused access to this loan facility.

- * Compound interest on loans is another serious hinderance and prevents many farmers from applying for them. This should be eliminated.
- * Loans are valued and granted on the basis of the land used for collateral. Only 80 percent of the land's value is granted in the form of a loan. The assessed price of land is usually wrongly determined, due to the old assessment record that does not reflect current market values, resulting in smaller loans which are not sufficient to meet the needs of the farmer. In addition, the borrower has to contribute in advance a certain amount of cash, typically one-third or one-fourth of the total loan amount, to the loaning agency. This is very difficult for any farmer. For example, if one needs Rs 500,00 for boring and turbine purchase, one-fourth is equal to Rs 125,000, which he has to pay in advance as a term of the loan. Few farmers have that much money and many cannot avail themselves of the loan facility. Such conditions should immediately be eliminated.
- * In many cases loans are wasted, due to the nonavailability of technical know-how. For example, a farmer purchases a tractor but he doesn't know how to drive it, nor does he know the required maintenance procedure and hence damages his tractor, wasting all of his efforts and money. It is suggested that the loaning agency should provide technical assistance to insure the correct use of the loan. Technical assistance is sometimes better than cash awards.
- * The loans should be sanctioned quickly because prices rise very fast and sometimes the procedures take so much time that the price of the required commodity doubles in amount by the time the loan is approved, particularly in the case of transformers.

Summary

The following recommendations were made by the discussion group:

- * Loaning procedures should be completed in the shortest possible time.
- * Loans should be interest-free.

- * The terms and conditions for the grant of loans should be easy and practical.
- * The loan should be returned in easy installments.
- * Crop prices should be insured so that farming can become a lucrative business and hence the return of loans assured.
- * The loaning agencies should provide after-loan technical services to the borrower in order to ensure the correct and lucrative use of the loan.
- * The property mortgaged against loans granted should be correctly assessed according to the existing market rate, and the illicit contribution system should be totally eliminated.

Commentary

One participant noted that Islamic tradition prohibits the charging of interest on loans. Hence, it is best to avoid taking out loans in the first place because it is a pipe dream to believe that loans will ever become interest-free.

A critical point was made that a major reason for not obtaining loans has been due to farm land whose value is insufficient to serve as collateral, due to an assessment system which was some 50 years out of date. A reassessment of land is required.

Returning to the question of Islamic tradition, it was noted that there were several Provincial Cabinet members who were studying this issue, but thus far had been unable to resolve the dilemma.

Another critical point was made on behalf of those farmers whose lands were yet to be titled, thus preventing them from using these lands to secure loans for the lack of suitable collateral.

Comments from the Chair

Following the presentation and subsequent comments from the last discussion group, one of the facilitators presented a brief summary of themes running through the ten presentations. Six themes were described. These were:

- * **Constraints:** Two chief constraints influence the nature of Balochistan agriculture, the availability of water and the availability of electricity needed to run the tubewells needed to pump ground water.

- * **Linkages:** While not emphasized as much as in other provinces, there nevertheless were a number of issues identified as affecting agricultural productivity which were a result of activities and/or processes which originated elsewhere. Examples cited were: the quality of water originating in the Punjab was low, contributing to declining agricultural productivity in Balochistan's irrigated lands; silting up of dams, attributed to a combination of poor land-use practices in the uplands and natural processes; and misapplication of pesticides, pesticide residues reaching water courses, eventually causing health problems in both humans and livestock through water consumption.
- * **Lack of Planning:** While not identified as a specific issue, there were a number of cases where poor planning and/or coordination was contributing to inefficient agricultural production. These included: lack of coordination between provinces, particularly with regards to water management; the absence of a master plan for water development in Balochistan; the existing status of water structures, specifically dams and karez systems; the chronic need for and better distribution of electricity; and poor pricing policies for certain agricultural commodities.
- * **Inequity/Lack of Empowerment:** As in other provinces, there were a number of examples supporting the argument that the small farmer has little say in decisions relevant to the agricultural sector which affect his welfare. These included: lack of input on the Price Commission; the large influence of the middleman in the sector, for example, when overpricing inputs, or selling outdated or adulterated pesticides; and lack of equitable distribution of inputs, particularly outside Balochistan's urban centers.
- * **Need for Technologies:** Particular emphasis was put on trickle/sprinkle water systems and alternative energy systems. The point was made -- yet once again that the results of applied research were failing to reach the farmer, due to the inadequacy of extension services.
- * **Inefficiencies:** There were a number of examples which illustrated why inefficiencies in the agricultural sector have contributed to Balochistan's failure to achieve the sector's full potential. These included: loss of produce attributed to the lack of cold storage facilities; water scarcity attributed to water systems in varying states of disrepair; loss of fertilizer due to poor

distribution networks; failure to get research results/training to the end-user; and ADB loans used for non-agricultural purposes.

As in other provinces, the primary responsibility for addressing these issues was directed toward the public sector. Specific roles were identified for WAPDA -- water, electricity, dam repair and development, and the conduct of water surveys; and the Departments of Agriculture -- export/import pricing policies, training, and extension, and Forestry -- reforestation and forestry management.

In addition to the large role identified for the public sector, specific roles were identified for cooperatives -- marketing of agricultural production, elimination of the middleman, and the private sector -- development of alternative energy sources, provision of livestock health care, and investment in agro-industries.

The facilitator closed by noting that he had not heard much about driving forces contributing to the status of Balochistan's agricultural sector. One mention was made of population and another on the role of Afghanistan transhumance in Pakistan. He speculated that this may be due to reduced population pressures in the province when compared to other regions in Pakistan.

He also noted that most of the discussion was one-sided and he did not hear much reaction from members of the private and public sectors in response to a number of criticisms leveled at them over the course of the day.

Two comments were made following the presentation of the summary. One was the suggestion that any money which would be channeled into Balochistan through donor assistance agencies should be spent/monitored directly by the donor(s) and not channeled through any national or provincial government institutions.

A second comment cited migration into rural areas as a growing problem in terms of increasing population pressures on the land.

Other Submissions

A Request for Diversification

Mr. Syed Nasir Shah
Dhadhar District, Kadrhi
Tehsil Dhadhar

We belong to a very poor areas by the agriculture point of view because of bad weather. It is nearby to Quetta and our crops are affected by cold weather in winter. It is near the hills and in the summer season it becomes very hot and we can't cultivate any crop. It is one of the hottest areas of Pakistan. In winter we cultivate all kinds of vegetables and wheat but our vegetables cannot give us return because of less prices and lack of markets or industry.

Over the last few years melon have become a major crop for us because it was profitable, but in the last two years our crop is affected or attacked by viruses, according to the agricultural experts. We apply insecticides and pesticides but can't get fruitful results.

We want alternate crops or a sugar mill is very necessary and a basic need of our area.

A Request for Electrification

Arif. R. Dumari
Mesa Crest ...
(addressed to the USAID director)

The implementation of electricity is a vital necessity considering the price of fertilizer in comparison to the sale price of produce.

Unfortunately, the process of implementation is so long that it has become very difficult to keep the ship afloat. I hail from an area which is only fifty miles from Karachi yet it has been almost fifteen years waiting to do so (get electricity installed). Even then it is incomplete, the poles and cables have been installed. It is almost two years since they have been left to season in the sun.

On behalf of the farmers we request that this should be expedited.

Definition of Sustainability

The following definitions were proposed:

No.1: To utilize the natural resources of water, soil, and climate for the benefit of the human race and to conserve them for the sake of future generations.

No.2: The land should be used in such a way that, by cultivating improved varieties and proper use of fertilizers, the soil should give best yields every year without harming the potential of the land.

No.3: First, stability in prices and a fair return to the farmer; and second, practical steps/solutions to ensure the sustainability of agriculture in Balochistan.

The participants accepted the first definition as the one most applicable to agricultural sustainability in Balochistan.

Names of Group Members

Group No.1: Water Availability

Mr. Malik Dinana Khan Bungalzi
Farmer
Village Dhadhar
District Kachhi

Mr. Malik Khrushid Ahmad Khawajakhel
Farmer
Kalati

Dr. Mohammad Iqbal (chairman)
PARC
Islamabad

Mr. Ghulam Rasal
Farmer
Pishin

Abdul Jalil Kathazi
Pishin

Sardar Noozullah
Pishin

Mohammad Ishaq
Hasik, Kalat

Aziz -ur-Rahman
District Kalat

Niaz Durrani (secretary)
Project Director

Mr. M. Iqbal
Village Dhadhar
District Kachhi

Sikandar Khan Baloch
Dashat
Kalat

Haji Shabbir Ahmad Umrani
Farmer

Haji Abdur Rahman
Farmer
Village Dhadhar
District Kachhi

Group No.2: Marketing, Middlemen, and Pricing Policies

Dr. Mohammad Saeed (chairman)
USAID/ARD
Islamabad

Mr. Md Ahmad Lebri

Mr. Md Yousef
Extension
Department of Agriculture
Pishin

Mr. Syed Bashir Ahmad
Agricultural Officer

Mr. Malik Rahmat ullah
Badal Karez

Mr. Mir E Khan
Village Dhadhar
District Kalat

Mr. Mitha Khan
Village Dhadhar
District Kachhi

Group No.3: Pest and Pesticide Management

Mr. Syed Abdul Ahad (chairman)
Quetta

Mr. Kahil-ur Rehman Bansulzi
Fisheries

Mr. Haji Abdul Basit Bansulzi
Kalili

Mr. Haji Malik Darvesh
Kalat

Mr. Haji Umar Khan
Vili Ganjdori
Kalat

Dr. Shahid Rafique
AZRI
Quetta

Mr. Haji Abdur Rehman
Village Dhadhar
Kalat

Mr. Malik Md Khan
Pishin

Mr. Mir Ghulam Qadir Mengal
Tamboo Narisabad.

Naqeeb Ullah

Mr. Haji Dil Musad
Village Hajidori
Kalat

Group No.4: Lack of Electricity

Jalal-ud-din Jomezai (chairman)

Abdullah
Pishin

Mohd Harriq Kakar
Ag Extension Officer
Pishin

Akhtar ali Maizai
Village Maizai
Pishin

Ghulam Akbar
AZRI
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Mohd Yaqoob
Hasik
Kalat

Wally Albertine
USAID/Islamabad

Group No.5: Lack of Agro-Based Industry

Mr. Yaqoob Shah
Pishin

Mr. Arif R. Durrani
Mesa Crest Ranch

Mr. Rais Ghulam Hyder
Kalat

Mr. Abdullah Han Mohd Shahi
Mrs. Nehida Safdan

Mr. Mohd. Tariq Sherida
Project Director
Fruit and Veg. Marketing Project
Quetta

Maj. (rtd) Habib ullah Bazai (chairman)
Quetta

Mr. Haji Abdul Aziz
Mastung
Kalat

Mr. Abdul Razaq Achakzai
Fruit Market
Quetta

Group No.6: Livestock Production and Range Management

Dr. Bakht Roidon Khan (Chair)
Director
AZRI
Quetta

Mr. Bashin Ahmad
Deputy Director
Extension
BILAD Project
Turbat

Dr. Ahmad Ali
BILAD Project
Turbat

Dr Daniel Bradbury
BILAD Project
Turbat

Mr. Malik Lal Jan Kakar
Farmer

Mr. Ichahil Khan
Farmer
Pishin

Group No. 7: Role of the Private Sector

Mr. Syed Musarat Hussain (chairman)
Fertilizer Company

Dr. Alister Allen
AZRI
Quetta

Mr. Hafiz Noor Mohammand
Quetta

Mr. Abdul Rahman
Kalat

Mr. Hafiz Abdul Saltar Shahwani
Mastung

Mr. Mohd Waris
Kachhi District

Group No.8: Need for Research and Appropriate Technology

Mr. Bazzai Tufail Ahmad (chairman)
Chief of Tribe
Quetta

Mr. Abdul Wahid Unrai
Kalat

Mr. Malik Shamsuddin
Kalat

Dr. Abolardo Rodriguez
AZRI
Quetta

Mr. Abdul Ghaffar
Pishin

Mr. Mir Mohammed Azeem Qazi
Mr. Shahid Sada Mhjon

Group No.9: Excessively High Interest on Agricultural Loans

Mr. Malik Abdul Hakim
Bostan
Pishin

Mr. Khudai Noor Battazai (chairman)
Battazai
Pishin

Mr. Said Mohd. Agha
Quetta

Mr. Abdul Hadi
Pishin

Dr. Syed Hassan Raza
Director
AZRI
Quetta

Mr. Mir Anwar Jan
Kalat

Mr. Rana Bashir Ahmad
Quetta

Mr. Munir Ahmad
Kalat

Mr. Said Maulin Dadulla
Pishin

Mr. Said Abdullah Ali
Pishin

Group No.10; Lack of Financial Support for Agriculture and Conservation of Natural Resources

Mr. Javaid Aziz Siddiqui
National Fertilizer Corporation
Quetta

Mr. Abdul Hadi
Mughatian

Mr. Inayat Ullah Khan Kakar
Barshore

Mr. Abdullah Shah
Agricultural Department
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Mr. S. Naseer Shah
Dhadhar

Mr. Malik Shahzad Khan
Kohlu

Mr. Mir Lashkari Raisa...
MaharGosh

Mr. Abdur Rahim
Pishin

Mr. Nasrullah
Dhadhar

Mr. Haji Allah Baksh
Sarwan Petroleum
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Mr. Ahmad Saeed
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CHAPTER VI

SUSTAINABILITY, ISSUES, AND THEMES: PROVINCIAL PERSPECTIVES

Introduction

The preceding four chapters have amply illustrated the range, diversity, and complexity of issues which affect the achievement of sustainable agriculture in Pakistan on a province-by-province basis. The need now is to synthesize this information into a more concise and usable format. This range of information is a consequence of various factors: differences in participant composition and backgrounds; varying degrees of reporting quality and conformity to the guidelines; and problems associated with translating complex concepts from several different languages into English. In light of these constraints, the approach adopted was a multi-level synthesis ranging from the general to the specific, with three separate analyses.

The synthesis collapses the total number of issues into smaller, more compatible classes of issue. These are first examined within a framework structured by critical elements of the four provincial definitions of sustainability. The second analysis summarizes the characteristics, solutions, and constraints affecting solutions on an issue-by-issue basis. Finally, a cross-sectoral analysis attempts to summarize the major themes which run through many of the issues, regardless of province. For greater detail on any specific issue, the reader is requested to return to chapters II through V.

List and Synthesis of Issues

A total of 18 issues were identified from the four workshops. These are listed in Table VI - 1. However, for purposes of brevity, some consolidation has occurred. For example, under the more general issue of Lack of Support to the Agricultural Sector, certain more specific issues identified in various discussion group reports have been incorporated. These include: extension services, financial support, education for farmers, required inputs -- particularly credit and finance, interest rate issues, research/appropriate technology, energy, and land tenure.

Table VI - I
Issues from the GOP/USAID-Islamabad Workshops

In Agricultural Sustainability

General Issues (all four provinces)

1. Marketing, middlemen, and pricing policies
2. Lack of support for agriculture -- inputs, credit, extension, etc.

Provincial Issues

3. Livestock production and rangeland management (NWFP, Punjab, and Balochistan)
4. Lack of development and technology for Barani/arid areas (NWFP, Balochistan, and Punjab)
5. Lack of long-term planning/relation between planning and development (NWFP and Sindh)
6. Soil erosion, watershed management, degraded lands, deforestation (NWFP and Punjab)
7. Salinity and waterlogging (Sindh and Punjab)
8. Pest and pesticide management (Punjab and Balochistan)
9. Environmental monitoring, education, and legislation (NWFP)
10. Family planning, poverty, and unemployment (NWFP)
11. Conservation and development (NWFP)
12. Land tenure and land fragmentation (NWFP)
13. Water diversion (Sindh)
14. Saltwater intrusion (Sindh)
15. Urban expansion (Sindh)
16. Water availability (Balochistan)
17. Role of private sector (Balochistan)

For purposes of further simplification these 17 issues have been collapsed into 10 basic issues and listed by group in Table VI -2.

Issues as they Affect Agricultural Sustainability

The first analysis attempts to examine these ten issues in the context of the definitions agreed to in the four workshops. The intended objective was to discern what aspects of the definition were not being met as defined by the issues within the conceptual framework developed -- and understood - by workshop participants.

The four provincial definitions for agricultural sustainability agreed to were:

- * Improving the productivity for the general welfare of people along with maintenance and enhancement of natural resources with the aim of striking a balance between basic human requirements, productivity, and the environment (NWFP).
- * Sustainability is defined as achieving and maintaining the quality of life for all rural people, both present and future. This can be achieved through various ways, the most relevant of which are: imposition of the rule of law guaranteeing protection and security; satisfaction of basic human needs in an equitable manner; and increased productivity and natural resource enhancement which should leave the environment improved for future generations (Sindh).
- * A system which is productive, profitable, preserves the natural resource base, protects the environment, contributes to improvements in human health and welfare, and can be maintained over time (Punjab).
- * To utilize the natural resources of water, soil, and climate for the benefit of the human race and to conserve them for the sake of future generations (Balochistan).

Table VI-2

General Issues in Agricultural Sustainability in Pakistan

Policies and Institutions

1. Lack of long-term planning
2. Lack of support for agriculture
3. Marketing, middlemen, and pricing policies
4. Role of the private sector

Natural Resources and Productivity

5. Water: salinity, waterlogging, saltwater intrusion, diversion, and availability
6. Rangelands: livestock, rangeland management, lack of development and technology in barani lands
7. Soil erosion

Farmers, the Environment, and Human Welfare

8. Pest and pesticide management.
9. Environmental monitoring, education, and legislation.
10. Conservation and development.

These were broken down into five classes of elements.

These were:

- * Objectives of the processes/system
- * Goal
- * Who is the beneficiary?
- * Over what time period are the objectives to be achieved?
- * Approach by which objectives are achieved

Table VI - 3 identifies each of the elements of the four definitions and groups them by class. Some interesting points emerge. Three out of the four provinces shared the dual objectives of increased productivity and conservation/enhancement of the natural resource base. Interestingly, the Punjab, the most agriculturally-developed of the four provinces, included profitability as an additional objective. The four provinces demonstrated a number of approaches by which the objectives were to be achieved -- ranging from conservation and balance to application of the law. This latter from Sindh where present circumstances make personal security an issue overriding most others.

Table VI - 4 lists the issues under the most appropriate element(s) derived from the four definitions for sustainability. The table demonstrates which elements of sustainability are being adversely affected by issues, thus impeding the achievement of sustainable agriculture as defined in the various workshops. This is a somewhat contrived classification scheme because of the interrelationships between agricultural development and the status of the natural resources on which the sector depends. This is demonstrated by the high degree of correlation between the dual objectives of Productivity and conservation of natural resources. For example, the prudent application of selected pesticides can serve to increase agricultural productivity, thus meeting one of the objectives of sustainability. However, improper application of certain highly toxic and long-lived pesticides can defeat the achievement of the second objective, and over time, one would argue increased productivity as well. Similar relationships exist for water, rangelands, soil erosion, and the general issue of conservation and development.

Table VI - 3

Analysis of Provincial Definitions of Sustainability

Definitional Element	NWFP	Sindh	Punjab	Baloch
Province				
Process/System Objectives				
Improve Productivity	X	X	X	
Conserve/Enhance MR Base	X	X	X	
Profitability				X
Benefit				X
Goal				
Improve Welfare		X		X
Improve Quality of Life			X	
Beneficiary				
Human Race	X	X	X	X
Time Period				
Present	X	X		
Future		X		X
Approach by Which Achieved				
Conservation			X	
Striking a Balance Between				
Productivity, Human Needs and the Environment		X		
Meeting Basic Human Needs in an Equitable Manner			X	
Enforce the Rule of Law			X	

Similarly, many of the issues identified in the workshops also affect the degree to which the recommended approaches can be effective in achieving the previously identified objectives. In this case, there is a clearer division between conservation and basic human needs/equity issues. For example, to achieve the dual objectives of sustainability, increased Productivity and enhancement of the natural resources base, water must be used conservatively. The fact that it has been identified as an issue signifies that as an approach it has been ineffective. Similar interpretations can be made for the other issues listed under the approach heading.

Interestingly, when collapsed no issues had a time dimension. This been may signify the participants' concern with topical issues affecting agricultural sustainability rather than underlying processes "driving" these issues. Some evidence for this interpretation can be found in the two issues taken from the long list with a time dimension, urban expansion and land fragmentation.

While somewhat unwidely, the analysis provides a means to frame the issues identified within previously agreed definitions of sustainability and provides the basis for justifying the selective application of solutions.

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Issue Profiles: Policies and Institutions

Lack of Support for Agriculture

The Issue

This is an issue which directly affects all four provinces and includes many of the key elements of any viable agricultural production system, such as supply and pricing of inputs, availability of credit, the generation of appropriate technology, land tenure arrangements, and the provision of extension services, training, and education. In various forms, the public sector, both provincial and federal, was roundly criticized -- particularly by the farmers the researchers, and the private sector. From their perspective, the agricultural departments are not helping small farmers, particularly those who live in the drier, rain fed areas of the countries. But the criticism was just as strong from small farmers in the irrigated areas of Punjab and Sindh.

Table VI - 4
Issues Affecting the Achievement of Agricultural
Sustainability as Defined by the Four Provinces

Process/System Objectives

1. Improve Productivity/Profitability

Marketing etc al.
 Lack of Ag Support
 Rangelands/Barani Lands Development
 Soil Erosion etc al.
 Lack of Long-term Planning
 Pest/Pesticide Management
 Water
 Role of the Private Sector
 Conservation and Development

2. Conserve/Enhance MR Base

Rangelands/Barani Development/ Soil Erosion etc al.
 Water
 Pest and Pesticide Management
 Environmental Monitoring
 Conservation and Development

Approach by Which to Achieve Objectives

Conservation

Rangelands/Barani Lands Development Soil Erosion etc al.
 Water
 Pest and Pesticide Management
 Environmental Monitoring
 Conservation and Development

Striking a Balance etc.

Conservation and Development

Meeting Basic Human Needs Equitably

Marketing etc al.
 Lack of Ag Support
 Underdevelopment of Barani Lands
 (Family Planning, Poverty etc.)
 (Land Tenure/Fragmentation)
 Role of the Private Sector

Time Period

Present/Future

(Urban Expansion)
 (Land Tenure/Fragmentation)

Underlying Driving Forces

Agricultural extension, particularly in the rain fed areas, is not a high government priority. Consequently, motivation is low -- in the absence of incentives, recognition, and awards. Similarly, the linkages between the researcher, the extension agent, and the farmer are weak. Not surprisingly, communication between the extension agent and the farmer is often poor, since the agent has little to offer.

The loan procedures of commercial banks and the ADB are cumbersome, time-consuming, and costly. Because of the various loan requirements, particularly the collateral, it is becoming increasingly difficult for small farmers to obtain credit. According to participants, corruption is widespread, with loan officers favoring the larger landowners.

Inhibiting Factors

A major factor that argues against changing the present situation is the present social structure prevailing in certain parts of the country -- feudal in some, tribal and authoritarian in others -- where the existing leadership actively opposes changes which might threaten their position. This is particularly the case with education for farmers and their children.

A second factor is the lack of government commitment to developing the barani areas of the country -- resulting in shortage of funds, high ratio of farmers per extension agent, low accountability, low research priority, and credit discrimination. It is easier to obtain a loan for irrigated land than for barani land.

Solutions

The technical solutions to these problems are well known, and include the following:

- * **Inputs:** Fertilizers and pesticides should be available on a timely, but economic basis.
- * **Credit:** Credit facilities should be made easily accessible to farmers, and the interest rates of commercial banks, the ADB, and other loan agencies should be reduced and, if possible, eliminated completely -- especially for small farmers and fishermen.
- * **Research:** Efforts be made to develop appropriate technology for small farmers, with emphasis on an integrated production system using chemical inputs, manure, organic wastes, and other low input methods which will improve farm productivity.

- * **Extension:** Provide adequate resources to support the extension service; strengthen the training facilities; and improve the linkages between farmers, extension workers, and researchers.
- * **Farmers:** Provide training in the following: the proper application and mix of fertilizer, pesticide, and other farm inputs; technologies which are appropriate for the particular environment; and different skills to enable people to find off-farm employment.

Implementation

Such a mammoth change can only be undertaken by the government, and planners and policy-makers should take the lead in implementation -- either with national resources or with the assistance of external donors. As one speaker eloquently put it, some of the problems in the agricultural sector are of the country's own making -- "It is the problem of political will, rather than one of economics."

Marketing, Middlemen, and Pricing Policies

The Issue

Great dissatisfaction was expressed about the present marketing infrastructure throughout the four provinces. First, farmers resent the fact that there are few marketing centers where they can sell their produce, a situation often exacerbated by the poor state of the roads and the lack of transportation. Second, farmers resent the power of the middlemen to whom they are obliged to sell their crops. These middlemen are criticized for their greed -- buying cheap and selling dear. Third, the government is criticized for its pricing policy for basic commodities. According to farmers, the prices they receive from the middlemen barely cover production costs.

Underlying Forces

Certain factors play an important role in perpetuating this situation -- particularly the farmers' lack of information about prices and commodities and the fact that small producers are not represented on the Price Commission, the federal entity charged with recommending floor prices to the government.

Inhibiting Factors

Given their desire to meet pressing economic needs, many producers are obliged to sell most of their crop at harvest time, thereby glutting the market and helping to keep prices low. When there is a surplus, there is a dearth of silos and cold storage facilities. There is little standardization or grading of commodities and there are few rules, regulations, and byelaws. Finally, there is a lack of proper institutions in the market place to represent the interests of both producers and consumers.

Proposed Solutions

While a great many solutions were proposed, the most relevant fell into the following categories:

- * **Legislation:** The existing legislation regarding marketing procedures should be enforced and, if necessary, new legislation should be introduced.
- * **Middlemen:** Control the number of middlemen in the market as well as check on their excesses.
- * **Marketing:** Establish more marketing centers with adequate storage facilities and improve the transportation network.
- * **Pricing:** a price Commission should be established at the provincial level which would announce floor prices before sowing begins. Such prices should incorporate the increases in both the inflation index and production costs.
- * **Planning:** Establish a relationship between price and demand for agricultural commodities through the introduction of crop zoning --- thereby avoiding the occurrence of seasonal gluts.
- * **Empowerment:** Farmers, small, medium, and large, should be represented on the Price Commission. In addition, organizations should be established to represent their interests in the market place.
- * **Information:** Information on prices, commodities, and general market intelligence should be widely disseminated through the mass media.

Implementation

The government should take the first step, responding to public demand as expressed through the people's elected representatives at both provincial and federal levels. Local, provincial, and federal governments should enforce the existing laws.

The Role of the Private Sector

The Issue

While this issue only made the priority list in one province, the private sector and its present role in agricultural development and sustainability permeated the whole conference. In the vocabulary of the conference, "private sector" meant commercial business, active in three specific domains: the supply of inputs; the marketing of commodities; and economic diversification, particularly agro-based industry.

There was agreement that the private sector was critical to the farmer in providing inputs, such as fertilizers, pesticides, agricultural machinery, and transportation. Nevertheless, the sector was criticized for not always providing these inputs on time, at inflated prices, sometimes outdated or useless, and without the necessary instructions or safeguards.

The role of middlemen has already been discussed. The potential role of agro-based industry was an issue only in Balochistan where horticulture and livestock are the two most important agricultural activities. Both produce a surplus and both need some value added if they are to be economically viable in the long term.

Driving Forces

The main driving force is the simple fact that the government cannot and should not do everything.

Inhibiting Factors

There appears to be little control or accountability in the private sector. In addition, rumors of corruption are rampant in which the small farmer is often the loser. The statement at the end of the Punjab Provincial Conference bears witness to its pervasiveness. In the case of Balochistan, for example, fruit growers have to compete with produce smuggled across the border from Iran and Afghanistan. In terms of domestic markets, they have to deal with long distances, poor roads, and high transportation costs -- all of which contribute to significant losses en route. And when there is a glut, vegetable-growers have been unable to sell their produce -- particularly potatoes and onions. The same constraints affect fishermen in the coastal zone.

proposed Solutions

The following activities were proposed:

- * **Fruit:** Establishment of juice, syrup, squash, and fruitcanning industries.

- * **Vegetables:** Establish a vegetable-canning and dehydration plant, especially for onions.
- * **Livestock:** Establish proper marketing and processing facilities for livestock byproducts, such as wool and leather.
- * **Fish:** Establish a fish canning factory in the coastal area.

Implementation

In the case of Balochistan, where the need is greatest, farmers are more than willing to play an active role -- if initial financing could be made available interest free with a grace period of 10 years.

Lack of Long-Term Planning Capability

The Issue

While this was a key issue in two of the provinces, it made the original list in a third, and underlined much of the discussion on other issues. The basic point made was that planning and development, specifically implementation, are divorced and that planning, as presently practiced at the provincial level, has little basis in practical reality. In addition, planning, if practiced properly, should reflect a basic philosophy regarding the developmental goals and objectives to be achieved.

Underlying Driving Forces

Several major factors work against long-term planning. In some areas, it is the present political instability, together with the lack of resources or misuse of these resources. There is little attempt to follow an integrated, intersectoral approach. External forces like the World Bank, the International Monetary Fund, and international donors influence the planning process, but often only in the short term.

Inhibiting Factors

Planning is presently overcentralized, there is little or no accountability on the part of the government, and little coordination with other developmental institutions at the provincial level. In addition, the P and D departments are primarily concerned with budgetary allocations and, consequently, have no staff at the level of field implementation. As a result, there are few incentives to integrate planning, monitoring, and implementation and to involve the local population directly in the planning process.

Proposed Solutions

The solutions proposed included institutional strengthening, decentralization, and local empowerment. These entailed the following:

- * **Institutional Strengthening:** There is a need for broader training in both P and D and the line agencies in solving cross-sectoral problems -- such as deforestation, rangeland management, and development of barani areas -- which require an interdisciplinary approach. This requires the necessary financial resources and qualified personnel. Above all, it calls for improved data collection and analysis on which to build improved planning capability.
- * **Decentralization:** There is a need for P and D to establish field level offices, supported by sufficient staff to work with implementing agencies.
- " **Local Empowerment:** There is a growing awareness that the local population should be more actively involved in the planning and implementation of development activities -- whether in planning at the grassroots level or pressuring the government to give more importance to long-term planning and the resolution of critical issues.

Implementation

This will call for action at both the provincial and the local levels. As long-term planning has been traditionally a prerogative of the government, the change should originate there, with encouragement and pressure from concerned institutions, organizations, and individuals.

Issue Profiles: Natural Resources and Productivity

Water

The Issue

Given the semi-arid conditions that prevail in much of Pakistan, together with the crucial role played by irrigation, water is the prime natural resource and figured prominently in many of the discussions. The issues raised by its availability and lack thereof cover a wide gamut, including salinity, waterlogging, saltwater intrusion, and water diversion in the irrigated areas, and water availability and water harvesting in the arid areas. The crux is having enough water of reasonable quality available to cultivate crops. In the irrigated areas, the key issues are quality and availability, whereas in the arid areas the issue is availability.

Driving Forces

In the case of waterlogging and salinity, there are three major causes: rising water table; seepage of water from canals; and excessive irrigation. These in turn may lead to: poor germination; lower yields; crop failure; and eventual abandonment of the land. In the case of water diversion, the factors at work depend on the design of the system, the way it is managed, and the role of politics and corruption.

In the case of water availability, the driving force is environmental. In the case of Balochistan, for example, there are no large rivers and water is obtained from two sources -- ground water in the form of rain and melted snow and underground water from tubewells and karez systems. The whole system is now under stress with the advent of electricity, the proliferation of tubewells, and the falling water table.

Inhibiting Factors

In the irrigated areas, there are already many drainage projects in Pakistan, for example the Salinity Control and Reclamation Project (SCARP). Experience has shown that largescale drainage projects are difficult to manage due to: shortage of money; lack of qualified staff; and poor performance by contractors.

In the arid areas, the limiting factors are the steadily falling water table and the poor on-farm management of existing irrigation systems, whereby water is not used in an optimal manner and, consequently, a lot is wasted. In addition, there is no master plan for the development of water resources, as well a shortage of funds, technical know-how, and experts.

Proposed Solutions

The following measures were proposed:

- * **Control of Waterlogging:** Implement the following measures: introduce horizontal and vertical drainage; line canals and water courses; cultivate water tolerant crops; and plant water tolerant trees.
- * **Prevention of Salinization:** Lower the water table; improve the soil structure; and keep soil covered under perennial vegetation.
- * **Management of Saline Lands:** Leach saline soils with good quality irrigation water. Do the same for sodic soils, adding gypsum as an amendment.

Management of Saline Soils: Salinity is accepted as a given, and crops are grown under existing conditions, with the following variations: screen salt-affected crops and varieties; plant salttolerant trees; and introduce cultivation practices adapted to saline conditions.

Water Availability: Control the wastage of water; control the flow of water through the use of check dams and delayed-action dams; increase the underground reservoirs through the establishment of percolation galleries; provide for the proper maintenance of existing karez; and formulate rules and regulations regarding the proper use of underground water resources.

Implementation

In order to manage and control waterlogging and salinity, an increased role is proposed for the Water Management Department, the Forest Department, research institutions, and NGOs.

In the case of water availability, there should be an active role for both the public and the private sectors. On the public side, there would be increased roles for WAPDA, PARC, and PCSIR. On the private side, there would be an increased role for individual farmers and also for the traditional organizations responsible for cleaning the karez.

Rangelands

The Issue

The ranges are overgrazed by nomadic and local herders. Shrubs and trees are cut for fuelwood, contributing to the degradation of the rangelands and the disappearance of native grass and shrub species. Soil and wind erosion aggravate the problem.

Underlying Forces

Outside of the tribal areas, many of the traditional range management and grazing systems have fallen into disuse. In addition, the number of animals -- particularly sheep and goats has increased dramatically, stretching the carrying capacity of the pastures to the limit.

Inhibiting Factors

Among the more important are the following: management of the natural rangelands has never been a government priority; lack of information on soil and water resources of the rangelands; lack of infrastructure facilities; and relatively harsh natural conditions.

Proposed Solutions

The following solutions were proposed:

- * **Grazing:** There should be a regular, controlled grazing system for the flocks which will help control overgrazing and ensure continuous forage availability for the livestock.
- * **Forage:** The creation of fodder and forage banks should be encouraged for the supply of forage during critical deficit periods.
- * **Range Rehabilitation:** Rehabilitation of degraded ranges should be undertaken through the planting of productive exotic grasses and shrub species, using flood water spreading techniques.
- * **Water:** An improved water spreading system should be developed for the efficient use of flood water -- necessary for the regrowth of native species of grasses and shrubs.
- * **Training:** Appropriate training in range management, range rehabilitation, and flood water spreading should be provided for the sustainability of this fragile ecosystem.

Implementation

provincial public institutions will be expected to play a key role in implementing these solutions. For example, government agencies, such as the Forest, Soil Conservation, Agriculture, and other departments should help ensure forage availability using improved water spreading and waterharvesting techniques. In collaboration with the local farming community, they should encourage controlled grazing systems in various localities for regular forage availability and proper establishment of the range. High priority should be attached to the research needs in productive forage and fodder species and their important role in range rehabilitation.

Soil Erosion

The Issue

Soil erosion exerts serious, deleterious effects upon the natural resource base and the possibility of long-term agricultural sustainability. The socio-economic costs associated with soil erosion include: degraded soils and low crop productivity; poor crop husbandry; poverty and poor health; and ultimately high unemployment.

Driving Forces

The principal forces which contribute to soil erosion are: absence of sound soil management practices, together with inherent soil conditions; lack of technical know-how; poor extension service; lack of credit facilities for rehabilitation of land; and overgrazing and deforestation.

Inhibiting Factors

These include biological constraints, such as the accelerated runoff and increasing water losses, partly due to the absence of moisture-conservation practices. Also inhibiting is the generally low soil fertility. Other factors include poverty, illiteracy, and political exploitation.

Proposed Solutions

The following activities were recommended:

- * **Erosion Mitigation:** Provision of land leveling and soil conservation equipment and practices, particularly erosion - mitigation strategies.
- * **Appropriate Technology:** Dissemination of mulching, use of green manure, recycling of household wastes, incorporation of organic matter such as dung, various tillage techniques, and similar low input practices.
- * **Training:** Upgrading of the educational level of extension agents and regular updating of their knowledge.
- * **Credit:** Credit facilities should be provided on soft terms for the purchase of required inputs by genuine farmers.

Implementation

Implementation of these solutions should be through increased coordination and assistance from the concerned government agencies.

Issue Profiles: Farmers, the Environment, and Quality of Life

Pest and Pesticide Management

The Issue

Pests are a serious problem for agriculture in Pakistan. It has been estimated that production can be increased 10 to 15 percent with effective pest control. It is estimated that Punjab consumes 80 percent, Sindh 15 percent, and NWFP and Balochistan five percent of the total pesticides imported. Due to the severe nature of the problem, pest management becomes an essential part of the agricultural system.

Driving Forces

Pest management is particularly important in cotton, a major export, which requires six sprayings each season. With other crops, if production levels are to be maintained or even increased, pesticide use must grow.

Inhibiting Factors

The following factors inhibit the effective use of pesticides: the laws regarding the use of pesticides are not enforced; dealers do not have training in pesticide use and application; little or no training is provided farmers in pesticide use and application; often the pesticides available to small farmers are outdated and have lost their potency; and there is a need for regulation -- DDT is still produced and distributed in Pakistan.

Proposed Solutions

The following solutions were proposed:

- * **Legislation:** The Agricultural Pesticides Ordinance of 1971 must be enforced and the federal government should provide the forum for its implementation through the provincial agriculture departments.
- * **Regulation:** Companies manufacturing pesticides must be directed to employ trained manpower to observe field applications. The authorization to distribute pesticides must be given only to qualified people with technical knowledge of pesticides and their application.
- * **Training:** Farmers should be trained in the proper use and application of pesticides, as well as the remedial actions to be taken in case of an accident. The dangerous aspects of pesticides should be widely disseminated to the public through the mass media.
- * **Research:** Research must be intensified to control pests without the use of pesticides. In addition, research should be conducted on the effects of pesticide use, particularly its effects on people.

Implementation

These proposals should be implemented by the federal and provincial departments of agriculture.

Environmental Monitoring, Education, and Legislation

The Issue

Environmental issues include deterioration of our natural resources, particularly the quality of water -- drinking, irrigation, and ground water. Soils, crops and air are all degrading at a very rapid rate.

There is no proper planning for housing and townships. As a result, poor drainage, blocked sewerage systems, or simply no sewerage system at all have created an extremely unhealthy environment. Wastes are directly disposed of into agricultural lands, drains, and orchards. There is no regulatory control over the disposal of city wastes.

Similarly, all sorts of industrial wastes and byproducts with unknown chemical, physical, and biological consequences are unscrupulously disposed of into our rivers. Use of agricultural chemicals is potentially dangerous for human and animal health. The number of vehicles which emit unleaded gas fumes has increased tremendously. In light of these issues, there is a risk to human health, animal health, and to our ocean resources (fish industry).

Driving Forces

The reasons for this degradation include population density, lack of education in basic health and hygiene, and lack of awareness among the rural and urban populations. There is no proper planning for housing and townships. Draft environmental legislation exists, but it remains unimplemented.

Inhibiting Factors

The principal factors include: lack of leadership at both the national and the grassroots level; lack of environmental education; lack of resources for proper development; lack of political support; and no motivation by the media.

Solutions

The following solutions were proposed:

- * **Environmental Education:** This can be promoted through: more effective use of the media; integration as part of the curriculum at the school level; and incorporation as part of the role of social and religious organizations.
- * **Land-Use Planning:** This can be promoted through: the preservation of fertile agricultural lands from construction of houses, industries, and large - scale townships wherever possible; the provision of adequate drainage and sewerage systems in urban and rural areas; proper garbage collection and disposal systems; and the Promotion of a well - planned landscaping, afforestation, and house gardening program.

- * **Baseline Information:** A thorough survey is needed to evaluate the existing quality of air, water, soils, and vegetation in light of the known standards.
- * **Empowerment and Responsibility:** Development of pressure groups to protect people's environmental rights and pressure industries to observe international standards for environmental pollution.

Implementation

The following actions were proposed:

- * Develop an action plan. This should be detailed, prepared at the grassroots level, and incorporated into district/provincial plans.
- * A monitoring program should be established which monitors the progress towards achieving the plan's goals and objectives.
- * The mass media should be brought in to support the plan and promote increasing awareness.
- * Finally, a task force should be created to clean streets, parks, and ponds.

Conservation and Development

The Issue

There are three major components:

- * **Land:** deforestation, erosion, desertification, salinity, and waterlogging; construction and industrialization causing land loss, land pollution from industries, and decrease in vegetative cover.
- * **Water:** pollution from industrial use; mismanagement resulting in overuse, salinity, waterlogging, construction of dams, and wastage as water goes @rom rivers to the sea unused.

- * **Air:** industrial pollution, decreasing rainfall, deforestation, greenhouse effect, smoking, emissions; effects of use and disposal of non- degradable products and aerosols.

Driving Forces

There are various driving forces, responsible for the present situation, the most important of which are: rural development and industrialization; deforestation; poverty and unemployment, leading to increased stripping of local resources; population growth, with more people for fewer resources; lack of relevant policies and legislation; and lack of incentives world-wide for the need to conserve resources.

Inhibiting Factors

Among the major factors are: lack of public will; lack of public awareness of the need to conserve; insufficient resources; conservation is expensive -- personally and nationally -- and rewards are long-term; lack of empowerment of qualified technical specialists; and political constraints.

Solutions

The following solutions were proposed:

- * **Public Awareness:** Develop this through the media and the educational system.
- * **Legislation:** Enact laws which ensure conservation of resources.
- * **Information:** Provide feedback which allows appreciation of the need to conserve.

Implementation

The following actions were recommended:

- * Develop a national strategy and general commitment through: public pressure from interest groups; identification of technical experts; and resource allocation.
- * Enact laws and enforce them, particularly the prevention of contrived misuse.
- * Monitor the impacts of development activities on the natural resource base and evaluate the results.

Cross-Cutting Themes

A number of themes were identified which ran both through issues within workshops as well across workshops. These were:

- * **Constraints:** There was broad recognition of both the natural and human constraints which serve to impede approaches to achieving agricultural sustainability, and often undermine the farmers' ability to maintain present levels of production. Typical natural constraints include: water scarcity; nutrient deficient soils; and high evapo-transpiration rates. Human constraints affecting agricultural sustainability include: the low level of education among many farmers; cultural and language diversity; and "externalities" such as the influx of refugees. An example of how the two combine to affect agricultural production is provided by waterlogging -- a consequence of the failure to account for the rising water table (natural) by providing adequate drainage (human).
- * **Linkages:** A number of examples were provided of issues affecting the agricultural sector which were a result of activities and/or processes which originated elsewhere. These include: inter-provincial conflicts over water quality and distribution (e.g. between the Punjab and Sindh and Balochistan); the affect of pesticide residues over time and space on human and animal health; the effects of deforestation contributing to accelerated erosion, and downstream sedimentation affecting water availability and distribution in downstream impoundments and irrigation structures; and the law and order situation in Sindh contributing to urban expansion, which affects agricultural production through reduction of the available labor force and the conversion of precious agricultural lands.
- * **Lack of Planning and/or Coordination:** This was a theme which ran through all the workshops. Emphasis was placed on this topic as a source of issues undermining sustainability and also as a solution. Examples include: the need for increased inter and intra provincial coordination among the appropriate institutions needed for increasing efficiency in water distribution; addressing the issues of salinization and water logging; and developing strategies for addressing conservation and development issues in general,
- * **Inequity/Lack of Empowerment:** While never an issue per se, this theme ran almost through almost all the workshop issues. Simplified, the small farmer was described as the individual who was always getting the "short end" and was virtually powerless to change the situation. A few examples from the many include: lack of access to markets, infrastructure, and education; exposure to a range of excesses at the hands of the middlemen (e.g. adulterated fertilizers), international markets, credit institutions (inequitable distribution of loans), and the public sector (see below). The

lack of empowerment is based on the feudal character of the agricultural sector and is the critical structural impediment to improving the lot of this group.

- * **Corruption:** There were few participants who appeared shy about raising this point. It runs through a number of issues, particularly those which are concerned with agricultural inputs, or the lack thereof, and crosses both public and private sectors, including the large landowners. Examples include: the selling of adulterated pesticides; inequitable access to all forms of agricultural inputs, including water and financial resources; and manipulation of local markets.
- * **Inefficiencies:** There were enough examples of inefficiencies in existing agricultural practices to justify arguments that this represents a significant source for increasing agricultural production in the future. These include: loss of production associated with inadequate storage, transport, and market infrastructure; underachievement of agricultural potential associated with water structures which are in various stages of disrepair; and loss of production associated with the poor timing of seasonally-required chemical and water inputs.
- * **Technological Innovation:** A number of technologies were identified as possible solutions to specific processes. Many of these appeared to already exist, in Pakistan and elsewhere, but were not reaching the small farmers. The near universal explanation for this was an inadequate extension service. Examples include: drip-irrigation technologies (Balochistan); the need for the development of salt-tolerant forage/fodder grass species (Punjab and Sindh); and development of high yielding varieties of cash crops for arid areas.

Major "omissions" or themes which one might expect to have emerged through the discussions and workshops included:

- * **Lack of Emphasis on Driving Forces:** With the exception of specific issues, such as urban expansion and land fragmentation and some mention of population growth, there was little emphasis on the contribution of underlying factors to the present agricultural situation in Pakistan. Little detail was provided on the role of domestic pricing policies, international markets, population, or changing technologies. This may be explained, in part, by the time constraints associated with issue preparation and emphasis placed on solutions.
- * **Non-Public Sector Solutions:** With few exceptions, the implementation of most solutions was identified as the responsibility of the public sector. This was particularly ironic, given the number of issues which were attributed to public institutional failure. Some emphasis was given to the private sector including: development of energy facilities; making provision for increased

animal health care facilities; and, of course, recognition of its role in the market place, but this latter role was described more in terms of the need to correct the sector's excesses rather than to praise its performance. Depressingly, very little mention was made of the need for community-based approaches, though there were instances where recommendations were made for farmers' cooperatives and on-farm water management associations.

- * **Other Subsectors:** Due to the various constraints associated with the scheduling of the workshops, there were a number of subsectors which were not adequately represented over all four workshops. Even where they were represented, the nature of the voting process often selected out their issues. The workshop facilitators attempted to "capture" their inputs through requesting written submissions and/or meeting informally with them over tea. These groups included: women (largely absent in the Punjab and Balochistan workshops); fishermen (absent in the Balochistan workshop); and the poultry sector.

A Final Word

In the introduction to this report, the principal objective of the workshops was stated as being to define the critical human and environmental and natural resource management issues pertaining to the future sustainability of agriculture in the four provinces of Pakistan. However, as both the specific workshops and the final synthesis make abundantly clear, this was not a question of having the armchair experts sit, pontificate, and pass judgement.

Rather, it was an attempt to hear the voices and opinions of the man and only very occasionally the woman -- in the street, in the businesses, in the fields, in the irrigation ditches, in the orchards, and in the market place. In this sense, the workshops were effective and the issues and solutions they came up with did not differ greatly from those of the acknowledged experts. This growing public awareness and recognition of the key sustainability issues is important, if not actually crucial for ultimately resolving them.

As the foregoing synthesis and analysis make abundantly clear, the proposed solutions are somewhat paradoxical. On one hand, the government -- both provincial and federal -- is blamed for many of the problems, while on the other, through some process little short of miraculous, it is now expected to resolve a lot of these very problems it originally helped create. There is little evidence to justify this leap of faith

particularly given the widespread criticism of politicians and the growing disillusion regarding their lack of commitment and leadership.

Be that as it may, these provincial voices and their concerns about the sustainability of their natural resource base have been heard and documented. The process of growing public awareness of these issues is well underway. The hope is that this document and the workshops that made it possible will lead to concrete actions and practical solutions to the key issues identified. This can be achieved through the national workshop scheduled for later this year.