

**AGRICULTURAL DEVELOPMENT:**  
**PRODUCTIVITY, DISTRIBUTION AND ENVIRONMENT**

Proceedings  
from the seminar organised by  
The Ministry of Foreign Affairs,  
NORAD and  
the Agricultural University of Norway  
at  
Sem Gjestegård i Asker, Norway

11<sup>th</sup> -12<sup>th</sup> March 1997

Edited by Ruth Haug and Edel Urstad

**NORAGRIC**  
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## **ACRONYMS AND ABBREVIATIONS**

**AHFSI:** Aggregated Household Food Security Index  
**CGIAR:** Consultative Group on International Agricultural Research  
**CIAT:** Centro Internacional de Agricultura Tropical (International Centre for Tropical Agriculture)  
**CMI:** Christian Michelsen Institute  
**DANIDA:** Danish International Development Agency  
**DKK:** Danish kroner  
**EDRF:** Environmental and Disaster Relief Facility  
**ERO:** The Economics of Rural Organizations  
**ERP:** Economic Recovery Programme  
**FAO:** Food and Agriculture Organization  
**FDI:** Foreign Direct Investment  
**FINNIDA:** Finlandian International Development Agency  
**GDP:** Gross national product  
**GEF:** Global Environmental Facility  
**GNP:** Gross Domestic Product  
**GSP:** Generalized System of Preferences  
**HH:** Households  
**IBS:** Intermediary Biotechnology Service  
**ICA:** International Co-operative Alliance  
**ICRISAT:** The International Crops Research Institute for the Semi-arid Tropics  
**IFAD:** International Fund for Agricultural Development  
**IFAP:** International Federation of Agricultural Producers  
**IFPRI:** International Food Policy Research Institute  
**IITA:** International Institute for tropical Agriculture  
**IMF:** The International Monetary Fund  
**ISNAR:** International Service for National Agricultural Research  
**KARI:** Kenya Agricultural Research Institute  
**LDC:** Least Developed Countries  
**MAC:** Ministry of Agriculture and Cooperatives, Tanzania  
**MFA:** Ministry of Foreign Affairs, Norway  
**MNC:** Multi-national companies  
**MNRT:** Ministry of Natural Resources, Tourism, and Environment  
**MUL:** Minst utviklede land (least developed countries)  
**NARP:** National Agricultural Research Master Plan, Tanzania  
**NGO:** Non Governmental Organisation  
**NIE:** New Institutional Economics  
**NLH:** Agricultural University of Norway  
**NORAD:** Norwegian Agency for Development Cooperation  
**NORAGRIC:** Centre for Environment and Development Studies  
**NRD:** The Royal Norwegian Society for Development  
**ODA:** Official Development Assistance



**OECD:** Organisation for Economic Co-operation and Development  
**SADC:** Southern Africa Development Community  
**SGR:** Strategic Grain Reserves  
**SPFMV:** Sweet Potato Feathery Mottle Virus  
**SUA:** Sokoine University of Agriculture, Tanzania  
**UNAG:** The Nicaraguan Farmers Union  
**UNCTAD:** United Nations Conference on Trade and Development  
**UNDP:** United Nations Development Programme  
**UNEP:** United Nations Environment Programme  
**USD:** United State Dollar  
**WB:** The World Bank  
**WFP:** World Food Programme  
**WFS:** World Food Summit  
**WRI:** World Resources Institute  
**WTO:** World Trade Organization

## INTRODUCTION

The seminar *Agricultural development: productivity, distribution and environment* was organised by The Ministry of Foreign Affairs, NORAD and the Agricultural University of Norway (NLH) on 11-12 March 1997 at Sem in Asker. The purpose of the seminar was to review premises and guidelines for Norwegian support to agricultural development; to analyse different experiences from support to agricultural development; to discuss economic and social conditions and as well as main objectives for agricultural development; and to suggest strategies which promote productivity in the agricultural sector whilst improving food security at household level and ensuring a sustainable use of natural resources. In addition, the seminar served as a meetingplace and network for representatives from different institutions involved in international agricultural development both from the public and private sector.

The seminar was started by Håkon Hjelde, Ministry of Foreign Affairs and Tove Strand Gerhardsen, NORAD, presenting Norwegian agricultural assistance after the White paper No 19: *A changing World* and after the World Food Summit. Experiences from support to agricultural assistance were reviewed by Aida C. Isinika, Sokoine University of Agriculture, and Hanne Carus, DANIDA. Alf Morten Jerve, CMI, discussed recipient responsibility and John Pender, IFPRI, suggested strategies for increased production, improved food security and sustainable use of natural resources. Stein Holden, NLH, Joel Cohen, ISNAR, and Judith Narvhus, NLH, highlighted technical innovations for increased productivity. The second day started with group work and group work presentations, followed by presentations of six success stories from agricultural development assistance. Last, a panel and plenary discussion concluded the seminar addressing the question: *How should Norway support agricultural development in the South through international assistance*. Summaries of the group work presentations, panel and plenary discussions are included in the proceedings.

The organising committee consisted of Steinar Hagen, Lars Ekman and Olav Lindstad from NORAD, Erik Berg and Per Mogstad from the Ministry of Foreign Affairs and Stein Holden and Ruth Haug from the NLH. Anne Utvær, NLH/Noragric, was responsible for the practical arrangement of the seminar. The proceedings was prepared by Ruth Haug and Edel Urstad NLH/Noragric. The introduction, group work presentations, summary of the panel and plenary discussions as well as conclusion are written by these two editors and do not necessarily reflect the official view of the organising committee nor their institutions.

About 60 people from 22 different organisations participated at the seminar. List of participants is enclosed.

Ruth Haug

Edel Urstad

## PROGRAMME

### **Agricultural Development: Productivity, Distribution and Environment**

- **Date:** 11-12 March 1997
- **Locality:** Sem Gjestegård, Semsveien 164/166, 1370 Asker, Norway
- **Organisers:** Ministry of Foreign Affairs, Norwegian Agency of Development Cooperation (NORAD) and Agricultural University of Norway
- **Registration to:** Anne Utvær, Noragric, Agricultural University of Norway, P.O. Box 5001, 1432 Ås. Lunch and coffee for both days, and dinner on Tuesday night will be covered by NORAD. There is no seminar registration fee.

#### **Objectives of the seminar**

- To review premises and guidelines for Norwegian support to agricultural development
- To analyse different experiences from support to agricultural development
- To discuss economic and social conditions and as well as main objectives for agricultural development
- To suggest strategies which promote productivity in the agricultural sector whilst improving food security at household level and ensuring a sustainable use of natural resources

#### **Programme**

##### **TUESDAY, 11 March 1997**

Chair person: Steinar Hagen, NORAD

- 8.30 Registration
- 9.00 Welcome by Steinar Hagen, NORAD
- 9.10 **Premises and Guidelines for Norwegian Support to Agricultural Development**
  - Norsk landbruksutvikling etter St.meld.nr. 19 og World Food Summit  
Haakon Hjelde, Ministry of Foreign Affairs
  - **NORADs retningslinjer for norsk landbruksstøtte**  
Tove Strand Gerhardsen, NORAD
- 10.15 Coffee break
- 10.30 **Experiences from support to agricultural development:**
  - Tanzania: Agricultural development: Lessons learned and challenges ahead. Aida C. Isinika, SUA
  - DANIDA: New guidelines in Danish agricultural assistance. Hanne Carus, DANIDA
- 12.30 Lunch

Chair person: Gunnar Øygard, NLH

- 13.30     **Recipient Responsibility: Donors, Governments, and the Rural Majority**
- Recipient Responsibility: Who takes recipient responsibility when the government apparently does not take responsibility for the rural majority? Why does the local population normally have so little influence in politics and distribution of resources?  
Alf Morten Jerve, CMI
- 14.15     Discussion
- 14.30     **Strategies for Increasing Agricultural Productivity whilst Ensuring a Sustainable Use of Natural Resources**
- Strategies to Increasing Agricultural Productivity, Food Security, and Sustainability of Natural Resources  
John Pender, IFPRI
- 15.15     Discussion
- 15.30     Coffee break
- 16.00     **Technological Innovations' Contributions to Increased Productivity and an Improved Situation for the poor?**
- Environmental problems and agricultural development in LDCs.  
Stein Holden, NLH
  - Technologies in transition: The case of agricultural research in bio-diversity.  
Joel Cohen, International Service for National Agricultural Research ISNAR
  - Storage and processing of agricultural products. Judith Narvhus, NLH
- 18.00     Discussion
- 18.30     Close of first day
- 19.30     Dinner

### **WEDNESDAY, 12 MARCH 1997**

Chairperson: Mike Angstreich, CARE Norge

- 8.30     **Group work**
- 10.00     Coffee break
- 10.15     Summaries from the groups
- 10.45     **Success stories:**
- Sasakawa Global 2000 - How to transform ideas into practice and achieve results.  
Gunnar Øygard, NLH
  - Agricultural Development, Farmers' Rights and Seedbanks in the Philippines.  
Elin Enge, Development Fund
  - Agricultural Research and Institutional Building at Sokoine University of Agriculture, Tanzania. Aida C. Isinika, SUA
  - Institutional Cooperation, farmer groups and agricultural development. Torgeir Dahl, The Royal Norwegian Society for Development
  - Institutional Collaboration Between Hydro and Research/Development Organisations in Vietnam.: The Role of the Private Sector in Contributing to Agricultural Development in the South. Ragnhild Sohlberg, Norsk Hydro
- 12.00     Lunch

- 13.00     **Panel Debate and Plenary Discussion: How Should Norway Support Agricultural Development in the South Through International Assistance?**
- A representative from the South: Aida C. Isinika, Tanzania
  - A representative from the NGOs: Elin Enge, Development fund
  - A representative from The Royal Norwegian Society for Development: Torgeir Dahl
  - A representative from the Agricultural University of Norway: Thor Larsen, Noragric
  - A representative from the private sector: Ragnhild Sohlberg, Norsk Hydro
  - A representative from the NORAD: Ingrid Ofstad
- 15.30     **Close of seminar**

## LIST OF PARTICIPANTS

<b><u>Family name</u></b>	<b><u>First name</u></b>	<b><u>Organisation</u></b>
<b>Aarbakke,</b>	Frøydis	NORAD
<b>Almestad,</b>	Johnny	Ministry of Foreign Affairs
<b>Angstreich,</b>	Michael	CARE Norge
<b>Aune,</b>	Jens	Agricultural University of Norway
<b>Berg,</b>	Erik	Ministry of Foreign Affairs
<b>Biseth,</b>	Helle	NORAD
<b>Bjerkomp,</b>	Sverre	Hydro Agri International
<b>Bryn,</b>	Anne	Interpretor
<b>Carus,</b>	Hanna	DANIDA
<b>Cohen,</b>	Joel I.	International Service for National Agricultural Research
<b>Dahl,</b>	Torger	The Royal Norwegian Society for Development
<b>Dæhlen,</b>	Per	The Royal Norwegian Society for Development
<b>Eie,</b>	Eva	Interpreter
<b>Ekman,</b>	Lars	NORAD
<b>Eknes,</b>	Moir	CARE Norge
<b>Endal,</b>	Ann Kristin	NORAD
<b>Enge,</b>	Elin	The Development Fund
<b>Fløyen,</b>	Arne	Norwegian College of Veterinary Medicine
<b>Fuglås,</b>	Målfrid	Norwegian Farmer's Union
<b>Gaustadsæter,</b>	Torbjørn	NORAD
<b>Gerhardsen,</b>	Tove Strand	NORAD
<b>Gjestang,</b>	Knut-Erik	The Royal Norwegian Society for Development
<b>Gran,</b>	Terje	NORAD
<b>Grimstad,</b>	Sidsel	Agricultural University of Norway
<b>Grønstøl,</b>	Hallstein	Norwegian College of Veterinary Medicine
<b>Hagen,</b>	Steinar	NORAD
<b>Haug,</b>	Ruth	Agricultural University of Norway
<b>Hjelde,</b>	Haakon	Ministry of Foreign Affairs
<b>Hofstad,</b>	Ole	Agricultural University of Norway
<b>Holden,</b>	Stein Terje	Agricultural University of Norway
<b>Høgset,</b>	Odd	Ministry of Environment
<b>Isinika,</b>	Aida	Sokoine University of Agriculture
<b>Jerve,</b>	Alf Morten	Christian Michelsen Institute
<b>Katle,</b>	Jessica	Agricultural University of Norway
<b>Larsen,</b>	Kjersti	Agricultural University of Norway
<b>Larsen,</b>	Thor	Agricultural University of Norway
<b>Leknes,</b>	Øyvind	ADRA Norge
<b>Lineikro,</b>	John	Norwegian Church Aid
<b>Lund,</b>	Arve	Agricultural University of Norway
<b>Maal,</b>	Bodil	NORAD
<b>Melby,</b>	Hans Peter	The Norwegian Embassy in Nicaragua
<b>Mogstad,</b>	Per	Ministry of Foreign Affairs
<b>Mosseby,</b>	Nina	Ministry of Agriculture

<b>Murphy,</b>	Colin	Agricultural University of Norway
<b>Narvhus,</b>	Judith	Agricultural University of Norway
<b>Nissen,</b>	Dag	Ministry of Foreign Affairs
<b>Nordang,</b>	Inge	Ministry of Foreign Affairs
<b>Nordlie,</b>	Kjell-Erik	The Royal Norwegian Society for Development
<b>Næss,</b>	Inger	NORAD
<b>Ofstad,</b>	Ingrid	NORAD
<b>Pender,</b>	John	International Food Policy Research Institute
<b>Pirenen,</b>	Hekki Olavi	FINNIDA
<b>Ringlund,</b>	Kåre	Agricultural University of Norway
<b>Semesi,</b>	Adelaida	Agricultural University of Norway
<b>Singh,</b>	Bal Ram	Agricultural University of Norway
<b>Smidestang,</b>	Ole	The Royal Norwegian Society for Development
<b>Sohlberg,</b>	Ragnhild	Norsk Hydro ASA
<b>Stangeland,</b>	Jens	Norwegian Missionary Council Office for International Development Cooperation
<b>Tevik,</b>	Asbjørn	Norwegian College of Veterinary Medicine
<b>Tviland,</b>	Marion	Agricultural University of Norway
<b>Tærum,</b>	Atle Sivert	Hydro Agri International
<b>Urstad,</b>	Edel	Agricultural University of Norway
<b>Utne,</b>	Sverre	NORAD
<b>Utvær,</b>	Anne	Agricultural University of Norway
<b>Vågen,</b>	Tor Gunnar	Agricultural University of Norway
<b>Wiersholm,</b>	Lars A.	Norsk Hydro Egypt
<b>Wiik,</b>	Henrik	Statistics Norway
<b>Wold,</b>	Bjørn	Statistics Norway
<b>Øiestad,</b>	Jon Kr.	Agricultural University of Norway
<b>Øygard,</b>	Gunnar	Agricultural University of Norway

**PREMISES AND GUIDELINES FOR NORWEGIAN  
SUPPORT TO  
AGRICULTURAL DEVELOPMENT**





## Norsk Landbruksutvikling etter St.meld. nr. 19 og World Food Summit

av

Haakon B. Hjelde  
Ekspedisjonssjef, Utenriksdepartementet

### Innledning

Blant vår tids store internasjonale utfordringer står bekjempelse av fattigdom, miljøtrusselen og flyktningeproblemene. Disse utfordringer er med på å forme norsk bistandsvirksomhet. En aktiv bistandspolitikk som både forebygger og reduserer disse helt sentrale internasjonale utfordringer, er en viktig del av vår utenriks- og sikkerhetspolitikk.

Vi gir bistand av solidaritet med dem som er vanskeligstilt, og for å støtte opp om nasjonale stabiliseringstiltak basert på demokrati og MR. Vi bør også erkjenne at vi gir bistand fordi vi selv har interesse av stabilitet og utvikling i land som geografisk ligger fjernt fra oss. Innsatsen for landbruksutvikling og matvaresikkerhet må sees også i denne sammenheng, og vi kan gjerne ha dette i mente når vi drøfter vektleggingene innen bistandsbudsjettet, som for 1997 er i overkant av 9,2 milliarder kroner.

Omlag åtte hundre millioner mennesker hevdes i dag å være uten sikker adgang til et tilstrekkelig inntak av næringsrik mat for et sunt og aktivt liv. Dette er situasjonen til tross for at matvareproduksjonen pr. hode er steget hurtigere enn befolkningsveksten de fire siste tiår. De siste 10-15 årene har den internasjonale landbruksarenaen vært preget av overproduksjon og handelsproblemer. På samme tid har underernæringen vært mer eller mindre konstant. Mange er bekymret for om vi kan produsere nok til å fø alle i framtiden, selv om vi skulle få til politiske, sosiale og økonomiske rammebetingelser som muliggjør en bedre fordeling både av produkter og innsatsfaktorer i produksjonen. Dette viser behovet for å diskutere landbruksproduksjon innenfor en bred tilnærming til fattigdom og fordelingspolitikk. Matvaresikkerhet dreier seg både om produksjon og tilgang, og for utviklingslandene har spørsmålet om matvaresikkerhet også en sikkerhetspolitisk dimensjon, på samme måte som dette hensynet også har vært sentralt i vår hjemlige debatt om norsk landbrukspolitikk og sjølforsyningsgraden.

### Landbruk i bistanden

Hvis vi ser på statistikken over norsk bistand, vil en fort finne ut at norsk støtte direkte til landbrukssektoren har hatt en nedadgående tendens. En bør imidlertid være forsiktig med å trekke den konklusjon at landbrukssektorens plass i bistanden er blitt vesentlig redusert. En meget stor del av nedgangen skyldes at vi har redusert varebistanden betydelig i forhold til hva som var tilfellet på 70-80-tallet. Dette har i særlig grad gått ut over leveranser av kunstgjødsel og andre innsatsvarer til landbrukssektoren. Dernest må vi huske på at en stor del av den bistanden som tar sikte på å fremme utviklingen av et levedyktig landbruk skjer i form av støtte til utdanning, institusjonssamarbeid, veibygging, industrbygging med sikte på viderefordeling osv. Dette fanger vi ikke så lett opp ved enkel statistikklesing.

I 1995 var den bilaterale bistanden til landbrukssektoren på drøyt 260 mill. kroner. 85 prosent av dette gikk til jordbruk, resten til skogbruk. Mesteparten gikk til land i det østlige Afrika. Nesten 40 prosent gikk via frivillige organisasjoner. Støtten preges ellers av en stor spredning, både når det gjelder land, fagområder og antall prosjekter.

Utviklingen av bærekraftige produksjonssystemer står sentralt både i St.meld. nr.51 fra 1992, rapporten fra Nord-Sør/Bistandkommisjonen og St.meld. 19 som Stortinget behandlet i juni i fjor. Det enkelttiltaket som i St.meld. 19 blir trukket fram som viktigst innen denne sektoren er å støtte oppbygging av sentrale offentlige funksjoner, med tanke på å styrke deres rolle som tilretteleggere. Videre vil kompetansebygging gjennom støtte til forskning, utdanning og veiledning, samt utvikling av effektive systemer for kredittformidling bli vektlagt.

Rammebetingelsene for landbruket i utviklingsland har endret seg mye det siste tiåret. Statlig eller offentlig kontrollert landbruksproduksjon går ned, og produsentene har vært nødt til å tilpasse seg markedet.

Slik faller landbruk i dag i stor grad inn under den såkalte private sektor. Stat-til-stat-samarbeidet i bistanden på dette området må derfor i første rekke gå på å øke kompetansen innen forskning, utdanning og veiledning. Bistand til institusjonsbygging, økt kompetanse i forvaltningen, samt til utvikling av lovverk, kartverk og databaser til bruk som planleggingsverktøy, bør også stå sentralt. Tove Strand Gerhardsen vil helt sikkert fortelle mer om dette.

I korthet kan man si at bistanden dreies i retning av å bedre rammevilkårene for landbruket. Samtidig nås den enkelte produsent fortsatt gjennom bygdeutviklingstiltak og andre prosjekter rettet mot landsbygda. Ikke minst er det blitt mer satsing på kvinners rettigheter når det gjelder eiendomsrett, arverett, tilgang på kreditt o.l.

De miljømessige og sosiale rammer er også viktige for landbrukssektoren. Også i denne forbindelse spiller det offentlige en hovedrolle. Økonomisk vekst i landbruket må ta utgangspunkt i en bærekraftig utnyttelse av naturressursene. Grunnleggende sosiale behov må bli søkt ivaretatt, og det må også investeres i helse og utdanning for å fremme en bærekraftig vekst som kan bidra til at alle grupper nyter godt av utviklingen.

Gjennom frivillige organisasjoner ønsker vi å gi støtte til gjennomføring av integrerte prosjekter som har som mål å bevare og forbedre forvaltningen av jord- og vannressurser samt biodiversitet.

Sentralt i det multilaterale arbeidet er vår deltakelse i styrende organer i de "tunge" FN-organisasjonene som FAO, Verdens Matvareprogram og IFAD. I samarbeid med andre medlemsland ønsker vi å påvirke organisasjonenes politikk. Multilaterale organisasjoner spiller en stadig viktigere rolle for å skape en slags konsensus om hvilke verdier og normer utviklingssamarbeidet skal baseres i. Disse organisasjonene er også sentrale i dette å koordinere sektorsatsinger som samler flere givere. Slike samordnede sektorsatsinger gjør det lettere for mottakerlandets myndigheter å forholde seg til mange givere. Det utvikles, i økende grad, sektorinvesterings-programmer som kombinerer reformer, institusjonsstyrking og kompetanseoppbygging med investeringer i sektoren - også på landbruksområdet.

Som nevnt bør landbruksproduksjon sees og diskuteres innenfor en bred tilnærming til fattigdom og fordelingspolitikk. Matvaresikkerhet dreier seg både om produksjon og fordeling. En interessant innfallsvinkel til nettopp forholdet mellom produksjon og fordeling vil være å se nærmere på sammenhengen mellom Toppmøtet om verdens matvaresikkerhet i Roma høsten 1996, som ble avholdt av FNs organisasjon for ernæring og landbruk (FAO) og Ministtermøtet i Verdens handelsorganisasjon (WTO) i Singapore i desember i fjor. En direkte sammenheng er ikke uten videre gitt hvis vi strengt ser på hva de to møtene dreide seg om. FAOs konferanse overløt handelsspørsmålene til WTO, mens i WTO konferansen var matvaresikkerhet i svært liten grad berørt. Men det er selvfølgelig en sammenheng. Fra norsk side er man opptatt av den betydning handelspolitikk har for landbruket, og da særlig landbruket i utviklingsland. Jeg vil derfor kommentere disse relasjoner litt nærmere før jeg går inn på hva de to konferansene bidro til hver på sitt område.

Det kan hevdes, rent prinsipielt, at handel bidrar til økt matvaretilgjengelighet fordi utveksling av varer medvirker til en mer effektiv bruk av ressurser og stimulerer økonomisk vekst. Uten handel vil man f.eks. ikke kunne bidra til fordeling mellom overskuddsprodusenter og de land som ikke produserer nok mat til sin befolkning.

Handel kan også bidra til å styrke mulighetene for en bærekraftig landbruksutvikling. Lokalisering av landbruksproduksjon til områder som bedre ivaretar miljøhensyn er viktig bl.a. ved at marginale landområder kan beskyttes mot overutnyttelse.

Erfaringer har vist at internasjonal handel med landbruksvarer gir landene mer inntekter og høyere sysselsetting enn det skjerming gjør. Ved å gi arbeid og inntekter til en større del av befolkningen, og da særlig den fattige landsbybefolkningen, vil en slik strategi således kunne bidra til å avhjelpe fattigdoms- og ernæringsproblemene i utviklingslandene. Økte eksportinntekter fra landbrukssektoren vil også gi økte muligheter for å gjøre utviklingslandenes økonomier mer allsidige. Ved å få flere bein å stå på vil økonomien være mindre sårbar overfor svingninger i markedsprisene for et fåtall varer. For små land, og for de fattige utviklingsland, vil en slik utvikling ikke kunne komme i stand bare på grunnlag av innenlandsk etterspørsel.

De fattigste utviklingslandene har få produkter å selge på det internasjonale markedet. De har imidlertid et potensiale for å eksportere enkelte landbruksprodukter, og de trenger eksportinntekter for å komme ut av sine fattigdoms- og utviklingsproblemer. Det er bred enighet om at tiltak for å utvikle landbruket er spesielt viktig for å bekjempe fattigdommen. Handel med landbruksvarer er ansett å kunne ha en vesentlig betydning for den økonomiske og velferdsmessige utviklingen. Ikke minst utviklingslandene selv har påpekt at bedre adgang til industrilandenes markeder for landbruksvarer vil være et viktig bidrag til økonomisk utvikling. Selv om de positive effektene av handel vil variere fra land til land, er det liten tvil om at utestengning fra industrilandenes markeder hindrer økonomisk vekst og velferdsutvikling i utviklingslandene.

EU's handelspolitikk, spesielt eksport av landbruksvarer, er eksempel på at også eksportordninger hos giverland er med på å undergrave de samme giverlands bistandstiltak for bedring av matvaresikkerheten. Mangel på samsvar mellom EU's handels- og bistandspolitikk ble for en og en halv uke siden drøftet på et uformelt rådsmøte mellom bistandsministerne i EU. Her ble det fastslått at man gjennom den felles jordbrukspolitikken måtte unngå tiltak som var skadelig for utviklingen av jordbruket i afrikanske land. Det ble særlig vist til eksempler hvor bruk av eksportsubsidier klart hadde vært til skade for lokale bestrebelser for å etablere

levedyktig jordbruk. EU-landenes bestrebelser på å sikre at utviklingslandenes interesser ivaretas gjennom bedre samordning mellom bistand og handel, må derfor sees på som et viktig bidrag til å bedre muligheten for matvaresikkerhet, ikke minst i Afrika.

Mens FAO bør spille en viktig rolle ved å bidra til en bærekraftig matvareproduksjon, spiller WTO en tilsvarende viktig rolle ved å sikre markedsadgang til industriland for utviklingsland som ønsker å eksportere matvarer. Sammen bør disse organisasjonene kunne bidra til å oppfylle de målsettinger som Rio-erklæringen uttrykte og som er videreført i den såkalte Agenda 21.

Agenda 21 understreker at fattigdom og miljøforringelse representerer noen av vår tids største utfordringer. Handlingsplanen omhandler bærekraftig forvaltning av naturressurser og tiltak innen miljø- og utvikling. Planen er basert på prinsippet om at alle tiltak skal være forenlig med en sosial og økonomisk utvikling.

Flere deler av Agenda 21 går på tiltak for å fremme bærekraftige landbrukssystemer og landsbyutvikling. Det pekes på nødvendigheten av å øke produksjonen uten at det går ut over ressursgrunnlaget. Det blir lagt stor vekt på lokalbefolkningers kontroll over egne ressurser og rettighet til land. Av de problemer som spesielt blir tatt opp er bevaring av det genetiske mangfoldet. Tiltak i marginale områder som tørrlandsområder, forvaltning av vannressurser og skogforvaltning er sentrale deler av Agenda 21 og nært relatert til landbruk. Det samme er situasjonen for urbefolkninger og utsatte stammefolk som har krav på særlig beskyttelsestiltak nasjonalt og fra det internasjonale samfunn.

Et av prinsippene (nr. 12) fra Rio-konferansen og Agenda 21, fastslår også følgende: Plikten til å fremme et åpent internasjonalt handelssystem, at handelspolitiske tiltak for miljøformål ikke må innebære skjult proteksjonisme, og at ensidige tiltak for å påvirke miljøsituasjonen utenfor importlandene selv bør unngås.

Gjennom norsk deltakelse i FAO såvel som i WTO og andre relevante organisasjoner søker Norge, i samarbeid med andre land, å forhandle fram avtaler som kan bidra til å forme en internasjonal samfunnspolitikk for en bærekraftig utvikling. En særlig utfordring er å sørge for at de vedtak som Norge har vært med på å godkjenne, i praksis også blir gjennomført i bilateral og multilateral bistands- og handelsvirksomhet.

Den brede forståelsen av landbrukets rolle og betydning preget også vedtakene fra Toppmøtet om verdens matvaresikkerhet (WFS).

Toppmøtet understreket at økt matvaresikkerhet ikke kan skilles ut fra generell økonomisk og sosial utvikling. Matvaresikkerhet er heller ikke mulig uten forsvarlig ressursforvaltning, og at bønder har tilgang på jord, kreditt og andre innsatsfaktorer.

Handlingsplanen som ble vedtatt av Toppmøtet, legger hovedansvaret for oppfølging klart på nasjonalt nivå. Giverland i samarbeid med internasjonale organisasjoner har et ansvar for å bistå de svakeste og fattigste landene i den grad de trenger det.

Oppfølging av Toppmøtet om verdens matvaresikkerhet vil derfor i stor grad bli konsentrert om situasjonen i Afrika. Vi oppfordres blant annet til å rette vår innsats inn mot de minst gunstige landbruksområdene der en stor del av de fattigste gruppene bor. Mange av anbefalingene er også i tråd med Forørknings-konvensjonene, som Norge har ratifisert.

Når det gjelder bistand til landbrukssektoren mer direkte, er det klokt å ta hensyn til at landbruksproduksjon bare er en del av det svært omfattende begrepet matvaresikkerhet. Det blir derfor viktig å se på både produksjon, foredling, handel og eksport av matvarer, samtidig som man ser på hvem det er som produserer matvarene og hvem som får nytte godt av den økte produksjonen.

Fra norsk side er vi fornøyd med at handlingsplanen i stor grad støtter opp under det vi allerede gjør i bistandsvirksomheten. Toppmøtet slo fast at fattigdomsbekjempelse må gå hånd i hånd med økt produksjon om det skal bli mindre sult. Dette har i lang tid vært en hovedstolpe i norsk bistand. Vi anser at det nå må rettes et fokus mot grunnleggende sosiale behov i samfunnet. Mye av omleggingen i bistandsbudsjettet for 1997 er slik sett helt i samsvar med anbefalingene fra Toppmøtet. I tillegg har Norge økt sin matvarehjelp og støtte til internasjonal landbruksforskning.

### **Status etter Ministermøtet i Verdens Handelsorganisasjon (WTO)**

Et synlig trekk ved globaliseringen av verdensøkonomien er at stadig flere land drar nytte av internasjonal handel. For WTO (Verdens Handelsorganisasjon) er det likevel en hovedutfordring å legge forholdene bedre til rette for de fattigste landene både når det gjelder å delta i det internasjonale handelssystem og få del i fordelene ved dette. Før jeg tar for meg oppfølgingen av dette under WTOs ministerkonferanse i Singapore i desember i fjor, la meg si litt om WTOs regelverk og håndtering av utviklingsland generelt.

WTO-regelverket, inkludert de fleste enkeltavtaler som er underlagt WTO-avtalen, gir adgang til særbehandling av utviklingslandene i forhold til andre handelspartnere, samt ytterligere særbehandling av de minst utviklede land (MUL) i forhold til øvrige utviklingsland. MUL unntas bl.a. fra forpliktelsen om å redusere eksportsubsidiene for landbruksvarer. WTO-avtalen inneholder i tillegg et vedtak om spesielle tiltak for MUL, bl.a. anbefalinger om faglig bistand for å hjelpe disse landene til å nyttiggjøre seg den handelsliberalisering som har funnet sted. I en ministerbeslutning i Sluttakten fra Uruguay-runden slås det fast at MUL bare kan anmodes om å påta seg forpliktelser i samsvar med deres utviklingsnivå. I WTO er det opprettet en egen komite for handel og utvikling og en underkomite for MUL som skal vurdere gjennomføringen av særbehandlingen av og tiltakene for utviklingslandene.

Sluttakten fra Uruguay-runden slår fast at den reform som WTOs Landbruksavtale innebærer kan få negative følger for de minst utviklede land samt netto matvareimporterende land, bl.a. ved at tilgjengeligheten av billig importert mat kan bli redusert. Det skal derfor etableres mekanismer som kan hindre slike negative konsekvenser av landbruksreformene for disse land. Av anbefalte tiltak som også ble støttet av ministrene i Singapore er bl.a.:

- at bistandstiltak i regi av utviklede land innbefatter teknisk og finansiell bistand til MUL og til netto matvareimporterende utviklingsland, for å forbedre landbruksproduktivitet og infrastruktur,
- at eksportkreditter for landbruksprodukter gir tilstrekkelig differensiering til fordel for MUL og netto matvareimporterende utviklingsland,

Fra MULs side har markedsadgang vært fremholdt som en vesentlig betingelse for økonomisk vekst. Dette bekreftes i en rapport fra WTO-sekretariatet som en viktig forutsetning for vekst i MUL. Av samlet tollpliktig eksport til de industrialiserte land utgjør eksporten fra MUL kun 1 prosent, og kun 1,2 prosent av varer som får GSP-preferanser<sup>1</sup>.

<sup>1</sup> Statistikk fra 1992: OECD/TD/TC/WP(95)22, 27. mars 1995, side 12.

WTOs regelverk gir adgang til å fravike det såkalte MFN prinsippet hva angår import fra utviklingsland. GATT-avtalens del IV pålegger de utviklede medlemslandene blant annet å gi høy prioritet til avskaffelse/reduksjon av hindringer for produkter av særlig interesse for utviklingsland. En følge av disse retningslinjene er at 26 land i dag, hovedsaklig OECD-land, har preferansesystemer for import av varer fra utviklingsland (GSP).

Under WTOs Ministerkonferanse i Singapore i desember 1996 ble det vedtatt en handlingsplan med formålet å legge forholdene bedre til rette for de fattigste lands deltagelse i det internasjonale handelssystem samt bidra til at de bedre kan utnytte fordelene ved dette systemet.

Handlingsplanen, inneholder forslag til tiltak på tre hovedområder. For det første bedret markedsadgang, for det andre gjennomføring av tiltak spesielt rettet mot MUL, og for det tredje faglig bistand.

i) Når det gjelder bedret markedsadgang, foreslår Handlingsplanen at WTO-medlemmer på frivillig basis vurderer raskere nedtrapping av de WTO-bundne tollsatser for MUL enn det URUGUAY-forpliktelsene tilsier; samt andre initiativ for tollfrihet og anskaffelse av kvoter på utvalgte produkter overfor MUL.

Norge har i denne sammenhengen fremmet et konkret forslag for hvordan dette kan følges opp:

- a. Industrialiserte land oppfordres til å fjerne alle tollsatser og kvantitative restriksjoner overfor MUL på industriprodukter, inkludert tekstiler, innen 1. januar 1998.
- b. Industrialiserte land oppfordres til å redusere vesentlig alle tollsatser og kvantitative restriksjoner overfor MUL på jordbruksprodukter innen 1. januar 1998.
- c. Ordinære utviklingsland oppfordres til å framskynde implementeringen av de bundne satser både på industriprodukter og jordbruksprodukter overfor MUL innen 1. januar 1998.
- d. Norge foreslår at industrialiserte land utøver smidighet med opprinnelsesreglene overfor MUL når det gjelder innførsel av varer som normalt ikke ville tilfredsstille opprinnelseskravene innen de forskjellige lands GSP-ordninger. Dette er et vesentlig problem for utviklingslandenes eksport, f.eks. Laos.

ii) Handlingsplanen for MUL legger også vekt på at WTO-medlemslandene bør bidra med å yte faglig bistand til MUL gjennom WTO-fondet. Norge har som kjent bidratt med 1,5 millioner USD, Nederland har gitt tilsagn om det samme på Singapore konferansen. Hovedutfordringen nå er å organisere ekspertise som kan bistå myndigheter og næringsliv på dette området i de fattigste landene.

iii) Handlingsplanen foreslår også: At den internasjonale faglige bistanden til de minst utviklede land forbedres ved at WTO i større grad samarbeider med andre relevante institusjoner, slik som Verdensbanken, IMF, UNCTAD, ITC, UNDP og OECDs utviklingskomite (DAC).

Norge vil arbeide for at WTOs handlingsplan følges opp med konkrete tiltak for markedsadgang og med bedret samordning mellom nasjonale og ulike multilaterale organisasjoner, slik at de minst utviklede land settes i stand til å delta aktivt i det globale handelssystemet.

**Satsingsområder og utfordringer**

De fremtidige satsingsområdene i bistanden må drøftes og velges ut fra de faktiske behov slik de springer ut av den endrede situasjonen i utviklingsland. Vi må også være i stand til å justere våre prioriteringer i takt med skiftende behov.

Et seminar som dette er et viktig bidrag inn i en slik bevisstgjørende endringsprosess.

Jeg ønsker lykke til og takker for oppmerksomheten.





## NORADs retningslinjer for norsk landbruksstøtte

av

Tove Strand Gerhardsen  
Direktør, NORAD

De årlige rapportene fra World Watch er sjelden oppmuntrende lesing. I år som i fjor vies matsituasjonen mye oppmerksomhet og det sies helt klart at verden trues av kornkrise. Det sies også at dyrking av matkorn stanger mot et tak i mange land.

Årsakene til dette er mange og varierte:

- Det har blitt vanskeligere å legge ny jord under plogen.
- Mer av det beste kornlandet blir tatt av byutvikling og bebyggelse. Ofte var jo et brukbart landbruk i området blant et av de viktigste grunnene til at en by eller tettbebyggelse utviklet seg akkurat der.
- Kornland overlates til andre og mer lønnsomme vekster som soya.
- Synkende vannressurser er også en bremse på avlingene.
- Uteblivelse av regntid er en trussel i mange av de afrikanske landene.

Samtidig øker etterspørselen etter korn på grunn av en raskt økende velstand i land i den fjerne Østen, særlig Kina.

Men dette er kjente problemstillinger i denne forsamlingen!

Like kjent er: Økt etterspørsel = økte priser

Ett år eller to med svikt i produksjonen vil gi priseksplosjon på markedet. I så fall truer nøden de fattige landene og den fattigste delen av verdens befolkning.

### Økonomiske rammebetingelser

Et land som er avhengig av betydelig import av mat må bruke eventuelle tilgjengelige ressurser for å dekke denne kostnaden noe som skaper fortsatt avhengighet, og det betyr forspilte muligheter til egen utvikling.

Nå strekker ikke tilgjengelige ressurser til for mange av landene. Importbehovene kan ikke finansieres med eksporten. Det gir et behov for omfattende finansiell støtte i strukturutpassningspakkene. Flere land, som for eksempel Tanzania, Nicaragua og Mosambik, mottar støtte som er betydelig større enn landets egne eksportinntekter. Resultatet blir at "markedskursen" på landets valuta blir høyere enn hva produktivitetsnivået i landets økonomi skulle tilsi. Kursen blir mye sterkere enn det den nasjonale økonomien gir grunnlag for. Dette har store negative konsekvenser.

En overvurdert lokal valuta er også et problem for bønder som produserer for det nasjonale markedet siden importerte jordbruksråvarer blir billigere og dermed utkonkurrerer nasjonale produkter.

En Verdensbankrapport anslår at for Tanzania er denne overvurderingen (lavt regnet) tilsvarende 15% skatt resp. subsidie på verdien av eksport og import. 15% kan synes å være et lavt siffer, men hvis dette sammenliknes med en normal lønnsomhetsmargin på 15-20% blir effekten tydeligere. Rapporten kommenterer at en slik overvurdering ".... would be considered devastating, and if explicit, would be immediate target for policy reform."

Dette er et stort spørsmål, som selvfølgelig berører samtlige produktive sektorer. Da jordbruk, jordbruksbasert industri og tjenesteproduksjon er dominerende i mange afrikanske land, blir dette et viktig jordbrukspolitikk spørsmål. Effektene av overvurdert nasjonal valuta forsterkes også av svake satsninger på produktivitetsfremmende tiltak, som jordbruksforskning, veiledning og utdanning. Resultatet er produktivitetsvikt i jordbruket de siste årtier. Dette indikeres tydelig i utviklingen av Verdensmarkedsprisene for de viktigste matvarene:

<b>Matvarepriser 1970 - 1995 i konstante 1990 USD:</b>			
<b>Type matvare</b>	<b>1970</b>	<b>1995</b>	<b>Endring i %</b>
Hvete	219	154	- 29,7
Ris	504	279	- 44,6
Sorghum	207	103	- 50,2
Mais	233	107	- 54,1

**Kilde: Sen 1996**

Produktiviteten på verdensbasis har økt. Som tabellen ovenfor viser har dette ført til en nedgang i verdensmarkedets priser. Samtidig har jordbruksproduksjonen og produktiviteten stagnert i Afrika blant annet på grunn av mangel på forskning og et ufordelaktig politisk miljø.

Mest mulig selvforsyning kan redusere importbehovet og dermed dempe belastning på landets økonomi. Vi må ikke tape av syne at menneskenes behov for mat er sammen med omsorg selve grunnlaget for liv.

### **Om gode rammevilkår**

Målene om redusert fattigdom og økt matvaresikkerhet nødvendiggjør en flersidig satsing: Også når det gjelder internasjonale rammevilkår, som handelsavtaler og valutakurser. Støtte til utvikling av gode nasjonale **rammevilkår** for en bærekraftig landbruksutvikling og støtte til utvikling av bærekraftige **produksjonsformer** er viktig.

Gode nasjonale rammevilkår sikres gjennom en sterk offentlig forvaltning med klare nasjonale lover og regler for å kunne rettlede, avveie, kontrollere, løse konflikter, og med apparat til oppfølging lokalt. (Vår modell med Landbruksdepartement, fylkeslandbrukssjef, kommunalt forvaltningsnivå, er kanskje en god modell for andre land?)

Situasjonen i Norge preget av sterke organisasjoner eid og styrt av selveiende bønder som gjennomgående har et høyt utdanningsnivå - blant annet takket være miljøet på Ås.

Situasjonen er en annen i de fleste afrikanske land.

### **Noen nødvendige betingelser, om enn ikke tilstrekkelige:**

- Omfattende endringer i mottakerlandenes forvaltning, gjennom for eksempel "civil service" reform og forbedrede systemer for offentlig budsjettering/virksomhetsplanlegging. Flere land er igang med et slikt arbeid og NORAD bistår blant annet Tanzania med deres Civil Service Reform og forvaltningsutvikling, og andre land er under vurdering. I Zambia er det en uro over at sterk vektlegging av fri konkurranse tar knekken på de fattigste. Den kvinnelige landbruksminister ønsker hjelp fra Norge.

Institusjonsbygging er generelt viktig og et prioritert felt. Dette er også viktig sett fra et landbrukspolitisk synspunkt.

### **Utfordringen er: Hvordan kan vi bidra?**

Organisering av bøndene: Våre erfaringer med andelslag og ulike samvirkeformer har vakt interesse, som samarbeidet med Norges Vel.

Samtidig er dette et vanskelig felt. Kvinner ansvaret for det daglige arbeidet, og det er ikke spesielt lett å organisere seg. Langt mindre kreve sin rett til jord, kunnskap og inntekt.

Hvordan kan vi best bidra til at den kunnskap mange har kommer ut til de som kan bruke den? Lave lønninger undergraver både arbeids- og samfunnsmoral til de ansatte i Tanzania. For eksempel finnes det rundt 150 landbruksforskere med doktorgrad. Disse er tvunget til å bruke en stor del av sin tid på annet enn det de er utdannet og ansatt for, for å overleve.

Forskningsbasert undervisning og opplæring for økte avlinger må sees i sammenheng med hensynet til økonomiske forhold i et langtidsperspektiv. Vi må også lære av våre feil - som for ensidig drift, for store arealer, for mye giftbruk.

I mange områder er bygdebefolkningen fanget i en ond sirkel der minkende areal per bruker leder til en økt dyrkingsintensitet uten at dyrkingsteknikken forandres tilstrekkelig for å kompensere for de økende næringstapene. Mange steder har dette resultert i redusert biologisk mangfold både i landbruket og i fri natur, forurensing av vann og forringelse av jordsmonn. Det er derfor et stort behov for utvikling av mer produktive og bærekraftige produksjonsteknikker.

Årsaksforholdene er komplekse og det er også eksempler på situasjoner der "en positiv spiral" er etablert der intensiveringen er forenet med forbedret og bærekraftig bruk av naturressursene. En sak synes imidlertid klar og det er behovet for å utvikle mer produktive og bærekraftige produksjonssystemer. Dette representerer en stor utfordring for Norge, hvor særlig NLH kan bidra. Gjennom blant annet SSE-programmet har NLH utviklet både kompetanse og nære kontakter med både private organisasjoner, myndigheter og landbruksuniversitet i det sørlige og østlige Afrika.

Reduserte avlinger på grunn av sykdommer og skadedyr, er en annen stor utfordring. Problemene knyttet til ukritisk benyttelse av plantevernmidler er allment kjent. Støtte til arbeidet med å utvikle mer miljørettet metodikk for plantevern fra NORAD er blitt gitt i flere år til Mellom-Amerika. Et større tiltak i Asia er under forberedelse i samarbeid med FAO og norske fagmiljøer, blant annet Planteforsk.

Når det gjelder biodiversitetsspørsmålet kan en også notere at NORAD sammen med de andre nordiske bistandsorganisasjonene i flere år har gitt støtte til den regionale genbanken i det sørlige Afrika. Støtten gjennomføres som et institusjonelt samarbeid mellom den Nordiske Genbanken og genbanken i det sørlige Afrika tilknyttet SADC. Denne våren foretas det en evaluering av genbankens virksomhet. Vi vil også følge opp muligheten hvordan vi i bistanden best kan følge opp "Global Plan of Action" for plantegenetiske ressurser, vern og bruk av disse i planteforedlingen.

En annen sentral problemstilling er landbrukets bruk av ferskvann. Vann er en knapp naturressurs i de fleste utviklingsland, og jordbrukssektoren bruker rundt 80% av dette vannet. I tillegg til de miljø ødeleggelser feil bruk av kunstvanning kan føre med seg (forsumping, salt/mineralavleiring), betaler ofte jordbruket en pris som ligger langt under det det koster å føre vannet fram, mens folk betaler langt mer for drikkevann. Siden de fattigste ofte betaler mest for drikkevann, skaper dette store ulikheter dersom vannet i landbruket prises kunstig lavt for at bøndene skal kunne dyrke vekster som er svært vannkrevende, for eksempel blomster til eksport - eller de bare overdriver vanningen.

Her kan mye gjøres ved bedre anlegg, og forvaltningsregimer - men ikke minst ved prising og opplæring.

Norge har hittil bare unntaksvis engasjert seg i kunstvanningsprosjekter, siden vi har svært liten kompetanse på dette. Imidlertid er dette et felt de fleste utviklingsland ønsker å øke, med spesiell vekt på "smallholder irrigation", det vil si opplegg hvor mange småbønder får tilgang til kunstig vanning. Dette feltet er svært komplisert, fordeling og drift er vanskelig å få bærekraftig, og eiendomsforholdene er slik at når jorda blir mer verdifull på grunn av vannet, presses kvinnene ut.

Norge må arbeide for å stimulere at vann- og landbruksmyndighetene blir enige om en forvaltning av denne naturressursen som gir høyest avkastning for hele samfunnet, selv om en da må oppgi noen av produktene.

Kvinnene er hovedprodusentene i afrikansk landbruk.

I NORADs retningslinjer fremholdes:

**Kvinnelige bønder, spesielt i Afrika, utfører i dag en stor del av jordbruksarbeidet og spiller en sentral rolle særlig for matvareproduksjonen, samt utgjør flertallet av de fattige. Deres spesielle kår, behov og potensiale har historisk sett vært oversett i de fleste land til tross for deres sentrale stilling i jordbruket. Det er derfor viktig å ivareta kvinnelige bønders rolle i utviklingen av jordbrukssektoren.**

En rekke store FN konferanser, blant annet kvinnekongressen i Beijing og det sosiale toppmøtet i København understreker betydningen av å ha mer fokus på kvinner i planleggingen av tiltak, blant annet i jordbrukssektoren. I de fleste afrikanske land er jordbruket dominert av såkalt "peasant farming" - hvor kvinner er sentrale. Til tross for økende bevissthet med hensyn til kvinners rolle i jordbruket, tar fortsatt afrikanske myndigheter for lite hensyn til småbrukere og spesielt kvinners behov. Kvinner produserer 60-80 % av maten som forbrukes av husholdninger i Afrika. Dette klarer de til tross for at de har begrenset tilgang til jord.

Når en skal gå inn i jordbrukssektoren må en vurdere hvilke positive, og eventuelt negative konsekvenser det vil få for kvinners arbeidsbyrde og for matvaresikkerheten. Vil tiltaket gjøre at kvinners arbeidsbyrde blir redusert eller øker det deres byrde? Vil tiltaket hjelpe kvinner til økte inntekter? Økte inntekter til kvinner betyr økt inntekt til hele husholdet. Det er dessverre ikke like selvsagt at økt inntekt til mannen øker husholdets inntekt. Kvinners arbeidsbyrde i de fleste afrikanske land har økt de senere år på grunn av sammenbrudd i blant annet helsetjenesten, skolevesenet, vannforsyningen, etc. AIDS epidemien har også store konsekvenser for kvinners arbeidsbyrde. Samtidig som arbeidsbyrden har økt for kvinner legges det stadig mer vekt på produksjon for markedet og dette er et dilemma for kvinnene. Hvordan kan kvinnelige bønder delta i produksjon for markedet og samtidig i vareta matproduksjon, barneomsorg og vedlikehold av husholdet? Kvinnelige bønder utfører mye av arbeidet i det eksportrettede jordbruket (cash crop jordbruket), mens de har liten kontroll over utbytte. Ved større satsing på "cash crop" får ofte kvinnene mindre tid til matproduksjon for familien - noe som er med på å påvirke matvaresikkerheten.

Følgende områder har blitt pekt på som problemområder for kvinnelige bønder:

- Dersom kvinnelige bønder produserer mer enn familien kan spise, for eksempel, av grønnsaker, er det ofte problemer med omsetning og oppbevaring av grønnsakene. Svært mange grønnsaker råtner langs veiene i sesongene, fordi det ikke er noe markedssystem.
- For at fattige kvinnelige bønder skal satse på produksjon av cash-crops må de være garantert at de får solgt varene, ellers har de ikke råd til å ta denne sjansen og investere i cash-crop jordbruk, dette tror jeg gjelder selv om de har tilgang på kreditt slik at de kan kjøpe innsatsfaktorer.
- Kreditt som kan brukes til å anskaffe redskaper som reduserer kvinnelige bønders arbeidsbyrde. For eksempel håndmøller for mais som vil spare kvinner både arbeid og tid. Store sentrale møller fører til at kvinner må gå langt og bære tungt.

Det er viktig å se kvinnelige bønders arbeid i en helhet. En må derfor ikke bare fokusere på kvinners produktive arbeid innen jordbruk og arbeidet for markedet, men se det i sammenheng med alle arbeidsoppgaver hun har.

Kjønnsaspektet skal naturlig nok vektlegges i alle NORADs tiltak, men også spesifikke tiltak støttes, for eksempel:

- Støtte til informasjon rettet mot kvinner om kvinners rettigheter til jord i Nicaragua;
- Støtte til spesifikke tiltak for å fremme landbruksveilednings arbeid med kvinnelige bønder i Zimbabwe.

Selvfølgelig både kan og må vi i NORAD bli bedre og gjøre mer. Utfordringene, og dermed mulighetene er mange på dette området. Et spennende område som hittil har blitt gitt lite oppmerksomhet er kvinnes arbeid med foredling av jordbruksråvarene. Et eksempel er forbedring av teknikker for småskala foredling av næringsmidler, som vil kunne skape både inntekter og spare tid. På dette området samarbeider NLH med fire land i det østlige og sørlige Afrika med støtte av NORAD. Kanskje kan vi satse mer?  
Gode ideer mottas - også om hvordan vi kan jobbe fram prosjekter i nært samarbeid med mottakerne, det vil si kvinnene og de politiske myndigheter.

Flere av samarbeidslandene er preget av svak institusjonell kapasitet til å prioritere, formulere og gjennomføre jordbruksprogrammer både innenfor den offentlige administrasjonen og blant lokale NGOer. Institusjonelt samarbeid med norske fagmiljøer er derfor en høyst relevant bistandsform, og NLH/NORAGRIC er naturlig nok sentrale her. Offentlig forvaltning må også sterkere inn. Det er mye kompetanse i departementene og i ytre etater på fylkes- og kommunalt nivå, og kan bidra med mye.

Også norske private organisasjoner har og vil i fremtiden fortsette å spille en viktig rolle i den norske utviklingsbistanden til jordbruksutvikling. (I 1995 var 100 millioner kroner kanalisert gjennom norske NGO til tiltak rettet mot primærnæringene.)

NORAD ønsker sammen med de private organisasjoner å analysere og vurdere hvordan de private organisasjonene kan medvirke i støtten til jordbruksutvikling. Her vil det være viktig å identifisere i hvilke situasjoner og områder private organisasjoner har komparative fortrinn. En særlig utfordring er å medvirke til fremveksten og styrking av private organisasjoner og institusjoner knyttet til de mange små og middels store gårdsbrukene i våre samarbeidsland.

Antall bistandsprosjekter i mange av våre samarbeidsland i Afrika er ofte for store i forhold til mottakerlandets administrative og økonomiske evne, og ofte makter mottaker ikke å skaffe seg oversikt. Store deler av bistanden faller utenfor ordinære budsjetter, og mottaker har dermed begrenset muligheter til å prioritere sin totale ressursbruk. Mye tid og arbeid går med til å oppfylle et mangfold av krav til rapportering og ulike betingelser/kondisjonaliteter fra giverne.

Derfor kan støtte til helhetlige sektorinvesteringsprogram og til sektorbudsjettstøtte være interessante alternativer. Mulige fordeler kan være:

- En vil minke de administrative omkostningene knyttet til enkeltprosjekter for både mottaker og giver;
- Det politiske systemet i samarbeidslandene kan bedre styringen av knappe resurser til prioriterte områder;
- En oppnår en mer balansert finansiering av ulike slag av kostnader

Samtidig stiller denne bistandsformen krav til mottakerlandets politikk og praksis når det gjelder fattigdomsrettet utvikling. Videre må en sikre seg at sektorinvesteringsprogrammer ikke resulterer i en sentralisering som motvirker den nødvendige lokale forankringen av utviklingstiltakene. Det stiller også strenge krav til mål og resultatrapportering.

Til tross for mange problemer, sektorinvesteringsprogrammer for landbruk er nå på gang i mange av NORADs samarbeidsland, for eksempel. Mosambik, Tanzania, Malawi, Uganda, i tillegg til

Zambia der et slikt program har vært etablert i et par år. NORAD vil vurdere mulighetene for å støtte og delta i flere slike programmer

Konklusjonene er at NORAD vil være fleksibel og kritisk med hensyn til bruk av bistandsform og samarbeidende institusjoner. En nøye analyse av landspesifikke forhold vil derfor stå sentral ved utformingen av bistanden til jordbruksutvikling i det enkelte land.

### **Avsluttende kommentarer**

I de afrikanske land der landbruk er dominerende næringsvei vil utvikling av landbruket være en av flere nødvendige forutsetninger for å redusere fattigdommen. Men ikke enhver type av landbruksutvikling vil automatisk innebære reduisering av fattigdom. Særlig to forhold er i dag sentrale for at landbruksutvikling skal kunne bidra til en reduksjon av fattigdommen:

- Bistanden må medvirke og bidra til at små og mellomstore gårdsbruk får tilgang til ressurser i form av jord, relevant og tilpasset kunnskap og teknologi samt tilgang til finansielle institusjoner.
- Den økonomiske politikken i samarbeidslandene må være gunstig for de mange mindre produsentene på landsbygda og bistanden må støtte oppunder en slik politikk.

Spørsmålene og problemstillingene er mange og svarene og løsninger er sikkert usikre. Det er i alle fall viktig at NORAD kontinuerlig analyserer effekten av sin bistand både på økonomisk, sosialt, kvinnepolitisk og økologisk grunnlag - og lærer av egne og andres erfaringer, slik at vi kan bidra positivt til en utvikling der landbruket blir et effektivt redskap for et bedre liv for verdens fattige - i et kort så vel som et langsiktig perspektiv.

Dette krever god dialog med mottaker bygd på gjensidig tillit og respekt, og at det norske fagmiljøet er aktive deltakere i bistandsarbeidet i denne sektoren..

Forskningsbasert kunnskap er et premiss for de beslutninger vi skal ta og de avtaler vi skal gå inn i. Det er også viktig å være med undervegs for å sikre løpende etterprøving og resultatmåling av om tiltakene bidrar til de mål som er satt.

En mulighet jeg ser for meg er å danne forsker/brukerteam som kan følge planer og/eller prosjektet i hele dens levetid. Et slikt team kan være satt sammen av norske forskere og forskere og brukere fra det aktuelle landet, her er det mye spennende muligheter når det gjelder kvalitetssikring og gjensidig læring.





**EXPERIENCES  
FROM SUPPORT TO  
AGRICULTURAL DEVELOPMENT**



## **Agricultural Assistance: Lessons Learned and Challenges Ahead. Productivity, Food Security and the Environment**

by

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### **INTRODUCTION**

From a global perspective, agriculture is a vital sector for survival of mankind being the main source of food and fibre. In developing countries the importance of agriculture is even more significant since besides addition to providing food and fibre, agriculture is a source of employment for many people providing the only means of livelihood to over 50% of the population and contributing to over 40% of the Gross Domestic Product (GDP). In Tanzania for example, agriculture is the most important sector in the economy accounting for between 45% - 61% of the GDP, 84% of employment and between 60 - 80% of export earning (World Bank, 1994).

In any country, development hinges on improvements in productivity which arises from technological change, institutional innovation as well as availability of biological and human capital. Equity as proposed in various development paradigms cannot occur in the absence of production growth unless there are substantial external inflows. Productivity has an important bearing on food security due to its direct effect on food supply and the indirect income effect. Meanwhile, national and household food security have an important bearing on the environment with implicit consequence on the sustainability of alternative options.

Despite its importance, the agricultural sector has been under funded in many developing countries. For Sub-Saharan Africa it is now widely recognized that the general neglect of agriculture in the 1970s lead to the economic problems of the 1980s (Tardanica, 1987) which prompted many countries to embark on economic reform with significant external financing. This paper examines how such external assistance in the form of credit, grants and aid, targeted to the agricultural sector and the economy as a whole has influenced changes in productivity, food security and the environment, in Sub-Saharan Africa. Special reference is made to Tanzania with a view of drawing lessons for future development intervention.

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## FINANCING AGRICULTURAL DEVELOPMENT

During this era of structural adjustment, agricultural Support needs to be addressed within the context of total available resources as directed by Structural Adjustment Programmes which in addition to direct support through government budgets strive towards more local mobilization of savings and setting a climate that attracts more foreign direct investment (FDI). Further more, Non governmental organizations (NGO) are becoming more important recipients of external assistance and more important players in the development process. Agriculture is intertwined with the rest of the economy providing food, raw materials, income, exports and employment to the economy. Meanwhile in addition to stochastic factors such as the weather, agricultural performance also depends on the condition of transportation and communication infrastructure, the quality of human capital, availability of technology and institutional support.

In developing countries such as Tanzania, provision of all of the above sorely depends on government programmes which to a very large extent rely on external assistance. In Tanzania for example, External sources of financing accounted for 59% of the total government during 1981/82 of which agriculture received 4.84%. This figure had risen to 86.8% in 1994/95, reflecting high dependence on external financing for economic recovery programmes of at least developing countries (LDCs). Tibaijuka (1992) similarly noted that foreign aid which had increased from 26% in 1967 to 71% during the 1992/93 was the most important indicator that dependence on aid has increased.

**Table 1: External Financing as % of Total Dev. Budget  
(Tanzania - Selected Years)**

Year	External % of Total Budget
1981/82	58.9
1988/89	54.4
1991/92	41.5
1994/95	86.8
1996/97	73.1

Source: Tanzania Government Development Plan (various Years)

Table 1 indicates that planning of government budget rely on external resources for over 50% of total government budgetary allocations in most years. This provide an adequate proxy to gauge the sectoral distribution of external assistance as presented in tables 2 and 3.

**Table 2: External Resources Budgetary Allocation (Selected years)**  
**External as % of Total Dev. Budget**

Ministry	81/82	88/89	90/91	91/92	94/95
Agriculture	4.8	8.9	8.3	6.4	7.0
Natural resources	2.8	3.9	1.1	2.6	2.4
<b>Sub-Total</b>	<b>7.6</b>	<b>12.8</b>	<b>9.4</b>	<b>9.0</b>	<b>9.4</b>
Communication & Transport	5.4	9.3	-	4.9	35.2
Construction & Works	8.1	-	18.2	8.2	-
Industry and Trade	11.8	3.7	4.5	2.8	0.3
<b>Sub Total</b>	<b>25.3</b>	<b>13.0</b>	<b>22.7</b>	<b>15.9</b>	<b>35.5</b>
Education	3.6	3.7	4.5	2.8	0.3
Health	0.9	0.8	3.2	1.5	3.3
<b>Sub Total</b>	<b>4.5</b>	<b>4.5</b>	<b>7.7</b>	<b>5.1</b>	<b>6.9</b>
<b>TOTAL</b>	<b>37.4</b>	<b>30.3</b>	<b>30.4</b>	<b>30.0</b>	<b>51.8</b>

Source: Tanzania Government Development Plan (various Years)

Tables 1, 2 and 3 reveal high dependence on external financing of the government development plan. All key ministries that are directly or indirectly related to agricultural productivity depended on external financing for over 60% of their development plans (table 3). Agriculture and natural resources have received roughly 9% of total external allocation while allocations for communications, transportation, construction and trade have ranged between 13% during 1988/89 to as high as 35.5% in 1994/95. Social services have been targeted for about 6%.

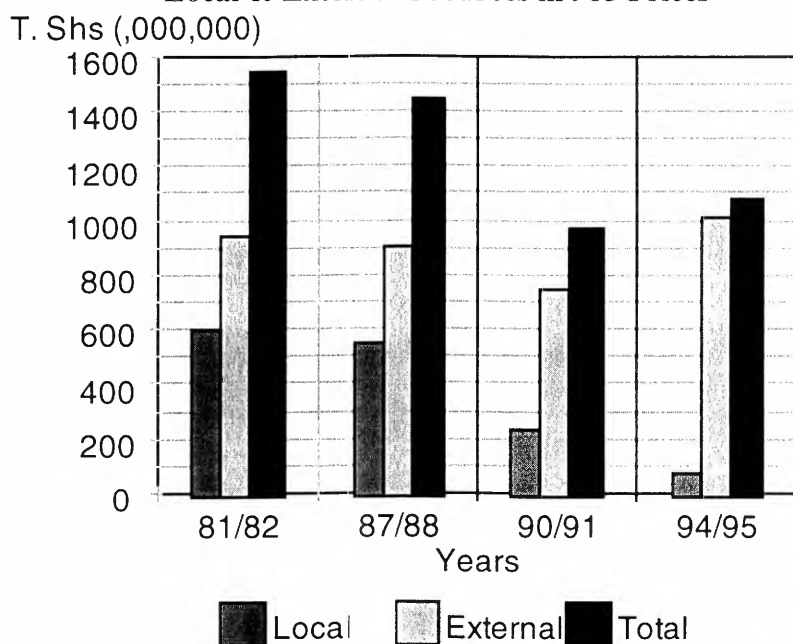
**Table 3: External Resources Budgetary Allocation**  
**External Resources as % of Ministerial Budget for Selected years**

Ministry	81/82	88/89	90/91	91/92	94/95
Agriculture	61	62	76	93	70
Natural Resources	83	74	55	96	90
Communication & Transport	77	66	71	-	93
Construction & Works	68	-	-	92	40
Industry & Trade	75	58	62	41	34
Education	80	68	73	90	76
Health	78	64	74	87	71

Source: Tanzania Government Development Plan (various Years)

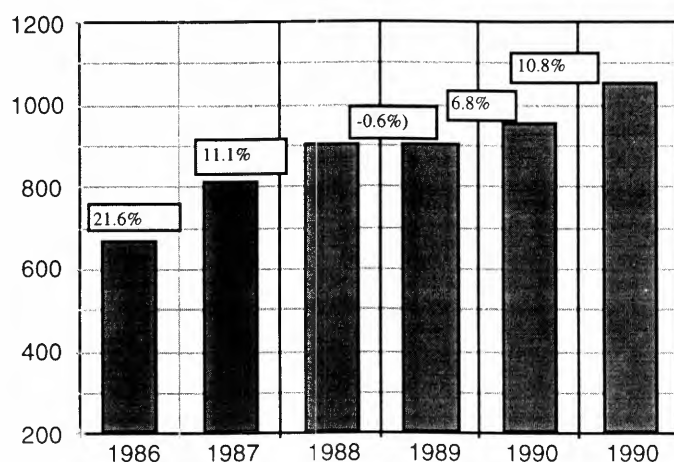
Unfortunately, this source of financing increased at less than 10% between 1986 and 1991 following economic reform (which were introduced in 1986 supported by the World Bank and IMF). Figure 1 provides an insight on trend for total external financing commitments to Tanzania.

**Figure 1: Tanzania Government Real Expenditures  
Local & External Sources in 985 Prices**



Source: Tanzania government development budget (various years)

**Figure 2: Total external Assistance to Tanzania  
Million US \$ (1987 - 1991)**



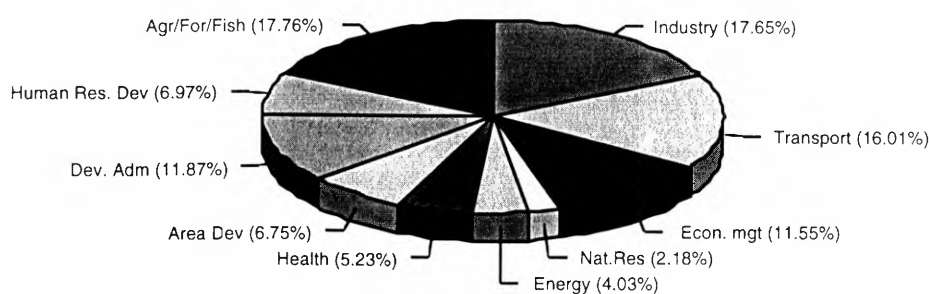
Source: UNDP Development cooperation, 1991

Tanzania being one of the poorest countries in the world is highly dependent on Official Development Assistance (ODA) whose volume has been rising at a decreasing rate since 1988 from both bilateral and multilateral sources. Such declines are a not good sign. As the United Nations Conference on Trade and development for LDCs (UNCTAD, 1992; 1993) Observes, LDCS are exclusively dependant on ODA for external financing because of their limited access to international financial markets and foreign direct investments. The report further notes that the flows of resource to Africa has been declining. Meanwhile, table 3 indicates that during the post economic reform era, more than 60% of external assistance to Tanzania has been aid dependent which was distributed across sectors as illustrated in figure 3.

Tanzania received most of its assistance (over 90%) for a only seven countries (Tibaijuka, 1992). In 1991, Norway ranked 3rd after Sweden and Denmark among bilateral donors followed

by Japan, Germany, Netherlands and Italy. However taking all donors into account the UN system leads with 24.8% of total external assistance of which the World Bank contributed 69% during the same year. Thus during 1991 for example, agriculture forestry and Fisheries received the highest amount of total external assistance (16.3%) flows, of which 22.6% went to the food sector while research development and the agricultural research support services received 6% and 6.9% respectively. Development of cash crops received 3% (DCA, 1993).

**Figure 3: Percent Distribution of Total External Assistance (Tanzania)  
By top ten Sectors**

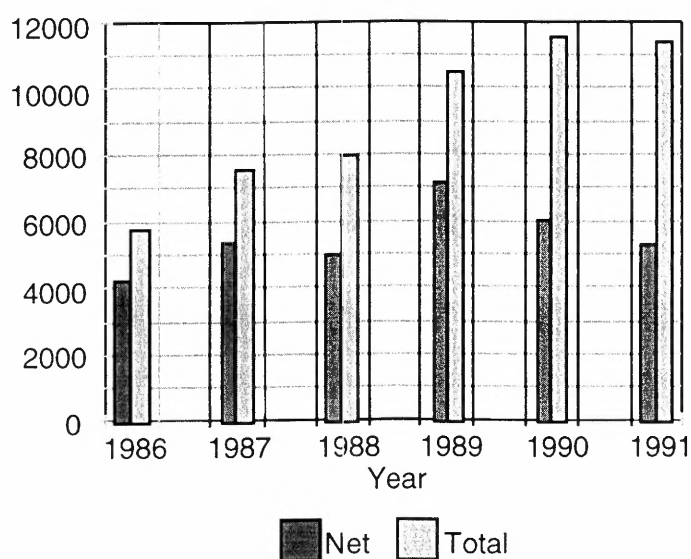


Source: UNDP Development Assistance Cooperation, 1991 Report

However, commitments to development assistance does not imply full remittance. Moreover, there is also leakage back to donor countries by way of technical assistance and debt servicing. Other leakages may include corruption and mismanagement. Figure three presents ODA commitments and disbursements and Commitments by Development Assistance member countries and institutions



**Figure 4: Net Resource Transfer to Sub-Saharan Africa <sup>2</sup> 1986 - 1992**  
**Million US Dollars**



Source: UNCTAD Trade and Development Report, 1993

Available data indicate that the process of getting government out of providing goods and services which do not involve market failure is progressing well. This has involved liberalized marketing of agricultural inputs, producers as well as other consumable good. Also the process of privatizing monopoly parastatal organization is still ongoing. In the case of agriculture this has resulted in the % share of the Ministry of Agriculture budget for Agricultural and Natural resources parastatals to drop from 72.9% and 39.9% respective in 1982 to 40.8% and 27% representing a 54.3% decline in real expenditures for the two sectors during 1991 (table 1)

<sup>2</sup>2 Net transfers to severely indebted low-income countries in SSA which include Equatorial Guinea, Ethiopia, Ghana, Guinea Bissau, Kenya, Liberia, Madagascar, Malawi, Mozambique, Niger, Nigeria, Sao-Tome & Principe, Sierra Leon, Somalia, Sudan, Uganda, Tanzania, Zaire, Zambia

**Table 4: Spending on Parastatals (1976 Prices) Millions**

Years	Agricultural Parastatal		Natural Resources Parastatals	
	Total Shs.	%	Total shs.	%
1982	201	79.9	40	39.9
1983	136	64.9	24	59.4
1984	140	52.5	26	46.9
1985	125	57.5	18	44.7
1986	84	48.1	24	49.8
1987	132	42.5	41	47.2
1988	102	42.7	31	39.7
1989	202	39.9	4	25.8
1990	44	37.1	12	11.9
1991	109	40.8	1	2.7

Source: World Bank (1994)

However the net effect of such privatization has not been fully documents, taking into count lost income for those who lose jobs. Nevertheless, it is generally agreed that structural adjustment programmes had negative income effects on the urban poor (Bagachwa, 1994)

Non-governmental organizations (NGOs) have also been beneficiaries of external assistance whose share has been increasing. According to the UNCTAD report for 1993 - 94, NGOs in Tanzania received \$ 785 and \$ 1967 during 1990 and 1991 respectively accounting for 0.3% and 0.6% of total ODA disbursement or a 150% increase in monetary terms. This is consistent with global trends where the role of NGOs in providing public goods including extension services for agricultural and natural resources management has been increasing both in terms of number of NGOs involved as well as resource allocation. While NGOs have been hailed for being more efficient in the delivery of services, these institution are not error - free, nor can they always substitute for government serveces.

Often, their spatial coverage has been limited to project areas which may not fit well with the programme approach to development. Moreover, given their limited ability to reach large segments of the population, in the absence of adequate coordinated planning, there many be spatial distortion in resource allocation. This is particularly true since many of the NGOs tend to locate in urban or accessible rural areas. Also, uncoordinated NGO activities may lead to duplication. Furthermore, as NGOs have proliferated following more availability of external resources, incidences of corruption within some NGOs have been reported. As such, the allocation of resources through NGOs needs to be monitored and coordinated at various levels without unnecessary bureaucratic and political tendencies.

## **MOBILISATION OF LOCAL RESOURCES**

Aid is meaningful if it will enhance the ability of the recipient to become self reliant (Tibaijuka 1992) so as to ensure sustainable financing of development activates in the long run. Another objective of World Bank/IMF structural adjustment programmes in Tanzania has been to increase the mobilization of local resources through more efficient tax collection and local savings so as to finance private investments and government spending. Thus, among other things, external assistance has been used for economic management which account for 10.6% of total disbursed assistance during 1991. Available data indicate that macro-economic adjustment in many countries are reducing inefficient subsidies giving more rational signal to private investors who

will be making the bulk of future investments in all sectors including agriculture (Alexandratos, 1995). However, in many Sub-Saharan countries, the rate of local savings is low, which makes it a limited alternative for financing development activities in the short and medium term. In the case Tanzania, despite partial liberalization of financial markets, other distortions still prevail including negative real interest rates and concentration of financial institutions in urban areas.

Local savings mobilization at local (Project or programme) level tends to be more successful as has been the case under the IFAD funded rural financial service project in southern Tanzania where savings rose by 244% within one year (1995/96) (GAK, 1996). But such achievements need to be viewed continuously since savers were enticed by the lure of credit which were offered at less than prevailing market rates. Local financial institutions which are supposed to provide credit among low income members of the economy are still in their very early formative stages.

Meanwhile, tax collection has also lagged behind projections due to corruption and a narrow tax base. In Tanzania, tax revenue increased at very low pace rising from 135.9 million shillings in 1990/91 to 215.6 million shillings in 1992/93, a 29% annual growth rate. Efforts to improve tax collection have included formation of a Tax Revenue Authority which is reported to have improved revenue collection by almost 100% within its first six months. However such improvements are yet to be felt by workers, producers and consumers since resources have been thinly spread over a multitude of needs. In fact, as figure 1 demonstrates, that local contribution to government allocation has actually declined significantly in real terms relative to their immediate post ERP level. The consequence has been under-funding of planned project, and deterioration of services. It has been reported for example that donors are threatening to pull out of some development activities including the University of Dar-es-Salaam, due to governments failure to provide budgeted financial allocation (Daily News February 22/2, 1997). This along with less than full disbursement of donor funds has meant actual government budgetary expenditures are low. with serious disruption of planned development activities and uncertain recurrent expenditures. For instance, during 1994/95 actual expenditure were only 40.9% and 67.1% of total government and agricultural approved budgeted respectively.

## FOREIGN DIRECT INVESTMENT

Another objective of economic reform in developing countries including Tanzania has been to attract more foreign investment. External assistance is supposed to facilitate this process by way of supporting the economic liberalization process to minimize or eliminate inefficiencies and distortions.(monopolies, distorted exchange and interest rates). An enabling environment also means the availability of good communication and transport infrastructure as well as public utilities including water, and electricity. A good living environment in terms of amenities such as residence, education, health care and entertainment has also been found to be important in attracting and sustaining FDI in Asian countries. Another factor that has been attributed to the flow of FDI to East Asia has been the good educational level of the labour force. Given the poor condition of all of the above in most African countries, the flow of FDI to Africa remained at such low levels that FDI does not provide a viable alternative to support development growth in most SSA countries within the near future. Africa's share of FDI remained below 2% of total FDI and below 5% of FDI for developing countries. Gains made in this regard following ERP of the support have not been sustained as table 6 indicates, because African has not attained the necessary threshold in terms of infrastructure, social and economic as well as political stability to attract substantive and continuous level of FDI.

**Table 5: Foreign Direct Inflows to Africa 1981 - 1994**

Year	FDI for			Africa's Share % of	
	All country	Developing Countries	Africa	All Countries	Developing countries
1981	63.7	20.6	1.4	2.2	6.8
1982	54.6	25.7	1.4	2.0	5.6
1983	50.4	17.1	1.2	2.4	7.0
1984	58.9	18.2	1.4	2.4	7.4
1985	58.5	15.4	2.9	4.9	18.5
1986	84	16.2	1.8	2.2	11.3
1987	136	22.6	2.5	1.9	11.2
1988	161.4	29.0	2.8	1.7	9.6
1989	198.6	28.6	4.8	2.4	16.8
1990	210.4	33.9	2.2	1.0	6.5
1991	162.3	40.3	2.8	1.7	7.0
1992	163.4	53.2	3.3	1.6	6.1
1993	184.5	71.8	2.9	2	4.1
1994	204	83.6	3.5	1.6	4.2
<b>Total</b>	<b>1790</b>	<b>476.2</b>	<b>35</b>	<b>2</b>	<b>7.2</b>

Source UNCTAD, 1995

Foreign direct investments trends for Tanzania have shown positive trends since 1990, however as pointed out earlier the magnitude of such investment remain very low. Having dwelt on the effect of external assistance on the mobilization of resources both local and external to finance development, let us now look at how this has affected trends on agricultural production , food security and the environment.

## DEVELOPMENT PARADIGMS

Before we embark on assessing the effect of agricultural assistance on productivity it is important to note that such assessment can only be done by proxy because first, agriculture is only one component among many interrelated economic activities. Second, as illustrated above external assistance is only a part of total financing to the economy and third, besides financing, there are other factors which influence the effectiveness of external assistance and indeed development financing in general.

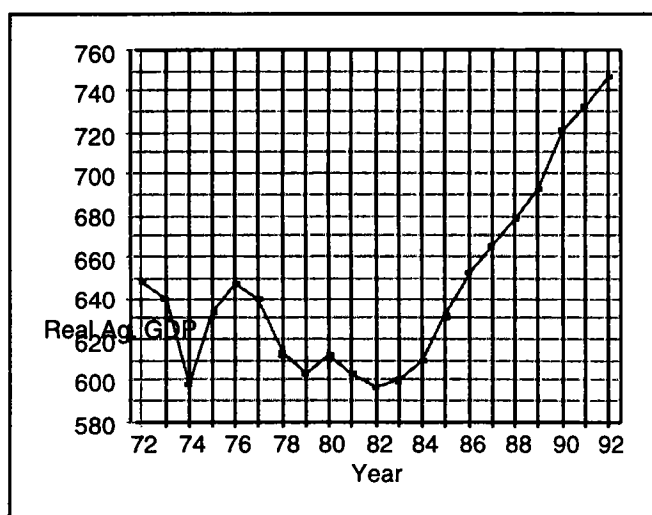
Development assistance is provided with the intention of stimulating and sustaining development which in this context will borrow from the economic and equity paradigm of development. The economic growth paradigm measures development in terms of indications such as the GDP or per capital income the assumption being that a better quality of life calls for higher incomes (World Bank 1991) which are associated with changes in productivity. The equity development paradigm goes further to address distributional aspects. Thus, under this approach, development is measured using indicators, that gauge improvement in social and demographic conditions. Kindelberger et al (1977), reconciled these two paradigm by defining economic development as involving economic growth (more output) as well as changes in the technical and institutional arrangements by which it is produced and distributed. While there may be growth without development, it is however difficult to contemplate economic development in the absence of

growth (Kindelberger et al 1977). Growing production that leads to sustained technological progress is the engine of development (World Bank, 1991). It is in this context that understanding the effect of agricultural assistance on agricultural productivity trends is important particularly in developing countries such as Tanzania where agriculture is most important sector.

## AGRICULTURAL PRODUCTIVITY TRENDS

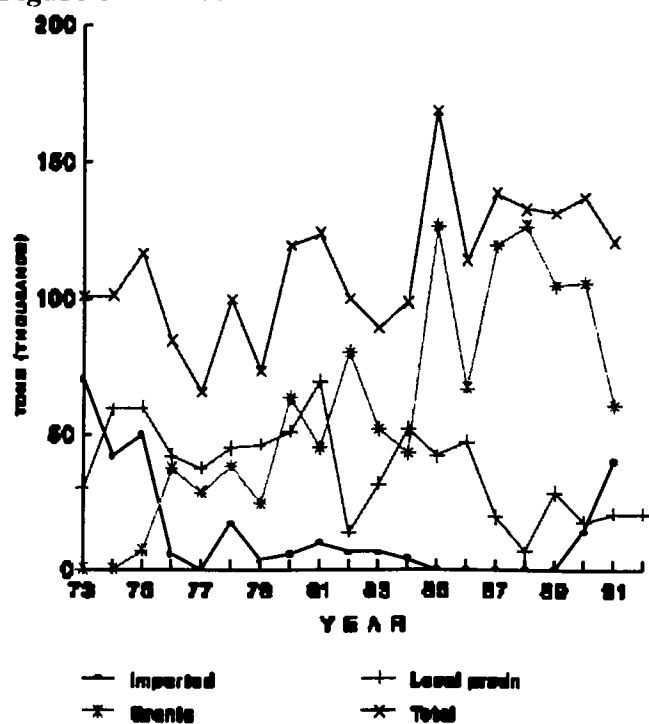
Productivity is a measure of technical efficiency in utilizing resources. In agriculture there are various ways of measuring productivity, the simplest being partial productivity indices. These include yield. In agriculture, yield is influenced by other partial indices such as units of fertilizer, agricultural chemical, labour and machinery per unit area. Others are units of cultivated land and farm machinery and unit of labour. Partial productivity indices are often used to measure productivity trends in developing countries such as Tanzania because of limitation in the availability and quality of data. On a more aggregate level productivity of the agricultural sector can be measured in terms of agricultural GDP per rural inhabitant. In the case of Tanzania between 1980 and 1992 trends in this measure of agricultural productivity are presented in figure 4.

**Figure 5: Rural Productivity Per Capita Agricultural GDP (1976 Prices)**



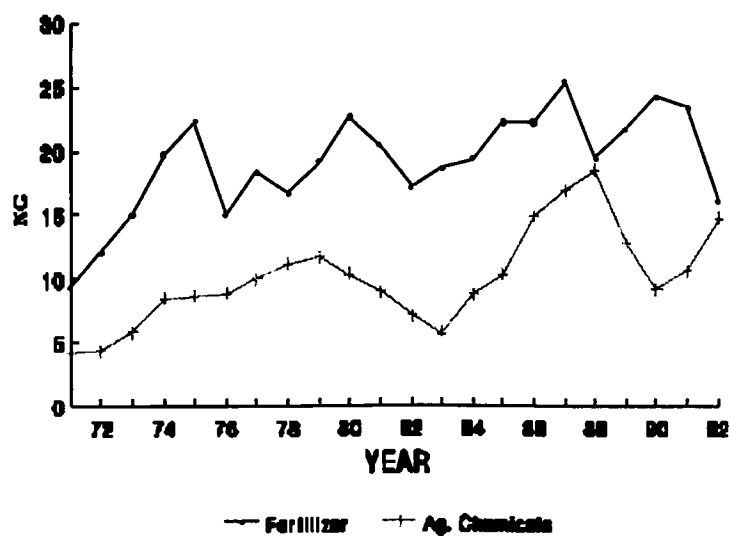
Source: World Bank, 1994

Figure 6 Total Fertilizer Available



Source: Isinika, 1995

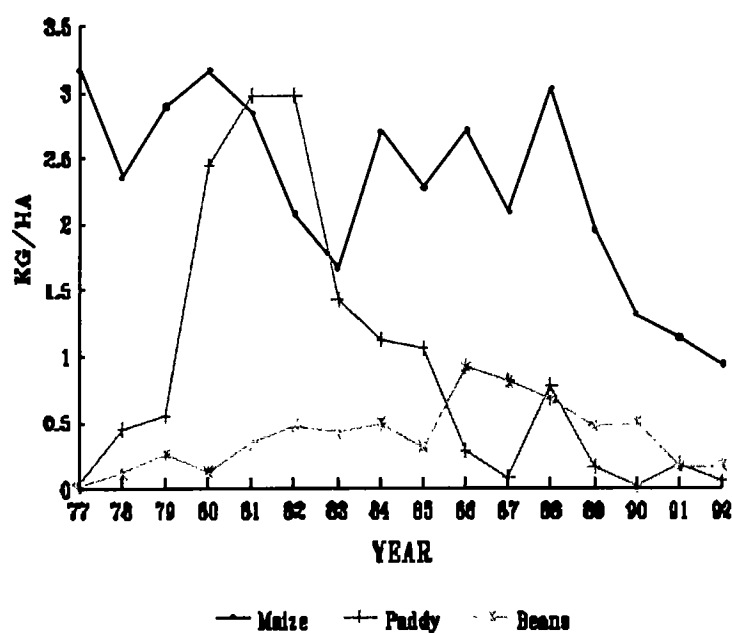
Figure 7 Average Inputs Available



Fertilizer = Kg/Ha  
 Chemicals = Kg/ 10 Ha

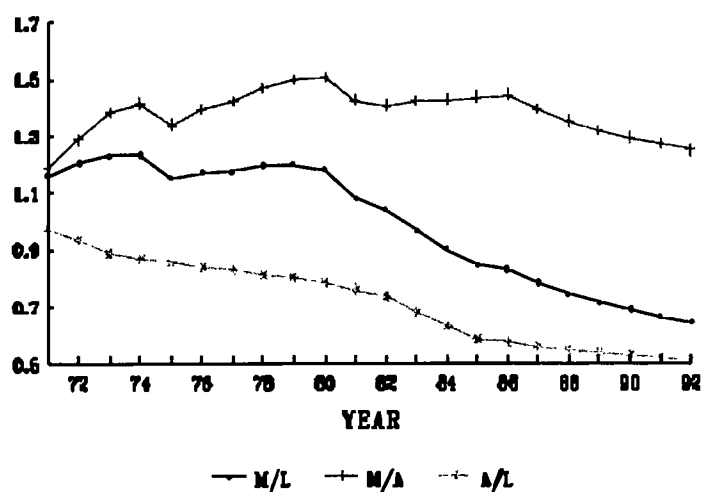
Source: Isinika, 1995

**Figure 8**                      **Average Improved Seed Supplied**



Source: Isinika, 1995

**Figure 9**                      **Partial Productivity Indicators for Implements, Land and labour**



M/L = Number of tractors per unit labor  
M/A = Number of tractors per unit land  
A/L = Number of hectares per unit labor

Source: Isinika, 1995

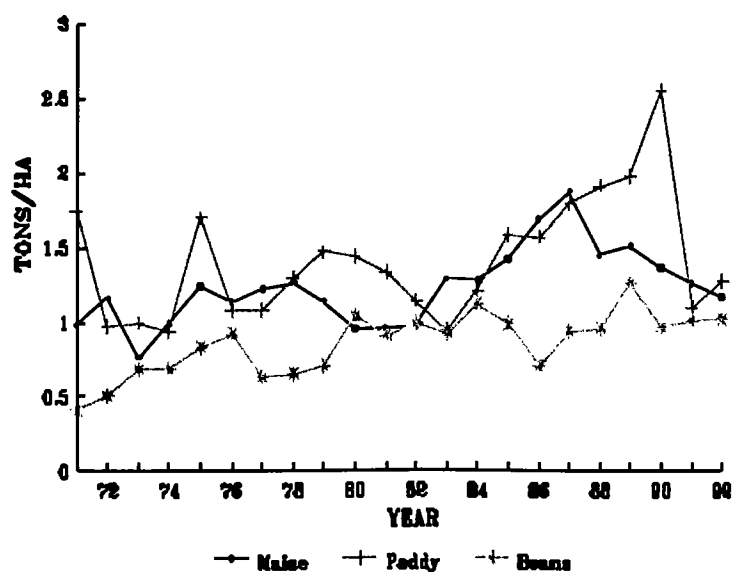
These trends indicate that rural productivity was unstable until 1982 being characterised by up and down trends. Recovery which began around 1993 from local initiatives to revive the economy resulted in positive productivity trends. Latter, in 1986 These government efforts

were supported by external financing from the World Bank, the International Monetary Fund as well as bi-lateral sources through Economic recovery programmes (ERP I<sup>3</sup> & II<sup>4</sup>). These efforts paid off since the recovery trend for rural productivity was sustained. However the upward trend has been interrupted by natural vagaries such as drought in 1991 (Isinika 1995) and economic constraints. In 1991 for example, the supply of fertilizer declined compared to levels that were available in 1985 as a result of a reduction in both import and grant sources (Isinika, 1995). As a result, the average per unit area of fertilizer available per unit of cultivated land during 1992 was equivalent to the amount for 1973 while the average per unit area for agricultural chemicals for 1990 was comparable to the amount available in 1980.

Although the third phase government (which came to power in 1995), has been engaged in lengthy negotiate with donors to secure more assistance<sup>5</sup>. Delays in reaching an agreement, resulted in lower fertilizer levels being distributed for use by farmers. In the Southern Highlands regions which are major maize producer, fertilizer demand estimates have exceeded supply in all years (AGK, 1996).

Likewise, the average availability of improved seed, whose rate of application is very low has exhibited negative trend between 1986 and 1992. This is the combined outcome of increasing area under cultivation and decreasing improved input supplied, which therefore implies that the Tanzanian economy has not been able to sustain levels of input supply that were boosted by the ERP support beginning in 1986. This underlines the high rate dependence on aid (Tibajuka 1992) in supporting agricultural development.

**Figure 10 Yield for Some Food-crops**



Source: Isinika, 1995

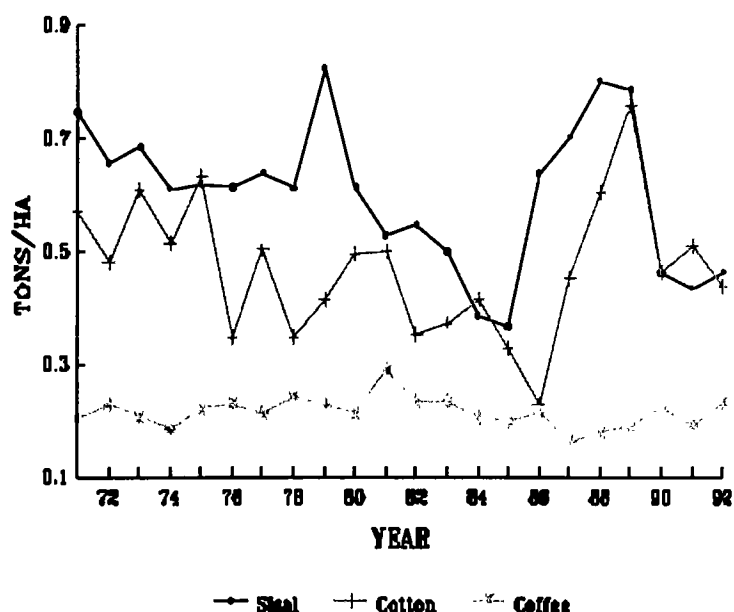
<sup>3</sup> ERP I from 1986 to 1989

<sup>4</sup> ERP II from 1989 to 1992

<sup>5</sup> which were concluded in December 1996



**Figure 11**                      **Yield for Some Cash-crops**

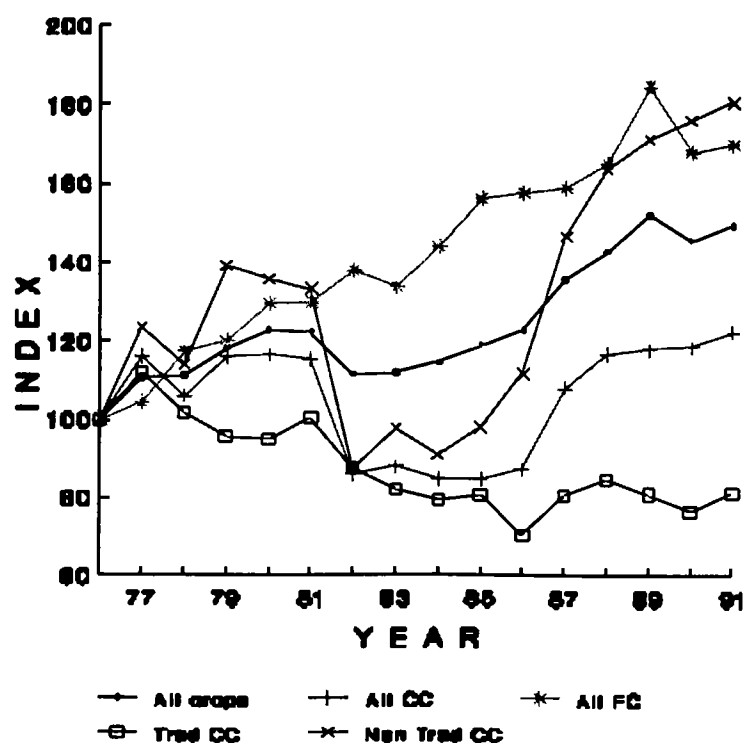


Source: Isinika, 1995

There has been variations in productivity trends by crop as farmers have allocated their resources according to their needs and prevailing market force. As figure 10 indicates. In general food crops have shown a gradual upward trend in yield while the yield of cash crops has shown fluctuations within a general downwards inclination, especially for sisal. Positive post ERP gains in yield have often not been sustained for most crops. The yield for coffee has fluctuate within a narrow range of between 0.18 and 0.24 tons per hectare.

Available data indicate that over-time, farmers have reallocated more of their resources towards food crops and no traditional cash crops which include cardamom, sesame, soybeans and sunflower. Consequently, the composition of crop mix has changed in favour of food and non traditional cash crops at the expense of traditional cash crops whose out put declined compared to corresponding values for 1972. The consequence of this has been declining level of agricultural export earning from \$ million 309.5 in 1981 to \$ 250.8 million in 1991 (World Bank, 1994). Farmers reallocation of resource to food crops is further illustrate by comparing cultivated land under food crops which has increased significantly overtime. While the area under cash crops has changed very little and in some years declined relative to 1972 levels.

Figure 12 Arithmetic Crop Output Indices



CC = Cash Crop  
FC = Cash Crop

These results indicate that most of the output gains registered since 1972 has come from expansion of acre under crop rather than productivity gains, a fact collaborated by a decomposition to separate yield and area as sources of output growth. However, output gains arising from both increased yield and acreage expansion did not ease food insecurity in the country (Tibaijuka 1992), Report 1980 - 1990, Agricultural Production fell at an average of -1.3% per capital food production fell by an annual rate of -2.3%. This means food production could not keep pace with population growth rate (2.8%). Consequently, the number of people living below the poverty line is estimated to have risen to 44% in 1992 from 40% in 1980 (Tibaijuka, 1992).

Productivity is the engine of output growth. As such, investments in agricultural research and extension are very crucial to ensure a constant flow of new technologies to farmers. In an assessment to crop research investments in Tanzania, Isinika (1995) estimated a marginal interest rate of return of 33.2% for the period 1972 - 1992. No equivalent estimates exist for livestock production which represented about 16% of the GNP in current prices (Isinika 1995) or 13% of the GDP in constant (1976) prices (World Bank 1994). nevertheless available data indicate that even lower levels of productivity prevail in this section. The 1995/96 Annual Report for Iringa region the southern Highland of Tanzania shows that the average milk yield from indigenous cows, which constitute the majority in the region was only 1.5 litres per cow per days/Cow being only 25% of the potential (AGK, 1996). The same pattern applies for other livestock products.

In general the evaluation of productivity trends in the livestock sector which also applies for natural resources including forestry and fisheries is constrained by availability of data on both inputs and output or relevant proxies. For example in the case of data on forestry activities (to which Nordic countries have provided significant support) in terms of aggregate total output, yield trend or the direct contribution of forestry activities to income have not been established.

Also, while it is well known that the supply of fish and fish products is threatened by low level, of fishing technology couple with environments pollution, (Lake Victoria) no comprehensive. productivity studies exist in Tanzania for fisheries.

### **Effectiveness of Agricultural Assistance**

Coming back to the basic question relevant for this discussion, can we link agricultural assistance to agricultural productivity trends? The immediate response is not necessarily since agricultural assistance is only one source of financing. Moreover, support to other complementary sectors of the economy should be addressed contemporaneously. Furthermore, in Tanzania where agriculture is mostly rain fed, using low levels of technology, stochastic weather is an important determinant of agricultural productivity. However, since external assistance plays a significant role in financing agricultural development programme through the government budget to the tune of 93% during the 1994/95 financial year, inference can be mad on the effect of assistance on productivity trends. For example, improved performance of the agricultural sector in the post ERP period in 1987 - 1989 has been attributed to direct external assistance to agriculture coupled with government restructuring efforts and good weather (Tibaijuka, 1992; Isinika, 1995).

However, such correlation between agricultural performance and assistance must be interpreted cautiously. In 1981/82 when total budgetary allocations were higher agricultural productivity using yield as an indicator was lower compared to 1990/91 (Isinika, 1995) when both local and external resources were lower in real terms. The effectiveness of any assistance depends on where it is directed. During the 1980s much of the agricultural assistance was misallocated by government planners (with the knowledge of providers) to ineffective government parastatals and projects which failed for various reasons including poor appraisal, mismanagement and external factors. This illustrates the fact that assistance amid distorted micro and macro policies did not contribute to productivity growth during the 1970s and the first half of the 1980s. Instead, it enhanced or at least supported negative productivity trends. On the other hand, assistance provided following economic restructuring efforts by the government has demonstrated positive results since it was appropriately targeted to promote efficiency as earlier illustrated. Tibaijuka (1992) calls this responsible aid where the provider is engaged in constructive dialogue with the recipient to allocate assistance where it will be most effective.

Available data also indicates that the level of agricultural assistance coupled with other resources are not yet adequate to sustain positive productivity trends in agriculture. Yet, the volume of assistance is already on the decline. According to the World Bank, financing for agriculture for developing countries has slipped form US \$ 6 billion in 1986 to \$ 2.6 billion in 1996 (The Guardian-Tanzania, 31/1/997). Meanwhile, in many developing countries it is becoming increasingly evident that investments targeted at agricultural research, extension, irrigation and the infrastructure along with parallel attention to rural health, education and job creation are imperative for sustainable productivity advances (FAO, 1996...Technical paper # 7). But in Tanzania only 4.4% of cultivated land is irrigated, the infrastructure is still poor, agricultural extension and research services continue to perform far below optimal levels while the productivity of human capital is very low.

In comparison, the Asian Green revolution which was introduced to India in 1965 (Eicher and Staarz, 1990), it was preceded by breeding initiatives that began in 1941 by the Rockefeller Foundation (Perkins, 1990). This implies that when the Green revolution was introduced the climate was conducive for success having the prerequisite of local scientists, a high level of education of clientele, maturity in agricultural institutions, a growing infrastructure and a political will among Asian governments. Moreover, donor assistance was concentrated on

a few commodities (Isinika, in press). Likewise, the Marshall plan for war ravaged Europe succeed for similar reasons (Business Times - Tanzania, 1997)

It would therefore be naive to expect that assistance provided in a span of less than ten years since the 1986 is enough to move the country towards sustained positive agricultural productivity trends. It would be equally naive to expect that the void left by dwindling external resources would be filled by local taxes, savings and foreign direct investments since as has been earlier discussed, the volume and growth rate of these resources is also very low. Meanwhile, the development process has not yet reached the necessary threshold for self sustenance. These arguments highlight the fact that while assistance should be provided on a graduated declining scale to avoid dependency (Tibaijuka, 1992; Aune & Glomsrod, 1996), support should continue up to the point where a critical threshold level is attained in order to avoid negation of prior development achievements.

The challenge to development planners and researchers is how do you know that threshold has been attained and how long does take to get there ? How much resource both local and external does all that translate to ? While modelling using computable general equilibrium models as well as dynamic optimal control model will provide an insight on these questions, in the empirical world, it requires a regular review of the development process focusing on policy instruments and their impact so that development will proceed along a purposefully guided trajectory with minimal deviations

## FOOD SECURITY

In 1987, Richard Tardanica wrote *although the thrust of IMF and World Bank policy reform requires greater emphasis be placed on agriculture, it is not clear weather these policies have improved food security since some features of stabilization policies such as better farm incomes enhance rural food security while others (reduced income of urban poor) have adverse effects.* Moreover, the effect of agricultural assistance on food security which has been pegged to IMF/World bank conditionalities depend on how such assistance has affected other sectors of the economy.

The World Bank definition of food security as access by all people at all times to enough food for an active health lifestyle (World Bank, 1986) is the most widely used. Other definitions of food security go further to focus on indicators of food insecurity also referred to as nutritional insecurity. These include undernutrition, malnutrition, infant mortality and daily calorific intake. The FAO has consequently defined three indicators of food security, namely calories per capita per day (Cals/cap), the aggregate household food security index (AHFSI) and the percentage of undernourished in the total population (UNNUR). The World Bank definition basically implies the other definitions since it entails both availability (food supply security) and access (food consumption security). Africa, Tanzania included ranks very low by both of these indicators. In fact average number of calories intake has declined.

### Food Availability

In Tanzania, national level availability of adequate food supplies comes from three main sources including local production, imports and food aid while distribution of these supplies relies on private traders. Thus inadequate food supply and dysfunctional markets may contribute to chronic, seasonal or transitory food insecurity (Amani et al, 1988). In Africa, chronic national food insecurity has been attributed to a general neglect to agriculture alluded to in the previous section. Likewise, seasonal food insecurity which often comes just before harvest and transitory food insecurity due to drought and floods have been attributed to previous under-investment for transportation and irrigation infrastructure, agricultural research and extension and marketing

institutions building as well as lack of human capital development (Tardanica, 1987; Isinika, 1995).

In the case of Tanzania, food security must to largely depend on improvements in local production since the country lacks comparative advantage in other areas (industry) and where such comparative advantage exists (such as tourism) the vast potential remain under-taped. The country's capacity to import food from other source of income therefore remains very low. Another argument in favour of boosting local production is that dependence on food aid leads to undesirable dependence. In the previous section, it was noted that agricultural assistance in terms of inputs supply, various agricultural projects/programmes and support towards economic liberalization has no doubt contributed towards increased national food availability. However, the exact role of agricultural assistance in the context of cause and effect is difficult to underpin in the absence of adequate data and empirical studies. There is a paucity of comprehensive studies which have attempted to establish the relationship between agricultural assistance and food security. Most conclusions on available literature are implied than derived from analysis of available data. This difficulty to make a direct linkage between these two parameters of development stems from some of the following considerations:

(1) Agricultural support existed (sometimes at higher levels) prior to the 1986 ERP. The crucial issue seems to be where such assistance is directed (Tibaijuka, 1992) rather than how much. In the past, external assistance has supported inefficient investments which did not contribute to better food security both at household and national levels.

(2) Farmers began reallocation resource (land and labour) from cash to traded and non-traded food crops long before the 1986 externally assisted ERP (Isinika, 1995). Thus the ERP merely accelerated an existing farmers response towards more favorable food crop prices.

(3) Much of the output growth for food crops including maize and beans has come from expansion in area (Isinika, 1995) using the same technology rather than productivity gains from biological, mechanical and human capital improvements

Specifically, it has been difficult to provide answers to some questions which are relevant to this discussion which include::

(a) what is the tradeoff between balance of payment and food security for various socio-economic groups within an economy ?

(b) To what extent can policy intervention changes lead to or real price changes which reflect production incentives ?

© How is agriculture responsive to incentives brought about by policy changes

In spite of such difficulties, however, looking at general levels of assistance, production and food security from a supply perspective, it can be inferred that agricultural assistance which has been geared to boost production and ensure food availability is one among many factors along with good weather and various institutional improvements which have contributed to more stable food prices (Business Times - Tanzania, 29/11/1996). This is indicative of an improved aggregate food security situation especially in urban centers. However, this picture musks some underlying household differences which may require specific policy intervention. The Tanzanian national food security policy is based on the wrong premise that all rural households are self sufficient in food (Bryceson, 1994), but studies have shown that some families may face chronic and seasonal food insecurity (Amani et al, 1988; GoT/WHO/UNICEF, 1989). This implies that

food aid should remain an important option for some families who face chronic, seasonal or transitory food insecurity.

This discussion points to the fact that despite intended effects the ultimate effect of agricultural assistance should be judged in the context of how it affects other sectors/factors in the economy. But, at the time being, it is obvious that agricultural assistance to Tanzania and indeed to the rest of Sub-Saharan Africa along with local financing has not yet sustained agricultural development in a direction that is less dependent on the vagaries of nature for both plant nutrients and moisture. Given current low levels of irrigation and fertilizer use (low input technology) in the face of high population growth rates, it is difficult to envision improvements in food security in the near future.

This stems from observation that growth in food supply has not been steady. According to Mero (1996), during 1993/94 cereal production fell by 7% creating a shortfall of about 800,000 metric tons. In 1994 and 1977 for example, a one season rainfall shortfall lead to immediate recourse to strategic grain reserves (SGR) to stabilize urban prices. Rural residents may also need food aid within short period of weather variations (drought/floods) due to limited rural food storage capacity (Bryceson, 1994). Strategic grain reserves stood at about 72,000 metric tons in October 1996 (Business Times- Tanzania, 7/2/1997) But food surpluses also exist in remote areas that are poorly served by roads. This year's (1997) disruption of bridges in Rukwa region (western Tanzania) is a case in point to demonstrated the problem of spatial as well as temporal transfer food supplies from surplus to deficit areas in Tanzania.

Sustained levels of food supply which will ensure food security it requires the removal of critical production and marketing constraints which require substantial levels of investments and these cannot be exclusively met from local sources. This calls for programmed external assistance that should over a period of time eventually tail-off based on a clear understanding between donors and recipients depending on the prevailing situation. Nonetheless, one positive contribution of agricultural assistance has been the establishment and maintenance of SGR coupled with liberalized food markets which have played an important role to minimize an otherwise shaky food security situation that existed prior to 1986.

## **Food Access**

Access to available food is more of a household phenomenon being a function of the household's ability to produce, purchase or have access to transfer based food supplies (aid). In Tanzania as well as elsewhere in SSA, various studies have looked at the effect of structural adjustment programme to which recent agricultural assistance has been associated to both inter and intra household (HH) food security. In rural areas where the food share of HH budgets has been estimated to be within the range of 65% - 71% (Amani et al, 1989; Sahn & Sarris, undated), food security often determined by the HH production and income since food are is a random event related to adverse weather conditions. Because factors that influence production at the HH level have already been discussed, this section will focus on the role of household income in ensuring food security.

Evidence from available studies have demonstrated the important role of HH income in food security through purchases and exchange transfers. In rural areas HH income comprise of four main components, (1) imputed value of consumption from own production, (2) cash income from sale of food and non-food crops, (3) wages and on farm income and (4) remittance and aid. A studies by Sahn and Sarris (undated) reveal the following facts:

- even for small holder farmers, none agricultural earned income is a significant share of total income being 25% in Tanzania
- Only 40% of agricultural income comes from the production of food crops

- non tradeable goods represent a very high share of agricultural income (61%) as well as a high value of sales (60%). About 30% of non traded goods are sold in local markets

non tradable goods mostly comprise of roots and tubers (cassava, sweet potatoes) as well as course grains. This reflects their importance of roots (cassava and potatoes) as well as course grains in the bundle of the consumption bundle of rural populations, therefore their importance for food security.

But a study by Amani et al (1987), pointed out that maize increased at the expense of roots and tubers due to lack of increase in the relative price of tubers with negative income implications for families that are dependent on these crops in the Southern part of Tanzania (Mtwara, Lindi and Ruvuma regions). A simulation model using data from Ruvuma (Southern Tanzania) likewise concluded that the acreage for tobacco would increase at the expense of maize and beans because of relative input and output price changes induced by ERP policies (Aune, 1996). These findings reiterate the fact that for rural HH, productivity and relative prices are important income determinants of food security. Meanwhile available data indicate, policies of the 1970s and 1980s in Tanzania lead to declines in real farm income declines (Isinika, 1995), implying food insecurity. Sahn and Sarris similarly argue that their data indicate that farmers have not been buffers against price shocks.

For urban dwellers, food security is attained from purchases using income earned through wages, and other sources. But the urban labour force in Tanzania has faced declining real wages, dwindling employment opportunities in the formal sector and an informal sector that is just emerging as a viable alternative for employment, therefore, full of uncertainty. As such, while the urban poor have benefited from more stable prices due to food markets liberalization, their access to food supplies have been limited by falling real incomes, particularly because both the food share of HH expenditures and the income elasticity of demand are high being 50% and 0.87 respectively (Amani et al, 1987). Similarly, declining real income has had a negative effect on rural food security where the expenditure elasticity of demand is 0.8, 1.51 and 0.75 of maize, rice and beans respectively. While at face value high food prices would have a positive net effect on rural incomes. Sahn and Sarris (undated) point out that a large number of small holder farmers were adversely affected (under the assumption of no adjustment on their part) since they were net food consumers facing bigger price elasticity of demand of around 0.88 (Amani et al, 1989). However, the aggregate net effect of agricultural assistance that has been associated with economic restructuring programmes is uncertain depending on the balance between positive and negative effects (Sahn and Sarris, Undated). In the final analysis our judgement of how agricultural assistance has influenced food security should be based on the following questions:

- has assistance contributed towards raising food supply ?
- has assistance been able to raise food access through production and/or income ?
- has assistance been able to smooth seasonal and annual variation through technological and institution innovations ?

While the answer to these questions may partly be in the affirmative, a qualifier is however needed to emphasize that achievement attained so far have not been up to sustainable levels.

## ENVIRONMENT

With regard to the environment, agricultural assistance in Tanzania during the post ERP period had both intended and unintended (derived) effects. Of the intended effects, high agricultural productivity and better food security was to be attained as result of improvements in input supply and specific agricultural as well as natural resources management projects/programme. As it has been pointed out at the very beginning however, any support to agriculture ought to be addressed within the broader context of policies under which such support has been provided. These include input support, direct support to afforestation and land management projects/programme and institutional restructuring support which has lead to removal of subsidies to fertilizer and other farm inputs, devaluation of the local currency and a market determined interest rate.

While some effects of policy changes on agricultural productivity and food security may be observable in the short run, environmental effects may become obvious only in the medium and long run. Even though Oygard, (1996) was of the opinion that it was too soon to judge the environmental effect to such policy changes, this discussion is given based on a limited number of available empirical studies, simulation models as well as general observation with regard to land degradation through loss of soil fertility, soil erosion, deforestation and overgrazing. Chemical pollution from farming has been reported for cotton and tobacco, but given the low levels of chemical input use in Tanzania the pollution of surface and under ground waste due to farming does not pose a threat as yet (BACAS, 1996). Nevertheless, the need to promote environmentally friendly farming practices coupled with monitoring of chemical levels on food crops which use high fertilizer levels, should be instituted by relevant government and non government bodies, particularly horticultural crops.

Environmental implications of soil degradation are based on deterioration which occur due to soil mining and soil erosion. One of the intended effects of agricultural support has been to increase the availability of chemical fertilizer through an import support programme. This contributed towards higher levels of fertilizer use during the mid 1980s. But available data indicate that levels of imported agricultural inputs including grants has been declining (Isinika, 1995), leaving farmers at the mercy of natural fertility which cannot sustain high levels of productivity. Meanwhile, studies consistently show that soil mining is the most important source of soil degradation (Mnkeni, 1994; Kaihura et al., 1996). Thus availability of fertilizer is recognized as a key element in increasing food supply while averting soil degradation. A computable general equilibrium model simulation predicted that removal of fertilizer subsidies reduced GDP growth by about 0.3% (Aune, 1996), while farmers reduced fertilizer use by as much as 70% (Aune et al, 1996).

However, Oygard (1996) challenged that, environmental consideration should not exclusively justify reversal of adjustment policy efforts. Indeed, for poor countries such as Tanzania, policies which promote economic growth may be tolerable even if they bring about some environmental problems. But the dilemma in the case of Tanzania is that in most cases degradation has reached alarming proportions in many areas. Deforestation for example, which is often closely related to soils erosion has reached alarming levels, posing a real threat to economic growth (Oygard, 1996; Solberg et al, 1994). In some cases farmers have responded to high fertilizer rates by reducing application rates. Such sub-optimal use of fertilizer levels are not adequate to avert soil degradation by erosion (Oygard, 1996). As the debate for or against fertilizer subsidies continues, policy strategies (instruments) should take into draw lessons from economic theory. If a distortional subsidy becomes necessary, it should be targeted at output such as a floor price for targeted corps (ibd) rather than direct subsidies on fertilizer. This would avoid the problem of resource misallocation to inefficient producers as well as to less profitable crops (Kuntson et al, 1990) since Higher farm prices would also raise the profitability of soil



conservation (Solberg et al, 1994)

## DEFORESTATION

Even though data provided by the Economic Commission for Africa (UN, ECA, 1995) indicates that the annual deforestation rate in Tanzania has declined from 2.8% in 1975-85 to 1.4% between 1985-1990 and to 0.8% between 1990-93, this figure still remains above the rate of 0.7 reported for the African continent also considered to be high (Hostad, 1994). Also Solberg et al. (1994) reported that the average annual reforestation rate of 9000 hectares fell short of the annual deforestation rate estimated at 130,000 ha per year.

However, the big national picture may portray a distorted representation on the effect of agricultural support directed at reforestation and natural management projects/programmes which have benefited from generous NORDIC support over a long period of time (Tibaijuka, 1992). Currently for example NORAD is supporting 10 projects under the Sectoral Support for the Management of Natural Resources in Tanzania within the Ministry of Natural Resources Tourism and Environment (MNRT) (Mugasha et al., 1996). The budget of the MNRT received 2.4% of external budgetary allocations during the 1994/95 financial year. Through such support, a total of 80,000 ha have been reforested through community forestry (Mascarenhas, 1991 in Solberg et al, 1994) projects under various organizations such as NORAD, DANIDA, and Concern (an Irish NGO). Besides the direct income effect, benefits accruing from these donor assisted efforts may be difficult to quantify (mitigation of climate, amelioration of water sheds, biodiversity conservation) or such benefits may not be appreciable within the short run. However, evaluation reports of most such projects indicate positive results in terms of imparting land and forest management skills to both farmers and extension personnel (Mugasha et al, 1996). Such a move should contribute towards sustainability, particularly given the shift in emphasis to indigenous species (Solberg et al, 1994) which is proving to be more cost effective on a large scale.

Some people have argued that the cost of formalized titling could not be justified in Sub-Saharan Africa on account of the relative security of tenure offered under traditional land ownership systems (Migot-Adhola et al., 1996). However, the rural African scene is changing quite fast in some places. Land markets have become more important and land conflicts are on the rise. Such developments may challenge the World Bank conclusion. There is no question that insecure tenure provides a disincentive for investment in soil conservation and tree planting. In addition it provides fertile ground for both deforestation and land degradation resulting from overgrazing, charcoal production and expansion of agriculture (Hofstad, 1996). While the high cost of offering title deeds to land owners, may be high, the current pace of land degradation both in rural and urban areas seems to point to the inevitability of titling all land in the medium and long run. It would be better to programme such an exercise at start implementing it now, be it at a slow rate over a period of say 30 years. Delaying to implement the Shivji report which advocated drastic land reform does not serve the country any good. It only transfers the formidable task and cost to future generations since procrastination will not make the problem go away. Moreover, titling may be the most viable alternative of assuring women access to land while avoiding the rigid cultural innuendoes.

## LESSONS AND CHALLENGES

So, what have we learned from the foregoing discussion? A number of issues have been highlighted which may be for reference. The effectiveness of agricultural assistance on agricultural productivity, food security and the environment depends on the total amount of development financing available as well as the manner in which such assistance is used. For optimal outcome, assistance should be directed where it offers the best returns. Some of these areas include agricultural inputs especially fertilizer as well as funds for irrigation projects which will reduce the vulnerability of agriculture to stochastic weather in the long run.

For agricultural assistance to be effective in raising productivity and food security with minimal environmental damage, there must be concomitant support to other complementary sectors of the economy especially the transportation and communication infrastructure. Also important are investments in education, health care as well as development of stable and efficient marketing and financial institutions.

All these investments amount to substantial amounts of resources which cannot be exclusively met from local resources. This means, external assistance is still required not only for agriculture, but for all development undertakings. In order for current and past investments (local and external) to bear positive returns eventually, assistance should be concentrated on specific key sectors to raise the level of development up to a threshold level reminiscent of the Asian Green Revolution or the European Marshall Plan. This means agricultural assistance should be comprehensive to include all key sectors. Failure of previous investments does not only hurt recipient countries, it also affects tax payers and benevolent people in donor countries who do not get a fair return on their part of philanthropic contributions.

Some ERP policies such as fertilizer subsidies may have to be revised in view of evidence that removal of subsidies may have negative effects on both household food security and aggregate income (GDP). However, any such policy revision should aim at minimizing distortional effects by using instruments which support output price rather than direct input subsidies.

Since off-farm income is an important source of food security for all farmer categories, it would be beneficial to locate agricultural processing industries close to rural areas. Such plants (small, medium and large scale) may end up minimizing cost because of lower transport costs for bulky inputs. Also such strategies may stem the currently high rural urban migration rate. However, private investors will not locate their investments in rural areas that are poorly served by infrastructure and utilities.

The most important challenge for both donors and recipient country planned is to monitor the development process so that corrective action are taken promptly in case of derailment due to wrong assumptions or a change in the environment (especially economic, political). For this to be attained, constructive dialogue is imperative (Tibaijuka, 1992).

One challenge for academics is for them to provide timely policy recommendations which are based on realistic analysis of the real world, so that policy makers are always armed with adequate information on possible consequences of alternative action. Computable general equilibrium models and dynamic optimal control models cited in this paper offer a good starting point.

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# **New Policy Orientations in Danish Development Assistance to the Agriculture Sector\***

by

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During the last few years Denmark's official development assistance has undergone reform with respect to policy objectives and in its approach and methodology. These new orientations for the development assistance have among others resulted in plans for a significant absolute and relative increase in agricultural assistance. Although Danish development assistance to agriculture increased in absolute terms, its share of Danish bilateral assistance declined from about 30 percent in the beginning of the 1980s, to about 7 percent in 1991. This trend has been reversed and the intension is now to increase support to the agriculture sector to about 20 percent of the bilateral assistance by year 2000.

This paper initially presents the new orientations of Danida's overall development policy followed by a presentation of policy issues regarding the agriculture sector.

## **1. Overall policies**

Denmark's development assistance is based on the policy guidelines outlined in the strategy paper - A Developing World, Strategy for Danish Development Policy towards the Year 2000<sup>1</sup> (referred to as strategy 2000) which was adopted by the Danish Parliament in 1994. The strategy was formulated to create greater coherence between Denmark's foreign policy and development cooperation programmes and to adjust Danish development policies to the profound global changes which have taken place since 1989.

The policy states that Danish development assistance will amount to one per cent of gross national income and will be divided almost equally between multilateral and bilateral development assistance. In 1995 the net disbursement amounted to DKK 9074 million (USD 1619 million).

Strategy 2000 emphasises that targeted efforts to alleviate poverty - by promoting economic growth and social development - must continue to be the focus of Danish development assistance. In addition, during the late 1980s Danida introduced three crosscutting objectives or themes which will be taken into account in the planning and implementation of Danish development assistance: i) improvement of the legal, social and economic conditions of women and promotion of women's participation in the development process, ii) promotion of environmentally sustainable development and iii) promotion of democracy and human rights.

The strategy proposes a further concentration with regard to the bilateral assistance. To improve the quality of development assistance, bilateral development cooperation will concentrate on

activities in a limited number of sectors in 20 programme countries. The 20 programme countries include: Bangladesh, Benin, Bhutan, Bolivia, Burkina Faso, Egypt, Eritrea, Ghana, India, Kenya, Malawi, Mozambique, Nepal, Nicaragua, Niger, Tanzania, Uganda, Vietnam, Zambia, and Zimbabwe. The preparation of country strategies and subsequent selection of sectors has been finalised for 14 countries and strategies for most of the remaining countries will be completed by the end of 1997. It is expected that agriculture will be one of the priority sectors in about 15 of the 20 countries.

With regard to the concept of sector programme support, the plan is to move away from assistance in the form of isolated project interventions towards more coherent sector programme support and to concentrate cooperation - on a long-term basis - on a few priority sectors in each programme country. Project assistance may still be given, however, mainly in the form of pilot projects.

The Plan of Action for Active Multilateralism adopted by the Danish parliament in 1996, outlines the fundamental principles governing Danish contributions to multilateral organisations. The Plan of Action states that Denmark will continue to attach high priority to the multilateral development activities of the UN system, international financial institutions and the EU development programme. An element of the strategy for active multilateralism is that overall assessment of multilateral organisations may lead to a concentration of Danish contributions on fewer organisations in the future. Higher emphasis will also be placed on assessing the performance of the individual organisations and disbursements will be regulated according to the results of such assessments - cuts in contributions may thereby come into question.

## **2. Policies related to agriculture and natural resources management**

In the strategy 2000 it is clearly indicated that there will be an increase in assistance to the agriculture sector and related subsectors including: primary agricultural production, forestry, fisheries, and all services related to these subsectors. The reason for giving increased priority to the agriculture sector is that growth in this sector is seen as a precondition for achieving general economic and social development in the major part of poor countries, where the agriculture sector is the main productive sector.

In line with the new orientation in the overall policies, separate policy papers for support to the different sectors have been elaborated including agriculture, forestry and agroforestry and fisheries. In addition, a number of sub-sector policy papers will be prepared in 1997.

In accordance with the current emphasis on sector programme support, major efforts are now being made to establish agricultural sector programmes (including forestry and fisheries) in recipient countries where development strategies for Danish assistance have been approved.

### ***Sector evaluation***

In 1993/94 a Danida Agricultural Sector Evaluation<sup>2</sup> was undertaken covering 29 projects in five countries. The evaluation found that about half the interventions had had a reasonable impact. There were no clear failures and no clear successes. Among the recommendations were that Danida should review its policy towards high and low-potential areas - a much debated recommendation. An increasing share of Danida's agricultural portfolio is allocated to low-potential areas where achievements have been less satisfactory than in high potential areas. The evaluation team considered that Denmark has yet to develop expertise in assisting low-potential fragile areas, while Danida and Danish suppliers of goods and services were assessed as having good experience and expertise in

dairy development, agricultural processing and relatively high-input farming systems.

### ***Agriculture and food security***

The long term objective of Denmark's policy in the area of agriculture and food security as stated in the new Agriculture Sector Policy<sup>3</sup> is to ensure:

- that future food needs can be met at reasonable prices through increased income to the poor;
- that the productivity in the agriculture sector is increased resulting in lower food prices;
- that the food security is improved.

Danish support to agricultural development shall primarily assist the poorest section of the farming community, and especially women, in increasing their income through a sustainable use of the resources to which they have access. However, this does not mean that Danida's agricultural support will benefit the poorest farmers exclusively and directly. Danida emphasises that governments should adopt pro-poor macroeconomic and agricultural policies aimed at broad-based economic and social development.

### ***Gender equality***

It is widely recognised that women play a central role in the agriculture production in developing countries. However, they seldom have sufficient access to and control over production inputs. Research and development of improved agriculture techniques is primarily addressed at men's activities and agricultural extension is delivered by men to men. It is seen by Danida to be of crucial importance that women receive a higher priority in the support to agriculture development. The food security of poor farm families and the nutritional status of children depends to a very high degree on the agriculture production provided by women - which is often invisible in the national statistics. Danida therefor supports programmes with focus on involving women. Danida has supported a programme for agricultural extension to women in India since the beginning of the 1980s. Through the programme women extension workers are trained and later they provide agricultural extension services to women farmers. In the long term these extension workers will be providing extension services to both men and women as it is not economically feasible to create a parallel extension system for women. Taking into consideration the relatively limited economic resources that have been invested in the programme, it has had a considerable effect on the overall policy in India as regards provision of agricultural extension to women.

Another example of a programme which has successfully addressed the needs of women farmers comes from Bangladesh where Danida supports the development of small scale poultry. Women with limited access to land can benefit from the programme where as little as ten hens, which are looked after carefully, can contribute as much to the income of a farm woman as if she worked as farm labourer.

### ***Environmental sustainability***

In the field of agriculture production and food security, issues of environmental protection are of key importance. In the preparation of sector programmes, it will be ensured that national environmental action plans which have implications for agricultural policies and interventions are integrated.

At farm level, priority will be given to the promotion of improved and environmentally sustainable land management systems including agroforestry, which have the potential to enhance and sustain land productivity while increasing the production and income of smallholders. Currently a number of programmes with focus on soil and water conservation are being supported by Danida in a number of cooperation countries. It is the experience that a long term commitment (15-20 years) is necessary for achieving sustained results from such programmes.



***Democracy and decentralisation***

Danida emphasises that smallholders should actively participate in the formulation and implementation of Danida-supported agricultural sector programmes. Farmers' organisations, formal or informal, can facilitate such participation and, where feasible, Danida will support arrangements in which governments contract with farmers' organisations to deliver certain support services. In relation to promotion of farmers' organisations Danida is assisting an independent farmers' association in Uganda which will take over some planning and other services currently being supplied by the state.

***Support services to production***

A large part of Danida's agricultural assistance will concentrate on support services for production focusing on capacity building. Danida's objectives in this sphere of cooperation are: i) improved cost-effectiveness and quality of services, ii) improved access to services by farmers, particularly poor and female farmers, and iii) promotion of institutionally and financially sustainable service delivery.

Danida assigns high priority to cooperation on general technical support services: agricultural research, agricultural education and training, and agricultural extension. Danida's support may comprise technical assistance and training, promotion of twinning arrangements, materials/equipment supplies and investment. Where feasible, Danida will support the involvement of farmers' organisations and NGOs in supplying services, with a financial contribution from government.

A new element within the assistance to the agriculture sector is that higher priority will be given to the development and rehabilitation of national agricultural research organisations. Danida's objective is to enable national research systems to import, adapt and apply the results obtained by international agricultural research institutions within the framework of the Consultative Group on International Agricultural Research (CGIAR). Danida has increased its contribution to these institutions considerably, from DKK 62 million in 1995 to DKK 100 million in 1996, covering all 16 research centres under the CGIAR.

In the Agriculture Sector Policy paper, further guidelines are presented regarding services specific to crops and livestock production as well as for assistance to rural institutions and agricultural marketing and agroindustry.

**3. Support to the agriculture sector through multilateral assistance**

The approaches stipulated in the strategy for active multilateralism are already being implemented in relation to Danish support to a number of multilateral institutions within the sector of agriculture and food security, among others the World Food Programme (WFP). In recent years the level of activities within emergency aid of WFP has increased and considerable experience has been gained by the organisation within this field. As a result, however, the organisation has given lower priority to development activities and it is felt from Danish side that the development activities are not being implemented satisfactorily. As a result, the Danish contribution to the general development programme of WFP has been reduced to DKK 194 million in 1996 from DKK 230 million in 1995. Denmark is currently proposing that more emphasis be placed on concentrating the development activities within the group of Low-income Food Deficit Countries.

As a general policy for food aid it is proposed from Danish side to gradually shift from support in kind towards support in cash. This would ensure higher cost efficiency and also ensure that the food aid meets the needs of the recipients.

The International Fund for Agricultural Development (IFAD) is from Danish side considered to be a well functioning organisation. Furthermore, there is a high degree of coherence between the objectives of Danish development assistance and the objectives of IFAD which focus on food security and economic development among poor rural communities. The Danish contribution has consequently been doubled from about DKK 15 million in 1995 to 30 million in 1997. In the light of the decision of increasing the contribution to the organisation, Denmark will finance a study of the operational and administrative efficiency of IFAD in 1998.

As regards FAO, the mandatory contribution from Danish side was DKK 15.5 million in 1995. Apart from this contribution, FAO only receives Danish assistance through personnel assistance and through the so-called multi-bi projects. In multi-bi projects assistance is earmarked to specific projects implemented through a multilateral organisation. In 1996 the multi-bi assistance to FAO amounted to DKK 26 million but this type of support is currently being phased out.

Together with the other Nordic countries, Denmark has criticised the management of FAO for being inefficient and centralised, and for not having a long term strategy as regards the planning of activities. Along the lines of active multilateralism this situation has led to the reduction of voluntary contributions to the organisation.

#### **4. Support to the agriculture sector through Danish NGOs**

A new strategy for Danida's cooperation with Danish NGOs was approved in 1993. The strategy recognises the comparative advantages of NGOs in terms of skills and networks but it also sets demands on organisations receiving public funding for development efforts.

Following the development of the new strategy, the share of the bilateral assistance disbursed through Danish NGOs increased rapidly and is now being consolidated at around 17% of the bilateral frame (DKK 1,000 million in 1995). The share of the support to NGOs directed towards development of agriculture and allied fields is around 15%, i.e. about DKK 150 million in 1995.

#### **5. The Environmental and Disaster Relief Facility**

In relation to Danish development assistance to the agriculture sector the newly established Environmental and Disaster Relief Facility (EDRF) will be of importance in future. As a follow-up to the 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro the EDRF was established as an additional budgetary allocation to supplement Danish development assistance increasing gradually to amount to 0.5 percent of GNP in 2002.

50 percent of EDRF funds are earmarked for environmental assistance. These 50 percent are equally distributed between assistance to Eastern and Central Europe and developing countries. The initial EDRF funds for assistance to developing countries have been almost exclusively administered by the Ministry of Environment and Energy through Danced (Danish Cooperation for Environment and Development). However, it is planned that an increasing proportion of the funds will be administered by Danida and when the frame is fully developed this part will amount to about DKK 700 million per year. Thematically, the EDRF will in future address issues in seven areas: urban development and industrialisation, the sustainable use of energy, agriculture, water resources, forests and wood resources, biological diversity and coastal zones. Geographically the assistance will be limited initially to countries in South East Asia and southern Africa.

<sup>1)</sup> Danida, 1994, *A Developing World, Strategy for Danish Development Policy towards the Year 2000*.

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<sup>2)</sup> Danida, 1994, *Evaluation Report: Agricultural Sector Evaluation, Vol. I: Synthesis Report*.

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<sup>3)</sup> Danida, 1996, *Agriculture, Sector Policies*. Copenhagen

## Norsk bilateral bistand til landbruk 1962 - 96

av

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NORAD

### INNLEDNING

Det er gjort en del tilbakeblikk på norsk bilateral bistand. En rekke evalueringsrapporter om prosjekter og programmer foreligger. Enkelte samfunnsforskere har vurdert forskjellige sider ved vår bistand sett i et historisk perspektiv, bl.a. i antologien "Den vanskelige bistanden" fra Universitetsforlaget i 1987 med Tore Linné Eriksen som redaktør. NORADs "Utviklingshjelp i 25 år" gir interessante helhetsvurderinger av vår u-hjelp i perioden 1962 - 87.

Når det gjelder innsats innen en av hovedsektorene for norsk bistand, landbruk, finner jeg ingen beskrivelser eller vurderinger som dekker flere prosjekter og programmer over lengere perioder. Med denne oversikten, som skal være en kortfattet oversikt og ikke en inngående analyse, lykkes det forhåpentligvis å fylle litt av dette tomrommet.

Oversikten er stort sett basert på NORADs årsmeldinger i perioden 1962 - 95. Den omhandler kun bilateral bistand på landbrukssektoren og herunder primært de stat til stat tiltak som NORAD hadde eller har giveransvaret for. Jeg har også tatt noen sideblikk til nordisk samarbeid og til virksomhet drevet av norske organisasjoner og institusjoner - som NORAD har gitt finansiell støtte til. Multibi-samarbeid med FAO og samfinansiering med Verdensbanken på landbrukssektoren, har jeg derimot ikke tatt med.

Med "bistand til landbruk" mener jeg støtte og samarbeid innen jordbruk, husdyrhold (inkludert veterinærmedisin) og skogbruk. Grovt sett omfatter landbruksbistanden "rene" landbruksprosjekter, foruten landbrukstiltak i distriktsutviklingsprogrammer. I de senere år finner vi stadig oftere koplingen landbruk - miljø i målsettingen for forskjellige prosjekter og programmer.

Utenriksdepartementet og NORAD - med assistanse av NORAGRIC - inviterer til et seminar om norsk bistand til jordbruksutvikling 11. og 12. mars 1997. Denne oversikten er i første omgang tenkt som et diskusjonsdokument for dette seminaret.

Oversikten er presentert i tre deler. Først en kronologisk framstilling i fem epoker for perioden 1962 til 1996, og deretter noen oppsummeringer. På denne måten håper jeg å kunne få fram en del av det mangfold og noen av de problemkomplekser som kjennetegner vår u-hjelp på landbrukssektoren. Til slutt følger personlige synspunkter på hva vi har lært av vår landbruksbistand. - Hele framstillingen står for min egen regning.

## 1962 - 69. OPPSTARTING

Starten av norsk bilateral bistandsvirksomhet tidfestes til Stortingets opprettelse av Fondet for hjelp til underutviklede land, det såkalte Indiafondet, i 1952. Indiafondet ble i 1962 avløst av Norsk Utviklingshjelp, en statsinstitusjon med eget styre, men administrativt underlagt Utenriksdepartementet. Planleggingen av norsk bilateral landbruksbistand startet samme år.

Årene 1962 - 69 var først og fremst en oppstartingsperiode for omfattende norsk bilateral bistand der landbruksinnsats hadde en bred plass. Den første gruppe i Norsk Fredskorps kom til Uganda i 1963. Det var flere deltakere med landbruksfaglig utdannelse blant dem. De to første norske juniorekspertene til FAO dro ut samme år. Den første gruppe norske bilaterale jordbrukseksperter startet opp i Kenya i 1965. Det nye Norsk Utviklingshjelp ga finansiell støtte til flere norske organisasjoners bistandsvirksomhet, som til Kirkens Nødhjelps "Abakaliki-prosjekt" i Nigeria og Norsk Misjonsselskaps landbrukssenter "Tombontsoa" på Madagaskar. I 1963 ble det også støtte gitt til det felles nordiske prosjektet "Kibaha" i Tanzania, der det bl.a. ble opprettet en jordbruksskole.

I 1965 ble det satt i gang forundersøkelse av et kunstgjødselprosjekt i Kenya. Litt senere ble det gitt støtte til jordbruksopplæring i Kenya - for stordrift på Thompson's Falls landbruksskole og på småbrukerskoler i Busia og Taita Hills.

I 1966 og 67 fikk Norge anmodninger om bistand på nye fagområder som skulle føre til et langvarig og omfattende samarbeid. Det gjaldt høyere skogbruksopplæring ved Makerere universitetet i Uganda som dengang var en del av det øst-afrikanske universitetet. Ved veterinærfakultet i Nairobi i Kenya påtok Norge seg å bistå med etablering av et Institutt for husdyrbruk. Innenfor nordisk samarbeid kom Norge med i bistanden til samvirkeutvikling i Kenya og Tanzania og litt senere til landbruksprosjektet i Mbeya i Tanzania. Alle disse prosjektene ble store og tunge tiltak med omfattende finansiell og faglig bistand.

Videre kom bevilgningene til de store kunstgjødselleveransene i gang i denne perioden. Kunstgjødsel som varebistand gikk først og fremst til Pakistan og India, men senere også til en rekke andre land.

NORADs årsmelding for 1969 påpeker at 41% av den bilaterale bistand regnet i kroner gikk til landbruk og fiske. Tilsvarende tall for 1970 var hele 50%. Kunstgjødselleveransene og fiskerivirksomheten sto for de største beløpene.

## 1970 - 74. UTVIKLINGSOPTIMISME

Årene rundt 1970 var fortsatt preget av utviklingsoptimisme - både hos giver og mottaker. Den økonomiske veksten i Øst-Afrika var lovende tross den raske befolkningsøkningen. I 1970 var økningen i jordbruksproduksjonen i Uganda på 3,8% mens folketilveksten var 3,2%. Jordbruksbefolkningen i landet utgjorde hele 91% av den totale folkemengden. Zambia tjente dengang store penger på sin kobbereksport, men i dette landet økte folkemengden raskere enn matproduksjonen - tross meget stort utviklingspotensiale på jordbrukssektoren.

Planleggingen av nye bistandstiltak var påvirket av de gode og lovende tider. Vår bistand, også til landbruk, økte sterkt. Ved landbruksfakultet i Uganda var vi med på opprettelsen av Avdeling

for plantekultur, inkludert støtte til proteinundersøkelser, til et herbarium og til forsøk med blomsterdyrking for eksport. Det hele var kommet vel igang da NORAD på grunn av Amin avvirket sin bistand til Uganda i årsskiftet 1972/73. - Støtten til høyere skogbruksopplæring ble flyttet til Avdeling for skogbruk i Morogoro som da var en del av universitetet i Dar es Salaam i Tanzania.

Instituttet for husdyrbruk ved Universitet i Nairobi som også ekspanderte sterkt i disse årene, fikk norsk støtte til bl.a. aktiviteter innen generelt husdyrbruk, husdyrernæring og genetikk. Norske midler ble videre gitt til opprettelse av et nytt Institutt for næringsmiddelhygiene. Vårt engasjement på husdyrsektoren kom snart også til å omfatte deltakelse i landsomfattende programmer med mange givere i bildet. NORAD var her med på etablering av tre veterinærstasjoner og et veterinærlaboratorium i Kenya.

To prosjekter som senere (i alle fall i noen år) skulle bli betegnet som "flaggskip" i vår bistand til Øst-Afrika startet også opp i disse årene: Forsknings- og veiledningsprosjektet "FIFAMANOR" på Madagaskar og sagbruket Sao Hill i Tanzania.

Et nytt bistandsopplegg fikk sterk vind i seilene i disse årene og for lang tid framover: Integrated Rural Development, eller i vår oversettelse: Distriktsutvikling. Vårt første prosjekt av denne type ble anlagt i Mbere i Kenya. Disse programmene var basert på små, ofte kortvarige innsatser på mange innsatsfelter innenfor et lite geografisk område. Gjennom tverrfaglig planlegging og et nært samarbeid med lokalbefolkningen ville en forbedre forholdene for målgruppen, ikke minst de fattige, på en mer direkte og effektiv måte enn ved andre prosjekter. Mbere-prosjektet omfattet 31 delprosjekter i 1973, særlig innen jordbruk, opplæring, helsestell og vegbygging.

De gode tidene tok slutt for de fleste u-landene med den drastiske prisøkningen på olje tidlig i 1970- årene. I en oversiktrapport skriver Leif Vetlesen at "For Norges viktigste hovedsamarbeidsland, Tanzania, økte således landets oljeregning i 1974 med et beløp som svarte til verdien av den samlede utviklingshjelp landet mottok dette året."

Mange av de prosjekter og programmer som ble planlagt før ca 1973, viste seg å bli for store og ressurskrevende for mottakerlandet, men det var det ikke så lett å forutsi dengang.

## **1976 - 83 SPREDNING AV BISTANDEN.**

I siste halvdel av 1970-årene skjedde det tross skiftende tider en betydelig geografisk og faglig spredning av bistanden på landbrukssektoren. Nye land kom etterhvert med, som Zambia (jordkartlegging og bureising), Botswana (landsbyutvikling), Mosambik (det store nordiske landbruksprogrammet MONAP), Portugal (skogskole og husdyrprosjekt), Zimbabwe (melkeproduksjon) og Nicaragua (veiledning). NORAD støttet også landsbygdutvikling gjennom utviklingsfond i nasjonale banker, for eks. Tanzania Rural Development Fund (utvikling av storfedrift) og Tanzania Investment Bank (sukkerproduksjon). I Sri Lanka ble bistand gitt til distriktsutviklingsprogrammet Hambantota. En rekke norske private organisasjoner fikk støtte til landbruksprosjekter i mange land - fra et stort jordbruks- og miljøprogram for Sahel-beltet i Afrika, til en landbruksskole for jenter i Limuru i Kenya.

NORAD hadde lenge gitt bidrag til landbruksforskning. Det gjaldt skogforskning ved den øst-afrikanske forskningsinstitusjonen EAAFRO inntil den ble nedlagt rundt 1970 og videre til

planteforskning ved FIFAMANOR på Madagaskar. NORAD ga støtte til et forskningsprosjekt i jord- og plantekultur ved Misamfu forsøksstasjon like utenfor Kasama i Nord-Zambia. Som jeg senere skal komme tilbake til, ble dette prosjektet "satt bort" til Norges Landbrukshøgskole v\NORAGRIC.

Ekspertbistand har vært en hovedkomponent i NORADs totale bistand, med det største antallet bilaterale eksperter på midten av 1970 tallet. I følge årsmeldingen for 1975 hadde NORAD det året engasjert totalt 264 eksperter og 68 fredskorpsdeltakere. Det er ikke mulig å angi noenlunde nøyaktig hvor mange av disse som hadde landbruksfaglig bakgrunn, men jeg gjetter på 30-35. Vanskeligheter med å få tak i norske fagfolk hadde på enkelte områder meldt seg noen år tidligere. Dette førte til økt bruk av utenlandske fagfolk - særlig fra de andre nordiske land - i norskfinansierte prosjekter. Heller ikke på landbrukssektoren var det lett å rekruttere fagfolk, særlig til universitetene. -

I 1975 utgjorde bistanden til landbruk 26% av den totale norske bilaterale bistand. Denne andelen går ned i årene framover.

I denne perioden går NORAD inn for å stimulere norske bedrifter til større engasjement i våre samarbeidsland. På landbrukssektoren var det foreløpig vanskelig å få til dette. I samarbeid med norske firmaer ble det utarbeidet planer for en kunstgjødsselfabrikk i Pakistan og et anlegg for framstilling av jordbrukskalk i Zambia. Planene ble ikke satt ut i livet. Hovedårsaken var at rammevilkårene omkring kommersiell drift var for usikre til å kunne forsvare større investeringer.

Som tidligere nevnt skapte oljekrisene på 1970-tallet enorme problemer for u-landene, særlig i Afrika. Prisen på importvarene steg meget sterkt, mens inntektene av u-landenes eksport økte bare svakt eller til og med minket i lengre perioder. For 1981 berettes det om stagnasjon eller tilbakegang for jordbruksproduksjonen i Afrika sør for Sahara - med mindre eksport og store behov for import av matvarer. De fattige afrikanske land gikk inn i en økonomisk krisesituasjon som de fortsatt befinner seg i.

## **1984 - 90 DISTRIKTSUTVIKLING, KVINNER OG MILJØ.**

Det norske Storting har besluttet at norsk bistand skal være fattigdomsorientert. Dette er ofte tolket slik at den viktigste målgruppen skulle være de fattige i de fattigste land. Denne hovedpremiss for vår bistand har hatt meget stor betydning for vår innsats på landsbygda og for valget av opplegg for landbruksbistanden. "Integrated Rural Development", eller distriktsutvikling, fikk økt popularitet hos bistandsgivere i 1980 årene i forventning om at slike opplegg ville gi de beste muligheter til å skape utvikling for og hos de fattige målgruppene. For norsk bistand gjorde vi utfordringene enda større ved å foreslå slike programmer lagt til fattige utkantstrøk - som Turkana i Kenya, Nordprovinsen i Zambia og Monragala i Sri Lanka.

Årsmeldingen for 1977 peker på at "Bistanden til landbrukstiltak har vist en synkende tendens de siste årene" og hevder at "dette skyldes bl.a. at landbrukstiltak etterhvert blir tatt med i samordnede distriktsutbyggingsprogrammer". Denne utvikling forsterkes utover i 1980-årene.

Støtte til forbedring av kvinnes kår har vært nært knyttet til bistand på landbrukssektoren og til distriktsutviklingsprogrammene, dette i erkjennelse av at det er kvinnene som står for det meste av jordbruksarbeidet i Afrika. Da NORAD i 1977 etablerte et fagkontor for landbruk og distriktsutbygging, ble en kvinnerådgiverstilling knyttet til dette kontoret.

De store kunstgjødselleveransene fortsatte utover i 1980-årene. I årsmeldingen for 1986 hevdes det at "Norges største bidrag til lokal matproduksjon de senere år har vært i form av kunstgjødsel".

I tillegg til fattigdomsorientering og støtte til kvinner tillegges fra 1980-årene en tredje tverrfaglig komponent - miljø - meget stor betydning for vår bistand, ikke minst for virksomheten på landbrukssektoren. Med vår tids hang til sterke uttrykk hevdes det i årsmeldingen for 1989 at "Kvinner - nøkkelen til utvikling", mens en annen artikkel har overskriften "Miljø - det viktigste av alt."

## 1991 - 96 FEILSLÅTTE PROSJEKTER OG - NYTENKNING

For oss som har arbeidet med u-hjelp i mange år, har den senere tids omtale særlig i massemedia av bistand vært frustrerende. "Lite eller intet er kommet ut av alle disse u-hjelps millionene", "U-hjelpa har vært skadelig", er vanlige påstander - også i fora som egentlig er positive til u-hjelp. Særlig tankevekkende er det å lese den indiske forskningslederen Ashok KhosLas artikkel i NORADs årsmelding 1994 hvor han bl.a. konkluderer med at "Tiden for tradisjonelle bistandsformer er forbi."

NORADs direktør i årene 1988 - 96, Per Øyvind Grimstad, har vært en forkjemper for nytenkning i bistanden. Mer enn noen annen står han bakom 1990-årenes strategi om **mottakeransvar**. I følge NORAD publikasjonen - "Innsyn" - innebærer begrepet bl.a. at "Mottakerlandet har selv ansvaret for sin egen utvikling. Derfor skal samarbeidet bygge på mottakerlandets egne mål og prioriteringer." For oss seniormedarbeidere blir det spennende å se om NORAD og vårt bistandsmiljø forøvrig, virkelig makter å lempe på den giverstyring som i stor grad har preget både norsk og annen u-hjelp i alle år.

Grimstad har også formidlet våre bistandsmyndigheters henstilling om mer bistand til landbruksutvikling. Han har understreket at landbruket tilhører "den produktive sektor".

Dette oppfatter vi på landbrukssiden som en velkommen forsterkning av tanken om å fokusere landbruksbistanden mer mot produktivitetsforbedringer i landbruket som et middel for å oppnå varig økonomisk og sosial utvikling i de fattige landene. - Den tanzanianske økonomiprofessoren Anna Kajumolo Tibaijuka hevder i sin artikkel i årsmeldingen 1993 om "Effekt og effektivitet i utviklingssamarbeidet" at det først og fremst er i landbruket og i infrastrukturen det må investeres.

I norsk bilateral bistand er det ikke gitt høy prioritert til landbruksutvikling de senere årene. Årsmeldingene for 1993, 94, og 95 kan berette lite om nye tiltak på denne sektoren. Landbruksbistand er fortsatt erklært som en av hovedsektorene for norsk bistand til Zambia og Nicaragua, men foreløpig har forholdsvis lite skjedd på det området. I noen grad skyldes dette at interne politiske forhold i disse landene har gjort det vanskelig å starte opp nye prosjekter i det hele tatt. - I følge NORADs statistikk utgjorde bistand til landbruk (inkludert, jordbruk, husdyrhold, skogbruk og samvirke) 4 - fire - prosent av vår totale bilaterale bistand både i 1994 og 1995. (Tallene for 1996 er ennå ikke tilgjengelige). Dette tallet er ikke direkte sammenlignbart med tallet 26 % i 1976 på grunn av de store kunstgjødselleveransene som det er færre av nå. Litt av forklaringen ligger også i at en del innsats i gråsonen landbruk-miljø er registrert under miljø. Men likevel, påstanden om at NORAD den senere tid har vært langt mindre engasjert i landbruksbistand enn noen gang tidligere, må være riktig.



I Stortingsmelding nr.19, 1995/96 legges det opp til større satsing på primærnæringene framover. Norske holdninger uttrykt under Verdens matvarekongress i Roma 1996 peker også i samme retning. Utenriksdepartementet har formidlet signalene videre til NORAD. Å sette disse ut i livet blir utvilsomt en av NORADs mange utfordringer i nærmeste framtid.

## ADMINISTRATIVE FORHOLD

Norsk Utviklingshjelp/NORAD hadde i årene 1962 - 83 sitt eget styre. I årene fram til 1977 var landbruksmiljøet representert i styret ved henholdsvis professor Georg Hygen, Norges Landbrukshøgskole, fylkeslandbrukssjef Trygve Haugeland og konsulent Edvard Nordrum, NLH. I hvilken grad dette påvirket NORADs prioritering av innsatsområder, er et interessant spørsmål som jeg ikke skal forsøke å svare på her.

NORADs administrative stab har hatt medarbeidere med landbruksfaglige bakgrunn siden 1969. I perioden 1977 - 93 var en del av NORAD organisert i fagkontorer. Kontoret for landbruk og distriktsutvikling var et av dem. Ved enkelte stedlige representasjoner\ambassader har landbruksfagfolk inngått i staben av utsendt personell.

Siden 1970 har NORAD hatt samarbeidsavtale med Norges Landbrukshøgskole om bistandsvirksomhet. I dag er NORAGRIC - Senter for internasjonale miljø- og utviklingsstudier - den sentrale enhet for samarbeidet på dette området. I 1979 ble det inngått en samarbeidsavtale mellom NORAD og norske samvirkeorganisasjoner. Støtten til samvirke og til faglig organisasjonsutvikling er koordinert og fulgt opp av Selskapet for Norges Vel. På skogsektoren har NORAD hatt samarbeid først og fremst med Det norske Skogselskap og konsulentfirmaet FORINDECO.

Det er utført flere utredninger om norsk bilateral bistand på landbrukssektoren. Den mest omfattende av dem forelå i 1983: "Norsk landbruk i u-hjelpsarbeidet med hovedvekt på bilateral faglig bistand", ledet av daværende assisterende direktør i NORAD, Nils Vogt. I utredningen ble det fremmet en rekke forslag om tiltak for å mobilisere vår fagbase på landbrukssektoren. Det skjedde imidlertid snart betydelige holdningsendringer til faglige bistand i det internasjonale bistandsmiljøet. Mottakerlandene hevdet at de nå kunne fylle stillingene med egne fagfolk. Samtidig pekte NORAD på at det stadig ble vanskeligere å rekruttere norske fagfolk. Resultatet av det hele ble en sterk reduksjon av den tradisjonelle faglige bistanden. - I dag er det trolig under en femtedel så mange NORAD-eksperter ute som for 15-20 år siden. - "Vogt-komiteen" lanserte forøvrig anbefalinger som førte til utvidet institusjonelt samarbeid, særlig med NORAGRIC og Selskapet for Norges Vel.

I 1980-årene kom det stadig forslag om det som ble betegnet som "å sette bort prosjekter". NORAD hadde begrenset kapasitet til å følge opp prosjekt- og programvirksomheten. Det var nærliggende å forsøke ordninger som andre internasjonale organisasjoner hadde praktisert i noe tid, nemlig å engasjere nasjonale faginstitutioner til i stor grad å ta seg av giverinstitutionens oppgaver, for eks. rekruttering av fagfolk, innkjøp av utstyr etc. NORAGRIC påtok seg denne oppgaven ved MISAMFU forsøksstasjon i Nord-Zambia - som NORAD har støttet i mange år. Samarbeidet NORAGRIC - MISAMFU pågikk i en del år inntil zambiske myndigheter overtok den fulle ledelsen av sentret.

En god del evalueringer og prosjektgjennomganger er foretatt av norsk finansierte bilaterale prosjekter på landbrukssektoren, men for ingen av dem er det gjort en evaluering som dekker hele prosjektperioden og noe tid etter at den norske støtte opphørte. Heller ikke er det utført sammenlignende studier av flere landbruksprosjekter. I tillegg til dette må det nok innrømmes at vi i NORAD - og i hele bistandsmiljøet forøvrig - er for dårlige til å trekke lærdom av vår innsats, for eks. ved bruk av relevante evalueringsrapporter ved drøfting av nye innsatser.

Det danske utenriksdepartement har fått utført en "Agricultural Sector Evaluation" som omfatter 29 prosjekter og programmer i fem mottakerland og som dekker 40% av bevilgningene til landbruk i perioden 1981 til 92. Norge burde gjøre noe av det samme!

## **HVA HAR LANDBRUKSBISTANDEN OMFATTET?**

Jeg bruker her den vanlige inndelingen: faglig og finansiell bistand. I sistnevnte inngikk i mange år store leveranser av kunstgjødsel.

### **Faglig bistand.**

Norske landbruksfagfolk har opp gjennom årene utført et omfattende og mangesidig innsats i den bilaterale bistandsvirksomheten. En nøyaktig statistikk finnes ikke, men det dreier seg trolig om mer enn 1000 årsverk. 85 - 90% av innsatsen har foregått i Afrika sør for Sahara. Hovedtyngden her utgjøres av landbrukseksperter sendt ut av NORAD og av norske frivillige organisasjoner. Den største norske fredskorpsinnsatsen finner vi også i Afrika, men med FK-deltakere i landbruksprosjekter også i Asia og Mellom-Amerika. Norske junioreksperter gjennom FAO har vært plassert nær sagt over hele den tredje verden.

De norske fagfolkene har vært engasjert i de forskjelligste oppgaver. Flertallet av dem har vært lærere og veiledere. Vi finner norske fagfolk som lærere ved små landbruksskoler langt ute i bushen såvel som universitetsprofessorer i hovedstedene; fagfolkene har arbeidet som veiledere for kvinnegrupper i landsbyer i Nord-Zambia og som pensumplanleggere i Tanzania. Særlig fram til 1980-årene gikk mange av dem inn i etablerte stillinger med stillingens vanlige fullmakter og administrative ansvar. Senere er det blitt langt mer vanlig med rådgiver-status. Selv etter at de er blitt rådgivere, har det vist seg at de i praksis engasjeres mer i daglig organisering og oppfølging enn det vi i NORAD hadde regnet med.

Kunnskapsoverføringen i bistandsvirksomheten har også skjedd med stipendiatprogrammer. NORAGRIC anslår at ca 700 stipendiater fra ialt 40 land har fått ett eller flere års studieopphold ved Landbrukshøgskolen. I de senere årene er det lagt vekt på å legge mer av kursvirksomheten til stipendiatenes eget land eller region.

### **Finansiell bistand.**

På landbrukssektoren har som nevnt kunstgjødseleveransene vært dominerende. Men det er også bevilget store beløp til skolebygg; fra et beskjedent klasserom på en skole der det er plassert norsk fredskorps til avanserte universitetslaboratorier. Under FIFAMANOR-prosjektet ble det bygget et moderne storfjøs, mens det i Zambia er oppført enkle lagerskur for

landbruksprodukter. I enkelte prosjekter, for eks. det fellesnordiske MONAP i Mosambik, har vi vært med på store utstyrsleveranser - fra hakker til traktorer.

## **HVA HAR VI SÅ LÆRT OM LANDBRUKSBISTAND?**

Her tenker jeg mest på erfaringer fra våre fattige samarbeidsland i Afrika.

### **Vi bør være mer «historisk nysgjerrige og lærevillige».**

Jeg har allerede nevnt en del om behovet for evalueringer. Her bør føyes til at påstanden om at NORAD generelt sett har en kort «institusjonell hukommelse» må være riktig. Vi er for lite opptatt av å lære av vår tidligere innsats og av å bruke denne lærdommen overfor nye tiltak.

### **Rammevilkårene er svært viktige.**

I NORADs årsrapporter påpekes det at flere av våre samarbeidsland, for eks. Tanzania, Zambia, Zimbabwe og Nicaragua satser for lite på landbruk og at de har en svak landbrukspolitikk og -administrasjon. Dette er fortsatt riktig. En del av vår landbruksbistand har gitt dårlige resultater, ikke minst fordi den av mottakerlandene ikke ble satt inn i en noenlunde helhetlig ramme med realistiske prioriteringer og koordinering. At giverne ikke har vært like villige til å la seg koordinere, hører også med til bildet. De nasjonale institusjonene har videre vært for svake til å kunne utnytte mye av den bistand de har fått. - Store forbedringer på disse områdene er imidlertid på gang. Ikke minst med støtte fra Verdensbanken, legger nå mange mottakerland et stort arbeide i å fastlegge en klarere jordbrukspolitikk enn de hadde tidligere, med bl.a retningslinjer for landbruksforskning og -veiledning. Videre er støtte til institusjonsutbygging gitt høy prioritet både av giver og mottaker den senere tid.

Det blir ofte sagt at de afrikanske bøndene egentlig ikke er interessert i å øke produksjonen. Et eksempel fra Nord-Provinsen i Zambia viser det motsatte. Et år oppfordret de lokale landbruksmyndighetene bøndene til å produsere mer mais. Prisen til produsent var god, og samvirkeorganisasjonen, Northern Cooperative Union, kjøpte opp maisen. Til en forandring ble det betalt kontant for produktene. Bøndene i Nordprovinsen dyrket mais som bare det, og viste at de både var produksjonsmotiverte og prisbevisste. Jeg tror dette ikke er noe enestående eksempel, men et bevis på at når rammebetingelsene er gode, da er det produksjonsvilje og -evne også hos den afrikanske bonde. - Eksemplet fra Zambia viser også et hovedproblem: Året etter greide ikke samvirkeorganisasjonen å få avsatt sine store lagre av mais, og mye av den råtnet. Dette viser med all tydelighet at dårlig markedsføring er et av de største problemene for matforsyningen i disse landene.

### **Vi bør redusere antallet «multimotiverte prosjekter».**

Bak innsatsene på landbrukssektoren har vi som giver ønsker om å få inn mange og gode motiver. Vi ser at det er nødvendig å øke produksjonen, men vil også ha en rettferdig fordeling. NORAD vil at våre fanesaker: fattigdomsorientering, kvinner og miljø, skal gjennomsyre også landbruksbistanden.

I tidligere faser av u-hjelp ble det satt i gang prosjekter med snevre målsettinger og uten særlig grundige vurderinger av de forhold og rammevilkår som prosjektet skulle gå inn i. Dette ga

oftest dårlige resultater. Spørsmålet er nå om vi har gått for langt over på andre siden. Krever vi at for mange forhold skal trekkes inn i vurderinger og planer, og at for mange mål settes for et og samme tiltak slik at det går ut over effektivitet og utbytte? Jeg frykter at svaret i mange tilfelle er ja.

Mange i bistandsmiljøet, i NORAD såvel som i private organisasjoner, har i sin store iver og velvilje ønsket å slå tre-fire fluer i en smekk, men har ofte ikke truffet ordentlig noen av dem.

Den danske evalueringsrapporten konkluderer med bl.a. dette: "Agriculture generally seems to perform less well than other interventions and there are clearly difficulties with achieving all three development objectives - poverty alleviation, gender equality and environmental protection - with the same intervention."

### **Vi er for bundet av vårt norske "ståsted" når vi vurderer landbruket i fattige land.**

Også i Norge var landbruk for ikke så lenge siden den viktigste næringsvegen med flertallet av befolkningen knyttet til primærnæringene. Nå vet vi godt at en skal være forsiktig med å trekke sammenligninger fra et samfunn til et annet, men verdens agrarhistorie viser mange eksempler på parallellitet i utviklingen, med de enkelte faser forskjøvet i tid.- Jeg tror vi kan finne erfaringer fra vår egen historie om landsbygduitvikling som - med en nødvendig tilpasning - kunne være til nytte i fattige jordbruksland. Det er nærliggende å tenke på tiltak for eks. til forbedringer av den lokale matsikkerhet.

Det moderne bistandsmiljøet er imidlertid lite opptatt av historie. Det er derimot sterkt preget av dagens hjemlige samfunnsforhold og prioriteringer - herunder våre egne problemløsninger - mer enn vi er klar over. Jeg tror at dette påvirker innstillingen også til landbruksbistand.

I Norge i dag beskjeftiger den direkte jordbruksproduksjonen bare 5 % av yrkesbefolkningen. Flertallet av bøndene har dessuten inntekter utenom gården. Under 3 % av våre eksportinntekter kommer fra landbruk, med salg av trevirke som det viktigste. Norsk landbruk utgjør bare en liten del av vårt nasjonalprodukt, men er effektivt og har problemer med overproduksjon på en del områder.

**Makter vi i tilstrekkelig grad å frigjøre oss fra dette bildet av landbruk når vi vurderer forholdene i våre fattige samarbeidsland og herunder bl.a. mengde og type landbruksbistand ?**

I våre fattige samarbeidsland er landbruk den viktigste næringsvegen, og det vil den forbli det i mange år framover. Det store flertallet i befolkningen - opp mot 85-90% - har landbruk som sitt yrke. Folk er avhengig av det de selv produserer både for sin matforsyning og for sine inntekter. Størstedelen av landenes eksportinntekter kommer fra landbrukssektoren. Staten har verken råd til store subsidier eller overføringer.- Vi får stadig påpekt at både matsikkerheten og inntektsgrunnet lokalt og nasjonalt er svekket i mange av våre samarbeidsland de senere år.

Mitt svar på spørsmålet ovenfor er nei.- Vi er bevisst og ubevisst bundet av vårt "ståsted". Noe "hjemmeorientert ballast" må vi ha med oss ellers er vi ikke brukbare som rådgivere, men ballasten må tilpasses forholdene i mottakerlandene og disse landenes prioriteringer langt bedre enn tidligere. Den nye given i vår bistand - med mottakeransvar i sentrum - krever det.



**RECIPIENT RESPONSIBILITY:  
DONORS, GOVERNMENTS AND THE  
RURAL MAJORITY**



**Recipient Responsibility:  
Who Takes Recipient Responsibility When the Government Apparently does  
not Take Responsibility for the Rural Majority?  
Why does the Local Population Normally have so little Influence in Politics  
and Distribution of Resources?**

by

Alf Morten Jerve,  
Director Advisory Services  
Chr. Michelsen Institute, Bergen

Ladies and Gentlemen,

I wish I had a simpler task than explaining the idea of 'recipient responsibility'. Let me try by approaching the matter from where I stand. After being a recipient of this generous lunch, it's indeed my responsibility to bring you back to a different reality. In fact, I have a contractual obligation to do so. I cannot run away from it, although I really felt like after the third helping of smoked salmon. And it is for you to evaluate, ladies and gentlemen, whether my attempt is a half-hearted 'who do you think you're fooling' - effort, an acceptable exercise of duty, or demonstration of personal commitment. In making your verdict, however, please remember there is nothing like a free lunch.

The topic of my presentation today is set in the context of free lunches and hungry guests. The conference organisers want me to tell you whom to invite. And underlying the questions in the conference programme, is also a qualifier: we want guests that not only fill their stomachs, but also get energised to move ahead with their personal commitments. And not only that. The organisers also want me to propose some proper lunch menus. Because, we want dishes on the table that are not just filling, but in their taste or nutrient content stimulate the energy of our guests in particular directions.

Metaphors aside, providing aid to agricultural development in countries where the majority still live in agriculture dependent communities, often the poorest in the country, compels us to ask:

- who is responsible for the aid menu,
- who prepares the list of invited guests, and
- what should we expect from our guests?

I take it that the organisers want the conference to focus on an apparent dilemma, if not a contradiction, with respect to these questions:



On the one hand, NORAD has over the last years given great emphasis to the principle of 'recipient responsibility', meaning that a donor should refrain from temptations to micro-manage the aid flow, as has often been the case - all the way from planning to implementation, to enable the recipient to take genuine responsibility for design as well as outputs of aid financed activities. The role of the donor as financier and adviser must be clearly demarcated from the role of the recipient of aid as key decision-maker and implementor. The relationship between the two should be a contractual one.

On the other hand, the subject of this conference takes us to an area where it is continuously debated who is the key decision-maker and implementor. The subject is the promotion of agricultural development in the poorest countries of the South, addressing vital issues of productivity, equity and environmental sustainability. This means focusing primarily on large rural populations, that not only are the key producers of agricultural products - women and men in different roles. They are at the same time among the poorest, environmentally most vulnerable, and politically most disenfranchised. We all know how little influence they have on politics and distribution of resources. Should they be the recipients of aid? What is 'recipient responsibility' in this context? Are the recipients able to actually exercise responsibility?

What about the state as the responsible recipient? We all know the abysmal legacy of agricultural policies in many of Norway's main partner countries. We are too familiar with the total lack of legitimacy of many departments of agriculture and their extension workers vis-a-vis local farmers. We have seen how states disregard farmers' ancestral claims to tenure and have undermined traditional forms of resource management.

Then there is the private sector? There are the suppliers of agricultural inputs, traders, money lenders, feudal landlords and other characters, frequently with an equally tainted image. NGOs mushroom where they are allowed to grow, but more often than not, on the spoils of aid rather than popular demand. And our concern moves on to worrying about the effects on peasant households of free trade in agricultural commodities, and the international politics of food aid. Who are the actors? Are they any more responsible?

In this complex situation of decision makers and trouble makers, of friends and foes of the peasant farmer, the big questions for this conference are:

- Can aid make a difference in generating the changes envisaged, combining productivity, equity and environmental sustainability?
- Does Norwegian aid possess the appropriate instruments to participate, being only one of many aid donors and constrained by its own aid policies and capacity?

My answer is yes - but the scope is narrow. To identify the openings we should look at the constraints from three perspectives, and I would encourage the conference to give equal weight to all three:

1. The first is the nature of the problem itself. What is it that we want to change? There is no one cure to all ills. Increasing the income to the farmer, is not the same as reducing soil erosion.

2. Second, is the rationality of the farmer herself or himself as a decision maker. Usually the farmer is the key agent of change in agricultural development, but not always.

3. Third, is the rationality of the aid bureaucracy as a decision maker. As an observer of USAID's agricultural programmes noted: "It is essential to remember that bureaucrats are as rational as peasants, and that their behaviour, like that of peasants, must be understood in terms of the institutional context in which they work."<sup>1</sup>

My simple argument is: Unless we are able to improve our analysis of the problem, better understand the rationality of potential recipients and of the aid bureaucracy, we shall perpetuate the gap between aid rhetoric and policy guidelines, and between the actual allocation of resources and outcome of projects. And I cannot think of any area where the gap has been wider and continued over such a long period.

As an approach to this exercise of understanding, let me propose some analytical steps and give a few reminders. This can be done in four steps.

### **Step 1: Problem identification - "light"**

This is the homework - of the government and its donor partners. There is a wealth of knowledge around, there are big and small problems, and no lack of good proposals for interventions with specific intended outcomes: whether it is increased productivity of small-holder maize production, improvement of the incomes of the poorest families, or adoption of soil conservation techniques.

Whatever the objective is, the logical framework approach, now widely used by NORAD, has thought us to go for the 'core problem'. This represents the weakest link in a set of assumptions about cause and effects. The logic is: if we can't strengthen the weakest link in the chain, it will be of little help to improve other parts.

Farmers in an Indian village did not adopt contour ploughing although they understood its value in soil fertility conservation, because hill side land was held in vertical strips. You don't change land tenure and inheritance system from one season to the next. Nevertheless, the core problem was land tenure.

There are, however, other kinds of core problems where intervention would be easier. Visiting remote corners of Rukwa Region in Tanzania, itself far from commercial centres, counting the number of houses with corrugated iron sheets, is a revealing exercise. It tells us something about market access. Three years after improving the road to Mwimbi, financed by NORAD, the number of such roofs had increased manifold. Two decades of state co-operatives and government extension service could not achieve the same, and was of little help, when maize rotted in the godown. The core problem, at that time, was the ability to maintain public roads.

Bangladesh after two decades of riding the wave of the green revolution, with higher yielding varieties of paddy and more irrigated land, now sees the curves flattening out, although still at a level much below Thailand, while the ranks of rural poor continue to swell. How is it possible

that the price of a kilo of rice stands at about 10 Taka (25 cents or 1.50 kroner) in 1997, and it was the same amount 25 years ago? The economist would say it represents a formidable increase in productivity. Of course, but part of that equation is poverty. More and more people are losing their foothold in agriculture. They just cannot survive as farmers on small and fragmented plots with a farm gate price of less than 10 Taka. The irony is, that the same struggle of survival of millions of poor smallholders, contributes towards depressing the prices. Many observers argue that this is an important explanation for the flattening out of the curves. The better-off land owners don't see the economics in further intensification, and have settled for cheap agricultural labour, and has turned their investments towards other sectors - not least in the urban areas. The core problem is debatable, but land reform comes rather close.

Whatever the proposed intervention is, with a better understanding of the core problem at hand, it is time for the next step.

## **Step 2: Stakeholder identification**

Stakeholder analysis is becoming a household word in development planning today. A stakeholder is a person, or normally a group, who can affect the outcome of a proposed intervention, or is benefited or negatively affected by the outcome. Broadly speaking we can distinguish among five types of stakeholders in agricultural development:

- the state: with its political and administrative institutions, and service organisations;
- the farmers: a heterogeneous group, no doubt;
- the private sector enterprises: processing farm products, producing farm inputs, and providing institutional credit;
- the international agents: donors and development banks, and trans-national companies as well; and
- the "middlemen": political brokers, moneylenders, petty traders, and extension workers too, who link the farmer to other stakeholders.

Among this array of stakeholders, it is important to distinguish between primary and secondary ones. We can define the primary stakeholders as those who most directly determine and influence on the core problem.

We are still at the homework stage of our approach. I am not saying that what we have done until this stage is a simple analytical task. Not at all, but it is a prerequisite for taking the next and most critical step in the approach.

## **Step 3: Participatory planning**

This means going to the primary stakeholders, or, better say, those who we think are the primary stakeholders - the key agents for change. It is important to stress that the poor peasant household need not be a primary stakeholder. But often they are, and numerous are those planning exercises in the name of participation where all around the table or under the acacia tree appeared to be secondary. I have been there myself, where we have produced logical frameworks for weeks, collectively overlooking that the key people were never invited - be it the woman on

the shamba, the private trader with the only trucks, or the district council chairman. Participation is about rights - the right to be informed, be consulted and be present.

We typically plan in the English language, as a courtesy to the generous donor, in situations where most of the stakeholders prefer other languages. Participation is also about communication - getting your message across.

Where the planning workshops miss out on the primary stakeholders, we often see that household surveys and other forms of data collection and opinion polls, become substitutes for participation. I have asked farmers myself: What is your main problem? What would you like to do if government or NORAD gave you 1000 kroner? Social research is important when professionally done. It can be based on participatory methods, it can enhance stakeholder's understanding of their own position, it can help stakeholders understand each other, but it is not participation. Participation requires listening and learning, but the real objective of participatory planning is joint decision making.

Joint decision making involves negotiation. It is about sharing of power and scarce resources. Participatory planning remains an illusion when farmers only get studied, informed or at best consulted. It follows, that conditions in many countries and areas are not conducive for promoting genuine participation of primary stakeholders. Where it is impossible, we should not pretend. Then we better stop before getting this far.

#### **Step 4: Understanding the rationality of stakeholders**

This step is the testing of assumptions. The logical framework approach has taught us to look out for killing assumptions. Participation is no guarantee for success. In all planning, also participatory planning, stakeholders play their games, make assumptions about themselves, and collectively influence each other's perceptions and positions.

Let me end this presentation by reflecting on some lessons about rationality, and I shall limit myself to the farmer and the donor.

#### ***The farmer***

It has been a long debate among social scientists: are peasants rational in their behaviour? We have heard about 'perverse market response' and 'the economy of affection'. Today, all leading theories about social actors and their behaviour, are based on assumptions about some form of rational choice. The problem is what we understand by rationality. If we say that whatever people do is rational, we say nothing. If we state that people act to maximise something very broad (like satisfaction) we say very little, but if we say people act to maximise one particular goal such as cash income, power or prestige, usually we are wrong. While the social scientists will continue to juggle with these theoretical dilemmas, empirical research continue to give us some important lessons:

- Poor farmers profit when they can. The challenge is to understand when they can.
- Not all profit is cash. When the cattle herd grows and the bumper crop is there, there are other ways to invest than going to the market first: getting the favourite spouse, gaining political influence, hire in more helping hands, or expanding one's access to land or other resources.
- Subsistence farming is necessary but not the goal. Virtually all farmers and pastoralists today produce marketable products. They all have a foot in the money economy, and they are ready to make use of it.
- Farmers' readiness to take advantage of new income earning opportunities often depend more on their assets than their attitudes.
- Poverty is not really about aversion to risk. When poor farmers are reluctant to specialise in cash crop production, it is because it is more economic to produce foodstuff for their own consumption rather than for sale.
- Poor farmers pay high interest rates not because they are bigger defaulters on loans. On the contrary, lending to them is generally less risky and more profitable than lending to the well-to-do.
- Individual farmers do not make their decisions in isolation. Decisions depend not only on what other people are doing, but on the form and quality of social relationships with other people. Decision making is the result of a social process, not the reflection of market-like competition among farming enterprises.
- In peasant farming we cannot assume that the production unit involves the same people as the household. Where households are formed around people sharing shelter and consumption needs, agricultural production involves a different set of people.

The agricultural economist Chayanov explained the reluctance of Russian farmers in the 1930s to expand their area of cultivation, by referring to the balance between drudgery and satisfaction. The farming household adjusted its input of labour to what they felt as necessary to satisfy consumption and other needs. In what some scholars refer to as 'domestic mode of production', the demand on the working hands in the household is conditioned by the number of mouths to feed. The incentives to go beyond this are few, and as the argument goes: improving the return-to-labour, is an incentive to the workers to work less.

My argument is: this is rarely the real life situation of peasant farming today.

- Firstly, decisions on production involve different people than decision on consumption. Studies of the role of women in households have made this point very clear.
- Secondly, production units generally expand beyond consumption units. When we look at who owns or controls the land, the herd and the water supply, this is quite evident. When we look at where the labour comes from, we often find several households.
- Last but not least, labour and capital assets have become commodities almost all over, and Africa is no longer the exception. Sweeping changes are taking place. Land markets replace communal tenure. The state no longer guarantees access to land. Money attracts labour in the remotest corners. Water gets privatised.

Studies of farmers as rational decision makers tell us that intervention such as better cropping pattern, input subsidies, price supports, water control, crop insurance, agricultural loans, rural

marketing facilities and transport infrastructure, will increase the output and incomes of farmers who have access to them. Studies do not always tell us who those farmers are, how they arrived at their present position and how they are likely to extend or deny such access to others. Nevertheless, these questions have to be addressed in our assessment of primary stakeholders and search for "responsible recipients".

### ***The donor***

The donor is conventionally seen as the helping hand. It fills the gap of finance and skills identified by legitimate authorities in recipient countries. The policy of 'recipient responsibility' tends to reinforce this view. The instruments of aid become restricted to what can be implemented by formal organisations capable of managing a donor-contract. This may include:

- Changes in national policies, laws and regulations, negotiated with central ministries.
- Enhancement of capacity, negotiated with formal governmental organisations.
- Enhancement of capacity, negotiated with NGOs.
- Training and extension, negotiated with extension services and schools.
- Research and Development, negotiated with universities.
- Incentives directly to farmers, negotiated with co-operatives.

The 'recipient responsibility'-policy limits the scope for starting from scratch, bypassing formal organisations, getting involved where institutions are weak, and taking the side of the poor farmers in conflicts over policy and resources. Many would argue that this is the way it should be. Donors need to keep their hands off. Others would argue that this leads to donor irresponsibility.

My concern is with the latter. Either the donor stays out, which can be a very responsible decision, or it must be prepared to engage in what it takes to deal with issues of poverty and environmental sustainability in agricultural development.

Is a donor like Norway ready to pick up the glove? It may take some changes in the rationality of its own decision making. Let me present some of the findings of a study made of agricultural decision making in USAID2:

- External pressures and internal dynamics create organisational incentives that often conflict with officially stated objectives and personal professional judgement.
- The most pervasive objective of the organisation is to come up with a program or project: somewhere to put money.
- Decision makers have an incentive to seek out information that helps the objective of moving money.
- Donor organisations have internal factions, with differing views on local farming conditions and problem identification. It matters a lot where the factions are "located" in relation to formal stages in the internal decision making process.
- The central level is more receptive towards careful analysis, where the operational units tend to be overwhelmed by the obligations of time tables, procedures and disbursement.

- Critical decisions on key recipient institutions and location of projects are made very early in the planning process.
- New projects are normally modelled on earlier projects to minimise risks in the approval process.
- Detailed economic, financial, social and environmental analyses tend to justify decisions already made.
- Project documents read as advocacy documents, that rarely reflect all information available to the planners.

The observations of Allan Hoben in 1980, after three years in the organisation, are still relevant. His conclusion can stand as a timely reminder to NORAD in the starting blocks of a new drive towards agricultural development:

Only a fundamental reorientation of organizational goals, criteria of success, and individual incentives would enable donor agencies to take serious account of the distinctive features of local farming systems in planning programs, to encourage wide participation in decision making, and to adjust the scale and pace of activities in response to changing local conditions. (p.365)

## **Conclusion**

We have to be realistic when searching for the scope and role of aid. On the one hand, there are problems where aid cannot contribute to the solution. On the other hand, we have to reduce the gap between rhetoric and outcome.

This will often mean: Stay away when the proper recipients are not available. Stay away when aid cannot be the kind of stakeholder required to promote change.

The least likely path to successful aid, is when we jump the primary stakeholders because they are too difficult to get to, or alternatively the donor takes upon itself to be responsible on farmers' behalf. There is no shortcut to their participation, as and when they truly are the primary stakeholders.

So, to the question in the title of my presentation: Who should take recipient responsibility when government apparently does not take responsibility for the rural majority?

At least not NORAD.

<sup>1</sup> Allan Hoben, Agricultural decision making in foreign assistance: an anthropological analysis, in: Barlett, P.F., Agricultural decision making: anthropological contributions to rural development, Academic Press Inc, Orlando, 1984, p337.

<sup>2</sup> See footnote 1.

**STRATEGIES  
FOR INCREASING  
AGRICULTURAL PRODUCTIVITY  
WHILST ENSURING A SUSTAINABLE USE OF  
NATURAL RESOURCES**





# **Strategies to Increase Agricultural Productivity, Food Security, and Sustainability of Natural Resource**

by

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## **1. INTRODUCTION**

Low agricultural productivity, food insecurity, and natural resource degradation are major problems for many developing nations, especially in sub-Saharan Africa. In recent years, increasing concerns about these problems and their interrelationships have generated great demand for practical strategies to address these different problems in a unified way. The purpose of this paper is to suggest guidelines for such a strategy, based upon the research conducted on these issues over the past two decades at the International Food Policy Research Institute and many other organizations throughout the world.

I want to emphasize at the outset that although the purpose of this paper is to provide practical guidelines for agricultural development strategies, much remains to be studied and understood about these problems, their interrelationships, their causes, and potential solutions. The set of factors that affect these problems are complex, and the ways in which these factors interact to produce impacts on productivity, food security, and natural resource conditions vary greatly across the diverse circumstances of developing countries. We should therefore be wary of assuming that we know more than we do about the causes and potential solutions to these problems, and be especially wary of “one size fits all” solutions. Nevertheless, I think it is useful to consider guidelines for agricultural development strategies based upon what we do know at this point.

IFPRI's mandate is to conduct policy research that helps to identify policies to promote improved agricultural productivity and food security in developing countries in a manner consistent with sustainable use of natural resources. In 1993, IFPRI launched a global initiative called “A 2020 Vision for Food, Agriculture and the Environment,” with two objectives: 1) to develop and promote a vision for eradicating hunger and malnutrition while protecting the environment, and 2) to generate information and encourage debate to influence action by national governments, nongovernmental organizations, the private sector, and international development institutions to realize the 2020 Vision. This initiative builds upon food and agricultural policy research by IFPRI and numerous other organizations, global consultations and regional workshops among researchers, policy makers, and officials of governments, NGO's, and the private sector. This paper draws primarily from the results of

that initiative.<sup>1</sup>

In the next section I present some background information on the problems of food insecurity, low agricultural productivity, and degradation of natural resources. The third section discusses some of the principal causes of these problems. The fourth section presents the IFPRI Vision and strategic guidelines to achieve it.

## **2. THE PROBLEMS**

The most pressing problems facing the poorest developing countries include malnutrition, low agricultural productivity, and natural resource degradation. These problems are interrelated, with each contributing to the other, as well as deriving from similar causes.

### **Malnutrition and poverty**

Malnutrition and food insecurity are still prevalent in much of the developing world, despite several decades of food assistance and development programs. About 800 million people--20 percent of the population of the developing world--lack access to sufficient food to lead healthy and productive lives. This represents an improvement compared to the situation 25 years ago; in 1970, an estimated 950 million people suffered from malnutrition.

Although malnutrition has declined globally, and especially in East Asia, it has remained a chronic problem in South Asia and has worsened in sub-Saharan Africa. These two regions have become the locus of most of the problems of malnutrition and food insecurity in the world. By the year 2020, most of the malnourished people in the world are expected to live in sub-Saharan Africa. Malnutrition is expected to decline in all other regions of the world, although the problem will likely remain severe in South Asia.

The pattern of poverty closely resembles that of malnutrition. Over 1.1 billion people in the developing world live in absolute poverty, with incomes of less than one dollar per day per person. One half of the children born in South Asia and sub-Saharan Africa are absolutely poor. Unless concerted action is taken, poverty will remain entrenched in South Asia and Latin America and will accelerate rapidly in sub-Saharan Africa.

### **Low agricultural productivity**

A major factor contributing to food insecurity and poverty in many developing countries is low agricultural productivity. Since the vast majority of people in the world's poorest countries sustain their livelihoods through agriculture, low agricultural productivity is almost synonymous with low overall productivity and incomes.

Agricultural productivity has been particularly disappointing in sub-Saharan Africa. Over the past 30 years, while average cereal yields doubled in Latin America and nearly tripled in Asia, they have shown little improvement in Africa (FAO 1994). Grain production per capita in sub-Saharan has actually declined by more than 20 percent since the mid-1960's, from what were already distressingly low levels (Ibid.). Unless substantial investments are made to improve

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<sup>1</sup>An overview of the 2020 Vision and recommended actions are provided in IFPRI (1995). Unless otherwise cited, information in this paper is from that document.

agricultural productivity in sub-Saharan Africa, the gap between food needs and supply will continue to grow. Given market oriented changes in the agricultural price and trade policies of the major supplier countries following the Uruguay round trade agreements, food aid appears unlikely to be able to bridge this growing gap.

### **Natural Resource and environmental degradation**

Contributing to the problems of low agricultural productivity and food insecurity is the degradation of the natural resource base in most developing countries. In the past half-century, nearly one fourth of the vegetated land of developing regions has been degraded, much of it moderately or severely (Oldeman, et al. 1990). The major sources of land degradation are deforestation, overgrazing, and unsustainable agricultural practices. Most of the degraded land is in Africa and Asia. The problem is most severe in Africa, where about 30 percent of the agricultural land, pastures, forests, and woodlands are considered degraded. Overgrazing accounts for about half of the land degradation in Africa, while deforestation is the most important source of stress in Asia and Latin America.

In addition to problems of soil erosion and compaction caused by deforestation, overgrazing, and inappropriate farming practices, in many areas soils are being mined of their nutrients as fallow periods are shortened and inadequate amounts of organic or inorganic sources of nutrients are applied to the soil. The problem of soil nutrient depletion is very severe in sub-Saharan Africa, where average application rates of fertilizer are only about 10 kg. per hectare per year, and few farmers use any fertilizer at all (Larson and Frisvold 1996). Use of organic methods of fertility management is also limited.

Water scarcity is also a critical constraint in many developing countries. 20 countries are water scarce, with annual internal renewable water resources below the threshold needed for socioeconomic development and environmental quality. By the year 2020, the number of such water scarce countries could approach 35. Competition for water is becoming acute, with ever greater potential for conflicts over water between sectors and countries.

There are numerous water-related challenges to sustainable agricultural development. New sources of water are increasingly costly to exploit due to high construction costs of dams and reservoirs and concerns about displacement of people and environmental impacts. The efficiency of water use in agriculture and other sectors is generally low. In irrigated areas, there are problems of waterlogging, salinization, and falling groundwater levels. Between 0.3 and 1.5 million hectares of arable land are lost each year due to waterlogging and salinization. Water pollution from industrial effluent, poorly treated sewage, and runoff of agricultural chemicals is a growing problem. Inadequate and unsafe domestic water supplies, compounded by inadequate sewage and sanitation systems, are major causes of disease and death in developing countries, particularly among children.

Increasing use of pesticides also pose a threat to water supplies and to human and environmental health in many developing countries. In India, for example, agricultural use of pesticides increased from 2,000 tons to 72,000 tons between 1960 and 1985 (Pinstrup-Andersen and Pandya Lorch 1995). In Colombia, pesticide sales have increased by 86 percent since 1980. Evidence is mounting that overuse of pesticides compromises human health, contaminates soil and water, damages ecosystems, and leads to pesticide resistance, pest resurgence, and evolution of secondary pests. There is also evidence that overuse of pesticides can reduce production: in Indonesia, rice yields increased after introduction of an integrated

pest management program that combined biological controls and host-plant resistance with reduced use of chemical pesticides.

### **3. CAUSES OF THE PROBLEMS**

The causes of these problems and their interrelationships in the diverse circumstances of the developing world are not fully understood. Nevertheless, the major causal factors can be fairly readily identified. These include poverty, rapid population growth, limited development of human resources, limited development of infrastructure and markets, limited access to improved agricultural technologies and inputs, and inappropriate or poorly implemented government policies. These factors are most severe in sub-Saharan Africa. I will consider each of these factors briefly.

#### **Poverty**

Poverty is clearly the root cause of food insecurity and malnutrition. Droughts as severe as those that have led to recent famines in sub-Saharan Africa occur elsewhere in the world, but do not cause famines where people have adequate reserves of assets and alternative sources of income.

Poverty also contributes to low agricultural productivity. When farmers are struggling to survive, they are reluctant to take risks by adopting new technologies or higher value products. They are also limited in their capacity to purchase productive inputs such as fertilizer and tools, even though such inputs might yield large benefits. Poverty causes people to take a more short term perspective in their decisions, limiting their interest in making investments with longer term benefits.

The short term perspective associated with poverty is also a major reason why poverty leads to resource and environmental degradation. Limited resource farmers often know that practices such as mining soil nutrients and plowing steep slopes are unsustainable; they often simply lack alternatives that would allow them to conserve resources for the future. Essentially, the natural resource base may be the only wealth they have at their disposal, and in circumstances of extreme need, they may be forced to spend that wealth.

The pressure caused by poverty and population growth can also lead to breakdown of community institutions for managing resources, such as communal grazing lands in sub-Saharan Africa. In many parts of Africa, traditional systems of communal management are breaking down, leading to the “tragedy of the commons” inherent in unregulated access to resources. Paradoxically, efforts by governments and international organizations to privatize common property without an adequate understanding of traditional communal management systems may have contributed to this breakdown.

Poverty may also contribute to these problems by contributing to population growth. Where people—especially women—are poorly educated, heavily dependent on agriculture, and lack adequate savings or social security for the elderly, fertility rates are high. Efforts to reduce the rate of population growth through voluntary means are thus unlikely to be successful unless these aspects of poverty are also addressed.

**Population pressure**

Population growth has been seen as a cause of malnutrition, declining agricultural productivity and resource degradation at least since the time of Malthus. As population grows, people are forced to farm smaller areas, expand onto more marginal land, or seek alternative sources of income. The first two of these responses tend to reduce labor productivity and thus per capita incomes, as a result of diminishing returns. They may cause resource degradation as well, particularly as agriculture expands into marginal and more fragile lands. As people move out of degraded rural areas in search of alternative sources of income, they add to the swelling ranks of the urban poor, contributing to urban problems of unemployment, crime, disease, pollution, and excess demands on urban services.

Although rapid population growth contributes to the pressure on resources and the difficulty of improving food security, it does not inevitably lead to resource degradation and malnutrition. There are numerous examples of countries and places where high population density or rapid population growth was accompanied by growing incomes and more sustainable resource management. For example, intensive rice production systems in many highly populated areas of Asia have been sustained for centuries, even on very steep lands. In the Machakos area of Kenya, rapid population growth was associated with improved management of the soil and water and increasing incomes. In that case, the improvements were due to profitable market opportunities for intensive cash crop production and sustained institutional presence promoting adoption of improved technologies (Tiffen et al.). Whether and how widely that experience can be replicated elsewhere in the developing world is a critical research question.

**Limited development of human resources**

There are strong linkages between hunger and investment in human resources, with causality running in both directions. Low levels of education and health in developing countries reduce the productivity and income earning opportunities of people and thus their ability to achieve food security. Conversely, poverty and malnutrition can reduce the cognitive abilities of children or increase the demands on children's time to work to support the family, both of which can undermine investment in children's education. Breaking the cycle of poverty resulting from these reinforcing effects requires adequate public investment in basic education, health services, clean water, and sanitation.

There has been significant investment in these areas in the past several decades. For example, developing countries' public expenditures on education and health as a percentage of gross national product have doubled since 1960; enrollment in primary education has risen considerably; infant mortality rates have fallen in most countries; and access to health services, clean water, and sanitation have all greatly expanded. Nevertheless, there is still a very large amount of unmet need. One third of children in developing countries still complete no more than four years of school. Investments in female health and education is particularly low. While almost as many girls enroll in primary school as boys, they complete only about half as many years of schooling on average. About 1 billion people in developing countries lack access to basic health services, 1.3 billion are consuming unsafe water, and almost 2 billion people, including more than half of the rural population, do not have access to adequate sanitation systems. Not surprisingly, infant mortality rates average 10 times higher in developing countries than in industrialized countries.

Low levels of education also likely contribute to problems of resource degradation. In some

places, farmers view resource degradation simply as “God’s will.” Limited education, especially of girls, contributes to high fertility rates and rapid population growth. Several studies have shown that education has a positive impact on farmers’ adoption of new technologies, including soil and water conservation practices. This may be both because education increases farmers’ ability to understand and adapt new technologies, as well as providing households with more opportunities and thus allowing them to take a longer term perspective in their decisions.

### **Limited infrastructure and market development**

In many developing countries, especially those in sub-Saharan Africa, the infrastructure is extremely inadequate to support market development. For example, transportation and other marketing costs for grains were about 140 percent of producer prices in Tanzania and Kenya in the late 1970s, compared to marketing costs of less than 30 percent of producer prices in Bangladesh, India, the Philippines, and Indonesia (Ahmed and Rustagi 1987). Without substantial improvements in roads and other infrastructure, it is difficult for competitive markets to develop and facilitate economic growth and efficient allocation of resources as envisioned by the proponents of structural adjustment and market liberalization policies. In the absence of well developed markets for inputs, credit, and outputs, farmers will lack the ability and incentive to adopt more productive technologies. This in turn reduces these nations’ ability to attain food security, and can undermine incentives of farmers to invest in improving their land and conserving the soil. Evidence from the Machakos area of Kenya (already cited), Central America (Scherr, et al. 1996), and elsewhere suggests that farmers are more likely to invest in conserving and improving their land when the economic value of doing so is increased by improved market opportunities and access to improved technologies. Thus market development may be a key factor enabling more sustainable, as well as more productive, use of natural resources.

### **Limited access to improved technologies and inputs**

Related to the issue of infrastructure and market development is access to technologies and inputs. Infrastructural investments yield higher social returns when there are appropriate and profitable technologies that can be adopted. Market development is necessary to ensure that the payoff from these investments is achieved. In many cases, farmers are discouraged from adopting new technologies or the use of inputs because of the lack of reliable supply of inputs, or unavailability of critical inputs in sufficient quantities at the right time.

While market development is a necessary condition, it is not sufficient for productivity improving technologies to be adopted. Adequate research is needed to develop technologies that are adapted to the diverse circumstances of developing countries. Factors such as drought tolerance, resistance to pests, attractiveness to human consumers and palatability by animals need to be considered as well as potential yields. Extension and technical assistance programs, especially programs that are sensitive to the perspectives of farmers and that adapt to their constraints, are also quite important. This is especially true for technologies that require significant time to demonstrate their benefits, such as many soil and water conservation measures.

Unfortunately, public expenditures on these programs are generally very low in developing countries, and have been declining in many countries. Public sector expenditures on

agricultural research are typically less than 0.5 percent of agricultural gross domestic product in low-income developing countries, compared with about 1 percent in higher income developing countries and 2 to 5 percent in industrialized countries. Growth in public sector expenditures on agricultural research in developing countries has slowed to 2.7 percent per year in the past decade. In Africa, research expenditures per scientist have fallen by about 2.6 percent per year since the early 1960s, although there has been growth in the number of researchers.

Some may argue that the decline in funds for agricultural research and extension has been due to limited success of these programs. Although there have been problems in some programs, most have shown substantial success. A 1993 IFPRI study by Evenson and Rosegrant found that more than 80 percent of the agricultural research programs analyzed in Africa and 90 percent in Asia and Latin America achieved a rate of return of more than 10 percent, and more than 40 percent of the programs achieved rates of return in excess of 50 percent. There is clearly room for profitable social investment in agricultural research and extension in developing countries.

### **Inappropriate or poorly implemented public policies**

The history of economic development throughout the world teaches that government policies can have a great impact on whether sustainable development occurs, both in the positive and negative sense. Past efforts by governments to direct the allocation of goods and resources in economies, regulate trade, and transform agrarian to industrial economies have largely failed; and there is now a transformation underway in the role of governments virtually everywhere. Although this process has brought about much needed reforms in many areas of government intervention, it has also been associated with government retrenchment in areas where appropriate government intervention is still needed. Helping to establish and enforce property rights; ensuring public safety; investments in education, infrastructure, agricultural research and extension; addressing problems of pollution and externalities; and regulation of non-competitive markets are all areas where the need for effective government intervention are needed to address market failures.

While it is easy to point out the need for effective government intervention, it is more difficult to devise and implement such policies taking into account the economic, political and social constraints in a given country. In many cases, innovative approaches building upon traditional institutions and local systems of governance are needed. For example, efforts to regulate use of common grazing lands or forests may be more effective if existing communal management systems are properly understood and strengthened. By giving local communities a greater stake in the benefits from the management of such resources (for example, by allocating state grazing or forest land to local communities), they may be more able to address their food security needs and more willing to manage these resources sustainably. Since many governments are experimenting with ways of devolving responsibility for resource management to more local levels, the time is ripe to study this process and the determinants of success or failure of alternative approaches.



#### 4. GUIDELINES FOR ACTION<sup>2</sup>

Based upon its experience in food and agricultural policy research in developing countries, and upon the review and consultations initiated as part of its 2020 Vision Initiative, IFPRI has developed a strategic vision and guidelines for action in six priority areas. IFPRI's 2020 Vision is "a world where every person has access to sufficient food to sustain a healthy and productive life, where malnutrition is absent, and where food originates from efficient, effective, and low cost food systems that are compatible with sustainable use of natural resources." To realize this vision, each country must develop and implement its own action program. However, as a guideline, sustained action is recommended in the following areas:

1. Strengthen the capacity of developing country governments to perform appropriate functions.
2. Enhance the productivity, health, and nutrition of low-income people and increase their access to employment and productive assets.
3. Strengthen agricultural research and extension systems in and for developing countries.
4. Promote sustainable agricultural intensification and sound management of natural resources, with increased emphasis on areas with agricultural potential, fragile soils, limited rainfall, and widespread poverty.
5. Develop efficient, effective, and low-cost agricultural input and output markets.
6. Expand international cooperation and assistance and improve its efficiency and effectiveness.

##### **Strengthen the capacity of developing country governments**

Current efforts to reform the public sector must not weaken the capacity of governments to carry out their appropriate functions. This capacity should be strengthened while governments relinquish functions that are better performed by others in the economy. Predictability and transparency in policymaking and enforcement, and continuity in policy design and implementation, are critical to allow the private sector to play a greater role.

Policies to support the 2020 Vision should be guided by a long-term national strategy for food security, agricultural development, and management of natural resources. In low-income countries, the agricultural system is likely to be the cornerstone of such a strategy because of its pivotal role as a source of food, employment, income, and export earnings.

To achieve the 2020 Vision, a prerequisite is for governments to be able to maintain law and order. Where armed conflicts and civil strife are occurring or are imminent, governments and the international community should give priority to conflict resolution and prevention.

International development institutions, in partnership with governments and communities, should strengthen early warning systems and response mechanisms for food and political crises. Development agencies should incorporate conflict prevention into program planning by identifying areas where potential conflict is high and defusing them by delivering aid in a manner that avoids competition and promotes cooperation among groups; by directing resources to conflict-prone areas; by promoting "engines of growth" to overcome scarcities;

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<sup>2</sup> This section draws heavily upon recommended actions in IFPRI's 2020 Vision summary document (IFPRI 1995).

and by providing opportunities for people in conflict-affected areas to participate in project planning, implementation and evaluation.

A second prerequisite for the 2020 Vision is that governments be able to develop and enforce regulations and standards in private markets and assure competition in those markets. Free markets are not necessarily the same as competitive markets, and there is limited benefit of replacing an inefficient parastatal organization by an unregulated monopoly.

A key aspect of the policy environment should be maintenance of macroeconomic stability and avoidance of arbitrary distortions of private incentives. Governments must maintain exchange rates, monetary and fiscal policies consistent with stability and broad based economic development. Subsidies and other policies that lower the cost of capital relative to labor and promote capital-intensive growth where labor is relatively cheap should be avoided.

Macroeconomic reforms and structural adjustment programs should be continued, but modified where necessary to promote enhanced access by the poor to productive opportunities and to protect the poorest from negative effects.

Governments should invest in goods that have high social net returns, but which are unlikely to be provided by the private market. Areas where such returns are likely to be found include infrastructural investment (especially in high population density areas with agricultural potential), education, agricultural research, and public health. More will be said about these issues below.

Governments can facilitate the transition to more open international markets by investing in market information facilities and other market infrastructure; by investing or facilitating private investment in storage, transport, and market services; by adopting policies to help farmers diversify production; and by facilitating the development of small-scale, labor-intensive, private sector agricultural processing (for example through technical assistance and credit availability). Governments should also seek to enhance their access to international markets through bilateral and multilateral trade negotiations and regional integration.

A key aspect of strengthening the capacity of central governments in developing countries is for these governments to delegate responsibility and authority for activities that are best done by others, including private enterprise, nongovernmental organizations (NGO's), local governments, and community and farmers' organizations. In many countries, NGO's and other parts of civil society have demonstrated their capacity to manage functions previously handled by central governments, such as poverty relief programs, credit programs, management of natural resources, and other activities. Governments should delegate more authority to provincial and local governments and encourage fuller participation by local people in decisions. An important principle to consider in deciding what and how to delegate is to place authority at the lowest possible level consistent with realizing economies of scale in administration and accounting for externalities.

International assistance agencies, including bilateral donors and multilateral institutions, should support these actions through technical and financial assistance.

### **Invest in poor people**

The 2020 Vision will not be realized unless developing countries invest in poor people to improve their well being, productivity, and enhance their access to remunerative employment and productive assets. This includes investment in primary education for all children; access to primary health care, including reproductive health services, for all people; access to clean water

and sanitation services; and training in basic literacy and skill development for adults.

Immediate emphasis should be given to neglected areas, particularly rural areas more distant from urban areas and roads; and to girls and women. Female education is among the most important investments for realizing the 2020 Vision, yielding direct benefits in improved welfare and productive opportunities, as well as contributing to reduced fertility rates and improved capacity of women to assure their family's health and nutrition.

Improved access by the rural poor, especially women, to productive resources can be facilitated through land reform and sound property rights legislation, strengthened credit and savings institutions, more effective labor and land markets, and infrastructure for small-scale enterprises. Labor-intensive public works programs have proven effective in generating employment, raising incomes, alleviating poverty and food insecurity, and building infrastructure. Governments should expand employment through a broad-based economic development strategy, removing implicit and explicit subsidies on labor-replacing capital and in most cases using agriculture as the engine of growth.

Direct transfer programs for poverty relief, food security, and nutrition are needed in many countries, at least in the short term. Such programs must be better targeted to the poor, and their impacts on food security monitored. Social safety nets for the rural poor are urgently needed. To assure appropriateness, the intended beneficiaries should be involved in the design, implementation, and monitoring of such programs. Empowering women to have a voice in local decisionmaking will enable their needs and concerns to be recognized and addressed. Governments must maintain support for effective famine early warning systems and other disaster preparedness measures. To fulfill these goals, the capacity of most developing country governments must be strengthened.

As mentioned previously, national governments should involve other elements of civil society in these efforts. The contributions of local communities and NGO's should be continued and strengthened. Better integration of the various actors and their responsibilities is urgently needed. Governments should find ways to transfer funds to NGO's and local communities for programs best handled by them. Governments and NGO's need to identify low-cost methods for providing social services to rural areas and seek opportunities for mobilizing local resources and local commitment to finance services through user fees and other means, where feasible.

International assistance agencies should provide financial support for these actions on grant terms or through long-term low interest loans.

### **Strengthen agricultural research and extension systems**

Given the overwhelming importance of agriculture in low-income developing countries, efforts to increase productivity and food security must increase agricultural productivity. Improved productivity per agricultural worker as well as per unit of land is needed. The required productivity gains will be possible only if agricultural research and extension systems are strengthened to allow development and dissemination of improved technologies to female as well as male farmers. In most developing countries, particularly low-income ones, the public sector will have to carry out much of the needed research. Private sector agricultural research is virtually nonexistent in these countries and is unlikely to play a major role in the near future. Nevertheless, the private sector can contribute more to the research effort in many countries, particularly if appropriate laws on intellectual property rights are designed and enforced.

Interactions between research systems, extension programs, private companies, NGO's, and farmers should be strengthened to assure that research is addressed to the needs of farmers and that the results are effectively disseminated.

Although each country must decide how much to invest in agricultural research and the priorities for research, the 2020 Vision is unlikely to be realized without substantial increases in research investment in low-income developing countries. A minimum target of 1 percent of the total value of agricultural output is appropriate for most low-income countries, with a longer term (5-10 year) target of 2 percent. Priority should be given to redressing the balance between scientific personnel and other expenses; in many low-income countries, including most of those in sub-Saharan Africa, available funds per agricultural researcher are insufficient to ensure effective use of human resources.

Although more research is needed for all ecoregions, there is an urgent need for research on areas with significant agricultural potential, low or irregular rainfall, fragile soils, large populations of poor people, and high risks of land degradation and loss of biodiversity.

Additional research is needed to develop drought-tolerant and pest- and disease-resistant crops, biological pest management, nitrogen fixation, more effective use of locally available organic materials, intercropping systems, and perennial crops, including agroforestry.

National agricultural research must be supported by a vibrant international agricultural research system that undertakes strategic research of a public goods nature with large international benefits. Current investment in international and regional agricultural research is grossly insufficient to realize the 2020 Vision.

With some notable exceptions, research on biotechnology is largely bypassing the developing countries. New partnerships need to be developed between private and public sector research in advanced countries, international agricultural research centers, and developing country research systems to ensure that biotechnology research benefits developing countries as well. Each country should develop a clear policy and research agenda for biotechnology, based on its research capacity and opportunities for collaboration. To enhance the social benefits of agricultural research, including biotechnology, developing countries should develop clear intellectual property rights and biosafety regulations, and remove inappropriate legal and institutional barriers to private investment in research.

Public sector extension in developing countries has a mixed performance record. Innovative strategies are needed to assure greater effectiveness. The use of mass media can help transmit technical and market information to farmers. Increased involvement of farmers in identifying research and extension needs is critical. Extension services must help strengthen communications and information flows (in both directions) between researchers and farmers, and among farmers. In some countries, the private sector and farmer cooperatives effectively provide extension services. NGO's are playing an increasingly important role in providing technical assistance in many countries. Because of its public goods nature, however, financing for agricultural extension must continue to be provided by the public sector. An innovative approach to extension is to provide farmer groups with matching resources to assist them in contracting for extension services.

### **Promote sustainable agricultural intensification**

A large share of the world's poorest people live in rural areas with significant agricultural potential, limited and unreliable rainfall, and fragile soils. The land in these areas is often degraded. The 2020 Vision cannot be realized without large public and private investments in these areas, including investments in infrastructure, market development, agricultural research and extension, education, health services, natural resource conservation, and soil improvements. Many of these areas have been largely neglected by public sector investments and private investment has been limited by poverty and lack of access to markets. Although outmigration may be the answer in the long run for some of these areas, it is unlikely to halt the growth of population and pressure on the resources in most of these areas by the year 2020. A major need in many places is for governments, in close collaboration with local communities and NGO's, to help establish and enforce clearly specified systems of rights to manage natural resources, including land, water, and forests. This does not necessarily imply privatization of rights or replacement of traditional systems of rights where these are functioning well. In many places, especially in Africa, efforts to impose land titling have had limited success in improving land tenure security and may be undermining the security that exists under communal systems of land tenure. Nevertheless, in many places communal systems of managing resources are breaking down under pressures from population growth, migration, commercialization, and other factors. Government action is needed in such places to help restore clear systems of authority in resource management, in a manner consistent with local concerns and institutions. In most circumstances, local control over resources should be enhanced and enforced and local capacity for organization and management strengthened. Public institutions responsible for managing and regulating natural resource use should be reformed to increase user participation in management and to provide incentives for private and community investments in protecting and improving natural resources. New methods of promoting resource improving investments, such as cofinancing between local communities, government, and the private sector should be explored.

In cases where resource management involves externalities that extend beyond the local community, a broader approach is needed to assure that these externalities are adequately accounted for. For example, private or local community management of forests may not take into account the broader benefits that proper forest management may provide, such as protection of watersheds, preservation of biodiversity, or reduction of global warming. Policies are needed to assure that these benefits are also considered. In general, incentive approaches are preferable to punitive approaches to achieving these benefits, given the poverty of people in fragile areas and the difficulty of enforcing punitive approaches.

Efforts to preserve biodiversity through habitat preservation should be pursued in the most critical areas, preferably areas that are sparsely populated, have little infrastructure, and are able to be effectively policed. For such areas, construction of new infrastructure should be avoided. Local communities should be encouraged to protect such areas. For example, in the case of national parks, a share of park revenues could be provided to local communities for protection and preservation. Where preserving such areas provides clear international benefits, international contributions should support alternative sources of livelihood for populations in and around such areas.

Low soil fertility and soil nutrient depletion is a major problem in many developing countries, including most of sub-Saharan Africa. Policies to address this problem are urgently needed.

Such policies should focus on assuring clear rights to land; access to credit, improved crop varieties and relevant information about efficient fertilizer use in different production systems; efficient markets for plant nutrients; and investments in rural roads and transportation systems. Fertilizer subsidies, though not generally advisable, may be needed in the short run until farmers have adequate knowledge of the benefits of appropriate levels of fertilizer use and the input market system is more developed. Given limited government resources however, priority should be given to making the investments needed to foster development of the marketing system.

Soil erosion and loss of soil moisture are also major problems. In many countries, programs have promoted construction of soil and water conservation structures such as terraces, bunds, and live barriers. While such efforts have been valuable in many cases, there are also many places where the technologies do not address farmers' concerns, often because of the high labor costs required to construct such structures, the limited and sometimes even negative effect on crop yields in the near term (especially where land is scarce), due to the space required by the structures, and the risks associated with such structures in some environments (for example, harboring pests and contributing to waterlogging problems in more humid areas). Less costly and more appropriate technologies are needed for many farming environments. Greater emphasis is needed on biological measures (such as measures to maintain adequate ground cover) and on changes in management practices (such as reduced tillage on steep slopes) where feasible. Policies that provide security of land tenure, access to markets, access to improved technologies and more profitable crops, education, and efforts to reduce poverty are also important to provide farmers with greater capacity and incentive to invest in conserving the soil.

Integrated pest management (IPM) programs should be promoted as the central pest management strategy. Such programs rely on safe and environmentally sound techniques such as biological control, host-plant resistance, and biopesticides; using only minimum amounts of chemical pesticides. Extension of IPM should receive national and international support. Governments are also advised to remove subsidies on pesticides; to facilitate private sector investment in new pest management strategies; to retrain research and extension staff in IPM techniques; and to ensure that farmers are trained in appropriate strategies of pest management.

To address water scarcities, national governments should invest in carefully selected, economically efficient projects to develop new water sources. However, given the high financial, human and environmental costs of developing new water sources, an increasing share of water demand will have to be met from more efficient water use. Governments should embark on comprehensive water policy reforms to promote more efficient water use. Policy reforms should provide secure water rights to individuals or water user groups. Tradable water rights should be developed where feasible. Irrigation infrastructure and management should be turned over to water user associations where well defined water rights provide incentives for efficient use. Governments must reform distorted price incentives and remove subsidies that promote inefficient use of water. In estimating the benefits of water projects, governments and development programs should give special attention to the time spent by women transporting water and the health benefits of clean water. Governments and development programs should help make appropriate water conservation technologies available. Water policy reform must also transcend national boundaries. In many regions, long

term solutions will require international cooperation to share scarce water resources. A large share of existing land degradation is technically reversible, but the cost of doing so is high in many cases. For example, large investments are needed to drain waterlogged areas and to replenish soil nutrients. Some of these investments will be made by private individuals as resource scarcity and prices of land increase. However, in many cases, poverty, insecure property rights, weak market development, externalities, problems of coordination and other factors may prevent private investments to address these problems. Governments must address these underlying problems to facilitate private investment in resource improvements where feasible and economic. In some cases, particularly where large externalities are present, governments will need to be involved in financing such investments. Policies can also help make the most productive use of degraded resources. For example, research can help develop crop varieties with higher salt tolerance to permit planting in salinized soils. Nevertheless, minimizing degradation in the first place is usually less costly than responding to degradation that has already occurred.

### **Develop competitive agricultural input and output markets**

Many developing countries are privatizing their agricultural input and output markets, replacing inefficient, poorly functioning state marketing companies and excessive, inappropriate government regulations with private sector marketing agents. It is essential that this process results in efficient, effective, and competitive markets for at least three reasons: (1) the gains from improved efficiency and reduced costs of marketing of staple foods can have a significant effect on food security through lower consumer prices and higher producer prices; (2) with the rapid urbanization expected in developing countries, efficient and effective food marketing becomes increasingly important; and (3) the rapid dietary transition projected for developing countries and international trade liberalization provide substantial opportunities in developing countries for competitive agricultural systems to expand employment in processing, packaging, and other value-added activities based on agricultural commodities. Agricultural systems will be competitive only if all components of the system, for example, input markets, production, and output markets, are efficient and effective. For the 2020 Vision to be realized, it is essential that developing countries adopt a systems view of agriculture. To facilitate a successful transition, governments should identify their role in agricultural input and output markets and strengthen their capacity to perform this role, while disengaging from functions better performed by other agents. The role of the state is to create an environment conducive to competition among private agents in order to provide efficient and effective services to producers and consumers, while assuring access to productive resources by the poor to enable them to compete on equal terms. Policies and institutions that favor large-scale, capital-intensive market agents over small-scale, labor-intensive ones should be removed. Market infrastructure that serves the public good, such as market information, roads and other rural transportation facilities, electricity, and communications facilities, should be developed and maintained by direct public-sector investment or effective regulation of private-sector investment. Governments should develop and enforce standards, weights and measures, and regulatory instruments essential for the markets to function. The failure of governments to invest in these public goods will result in lack of competition and in fewer and larger private companies, because larger companies are more likely to be able to fill the government's role where these basic public goods are absent.

Other tasks for government include removing institutional barriers to the creation and expansion of small-scale credit and savings institutions and making them available to small traders, transporters, and processing enterprises. Such institutions have also been effective in many countries in helping the poor to face risk and to generate more income. Governments should provide technical assistance and training to create or strengthen small-scale, competitive, private-sector market arrangements. Policies and practices that increase distribution costs, such as formal and informal road tolls associated with the transportation of agricultural commodities, should be abolished except when justified to cover the costs of constructing or maintaining the facility. Where distribution costs in agricultural input and output markets in low-income developing countries are high, opportunities exist for reducing unit costs of food to consumers without reducing producer incomes.

Governments should allocate the resources necessary to develop and maintain infrastructure, especially in rural areas. They should also help revitalize local governments in rural areas and create institutions to help them develop and coordinate new infrastructure. To improve efficiency, governments should recover costs through user fees, select projects based on careful evaluation of potential demand for services, and involve private contractors in executing projects.

As international trade becomes more open and more countries join regional economic arrangements, countries that do not reduce high transactions costs, will fail to be competitive in both domestic and foreign markets. Efficient and competitive markets for agricultural goods are also important for supporting developing countries' efforts to expand employment and export earnings by producing and processing high-value products. Expanded agroprocessing can be an important source of additional rural and urban employment. While agroprocessing itself should be undertaken by the private sector, governments should facilitate the expansion. Finally, effective seed multiplication and distribution systems, critical for disseminating improved seeds for agricultural research, are absent in many developing countries. While the multiplication and distribution activities may be undertaken by either the public or the private sector, the government should assure a conducive environment for the private sector to enter these activities and should develop and enforce regulations to assure quality control, competition, and access to improved seeds by small farmers.

### **Expand and improve international cooperation and assistance**

The 2020 Vision will be achieved only if individuals, households, communities, civil society, and local and national governments undertake the required actions. International development assistance can provide only a fraction of the financial resources that will be needed to achieve the 2020 Vision. But these resources are crucial and must be allocated in ways that complement national and local efforts. Therefore, donors of international development assistance should focus their official government-to-government assistance on countries whose governments have demonstrated commitment to eradicating poverty, food insecurity, and malnutrition; to support an efficient, effective, and low-cost agricultural sector; and to protecting the natural resource base from degradation—goals embodied in the 2020 Vision. The amount of international development assistance required to support the actions described here will exceed the development assistance currently available. Therefore, both donor and recipient countries must renew their efforts to assure that available international assistance is put to the best possible use. International development assistance should focus on four areas:



(1) activities with large international benefits, such as international agricultural research and alleviation of global environmental problems; (2) investments in public goods with high social payoffs and long-term benefits for broad-based economic growth and poverty alleviation, such as primary education, primary health care, nutrition programs, agricultural research, sustainable use of natural resources, and physical and institutional infrastructure; (3) programs to foster more efficient and effective use and allocation of resources shared by more than one country, such as allocation of water from a given river basin among countries bordering the basin; and (4) efforts to assure that low-income developing countries realize their fair share of the benefits from international trade liberalization.

The current downward trend in international assistance from the OECD countries must be reversed, and industrial countries currently giving below the agreed-upon target of 0.7 percent of their GNP should rapidly move toward that target. It is in the self-interest of donors to provide development assistance, not only to address important humanitarian considerations in developing countries, but also to enhance employment and trading opportunities in the donor countries. Developing countries are the largest potential market in the world, but that potential must be developed. The faster these countries grow, the more they import. By helping them to grow, development assistance creates export markets and economic growth for donor countries.

International assistance must be realigned to low-income developing countries, primarily in Sub-Saharan Africa and South Asia where the potential for further deterioration of food security and degradation of natural resources is greatest. In higher-income developing countries, concessional aid such as grants should be replaced by internationally available commercial capital, freeing resources for low-income countries.

As the GATT agreements are implemented and distortions in the agricultural sectors of developed countries are reduced, the amount of food aid available for developing countries is likely to fall. Yet, the need for food aid, both for meeting humanitarian emergencies and for chronic food insecurity, is unlikely to be diminished. The international community will thus need to reassess how gaps between countries' food needs and their economic ability to meet these needs are to be filled.

International emergency assistance has increased dramatically during recent years at the expense of development assistance. Future emergency assistance should be linked with development assistance to help prevent such emergencies and to enhance the ability of households to withstand such emergencies.

Measures to diversify sources of external financing should be pursued, together with measures to stem capital flight. To improve effectiveness of aid, each recipient country should develop a coherent, detailed, and operationally useful strategy for achieving the goals underlying the 2020 Vision, identifying the most appropriate use of international assistance. Where such a strategy already exists, it should be reviewed periodically. The role of international assistance should be clearly specified.

## 5. CONCLUSION

The 2020 Vision of a world free from hunger and malnutrition is achievable, but to achieve it will require sustained commitment on the part of developing country governments and the

international community. It will also require much learning; learning from the past and learning from the diverse set of circumstances existing across the developing world today. While no simple blueprint exists that will be successful in all places, much can be learned and adapted from the experiences of successful development that are occurring everywhere in the world. I hope that IFPRI's work will contribute to that process of learning, and to making the 2020 Vision a reality.

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**TECHNOLOGICAL INNOVATIONS' CONTRIBUTIONS  
TO  
INCREASED PRODUCTIVITY  
AND AN  
IMPROVED SITUATION FOR THE POOR**



Discussion Paper #D-2/1997

# **Environmental Problems and Agricultural Development in the Least Developed Countries<sup>1</sup>**

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## **Abstract**

This paper gives an overview of major environmental problems and the relationship between agriculture and environmental degradation in the Least Developed Countries<sup>3</sup> (LDCs) with special emphasis on the African LDCs. The most severe environmental problems in LDCs are linked to the agricultural sector which is the backbone of most of these economies. The links between the economy and the environment typically go through the production systems of economic agents most of whom live in rural areas in what may be called biomass-based subsistence economies. The main forms of environmental degradation are identified, differences between agroecological zones are outlined, and the consequences for agricultural and rural development discussed. The principal causes of degradation are identified with emphasis on the links with existing agricultural techniques. The consequences of area expansion of agricultural production, the sustainability of current agricultural practices, and the significance of population pressure as a cause, are discussed. The policy implications and need for major policy measures is assessed. Alternative policy measures are presented, before the role of the international community in assisting LDCs in alleviating environmental degradation is briefly discussed. It is concluded that major policy efforts are required and that assistance from the international community is necessary to overcome the problems.

Key words: Least Developed Countries, environmental degradation, agricultural development, environmental policy.

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<sup>1</sup>Paper written for the United Nations Conference on Trade and Development (UNCTAD).

<sup>2</sup>Thanks are due to Martin Brownbridge, Eirik Romstad, Prem Sankhayan and Bekele Shiferaw for valuable comments on an earlier version of this paper.

<sup>3</sup>The Least Developed Countries refer to 48 countries identified by the United Nations to be the least developed in the world. Thirtytwo of these are found in Africa.

# 1. Introduction

The most severe environmental problems in most of the Least Developed Countries (LDCs) are linked to the agricultural sector which is the backbone of these economies. These links between the economy and the environment typically go through the production systems of economic agents most of whom live in rural areas in what may be called **biomass-based subsistence economies** (Dasgupta 1993). Close to 80% of the population in LDCs live in rural areas where agriculture represent the backbone of the economy. Farm households represent the dominant type of decision-making units in these rural economies. The behavioural response of farm households has to be considered when designing policies directed at rural development, increased food production or reducing environmental problems, such as land degradation and deforestation. By putting households in the centre for policy analysis as key decision-making units one is able to achieve a focus on **incentive structures**. Why are farm households carrying out activities which cause environmental degradation? How can policy makers create incentives for farm households to behave the way they want them to do, or in other words, how can negative environmental externalities be internalized?

Although rural households represent key decision making units in relation to the most severe environmental problems in LDCs, group responses at more aggregate levels (e.g. at village, watershed, chiefdom, etc.), should of course not be neglected. Collective action at various levels is often necessary to tackle various forms of environmental degradation. Its potential importance will vary with agroecological, cultural, economic and other institutional conditions.

A large majority of the poor in LDCs live in rural areas. They spend 60-80% of their income on food. The Brundtland report (WCED 1987) placed the focus on the links between poverty and environmental degradation. Economic growth and poverty reduction were seen as important ways of reducing the problems of environmental degradation. The widespread occurrence of policy failures in many LDCs received a lot of attention in the 1980s and was considered a key growth inhibiting factor in their economies. The debt crisis lead to a policy shift aiming to increase economic growth by reducing the role of the state and leaving more room for markets to operate undisturbed. The International Monetary Fund and The World Bank came in a central position through their provision of Stabilization and Structural Adjustment loans to the majority of LDCs. The World Bank emphasized that there were a lot of **win-win** options in the Stabilization and Structural Adjustment Policies. However, it was realized that these policies were not sufficient alone to ensure environmental quality (World Bank 1992). Emphasis was also given to the need for strong public institutions and policies for environmental protection.

Many of the LDCs have prepared National Environmental Action Plans or Environmental Conservation Strategy documents that have contributed to increased environmental awareness in these countries. Environmental Investment Programmes are being implemented and attempts to integrate environmental concerns and policy elements in sectoral policies are being made.

The Global Environmental Facility (GEF) was established after the Rio conference in order to enable countries to integrate global environmental concerns into their national development goals. The GEF work is coordinated by The World Bank, the United Nations Development Programme (UNDP), and the United Nations Environment Programme (UNEP). So far GEF funds have reached only a few of the LDCs and have been primarily directed at biodiversity conservation of threatened species and particularly unique ecosystems, and reduction of greenhouse gas emissions. These projects may be directly or indirectly linked to the agricultural sector but their impact has so far been limited.

Strong economic growth has not materialized in the majority of LDCs by the mid 1990s as annual real GDP growth rates per capita were negative (-1.7%) for the LDCs as a whole during the period 1990-94 (UNCTAD 1996). The annual growth in agricultural production per capita showed a similar trend (-0.9%). The share of agriculture in GDP has increased from 39 to 46% from 1980 to 1994 (ibid.). There is a differentiation among the LDCs, however. A small group of 10-12 countries has

achieved impressive growth rates and made significant progress in raising living standards. A much larger group of the LDCs (21 countries) has been classified as "Low-growth LDCs". Among these, 17 countries are in sub-Saharan Africa. The third group has been severely affected by civil strife and war and consists of about 15 countries. Destruction of infrastructure and forced migration have caused collapse or major setbacks in the agricultural production in these countries. In 1995 and 1996, there seems to be signs of economic recovery in the second and third groups. Average growth rates have increased in African LDCs as well. Good rains in eastern and southern Africa in 1995/96 resulted in increases in agricultural production with significant positive impacts on GDP figures. However, this created downward pressures on agricultural prices which in turn affected recovery rates for agricultural credit programmes which were in disarray in several countries. Price instability in food crop markets represents a major challenge under the new policy regime.

This paper focuses on the major environmental problems which are of relevance to agriculture and rural development in the LDCs. These problems essentially get manifested as land degradation, like desertification, deforestation, soil erosion, nutrient depletion, acidification, salination, etc. Industrial pollution and urban environmental problems are therefore not included. More specifically the paper aims at:

- (i) Providing an overview of the extent of environmental degradation in LDCs:
  - the main forms of degradation
  - differences between agroecological zones
  - consequences of environmental degradation for agricultural and rural development
- (ii) Identifying the principal causes of environmental degradation:
  - the links to existing agricultural techniques and practices
  - the consequences of area expansion of agricultural production
  - the sustainability of current agricultural practices
  - the significance of population pressure as a cause
- (iii) Identifying the policy implications of the environmental problems in rural areas in LDCs
  - are major policy measures warranted?
  - alternative policy measures to tackle the environmental problems
  - the role of the international community in assisting LDCs to alleviate environmental degradation.

In part two of the paper a theoretical basis for the analysis is provided. Part three deals with point (i) above while part four addresses point (ii) above and in part five point (iii) is covered.

## 2. Theoretical and Conceptual Basis

The theoretical basis for this paper is from the disciplines of environmental economics and development economics. An effort is made to integrate concepts, theories and principles from these two subdisciplines of economics. This is by no means an easy and straight forward task as it involves using of theories and concepts developed for the analysis of a first best world while rural economies in LDCs are characterized by high transaction costs and imperfect information. These transaction costs and information problems are to a large extent pervasive and cause market imperfections which may not represent **market failures** if we define the latter as situations with inefficiencies. Inefficiencies are only present when the introduction of a policy measure improves the overall efficiency when the costs of introducing the policy measure are included. There may thus be situations where the correction of a market imperfection, such as a missing labour market in a remote rural



economy, should not be attempted by the creation of such a market. Likewise, it may not necessarily be advisable to intervene in credit markets in rural economies although most of the population are rationed out of the market and interest rates are very high. Typically, interlinkages of markets, like in share tenancy, where labour and land markets are interlinked, may not represent inefficiencies but rather efficient solutions in an economy with high transaction costs, asymmetric information and exposure to risk. In this type of economy, efficiency and equity issues become nonseparable. The initial distribution of resources matters for efficiency and sustainability, and redistribution of resources may be warranted on efficiency grounds although this has to be carefully judged in each case. For example, the social and political costs in relation to redistribution of land rights may be very high and unpredictable (Heath and Binswanger 1996).

The Economics of Rural Organization (ERO) (Hoff *et al.* 1993) may be seen as a specialized branch of the New Development Economics (Stiglitz 1986) which itself is a specialization within the New Institutional Economics (NIE). ERO addresses fundamental issues of institutional organization, efficiency, distribution, and the role of the government in rural economies in developing countries. However, as it is a fairly young research programme and has focused more on efficiency than sustainability, it is not well developed yet for the analysis of environmental conservation. Still, it has provided important insights which could be combined with insights from environmental economics in the process of analysis and design of efficient policies to combat environmental problems in rural economies in LDCs. The challenge is to develop efficient policies for economies constrained by high transaction costs and imperfect information. In these economies, markets may be missing, seasonal (partly missing), selectively missing (rationing), interlinked (e.g. share tenancy), or thin (imperfect competition). These phenomena are common in relation to markets for land, labour, credit, risk/insurance, and food. Asymmetric information leads to problems with adverse selection and moral hazard, which may be forms of pervasive externalities. These economies may be seen as **constrained Pareto-inefficient** and it may almost always be possible to intervene to improve efficiency (Greenwald and Stiglitz 1986).

The environmental economics perspective applied here uses a wide definition of **externality** related to agricultural production. The externality is a nonmarketed output which may have a positive or negative effect. Environmental degradation not accounted for in the market represents a negative externality. Externalities in form of environmental degradation caused by agricultural production in LDCs are often associated with production over large areas and are thus essentially "nonpoint source" in their characteristic. If the private discount rate is higher than the social discount rate, and if this causes farmers to deplete their land resource, this is also regarded as an externality as it will have a negative effect on the utility of future generations.

In a world without transaction costs there would be no externalities (Coase 1960) and distribution would not matter for efficiency. In the real world, however, the institutional structure, and the structure of transaction costs and information influence the extent to which there are externalities that could be **internalized**. Because the external effects may be many, complex, dynamic, include human health and lives, have specific distributive characteristics, and are not valued in markets, the estimation of their social values are by no means trivial. Regulation may require fundamental changes in institutional structures, e.g. in property rights regimes and thus making the institutional framework an endogenous part of the analysis. Identification of the optimal - transaction cost and externality cost minimizing - institutional framework, which maximizes a combined efficiency and distributive policy objective - represents the vision of optimality.

The selection of the best policy in a second or third best world, which includes the *laissez faire* option, requires careful analysis and understanding of the key features of the externality problem. Externalities are **Pareto-relevant** only when their internalization improves efficiency. The sum of the

benefits and costs of internalization must then be positive. Additional arguments for internalization or corrective measures could be made on distributive grounds, e.g. if a *laissez faire* policy has intolerable consequences for poor groups in the society or cause irreversible losses of biodiversity.

### 3. Environmental Degradation in LDCs: An Overview

#### 3.1. The main forms of environmental degradation

The most severe environmental problems in LDCs are found in rural areas where most of the people live. Land degradation, which involves both vegetation and soil degradation, represents the most severe problem. Loss of vegetation includes deforestation, overgrazing and loss of biodiversity. These may again have impact on soil degradation which includes water erosion, wind erosion, physical degradation, and chemical degradation. Water erosion causes loss of productive soil and terrain deformation. Wind erosion may cause loss of topsoil and terrain deformation as well. Physical deterioration includes compaction, surface sealing and crusting and is related to loss of soil organic matter. Chemical deterioration includes loss of nutrients, salination, acidification and pollution. The relative importance of these varies from location to location depending on agroclimatic conditions, population pressure, economic, and institutional factors.

##### (i) Degradation of vegetation

Deforestation in LDCs has received global attention because of its impacts on CO<sub>2</sub>-levels in the atmosphere and loss of biodiversity, particularly in rain forests, where there may be many useful medicinal plants etc. of global interest. Deforestation has therefore attained the status as a global environmental externality. At the local level deforestation in LDCs may not be seen as an externality problem to the same extent but rather as a necessary part of the development process to convert lands to more intensive and profitable use. As large areas of primary as well as secondary forest have been cleared, the concerns about the consequences have also increased in LDCs. Estimated deforestation rates in the various countries are more or less uncertain, however. For example in Zaire, which contains the largest share of primary tropical rain forest among the LDCs, World Resources Institute (WRI 1990) estimated the deforestation rate at 0.2% while WRI (1994) estimated the rate at 0.6% for the 1980s (for Brazil there was a reduction from 1.8% to 0.6% for the same two sources). Problems with definition, lack of empirical studies, and problems of interpreting satellite images explain some of this uncertainty. Recent studies have shown that deforestation rates in Zaire have been overstated due to misinterpretation of satellite images (New Scientist 1996). Most of the clearing is here clearing of secondary forests which have been cleared before. Deforestation rates may in many cases have been overestimated because temporary clearing of forest, e.g. for shifting cultivation, has been included even when shifting cultivation was practiced as a sustainable land use system (Angelsen 1995). Recent studies have shown that Mozambique has four times and Nigeria two times as much timber as was earlier estimated by FAO (New Scientist 1994). Previous estimates were made by foresters who considered tree trunks only and therefore ignored the wood in branches and roots. They also ignored trees on farms. These trees were also invisible on satellite images and may constitute as much as one third of total wood biomass in Kenya and Uganda.

If deforestation were defined as reduction in wood biomass rather than (temporary and permanent) clearing of trees, better estimates would emerge. It would, however, require more empirical studies and modeling of regeneration processes.

Although the problem of deforestation has been overstated in many cases, there is still no doubt that it is a serious environmental problem at the local level in many places. Shortage of fuelwood and

building materials are severe in many densely populated areas, like in the highlands of Ethiopia where animal manure is increasingly used for fuel, which again has an indirect negative effect on soil fertility. Deforestation may also lead to serious erosion on steep slopes and cause floods and drying up of streams and siltation problems in the lowlands.

Grazing lands or rangelands cover large areas of arid, semiarid and drier parts of the subhumid zones. Overgrazing was until recently thought to be a major cause of desertification<sup>1</sup>. Recent studies of the vegetation in arid and semiarid areas have revealed, however, that the grass vegetation is much more resilient than earlier thought (Leeuw and Reid 1995). The biomass production by grasses is largely determined by rainfall and the impact from livestock is now believed to be much less severe. This may lead to re-classification of 8-9 million km<sup>2</sup> of African rangelands from moderate and severely degraded<sup>2</sup> to none or slightly degraded (ibid.). Oldeman (1993) also classify less than 5 million km<sup>2</sup> as degraded and of these 3.2 million km<sup>2</sup> as moderately or severely degraded. Does this imply that much of the desertification ghost has vanished? Whether animals remove nutrients from the grazing lands depends on what happens with the manure. If the manure is used on cropping land or for fuel, grazing lands will be exposed to more serious nutrient mining, particularly if stocking rates are so high that a large biomass is removed. Too high stocking rates will have a negative effect on biomass production and removal.

Fires cause a much larger loss (78% of total estimated loss in Africa) of grass as well as woody biomass than removal by livestock and humans for fuel etc (ibid.). Savanna fires cause the largest emission of CO<sub>2</sub>. A large share of these fires are due to human activities like shifting cultivation and hunting.

Loss of biodiversity is considered a serious problem in many of the LDCs. Madagascar and Zaire are two out of seven countries in the world referred to for their unique ecological richness as "megadiversity" countries. This biodiversity is most seriously threatened in Madagascar due to rapid deforestation. Genetic erosion is also occurring in cultivated lands as indigenous varieties are replaced by improved varieties which often have a much more narrow genetic basis.

## (ii) Soil degradation

Soil capital depletion is now appearing as the most serious environmental problem in many LDCs. It threatens both agriculture and the environment (Pimentel 1993). Erosion reduces crop productivity by reducing the availability of nutrients, water, soil organic matter, and the rooting depth as soils become shallow. Soil degradation is particularly a problem in densely populated rural economies. Stoorvogel and Smaling (1990) estimated nutrient depletion in 38 sub-Saharan countries of which 26 belong to the LDCs. Almost all countries had negative nutrient balances (net losses of nitrogen, phosphorus, and potassium). Burundi, Ethiopia, Lesotho, Malawi, and Rwanda were classified as having very high nutrient depletion rates while Madagascar, Mozambique, Somalia, Tanzania, and Uganda had high rates. The rates were considered to be low in Angola, Central African Republic, Chad, Guinea, Mali, Mauretania, and Zambia.

The literature is split with respect to the seriousness of land degradation or desertification in arid and semiarid areas of LDCs as well as of its causes. As already mentioned, recent research indicates that the negative effects of overgrazing seem to have been overstated as the grass vegetation is more resilient than earlier thought. Nutrient depletion, however, now appears more serious in the Sahelo-Sudanian zone in Africa (Penning de Vries and Djitéye 1982, Breman and de Ridder 1991, Lal 1993, Kessler 1994). A recent study indicate that about 90% of African soils are deficient in phosphorus, a key nutrient in the production of biomass (World Bank 1994).

The on-site effects of soil degradation in LDCs are usually the most serious but there are cases where erosion has serious downstream effects and contributes to water resource degradation, siltation of

dams, lakes, etc. Sedimentation and more irregular water flows may also reduce agricultural productivity in the lowlands. Pollution problems are less common as fertilizer and pesticide uses are low or moderate in most LDCs.

Salination is usually related to irrigation projects in dry areas while soil acidification is more common in humid and sub-humid forest and savanna zones. Fertilizer use in relation to agricultural activities has frequently contributed to soil acidification.

### (iii) Water resource degradation

Water resource degradation is considered to be more severe in densely populated areas and regions with water scarcity. Pollution and salination are forms of this problem. Water pollution is common in urban areas and even more so in densely populated rural areas. Poor and worsening sanitary conditions cause scarcity or lack of clean water. In combination with scarcity of fuelwood for boiling of water, water contamination affects the health, working power and welfare of rural people and contributes to the vicious spiral of poverty and environmental degradation. Increasing demands for water may also affect the water table.

## **3.2. Degradation in relation to agroecological variation**

Agroecological variation has already been mentioned in relation to the various forms of land degradation and the controversies in relation to the severity of these. We will here go into some more detail in relation to the importance of agroecological variation. We will specifically look at the relative seriousness of environmental problems in (i) arid and semiarid areas, (ii) subhumid savanna areas, (iii) highland areas, and (iv) humid lowlands (forest zone). The concept "fragile lands" is used broadly to refer to those lands which are prone to rapid degradation upon disturbance of vegetative cover. Two categories of fragile land may be distinguished. The first type can sustain intensive cultivation if proper conservation measures are used, the second type will degrade even when conservation measures are used (Scherr et al. 1996).

### (i) Arid and semiarid areas

The land in these areas is generally very fragile and unfavourable for development (World Bank 1996). Wind erosion is more serious in these areas and the potential rates may range from 10 to 200 t/ha/year<sup>2</sup> in Sahel where soil crusting and compaction are also severe (Lal 1993). In the sub-Saharan region the combination of wind and water erosion contribute to rates ranging from 10 to 50 t/ha/year (ibid.). Overgrazing cause an increase in wind erosion. Water is the most limiting factor in the most arid areas but in semiarid areas with 600-800 mm rainfall nitrogen is often a more important factor limiting crop production. Yield decline is an increasing problem in areas with intensive cultivation as the carrying capacity of the land is exceeded in many places with the type of agricultural technologies used (Pieri 1995, cited in World Bank 1996). The soil degradation has increased the risk of drought.

Among the LDCs, arid and semi-arid regions in Africa (Sudano-Saharan Belt) constitute around 40% of the total land area and contain about 13% of the total population. Less than 20% of the land is suitable for cultivation and forest (woody savanna accounts for less than 10% of the area. The demographic pressure is very high and increasing rapidly, especially in the river valleys and wetland areas like the Niger Delta and around Lake Chad. A serious fuelwood shortage is also expected (ibid.).

## (ii) Subhumid savanna areas

Water erosion is most important, causing a soil loss of 10 to 200 t/ha/year depending on vegetative cover and slope (Lal 1993). Deforestation is an increasing problem in many places as shifting cultivation continues when the carrying capacity for this land use system has been exceeded due to population growth and concentration. This is particularly the case in northern Zambia and northern Malawi. Permanent cultivation of maize has been common and has led to further acidification of acid soils due to intensive use of fertilizers. Some of these lands may have been put out of production for a long time because of this.

## (iii) Highland areas

Highland areas in African LDCs are found in Ethiopia, Madagascar, Uganda, Tanzania, Rwanda, and Burundi. They are generally quite fertile and carry high population densities but are also fragile lands (Scherr *et al.* 1996). The Ethiopian highlands which constitute 50% of the East African highlands, contain 88% of the Ethiopian population. This area is only 2.5% of the total area of LDCs but it contains a population which is close to 10% of that of all LDCs. Erosion, nutrient depletion, overgrazing, deforestation, and water resource degradation are all of severe character here. Large parts of the Ethiopian highlands are classified as severely eroded. Similar problems are found in the highlands of Tanzania, Uganda, Madagascar, Rwanda, and Burundi as well.

## (iv) Humid lowland areas

With removal of forest vegetation erosion becomes a serious problem when annual crops are grown. Erosion rates may go up to 100-200 t/ha/year. With perennial (tree) crops erosion rates are much lower. Shifting cultivation and shortening of fallow periods may cause deforestation and loss of biodiversity. The largest share of primary tropical forest in LDCs is found in the Congo Basin. The rate of deforestation here may not be as high as earlier thought. The pressure on these areas is likely to increase, however, with increasing population pressure in surrounding areas. The population carrying capacity is large compared to current population size. Environmental problems are increasing in some of the coastal areas where population densities are high and growing very fast. Agricultural activities also contribute to pollution and depletion of coastal resources. The coastal areas of Benin and Togo are already badly affected (World Bank 1996).

Overall we may conclude that the East African highlands and the arid and semiarid areas are facing the most severe environmental problems among the African LDCs. Agricultural activities are at the core of these problems where soil degradation is the most severe problem requiring combative action if sustainable livelihoods are to be reestablished. To illustrate this, estimates of relative importance from Malawi and Madagascar can serve as an example: Net Present Value (at 10% discount rate) of the annual irreversible loss of soil productivity due to erosion was estimated to represent 8.1% of GDP (excluding off-site effects), social costs of deforestation were estimated at 2.7% of GDP, and total annual social costs of water resource degradation was estimated at 0.7% of GDP (Department of Research and Environmental Affairs 1994). In the NEAP for Madagascar costs of annual land degradation were estimated to be in the range of 5 to 15% of GDP. Land degradation then consisted of pasture degradation (3%), hillside degradation (7%), deforestation due to shifting cultivation (81%), and off-site damage (9-10%) (Larson 1994). Such estimates are crude and uncertain, however.

### 3.3. Consequences for agricultural and rural development

As the majority of the population in LDCs live in rural areas and subsist on the natural resource base which is degrading at an alarming rate in many areas, severe poverty is a consequence. Agricultural production may stagnate or even decline in some of the most affected areas. The marginal return to labour is declining over time with stagnant technology and falling land productivity. This has been compensated for by increasing labour input and expanding the area under crops, shortening of fallow periods, etc. An agricultural involution (Geertz 1963) may be the outcome unless sustainable ways of intensification are found. Traditional agriculture with minimal levels of purchased inputs is dominating. Backward linkages to the rest of the economy are therefore weak. Increasing subsistence demands and falling productivity also threatens to reduce the forward linkages in areas where population densities are close to or above the carrying capacity of the land. Particularly in dry areas and in some of the highlands with severe population pressure the share of rural households which are net buyers of food, is increasing. This leads to increasing food insecurity as the buffer against crisis is reduced. On average for all LDCs food production per capita has declined at rates of -0.5% and -0.7% for the periods 1980-1990 and 1990-94. In other words, the population growth is outstripping the growth in food production (UNCTAD 1996).

Environmental degradation increases the probability of drought. Droughts have had severe effects in Sahel, Ethiopia and Southern Africa, and there is a fear of climatic change (World Bank 1996). Droughts have caused human disaster and forced migration of permanent or temporary character in all these areas. Environmental refugees, persons who have been forced to abandon their homes as a result of human-induced environmental problems, are estimated at 10 millions (Pinstrup-Andersen and Pandya-Lorch 1994). These refugees may induce conflicts and new environmental problems in the areas they move to. In some cases resettlement is taking place within national borders. In other cases, national borders are crossed and that may possibly contribute to international conflicts.

Stagnation and increasing poverty lead to increasing pressures on the scarce environmental resources. The short planning horizons or high rates of time preference of the land users may induce more rapid resource degradation and reduce conservation investments further (Holden *et al.* 1996, Shiferaw and Holden 1996).

Cases of neo-Malthusian poverty-environment traps<sup>4</sup> are widespread in rural areas of LDCs. Yet, there may be rural societies with similar characteristics except that these do not show the same development path of environmental degradation but follow the Boserupian path of intensification and improved living standards<sup>5</sup>. Other communities have undergone stages of degradation but have then at a later stage switched to a positive development path. There is therefore still hope for the degrading areas in LDCs. They may, however, need assistance from the outside to switch to sustainable paths. In order to identify the best approach for this, a thorough analysis of the causes of the environmental degradation is needed. The solution to the problems may lie in attacking the key causes of the problems.

## 4. Principal Causes of Environmental Degradation

The causes of environmental degradation may be structured in several ways. One may also distinguish between 'proximate' and 'principal' causes. Proximate causes of land degradation may include factors like shortening of fallow periods, removal of crop residues, lack of erosion control, etc., while the principal causes could be (i) policy failures, (ii) market failures, (iii) social and political instability, and (iv) population pressure, or in most cases a mixture of these. Policy failures and market failures could also be combined as institutional failures (Papandreou 1994, Dasgupta and Mäler 1994). These four

principal causes are elaborated below followed by a discussion of the links to the agricultural sector and a more thorough discussion of the population issue.

#### (i) Policy failures

Policy failures relate to national and international policies which have caused or exaggerated the environmental problems in LDCs. These policy failures lead to wrong pricing of the environment and consequently negative environmental externalities which have been growing with growing scarcity of natural resources. The policy failures include price distortions through government controlled prices, subsidies or taxes which give wrong price signals, misspecification of property rights regimes and other legal structures, government projects which directly cause environmental damages, and weak public institutions. Some examples include; severe taxation of the agricultural sector and underpricing of agricultural outputs which have led to stagnation of growth and resource depletion, state appropriation of property rights which has undermined traditional (often communal) property regimes and has in many cases led to *de facto* open access and resource degradation. This form of undermining or elimination of local common property regimes has taken place in many LDCs (e.g. Ethiopia, Mauritania, Tanzania, Zaire, and Zambia). Urban bias in form of implicit and explicit taxation of the rural population has crippled agricultural growth and led to severe rural poverty and environmental degradation. Disproportionately low investments in rural infrastructure, health services, water supply and sanitation, education, agricultural research and extension, rural credit, and local institutional development, are results of this bias. International organizations also need to take some of the blame for this.

The borderline between this category and market failures is blurred, however. Market failures may be seen as one form of institutional failures to which policy failures also belong. In a world with transaction costs and imperfect information, it may be hard to know how much of the blame should be put on policy makers. Hindsight (new information) often makes them scapegoats for past policy failures. It is a clear policy failure when the information was clearly available but ignored. (Still, in a second best world, the optimal mixture and sequencing of policies is far from obvious).

#### (ii) Market failures

Market failures imply inefficiencies related to market institutions. All market imperfections do not represent market failures as some market imperfections may be optimal from an efficiency point of view. In rural economies with high transaction costs and imperfect information, like e.g. in pastoral economies, nonmarket institutions may represent more efficient substitutes as compared to their market alternatives (McIntire 1993). Frequently mentioned subcategories of market failures include (Pareto-relevant) externalities, property regime failures, nonconvexities, imperfect competition and other Pareto-relevant failures in risk, credit and future markets. The concepts of exclusiveness and rivalry have been introduced to try to sort out some of the confusion related to the concept of public good/bad.

Market failures may lead to underpricing of the environment. If property rights to land are not fully specified, the land user may not account for the whole social user cost of land. This may be due to land tenure insecurity or missing credit markets combined with poverty causing private discount rates to be (much) higher than social discount rates. Externalities may cause environmental resources to be underpriced or even to be considered as free in situations of open access. The full cost of deforestation or soil degradation is not taken into account by the land user and open access in pasture land may cause overgrazing because of free rider problems. Off-site externalities are not taken into consideration by the land user in cases when those being exposed to the problem have no property rights or influence and negotiation costs are prohibitive. Markets in rural economies are often thin and the land users exposed to monopsonists who pay very low prices which again may cause

underinvestment in conservation.

### (iii) Social and political instability

Social and political instability may be an outcome as well as a cause of poverty and environmental degradation as the social capital also may be depleted during periods of economic decline. Deterioration of the social capital has many faces. Social and political instability usually have historic roots which cannot be ignored. Conflicts between classes, ethnic groups, political movements, or nation states may end in wars which disrupt public life for long periods. Social insecurity and forced migration are often outcomes which may lead to serious environmental degradation in and around refugee camps and in new settlement areas. During the civil war in Mozambique the rural population was forced to move to the coast or into neighbouring countries. This led to severe pressures on coastal resources and border areas in Malawi.

Destruction of manmade capital and disruption of production have severe effects on living standards and household security. Mozambique and Ethiopia are rich in resources but among the poorest of the LDCs due to their history. Taxation of the agricultural sector may also have been an important way of financing some wars, e.g. in Ethiopia.

Investment decisions in agriculture may be severely affected by social and political instability. Local institutions may erode, crime and theft may become more serious problems. Theft of agricultural output is an increasing problem e.g. in Zambia and Madagascar, particularly in periurban areas. Social insecurity and poverty may therefore reinforce each other.

### (iv) Population pressure

Rapid population growth and high population density in stagnant poor economies lead to increasing poverty and resource scarcity. Increasing poverty in turn may lead to increasing population growth. Children may serve as income earning assets which provide security at old age (Dasgupta and Mäler 1994). Religious and cultural norms as well as lack of education, particularly among women, contribute to the difficulties of family planning.

Population pressure leads to increased pressure both on the extensive and intensive margins as both labour supply and demand increases. If sustainable intensification for some reason is not taking place, environmental degradation will be the outcome. In some of the most densely populated areas, e.g. in Ethiopia, Uganda, or Madagascar, fragmentation of land holdings has gone very far while technology has remained constant.

## **4.1. The links to existing agricultural techniques and practices**

### (i) Intensification

Intensification may be a result of push as well as pull factors. Market driven demand pulls may come through export lead growth. Population growth both increases demand for food and income and increases supply of labour. Land becomes relatively more scarce and there is a substitution from land to labour which usually has been associated with decreasing marginal returns to labour. Improved market access, new technologies, and better terms of trade may, however, make intensive land use more profitable than extensive land use and lead to voluntary intensification. This may be the outcome of good policies. The substitution from land to labour may also have negative long-term productivity consequences. These effects may be masked by introduction of improved seeds, use of fertilizers, and only become evident under stagnant technology. Maize production in Malawi is a



typical case.

## (ii) Low vs high external input use

Under-investment in public goods like agricultural technologies may cause non-availability of appropriate technologies for intensification. In other cases, use of subsidies and "technology packages", research, extension and provision of credit, have stimulated high input use for a few commodities, like maize, wheat and rice. Too often these policies fail to provide good solutions for poor farmers on marginal lands in the LDCs. Non-adoption of these Green Revolution technologies was thus the result in most African LDCs. Farming systems in large parts of the LDCs are therefore typically of the low external input type.

There has been a controversy over whether a low or high external input strategy should be preferred. On one side it has been claimed to be necessary to use higher levels of external inputs to facilitate intensification and reduce the pressure on marginal lands (Reardon 1989). On the other side it is claimed that a low input strategy, building on indigenous technologies and knowledge may both be environmentally preferable and socio-economically more realistic in remote marginal areas (Kesseba 1989, Holden 1991). The high external input strategy involving subsidies may also crowd out biological conservation technologies, mixed cropping and intercropping (Repetto 1987). However, there may be complementary effects of e.g. combining high yielding varieties, fertilizer and conservation technologies from biological-technical and environmental policy perspectives (Holden and Shanmugaratnam 1995).

The changes in price policies may facilitate higher levels of input use in high potential areas with good market access where intensification and use of higher levels of external inputs could be expected. Remote marginal areas may, on the other hand, become more isolated and locked out of national and international markets due to high transaction costs. Levels of external input use may thus decline or continue to be very low.

## (iii) Tradables vs nontradables

Past policies put restrictions on trade and distorted the exchange rates. This had negative effects on the export of agricultural commodities. Cash crops for export are frequently tree crops which often are more environmentally benign than nontradable agricultural commodities. Past policies may therefore indirectly have increased the pressure on the environment if they implied a higher level of unsustainable production of nontradables. The extent to which the export of tradables can be increased and thus their areas expanded to reduce environmental degradation is questionable, however, as world demand may not be very elastic and world prices may respond negatively if many LDCs go for the same strategy and these have a large share of the total production for export.

## (iv) Overuse of open access resources

Breakdown of common property regimes due to policy failures and social and political conflicts, in combination with rapid population growth, has caused increased pressure particularly on forest resources and grazing lands. Expansion of cropping areas and increased numbers of livestock are the main elements of this increase. These have input substitution and other production system consequences.

## (v) Poverty and investment

Policy failures and social and political instability have contributed to economic stagnation and decline in many LDCs with extreme poverty as a result, particularly in rural areas. Rapid population growth

has made this poverty even worse as the poor have not been fully able to compensate for the effects of population growth through intensification and extensification. Poverty in combination with credit constraints lead to low investment levels and sometimes overuse of scarce resources. Nonsustainable encroachment on marginal lands may thus be preferred and the only option as a short-term survival strategy for the poor. Poverty may also contribute to the breakdown of common property regimes and undermine the advantages of introduction of secure (private) property rights to land.

#### **4.2. The consequences of area expansion of agricultural production**

Lele and Stone (1989) documented an outward migration to marginal areas when land in high potential areas is no more accessible. They call this "regressive intensification" and describes it as soil mining activities. Deforestation, loss of biodiversity, encroachment into wildlife parks, reduction of grazing lands for livestock, soil erosion with on- and off-site effects, are the major consequences of area expansion of agricultural production. Expansion of cropping may take place into lands which are very fragile and incapable of sustaining production even with conservation efforts. This may be the case on steep slopes with shallow soil. Farming may last for only few years and rehabilitation costs may be prohibitive. Conservation or tree planting would in many cases have been better in these types of areas from the society's point of view.

Expansion of crop production into grazing lands may increase the competition between crops and livestock. In Ethiopia this pressure has made it increasingly difficult for land scarce farmers to maintain their livestock. It may create conflicts between agriculturalists and pastoralists and have severe consequences for the livestock movement and pasture management of nomads.

#### **4.3. The sustainability of current agricultural practices**

Current agricultural practices in many LDCs are not sustainable. The practices are in many places in transition from an extensive steady state to more intensive forms. The incentive structures are frequently such that it pays for the farmer to choose the most extensive techniques as long as they are available. Shifting cultivation may therefore be practiced long after the carrying capacity of the system has been exceeded because it gives higher returns to their most scarce resources (labour and cash) in the short run (Ruthenberg 1980, Holden 1991). Because intensification may be seen as climbing a hill as it usually requires more work per unit of output (Boserup 1965, Ruthenberg 1980, Pingali *et al.* 1987), this tendency of finding extensive systems practiced after their carrying capacities have been exceeded, is typical. This may in many cases only be a temporary phenomenon which continues as long as it increases short term returns to labour. People will then switch to more intensive techniques when that is necessary. These development paths or evolution of farming systems will vary with agroecological conditions. Typically this involves shortening of fallow periods and extension of cropping periods, possibly to annual cropping or multicropping without fallow if soil fertility is good and/or access to purchased inputs is good. These more intensive systems, which now are practiced many places due to increased population pressure, may or may not be sustainable. This will depend on agroecological conditions, the institutional structure, etc. The degree of market integration, choice of crops and cropping systems, use of conservation technologies, and use of purchased inputs and their effects on the farming system are important. It may be technically feasible to develop sustainable high external input systems for annual crops in the humid lowlands (rain forest areas) but these solutions have not proved to be economically viable in most places. Systems based on tree crops are more suitable and may represent sustainable alternatives under these conditions. There are also problems related to making high external input systems profitable in the savanna and semi-arid areas because of the poor market access in many places.

The removal of pan-territorial pricing systems and cuts in governments' spending on rural infrastructure have contributed to reduction in use of purchased inputs in some cases. In northern Zambia it has caused a considerable contraction in maize production and expansion of shifting cultivation leading to more rapid deforestation (Holden 1996). The maize production in these savanna areas was not practiced in a sustainable way, however, as it involved use of acidifying fertilizer on acid soils without the use of soil ameliorating inputs such as lime. Therefore, it really represented another form of shifting cultivation because new land was needed already after 4-5 years and the acidification which had taken place during cropping may to a large extent be seen as an irreversible form of environmental degradation because the use of lime is unprofitable. The removal of fertilizer and transport subsidies therefore lead to a switch from one form of environmental degradation (acidification) to another (deforestation). The deforestation problem may only be temporary, however, as more intensive forms of cultivation are known and practiced the area. Furthermore, the deforestation due to shifting cultivation does not lead to the same loss of resilience capacity as the acidification is causing. This environment (*Miombo* woodlands) is still able to absorb large population increases with the technologies which are locally available.

In semi-arid areas intensification also involves shortening of fallow periods and extension of cropping periods. Erosion and nutrient depletion are the key problems causing much of current practices to be unsustainable under conditions of poor market access and high population pressure. More intensive farming systems are not to the same extent available here, e.g. in form of tree crops, without large investments in irrigation. There is a need for rehabilitation of many of these dry degraded areas.

#### 4.4. The significance of population pressure as a cause

Whether population pressure is a principal cause or just a symptom of other failures is a debated issue (Cleaver and Schreiber 1994, Heath and Binswanger 1996) and relates to the contrasting hypotheses by Malthus (1798) and Boserup (1965). Environmental degradation and poverty in LDCs have created a new interest in the understanding of the conditions under which the Boserup-hypothesis of intensification and agricultural development holds as a response to population pressure (Scherr *et al.* 1996).

Population pressure must be used as a relative concept in relation to environmental degradation. What is a relatively high population density in one area may be a relatively low population density in another area with higher agroecological potential, better market access, more nonagricultural opportunities, stronger institutional capacity, more favourable policies, etc. The concept of population pressure should be related to the carrying capacity of the land resource and the latter should in turn be seen as a function of agroecological conditions as well as technology, market access, culture, nonagricultural opportunities, institutional structure, terms of trade, policy, etc. (Holden 1991). Frequently the carrying capacity concept has been used as a pure agroecological concept and then has its clear limitations and has been subject to criticism (Heath and Binswanger 1996). Applied in a careful way within a wider framework it may be of more use, however (Arrow *et al.* 1996). Attempts at relating the actual population densities in many LDCs and estimated population carrying capacities based on known technologies (FAO 1980, Higgins *et al.* 1982, Harrison 1990) have indicated that international migration or industrialization will be necessary in some countries (Burundi, Ethiopia, Lesotho, Mauritania, Niger, Rwanda, Somalia, Uganda) while internal migration may solve the imbalance in other countries (Burkina Faso, Chad, Madagascar, Mali, Tanzania). Another view could be that trade and reduction of the food self-sufficiency requirement, or a solution to the poverty or purchasing power problem in the deficit producing areas, would be required.

Grepperud (1994) found high degree of soil degradation in areas where the population density significantly exceeded the carrying capacity in the Ethiopian highlands. This study at meso level is supported by study at micro level in one degraded area in the Ethiopian highlands (Shiferaw and Holden 1996). This study shows that the households with more extreme land shortage were more likely to remove conservation structures which had been introduced through food for work programmes. Independently estimated rates of time preference of the household heads were also found to have a significant impact on the probability of removal of conservation structures. Population pressure and poverty-induced high rates of time preference may thus work as a disincentive for conservation when further intensification is impossible.

Heath and Binswanger (1996) use the case study of Grepperud and compare it with the study by Tiffen *et al.* (1994) in Machakos in Kenya where sustainable intensification has taken place. They attribute the difference between the two to the difference in institutional frameworks and policies in the two countries. Heavy taxation of Ethiopian farmers, poor infrastructure, poor market access, poor off-farm employment opportunities, insecure property rights, villagization, forced migration and collectivization, were seen as the important explanations for the Malthusian scenario in Ethiopia.

Lele and Stone (1989) concluded, based on a study of six African countries (two LDCs), that contrary to the Boserupian hypothesis, autonomous intensification may not take place on the fragile lands in Africa with the current high rates of population growth. They emphasized the need for the state to enhance productivity in form of "policy-led intensification".

Forced migration may contribute to sudden or very rapid population increases in some area. Such changes may put extreme pressures on the adaptive capacity of local institutions. If migration results in mixing of ethnic groups with very different traditions with respect to land use and property regimes, it may cause a further breakdown of management regimes and lead to open access degradation. Forced migration due to the civil war in Mozambique has caused a concentration of people near towns along the coast and this has created a severe pressure on coastal resources. Under such conditions local institutions may need assistance from outside to cope with the problems. An endogenous evolution of institutions which are capable of tackling the new environmental problems cropping up, may only be possible when population growth is not too rapid and/or when there is a considerable human and social capital to draw on. This is not the case in most LDCs. Thus assistance may be needed for the development of better institutional structures and policies.

## 5. Policy Implications of Environmental Problems in Rural Areas

### 5.1. The need for specific environmental policy measures

It is now generally agreed that the environmental problems in many LDCs are of such a kind and severity that specific environmental policies are required in addition to general policies. Removal of policy failures may be beneficial for efficiency and the environment (**win-win** effects). If past policies also had adverse effects on poverty, their removal could even create **win-win-win** effects and contribute to the removal of poverty-environment traps (Heath and Binswanger 1996). These policies may not always be able to correct the underlying market failures which may still create severe problems. Particularly financial markets are malfunctioning and this may have adverse effects on investment in conservation. Typically in rural areas in LDCs markets are far from perfect. Information is scarce and costly, particularly for remote rural societies which may fail to link up to national markets. Environmental degradation is often severe in these types of areas. Policies which can deal with these problems are badly needed and have to be adapted to local circumstances. A list of

possibly relevant policy measures will be provided here. The appropriate mix and sequencing of policies to achieve sustainable management of the natural resources will have to be assessed in each case based on a thorough analysis. At the local level it is crucial to identify what the local communities may be able to do themselves, what they can do with assistance from the outside, and what the government has to do. However, changes in general policies (land tenure policies, tax policies, provision of services, etc.) also affect the ability of the local communities to deal with the problems. The LDCs have a long way to go in identifying and implementing the appropriate policy measures.

## 5.2. Policy measures for environmental conservation

Stabilization and structural adjustment policies have been introduced in many LDCs but have not yet become effective in stimulating economic growth. Many countries are still struggling with their macroeconomic imbalances and large debts. Assistance from the outside is clearly needed to bring these economies on their feet. Stable macroeconomic and political conditions are important to enable governments to put more priority on environmental sustainability issues. Privatization is an important part of the adjustment process. The distributional effects of this privatization process have consequences for the extent and distribution of poverty and consequently also for environmental conservation. The poor typically have weak bargaining positions in this process and risk becoming further marginalized. The power structure may lead to the establishment of more large and inefficient farms (Heath and Binswanger 1996). Zambia is a typical example of this problem. The "urban bias" is likely to continue but a decentralization of power may help in reducing the problem although that is not guaranteed. Transparency and public awareness may help in improving conditions.

Specific policies targeting environmental conservation should as far as possible be integrated into sectoral and other national policies. Particularly, it is important to integrate the environmental and agricultural policies as the most severe environmental problems are linked to the agricultural sector. Unfortunately, in many LDCs there has been a tendency to develop agricultural and environmental policies separately in separate ministries. Many LDCs are now in the process of trying to integrate these but bureaucratic inflexibility, little experience and lack of standard prescriptions hamper the process.

A short list of specific policies is following, highlighting some of the most important environmental concerns in the LDCs.

### (i) Land tenure policies

These include delineation and enforcement of property regime rules. *De facto* open access to scarce environmental resources should be avoided. A change from state property to private and/or communal property regimes may go a long way in dealing with these problems. In a world with transaction costs the distribution of resources may also matter for efficiency (Coase 1960). The facts that small farms often are found to be more efficient than large farms (Hoff *et al.* 1993), and that subsistence constraints may force poor households to deplete their resource base, underline the need for a policy concern with respect to the distribution of land resources. Establishment of a market for transfer of property rights may or may not improve efficiency. Lack of purchasing power may prevent those who would make most efficient use of the land, from purchase of it. A land market could also lead to more concentration of land in the hands of a rich minority who may afford to sit on this property for reasons of prestige and future security, with little concern with its optimal utilization from society's perspective. Many LDCs, particularly in Africa, have been reluctant to introduce land markets for these reasons and land reforms have been introduced to ensure a more equitable

distribution of land resources. Such land reforms may still be a relevant instrument which could be beneficial from efficiency, distributive and sustainability perspectives in some LDCs. For some forms of agricultural production there may, however, be significant economies of scale which make privately run large commercial farms the most efficient solution. A communal property regime may in other situations be the most efficient solution e.g. for grazing lands. What is important is that the state ensures security of tenure such that owners can derive the benefits from their investments. Protection of the rights to genetic resources is another area where national efforts may be important.

(ii) Legal rules for resource use

Command and control approaches to regulate individual and group behaviour may in many cases be the best way of regulating behaviour but may in other cases be inefficient due to the problems of monitoring and enforcement. Cultural norms, social and political conditions also matter for the benefits of such rules versus the costs of implementing them. They may be relevant for protecting e.g. wildlife reserves and forest reserves. However, this system of control has been criticized for making local people enemies of the state. Recently alternative methods involving the local people in the management of resources have been tried and often found to be successful. Provision of resource use permits (concessions) for a limited time period is another system which has been criticized as it does not provide the user with self-interest in conservation of the resource base beyond the end of the concession period. Rather there may be strong incentives to violate legal rules due to high costs of monitoring these types of activities (e.g. logging concessions in rain forest areas). Quotas may similarly be used in communal grazing lands to avoid overstocking. Legal restrictions on use of pesticides and ban of production and trade of dangerous pesticides represent important categories of legal policy instruments.

(iii) Development of public institutions

Strong public institutions are needed to deal with many of the severe environmental problems in LDCs. Systems of monitoring, implementation of policies, enforcement of rules, dissemination of information, coordination of efforts across ministries, etc., are also required.

(iv) Decentralization of power and responsibility

Human capital development and empowerment of local people represents a combination of top-down and bottom-up approaches to development. Building on indigenous knowledge and cultural heritage as well as scientific knowledge may help finding local solutions to environmental problems. Provide assistance where local communities indicate that they need assistance from the outside to tackle their environmental problems. Collective action could be stimulated and used to tackle key environmental rehabilitation and conservation. Tigray in Ethiopia may be a good example of how this could be done. The success of the approach depends on the homogeneity of the communities, the social capital (Serageldin 1996), and the state-community relations. A crucial issue is how to overcome the free rider problem (Ostrom 1990).

(v) Improved access to basic services in rural areas

Education, health services, safe water, infrastructure, and information are typical public goods where the state should continue to have an important role in LDCs. Under the new market friendly policy regime market information will be crucial in remote rural economies with thin markets. Radio broadcasting could be a cheap and efficient way of reducing the information asymmetries and costs and also help in relation to local mobilization. This may also help reduce price instability and improve overall rural-urban terms of trade. Education of women (and men) and promotion of family planning could help reducing population growth.

(vi) Investment in agricultural research and extension

There is a need for broadening the perspectives of agricultural research. The idea of a "New Real Green Revolution" which not only focuses on increased agricultural productivity in the short run but which integrates productivity increasing new technologies with environmental conservation, may assist in switching to more sustainable development paths. Crops (and animals) which were neglected in the earlier Green Revolution but which are the mainstay of the poor living on fragile lands have unexploited genetic potentials in terms of yield, product quality, and resistance against pests and diseases. Developments in biotechnology have increased this potential and made it possible to tap it more quickly and at lower costs. It can substantially improve the productivity of other resources (land and labour), and reduce the needs for some purchased inputs like pesticides and perhaps fertilizer. Fertilizer efficiency could also be substantially improved. Increased resistance may reduce year to year yield variations and contribute to food security. Marginal returns to intensification may increase relative to marginal returns to area expansion. Subsistence requirements may be met on a smaller piece of land than before. These effects depend on the efficiency of dissemination and adoption of the new technologies which again depends on the efficiency of the extension system and the "palatability" of the new technologies. Adoption processes are often unpredictable but farmer involvement during the research process may reduce this uncertainty. Environmental policy research also requires stronger involvement of social scientists than what has been typical in agricultural research.

(vii) Stimulation of rural financial markets

Poorly developed rural financial markets may inhibit or reduce investments in conservation and more productive technologies. State interventions in credit markets have in many cases not been successful from an efficiency perspective due to high default rates and large subsidies. Stimulation of local savings and credit institutions and use of peer monitoring and group lending may improve the functioning of these markets. Provision of credit could be a part of a targeting policy, e.g. to stimulate adoption of particular techniques and production of particular crops and may be an efficient instrument for these purposes at least as long as it is provided.

(viii) Pigouvian taxes and subsidies

Environmental externalities could be reduced or internalized by introducing taxes or subsidies to adjust for discrepancies between private and social marginal costs and benefits. Taxes could be used on negative externalities and subsidies on positive externalities. Whether these instruments would be efficient depends on the structure and size of transaction costs and behavioural responses. Fertilizer subsidies could perhaps be defended in cases of severe nutrient depletion. Fertilizer subsidies were common in many LDCs but have been removed or reduced as a part of structural adjustment policies. Output taxes equal to user costs could in some cases be defended on erosive crops if this would lead to a substitution into less erosive crops. When the erosive crops are food crops essential for survival, introducing an output tax is problematic from a poverty perspective and the response elasticity small if not of opposite sign. One could also argue for subsidies on environmentally benign crops (e.g. tree crops) or production methods, e.g. conservation technologies. Tree planting and building of terraces could be stimulated in this way. Short term returns to these types of investments are typically low and a discrepancy between private and social rates of discount could be used as an argument for such subsidies if sufficient incentives for their management and maintenance exist at a later stage (e.g. secure property rights). Subsidies, however, put additional pressure on constrained government budgets of LDCs but the donor community may be willing to provide these funds.

#### (ix) Cross-compliance and interlinkage policies

In a world with significant transaction costs and imperfect information use of cross-compliance or interlinkage mechanisms may reduce transaction costs, improve the targeting of policies and thus also the efficiency. These policies may be used (with care) to promote the adoption of specific technologies or to reach specific geographical areas and social groups. They may be used as temporary, and in some cases permanent instruments. If they are to be used as temporary instruments, proper incentive structures should be in place to ensure lasting effects of intervention. The approach is likely to be more effective if it involves some bottom-up participation by local communities as monitoring and enforcement mechanisms may be necessary to ensure their success. Examples of these instruments include credit and new technology (e.g. improved seed and fertilizer) packages (interlinking credit and input markets), food for work programmes (interlinking food and labour markets). In order to target environmental problems it could be relevant e.g. to link credit, improved seed and fertilizer inputs to conservation investment, or to link food for work programmes to conservation investment, tree planting, etc. In particular poor households living on fragile lands could be targeted with such programmes both to rehabilitate degraded lands and to prevent further degradation of land in use. Subsidies may also be defended in such cases if the cross-compliance results in internalization of a larger share of the externalities. Such instruments have to be adjusted to local circumstances, however, and require expert design and monitoring as it may be hard to predict spill-over effects. More research is required to test these instruments through pilot projects.

What is the appropriate mix of command and control and incentive based instruments is still debated and depends on historical, cultural, agroecological, economic, social and institutional circumstances. Economic theory and analysis are important tools in the process of developing better policies for management of natural resources in LDCs. Investment in human capital is essential in order to improve policy making. This may be one of the areas where assistance from outside may be needed.

### 5.3. The role of the international community

Important arguments for international concern and commitment to address environmental problems in the LDCs include global externality effects because of loss of biodiversity, carbon emissions, and political and economic instability, in addition to the general moral obligation to reduce human sufferings.

The level of commitment to dealing with the environmental problems within the LDCs themselves are important for the potential role of the international community. Political instability may cause short planning horizons and a large discrepancy between the discount rates of policy makers and that of society. Power structures may also be such that poverty reduction and environmental conservation are not given priority. In such cases it may be argued for the use of international pressure and provision of conditional assistance (a form of cross-compliance). In other cases the national government is committed to dealing with the problems but lacks the human and other resources to develop appropriate institutions and policies. This is a place where the international community already plays an important role in many LDCs. Both loans and grants are provided for this. Likewise, funding of research tied to international research centres (CGIAR) is important as joint international efforts to generate improved technologies and policy relevant knowledge (of public goods nature). Coordination among donors is also important to reduce the burden on national governments and improve consistency of efforts. National Environmental Action Plans and Conservation Strategies form starting points for these efforts. Funding of Environmental Investment Programmes will typically require substantial international assistance. Related to the large environmental problems in the agricultural sector, there is still a long way to go to develop good policies and projects and to



attract the necessary funds. There has typically been an urban bias in the funding by international organizations as well. The World Bank had spent 61% of its total lending for the environment up to 1995 on pollution management and urban environment projects (World Bank 1995).

Donors and NGOs may also be involved in projects at micro and meso levels to assist in local institutional development and finance conservation efforts and human capital development. Such efforts will have to be adjusted to local needs and priorities. Patience, long term commitment and skills are required. Human resource development is also required in donor and NGO organizations. Small pilot projects may in many cases be preferable to explore alternative policy instruments. By linking research to these efforts, rapid knowledge generation may be facilitated.

## Notes

- <sup>1</sup> The term desertification has been adopted by a major UN programme to combat land degradation and has been defined as the diminution or destruction of the land leading ultimately to desert-like conditions (Pimentel 1993). The term land degradation has been preferred and appears now more and more to replace the term desertification, e.g. in World Bank (1996). Mabbutt (1984) concluded that desertification of rainfed croplands was the greatest threat because of the high potential for severe desertification and the large number of people dependent on these areas, viz. 85% of the rural population of dryland areas (Pimentel 1993).
- <sup>2</sup> Moderately degraded land has lost 25% of its productive potential, while severely degraded land has lost at least 50% of its productive potential.
- <sup>3</sup> t/ha/year: Loss of soil in tonnes per hectare per year.
- <sup>4</sup> Malthus (1798) made the hypothesis that ultimately population growth (geometric) will outstrip growth in food production (arithmetic) and force the living standards of people towards the existence minimum as the final check against population growth. Neo-Malthusians see environmental degradation as an additional cause strengthening the probability of this outcome in isolated resource poor agricultural based economies with rapid population growth.
- <sup>5</sup> Boserup (1965) challenged Malthus' hypothesis and stated that population growth may be a necessary condition to promote agricultural intensification and development of a more diversified economy. Observed development paths in many LDCs have recently challenged the Boserupian hypothesis and fueled a new Malthus-Boserup debate (Lele and Stone 1989, Turner et al. 1993, Cleaver and Schreiber 1994, Grepperud 1994, Heath and Binswanger 1996, Scherr et al. 1996). More research is needed to understand why some economies are observed to be on a nonsustainable path while others are on a sustainable path, and how policy best may facilitate a switch from a nonsustainable to a sustainable path.

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# Technologies in Transition; The Case of Agricultural Research and Biodiversity<sup>1</sup>

by

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## I. Introduction and Objectives

When speaking of international development collaboration, it is most difficult to learn from generalities. It is better focus on specific examples, learning from their trials and errors, and from their courage to begin. This belief is supported by some old advice:

*Success can be achieved by setting up great tasks for oneself, proceeding step by step, while checking up on oneself, and stopping from time to time to look back at what has been done and forward to what remains to be done.*

This presentation will describe such specific cases of international collaboration in agricultural research which are proceeding step by step, look back on what has been accomplished, and forward towards progress yet to come. Its objectives are to: (i) examine the expectations for and context in which agricultural research is evolving, (ii) review specific cases of international collaboration, (iii) derive lessons from an analysis of these cases, and finally, (iv) consider these lessons in relation to a social agenda for food and agriculture. From this information, I hope to show that the international community has stimulated a learning process that has effectively helped guide the directions of many towards the needs of the disadvantaged.

## II. Listening to Those Close to the Issues

I first met John Waweru, Chief Executive of the Kenya National Farmers' Union, at his office in Nairobi where we discussed his becoming a member of the Kenyan delegation to the Intermediary Biotechnology Service (IBS) *Agricultural Biotechnology Policy Seminar*. John did indeed attend, and we benefited greatly, particularly while participating in a panel called, *Reviewing the Issues*. Here, participants provide a synthesis of the seminar from their own personal perspective with John giving the farmer's view by making the following points:

- First, he noted that partnerships between farmers and researchers are often lacking, while demands by farmers on researchers will grow. Today's farmers are much more literate than before, and are able to contribute to constraint identification and priority setting.
- Second, he recognized that an integrated approach to conventional and advanced agricultural research will be necessary.

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<sup>1</sup> Paper invited for the seminar, *Agricultural Development: Productivity, Distribution and Environment*, 11-12 March, 1997; Asker, Norway.

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- On the policy side, the environment for the adoption of new technologies by farmers should be made more conducive.
- Finally, he recognized that not all new technologies can be developed nationally, and that the evaluation and adoption of already existing technology packages could be enhanced (Komen, Cohen and Ofir, 1996).

At this same seminar, we were pleased to have Dr. Z.M. Nyiira, from the Uganda National Council for Science and Technology. In his opening address, he emphasized that technology-intensive goods and services are key sources of wealth for Africa's future and that the potential of biotechnology for pushing forward the frontiers of knowledge in improving crop and animal yield potential, increasing the nutritional and market value of existing and upcoming products, and reducing the costs of production, is unquestionable.

However, Dr. Nyiira went on to say, technologies in themselves may never solve farmers' problems. They need to be used within the political, social, cultural and economic environment where they are intended to be applied. The effectiveness and impact of biotechnology in Africa should be considered in this context. To do this, African countries must define: (1) the problems that need to be addressed by biotechnology; (2) the modality of applying biotechnology to farmers' real problems; (3) the implications of biotechnology for the social, economic, cultural and political realities of small-scale producers, and (4) the level of economic, safety and intellectual property risk acceptance. (Komen, Cohen and Ofir, 1996).

These leaders, speaking from different positions and countries, confirmed their expectations for new technologies as well as the need for them to be developed in relation to social objectives and with improved relevance. They emphasize that new technologies to enhance productivity are expected, that biotechnology is a part of this development, and these advances should be undertaken in accordance with agricultural and social needs. These points are related to the theme of this workshop, where we consider how the development of technologies can contribute to productivity while simultaneously addressing a social agenda.

### **III. Evolving Technologies, Based on A Firm Foundation**

Clearly, Mr. Waweru and Dr. Nyiira have expectations that benefits will come from advanced agricultural research and technologies. Let us now consider the global context in which such technologies are being developed. We are witnessing an evolution in the way information, both biological and digital, is being understood, used and delivered. Information has always been crucial to agriculture, but this evolution means that information can be used in new ways. It will be increasingly substituted for functions previously provided by external inputs. Information at the genetic level is of special significance to agriculture and productivity. The use of such information is one means to increase productivity without abusing nature (Magretta, 1997).

Using this new genetic information requires our continuing commitment to maintain a firm foundation in agricultural research and biodiversity, while building relevant policy expertise and understanding. Providing an equally firm foundation in the science of germplasm and biodiversity ensures we know the sources of genetic information, encoded in the genes of life around us, which can then be linked with breeding and other agricultural disciplines.

National policies which ensure whether or not and how these developments occur are crucial to the foundation for research. The two colleagues I introduced from the Africa seminar

emphasized this point very clearly. To the policy makers, it is urgent to stress that this process is a slow and gradual evolution, it is not a revolution, and that the long term commitment to agricultural research cannot be bypassed. This “coupling” of new technologies with appropriate economic policies, infrastructure development, support services and education is especially important for Africa, as noted by Lynam and Blackie (1994). Agricultural research and technologies contribute to income generation in Sub-Saharan Africa, where agricultural production continues to be a primary source of income, jobs and gross domestic production. While in general, regions and countries will become less dependent on agriculture as a source of wealth, African countries expect to have 32% of their gross domestic production derived from agriculture in the year 2000 (Norse 1994).

In the next section, specific examples from plant breeding, biotechnology, and biodiversity have been selected to illustrate this evolution in information. They show how it can substitute for external inputs currently part of agronomic practices, how this information is connected to conventional research, and future policy needs.

#### **IV. International Collaboration in Biotechnology - Getting Something Started, Bringing It to Fruition**

**Building our knowledge base.** Over the past four years, we have taken a two-step approach to building and disseminating our knowledge base regarding biotechnology as practiced for and with developing countries. First, to better understand emerging needs of developing countries with regards to biotechnology and to assess the potential for international collaboration, a meeting was held at the International Service for National Agricultural Research in The Netherlands (Cohen and Komen 1994). This meeting led to a study of international biotechnology research and advisory programs, and their base of support, provided primarily from international donors and foundations. This group of 46 international biotechnology programs share a specific objective of developing and transferring products from biotechnology which address developing country needs. These initiatives are categorized as follows:

- Research programs for crops or livestock at national or international public institutes;
- Advisory programs which concentrate on policy and research management issues;
- International or regional biotechnology networks for specific crops or regions;
- Bilateral or multilateral donor programs which support international biotechnology activities (Figure 1; Appendix I).

*Focus.* Information collected for international collaboration in biotechnology is now stored and made available through *BioServe*. Its combined data clearly demonstrate a range of unique opportunities for accessing and developing specific technologies for developing countries. These opportunities are unique because:

1. research is undertaken on essential commodities, or foods on which significant numbers of people depend, often with regional significance (Table 1; Brenner and Komen 1994; Cohen and Komen 1994; IBS 1994);
2. research objectives target a range of new products, including improved crop plants, livestock vaccines, and diagnostic probes;
3. diseases and pests selected are major problems to sustainable agricultural productivity in tropical, as opposed to temperate, agricultural systems, and,
4. access to proprietary technologies can be provided.



There are approximately 126 activities for the 46 projects listed, and of these, the majority of work is concentrated on disease and insect resistance, accounting for 60% of the total research effort (Table 1). Specific disease and pest examples will be given later. However, as extensive as this list of objectives and activities may seem, when compared to the diversification of biotechnology research in the industrialized countries, the list seems far more constrained. The international programs have a much smaller emphasis on quality traits, and no research on herbicide resistance, factors affecting ripening, developing new carbohydrates or proteins, and little research on fungal diseases.

*Program elements.* An analysis of seven major program elements for the international programs was undertaken, and indications of their respective percentage of effort. Elements of primary importance are: research and development; human resource development; national program participation and networking; program planning, policy, and management; monitoring and evaluation; information and communication; and, infrastructure development.

These elements were defined as follows. First, research and development included all costs for the actual research component of the programs, whether crop or livestock. Human resource development accounted for training (short and long term), including post doctoral positions. National program participation denotes funding reserved to facilitate research and exchanges with national programs in developing countries. Monitoring and evaluation funding, while limited, gives an important indication of effort planned for the monitoring of biotechnology research. Program planning included internal management issues and their relation to issues such as biosafety. Information and communication documented expenditures for electronic linkages, newsletters and data bases. Finally, infrastructure development included resources for, for example, laboratory and computer equipment.

Each program was asked the percent of total effort assigned to the above components. Data received reveal that research and development costs account for approximately 50% of total program costs (Figure 2). In comparison, human resource development totals 18%. This emphasis on research means that the other activities surveyed received comparatively little attention. It also indicates the research-intensive nature not only of biotechnology, but for agriculture in general, and more specifically, for meeting the needs of tropical agriculture.

**Dialogue.** Our second approach to building and using information entails a series of *Agricultural Biotechnology Policy Seminars*, held regionally for collaborating countries. In these seminars, attention is given to case study examples of biotechnology research providing solutions to agricultural problems in developing countries. These seminars complement technical research by providing opportunities to explore questions of policy, management, needs, and priorities posed for developing countries as they consider new technologies entering their agricultural systems (Komen, Cohen and Ofir, 1996). Policy seminars have been held for over 25 countries, including southeast Asia, east and southern Africa, Latin America, and West Asia/North Africa.

The case studies are explored by multi-disciplinary and representative delegations from six countries. In formulating these delegations, IBS ensures the direct involvement of individuals with responsibility for, or vested interest in, the design, implementation, and use of agricultural biotechnology. This range of stakeholder interests enriches each delegation's debate as they identify areas requiring further support, often taking the form of policy dialogues, management recommendations, or responses needed for various international agreements. As such, each

seminar builds on available data and scientific understanding to address the broader needs of stakeholders, including policy makers, managers and researchers, and end users, as can be seen for Africa (Komen, Cohen and Ofir 1996). By providing this opportunity, IBS complements the heavy emphasis which other international programs must place on research.

**Beneficiaries.** I introduce considerations of the small holder farming communities now, as it pertains to the crops and diseases presented in my examples. In Sub-Saharan Africa for example, we know that smallholder crop cultivation is the predominant farming system. How do we define such farming communities? They are primarily characterized by reliance on family labor, a small stock of physical capital, and relatively abundant land to Asian countries. Purchased inputs- seed, fertilizers, and chemical pesticides - are not widely used. While crop production is the major activity, off-farm activities such as trading, small-scale industry, livestock, and fishing are important activities throughout Africa. Although small farmers strive to meet their own food needs, 20-30% of the staple food production is marketed in most countries (Eicher and Baker, 1992).

In the policy seminars, the beneficiary perspective is provided by including end users, which usually means NGOs, farmer organizations, and/or the private sector. Their complex and diverse needs present opportunities as well as constraints to the international research programs. Addressing food security for small holders means working on a large number of crops, for which technology transfer and delivery of results can become complicated, depending on the traits and crops involved.

**Examples.** From this information, I have selected four examples to provide an overview of this research base, including progress, accomplishments, and difficulties, and to illustrate:

- how resources are spread over diverse targets, regions, and time frames,
- their ability to identify and address agricultural and sustainability needs,
- their research-intensive nature, and,
- an ability to form new partnerships.

One example is given for plant breeding augmented by molecular markers, two for recombinant technologies (one crop and one livestock), and an example illustrating developments in biodiversity.

## V. Four Specific Examples

**A. Plant breeding and molecular markers - the case of durable resistance.** Here, plant breeding is augmented by molecular mapping and knowledge of genetic diversity to combat insufficient durability of resistance to pests, a problem confronting many disease and insect breeding programs. Consequently, the interest in "durable resistance," defined as resistance that remains effective while a cultivar possessing it is widely cultivated, has received much attention (Khush, 1996). As for rice, blast is its most widespread and damaging disease, consequently durable resistance is a major breeding target. When blast control blast is needed, and not present in the form of cultivar resistance, than fungicide treatments are applied which may not be effective, economically sound, or desirable from an environmental perspective.

Conventional resistance has been made available genetically, but it has traditionally been weakened or lost after three years. However, durable resistance has been achieved in rice

cultivars resulting in Oryzica Llanos 5, developed as a resistant variety by CIAT, the National Federation of Rice Growers, and the National Research Institute of Colombia (Correa-Victoria, 1997). This variety, containing the durable resistance, was made possible because genes from several sources of resistance were combined and selected through complex breeding, and by use of rice cultural practices and disease management concepts to ensure durability.

The variety was introduced to tropical agroecosystems in Colombia and represented a solution to the problem of blast, as well as the potential to reduce the unwise or ineffective use of fungicides. The cultivar was adopted across Colombia, including use by small holders, in the season following its release, and has been planted in at least 50,000 ha per year until 1996. Since then, newer high-yielding cultivars were released and widely adopted by farmers (Correa-Victoria 1997).

Decreases in the use of fungicides as a result of farmers growing these new varieties have been reported. Unfortunately, it has not been possible to review this data at this time. Measures of declining use of fungicides in agroecosystems of Colombia are able to be estimated, in that farmers expenditures on these chemicals range from 6-50% of total crop protection costs. Actual estimates of how much farmers have saved over this period of time and how much the use of fungicides has been reduced as a result of resistance will be obtained later (Correa-Victoria 1997).

More recently, advanced techniques derived from biotechnology have been coupled to the applied breeding strategies (Roca et al, in press; Tohme, Correa-Victoria, and Levy 1992). These molecular tools are helping to understand the mechanisms controlling durable resistance in Oryzica Llanos 5 by typing resistance genes to different genetic families of blast, identifying molecular markers associated with resistance genes in other highly resistant cultivars, and guiding rice breeders in selection of potential parents leading to lines with durable blast resistance. Genes are being identified which express resistance to six pathotype lineages of the blast pathogen. This analysis depended on the use of DNA probes containing cloned fragments of the blast fungus genome which could then be used to construct DNA fingerprints of the fungus. Molecular markers were then used by breeders to confirm the manipulation and selection of various sources of resistance to these six lineages of the blast fungus (Tohme, Correa-Victoria, and Levy 1992).

**B. Biotechnology - a new Rinderpest vaccine.** The potential use of recombinant vaccines is described for rinderpest which is one of the single most important diseases of livestock in developing countries. The vaccine has been developed and is being tested by Dr. T.D. Yilma of the International Laboratory for Tropical Animal Disease Agents and scientists from Kenya. Rinderpest is an acute, highly contagious viral disease of cattle and buffalo, manifested by high mortality.

The conventional Plowright tissue culture vaccine (PTCV) has been widely used for vaccination against rinderpest. However, there have been difficulties in sustaining the manufacture of this vaccine, its delivery in the field, obtaining skilled personnel, its requirement for refrigeration, and vaccine instability. In contrast, the lyophilized form of vaccinia virus used in the recombinant vaccine is heat stable, easily produced and transported, and administered by scarification (Yilma, 1991). This new vaccine will offer herdsmen and cattle owners opportunities for enhanced protection against rinderpest, and the chance for the eradication of the disease itself.

The rinderpest virus (RPV) is a member of a group of viruses, including measles virus of humans, distemper virus of dogs, and peste-des-petits-ruminants virus of goats and sheep. The haemagglutinin (HA) and fusion (F) surface proteins have been shown to provide protective immunity. cDNA copies of the HA and F mRNAs were made, and the complete nucleotide sequence of both the HA and F genes was determined. Standard procedures were used to construct vaccinia virus recombinants expressing the HA gene and the F gene of RPV (Yilma *et al.*, 1988).

Protective immune response studies in cattle were conducted in the high containment facility at the Plum Island Animal Disease Laboratory in the United States according to proper institutional guidelines. The cattle were evaluated for protection with a challenge of a heavy dose of rinderpest virus subcutaneously injected. Cattle vaccinated with the recombinants were completely protected when challenge-inoculated with greater than 1000 times the lethal dose of the virus. More recently, a highly attenuated vaccinia virus (Wyeth) double recombinant has been developed expressing both the F and H genes (Yilma, 1993). This vaccine ensured protection as well. Detailed study of safety and efficacy data from the tests conducted at Plum Island was part of the biosafety review and approval undertaken by sponsoring organizations and the Government of Kenya in preparation for receiving an export permit from USDA/APHIS. Following its receipt, the vaccine was shipped to Kenya, where it is now under limited, contained testing.

**C. Biotechnology - viral protection for sweet potatoes.** Root and tuber crops including sweet potato, are extremely important, both economically and for food security, for Africa. Sweet potato is grown as a staple food in some regions and as a food supplement in other regions, and provides food security during times of drought in most African countries. These crops form a year-round food base, whose full impact can only be realized in its absence, as most of the crop is eaten before reaching the market. Currently, Kenya alone is producing about 1 million tons of sweet potato feeding a substantial population of resource-poor farmers, especially women and children.

In Africa, viral diseases result in devastating losses in the root and tuber crops, causing a 20% to 80% reduction of potential harvests. Sweet potato viral diseases are among the most serious. While Sweet Potato Feathery Mottle Virus (SPFMV) is probably the most widespread sweet potato virus, it does not cause major losses by itself. It is frequently found in combination with one of several other viruses, resulting in a synergistic increase in disease severity. By controlling this virus, it is expected that many other virus diseases will be controlled.

In an attempt to address the need for improved resistance to this virus, a collaborative research project was undertaken, with two objectives: (i) production of improved virus-resistant sweet potato through gene technology, which would increase yields by about 70%, and (ii) the transfer of gene technology for transformation and virus protection to KARI and Africa; i.e., building capability and training people to handle gene technology for transfer to Africa (Wambugu, 1996).

The project was sponsored by Monsanto Agriculture Company (USA), the US Agency For International Development, and the Kenya Agricultural Research Institute (KARI). It was conceived to help support sustainable agriculture and food security in Africa. Monsanto wanted to share their biotechnology discoveries as long-term humanitarian aid to Africa, in the hope that in the future it might also be a strategy or opportunity for creating new business partners. Consequently, Monsanto considered how to donate biotechnology to impact on food security in the developing world without jeopardizing future business interests. This could best be accomplished by selecting a crop, such as

sweet potato, to be improved which is important in Africa, but not in countries where major business opportunities are likely. However, Monsanto had not initiated such a venture before and sought the experiences and networks established by USAID in Africa, its growing expertise in working with multiple partnerships, as well as a source of partial funding (Cohen, 1993).

The SPFMV coat protein gene (cp-gene) clone was available free from public domain research, as developed by the Department of Plant Pathology of North Carolina State University. The cp-gene had been cloned earlier through collaborative research with the International Potato Center. The Scripps Institute had done some further cloning and manipulations of the SPFMV cp-gene and was willing to collaborate in this project. At the end of 1991, the project began, and a KARI scientist initiated research at Monsanto.

Limitations occurred in the initial approach regarding allocation of an unrealistically short time frame and funding for biotechnology development, testing, and transfer to Kenya. However, progress is being made, as a high-frequency sweet potato leaf and stem explant transformation system was developed, using *Agrobacterium tumefaciens* (sp.ABI), as expressed by GUS positive calli. Transgenic shoots expressing the cp-gene are currently being developed at good frequency from transgenic sweet potato callus from the Kenyan genotypes, which is a major breakthrough. There are consolidated efforts to develop a reliable transformation system and to optimize it for transfer to KARI. Recently, the KARI/Monsanto sweet potato team announced the successful development of transgenic sweet potato with resistance genes to SPFMV, in a stable reproducible system using a Kenyan sweet potato genotype. Remaining issues are being addressed on a "crossing the bridge when you come to it" basis by the partners, and the project is making good progress towards its goals (Wambugu, 1996).

**D. Biodiversity - INBio's National Biodiversity Inventory.**<sup>3</sup> Costa Rica's national biodiversity inventory, led by INBio in collaboration with other institutions and research centers, builds on a long history of scientific study and inventories conducted by national and international specialists (Janzen 1983). Given the magnitude of the inventory task which calls for taxonomically identifying an approximate half million species, INBio introduced cost-effective measures to facilitate the process while responding to the need to involve larger cross-sections of society in conservation activities. INBio relies on "parataxonomists", a group of lay people from Costa Rica's rural areas trained to collect and carry out a preliminary cataloguing of specimens collected in three groups at present (insects, plants and mollusks) before transporting them to INBio's headquarters. Parataxonomists stationed in "biodiversity offices", are not merely collectors, but also initial cataloguers of specimens and a direct link to the communities which live in and around Costa Rica's Conservation Areas.

With a coordinated work team in place, the inventory's first goal is to accumulate the specimens necessary to clean up the taxonomy of Costa Rican biodiversity in both a national and international context (Sittenfeld and Gámez 1993). "Taxonomic cleanliness" will take the form of identified reference collections, scientific publications, biological species catalogues, field guides, and electronic identification services. In the long term, the inventory will establish species' ranges in more detail and initiate the process of understanding their natural history and other characteristics.

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<sup>3</sup> Text adapted from the IBS case study report, *Managing Biodiversity for Agricultural Research: Building Awareness from the INBio Experience: The Case of Costa Rica*, by Ana Sittenfeld and Annie Lovejoy.

The results are impressive. As of 1996, the reference collection of insects is over 2.5 million specimens. Of these, 2.1 million have been bar code labeled, taxonomically separated to order and 384,000 are identified to species level. The taxonomy of an estimated 12,000 plant species is almost completed. Information generated by the inventory is vital, as the data generated support biodiversity prospecting collection and studies. Inventory backing also greatly reduces the investment risk in the eyes of private enterprise. To facilitate the management and manipulation of species and conservation information, the Institute has designed and is implementing a computerized Biodiversity Information Management System.

Recent experience in biodiversity prospecting negotiations between INBio and Merck & Co. Inc. have succeeded in establishing favorable terms for technology transfer, royalties, and direct payments among others, for INBio and Costa Rica's Conservation Areas. However, the issue of benefits accrued from bioprospecting is difficult given the inherent complexities of assigning value to the accumulated and increased knowledge of biodiversity at INBio, to the transfer of know-how and technology or to enhanced capacity building. From 1993 to 1996, over US\$ 2 million are considered as direct contributions to Conservation Areas, biodiversity inventories and national universities.

INBio's biodiversity prospecting framework was clearly understood by both Merck and INBio, the end result of which demonstrates that companies can return part of the benefits of pharmaceutical development to the biodiversity-rich country where the chemical compounds originated. Both parties were conscious of the mechanisms needed to ensure that some of these benefits (i.e. part of the initial funding) would directly finance conservation while the remainder would indirectly finance conservation through investment in biodiversity inventories, biodiversity information systems and biodiversity prospecting in association with the Conservation Areas and National Parks.

## **VI. Lessons Learned**

I have presented examples studied regarding collaborative research and international developments targeting biotechnology and biodiversity. By reviewing these initiatives, suggestions can be made regarding the difficulties these programs face, and lessons learned as stated earlier: resources spread over diverse targets, regions, and time frames; ability to address needs for productivity and sustainability; the research-intensive nature of the projects; and, their ability to form new partnerships. I would like to highlight some lessons below, and conclude by providing a perspective on genetic information and future agricultural improvements.

**A. Resources stretched over diverse targets, regions and time frames.** Our analysis of the 46 international biotechnology research and advisory programs indicates that they address five broad research objectives, containing over 100 separate activities and diverse targets (Table 1). This work spans over 15 kinds of crops or livestock, some of which pose significant research problems and for which a general lack of knowledge exists when compared with crops of commercial interest. There is a paucity of identified genes to address farmer needs, for example for resistance to abiotic stress factors, and technologies for micropropagation, regeneration and transformation often do not exist, or are not yet transferable. These activities have been divided almost evenly among countries in Africa, Latin America and Asia (Cohen and Komen, 1994).

This range of objectives, activities and regional focus also reflects interests of organizations providing financial support. This relationship can create difficulties, as time frames for proposals

are constrained to comply with grant requirements. Due to the technical nature of the research, as shown above, longer time frames are needed, with initial periods of at least five years. However, beginning in the 1980s and continuing in the 1990s, there was a tendency to minimize time frames for biotechnology, as it was “sold” as a short cut to conventional research. Difficulties in implementation, time, and funding are reached as new technologies need testing, for both safety and efficacy, in the collaborating countries. For countries to consider testing, scientific, policy, and managerial competency are needed, and these areas often have not kept pace with international research.

**B. Research-intensive nature of the projects.** Major expenditures among the international biotechnology research and advisory programs occurs for research. In fact, among the 46 programs surveyed all but four are directed towards research. This leaves little for socioeconomic, policy or managerial issues; and, to enhance competency for biotechnology in developing countries. For example, only 10% is used for national program participation, i.e. those costs available for supporting participation of scientists from developing countries in the international programs. These figures indicate that while research may be well financed, adequate support to build developing country capacity and collaboration is funded to a lesser extent.

The research focus and funding constraints of the international research programs was studied as background information by IBS in determining the scope of its own activities. It was seen that relatively few programs could support in-depth analysis and research on the policy, management, needs and priorities of developing countries. This supported the original intention of those advocating for a program such as IBS. Thus, IBS attempts to complement the resources provided by the international research programs, through its policy seminars and management courses, to enhance competency and capacity among collaborating developing countries.

This same research-intensive quality is true for biodiversity, as demonstrated by the INBio experience, where biological information is collected and coupled with an electronic data base. This coupling of information allows for further research at the genetic and species level, which can be carried out by INBio and its collaborative partners, as well as expanding partnership for product development, as shown below.

**C. New partnerships possible.** The sweet potato research case and the INBio experience illustrate that new partnerships are possible, spanning public-private collaborations. Projects with small holders as beneficiaries in the have found ways to work with the needs and conditions of the economics of the market and of nature. In this regard, national and public institutions benefit from collaboration with international biotechnology programs. The international programs provide access to both public and proprietary-domain technologies. Examples of other commercial technology transfer from international programs is shown in Table 2. These new opportunities build on traditional international research which has relied almost exclusively on partnerships with public-sector institutions in developed countries for advances in basic research.

If collaboration with the private sector is an option, then communication with commercial organizations should occur at an early stage. This helps to ensure that products are appropriate for production and geared to the identified clients or users of the research. In such cases, programs may consider contractual mechanisms for technology transfer, such as collaborative research and development agreements, which itemize the terms of development between public research institutions and private producers. Such was done in agreements developed by INBio.

**D. Productivity and sustainability needs.** Data provided in Table 1 and Appendix I indicates that the focus, objectives, and activities of the international biotechnology research and advisory programs target crops of significance for food security, small holder farming communities, and pest or disease problems which detract from sustainable productivity. Priority setting methods have varied considerably among these programs (Cohen, 1994). Even so, numerous objectives of important social significance have been identified (Table 3). However, these programs generally lack sufficient resources to develop socioeconomic expertise. The primary focus for their financial and human resources are devoted to their particular biological research activities, and socioeconomic issues cannot be supported to the same degree.

Biotechnology and sustainable agricultural systems are often portrayed as antagonistic ends of a continuum. However, this portrayal lacks evidence, especially given that the use of biotechnology-derived agricultural products in agroecosystems is still largely unknown. In fact, there are many applications of biotechnology which seek to minimize the use of chemical inputs as pest, weed or disease control strategies in developing country agriculture. The relation between these applications and broader concerns of sustainability have been recognized (Hauptli et al., 1990). Potential solutions to pest management problems are being advanced from research highlighted in this paper.

## **VII. Concluding Remarks: Genetic Information and Agriculture's Future**

As mentioned previously, information technologies are in a state of evolution, including information encoded in genes. The case studies presented illustrate a range of prior practices and external inputs which could be altered by the judicious use of this information (Table 3). Putting the right information in a plant or vaccine means that information substitutes for pesticides, fungicides, costly equipment needs, or ineffective cultural practices. These technologies also show a wide range of target beneficiaries, often those most needing alternatives to current practices.

This strategy, of substituting diverse sources of information for prior dependency on chemical control measures, is being advanced in the commercial sector (Magretta, 1997). A second and related point, how this genetic information can be provided with management practices targeting sustainability, is also under exploration. Thus, while illustrating the potential of this evolving technology, advancements in technologies alone are not complete solutions, and that information will be needed to manage them safely, appropriately, and sustainably.

Will international agricultural research realize gains and benefits from expanded use of genetic information? As mentioned previously, IBS is updating information maintained on international biotechnology research and advisory programs, including their base of financial support. This update is interesting on many accounts, but for our purpose, it reflects continued commitment, growth, and development of the programs initially surveyed. This updated information, together with the results presented in the four selected cases, indicates the continued need for collaboration and support. However, this view contrasts sharply with recognizing that many organizations supporting such international research and advisory programs are, "... under political pressure from an irresistible combination of budget cutters and greens" seen as responsible for budget declines for such research (Economist, 1997). In fact, "Governments in



rich countries - and particularly in Europe - have become reluctant to finance research into genetically-engineered crops for poor countries" (Economist, 1977).

In closing, I have provided cases where expectations regarding new uses of genetic information for agriculture and biodiversity are being met, where research offers products not to be made otherwise, and where research contributes directly to a broad range of beneficiaries. The cost of this work is high, with much of the initial investment for research. While numerous activities have been started, only a very few will have the potential and the opportunity to reach completion. While new partnerships have been cited, there are still too few examples to ensure delivery of all research results. Thus, the number of projects adopted for full development must be realistic. If this gap between projects started and those completed grows, it will jeopardize future investments, and minimize the knowledge gained from the cases presented.

To increase our chances of reaping these benefits, biotechnology should be an integral part of the coming agricultural agenda, a team player which serves broader productivity and social goals, respectful of the foundation provided through biodiversity, and integrated fully with conventional agricultural research.

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**Table 1. Five research objectives and related activities undertaken by international biotechnology projects for crops of major importance to developing countries**

<b>CROPS</b>	<b>OBJECTIVES</b>					<b>All</b>
	<b>Disease resistance</b>	<b>Insect resistance</b>	<b>Virus resistance</b>	<b>Quality traits</b>	<b>Micropropagation</b>	
<b>CEREALS</b>	<b>9</b>	<b>13</b>	<b>8</b>	<b>12</b>		<b>42</b>
rice	5	4	6	6		21
maize	1	6	2	3		12
sorghum	1	3		2		6
other	2			1		3
<b>ROOT CROPS</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>2</b>	<b>1</b>	<b>19</b>
potato	1	3	2			6
cassava	1		3	2		6
yam	2		1		1	4
sweet potato		2	1			3
<b>LEGUMES</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>6</b>		<b>20</b>
bean	1	2	1	2		6
groundnut	1	1	3	1		6
chickpea	1	1		2		4
other	1	2		1		4
<b>HORTICULTURE</b>	<b>2</b>		<b>3</b>		<b>1</b>	<b>6</b>
<b>PERENNIAL</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>15</b>	<b>22</b>
banana\plantain	2		1		5	8
industrial crops				1	4	5
coffee		1			4	5
sugarcane			1	1	1	3
cocoa					1	1
<b>FORESTRY SPECIES</b>				<b>2</b>	<b>5</b>	<b>7</b>
<b>MISCELLANEOUS</b>	<b>3</b>	<b>3</b>		<b>2</b>	<b>2</b>	<b>10</b>
<b>ALL</b>	<b>24</b>	<b>28</b>	<b>24</b>	<b>26</b>	<b>24</b>	<b>126</b>

Source: IBS BioServe Database, 1997

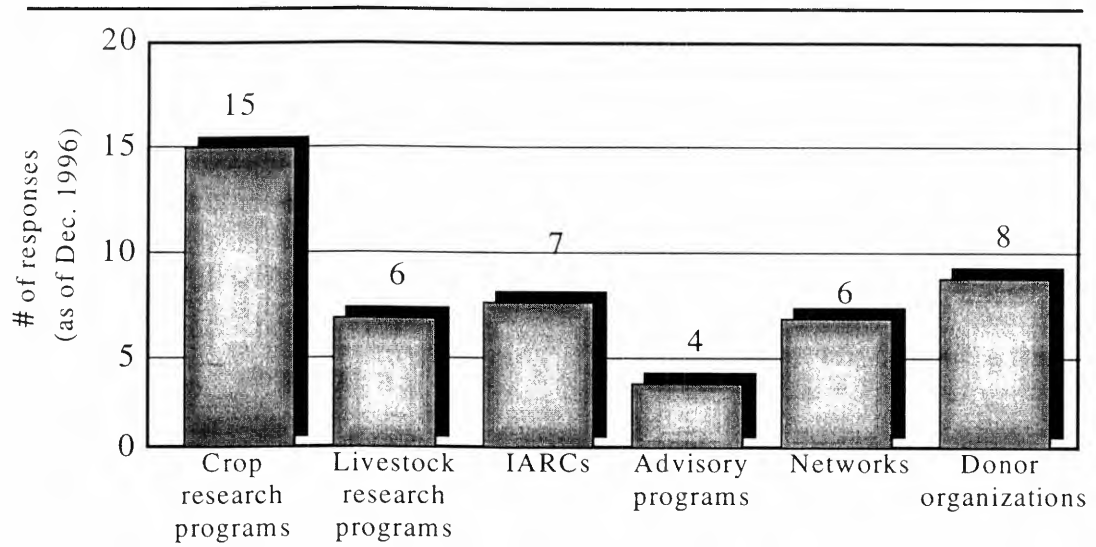
Note: Figures are based on information gathered from 22 international research programs that include activities in crop research. For this table, we used those research activities with a specific applied objective, excluding research activities aimed towards general technology development.

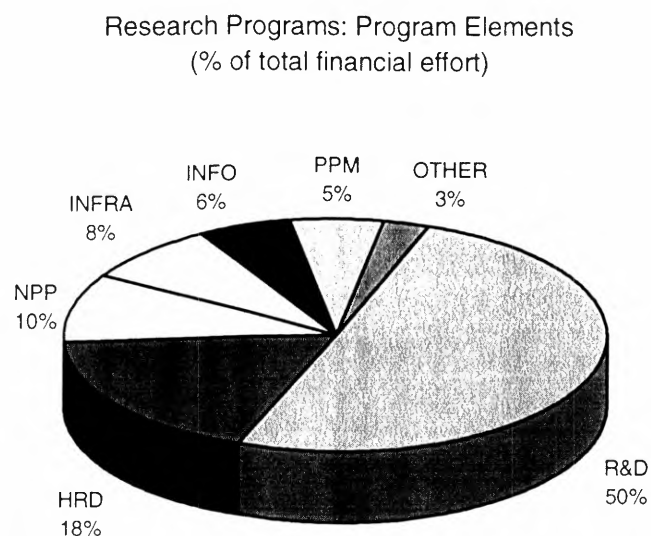
Table 2. Private-sector technology transfer in international research programs on agricultural biotechnology (Source: IBS, 1994).

International Program	Private-sector Collaborator	Technology	Collaborating Institute(s)
Agricultural Biotechnology for Sustainable Productivity (ABSP)	ICI Seeds (USA)	Maize transformation with <i>Bacillus thuringiensis</i> protein genes, for resistance to Asian stemborer	Central Research Institute for Food Crops (CRIFC, Indonesia)
	DNA Plant Technology (USA)	Bioreactor technology for micropropagation of banana, pineapple, coffee, and ornamental palms	<ul style="list-style-type: none"> <li>• Agribiotecnologia de Costa Rica (ACR)</li> <li>• Fitotek Unggul (Indonesia)</li> </ul>
Feathery Mottle Virus Resistant Sweet Potato for African Farmers	Monsanto (USA)	Transformation technology for the development of virus-resistant sweet potato	Kenya Agricultural Research Institute (KARI)
International Service for the Acquisition of Agri-biotech Applications (ISAAA)	Monsanto (USA)	Transformation technology for the development of potatoes resistant to potato virus X and Y	Center for Advanced Research Studies (CINVESTAV, Mexico)
	Asgrow Seed (USA)	Coat-protein technology for the development of melons resistant to cucumber mosaic virus	<ul style="list-style-type: none"> <li>• Research Center in Cell and Molecular Biology (CIBCM, Costa Rica)</li> <li>• CINVESTAV</li> </ul>
	Pioneer Hi-Bred (USA)	ELISA kits for local maize viruses	National Research Center for Maize and Sorghum (CNPMS, Brazil)
ODA Plant Sciences Research Programme	Agricultural Genetics Company (UK)	Insect-resistance genes for potato and sweet potato	International Potato Center (CIP, Peru)

Table 3. Using genetic information to substitute for less effective practices and enhance productivity.

Case Study Examples	Target for New Information	Identified Need	Using Genetic Information	To Substitute for Prior Practices	Beneficiaries
Durable Resistance and Molecular Markers	Rice	Improve resistance to blast fungus, and greater understanding of durable resistance mechanisms	Genes from several sources of blast resistance, and use of DNA probes	Spraying fungicides or other chemical controls, as comparable practices lacking	Small holder and other farmers in Colombia, as well as agricultural scientists, breeders
Recombinant vaccine	Rinderpest Control	Effective vaccine, more capable of withstanding African conditions	Genes cloned which produce surface proteins of virus	Cold chain refrigeration and other technical difficulties for vaccinations	Nomadic herders, small holders
Viral protection	Sweet potato	Effective virus resistance for use in household farming situations	Coat protein gene for feathery mottle virus	Poorly adapted cultural practices	Small holders, women
Biodiversity	In situ biodiversity	Improved knowledge base and inventory for biodiversity	Provide source of genetic information to meet future needs	Disorganized information, not inviting to users, lacking precise retrieval mechanism	Broad stakeholder involvement

**Figure 1: International Biotechnology Programs**



*Fig 2. R&D = Research and development; HRD = Human resource development; NPP = National program participation; INFRA = Infrastructure development; INFO = Information and communication; PPM = Program planning, policy and management. Chart is based on data on grant funding for the 25 crop and livestock research programs (totaling US\$ 140 million), in order to keep the information comparable.*



NAME (host Institution)	PRIORITIES	AGRICULTURAL FOCUS (crop / livestock)	REGION / COUNTRY FOCUS
ICGEB - Plant Biology Programme (International Center for Genetic Engineering and Biotechnology, Italy/India)	<ul style="list-style-type: none"> <li>• capacity building</li> <li>• genetically improved rice</li> </ul>	<ul style="list-style-type: none"> <li>• rice</li> </ul>	<ul style="list-style-type: none"> <li>• international member countries</li> </ul>
ICRISAT - Molecular and Cellular Biology Program (International Crops Research Institute for the Semi-Arid Tropics, India)	<ul style="list-style-type: none"> <li>• support and complement conventional crop improvement programs at ICRISAT</li> </ul>	<ul style="list-style-type: none"> <li>• sorghum</li> <li>• pearl millet</li> <li>• groundnut</li> <li>• chickpea</li> <li>• pigeonpea</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
ILIRSDA - Plant Biotechnology Program (Institut international de recherche scientifique pour le développement en Afrique, Côte d'Ivoire)	<ul style="list-style-type: none"> <li>• conservation and characterization of yam germplasm</li> <li>• micropropagation and genetic improvement of yam and other crops</li> </ul>	<ul style="list-style-type: none"> <li>• yam</li> <li>• African eggplant</li> </ul>	<ul style="list-style-type: none"> <li>• Africa</li> </ul>
ITA - Biotechnology Research Unit (International Institute for Tropical Agriculture, Nigeria)	<ul style="list-style-type: none"> <li>• tackle recalcitrant problems in crop improvement</li> <li>• enhance national research capabilities</li> </ul>	<ul style="list-style-type: none"> <li>• cowpea</li> <li>• yam</li> <li>• cassava</li> <li>• banana/plantain</li> </ul>	<ul style="list-style-type: none"> <li>• Africa</li> </ul>
International Laboratory for Tropical Agricultural Biotechnology, ILTAB (Scripps Research Institute, USA)	<ul style="list-style-type: none"> <li>• genetically engineered food crops with virus resistance</li> </ul>	<ul style="list-style-type: none"> <li>• rice</li> <li>• cassava</li> <li>• tomato</li> <li>• sugarcane</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
International Program on Rice Biotechnology (Rockefeller Foundation, USA)	<ul style="list-style-type: none"> <li>• rice genetic improvement</li> <li>• capacity building</li> </ul>	<ul style="list-style-type: none"> <li>• rice</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
International Service for the Acquisition of Agri-biotech Applications, ISAAA (Cornell University, USA)	<ul style="list-style-type: none"> <li>• Transfer and delivery of appropriate biotechnology applications to developing countries and the building of partnerships between institutions in the South and the private sector in the North, and by strengthening South-South collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• vegetables</li> <li>• fruits</li> <li>• field crops (e.g., cotton)</li> <li>• cereals</li> <li>• forestry</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
Overseas Development Administration - Plant Sciences Research Programme (University of Wales, UK)	<ul style="list-style-type: none"> <li>• genetically improved crops</li> </ul>	<ul style="list-style-type: none"> <li>• cereals</li> <li>• roots and tubers</li> <li>• legumes</li> <li>• oilseeds</li> <li>• fruit and vegetables</li> <li>• fibres</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
Philippine-German Coconut Tissue Culture Project (Albay Research Center, Philippines)	<ul style="list-style-type: none"> <li>• micropropagation of coconut</li> </ul>	<ul style="list-style-type: none"> <li>• coconut</li> </ul>	<ul style="list-style-type: none"> <li>• Philippines</li> </ul>
Regional Program of Biotechnology for Latin America and the Caribbean (several UN organizations)	<ul style="list-style-type: none"> <li>• collaborative research projects</li> <li>• training</li> </ul>	<ul style="list-style-type: none"> <li>• maize</li> <li>• potato</li> <li>• sugarcane</li> </ul>	<ul style="list-style-type: none"> <li>• Latin America and the Caribbean</li> </ul>

NAME (host institution)	PRIORITIES	AGRICULTURAL FOCUS (crop / livestock)	REGION / COUNTRY FOCUS
Research on the Date Palm and the Arid Land Farming Systems (Estacion Phoenix, Spain)	<ul style="list-style-type: none"> <li>• in-vitro propagation</li> <li>• biological control technology</li> <li>• date palm farming systems</li> </ul>	<ul style="list-style-type: none"> <li>• date palm</li> </ul>	<ul style="list-style-type: none"> <li>• Africa</li> <li>• Asia</li> </ul>
<b>LIVESTOCK BIOTECHNOLOGY PROGRAMS</b>			
CIRAD - Animal Production Division (Centre de coopération international en recherche agronomique pour le développement, France)	<ul style="list-style-type: none"> <li>• development of heat-stable vaccines through genetic engineering</li> <li>• improved diagnostic tests</li> <li>• determination of genetic resistance to diseases</li> </ul>	<ul style="list-style-type: none"> <li>• cowdriosis</li> <li>• dermatophilosis</li> <li>• rinderpest</li> <li>• peste des petits ruminants</li> <li>• mycoplasmosis</li> <li>• trypanosomiasis</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
ILRI - Tick-Borne Diseases Program (International Livestock Research Institute, Kenya)	<ul style="list-style-type: none"> <li>• novel vaccines</li> <li>• improve current control methods</li> </ul>	<ul style="list-style-type: none"> <li>• theileriosis</li> <li>• cowdriosis</li> <li>• anaplasmosis</li> <li>• babesiosis</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
ILRI - Trypanosomiasis Program (International Livestock Research Institute, Kenya)	<ul style="list-style-type: none"> <li>• improve diagnosis and parasite characterization</li> <li>• novel vaccines</li> <li>• breeding for genetic resistance</li> </ul>	<ul style="list-style-type: none"> <li>• trypanosomiasis</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
International Laboratory of Molecular Biology for Tropical Disease Agents, ILMB (University of California, USA)	<ul style="list-style-type: none"> <li>• live recombinant virus vaccines for animal diseases</li> <li>• technology transfer</li> </ul>	<ul style="list-style-type: none"> <li>• rinderpest</li> <li>• bovine virus diarrhoea</li> <li>• equine influenza</li> <li>• peste des petits ruminants</li> <li>• foot and mouth disease</li> <li>• vesicular stomatitis virus</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
International Program on Vectors and Vector-borne Diseases (University of Florida, USA)	<ul style="list-style-type: none"> <li>• development and commercialization of improved vaccines and diagnostic tests</li> </ul>	<ul style="list-style-type: none"> <li>• heartwater</li> </ul>	<ul style="list-style-type: none"> <li>• SADC countries</li> <li>• Caribbean</li> </ul>
Small Ruminant Collaborative Research Support Program - Animal Health Component (Washington State University, USA)	<ul style="list-style-type: none"> <li>• improve the efficiency of milk and meat production from small ruminants</li> <li>• virus-vectorized vaccines for sheep and goats</li> </ul>	<ul style="list-style-type: none"> <li>• heartwater</li> <li>• contagious caprine pleuropneumonia</li> <li>• Nairobi sheep disease</li> </ul>	<ul style="list-style-type: none"> <li>• Kenya</li> <li>• Indonesia</li> <li>• Bolivia</li> </ul>
<b>CROP / LIVESTOCK PROGRAMS</b>			
ICIPE - Biotechnology Research Unit (International Centre of Insect Physiology and Ecology, Kenya)	<ul style="list-style-type: none"> <li>• biological control of pests (plant protection) and vectors</li> <li>• development of anti-tick vaccines</li> <li>• development of diagnostics tools</li> </ul>	<ul style="list-style-type: none"> <li>• maize</li> <li>• sorghum</li> <li>• cowpea</li> <li>• cattle</li> </ul>	<ul style="list-style-type: none"> <li>• Africa</li> </ul>
Indo-Swiss Collaboration in Biotechnology, ISCB (Federal Institute of Technology, Switzerland)	<ul style="list-style-type: none"> <li>• research capacity building</li> <li>• human resource development</li> <li>• development, production and commercialization of specific biotechnology products</li> <li>• partnerships between research groups (public and private sector)</li> </ul>	<ul style="list-style-type: none"> <li>• foot and mouth disease</li> <li>• contagious caprine pleuropneumonia</li> <li>• plant biopesticides</li> </ul>	<ul style="list-style-type: none"> <li>• India</li> </ul>

NAME (host institution)	PRIORITIES	AGRICULTURAL FOCUS (crop / livestock)	REGION / COUNTRY FOCUS
<b>NETWORKS</b>			
African Biosciences Network - Sub-Network for Biotechnology, ABN-BIOTECHNET (University of Nigeria, Nigeria)	<ul style="list-style-type: none"> <li>genetically improved crops and farm animals</li> <li>disease control through new vaccines</li> <li>capacity building</li> </ul>		<ul style="list-style-type: none"> <li>Africa</li> </ul>
Asia Network for Small-Scale Agricultural Biotechnologies, ANSAB	<ul style="list-style-type: none"> <li>plant tissue culture</li> <li>biopesticides</li> <li>biofertilizers</li> <li>mushroom technology</li> </ul>	<ul style="list-style-type: none"> <li>potato</li> <li>kapok tree</li> <li>rice</li> <li>mushroom</li> </ul>	<ul style="list-style-type: none"> <li>Asia</li> </ul>
Asian Rice Biotechnology Network, ARBN (International Rice Research Institute, The Philippines)	<ul style="list-style-type: none"> <li>DNA fingerprinting of pests and pathogens</li> <li>low-cost marker-aided selection</li> <li>transgenic rice</li> </ul>	<ul style="list-style-type: none"> <li>rice</li> </ul>	<ul style="list-style-type: none"> <li>Asia</li> </ul>
<u>Phaseolus</u> Bean Advanced Biotechnology Research Network, BARN (International Center for Tropical Agriculture, Colombia)	<ul style="list-style-type: none"> <li>constraint identification</li> <li>technology transfer</li> <li>information exchange</li> </ul>	<ul style="list-style-type: none"> <li>beans</li> </ul>	<ul style="list-style-type: none"> <li>international</li> </ul>
Cassava Biotechnology Network, CBN (International Center for Tropical Agriculture, Colombia)	<ul style="list-style-type: none"> <li>stimulate cassava biotechnology research on priority topics</li> <li>integrate priorities of small-scale farmers, processors, and consumers in cassava biotechnology research planning</li> <li>information exchange</li> </ul>	<ul style="list-style-type: none"> <li>cassava</li> </ul>	<ul style="list-style-type: none"> <li>international</li> </ul>
Technical Cooperation Network on Plant Biotechnology, REDBIO (Food and Agriculture Organization of the United Nations, Regional Office for Latin America and the Caribbean, Chile)	<ul style="list-style-type: none"> <li>generation, transfer and application of plant biotechnology</li> <li>national and regional policies</li> <li>information exchange</li> </ul>	<ul style="list-style-type: none"> <li>vegetables</li> <li>roots and tubers</li> <li>cereals</li> </ul>	<ul style="list-style-type: none"> <li>Latin America and the Caribbean</li> </ul>
<b>DONOR AGENCIES</b>			
Australian Centre for International Agricultural Research, ACIAR	<ul style="list-style-type: none"> <li>use biotechnology wherever appropriate as a research tool within any of ACIAR's projects</li> </ul>		<ul style="list-style-type: none"> <li>international</li> </ul>
DGIS Special Programme Biotechnology and Development Cooperation (Ministry of Foreign Affairs, The Netherlands)	<ul style="list-style-type: none"> <li>improve developing-country access to biotechnology, with special emphasis on small-scale producers and women</li> <li>technical cooperation</li> <li>international collaboration and coordination</li> </ul>	<ul style="list-style-type: none"> <li>"orphan" commodities</li> <li>cassava</li> </ul>	<ul style="list-style-type: none"> <li>Colombia</li> <li>India</li> <li>Kenya</li> <li>Zimbabwe</li> </ul>
FAO/AGP Programme on Plant Biotechnology (Food and Agriculture Organization of the United Nations, Italy)	<ul style="list-style-type: none"> <li>information dissemination and cooperation</li> <li>advisory services</li> <li>capacity building</li> <li>promote research, technology transfer and adoption</li> </ul>	<ul style="list-style-type: none"> <li>rice</li> <li>roots and tubers</li> <li>horticulture</li> <li>industrial crops</li> </ul>	<ul style="list-style-type: none"> <li>international</li> </ul>

NAME (host institution)	PRIORITIES	AGRICULTURAL FOCUS (crop / livestock)	REGION / COUNTRY FOCUS
GTZ Biotechnology in Plant Production (Agency for Technical Collaboration, Germany)	<ul style="list-style-type: none"> <li>• development of micropropagation systems with diagnostic and pathogen elimination</li> <li>• training and capacity building</li> <li>• integration of biotechnology within BMZ/GTZ supported projects</li> </ul>	<ul style="list-style-type: none"> <li>• potato</li> <li>• cassava</li> <li>• yam</li> <li>• date palm</li> <li>• coconut</li> <li>• banana</li> </ul>	<ul style="list-style-type: none"> <li>• Africa</li> <li>• Asia</li> </ul>
Swedish Agency for Research Collaboration with the Developing Countries, SAREC	<ul style="list-style-type: none"> <li>• plant and forestry genetics</li> <li>• diagnostics and vaccines in veterinary medicine</li> <li>• environment</li> <li>• biosafety</li> <li>• policy research</li> </ul>		<ul style="list-style-type: none"> <li>• Africa</li> <li>• Asia</li> </ul>
United Nations Development Programme	<ul style="list-style-type: none"> <li>• productive and sustainable agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• food crops</li> <li>• cash crops</li> <li>• livestock</li> </ul>	<ul style="list-style-type: none"> <li>• international</li> </ul>
United Nations Educational, Scientific, and Cultural Organization – Biotechnology Action Council	<ul style="list-style-type: none"> <li>• human resource development</li> </ul>		<ul style="list-style-type: none"> <li>• international</li> </ul>
World Bank	<ul style="list-style-type: none"> <li>• invest in biotechnology as a contribution to economic development in World Bank member countries</li> </ul>		<ul style="list-style-type: none"> <li>• international</li> </ul>
<b>POLICY / MANAGEMENT PROGRAMS</b>			
Biotechnology Advisory Commission, BAC (Stockholm Environment Institute, Sweden)	<ul style="list-style-type: none"> <li>• provide independent, impartial advice on biosafety development and implementation to developing countries</li> <li>• biosafety capacity building</li> </ul>		<ul style="list-style-type: none"> <li>• international</li> </ul>
Canada-Latin America Initiative on Biotechnology and Sustainable Development, CamBioTec (Center for Technological Innovation, National Autonomous University, Mexico)	<ul style="list-style-type: none"> <li>• identify opportunities for biotechnology research and applications by tracking technological trends and carrying out priority-setting exercises</li> <li>• strengthen public policies in biotechnology</li> <li>• promote improved management of innovations</li> <li>• foster partnerships between Canadians and Latin Americans</li> </ul>		<ul style="list-style-type: none"> <li>• Latin America</li> </ul>
Intermediary Biotechnology Service, IBS (International Service for National Agricultural Research, The Netherlands)	<ul style="list-style-type: none"> <li>• biotechnology research program management and policy formulation</li> <li>• country reviews</li> <li>• identify international program expertise</li> </ul>		<ul style="list-style-type: none"> <li>• international</li> </ul>
Support to Agricultural Biotechnology Policies (Interamerican Institute for Cooperation in Agriculture, Costa Rica)	<ul style="list-style-type: none"> <li>• biosafety, IPR</li> <li>• industry development</li> </ul>		<ul style="list-style-type: none"> <li>• Latin America and the Caribbean</li> </ul>



# **Storage and Processing of Agricultural Products**

## **- The Challenge for Food Technology in Developing Countries -**

by

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### **Food as a commodity**

The problems of food security are many, but one aspect which has received insufficient attention is how to prevent the destruction and spoilage of food following harvesting, gathering or butchering. Some estimates put the loss of food through spoilage as high as 40% in developing countries. It may be surprising that the estimate for food losses in industrialised countries is as high as 25%. However, the reasons for these losses are not the same. The loss of food in industrialised countries is due largely to wastage and poor utilisation of raw materials - to a great extent a problem of an affluent society. In developing countries, on the other hand, the loss of food is mainly due to spoilage by microorganisms or to being eaten and sullied by insects or larger animals, especially rodents.

In a drive towards increased food security and food safety in developing countries, several important aspects should be addressed. Firstly, the provision of enough food must include preservation ( in general terms) of the food that is produced. To grow more food when 40% is destroyed before it can be eaten by man or his domesticated animals is not good economy and is certainly ecologically indefensible. Secondly, the available food should be safe. It should be free from pathogenic microorganisms and poisonous chemicals. The food available to a population should enable them to have a balanced diet.

The small scale farmer in developing countries will most likely stay poor unless radical changes are made to food production systems. The poor farmer cannot get rich by selling his excess production on the world market. It is questionable whether a policy which advocates and promotes production of low-price commodities and self-sustainability offers these farmers much of a future.

If a farmer produces exactly enough food for his family, and nothing else in the way of saleable items, his situation will in fact grow worse since he will have no available cash to purchase any other of life's necessities unless he himself goes hungry. Production of food in excess of requirements gives the potential of earning money by selling the surplus. How successful this is depends on the demand from the local market and also of the local peoples' buying power. At best such income will be spasmodic. At times the farmer will have no surplus to sell, at other times a general surplus of a commodity may make sale difficult or unprofitable.

In a developing system, food is a commodity which becomes part of the raising of the standard of living.

## Food Losses

Much food is lost due to spoilage during storage. In tropical countries, the hot temperatures are conducive to rapid deterioration due to microorganisms and pest control is more difficult than in temperate climates, where harsh winters exert a certain seasonal control. With the problems and expense of creating a system of cooled food transport, getting the food to larger markets unspoiled may not be possible. Trucking of fruit and vegetables on poor roads may cause considerable bruising, thus reducing their sale value and hastening decay. Transporting milk in uncooled tankers over long distances to a large dairy will result in growth of microorganisms which at best make the milk a poor raw material for further processing, at worst unsuitable for use at all. Raw meat and fish suffers similarly from transport. Thus, the transportation of food raw materials to a distant market not only results in an inferior product but will also mean that the additional profit attainable by food processing is moved from the rural to the urban areas.

Much of the total profit in food production lies, not in the growing of crops or the rearing of animals, but in the *processing* of food raw materials. The income of rural populations can only be meaningfully increased if processing of raw materials is done *in the rural areas* so that the profits of this processing are returned to the local producers. This could be achieved by the setting up of small-scale co-operative food processing units. It is important to point out that this sequence of events has taken place in the past in most industrialised countries, in particular within dairying. Surplus food products can either be sold locally or transported to urban areas. The latter can result in a much-needed translocation of revenue from the urban to the rural areas which should also slow down urbanisation. An additional advantage with local processing is that processed foods often have an extended shelf life compared to the raw materials and are therefore easier to transport. A significant advantage can be gained by processing locally a highly perishable product and reducing losses through early treatment. Waste from food processing in rural areas can be composted or fed to animals; in urban areas this waste constitutes a pollution problem and is expensive to dispose of properly.

*Large-scale* production of processed food products may bring the benefits of more cost-effective processing and improved food quality. However, the establishment of large factories in the urban areas will not benefit the rural farmer. It will benefit the investors and the factory workers and also possibly increase the influx of rural peoples to the towns. In addition, the present lack of expertise in food science would make large-scale units dependent on foreign leadership.

## What can Food Technology offer?

The processing of food does not only result in the extension of shelf life. Food which has been processed is often safer from the point of view of pathogenic microorganisms. This can be due to the actual process, of which heat treatment is probably the most important. If processing has been done near to the area of raw material production then growth of unwanted microorganisms in the unprocessed food should be reduced due to the shorter time before processing can take place. This reduction in time may also cut down the opportunity for the development in the food of toxins from microbial growth.

Many food processing techniques alter the nutritional value of the product - either positively or negatively. For example, some heat treatment of some foods may result in a more digestible food but may also reduce the amount of vitamins or the availability of amino acids.

Processing of food almost always results in a change in the sensory attributes. In some processes, this change is not desirable and every effort is made to reduce such changes. An example of this is the use of heat treatments for milk which give the least possible change in taste whilst still achieving the necessary reduction in microorganisms. However, in many other cases, the process results in changes which are necessary to attain the desired taste or texture. Dried and salted foods taste different from the original raw

material and as such may be regarded as a food different from the fresh product. Fermentation processes result in production of important flavour compounds which are characteristic for the product.

### **Challenges in developing countries for Food Technology**

In developing countries, many of the foods eaten are not those which figure in text books for food technology. The raw materials may be uncommon or even unknown in industrialised countries and technologies may be used whose description has never been published. However, these foods are a part of the people's heritage and culture. The raw materials are usually produced in sustainable systems, suited to the area's climate and soils. Introduction of alternative foods or technologies based on those used in industrialised countries is not necessarily going to be a success story.

More advanced food processing technology may be dependent on the availability of electric power or other fuels and this can be a problem in remote areas. The use of wood for fuel cannot be recommended as part of development of local food processing due to the negative impact on the environment.

Central to many food processes is the availability of plenty of potable water. This can present a problem for rural areas but is in any case one of the most important aspects of development and many projects exist for the provision of water in rural areas.

Vagaries of climate, in particular high ambient temperatures, are also a challenge for the development of small - scale food processing industries since the onset of spoilage is brought forward. Heavy rains and poor roads can also cause problems for transport of products away from the local production areas to small or large towns. The need for pest control is greater in tropical areas. However, if the product is destined for export, the purchasing country may impose minimum levels for pesticide residues which are difficult to attain whilst controlling the pests.

Distribution, sales and marketing are foreign terms in areas which have previously based their food production and consumption on self-sufficiency. These aspects must, however, be addressed when developing systems of local food processing.

### **Traditional Food Processing**

The use of heat to treat food is one of the most ancient of food technologies. Many raw materials change both in taste, consistency and digestibility when subjected to heat. Simultaneously, the food becomes safer as pathogenic microorganisms are destroyed. Heat treatment at the household level is a fairly uncontrolled process, with neither even nor constant temperature and times being employed.

The sun-drying of foods is a cheap way of preserving those foods which lend themselves to this treatment, for example some fruits, nuts, fish and meat. Dried foods are less prone to microbial degradation due to their low water activity. However, dried foods may be attacked by yeasts and moulds, and are not necessarily free from pathogenic organisms if they have not been dried under hygienic conditions.

Some fruits and vegetables can be extracted to give juice which may then be fermented to alcoholic brews.

In tropical countries, many foods undergo spontaneous fermentation and the result becomes a new product with new properties of flavour and consistency.

### **Traditional Fermented Foods**

Fermentation of food is caused by the growth of specific microorganisms. The microorganisms naturally present in, or added to, the food begin to grow and their metabolism of the food components causes specific changes in the taste and consistency of the original raw material. In most countries of the world



fermented foods of various types are consumed. We are all familiar with dairy products such as yoghurt and cheese, and with olives and coffee. These, along with many other everyday foods are in fact produced using fermentation techniques. In tropical countries the range of fermented foods is often greater. This is a natural consequence of the high ambient temperature and lack of cooling facilities.

Virtually all types of foods can be -and are- subjected to fermentation processes: vegetables, fruits and cereals; milk, fish and meat. In the case of spontaneous fermentations, the microorganisms which cause the desired changes are those present in or on the raw materials. Various technological procedures can influence which microorganisms will dominate in the fermented foods. In many cases, the desirable organisms have been found to be various specific types of lactic acid bacteria and /or yeasts. However, in such an uncontrolled production system, the chance of other, less desirable, organisms also being present, represents a threat both to health and to food quality. An unsuccessful fermentation can therefore result in wastage of large amounts of raw materials.

### **Upgrading of traditional fermented food technology**

Little is known about the changes and the causes of changes that occur during the fermentation of the majority of traditional fermented foods in tropical countries. If the traditional foods of these countries are to be preserved, it is necessary that these processes are researched before they are forgotten and replaced by unfamiliar foods introduced from industrialised countries. Such research requires a detailed documentation of the traditional production technology, including local variations. The microorganisms responsible for these fermentations must be isolated, characterised and selected according to their desirable contribution in the fermentation process. They can subsequently be added to new batches of raw material in order to promote the desired fermentation. The development of suitable small-scale processing equipment is also necessary. This can facilitate the preparation of the raw material before the fermentation step or contribute to the actual fermentation by providing an environment in which the fermentation can proceed under controlled conditions of temperature and humidity, and free from contamination by unwanted microorganisms or pests. Control of fermentation processes gives safer foods of consistent and better quality since the fermentation is no longer a matter of chance.

### **Let's get the food and the technology right !**

In the development of traditional food technologies for small-scale processing it is important that certain aspects are not forgotten. The raw material and intended product should be familiar to those who will carry out this processing. The target market should also be defined. The scale of production and the requirements for distribution and packaging will to a large extent be dependent upon whether the product is destined for local markets, urban areas or for export. The introduction of small-scale processing of raw materials which are known to have a sustainable production and a stable market is more likely to be successful than introduction of, for example, a non-indigenous plant which is to be processed into an unfamiliar product with unknown long term appeal. When selecting a raw material or food product, the type of storage or distribution network necessary for an acceptable shelf life must also be considered.

When considering the establishment of small-scale food manufacturing systems, the seasonal variation in the availability of raw materials should be assessed. A production based on raw materials which have a limited keeping quality and which are harvested only two months of the year is not likely to be an economic success and will at best provide spasmodic income.

Small-scale technology has an advantage over large-scale manufacturing since the equipment required can be kept relatively simple and may be based on man- or animal power. This should reduce the chances for production stops due to breakdown of equipment in areas where it may be difficult to obtain spare parts quickly and where qualified technical assistance may be hard to come by.

The economic aspects of upgrading traditional food technologies cannot be ignored and there is a need for experts in this field to assess the market potential for products before significant investments are made.

### **The gender issue**

In many developing countries, women are responsible for the production and processing of food for the family, possibly also for sale. These women have an inherent understanding of the food processes and the procedures necessary for the products' safety. The production of food is part of their cultural heritage. The making of saleable commodities for the market not only give women the social contact and status but also money in *their* hands which they can use according to their priorities. Women are more likely to use money for the improvement of the family's well-being.

This strong emphasis on women may act as a break in the development of small-scale production systems within the present social structure in so far as women unfortunately have less access to improved technology, extension services and credit. If food manufacturing businesses become dominated by men, the women will lose an important source of income and contact. This threat to the social structure of rural communities can be mitigated by assistance in the setting up of women's co-operatives, and making special credit facilities available to women.

### **The potential effect of local food processing on poverty and hunger in the rural areas**

The *local* manufacture of value-added products will bring much-needed revenue to the local populations. The costs of transport of raw materials is reduced and the raw materials can also be processed at the optimum time to achieve best end-product quality. The reduction in food spoilage makes for better economy for the producers, both of raw materials and of products. Safer food will reduce the incidence of food-borne diseases, and the manufacture under controlled conditions will result in better and more stable food quality.

The more organised production and processing of food, where the economic gains are returned to the primary producers will increase the income of these people and also their standard of living. Development of processes which are not too affected by seasonal variations in the availability of raw materials will give the farmer a steady income compared to yearly harvesting of a cash crop.

### **What more is necessary ?**

In developing countries, much emphasis has - rightly - been made on the *production* of more food by improved agricultural systems, the use of fertilisers and the introduction of new varieties of crops, and also on ecological aspects such as the limitation of soil erosion and deforestation. Many developing countries are becoming increasingly aware that they must move from being primary producers to also becoming processors of food. However, this has thrown light on the lack of competency within the field of food science, both in the industry and also in educational institutions where Departments of Food Science are in many countries in their infancy.

By increasing the competency of staff at educational establishments, their knowledge can be passed on to future students destined for the country's food industry. The institution can also become a source of help for the industry on a consultancy basis, thus building on these ties for mutual benefit. Funding for the building up of this type of competence should also include the provision of the necessary "hardware" to give the necessary practical experience, for example pilot plants and laboratories.

The aspect of production hygiene must receive special attention. The move from home processing to small-scale or even large-scale processing creates the possibility of widespread food poisoning or mass food spoilage if the necessary precautions are not taken. It is imperative that knowledge of production hygiene is passed on to all workers in food and catering industries.

In the rural areas, outside investment in processing equipment can give a much needed head start. Advice about and investment in transport and distribution systems and also infrastructure such as buildings is

necessary. As a national food industry develops, the need for *control* of food quality and safety becomes more pressing. It may not be possible to export processed foods if certain safety and quality standards cannot be documented. Central control laboratories are an indispensable institution if the quality of the food produced is to be ensured.

## Background Literature

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**GROUP WORK  
AND  
GROUPS' PRESENTATIONS - SUMMARIES**



## **GROUP WORK**

### **Themes for the groups:**

**Group 1:** Political, economic and social conditions for agricultural development.

**Group 2:** Agricultural development and food security. Access by the hungry to food and to production resources.

**Group 3:** Environmental problems and agricultural development.

**Group 4:** Agricultural production, poverty alleviation and gender.

**Group 5:** The role of technical and institutional innovations in agricultural development.

**Group 6:** Rural development: partnership, public and private sector in credit, extension, input distribution and marketing.

### **Questions to be addressed:**

1. What are the main problems and opportunities relating to the topic of your group?
2. What lessons can be learned from previous experiences in this field regarding assistance to agricultural development?
3. What are the key operational implications of the lessons learned which should be considered in the future Norwegian assistance to agricultural development and which strategies should be given priority?
4. How should different actors (donors, public and private sector in the South and North, local institutions, rural people, NGOs, universities/research institutions etc.) collaborate to achieve sustainable agricultural development and improve the food security situation for the poor as relates to the topic of your group?

Each group was given 1 ½ hours to discuss their topic. A summary of the presentations follows below.



## GROUPS' PRESENTATIONS -SUMMARY

### **Group 1 - Political, economic and social conditions for agricultural development.**

**Group leader:** Ole Hofstad.

**Group members:** Helle Biseth, Steinar Hagen, Alf Morten Jerve, Thor Larsen, Hans Peter Melby, Nina Mosseby

#### *Main problems and opportunities*

- Weak civil societies:
  - lacks good governance
  - struggle with a high pressure on governments
  - lack interest organisations for poor peasants
- Markets, prices and taxation. The trend has been to remove controls
- Macro-economic conditions
- Lack of education
- Land tenure

#### *Key operational implications of the lessons learned*

- Assist governments in building systems for good governance
- Develop management systems to avoid corruption and mismanagement
- To recognise that development institutions have to develop from people's own perception of problems
- To try to promote markets to work properly through emphasising frame conditions rather than sector projects
- To support policy development
- To assist in the implementation of the policies
- To improve infrastructure
- To promote credit institutions
- To make better use of research
- Education might have long term effects in favour of the agricultural sector
- Basic education should be improved with priority towards a larger set of the population
- Education for women should be encouraged
- Assist in the registration and drawing up of maps

## **Group 2: Agricultural development and food security. Access by the hungry to food and to production resources.**

**Group leader:** Ruth Haug.

**Group members:** Torger Dahl, Arve Lund, Adelaida Semesi, Johannes Stangeland, Asbjørn Tevik,

### *Main problems and opportunities*

- Too little emphasis on primary stakeholders' lack of farmer participation, too little dialogue, and too little listen and learn
- Poverty and hunger
- Elite benefit from assistance
- Top down approaches
- Lack of funds for appropriate planning of projects
- Universities function as ivory towers
- Lack of appropriate incentive systems in the academic environment for research to play a role in rural development and poverty alleviation

### *Lessons learned and strategy development*

- Need for quantitative and qualitative goals for agricultural assistance (e.g. 20% as Danida).
- Sector strategy for agriculture and rural development  
E.g.: Country studies for each partner country on agricultural and rural development.
- NORAD should clarify what it means by food security. NORAD should also recognise and follow up the policy statement and action plan from the World Food Summit which Norway has signed.

### *Key operational implications of lessons learned*

- Farmers first and last-strategy:

A) Institutional collaboration through 'Movement to movement':

Farmers groups/farmers unions make direct links between North and South. This is not an aim in itself but a tool to get access to inputs, credits, extension, markets which should lead to empowerment.

B) University collaboration:

- Change the ivory tower setting
- Research and education which should have a meaning in society
- Extension, outreach, farmers
- Change the incentive systems
- Production of text books
- In-service training

### **Group 3: Environmental problems and agricultural development.**

**Group leader:** Stein T. Holden.

**Group members:** Knut-Erik Gjestang, Jessica Kathle, Inger Næss, Sverre Utne, Tor G. Vågen, Henrik Wiig

#### *Main problems and opportunities*

- Land degradation; lack of recognition and understanding of local differences
- Agro-ecological limiting factors: seed quality improvement, fertiliser and nutrient availability
- Socio-economic limiting factors: poor market structure, uneven and uncertain distribution of resources, gender, national policies, institutional capacity

#### *Lessons to be learned*

- Local participation is important in the identification and implementation of projects/programmes, knowledge of local conditions, and in the building of local institutions

#### *Key operational implications of the lessons learned*

- Work through and strengthen local institutions
- The need for a closer collaboration and linkage between development assistance and research
- Donors need to coordinate their interventions through a demand driven approach
- NGOs are important at local level, but it is important to strengthen the role and capacity of governments
- There should be a linkage and coordination to the CGIAR-system
- Strengthen national policymaking capacity and policy

## **Group 4: Agricultural production, poverty alleviation and gender.**

**Group leader:** Bodil Maal.

**Group members:** Moira Eknes, Terje Gran, Aida Isinika, Kjersti Larsen, Inge Nordang, Atle Tærum, Bjørn Wold

### *Main problems and opportunities*

- 70% of all poor people (1.3 billion) are women. Gender need therefore to be central in any attempt to alleviate poverty.
- Poor people does not make a homogenous group. They have different resource bases (entitlement bundles) concerning human, material, legal, cultural and social resources.
- Poor people tend to have poor access to resources. Consequently, women have poor access to vital resources.
- Poor people are difficult to reach directly (i) because they often lack a permanent house (floating population), (ii) because poor women often have no spare time to set aside to participate in projects/programmes because they need to work for the wellbeing of their family, (iii) social restrictions makes it more difficult for poor women to participate in larger groups, and (iv) some may be ill due to various reasons.
- Poor people usually lack legal property rights to the land which they are cultivating.
- Poor people tend to lack the incentives to ask for assistance to supervision, inputs etc.
- Governing staff tend to have negative perceptions about poor people.
- Agricultural extension agents often address successful male farmers.
- In marginal areas input resources to agriculture (i.e. chemical fertiliser) are not accessible. Poor people usually can not afford to travel to town markets (i.e. to buy fertiliser) due to high transport costs and because they lack purchasing power. Women may have difficulties in transporting heavy bags of fertiliser.
- There need to be an empowerment of poor people: increased access to markets, improved education and access to education particularly for girls. But: poor households loose important resources by sending girls to school. What are the consequences of this strategy?

### *Lessons to be learned*

- It is necessary to direct assistance to poor women. They should be empowered before asking for support from the government.
- Direct support to women might cause women to face problems in relation to powerstructures and men when the projects are phasing out. It is therefore important to always include the entire local community, and include the traditional powerstructures before implementing any gender related projects.
- Introduction of new technology requires particular recognition of gender issues. Experiences show that men tend to take over the new technologies introduced.
- Empowerment is a slow process. Poor women need to see their own potential in order to be the driving force in their own development. The process should not be hurried!
- Field assistants and supervisors should only motivate and support the process. Poor women themselves need to take the initiative! This type of assistance tend to collide with donors' eagerness to use funds rapidly (the pipeline problem).

- Structural Adjustment Programs have excluded public market interventions. The smallest (and often poorest) producers do not manage to adjust to the opened markets. There is a need for a minimum price on central agricultural products in order to ensure that poor people can sell their products. Poor people need transport to the central markets.
- Female and male farmers need to organise themselves. NORAD should support farmers unions, but avoiding parastatal organisations. We should draw upon the experiences from East African co-operatives.
- Previous women-projects have usually been small-scale lacking a marketing potential (handicraft). There is a growing potential in supporting women which enter trading as business.

*Key operational implications of the lessons learned*

- Integrated rural development programmes should be given more emphasis and support, strengthening local groups and institutions
- Norwegian assistance should be directed directly to the rural districts. The rural districts need to be empowered, and the local community should be given more legal rights in the district politics (through i.e. taxes and local ownership in programmes and projects).
- Female and male farmers networks should be supported and encouraged. There should be given small funds to local communities. The local community need to be given ownership and responsibility for the projects. It is a challenge for the donors to ensure that the funds remain within the local community, and they should avoid trying to cover the entire country at once.
- Training/education and information should be offered to the communities if they are interested in it. This should be carried out through a demand driven approach.
- Women should be given access to markets, information, credit and transport.

*How different actors should collaborate*

- It has to be a close collaboration between universities in the South and the North, NGOs and governments/national authorities.
- Research should be directed towards a more action-based focus, compared to today's theoretically and academically based research.
- There is a need for research that satisfy the national needs and as well as the needs of the poor population. Women needs should receive more attention.

## **Group 5: The role of technical and institutional innovations in agricultural development.**

**Group leader:** Lars Ekman.

**Group members:** Jens Aune, Joel Cohen, Colin Murphy, Judith Narvhus, John Pender Kåre Ringlund, Jon Kr. Øiestad,

### *Main problems and opportunities*

- Gap between potential and performance in relation to:
  - incentives and resources for technological innovations
  - institutional linkages
  - linkage of technical and social aspects; farmers perspectives
  - economic and policy environment conducive to farmer innovation
- Need for a longer term perspective in terms of external finance
- Lack of national commitment

### *Lessons to be learned*

- Methods and experiences should be given more emphasis (holistic, empirical, on-farm)
- Paradox: there are high social returns to technological dissemination and research, whereas there is a low priority and commitment by national governments. Why? The accountability of governments are more influenced by an urban elite which lacks awareness of the rural potentials. (Parallel issue: CIGAR funding: fear of competition?)

### *Key operational implications of the lessons learned/ How different actors should collaborate*

- Donors should keep a long term perspective in their funding
- Donors should support capacity building in policy research and formulation with regard to technological generation and dissemination systems.
- Support/stimulate involvement of farmers in priority setting through i.e. channel funds
- Insist on governmental accountability for conducive environment for innovation

## **Group 6: Rural development: partnership, public and private sector in credit, extension, input distribution and marketing.**

**Group leader:** Lars A. Wiersholm.

**Group members:** Frøydis Aarbakke, Hanne Carus, Kjell-Erik Nordlie, Hekki Olavi Pirenen, Ragnhild Sohlberg, Marion Tviland, Edel Urstad

### *Problems and opportunities*

- Lack of proper partner institutions
- Lack of good partnership contracts, both from donors' and recipients' side
- Too much focus on financial issues in the debate of recipient responsibility
- Lack of equal information between donors and recipients
- Short time planning and implementation periods
- High economic risks, i.e. small markets and unstable exchange rates makes few foreign companies willing to provide loans on inputs and credit.
- High risks for farmers concerning input and outputs/yields makes it more risky to use inputs.
- Lack of small scale credit schemes within already existing systems

### *Lessons to be learned / Key operational implications of the lessons learned*

- Partnership requires:
  - Institution building. There should be given priority to find/establish good partner institutions from the partner countries
  - Planning.
  - Mutual respect. Difficult to create due to one party bringing in the money.
  - Honesty about the project period
  - Long term relations. Good partnerships needs time to evolve and be strengthened.
  - Financial control. There should be strict rules for reporting. Time should be spent on explaining why reporting is required.
  - Commitment from the partner countries to give some financial contribution
- Farmers should be assisted in getting an improved access to vital inputs through:
  - providing information
  - reducing transaction costs
  - ensure availability of inputs
- Improved access to markets through i.e. cooperation between farmers (stronger together, floor price etc.).
- Small scale credit schemes should be established. But this is sometimes difficult to do through already existing credit institutions, as they might be unwilling to make small scale investments.
- Every credit system need to have a component of savings.

*How different actors should collaborate*

- There should be created a consultant base through a collaboration between the Norwegian actors becoming proper discussion partners (private, research, NGOs). NORAD, and every actor should exchange views, and draw upon each others knowledge. The discussion partners should meet and focus on particular issues/sectors within one country at a time.
- Donors should talk together and coordinate their actions.
- Donors should coordinate their plans with the ministries.
- Farmers should join hands in order to secure their access to credits, markets, and to handle a least-price system for their products.





## SUCCESS STORIES



## Sasakawa Global 2000, Visions and Strategies

by

Gunnar Øygard  
Advisor Emeritus  
Noragric

### 1. In brief

Sasakawa Africa Association has as the main goal to support programs aimed at defeating malnutrition and poverty in Africa. The organization's strategy is to support programs which can bring science-based crop production methods to the small farms of Sub-Saharan Africa. the program is based on the belief that proven agricultural technology is the key to overcoming widespread food shortages.

Sasakawa Africa Association works in collaboration with Global 2000, a program of the Carter Centre, Atlanta, USA, with the main emphasis to deepening the knowledge of field extension workers about new food technologies and improving their motivation. The program also strives to revive the economic climate for food production by helping decision makers to discern policy bottlenecks and develop sensible alternatives.

The work started in 1986 in Ghana and Sudan. Later new projects followed in Benin, Ethiopia, Nigeria, Tanzania and Togo. Recently projects will start in Burkina Faso, Eritrea, Guinea, Mali, Mozambique and Uganda.

Before starting a new project SG 2000 determines that there is a pool of technology appropriate for the country that could have a significant impact, that the country is food-insecure, and that the government is committed to agricultural development. On that basis SG 2000 and the government draw up a memorandum of understanding that lays out the responsibilities of both parties.

Jimmy Carter, the president of Global 2000 and Norman E. Borlaug, the president of the Board of Directors Sasakawa Africa Association plays a critical role in facilitating this process.

## **2. Typical Project Components**

SG 2000 is working through government agencies. The funds are used for operations rather than for expatriate salaries. Initially SG 2000 focus on training extension workers and farmers in better production technology for the principal food crops. They later take on issues as improved on farm storage, input availability, and credit services. After some years SG shifts from direct involvement in production demonstration programs and expands work in grain storage, draft power, agro-processing, and seed production.

### **2.1 Crop production demonstrations**

The demonstration plots is based on farms where the farmers who agree to provide labour and land for the plot. The plots are large, 1000-5000 square meters. This is done to provide a convincing demonstration of the recommended technology and to reward the farmer with a significant economic return. With such a big plot farmers get a realistic idea of the labour and input costs, as well as the return from the new technology.

The farm families in the area are invited to field days held at the demonstration plots, where they can discuss the pro and cons of the new technology with the participating farmers.

During the last 10 years, SG 2000 has helped to establish 600 000 crop demonstration plots in the participating countries. More than half of these have been financed by the collaborating national governments.

### **2.2. Draft power**

In some of the countries, training programs to introduce and improve draft power have started both for tilling, weeding and transport.

### **2.3 On-farm post-harvest demonstrations**

In most African countries the market systems is functioning poorly. The variation in the food prices are dramatic through the years and therefore on-farm storage is important to preserve the family food supply, to be less depending on a fluctuating market. Better storage facilities and improved ways of harvested grain is important to reduce losses. Some 8000 extension workers have learned how to construct inexpensive but steady storage bins that ward off attacks by insects and rodents.

### **2.4 Agro processing enterprise development**

In cooperation with IITA, Sasakawa 2000 has introduced improved tools and simple machines for processing cereals, oilseeds, roots and tubers.

## **2.5 Private seed enterprise development**

Ghana has developed a flourishing system of farmer seed growers. SG 2000 has been active to extend the skills needed for seed growing to small-scale farmers. A strong national seed certification unit is a critical factor in assuring seed quality, which is a requirement to develop a well functioning sustainable seed market. SG 2000 have been active in the necessary training activity in this development.

## **2.6 Input dealer development**

An efficient system for distributing agricultural inputs is lacking in most African countries. SG 2000 has tried to stimulate local small shops to stock agricultural inputs as they already serve local communities with soft drinks and beer. SG 2000 also helps find ways for input dealers to gain inventory credit from banks and wholesalers.

## **2.7 Farmers association development**

SG 2000 activities brings farmers together and stimulates cooperation among farmers. Farmer groups have acquired the skills to grow and market seed, a demanding but profitable activity. Also savings and loan associations have been developed. Those associations often support other activities as village clinics and schools.

## **2.8 Training of extension staff**

Extension staff in SG 2000 countries are given opportunities to study for a B.Sc. or M.Sc. in agricultural extension. Candidates are selected for technical and leadership skill demonstrated in the field. SAA is also cooperating with universities in the region to develop better programs in extension education and outreach activities.

## **2.9 Policy interventions**

Global 2000 established in 92 an Agricultural Council of Experts. This group is made up of authorities on African agricultural policy and led by G. Edward Shudz, dean of Hubert Humphrey Institute at the University of Minnesota. This group is in an active dialogue with decision makers and professionals analysing the present situation and the potential for improvements in the collaborating countries.

## **2.10 Workshop series**

Periodic workshops to address urgent agricultural development issues are convened by SAA and organized by the Centre for Applied Studies in International Negotiations, Geneva, another organization linked to the Carter Centre.

These workshops bring together a broad spectrum of government leaders, representatives of aid agencies, development banks, NGO's and private companies.

Following proceedings are results from the workshops:

1990 Feeding the Future: Agric. Development Strategies for Africa.

1992 Africa's Agricultural Development in the 1990s: Can it be Sustained.

1993 Policy Options for Agricultural Development in Sub-Sahara Africa.

1994 Developing African Agriculture: New Initiatives for Institutional Cooperation.

1995 Strengthening Extension Services in Sub-Saharan Africa.

1996 Achieving Greater Impact from Research Investments in Africa.

1996 Women, Agricultural Intensification and Household Food Security.

1997 Overcoming Rural Poverty in Africa, planned

### 3. **Assment of the Sasakava Global 2000**

The SG 2000 is a comprehensive program for Agricultural Development and the programme has been positively received. The Government of Ethiopia fully support the activity and take a growing responsibility for the program. Also in other countries the program is an integrated part of the development effort both from government and NGOs. The positive element as I see it, is the following:

- It has a clear vision, and well defined set of objectives.
- The program address important elements in the agricultural development process.
- The program links in an efficient way knowledge and experience from international research, national research, extension, administration and education. It also links and cooperate with relevant institutions of importance in the development process as universities. The program also brings in the issue of the development of organisations and businesses for serving agricultural production and the processing of agricultural products.
- The program is using efficiently the organisations' resource persons to facilitate for efficient support and cooperation.
- The program is an integrated part of the set up for agricultural development in the cooperating countries.

The following questions can be raised about the program:

- The program is selling a technology strongly based on external input. A relevant question will be, are the technological packages adjusted to variations in agroecological conditions and to the price relationship between input prices and produce prices.
- Are local knowledge given necessary room when defining the technological packages.

There has not been done a comprehensive evaluation yet. There is, however, done 2 interesting studies, one in Ghana and one in Tanzania.

The study in Ghana, 1991 shows impressive improvements in yields. It also shows an impressive expansion in farmer participating with the result overstretching the resources, and the program got a really set back.

The study in Tanzania, done in 1993, showed that the maize yield could more than double. The review mission did fine enthusiasm among farmers and among local political leaders. The village level extension workers were strongly motivated by having something tangible to offer farmers, and by recognizing their important role in improving agriculture.

The study from Ethiopia, annual report 1995 from Sasakawa Global 2000 shows a yield increase compared with conventional practise of maize, wheat and `teff to be 185%, 146% and 50% respectively.

The % repayment of loans in 1995 was 94%.





## **Agricultural Development, Farmers' Rights and Seedbanks in the Philippines**

by

Elin Enge

Director, The Development Fund, Norway

### **A) Noen generelle betraktninger innledningsvis:**

Minne om Nord- Sør / Bistandkommisjonens refleksjoner om betydningen av alternative former for modernitet (jfr. «feil utvikling» med overforbruk i nord og underforbruk i sør)  
(ref: Sitat: s.106.)

Dette utfordrer oss til å tenke på mangfold både mht. biologisk og kulturelt mangfold og sammenhengen mellom disse.

Dette kan illustreres ved;

Dr. Bengus ( Utdanningsminister i Sør Afrika ), 3 grunnforutsetninger for utvikling, som omfatter:

a) *Basisbehov.* - m.a.o. retten til mat

b) *Sjølberging.* - som vil innebære kamp mot globalisering, og WTO regelverket. En globalisering som i stor grad er diktert av de som sitter i maktposisjoner.

c) *Kulturell identitet.* - som en oversett forutsetning for utvikling på egne premisser. Kontroll over egen utviklingsvei.

Mye av denne tenkningen ligger til grunn for Utviklingsfondets arbeid.

Utviklingsfondet er en organisasjon som setter fokus på landsbyggdutvikling, gjennom

-bærekraftig landbruksutvikling -hvor fremme av biodiversitet er viktig,

-integret bygdeutvikling, med kredittprogrammer og småindustri som delelementer,

-gjennom samarbeid med lokale organisasjoner på flere nivå; -både lokalt og nasjonalt.

Vi har et meget godt samarbeid med NORAGRIC om bl.a. prosjektet på Filipinene og gjennom SSE programmet i Etiopia. Dette trekantsamarbeidet mellom norsk bistandsorganisasjon, norsk forskningsmiljø og u-landsbaserte organisasjoner og bønder «grasrotforskere» er vesentlig for suksessen i endel av Utviklingsfondets prosjekter

### **B) Case-story:**

SEARICE. ( South East Asian Regional Institutet for Community Education),

basert på Filippinene. Innleder med litt generell bakgrunn for utviklingssituasjonen på Filippinene. Prosjektet som beskrives gjennomføres av SEARICES «datterorganisasjon» CONSERVE. Basert på Mindanao. Målsetningen med prosjektet var initielt å kartlegge og fremme Biodiversitet og in situ bevaring. «Empowerment» av den enkelte bonde har etterhånden fått en mer fremtredende plass i prosjektet. Dette med fokus på bonden som forsker og drivkraft i endringsprosessen. Dette er idag ansett som vel så viktig som den mer biologisk orienterte forsknings komponenten i prosjektet. Prosjektet er et eksempel på « sustainable agriculture» i praksis og viser til like gode totalinntekter for det enkelte hushold etter overgang fra høy-input jordbruk til mer økologisk tilpasset jordbruk.

Prosjektet har sitt utspring i en grunnleggende kritikk av den grønne revolusjon;

-fordi den ikke «nådde» den **fattigste bonden**

-og fordi den belaster **naturressursgrunnet** for mye til å kunne være bærekraftig over tid.

SEARICE som «moderorganisasjon» for prosjektet, jobber på flere nivåer (slik en NGO bør!), med:

-Grasrot mobilisering

-Nasjonal lobbyvirksomhet til fremme for biologisk mangfold i bondens åker, PGR og «intellectual property rights», IPR

-Internasjonal lobby, ditto

-Og ikke minst med spredning av PGR og praktisk rettet arbeid rundt dette til andre NGOs gjennom relevante nettverk.

Prosjektet som startet via CONSERVE, er nå spredt til Bohol ( en annen øy på Filippinene), gjennom CBDC programmet, og gjennom et regional opplæringsprogram i Sør-øst Asia, som favner 6 naboland. Erfaringene er også aktivt formidlet til andre prosjektpartnere i Utviklingsfondets nettverk. Og har ført til et konstruktivt samarbeid med Norsk Bonde og Småbrukarlag i Norge.

Hvis vi skulle anføre en svakhet ved prosjektet, vil det være at kvinndimensjonen er for dårlig dekket inn.

\*

## Kommentarer til lysbildeserien.

Filippinene et land i ikke fullt så rivende utvikling som «nabo tigre».

\*Nå for første gang avhengig av import av ris

\*1,3 millioner under fattigdomsgrensa

\*muslimer og katolikker

\*landbruksutviklingen strekt preget av den «grønne revolusjon»

\*Rene Salazar som nøkkelperson for prosjektet

\*CONSERVE ... Fremme av Biodiversitet et hovedelement (refleksjon over tap av artsmangfold: 30.000 rissorter i India (i dag stammer 75% av produksjonen fra 10 variasjoner)

\* Redusert mangfold gir økt sårbarhet både miljømessig og menneskelig.

\* en vesentlig del av prosjektet gå ut på å involvere bøndene direkte, dette innebærer respekt/nærhet og at de defineres som «partners» ikke «benefitiaries».

\* «Farmers training farmers» vil over tid overflødiggjøre CONSERVE og forsøksgården er allerede avviklet.

\* IPM/EPM

\* Organisk Gjødning

\* I sum = Organisk jordbruk

\* som har gitt like god økonomi, bedre ernæring, bedre helse og miljø!

mao. *økonomisk effekt, miljøeffekt, sosial effekt*

SEARICE har ikke dogmatisk tilnærming til organisk jordbruk, veksler for.eks. mellom EPM og IPM.

### **Svakheter:**

Markedsføring fortsatt et «problem»

Kvinnedimensjonen er svak!

\* Prosjektet har gitt meget positive ringvirkninger.

**Utdypende litteratur om prosjektet kan fås ved henvendelse til :**

UTVIKLINGSFONDET

tlf: 22 35 10 10

Fax: 22 35 20 60

adr: Nedrgt 8

0551 Oslo

e-mail: u-fondet@sn.no



## **Agricultural Research and Institution building at Sokoine University of Agriculture (SUA)**

by

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Dr., Lecturer, Sokoine University of Agriculture  
Morogoro, Tanzania

1. Sokoine University of Agriculture (SUA) has mandate to carry out agricultural research that will enhance agricultural production in the country. In Tanzania, agricultural research which is responsible of producing the bulk of farm technologies falls under the jurisdiction of the Ministry of Agriculture and Cooperatives (MAC). However, for administrative purposes, SUA falls within the Ministry of Higher Education Science and Technology. Consequently there was a time when coordination of research activities between SUA and the MAC depended on interaction between interested researcher arising from personal interests and initiatives. However, since the development of the National Agricultural Research Master Plan (NARP I & II) in 1989 and 1996, this has changed. Now SUA takes into account national priorities (as per national research master plan) in reviewing all research proposals for funding. This is done through the Research and Postgraduate Publications Committee. Since NARP I SUA developed a Memorandum of Understanding with the MAC. Under NARP II, SUA (which has the highest concentration of agricultural scientist in the country) will receive research fund from the national research programme from World bank financing as part of the rehabilitation of agricultural research in Tanzania. NORAD will provide these resources to SUA through the multilateral institution This will help to forge closer links between SUA and the MAC.
2. Over the years, SUA has been a beneficiary of research funds from various sources including NORAD which have had a positive contribution in improving agricultural productivity. In collaboration with researcher and extension workers within as well as collaboration with external scientists, SUA has contributed towards research that has improved the productivity of beans, maize, paddy, dairy cattle and goats, management of forestry resources, soil management etc.
3. In order to enhance SUA's capacity to conduct research that strives to address problems of the farming community in Tanzania, NORAD, is providing research funds under the SUA-NORAD frame agreement which has significantly improved the institutional capacity for research. In addition NORAD has been in the forefront on capacity building in terms of human capital development. Many academic members of staff as well as technicians have benefited from graduate and post graduate training scholarship. The same funding will contribute towards improvement of the library and other facilities which will enhance the institutional research capacity. But SUA as an institution as well as individual researchers within SUA continue to seek for other financial research resources from both within and outside the country so as to diversify sources of research funds.

4. As more research funds have become available, researchers have been induced to come up with more research proposals which compete for research funds. At one time (when external resources had almost dried up) the main source of funds was through government budgetary allocations (up to \$2500). The number of research proposals submitted then was relatively lower. It seems that the opportunity cost of time for written a proposal at SUA is greater than \$ 2500

Under the SUA review process for research proposals, more emphasis is now placed on research which produce results with on-farm application. As a result, there are more action research programmes such as

- the dairy goats project - Animal science department
- multipurpose trees - forestry
- matengo and Uluguru mountain conservation - multi-disciplinary
- farming systems research - multi-disciplinary

6. The university is now more involved in outreach activities which are coordinated by the Institute of Continuing Education. These include: (1) the Sokoine Extension Project, which has been operational in Morogoro regions since 1988 with funding from the Irish government. This project is now being extended to other regions to improve on the Training and Visit (T&V) extension methodology. (2) The SUA-TU linkage project has outreach activities in three districts involving seven areas of operation. These include:

- crop production
- horticultural production/preservation and marketing
- fish farming
- sustainable land use
- animal drawn technology
- interaction between animals and humans in the periphery of game reserves
- irrigation.

These outreach activities are creating a lot of enthusiasm from university researchers especially those who had limited prior outreach experience

7. In an effort to forge a link that will facilitate technology transfer from research to wider application two scientists within the Department of Animal Science have initiated a foundation (SURUDE) which has been effective in biogas technology on credit to many rural and urban families who had otherwise limited chances of accessing the technology

8. There is an increasing awareness among researchers at SUA that gender sensitive research is not only about women and it is not a trivial matter. More men are becoming more involved in gender focused research. A colleague who's gender focused research proposal recently received funding from a local research fund commented thus; "I did not know that literature on gender was so advanced to include analytical models !!. Last year, the university established a university-wide committee to develop a proposal for women development support. The document proposed activities in three main areas namely training, gender sensitive research and gender sensitive outreach activities. This year (1997), the proposed project sill receive 17 million Tanzania shillings (about 200,000 Norwegian Kroner) to support women's training. This initiative is a

short term measure to bridge the gap which arises from many years of the marginalized of women in training and other development undertakings

All of the examples given above are the result of prior investments in training and research which NORAD has been a key player.

**Nevertheless, there are areas in which the potential of SUA is limited due to a number of factors. These include:**

1. Documenting and packaging research results and extending them to farmers. Funding to be provided from World Bank financing is set to alleviate this problem. Farmers ought to demand output from research and extension as a matter of necessity. Now that farmers will be contributing towards the Agricultural research fund, it is hoped that farmers organizations which are evolving around the country will provide an additional push in the direction of demand driven agricultural research. This therefore calls for efforts to support genuine farmers efforts to organize
2. The process of technology transfer is very weak in Tanzania. Efforts which will hasten the process from research to application should be charted out and supported
3. The drive for action research should not let us lose sight of the need to allocate some funds to basic research to enable countries to adapt and make use of research from CGAR as well as other developed countries





# **Institutional Co-operation , Farmers Groups and Agricultural Development**

by

Torger Dahl

Director of International Section

The Royal Norwegian Society for Development (NRD).

## **Introduction**

NRD's international engagement is based upon a close cooperation with the Norwegian co-operative organisations in housing, consumer, agriculture and fisheries. The cooperation is institutionalised in a continuous 4 year agreement period where their financial and technical assistance are important elements. Further does NRD have intentional agreements with agricultural organizations like Farmers Union and co-operative organisations in the following sectors; dairy, poultry, cattle breeding, slaughtering, input supply and vegetable growers. NRD's other member organisations include women farmers, smallholders, bee keepers, youth organizations and several others in the agricultural sector.

During the 188 years of NRD many of these organisations have been given «birth support» by NRD and thus given us experience and competence in human development, organisation development and institution building. As an independent organisation NRD can take care of the interests of our member organisations in development matters though it must be said that our major competence is in the agricultural sector.

The cooperative organisations are members of ICA, International Co-operative Alliance, which is the global co-operative organisation. Its global membership and network in developing countries are important links for NRD to national and local partners. IFAP, International Federation of Agricultural Producers is another important global network for the farmers unions.

## **How do we work**

NRD and its members organisations do operate as NGOs. This means in short that we can cooperate directly with similar organisations in other countries. NRD enters into formal agreements with national authorities where this formality is necessary, under which we can operate under special favourable conditions and enter into special project agreements with our national partner. In the same way NRD enter into project agreements with a Norwegian partner where the division of duties, responsibilities and financial matters are defined. Another important agreement is between NRD and NORAD on financing. This means that NRD has the overall responsibility for the planning, implementation, administration and evaluation of development activities on behalf of the member organisations.

The overall mode of co-operation is movement-to-movement or organisation-to-organisation,

i.e. co-operative to co-operative, farmers` union to farmers` union. NRD also co-ordinates the mutual contact and activities between the partners. To assist NRD each project is supported by a project committee which consists of members from the Norwegian organisation and NRD. In the project implementation NRD and the Norwegian partner carry out the project follow up together. These follow ups are planned activities and the organisations have appointed special competent members or staff to assist NRD.

### **Success stories**

According to the programme I shall present a success story or stories. I will present projects where objectives are achieved despite unfavourable political and economical conditions. The degree of success must be judged by others than NRD and when working with human development through training and education the results can not be measured after a short project period.

I have chosen examples from projects in Central-America and Africa. Experiences from Central-America may not be 100% applicable to Africa, but the mode of work and approach are almost the same.

In the close co-operation and contact between the partners annual exchange visits are part of the programme. This type of contact broadens the network and develops the mutual understanding and as a valuable side effect, increases the support for development co-operation in general in the organisation and in the public opinion.

### **Organising small and medium scale farmers in Nicaragua**

The Central-American example comes from Nicaragua where our partner UNAG, the Nicaraguan Farmers Union gets financial and technical support in their efforts to develop an organisation for small and medium scale farmers. The co-operation started in 1987.

Project background:

- \* 70% of the agricultural land owned by small and medium scale farmers
- \* Civil war divided the people. Men at war, women got job opportunities
- \* Paternalism
- \* Underdeveloped farming technology and low level of knowledge amongst farmers
- \* Lack of credit and disputes over land rights in the 90s
- \* Low repayment rates on loans and credits. Repayment levels 20-60%.

The project is characterised as a success due to:

- \* The target group has actively participated in the planning and implementation
- \* Three basic components: organising, training and credit
- \* Women are given special attention and are as an integrated component in the project
- \* The women claim that their participation has given them selfconfidence and possibilities to achieve higher personal status
- \* The support is vertically integrated, local to national level
- \* Planning, implementation and control at all levels
- \* In Nicaragua the project is managed by representatives from local farmers union, women groups and the co-operative sector
- \* In Norway representatives from the Farmers Union, agricultural co-operatives and NRD sit in an advisory committee to support NRD
- \* Training of local Nicaraguan personnel has eased their communication with NRD

- \* Well understood routines for follow up, accounting and reporting minimise the chances for mismanagement

The most important results:

- \* The organising of the farmers in the region IV has created possibilities for participating farmers to reach important positions. 2 leaders were elected to the parliament in the 1996 election.
- \* Farmer Union members in region IV have the highest rate of membership fee payment to the Nicaraguan Farmers Union, UNAG
- \* Through the active participation from the Norwegian partners UNAG has developed into a independent organisation; i.e. less political bindings to the Sandinistas
- \* The project has developed UNAG to one of the strongest NGOs in Nicaragua
- \* The credit component has attracted the highest attention from the farmers
- \* 7 credit funds are established
- \* The target group has set a floor limit of 80% repayment of credit, which is achieved.
- \* The credit component will be copied by other development partners
- \* 7 co-operatives have been organised, 3 of them by women

### **The Horticulture Project, The Gambia**

The project which started in 1987, was sponsored until mid-1995 by the Norwegian Society for Rural Women and NORAD through The Royal Norwegian Society for Development.

Target group:

Women of the Lamin and Bakau gardens, in total 750 women.

Objectives:

To contribute to:

- \* The ability of income generation by women vegetable growers.
- \* Increased vegetable production and improved nutritional status of the women and their families.
- \* A regular supply of locally grown vegetables to replace imports.

Main components:

- \* Education and training (organisation, vegetable growing, marketing, nutrition).
- \* Better water supply (wells, pumps, solar panels, distribution systems).
- \* Development fund.
- \* Storage facilities.
- \* Vehicles (2 trucks for marketing).

Achievements:

- \* Better income was generated through co-operation among the women, particularly by joint marketing efforts. It's worth noting that the wide range of products was grown to meet the various demands of the market. Previously, like most vegetable growers in the country, the women concentrated on tomatoes and onions which didn't create much income.
- \* The production increased and the nutritional status was improved.
- \* Competition with imported vegetables proved too difficult to match, as surplus produce from Europe was sold at low prices.

After the coup d'état in 1994, the tourist industry which constituted an important part of the market, went into difficult times and the demand of vegetables became less. As many expatriates left the country, another important segment was reduced.

The situation was worsened by the reduction of development assistance upon which the country is heavily dependent. The consequence of all this was that people had less money and could only buy the basic vegetables which were less profitable to the women at Bakau and Lamin.

However, now in 1997, the two gardens are still in use, much thanks to the women's ability to cooperate and manage together. These skills were learnt during the project years, and it is fair to state that the project has been successful, at least to the extent that it enabled the women to carry on during difficult times. The full success can only be achieved if times become better in The Gambia, and the demand for vegetables resumes its past level.

## **4H in The Gambia**

The idea of 4H was introduced to The Gambia by the Norwegian 4H volunteers at the Chamen Self Development and Training Centre in the North Bank Division. The development of Gambia 4H has since 1987 been sponsored by the Norwegian 4H and NORAD through The Royal Norwegian Society for Development.

**Target group:**

Rural youth and their 4H clubs.

**Objectives:**

To contribute to:

- \* The formation of 4H clubs in The Gambia in order to minimise the number of youth moving from rural to urban areas in search of jobs.
- \* The objectives of 4H are to encourage the development of hard working, conscientious rural youth, and to create an atmosphere within the clubs where social awareness and respect for the natural environment are promoted.
- \* 4H clubs in The Gambia aim at bringing about mutual understanding among youth, to organise the non-organised youth, getting rid of dishonesty, becoming educated and bringing about good health care.
- \* Furthermore, the organisation aims at educating the members to becoming enlightened citizens who are adaptable to the Gambian society, able to think independently and creatively. They are also expected to follow a healthy lifestyle and to be of service to other people. By organising training projects as income-generating activities, self-reliance is also brought to the participants in a practical manner.

## **Achievements:**

As of now, there are 28 registered 4H clubs in The Gambia representing about 1,300 members.

The responsibility for project implementation was transferred to the Gambians when the last pair of Norwegian instructors left in 1995. A senior instructor and two assistants are now carrying out the activities in a professional manner.

With constant promotion, girls' participation has now reached 30% at the membership level. In terms of committee participation, however, the share is much lower, and efforts are made to improve the situation.

Components:

- \* Education and training (organisation, skills, marketing), facilitated by pairs of Norwegian 4H volunteers until 1995, now by three Gambian instructors.
- \* Support (loans and advice) to so-called training projects. i.e. economic activities at the club level (agriculture, horticulture, animal husbandry, carpentry, African batik, etc.).
- \* Exchange visits by Norwegian 4H members to The Gambia, and Gambian 4H instructors and members to Norway are seen as very important and have been going on for many years.

Additional information, 4H:

Gambia 4H is a non-political international idealistic rural youth organisation.

The first 4H club was formed in the USA in 1902.

The 4H idea spread, and you can now find 4H clubs in more than 80 countries all over the world. It started in Norway in 1926 (in The Gambia in 1987).

The 4H's stand for:

clear Head

warm Heart

clever Hands

good Health



**Institutional Collaboration Between Hydro and Research/Development  
Organisations in Vietnam:  
The Role of the Private Sector in Contributing to Agricultural Development in  
the South**

by

Ragnhild Sohlberg  
Vice President Norsk Hydro ASA,  
Vice-Chair/ Governing Board ICRISAT



**INFORMATION ON  
THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH  
(CGIAR)  
and  
THE INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS  
(ICRISAT)**

**1 CGIAR**

The CGIAR is an informal association of approximately 50 public and private sector donors. It is cosponsored by the Food and Agricultural Organization of the United Nations (FAO), the United Nations Development Program (UNDP), the United Nations Environment Program (UNEP), and the World Bank.

The Chairman of the CGIAR is Mr. Ismail Serageldin, Vice President of the World Bank.

The CGIAR aims through its support to international agricultural research, to contribute to promoting sustainable agriculture for food security in developing countries.

CGIAR has charged its Technical Advisory Committee (TAC) with the responsibility of ensuring that the programs supported by the Group are of high quality and relevance (through External Program and Management Reviews, EPMR).

Each center in the system is autonomous. Reviews provide a measure of central oversight, provide information to the donors that their investments are sound, and/or recommend measures to improve the effectiveness.

**2 ICRISAT**

ICRISAT was established in 1972. It is one of 16 nonprofit, research and training centers funded through the CGIAR.

The semi-arid tropics (SAT) encompasses parts of 48 developing countries including most of India, parts of southeast Asia, a swathe across sub-Saharan Africa, much of southern and eastern Africa, and parts of Latin America. Many of these countries are among the poorest in the world. Approximately one-sixth of the world's population lives in the SAT, which is typified by unpredictable weather, limited and erratic rainfall, and nutrient-poor soils.

In this world's poorest and most fragile area, ICRISAT works to contribute to the relief of poverty, hunger and environmental deterioration. Agricultural activity is inextricably linked to both the causes of, and potential solutions for, these three afflictions. Since the majority of the poor in the SAT are engaged in farming or other

agriculturally-related enterprises, the road to prosperity lies in the development of more productive, efficient, and stable agricultural systems.

### ICRISAT's Mission

Through international research and related activities, and in partnership with national research systems, to contribute to sustainable improvements in the productivity of agriculture in the semi-arid tropics (plus other countries in which ICRISAT's mandate crops have relevance) in ways that enhance nutrition and well being, especially of low-income people.

ICRISAT's mandate crops are:

- sorghum
- pearl millet
- finger millet (not an active program)
- chickpea
- pigeonpea
- groundnut (peanut).

These 6 crops are vital to life for the ever-increasing populations of the SAT, and ICRISAT serves as a world center for the improvement, and acts as a world repository for the genetic resources, of these crops.

ICRISAT's mission is to conduct research which can lead to enhanced sustainable production of these crops and to improved management of the limited natural resources of the SAT. The Institute's mandate is to:

- ☐ Serve as a world center for the improvement of grain yield and quality of sorghum, millets, chickpea, pigeonpea, and groundnut and act as a world repository for the genetic resources of these crops.
- ☐ Develop improved farming systems that will help to increase and stabilize agricultural production through more effective use of natural and human resources in the seasonally dry semi-arid tropics.
- ☐ Identify constraints to agricultural development in the semi-arid tropics and evaluate means of alleviating them through technological and institutional changes.
- ☐ Assist in the development and transfer of technology to the farmer through cooperation with national and regional research programs, and by sponsoring workshops and conferences, operating training programs, and assisting extension activities.

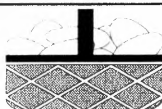
ICRISAT communicates information on technologies as they are developed through workshops, networks, training, library services, and publishing.

ICRISAT has research institutes in Western and Central Africa (WCA), in Southern and Eastern Africa (SEA), and in Asia (India). The Corporate Office is located in Patancheru, Andhra Pradesh, India.

**Agricultural Development:  
Productivity, Distribution, and Environment**  
Sem Gjestegård, Sem, Asker  
11-12 March 1997

12. March 1997, 1045-1200  
"Success Stories"

**5. "Role of the Private Sector:  
Hydro's Cooperation with Research  
Institutions in Vietnam----  
seen with 'ICRISAT eyes' "**



## Outline

- CGIAR and ICRISAT (also see attachment)
- Norsk Hydro's research partnership in Vietnam
- Examples from ICRISAT's research in Southern and Eastern Africa

## CGIAR and ICRISAT (see attachment)

- The Consultative Group of International Agricultural Research
  - informal association of approx. 50 public and private sector donors, cosponsored by FAO, UNDP, UNEP, and the World Bank
- The International Crops Research Institute of the Semi-Arid Tropics
  - one of 16 non-profit research and training centers funded through the CGIAR
  - research institutes in India (1) and Africa (6)

## Semi-Arid Tropics (SAT)

- The world's poorest and most fragile area
- Includes 48 developing countries, incl. most of India, parts of southeast Asia, most of sub-Saharan Africa, much of southern and eastern Africa, parts of Latin America
- *Unpredictable weather*
- *Limited and erratic rainfall*
- *Nutrient-poor soils*
- *Home to one-sixth of the world's population*

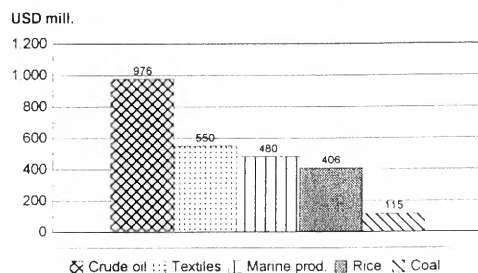
## ICRISAT's MAJOR TARGET

- Prosperity (poverty alleviation)
  - increase yield and stability of the staple food crops of the poor
  - crop management innovations and practices (soil, water, nutrient)
- Environment / sustainability
  - arrest/reverse environmental degradation
- Diversity
  - create options, spread risks
- Inclusiveness
  - science-based agricultural development in strategic partnerships
  - gender issues

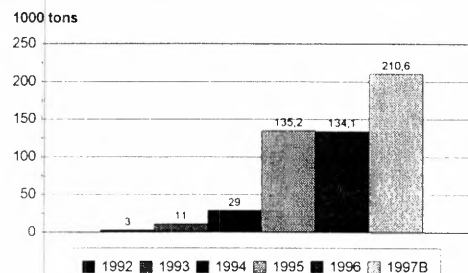
## Vietnam (VN)

- 52% of VN children are malnourished, 14% suffer from severe malnutrition (FAO/VN sources, 1995)
- Recent years, substantial expansion in agricultural production and exports
  - 3rd largest rice exporter after Thailand and USA
- Major driving force: Imported nitrogen from Urea and DAP[diammonium phosphate] (85% imports, consumption more than quadrupled 1980-93)
- High crop yield and quality can only be maintained / achieved by more balanced fertilization

## Vietnam: 5 major exports (1995)



## Norsk Hydro Indochina: Invoiced fertilizer sales 1992-96, budget 1997



## Norsk Hydro Indochina

- Overriding goal of R&D:
  - improve farmers' knowledge of principles of **balanced** plant nutrition
  - field experiments country-wide in cooperation with leading research institutions and the local extension services

## Hydro's R&D

- Objective:
  - Improved fertilizer management for yield and quality
  - Environmentally sound use of nutrients, select product mix for VN based on R&D, establish economic (and, hence, environmentally) optimum nutrient ratios
  - Reduction in pesticide use by balanced fertilization, better understanding of interaction between IPM and INM (Integrated Pest/Nutrient Management)
  - International Public Good (IPG), i.e. non-proprietary research
- Partnership with:
  - Leading research institutions in VN
  - VN extension services, trials in farmers' fields

## Hydro's Agricultural R&D in Vietnam

- Startet 1995, 5-year time horizon
- R&D Budget 1997 (10% annual increase)
 

– North Vietnam:	USD 55 000
– Central Highlands:	USD 30 000
– South Vietnam:	USD 58 000
– Special Projects:	USD 30 000
<b>TOTAL</b>	<b>USD 173 000</b>

## Special Environmental Project

- Carried out by the Economy and Environment Program for Southeast Asia (EEPSEA)
- Sponsored by Norsk Hydro Asia Pte, Ltd., Singapore
- Project title: "Effect of NPK fertilizer application on pesticide management in paddy rice"
- Objective:
  - Investigate use of NPK fertilizer on the occurrence of insect and other pest infestations in paddy rice in the Mekong Delta (Principle of Integrated Nutrient Management, INM, combined with Integrated Pest Management, IPM.)
- Potential payback for Vietnam's agriculture:
  - Balanced use of fertilization in rice could increase yields and reduce the use of pesticides

## Hydro's Country-wide R&D-partners

INSTITUTION	REGION	CROPS
Cantho Univ.	Mekong Delta	Rice, maize, etc.
Hanoi Agric. Univ.	Red River Delta	Rice, maize, etc.
Tay Nguyen Univ.	C. Highlands	Coffee, tea, etc.
Coffee Res. Inst.	C. Highlands	Coffee
VISERI (Sencult.)	C. Highlands	Mulberry
Lam Dong Agr. Ext.	C. Highlands	Vegetables
Dalat Res. Center	C. Highlands	Potato, veget.
Ninh Thuan Agr. Ext.	S. Coast	Grapes
Long Dinh Fruit Res.	Mekong Delta	Fruit trees
Seed Co. of Ho C.M.	Saigon	Vegetables

## Zimbabwe Agricultural Indicators (late 1980s)

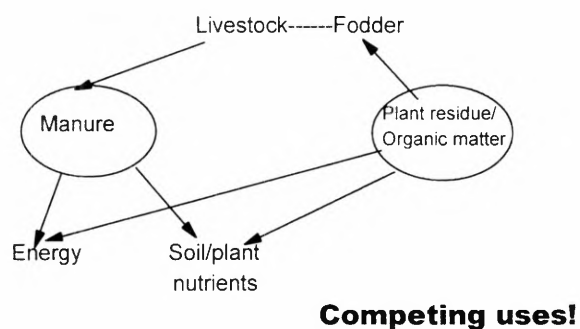
	High rainfall	Med. rainfall	Low rainfall
<b>% smallholder:</b>			
- Population	20	51	29
- Grain prod.	58	28	14
- Grain sales	80	17	3
- Fertilizer use	91	8	<1
- Receive Extension Adv.	53	16	13

Source: ICRISAT, SEA

## Zimbabwe: Sorghum yield advantages (kg/ha) w/ and w/o fertilizers (1992/93 and 1993/94)

	Without fertilizers		With fertilizers	
	Farmers' local variety	Improved variety (SV 2)	Farmers' local variety	Improved variety (SV 2)
1992/93 avg.	1.52	1.63	19.92	2.51
1992/94 avg.	0.98	1.38	2.32	2.57
Overall two years	1.33	1.57	2.10	2.42
% yield gain		18	58	82

Source: ICRISAT, SEA



## Conclusion

- Hydro's R&D in VN in line with several of ICRISAT's objectives:
  - secure and increased food supply
  - inclusiveness / partnership
  - environment / sustainability
  - research results an international public good (IPG)

**PANEL DEBATE AND PLENARY DISCUSSION -  
SUMMARY:**

**HOW SHOULD NORWAY SUPPORT AGRICULTURAL  
DEVELOPMENT IN THE SOUTH THROUGH  
INTERNATIONAL ASSISTANCE?**



## SUMMARY OF PANEL DEBATE AND PLENARY DISCUSSION

Thor Larsen, the Agricultural University of Norway, started the discussion by encouraging everybody to see beyond statistical analysis in order to determine future action. Topics of common interests should be discussed among all actors involved, such as governments, professional institutions, organisations and individuals in the South as well as interest groups in the North. He pointed out that professionals should be better in collaborating. Equally, important networks between the private sector and industries, research institutions, NGOs and governments should be made operational.

Elin Enge the Development Fund, started by praising DANIDA for their steps towards a sectoral focus and their 20% emphasis on agriculture in their policy approach. She found this policy-step encouraging, and requested similar actions by NORAD. Global differentiation is important to take into account when dealing with development issues. She questioned why the multi-national companies (MNCs) seem to have fallen out of the agenda. MNCs should be brought in as cooperation partners instead. The role of the civic society should be given more emphasis. Civic education should be highlighted, making the farmers understand why their products never pay, and why subsistence seem to be the only economic system that will work for them. We should fight poverty through empowerment of farmers. But, as she said, empowering one group means moving some people up and others down the ladder. That means: somebody else has to be de-empowered.

Torger Dahl, the Royal Norwegian Society for Development stressed that the individual *farmer* has to be recognised as the centre for any agricultural development. He drew a line between the role of external support in order to reach the farmers: First, resource persons have to be identified. Second, communities with development potential should be supported. Third, national authorities should be given assistance to work out sustainable agricultural policies, and fourth, training and education should be encouraged through independent institutions. Equally important, external agencies should support farmers unions.

Aida Isinika, Sokoine University of Agricultural stressed that development assistance is necessary to a certain point, but from that point onwards e.g. Tanzania should be 'independent' and self reliant. She highlighted that empowerment at local village level requires that local institutions have to be included in the planning stage of any external intervention. Opportunistic participation is required so that the efforts not only benefits the most powerful individuals, but that the communities themselves get a raised welfare. She stressed that subsidising fertilisers only would benefit the rich. Better pricing of farm products would be a better approach to assist the poorest farmers. Floor pricing would be more useful for the poorest farmers. She further emphasised the benefit of roads and better infrastructure to rural communities, and encouraged the Norwegian aid agencies to support road development and road constructions in Tanzania.

Ragnhild Sohlberg, Hydro and ICRISAT, affirmed the importance of spending time on problem identification before taking any action. All stakeholders should be drawn into the planning discussion. The private sector has knowledge that other parties might make use of, and vice versa. Hydro is for instance onshore in many African countries.



Ingrid Ofstad, NORAD started by stressing the importance of setting goals for *where* we want to go, how far we want to go, and how we are going to get there. She highlighted that the problem was not only *what* to do, but *how* to do it. The new policy guidelines from Parliament give increased priority to the agricultural sector, but do not set a precise target for this assistance. What is the role of the Norwegian society in this context? How should we go about making use of the knowledge and competence that exists within this very group (the participants at the Seminar), in relation to partners in the South? How can NORAD make use of the available resources, in order to support the different actors to do the best on the technical side?

After these introductions from the panel, the floor was opened for questions and comments.

Ole Hofstad (NLH) said that the problem identification should be emphasised more, and that any development effort should utilise consultants with different views.

Thor Larsen (NLH) replied on this comment by saying that there is an increasing need for educational programmes, training etc. In his opinion there has not been given enough priority to encourage and support this.

Kåre Ringlund (NLH) stressed the importance of conserving germ plasm. He emphasised that the most important gene material for food production exists on the fields of farmers.

Alf Morten Jerve (CMI) questioned what we actually mean with the term agriculture. Is poverty, education, empowerment, local governments parts of the issue? There is a need for NORAD to make distinctions concerning this. If agriculture is defined broader than only production, then this understanding should be integrated and reflected to all the various aspects of development assistance. In his opinion, farmers should be viewed as production units which are socially bounded. This implies a need for integration of various fields of disciplines.

Gunnar Øygaard (NLH) stressed that the most important action towards reducing rural poverty is to promote agricultural development.

John Pender (IFPRI) raised a critical comment on the credibility of bottom-up approaches and sustainable development requirements when considering the actual policy of our development efforts. We tend to require democratisation and sustainable resource management systems as a prerequisite for our involvement/support. Through our emphasis on for instance gender and democratisation we impose our value systems on others which may not recognise these issues as we do. This is contradictory to the debate of bottom-up and locally based development. Farmers may actually raise other concerns than what *we* consider to be important. Some of these might even be conflicting; such that farmers are more concerned about increased production rather than environmental issues.

Hans Petter Melby (the Norwegian Embassy of Nicaragua) stressed that first one need to know what the priorities are and which resources are available before talking of *how to do things*. Is NORAD a kind of supermarket where everything is available? There is a need to prioritise something whilst something else gets less attention. Whether you talk about rural or agricultural development does not matter. The question is: do NORAD actually *want* to

concentrate on agriculture or do they not? If NORAD do, what are the resources to do so. If agriculture is prioritised, then other sectors need to be tuned down. If there are less sectors to concentrate on, this would probably facilitate a better approach on the agricultural sector. When this question is answered one can find out how to proceed.

Ingrid Ofstad (NORAD) replied to Melby's comment by confirming that agriculture *is* a priority area, and that there are resources to make use of! She stressed that there are no limitations of funds in this context: NORAD has the funds. But NORAD needs to know *where* to make use of these resources, and how it should be done. NORAD wants to strengthen the agricultural sector through an increased support to universities, NGOs and Governments in general.

Thor Larsen (NLH) replied to Ofstad's comment by referring to several proposals on agricultural research and education that NORAD has rejected or not even considered. If funds are not the limit why does this happen? If resources for project planning are not provided then it is difficult for NORAD to determine where and how assistance can be provided.

Jens Stangeland (Norwegian Mission Council Office for International Development Cooperation) raised the issue of how to pursue development. He emphasised that those who has to change the agricultural sector is the local people. We, the outsiders, are not among those who know most regarding local development. There is a need for appropriate technology, yes, but there is also a need for an appropriate development.

Lars Ekman (NORAD) made a critical comment on the discussion concerning the quantitative goal of assistance. He argued that the volume of assistance is not the most important issue to rise. Rather the quality and impact of assistance should be emphasised. Here, the key problem is urban bias in the policies and intentions of the governments in many of our partner countries.

Stein Holden (NLH) gave an example from Mozambique where imported food contribute to 1/3 of the food requirement in the country. The value of this import is three times the value of total export. Besides, total import is 10 times the total export of the country! But, Mozambique has approximately 4 million ha. fertile farm land which is not being utilised. The most common argument for not giving priority to the agricultural sector in Mozambique, is the danger of land-mines in the rural areas. In Holden's point of view is that this argument does not hold: Most people live in the larger cities of Mozambique, and are dependent on suburban agriculture. Agriculture should therefore be given first priority as it plays a crucial role in rebuilding the national economy. Holden concluded that he found it strange that agricultural development has not been given a more central role in the new country strategy of NORAD as this is so crucial for the rebuilding of most national economies.

Bjørn Wold (SSB) recommended sector strategies in accordance with the World Bank, e.g. integrated agricultural and rural development sector strategies where different actors play a role in strategy development and implementation.

Bal Ram Singh (NLH) recognised the importance of land and water resources when dealing with food security. The agricultural production has to increase per unit of land in order to meet the increasing food demand. There will be a simultaneous increase in the demand for water.

Inge Nordang (Ministry of Foreign Affairs) explained the complexity of the framework for Norwegian assistance. There are all together 40 strategies within MFA and NORAD which makes a complicated material to deal with. He stressed that it is more important for the recipient countries to have proper agricultural strategies, than for NORAD to have one.

Lars A. Wiersholm (Norsk Hydro Egypt) expressed that all actors should draw upon each others experiences, meet in the same countries where they are operating, and learn from each other. Everybody who works in this area should assist and transfer information to the farmers from research done in African countries. He highlighted the importance of developing strategies which could address the problem of water shortages.

Colin Murphy (NLH) wondered what the policies of the foreign affairs actually means for the agricultural sector regarding setting priorities and resource allocation. He particularly stressed the importance of research and education in agricultural development.

Adelaida Semesi (NLH) stressed that there is need for cooperation and communication. However, there cannot be equal cooperation as long as the parties have different sets of information and technical know-how. The human resource development component has to receive high priority. Improved technology improves the flow of information. The speed and time of implementing programmes need to be emphasised within the context that development in countries without good infrastructure requires a slow speed! Do not only hit and run! When projects fail, it is important to find out what went wrong, and why the approach failed. Learn from experience and start over again with a new strategy!

Ruth Haug (NLH) expressed her disappointment with NORAD's representative in the panel discussion. Compared to the positive impression NORAD's new Director General gave in the opening of the seminar, the NORAD panel discussant gave few positive signals and was only to a limited degree willing to share her thoughts with the seminar participants regarding how NORAD plan to follow up on St.m. nr. 19 and its objective on increasing the support to the agricultural sector. It is still an open question if NORAD has got any further on implementing this in their strategies. In Haug's opinion it seems like NORAD still is at a status quo regarding this issue.

Kjersti Larsen (NLH) stressed that all development effort emphasises *our* focus, *our* sectors *our* disciplines. It would be more important to discuss whether or not we have a common understanding of development and modernisation. What do we actually mean? What kind of a 'good society' is it that we aim towards when talking of development. The reasons for all the unintended negative outcomes of development assistance can be ascribed to the fact that we do not really know what we are developing societies towards.

Per Dælen (The Royal Norwegian Society for Development) stressed the comparative advantages Norway have in the ability to organise farmers. The problem is that this is *cheap* and does not leave any visible sign telling we have been there. Therefore this seems to be ignored not being big enough, and therefore not even considered properly. In his opinion this should really be given emphasis in future development discussion!

Hanne Carus (Danida) emphasised the importance of spending time in identifying partners. She further explained that the issue of volume was difficult to deal with particularly in the phase of identifying appropriate projects. She explained that Danida's agricultural sector programme

covers a wider area than agriculture. She also questioned the role of NGOs which become private consultancy companies, thereby take over the responsibility of the Governments.

Inger Næss (NORAD) stressed how crucial it is to have a dialogue between the private sector, research institutions, NGOs, the public, and NORAD is. She asked whether or not the research organisations really want to cooperate.

Hans Petter Melby stated that having 40 strategies is the same as having no strategy at all, giving reference to Inge Nordang's comments of the 40 strategies in MFA/NORAD. He stressed that development assistance tend to make governments independent of their own institutions and resources. Instead, the governments relate more to foreign embassies than to their own people.

### **Final comments from the panel:**

Ragnhild Sohlberg affirmed that partnership between the various institutions is crucial, but she had noticed certain limitations. Sohlberg answered Ofstad's question if research institutions were interested in cooperation on behalf of ICRISAT. ICRISAT wants to undertake research, but only according to ethically acceptable conditions. In her opinion, there should be a better collaboration between the Nordic donors. It is not the *level* of aid that is the problem, but *how* it is implemented. She rounded off her conclusion by emphasising that it is easy to *maximise the costs* of aid, but that the *effectiveness* need not be expensive! Effectiveness needs clear goals!

Thor Larsen stressed that Noragric on behalf of NLH was interested in a good cooperation with everybody concerned both in the private and the public sector. He was waiting for a follow-up from NORAD regarding implementations of policy documents, as well as a reply on several requests from Noragric and partners in the South.

Ingrid Ofstad started by saying she was sorry that some participants felt that she had not managed to follow up on the positive presentation of NORAD's new Director General. She explained that her intention had been to challenge the participants to take part in a dialogue with NORAD on how to proceed, not to present ready made plans. She stated that there will be an increased agricultural support. The quality of the support will also be improved. But NORAD still have to find a proper way to do it. The collaboration between the public, NGOs, industrial and private sector, and research institutions will be necessary in Norway as well as in our partner countries. However, these tasks can not be handled by NORAD alone. NORAD needs close dialogue and collaboration with other institutions.

Aida Isinika emphasised that the liberalisation of markets is not error-free in Tanzania. Because markets are imperfect, liberalisation causes problems. Tanzania has created its own types of monopolies. In developed countries farmers are subsidised, but in Tanzania farmers are being victims of a liberalised market economy. Developing countries do not have the same opportunities as developed countries. What is needed is an institutional interaction between North and South in order to improve technical assistance.

Elin Enge started by highlighting the importance of using the 'right kind of language' so that persons from different disciplines can understand each other properly. She referred to research environments which often are 'closed' and which tend to use a highly specified language which might not always make sense to other institutions, i.e. NGOs. A closer collaboration between

NGOs and research institutions is therefore important. Where you put your money reflects your priorities. The debate on volume is therefore essential. To identify good partners take time. Therefore one also need to prioritise time. We need to be trustworthy and we need to be stable partners. We should not fall into the trap of 'fashion aid'. Volume and quality are two factors of the same issue. Therefore, the right timing is needed for these kind of efforts. We need to consider how we are influencing the multilateral sector. How do we tie our policies to our bilateral efforts? This should be done more consistent than before. There is also a need to move from projects to a programme approach! Networking is essential. Who should facilitate this process? We are just in the infancy of cooperating together, and there is a need for making use of all opportunities for collaboration!

Torger Dahl questioned what would happen *after* the seminar. He would like to have the reports from the seminar, call a meeting with different actors, and analyse the situation. The various parties' resources and competence should be compiled together and coordinated. Priority should be given to practical action!

Michael Angstreich (CARE Norge) closed the Seminar by concluding that it was impossible to wrap up the whole event in some few lines. All stakeholders should focus on practical action plans for NORAD, research institutions, NGOs, and the partners in the South. The Seminar should be considered a milestone in addressing agricultural development policy, and should contribute to increased support to agricultural and rural strategy development.

## NORAGRIC'S CONCLUSIONS AND RECOMMENDATIONS<sup>1</sup>

Despite urbanisation, nearly three-quarters of the world's 1,3 billion poor will continue to live in rural areas well into the next century. The significant majority of the rural poor depend upon agriculture for most of their meagre livelihoods. According to the World Food Summit, poverty is the major cause of food insecurity, and sustainable progress in poverty eradication is critical to improve access to food. Food security is not only a question of increasing food production. It is equally important where agricultural production takes place and who receives the associated income. The Norwegian North - South policy aiming at poverty reduction will in particular address rural poverty and sustainable natural resource management in marginal areas of Sub-Sahara Africa, where poverty and malnutrition is expected to increase in the next century (re: Haakon Hjelde: '... rette vår innsats inn mot Afrika og de minst gunstige landbruksområdene der en stor del av de fattige bor.'). Norwegian support to the primary industries will be strengthened in accordance with the priority-setting indicated in the White paper to the Parliament no 19. The challenge the seminar participants were given by the NORAD representative in the panel discussion was that NORAD know *what to do*, but not *how to do it*. Increased support will be given to agriculture and rural development, but the mechanism for implementation is yet to be determined. NORAD stated that the resources are available and recommended that different actors enter into dialogues with NORAD and each other in order to come up with joint initiatives which embrace partners in the South and North within public and private sectors: research, education, training, extension, management, NGOs, farmers unions, farmer groups, woman groups, etc.

Tove Strand Gerhardsen stressed in her presentation that research-based knowledge is a prerequisite for the decision-making process in NORAD. She suggested to establish researcher/user teams to review plans and projects over a longer time period. She underlined the opportunities in quality control and joint learning experiences.

The seminar participants expressed the need for transparency in the priority-setting and resource allocation. Funds must be made available for joint project planning among partners in the South and North in order to be able to address the challenges put forward by NORAD regarding the mechanisms. The issues of quantitative goals for support to agriculture and rural development as well as the need for a sector strategy were also frequently raised in the discussions. A strategy document would serve as a communication tool to clarify priorities and to facilitate transparency and dialogue between NORAD and the different actors on the agricultural and rural development scene. According to the World Bank, the main reason why support to rural development in general has declined is because the process of strategy formulation has been weak. Regarding quantitative goals for agricultural development support, the discussion focused on whether there is a conflict between volume and quality; and whether volume and quality are two factors of the same issue. In other words whether quantitative goals e.g. DANIDA's 20% to the agricultural sector is a necessary prerequisite for effective priority-setting, which again will lead to qualitative improvements in agricultural development programmes.

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<sup>1</sup> This chapter is written by the editors and do not necessarily reflect the official view of the organising committee nor their institutions.

The purpose of the seminar was also to analyse different experiences from support to agricultural development. We learned from the DANIDA representative that in addition to the new *strategy for agricultural sector support* and the quantitative goal of 20% of the bilateral assistance to agriculture, DANIDA had started a comprehensive evaluation of the Danish assistance to the agricultural sector. The evaluation showed that half of the interventions in the sample studied had had acceptable impact, whereas the achievement of the other half had been less satisfactory in terms of the general development objectives. Apparently, DANIDA has in their evaluation of agricultural sector support, done what is very often lacking in the development discussion: *They have drawn a lesson from past experiences*. Donors tend to abandon development concepts when results are not according to the expectations, and hunt for new paths and fashions instead of analysing the problems, adjust the strategies and come up with new solutions.

It was suggested that as a follow-up of the seminar, a meeting should be conducted among the different actors in agriculture and rural development (public and private sector, NGOs, research and education). The purpose of this meeting should be;

- to assess the outcome of this seminar;
- to promote communication and collaboration among the different actors to pursue the partnership idea;
- to set the common ground for collaboration among the different partners;
- to discuss different mechanisms for Norwegian support to international agriculture and rural development; and
- to bring the process a step further in proposing concrete actions in accordance with the White paper no 19 (re: statements on increased support to the primary industries).

As a follow-up of the seminar, there is also a need to clarify several questions which were left hanging and which will need attention by MFA/NORAD such as: What are the current thinking in MFA/NORAD on how to implement the policy statements in the White paper no 19 on increased support to the primary industries? What are the priorities and what are the available resources? Will there be an evaluation of Norwegian assistance to agriculture and rural development? Will strategies, action plans or guidelines be developed for increased support to agriculture and rural development? What is NORAD's view of integrated rural development programmes (re e.g. the World Bank's new sector strategy on *Rural development from vision to action*)? How will NORAD follow-up the action plan of the World Food Summit in Norway's bilateral assistance? Will there be quantitative goals for Norwegian support to agriculture and rural development? Will funds be made available for project planning and appraisals in a South-North partnership context. If so, what are the criteria? If NORAD knows *what to do* but not *how to do it*, what will NORAD do in order to enhance and encourage agricultural and rural development?

We hope that the seminar will contribute to bringing the process of following -up on the positive signals in White paper no 19 and the inspiring introduction given by the Director General of NORAD one step further regarding increased support to the primary industries.