DRAFT

SOMALI JOINT NEEDS ASSESSMENT

PRODUCTIVE SECTORS AND ENVIRONMENT CLUSTER REPORT

October 21, 2006

ACRONYMS AND ABBREVIATIONS

[[DELETED A&As do not appear in text]]

ADO	Agricultural Development Organization
ACP	Africa, Caribbean, and Pacific (ACP countries are signatories of the Lomé Convention)
BDS	Business Development Services
ARDOPIS	Agricultural Rehabilitation and Diversification of High Potential Irrigation Schemes in Africa
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BSF	Belgium Survival Fund
CAHWs	Community Animal Health Workers
CDD	Community-Driven Development
CEFA	Committee for Agricultural Training
CEM	Country Economic Memorandum
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CGIAR	Consultative Group for International Agricultural Research
COMESA	Common Market for Eastern and Southern Africa
DSBC	Dubai Somali Business Council
EBA	Everything but Arms
EC	European Community
EEZ	Exclusive Economic Zone
EU	European Union
EXCELEX	Export and Certification of Livestock for Export (Livestock Export Inspection Program for Ethiopia, Djibouti, and Somalia)
FOB	Free On Board
GDP	Gross Domestic Product
GECPD	Galkayo Education Center for Peace and Development
HACCP	Hazard Analysis and Critical Control Points
ICAO	International Civil Airlines Association
ICT	Information and Communication Technology
ITU	International Telecommunication Union
IUCN	The World Conservation Union

IFAD	International Fund for Agricultural Development
JAN	Joint Needs Assessment
JOSP	Jowhar Offstream Storage Project
FAO	Food and Agriculture Organization
FEWS	Food Early Warning System
FSAU	Food Security Analysis Unit
JNA	Joint Needs Assessment
JOSS	Jowhar Off-Stream Storage
MDG	Millennium Development Goal
MFI	Microfinance Institution
MoLAE	Ministry of Livestock, Agriculture, and the Environment
NECFISH	North East Coastal Fishing Company
NGO	Nongovernmental Organization
NIADP	Northwest Integrated Agricultural Development Project
OIE	Organisation Internationale Epizootique
PACE	Pan African Campaign for the Control of Epizootics
PACSU	Project Assistance, Capacity Building and Supervision Unit
PSE	Productive Sectors and Environment
SAHSP	Somalia Animal Health Services Project
SAGRA	Somali Agricultural Association
SATG	Somalia Agricultural Technical Group
SLSS	Somali Livestock Sector Strategy
SMEs	Small and Medium Enterprises
SNRS	Somali National Region States
STA	Somali Telecommunication Association
SWALIM	Somalia Water and Land Information Management
TFG	Transitional Federal Government
TRA	Telecommunications Regulatory Authority
UNEP	United Nations Environmental Programme
UAE	United Arab Emirates
USAID	United States Agency for International Assistance
UNDP	United Nations Development Programme
UNCLOS	United Nations Convention on the Laws of the Sea
VDC	Village Development Committee
VSF	Veterinnaire sans Frontieres
WB	World Bank
WTO	World Trade Organization
WUA	Water Users Association

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ACKNOWLEDGEMENTS <<A>>

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FOREWORD <<A>>

This cluster report is part of the technical background work of the Somali Joint Needs Assessment (JNA). Cluster reports are technical assessments and should not be thought of as a final output of the Somali JNA. Prioritization is a two-part consultative process (first, technical and second, political), and this report is primarily concerned with technical prioritization. Political prioritization is incorporated in the integrated Reconstruction and Development Program (RDP).

This draft cluster report is the outcome of an exhaustive technical exercise involving extensive consultations with Somali stakeholders, ranging from civil society groups to national and local authorities and parliamentarians. It has been produced by an integrated team of Somali and other technical experts to review priority needs and develop reconstruction and development proposals to address those needs. The report draws on information from (i) existing sources, (ii) consultation workshops, (iii) selected field visits and meetings with a wide array of Somali groups and individuals, and (iv) questionnaire-based fieldwork undertaken by Somali experts in all regions. It responds to specific local needs by providing differentiated suggestions for South Central Somalia, Puntland, and Somaliland. Moreover, it reflects the importance of three key cross-cutting issues—peace-building and conflict prevention, capacity building and institution development, and human rights and gender—by addressing them as an integral part of the proposed initiatives to achieve desired reconstruction and development objectives.

The RDP will present a proposed set of initiatives to address priority needs from among the wider set of needs. Clearly, not all needs can be addressed immediately or within the five-year time frame of this RDP. Implementation capacity and likely resource availability will both be considered in developing RDP initiatives. But behind all this is the fundamental objective of supporting Somalis in deepening peace and reducing poverty as quickly as possible in a sustainable way.

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SUMMARY <<A>>

1. This report is a contribution to the Somali Joint Needs Assessment mentioned in the Foreword. It is aimed at providing a reconstruction and development program for the productive sectors in the economy and for the environment. The program is composed of actions on policy and investment—public and private. The main outcomes from the program of proposed investments are increased income generation, higher levels of employment, poverty reduction, and improved food security, with a heavy focus on isolated areas. The analysis of major issues in agricultural are considered separately in Somaliland, Puntland, and South Central Somalia because, despite a number of similarities, there are a number of different circumstances in each area which require specific attention. On the other hand, for the environment and private sector development, the three areas were discussed together because the issues were so similar and to avoid tedious duplication. In this summary the issues will be discussed without separate focus on the three areas because conclusions and recommendations apply to all areas. Conclusions and recommendations that are different between areas are discussed in the relevant sections. In all areas progress in the pastoral, agricultural, and fisheries subsectors will be dependent on infrastructure development and improved social services. These issues are addressed in other cluster reports.

2. The focus in this report has been on development opportunities and the way in which these opportunities can contribute to improving the welfare of all Somalis. Despite the destruction and human suffering of the last 15 years there are considerable opportunities in all three areas covered. One reason for optimism about the future is the indefatigable energy and imagination that still exists among Somali leaders and entrepreneurs. Indeed, while many Somali physical, human, and social capital assets have been substantially depreciated; the Somali spirit is still strong. This report is clear about the environmental problems in the pastoral, agricultural, and fisheries subsectors, but it is optimistic that there is still time to take actions that will resolve most of the problems and lead to reconstruction and sustainable development—assuming a broad-based peace agreement.

3. Two major themes emerged from this work: first, the major significance of the destruction of the environment and the urgent need to take action to recover as much as possible of the former rich Somali natural resource base; second the importance of generating growth in the pastoral, agricultural, and fisheries subsectors for the viability of the whole Somali economy and to achieve employment, income generation, and poverty reduction. This cluster report therefore links to the foundations of the livelihoods and welfare for all Somalis. The challenge is to achieve sustained improvement and management of the environment and a growing agricultural sector that together will generate the income to fund social services and infrastructure development.

CONCLUSIONS <<B>>

The Environment <<*C*>>

4. The environment has been severely damaged because of the absence of government and irresponsible exploitation by powerful groups and individuals. Huge areas that were once tree-covered rangelands have been reduced to treeless plains, with the result that wildlife has all but disappeared and soil erosion is common. The tragic truth is that charcoal is still being exported from major Somali ports despite the existence for many years of a national export ban. Marine resources have been plundered over the last 15 years through overfishing by foreign vessels and damage to marine habitat, to the extent that the vaunted large potential of the Somali fisheries industry may now be no more than a distant mirage unless substantial actions are taken very soon. Thus the report has ***concluded*** that an urgent and rigorous action plan to address these and other environmental issues should be part of the reconstruction and development program, starting with enforcement of the charcoal export ban and a thorough field-based "State of the Environment" report, which would include an assessment of all marine resources.

The Livestock Sector <<*C*>>

5. The majority of people in all Somali areas depend to a large extent on livestock for their livelihood. But these livelihoods have been seriously threatened, and in some cases destroyed, by the recent four-year drought (which ended in 2004), by the indiscriminate felling of trees in the rangelands to produce charcoal, and by the ban on imports of livestock by the Kingdom of Saudi Arabia, which for many years led to overstocking. Miraculously, due to alternative market opportunities, the exports of sheep and goats have returned to the estimated prewar numbers. While this is an encouraging outcome, the fodder production on the treeless, windswept rangelands is now more susceptible to the effects of drought. It is therefore ***concluded*** that in future livestock management and marketing strategies will need to be more aligned with seasonal shifts in fodder availability in the central and northern rangelands if livestock production there is to be sustainable in the face of periodic droughts. In the southern riverine areas drought is also a serious periodic problem as it was in 2005–06. A chronic problem for cattle in these areas is the tsetse fly, which carries the parasitic protozoa trypanosomiasis that causes weakness, low productivity, and ultimately death in cattle. Because tsetse fly inhabits trees and bushes, cattle are not able to use the considerable riverine areas for grazing. It is therefore ***concluded*** that an eradication program for tsetse fly, which was almost successful before the war, is warranted.

6. All livestock-exporting regions need to improve export inspection and certification procedures for livestock so that Somali livestock exporters can regain access to the market they lost in Saudi Arabia five years ago because of the dissatisfaction of Saudi authorities with procedures in Somalia. As described in the report, the current rolling (repetitive) inspection process (which, after three inspections at locations ever closer to the port, ends with the issue of an export certificate) is time-consuming, costly, and hard on animals. On the other hand, moving away from this process towards a certification process without rolling inspections would require protection from major diseases contracted in an animal's district of origin or during its transport to port. While animal transport secure from infection risk can

be arranged, achieving control of diseases in a district takes many years. The obvious ***conclusion*** is that programs to strengthen public and private veterinary and paraveterinary services and to control major diseases should be funded and started as soon as possible. It is also ***concluded*** that in the short to medium term there is no option other than persisting with the current rolling inspection process, but that through some strategic investments it should be made more efficient, less costly, and less stressful for animals. This report also ***concludes*** that in the short to medium term the Livestock Boards should collaborate and formulate an improved livestock inspection and certification system based on a progressive control of epizootic diseases. The Boards should prepare a joint report within a year of obtaining funding for this task.

Agriculture and Watersheds <<C>>

7. The heart of the agricultural sector is also in the heart of the remaining conflict zone in the South Central area. As a result farmers in this area still suffer from destroyed flood-control levees and dysfunctional irrigation systems, unreliable supplies of inputs such as fertilizer and seeds, uncertain markets and prices, and no resolution of land disputes resulting from unlawful appropriation of land by warring parties. This report ***concludes*** that the rehabilitation of destroyed flood-control levees and irrigation systems in the Shabelle and Juba river basins would be economic investments on the basis of previous profitability, strong growth in demand for domestically produced food in Somalia, and access to export markets for sesame, bananas, and grapefruit.

8. Associated with the traditional field and tree crop production, there are considerable prospects in various Somali regions for a number of high-value specialized crops such as dates, vegetables, fodder plants, frankincense and myrrh, gum arabic, honey, and a range of medicinal plants that could all be developed into significant sources of income for farmers and pastoralists. This report ***concludes*** that because of the economic importance of these field and tree crops, their production and marketing should be supported by governments through the establishment of public and private extension programs.

Fishing Industry <<C>>

9. During the last 15 years the marine resources along the Somali coastline have been regularly plundered by between 500 and 1,000 trawlers and other types of ships, few of which are licensed and most of which break international fishing laws. For example, the once substantial and valuable lobster resources have been almost wiped out. It is estimated that for Somaliland, Puntland, and South Central Somalia combined, about US$95 million in export revenue each year is lost to illegal fishing, which is about 25 percent of the value of the estimated potential annual catch. Artisanal fishermen have also suffered from illegal fishing close to shore because of the damage it does to their nets and the disruption to their own fishing, which means they find it extremely difficult to sustain an adequate livelihood.

10. This report ***concludes*** that governments should take strong measures to enforce licensing of all vessels (international and national) fishing in Somali territorial waters, establish a coast guard to monitor licensees and their fishing practices, and provide public

infrastructure such as jetties, navigation aids, and access roads in isolated coastal towns along the Somali coast.

Women in the Productive Sectors <<C>>

10. Women are crucial contributors to private sector development in all Somali regions. However, women work under extremely difficult conditions because in general they are marginalized from many of the opportunities presented to men. Invariably the women need to earn a supplementary income for their families to avoid poverty. Very often, they are widows as a result of the war, have children or elders to care for, and want education for their children. They usually have no independent means of transport, no access to capital, and are involved in time-consuming work like herding goats and sheep (assisted by children). Many women are butchers and fish retailers. **[[Note: tried to make distinction between the circumstance that is "invariable" (supplementary income) and all the others that "usually occur."]]** They work long hours in value-added or service-type enterprises—often selling perishable products such as meat, vegetables, fish, milk, and other foods in town markets where there were no toilets or childcare facilities. They are appalled by the destruction of the environment as a result of charcoal production and overfishing, but understand the pressures to overuse natural resources, even though much of the income generated goes to pay for qat. They are not looking for subsidies, but are looking for better infrastructure such as roads, water supply, and markets. In one Somali area the lack of women's representation in local government was deplored.

11. A number of ***conclusions*** emerged from the mission's discussions with numerous women's groups that are relevant to a strategy for improving the prospects for women in Somali society, particularly in the productive sectors.

(i) Nontraditional employment. Most of the income-generation activities that women engage in are in the nature of small enterprises that require some capital, are very time consuming, and take women away from the household and create problems for child care. With economic growth, jobs in service industries should in theory emerge quickly in the economy. But for those future jobs a number of skills will be needed and hence adult education of various kinds may be an important public sector strategy to prepare women for nontraditional employment opportunities.

(ii) Microcredit. For those intending to establish small businesses microcredit will be important. The pilot credit program previously financed by the European Commission in Somaliland and Puntland, despite the problems expressed by religious leaders over their interpretation of fixed charges as *riba* (usury) for the use of this credit, may be a useful model for small-scale credit, because 70 percent of its borrowers were women—mainly in urban areas.

(iii) Toilet and child-care facilities. Providing improved toilet and child-care facilities in markets is an obvious strategy for relieving stress on women and improving their opportunities to function for long hours in markets. Local

governments should be responsible for constructing the facilities with public funds, and vendors at markets should pay a levy for maintenance.

(iv) Technology. Relieving women of tiring and time-consuming manual labor in agriculture and other enterprises will be an important part of enhancing the welfare of women. Much of this could be done through the adoption of available technology, which could be disseminated by the appropriate TGF **[[not defined or used elsewhere]]** ministry.

(v) Education of young children. The education of young children will be a focal point for the JNA and is covered by another cluster. Targeted assistance programs, such as subsidized community child care, should be established to ensure that women who work (particularly women who are at or below the poverty line) do not at the same time prejudice their chance to ensure a basic education for their children and so contribute to human capital development.

12. Somaliland and Puntland, and to a lesser extent South Central Somalia, have a range of known mineral resources such as coal, gypsum and limestone, sepiolite and meerschaum, and various gemstones, as well as precious and base metals such as gold, copper, nickel, lead, and zinc that should be further investigated since they present prospects for income and employment generation. Even oil production is said to be a realistic possibility based on oil finds in Yemen on lands with similar geological structures as in Somalia. Another potential opportunity for the use of the marine resources is tourism. With its beautiful shoreline and mountains in the hinterland, northern Puntland could become an outstanding tourist location. The report ***concludes*** that these natural resources should be exploited; but the challenge is establishing a competent and transparent public contracting authority within the central government to manage the decisions over rights by the private sector to exploit these public resources.

13. The private sector has been the source of entrepreneurial energy and income that has kept all Somali areas afloat economically for the last 15 years and this energy can be harnessed to generate considerable income from the apparent substantial mineral wealth. Agriculture and livestock production are at the core of the private sector and have kept at least 70 percent of the Somali population employed during some part of the year. During the civil war the nonagricultural part of the private sector was also highly productive; it provided most essential services such as power and water supplies, all transportation, social services such as health and education, informal financial services, and a highly effective telecommunications system.

14. The success of a range of private investments has proven that governments need not always invest in the provision of services. The main service missing at this time in the Somali economy is a formal banking and insurance sector. This seriously limits regular commercial trade. The private sector has also drawn attention to the absence of formal commercial banking facilities as a major impediment to private sector investment. Without a commercial banking system barter trade will remain dominant. Another cluster report has addressed the actions required to establish formal banking and insurance services. Nevertheless, other actions to encourage private investment are critical. This report

concludes that the private sector will expand if governments establish clear regulations on matters such as phytosanitary standards for food exports as well as quality standards for all major exports, ensure a transparent legal system to resolve trade disputes, and invest in essential infrastructure such as roads and water supplies that helps establish an enabling environment for private investment.

Implementation Capacity ***<<C>>***

15. A reconstruction and development program, which will be implemented by the public sector, will include analysis and decisions on public policy and expenditure. In the last 16 years Somali government institutions have had little experience in either policy analysis or public expenditure management. The competence of Somali institutions currently are at different levels depending on their history and experience. Those in Somaliland are generally at a higher level of competence and effectiveness because of their more comprehensive experience in a government; Puntland is close behind. There is no government in South Central Somalia. In comparison with government institutions in other sub-Saharan countries at similar levels of development, the institutions in Somaliland are sound, even though they may not have the range of experience as other countries. The Ministries of Livestock, Agriculture, and Environment in both Somaliland and Puntland have competent staff, but there is virtually no capacity to implement any programs or projects at the regional and district level. Many districts are remote with few communications and hence even a dialogue between such districts and the central ministry will be very difficult.

16. In the light of the weak institutional capacity, the RPD for the productive sectors and the environment includes a number of capacity-building components. There is a proposal for strengthening Somaliland's environmental agencies and the Ministry of Fisheries and Costal Development and the Marine Police, including both equipment and training, which will cost an estimated US$1.1 million and US$2.1 million, respectively. Similar programs are proposed in Somaliland, such as a proposal for training district administrators (estimated to cost $200,000); sukch programs need a strong implementing agency. In general, the public sector's weak absorptive capacity to use external assistance is the core issue that needs to be addressed through capacity building.

Investing for Results ***<<C>>***

17. Reconstruction and development costs related to the needs of the productive sectors and the environment are considerable because of the massive destruction of physical capital during the civil war. A substantial amount of capital will come through the private sector as the investment climate improves and as governments establish policies on sector development, the respective roles of the public and private sectors, and other specific issues. Clearly, however, there are essential public investments that should be made in the short run to rehabilitate public infrastructure to support the largely private productive sectors in the economy. Those investments are the focus for this report.

18. It has been estimated that over a five-year period, a priority public investment program amounting to US$296 million would be needed for Somaliland, Puntland, and South Central Somalia in the productive sectors and the environment. About US$98.2 million of

this investment would be for crop production, including flood control and the rehabilitation of public irrigation schemes (both pump irrigation and rainfed) in the Shabelle and Juba valleys. Obviously the investment would need to be phased over a number of years because absorption capacity is weak—although absorption capacity could be strengthened with technical assistance. It is estimated that about US$53 million would be appropriate in the first year of a program, US$89 million in the second year, and the remaining US$154 million over the following three years.

RECOMMENDATIONS<<B>

19. The following is a list, compiled from this report, of the priority recommendations for policy and institutional changes, along with recommended investments. These recommendations also apply to all Somali areas. There are many other recommendations in the report that apply to individual regions. They will be found in the relevant sectoral chapters.

20. **Environment.** The main recommendations made in the report are as follows:

- Strictly enforce the public licensing of charcoal production and enforce the charcoal export ban.
- Intensify pilot reforestation programs under various soil and climatic conditions.
- Strictly enforce wildlife conservation laws.
- Complete a thorough "State of the Environment" report.
- Investigate the alleged toxic waste sites south of Gara'ad.
- Clean up the chemical contamination at the former Desert Locust Control Organization site in the Ayaha Valley.
- Investigate chemical contamination at the former missile site in Berbera and other sites; if necessary draw up and implement a plan for decontamination.
- Establish a broad-based National Environmental Coordination Committee with representative membership from all area governments.

21. **Livestock.** The main recommendations made in the report are as follows:

- Eradicate the tsetse fly from the Shabelle and Juba valleys.
- Strengthen public and private veterinary and paraveterinary services.
- Fund and begin control of epizootic livestock diseases as soon as possible.
- Continue to implement the rolling public quarantine export inspection system for livestock in the short to medium term, but make it more reliable, less costly, and less stressful for animals.

- The Livestock Boards should jointly, within one year of being provided with a terms of reference and funding, prepare a proposal for an improved public livestock inspection and export certification process for all Somali ports, based on progressive control of epizootic diseases, and compliant with the standards of the Organisation Internationale Epizootique (OIE).
- Evaluate alternative management and marketing strategies for livestock in northern and central areas with the following objectives: (i) make more effective use of the changed rangeland environment, and (ii) more effectively hedge the risk that results from the lower resilience of the rangelands to drought as a result of the removal of most tree cover.

22. **Crops and Watersheds.** The main recommendations made in the report are as follows:

- Rehabilitate the public flood levees and irrigation systems in the Shabelle and Juba Valleys.
- Improve rainfed and pump irrigated crops in all areas.
- Establish strong public and private research and extension services for crop producers in all Somali areas.

23. **Fishing Industry.** The main recommendations made in the report are as follows:

- Enforce the licensing of all boats fishing in Somali territorial waters.
- Establish a public or private coast guard with jurisdiction over all Somali territorial waters to monitor licensees and their fishing practices, and to eradicate piracy.
- Provide public infrastructure such as jetties, navigation aids, and access roads to support artisanal fishermen in isolated coastal towns along the Somali coast, subject to commitments by communities to regularly maintain the infrastructure.

24. **Women in the productive sectors.** The main recommendations made in the report are as follows:

- Ensure that all public market places have adequate toilet and child-care facilities for women.
- Assess the options for providing enhanced technology to women engaged in weeding, harvesting, threshing, grain milling, and collection of wood and water to facilitate their activities and reduce their enormous labor input into these activities.
- Explore the applicability of microfinance institutions to the needs of women for microcredit for small-scale businesses.

25. **Other Private Sector Development.**

- Governments should support exploitation of national mineral resources through the establishment of competent and transparent public authorities that are responsible for contracting the rights of the private sector to exploit mineral resources.
- Governments should support private sector investment in the following ways: establish clear and transparent regulatory authorities, encourage the establishment of private commercial banks and insurance companies to support formal trade and investment, ensure an efficient legal system to resolve disputes, design a consistent land policy, and invest in essential infrastructure such as roads that help improve the enabling environment for private investment.
- The private sector should establish independent chambers of commerce as vehicles for opening a dialogue with governments on issues such as the costs of doing business, the investment climate, economic policy, and trade policy.

SOMALI

JOINT NEEDS ASSESSMENTS

PRODUCTIVE SECTORS AND ENVIRONMENT CLUSTER

1. INTRODUCTION

Objectives and Scope <<B>>

1.1 The objective of this report, prepared by the Productive Sectors and Environment Cluster (PSE Cluster) of the Somali Joint Needs Assessment (JNA), is to assess the prospects for the productive (real) sectors in Somalia to develop, grow, generate employment, and contribute to poverty reduction and food security. Prospects for development will depend crucially on peace and the reduced risks and uncertainty that peace will bring for investors, sound economic and social policies, the opportunity to make profits, and the levels of public and private investment. The extent to which development prospects will be realized will also depend heavily on the extent to which the serious degradation of natural resources environment can be reversed since most of Somalia's current productive capacity is dependent on the sustainable use of these resources.

1.2 The PSE Cluster activities cover livestock, agricultural crops, fisheries, and forestry as well as manufacturing, telecommunications, and the general development of the private business sector (large-, small- and medium–size enterprises) in the widespread and diverse Somali regions. The report will emphasize the prospects for agroprocessing industries and productive uses of mineral resources such as coal, tin, gypsum, gemstones, and oil. The cluster will also focus sharply on the appropriate roles of the public and private sectors in establishing the incentives for investment and hence the conditions for production and growth. It will also pay particular attention to environmental issues that need to be addressed by the public sector in the context of the extensive use by the private use of natural resources.

Linkages of the Productive Sectors to the Environment and to Other Clusters <<B>>

1.3 Income generation and the creation of wealth—through the production of livestock, crops, fisheries, forestry, mining, and other productive activities that process and manufacture goods from raw materials—depend on the sustainable use and good management of Somalia's considerable natural resources. The status of the environment is an indicator of the way natural resources are being used. Employment, incomes, and livelihoods of families throughout Somalia are linked to the performance of the productive sectors and hence also to the environment. The success of the productive sectors, however, is in turn strongly linked to the performance of other clusters around which the JNA analysis is

organized, namely: the achievement of peace, security, and political stability; the capacity governmental and nongovernmental institutions to deliver dedicated governance and equitable laws; the soundness of macroeconomic and sectoral policies, including the establishment of an attractive enabling environment for private sector investment; equal economic and social opportunities for men, women, and clans; sufficient high-quality infrastructure; and provision of effective and reliable education and health services. Strong performances of all these activities will stimulate broad-based growth of the Somali economy, improve the welfare of all households, reduce poverty, and thereby ensure universal food security.

Achieving Millennium Development Goals <<B>>

1.4 Growth of the productive sectors and achieving the sustainable use of Somalia's natural resources will contribute to meeting a number of the Millennium Development Goals (MDGs) established in 2000 by the United Nations General Assembly. Specifically the agricultural and nonagricultural productive sectors can contribute to growth in employment and hence poverty reduction and food security, export income to finance a range of imports including new technology, tax revenues for all levels of government to finance the provision of improved social services, and many infrastructure services such as roads, electricity, and water supplies.

Building on the Paris Declaration <<B>>

1.5 The Paris Declaration of April 2004 reaffirmed a commitment among donors to harmonize and align aid delivery. The commitment was to accelerate progress in a number of areas, namely strengthening partner country development policies, aligning aid with partner priorities, enhancing accountability, eliminating duplication of efforts, reforming and simplifying procedures, and defining measures and standards of performance.

1.6 The donors also made commitments to address a number of other issues, namely to assist the development of implementation of results-driven national development strategies, provide more predictable aid flows, decentralize responsibility for donor activities to field staff, integrate global programs into national development agendas, and address corruption and lack of transparency.

1.7 The JNA is an opportunity to incorporate the main elements of the Paris Declaration in the development of an assistance program for Somalia.

Structure of Report <<B>>

1.8 After an introduction (Chapter 1), Chapter 2 discusses what is arguably the most important issue after broad-based peace—the status of natural resources and the environment. Chapter 3 to briefly reviews the relative importance of the main productive sectors in the economy. Chapter 4 assesses various opportunities and challenges facing the agricultural sector, which includes livestock, crops, watersheds, forestry, fisheries. In Somalia agriculture is the dominant part of the economy and the core of private sector activity. Chapter 5 reviews the progress and prospects of the nonagricultural private sector, which covers manufacturing and mining activities, telecommunications, airlines, and small-scale

enterprises, as well as the business environment and strategies to support the private sector. Finally, Chapter 6 examines the strategic actions that are necessary to achieve results. The strategy will be a mixture of public policy, building institutions and their capacities, public investment, and ensuring an enabling environment for private sector investment.

2. NATURAL RESOURCES AND THE ENVIRONMENT <<A>>

Overview of Priority Issues <<B>>

2.1 Somalis have always depended on natural resources for most of their production and incomes.[1,2] **[[Footnote 1 moved off of chapter title]]** This continues to be the case. Nomadic pastoralism and crop-based production of livestock have always been a key activity and the source of most domestic and export income. In addition, the South has always been the main agricultural and food-producing area and in the late 1980s started to produce exports of substantial value such as fruit and sesame. After the start of the civil war, lobster, fish, and charcoal emerged as important sources of local private income and export revenue.

2.2 This chapter concludes that there are a number of priority environmental issues that need to be addressed urgently. They will arise repeatedly throughout the report as it examines the use of Somalia's natural resources for the generation of employment and income in the productive sectors. The issues are as follows:

- Massive degradation of natural resources—the result of deforestation, overgrazing, inadequate soil conservation, overfishing, and destruction of wildlife habitat—has created a serious threat to biodiversity as well as livelihoods and future development.
- Unclear legal and institutional responsibilities, and weak to nonexistent institutional capacity at federal, regional, and local levels for addressing environmental problems and enforcing laws and regulations, call for immediate clarification of legal responsibilities at different levels of government.
- Authoritative high-level commitments need to be made to ensure environmental accountability in all development projects, including prescreening of projects for potential negative environmental impacts. Also, there should be accurate monitoring of environmental conditions and the trends in those conditions.

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[1] Most of the material in this chapter was drawn from a background paper prepared for the JNA by UNEP, titled "Somalia Joint Needs Assessment: Environment Sub-Cluster Report," May 2006, draft for comment. The UNEP report is based on information obtained during its mission to Bossaso and Hargeisa between March 27 and April 3, 2006, as well as on background work and references cited in the report. A questionnaire (reproduced in the UNEP report) was also sent to environmental umbrella organizations, whose members are active across Somalia, to extend the coverage of information collection in Bossaso and Hargeisa. The responses received were analyzed and included in UNEP's report where appropriate. The UNEP report is available on request. The support of The World Conservation Union (IUCN) is also gratefully acknowledged.

[2] Minerals are known to be among Somalia's natural resources, but information on the extent of these resources is weak or nonexistent. The potential exploitation of mineral resources will be covered in Chapter 5.

- The lack of waste management infrastructure and resulting hazardous dumping of waste, and a number of sites containing chemical contamination, pose significant health risks and need to be urgently decontaminated.
- A thorough field-based "State of the Environment" report is needed, to assess the status of the natural resource base and to guide future resource management and development decisions.

Severe Stress on Water Resources <<B>>

2.3 Somalia is to a large degree arid or semiarid with irregular rainfall and water resources that vary in quantity and quality according to location. In much of the north and northeast, subsurface water is saline and often the only permanent source of sweet water is found in deep boreholes. In the south, however, water is obtained from rivers and shallow wells. Extensive, permanent swamps and floodplains occur on the Shabelle River, while additional swamps abut the Juba River. These are the two large perennial rivers which rise across the border in Ethiopia and flow across the southern part of Somalia. The Juba reaches the Indian Ocean and the Shabelle ends in a swamp. Both are important sources of water for domestic consumption, irrigation, and livestock. The area between the two rivers is the country's main rainfed agricultural zone.

2.4 Temporary watercourses, known as *lachs* or *laks*, drain the southeast sloping plateau of northeastern Kenya into southern Somalia, the main ones being Lach Awaro, Lach Bogal and Lach Dheere (Hughes and Hughes, 1992). Cisterns (*berkeds*) are another source of surface water for at least a few months of the year, these being pans or dams whose bottoms and sides are cemented and covered to ensure that water is not lost to evaporation and seepage (Amuyunzu, 1997). Underground aquifers are also widely exploited, either through boreholes, shallow wells, or at natural springs.

2.5 UNDP estimated that only about 5 percent of the population has secure access to water throughout the year (UNDP, 1998). An estimated 31 percent of the population has access to safe drinking water in the northwest, while comparable figures for the northeast and southern part of the country are 19 percent and 20 percent respectively. In Mogadishu, the figure is not more than 35 percent in the urban area and 10 percent in rural Benadir (UNDP, 1998).

2.6 The Human Development Report for Somalia (UNDP, 2001) estimated that Somalia's annual renewable fresh water fell from 2,500 cubic meters per person per year in 1950, to 980 cubic meters in 1990, with a prediction of 363 cubic meters by 2025. It is generally accepted that when this value falls below 1,000 cubic meters per year, water scarcity begins to hamper health, economic development, and human well-being; below 500 cubic meters per year it becomes life threatening.

2.7 Water provision in the major cities is either privately owned and supplied or communal. In some cities such as Hargeisa current water supplies are limited and costly. The Infrastructure Cluster will provide more details on urban water supply and demand. Part of the demand for urban water supplies results from transport of water to rural areas from urban distribution systems, a phenomenon usually due to subsidized water sales in urban

areas. In rural areas water is collected in cement catchments (*berkeds*) or obtained from wells or boreholes that may be communal or private. An active system for water delivery has developed, spanning very small operators with wheelbarrows or donkeys to operators with one or more trucks. For example, there are over 800 *berkeds* in Eastern Sanaag alone, 350 shallow wells, and 27 boreholes. A drum of 200 liters of water typically sells for US$0.50–1, but can cost several times that price after prolonged droughts. Destitute and poor families traditionally do not pay for water; those with slightly more funds borrow from relatives in difficult times. The UN estimated that of the average current indebtedness of an Eastern Sanaag family, after 4 years of drought and at prices for water of US$3.8 per drum (October 2003), are US$50–100 per family to water providers alone. Consider this in relation to average per capita incomes for all Somali regions of about US$230 per year, or about US$1,150 per household.

Forests and Rangelands under Sustained Attack <<B>>

Natural Forests and Rangelands <<*C*>>

2.8 Stands of closed forests are limited to Southern Somalia and occupy only about 2.4 percent of the country (IUCN, 1992). However, if the *Juniperus* forests and evergreen tracts in the mountains in the north are included, the total forest coverage would probably amount to around 14 percent (90,000 square kilometers) of the land. Important among these are the mist forests of the Golis Range (see Box 2.1). There used to be vast stretches of rangelands covered by various species but predominantly acacias and native grasslands. Most of the trees on these rangelands have disappeared.

Box 2.1: Mist Forests of the Golis Range in the North

The mist forests of the Golis Range of Somaliland are the only true forest areas of Somalia and are important centers of biological diversity and species endemism. On account of their biological richness, mist forests—so called because of their ability to remove moisture from the air as it blows in from the coast and rises above the plateau—are also important resources for pastoralists during dry seasons and periods of drought.

Gacaan Libax, a highland area reaching 1,719 meters in northwestern Somalia, hosts one of the largest and most intact mist forest areas in Somalia. Local people are well aware of the importance of these forests to their livelihoods, especially for the grazing and water resources they provide.

However, people are forced to demand more and more from these forests due to the loss of traditional grazing lands to private livestock enclosures, an increased number of livestock, and the lack of law enforcement. According to a case study **[[Give a full reference for this report?]]** by the NGO Candlelight for Health, Education and Environment (CLHE), the mist forest areas were previously protected, but the management system was disrupted by the civil wars and the absence of government protection mechanisms. This led to indiscriminate tree cutting and over-grazing. In addition, the undesirable blue flowering vine *ipomoea* sp. (Morning Glory—locally known as "Badhi-beeto") became abundant in the area. It causes illness and death in animals forced to graze on it in the absence of other plant species. The plant's dry leaves are, however, a good dry season feed. Since this area is communal land it is particularly vulnerable to land enclosures. See Chapter 4 and Box 4.2 for a more detailed discussion of the impact of enclosures.

Source: UNEP, 2006. **[[full reference moved to bibliography]]**

2.9 Virtually all of the tropical floodplain forest that once existed along the Shabelle River has been cleared for smallholder agriculture and sugar and banana plantations, except for a

small patch set aside as a reserve at Balcad by the Somali Ecological Society. Aerial photographs from 1960, 1983–84, and 1987 reveal a drastic acceleration in cleared forests in the Juba valley as well—probably encouraged by irrigation and drainage schemes. Only the poorly accessible Middle Juba, with its predominantly saline, alkaline, impermeable soils, has retained significant areas of relict floodplain forest. Compared with surrounding woodland and bush, these floodplain forests are floristically rich and are notable for their diversity of specialized birds and animals (Madgwick, 1989).

2.10 A number of mangrove stands have been reported, the best areas being between Saada Din Island and Saba Wanak in the estuaries of three watercourses that reach the sea west of Bossaso, and in the three estuaries just north of the Kenyan border (Hughes and Hughes, 1992). These and other stands, however, have been seriously depleted for firewood and construction timber. Some have been completely denuded and are now salt marsh ecosystems. Overall the regenerative capacity of the mangrove ecosystems may have declined in recent decades—a result that will almost certainly affect the capacity of these areas to function as breeding and nursery sites for near- and off-shore fish, crustaceans, and mollusks. These areas would now also provide less protection to the coastline.

2.11 In 2000 about 60 percent of the country was covered by very sparse savannah woodlands (see Annex A) and since then the percentage has no doubt declined significantly. Forests and woodlands have always been important as sources of household energy and construction materials. Frankincense from *Boswellia* species growing in the north east, *Commiphora* that produces myrrh in the southwest and the northeast, gum arabic from *Acacia* spp, and *Cordeauxia edulis* (thought to be endangered) that produces *yicib* nuts in central regions are also important revenue-producing wood products (UNEP, 1984).

Charcoal Production *<<C>>*

2.12 Charcoal is the fuel of choice in most Somali households (see Box 2.2) and for certain specific purposes in Gulf country households; these uses create a strong demand. The once majestic acacias and other trees that graced the rangelands have almost disappeared due to the ravages of charcoal production over the last 15 years. In a study on wood-based energy dynamics in Somalia, charcoal output from north East Somalia in 1996 alone was estimated to be in the order of 4.8 million sacks, each weighing 25–30 kilograms, 80 percent of which were exported. Producing such a volume requires cutting down about 2.1 million *Acacia nilotica* trees. At an average density of 60 trees per hectare, this translates into a deforestation rate of 35,000 hectares of land a year. Such a rate of deforestation would have cleared 170,000 hectares of land during the last five years of the 1990s alone, when the area witnessed a massive outflow of charcoal for export (WSP, 2001).

Box 2.2: High Demand for Charcoal by Households in Major Cities

A country-wide assessment of the scale of charcoal production and consumption has not been undertaken, but a report by the NGO Agricultural Development Organization (ADO) in its paper, "Environmental Degradation, Lessons and Experiences,"**[[Year? Give full reference for report? Stub created in bibliography]]** concluded that annual charcoal consumption in the major cities of Hargeisa, Berbera, Borama, and Buroa is approximately 2,309,200 sacks, which require about 1,154,600 trees to produce, equivalent to about 19,240 hectares. Over the last 15 years this would have been the equivalent to about 300,000 hectares. Since an estimated 50 percent of charcoal energy is lost in the cooking process and some 95 percent of the

urban population uses inefficient metal stoves, there would be enormous benefits for the rangeland environment if consumption of charcoal were reduced by using more efficient stoves that are available, or alternative energy sources such as kerosene or solar systems. See the cluster report on Infrastructure for a discussion of alternative household energy sources.

Source: Agricultural Development Organization, Hargeisa, Somaliland.

2.13 Most charcoal is today produced in Southern Somalia and illegal exports (about 80 percent of production) constitute a large share of all exports from the South. There has been a rapid expansion in the production of charcoal in recent years, with much of it being exported to meet demand in Saudi Arabia, Yemen, the UAE, and India. The incentives for charcoal exports are clear: charcoal prices in Southern Somali regions are in the vicinity of US$3–4 per bag (free on board [fob] Kismayo), while in the Gulf States the same bags sell for US$10 each.

2.14 The destruction of the rangelands for charcoal production has naturally led to scarce wood resources and conflict for control of them. Among other goods, acacia trees provide important dry-season forage for all animals, and their roots fix nitrogen that enriches the soil close to the trees. **[[Note: Tried to clarify resource/conflict connection in previous sentences; may have changed meaning. Nitrogen-fixing roots are more a "good" than a "resource" in contention.]]** However, relations between charcoal producers and local communities are complex. In many cases producers are members of the community and in other cases outsiders have taken control of forest resources, production, and sale of charcoal. Many conflicts have arisen and casualties recorded because of competition for both wood resources and markets, according to the Candlelight NGO case study.[3]

2.15 In its paper **[[Any more publication/dissemination info available? Date?]]** on environmental degradation, the Agricultural Development Organization (ADO) based in Hargeisa states that rural communities are heavily involved in charcoal production. In the past, businessmen and cooperatives from urban centers encouraged rural youth to engage in the burning of dead trees for charcoal. With the increasing scarcity of dead trees, live trees were cut in order to satisfy the increasing demand. Since outsiders were not allowed to cut and burn trees in specific areas, incentives were offered to locals—especially decision-making elders—to carry out work in their areas. This was usually coupled with the mobilization and training of rural youth for mass charcoal production, allowing them to support their low-income families and their demand for qat. Since the incentives for charcoal production were strong, opposition to charcoal production was weak and the practice even stretched to nomads. It is nevertheless ***recommended*** that the licenses for charcoal production and the charcoal export ban be strictly enforced. .

2.16 Charcoal production is the major cause of deforestation in Southern and Northern areas, in addition to other causes such as the traditional use of wood for household energy and construction. The acacia species (used for charcoal production) does not grow fast enough to replace felled trees. Heavy grazing pressure is one reason for lack of natural

[3] The Candlelight study notes that the government issues charcoal production licenses according to the terms of Environment Conservation and Protection Act No. 04/98. Too many licenses have been issued and the budget of the Ministry of Pastoral Development and Environment is inadequate to ensure proper supervision and monitoring of charcoal production.

regeneration. Reforestation programs have been successfully implemented in other arid and semiarid areas, such as Niger, Cameroon, Nigeria, and Chad, and could play an important role in rehabilitating deforested Somali environments (see Annex J for details). A number of Somali pilot projects supported by NGOs have shown that there are sound prospects for community reforestation. It is ***recommended*** that pilot reforestation programs using a range of species, including the fast-growing legume *Leucaena leucophila* that has already been shown to be very adaptable to a range of Somali agroclimatic conditions, be promoted vigorously under various climatic and soil conditions in order to refine the silviculture technology for Somali environments.

Gums and Resins **<<*C*>>**

2.17 Frankincense used to be Somalia's fourth-largest foreign currency export earner, with an annual production of 12,000 tons. Due to their value, *Boswellia* are highly prized trees with tree tenure systems. Although not cut for charcoal or other uses, their natural regeneration is threatened by overgrazing (EC/IUCN, 1997) and today this sector is in a state of neglect. Under the government of Siad Barre, state support to frankincense producers facilitated certain aspects of production and export trade, but this same state control destroyed private trading networks, leaving behind a vacuum when the government collapsed. Now, since production and export is no longer regulated, there are concerns over the scale at which trees are being "tapped."

Marine Resources Unsustainably Exploited <<B>>

2.18 The coastline of Somalia is 3,025 kilometers long and about 55 percent of its population lives in the coastal areas. The area of Somalia's continental shelf is 40,392 square kilometers and its territorial sea is 68,849 square kilometers. A subsequent section of this report will discuss the commercial use of Somali marine resources. This part of the report will discuss the status of the marine resources.

2.19 Overfishing is a serious problem, although its extent still needs detailed investigation. Overfishing has been caused by unlicensed trawlers from many nations that have fished Somali waters within the Exclusive Economic Zone (EEZ) unmonitored and have taken substantial amounts of fish. Unlicensed trawlers also come close to shore, where they catch lobster and shark and destroy reefs and other natural marine habitat. Research has made the results clear. Approximately 80 percent of Puntland's original lobster stock is now believed to have been lost (FAO, 2005b). A number of the once-abundant shark species (including saw, hammerhead, white, and mako) have allegedly **[[Who is alleging? "Apparently" might be better word]]** disappeared in some areas, while the average sizes of some other shark species landed have decreased over the past five years.

2.20 Discussions with stakeholders from Bossaso indicated that at any one time in the period from December 2005 to March 2006, between 700 and 1,000 illegal, unregulated, and unreported vessels were seen operating along off shore. Precise numbers are not known because there is no surveillance or licensing system. There is no regulation or enforcement of the catch (the number caught per species) of the method of capture (the mesh size and net type). For example nets 150 meters long by 100 meters deep were reported to be laid,

indiscriminatingly catching all species and resulting in enormous waste. In addition, it was noted that there have been many new entrants to the fishing industry, some of whom have inadequate training and lack knowledge of sustainable fishing methods (including returning undersized fish and using appropriate equipment).

2.21 The absence of a well-financed, effective public sector institution responsible for the management of marine resources has also resulted in a complete absence of defined areas where fishing is prohibited or restricted, such "no take" zones.

2.22 To make matters worse, postharvest losses by weight of fish and shark catches along the Puntland coast are estimated at 60 percent and 70 percent, respectively. Trade in shark products is dominated by trade in fins and to a much lesser extent by dried or salted shark meat. This focus on fins results in large numbers of sharks being wastefully discarded after their fins are taken. Stakeholders in Bossaso advocated the establishment of fish processing factories to help reduce waste from postharvest losses. In addition they noted that although Puntland has a Puntland Fisheries Regulation (dated April 2005) and a Fisheries/Marine Policy and Strategy (dated April 2004), these are not being enforced. Stakeholders from both Bossaso and Berbera highlighted the need for establishing a strong coast guard to eliminate illegal and destructive fishing being undertaken by either national or foreign vessels.

2.23 About 11 percent of the world's seaborne oil is transported through the Red Sea and Gulf of Aden (ITPOF, 2003),**[[not in Biblio]]** and the frequency of tanker movements poses a constant threat of oil spills. Somalia has no national capacity to deal with an oil pollution incident of any magnitude, which is a concern given the ecological importance of marine and coastal ecosystems in the region (World Bank, Undated). The closest cleanup equipment is located at the IMO Regional Response Centre in Djibouti for the Gulf of Aden region (UNCTAD, 1998). This facility, however, is awaiting reactivation (World Bank, Undated). Besides the threat of oil pollution, waste pollution, mainly from coastal communities, has been cited in a number of reports (for example, FAO, 2005a; UNDP, 1998). Such wastes range from discarded batteries to household wastes and animal carcasses. There have also been reports of illegal dumping of hazardous waste by foreign enterprises.

2.24 Increased siltation can result from agricultural land use and nonagricultural activities such as limestone quarrying on the coast, beach sand mining, and sediment discharge via the Juba River. Siltation could affect the fishery nurseries in the reefs and mangrove ecosystem. There have not been any coastal environment or fisheries surveys that could help assess changes and effects in these ecosystems. It is therefore **recommended** that a thorough "State of the Environment" report be prepared to assess the status of natural resources and recommend actions to guide future natural resources management.

2.25 At present no Somali area has an effective institution or strategy for the assessment of the coastal and marine environment. None of the Somali areas possess the requisite oceanographic equipment for sampling the marine environment and none have the human resources and institutions with the necessary facilities and instrumentation to carry out rapid assessments and analysis. A similar situation exists for rangelands, forests, and water resources.

Biodiversity and Protected Areas <<B>>

2.26 Arid and semiarid conditions have persisted in all Somali regions throughout the long-term climatic fluctuations that have affected much of the African continent (Simonetta, 1988). As a result, this region has been an evolutionary center of fauna and flora adapted to these conditions. Early explorers, hunters, and colonial officials traveling through Somalia during the late 1800s reported on the astonishing abundance and diversity of wildlife. Ruthless overexploitation, however, has meant that many of the country's wildlife species are now endangered or rare, while key ecosystems have been seriously degraded.

2.27 Now only small remnant pockets of wildlife exist, with many species approaching extinction. Some, such as the elephant (*Loxodonta africana*), black rhino (*Diceros bicornis*), lion (*Panthera leo*), and Swayne's hartebeest (*Alcelaphus buselaphus swaynei*) have been wiped out from most of the country, while the wild ass (*Equus asinus somalicus*) population that once numbered in the thousands has been reduced to just a few dozen (Sommerlatte and Umar, 2000). Somalia has ratified the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) (http://www.cites.org/), but few if any practical measures are being taken to ensure its implementation. Ten species of birds are threatened, of which two are critically endangered. The country used to have one of the most extensive and least spoiled coastlines in Africa, but important coral reefs, seabird colonies, and turtle nesting beaches are currently unprotected. At the end of the last century there were believed to be large dugong populations and extensive seagrass beds in near-shore waters. **[[Are these gone now?]]** Important seabird nesting sites include Mait Island, Zeila Island, and the Bajun Islands off Kismayo. Other less known species that are endangered may receive even less attention: they include two of the country's 223 reptile species and three of its 331 species of fish (WRI, 2003).

2.28 Despite its harsh physical environment, Somalia is home to some 3,028 species of higher plants, of which 17 are known to be threatened (WRI, 2003). Somalia is considered a center of floral endemism (White, 1983), and of the known species 700 (17 percent) are endemic—a feature only surpassed by the South African floral region. At least 151 plants in Somalia have known medicinal values (IUCN, 1997a). However, data are insufficient to describe the status of these resources or the degree to which rural communities in particular rely on or manage them.

2.29 The Somali people, especially the nomads who live in close contact with the environment, have an extensive knowledge of plant-animal fundamentals (Barkhadle, 1993). Most plants and animals have a local name and their phenology, distribution, and ecological zones are known: the use of virtually every plant within the grazing zone—the *deegaan*, which might range from 200 to 2,000 square kilometers—is known. Latest reports (WRI, 2003) show that there are 14 protected areas in total, but only one exceeds 100,000 hectares. Eleven **[[protected?]]** wildlife areas have been declared since 1970 but by 1986 only two are thought to be functional. Less than 1 percent of the country is included in protected areas, much of this being occupied by the Lag Badana National Park. In reality, however, there has been no formal protection offered to any of these sites since the early 1990s due to the civil war and the consequent breakdown in the rule of law and government administration. With such an incomplete network of protected areas—terrestrial and marine—there are serious

grounds for concern over the long-term prospects for biodiversity conservation or any form of development based on sustainable use of resources.

2.30 The most important sites in need of protection are Zeila, Las Anod-Taleh-El Chebet (already proposed as a national park), Ras Hafun-Ras Gubah, El Nammure, Hobyo, Haradere-Awale, Jowhar-Warshek, Harqan-Dalandoole, and Lack Dere (also proposed for national park status) (Government of Somalia and IUCN, 1990). Two mountain sites of particular interest are Goan Libaax and the Daalo forest, the latter of which has some *Juniperus* forest.

2.31 Priority wetlands in need of protection include Jowhar-Warshek, Har Yiblame, Eji-Oobale, Awdghegle-Gandershe, Arbowerow, the Boja swamps, Angole Farbiddu (which includes a riverine forest), and Lake Radidi (Government of Somalia and IUCN, 1990). Somalia is not a party to the Ramsar Convention and no wetlands of international importance have been declared in the country.

Waste Management<<B>>

2.32 As mentioned in previous sections, waste management has deteriorated in many areas and is nonexistent in others. Contamination risks for groundwater as well as marine and coastal areas are increasing. Human and household waste disposal sites are generally close to dwellings and water sources. There is a lack of solid waste management and proliferation of plastics bags littering the landscape (UNEP, 2005). Plastic bags pose a choking risk to livestock, block watercourses, and ultimately add to coastal pollution.

2.33 Despite Somalia's low level of development, sluggish industrial activities, agricultural land use practices, and underproductive agricultural and fisheries technologies, anecdotal evidence indicates that there is severe localized land-based and marine pollution. **[[This sentence needs revision. "Low level" can't apply to "land use practices", etc. I tried to suggest some of the missing adjectives. "Low development" seems to include everything else.]]** The most obvious observable effect of failed waste management is the detritus, including countless rubber sandals, livestock remains, and human waste littering the beaches. In the short term, proper waste management strategies such as controlled landfills accessible to urban areas, but located away from the near-shore zone, would greatly alleviate this problem.

2.34 A UN technical fact-finding mission visited the Puntland region of Somalia on May 25–29, 2005, to investigate allegations of toxic waste hazards uncovered by the tsunami. The mission visited three key populated coastal locations at Hafun, Bandar Beyla, and Eyl. No traces of toxic waste were found, but the mission added that "the urgent need remained for a more comprehensive assessment of the natural environment of Somalia, which would include further investigations of alleged toxic waste sites on land, and dumping of toxic waste at sea" (UN, 2005a). This report ***recommends*** that this more comprehensive assessment be done as soon as possible south of Gara'ad to the Kenya border. It is also ***recommended*** that a surveillance system for the existence of toxic waste be established.

2.35 Pesticide storage also poses a serious health and environmental threat. For example, a storage depot formerly belonging to the Desert Locust Control Organization for Eastern Africa in Ayaha Valley in an elevated location 5 kilometers from Hargeisa was abandoned after the collapse of the central government. A significant amount of pesticides, including Dieldrin, Heptachlor, BHC, DDT, Malathion, Fenitrothion, Mevinphos, Diazinon, and Tetrachlorvinphos was stored in that area. Since the abandonment, large quantities of pesticide have spilled either by leakage or intentional emptying of containers by looters. This has caused considerable hazard to numerous people living in the vicinity. Also, thousands of residents who lived and still live in the valley are inevitably affected by contamination of the water catchment area.

2.36 A report by the Kenya Plant Health Inspectorate Service (KEPHIS), made at the request of the government and with UNDP financial assistance, stated that "the contamination can be classified as an example of a catastrophe of mass proportion." The report further stated that although no pesticides were detected in the five water samples, the pesticides are "persistent chemicals which can last in the environment for a long time and can cause acute chronic diseases which can damage the nervous system in human beings. Some may eventually cause cancer." **[[NOTE: Full publication/access information must be given for this report if it is quoted]]** The initial recommendations were addressed by UNDP and included building a fence around the contaminated area, building a roof over the contaminated area to prevent runoff, closing a school adjacent to the compound, and increasing the awareness of people about the need to avoid the compound. In addition a cost estimate for the removal and incineration of the pesticide residue is now available. This report ***recommends*** that decontamination at this site be completed urgently.[4]

2.37 Stakeholders identified one other area requiring specialist waste management treatment—the former surface-to-air missile base site at Berbera, where rocket fuel was stored and may still be present. In addition, it is understood that similar fuel storage sites may exist in Hargeisa and other cities in Somaliland. It is ***recommended*** that the Berbera site, and other similar missile fuel storage sites, be carefully investigated for chemical contamination; if it exists, a plan for decontamination should be drawn up and implemented.

Legal Systems and Institutional Framework <<B>>

Judicial Practice<<C>>

2.38 The collapse of the central government in early 1991 led to a virtual disappearance of Somalia's already feeble state structures and to political, legal, and economic disruption and fragmentation. In the absence of a formal legal system, there has been a reversion to customary practices. In the legal vacuum left by the collapse of the state, many Somalis have looked to Islam as the main source of law. Today there is widespread application of customary law in resolving disputes, an increased role of religion in the judicial system, a lack of knowledge, and a pattern of abuse of secular law.

[4] There may also be storage sites for pollutants such as chlorinated pesticides stored for use in certain southern areas. Without data on the location of these sites and how the chemicals were used, it is impossible to assess the magnitude of the threat.

2.39 Somalis, whether they are pastoralists, traditional farmers, fishermen, or frankincense collectors, use the *xeer*, the traditional Somali system of governance, which defines the rights and the responsibilities of individuals within a group bound by ties of kinship to regulate socioeconomic and political relations. It is also used for conflict resolution and fostering unity and mutual cooperation of the subclan and lineage members. Furthermore, xeer maintains the peaceful coexistence and cooperation between neighboring clans and within subclans. Xeer also envisages the protection of the environment and regulates the use of common resources such as water points, pastures, forests, and grazing land. In short, the xeer has legal, socioeconomic, and political functions and defines rules and regulations for perpetuating the clan's kinship-based organizational structure and social order. The system is perhaps best summed up by the Somali proverb "Tol iyo fardo, tol baan doortay," which could be translated as "Between wealth and clanship, I choose clanship" (World Bank, 2005c).

Institutions <<C>>

2.40 Until the establishment of the Ministry of Environment and Disaster Management in 2005, Somalis lacked any central body responsible for these matters. The capacity of the Ministry needs support and strengthening. Prior to the Ministry there was a National Environmental Committee, with representatives from 13 ministries/agencies, which served as the coordination body for environmental governance (Gudel and Mwanza, 1979). Most environmental issues, however, were referred to two organizations within the Ministry of Livestock, Forestry, and Range, **[[different from Ministry of Livestock, Agriculture, and the Environment (MoLAE)?]]** these being the National Range Agency and the Central Rangelands Development Project. These organizations had the capacity to take action on the environment.

2.41 Environmental management issues featured in some of the country's earlier development plans, but the first targeted initiative was launched in 1996 when the World Conservation Union (IUCN) began the Somali Natural Resources Management Programme. The Programme was designed to promote sustainable use of natural resources and through it the country began to address specific environmental issues, including fuel-wood conservation, fisheries management, marine conservation, and land-use planning. Coverage in all regions was not possible due to security concerns, but by the time the program ended in 2000 a number of key management issues had been identified, which may allow the core of a comprehensive and integrated environmental management system to be formulated. **[[Any progress/changes as of Nov. 2006?]]** The future of any such system, however, must fully address the needs of the people in Somalia, whose current livelihoods are heavily dependent on a diminishing and deteriorating natural resource base. This can only be done if there is a comprehensive assessment of the status of the environment. It is therefore ***recommended*** that a "State of the Environment" report be prepared. Subsequent sections of this report will refer again to the need for investigations of Somalia's natural resources, such as the fisheries. These assessments may be done separately but will also contribute to the State of the Environment report.

2.42 It is therefore ***recommended*** that a broad-based Somali Environmental Coordination Committee should be created and made functional. The Committee should have broad

representation from key stakeholders, including those in fisheries, the Ministry of Environment and Disaster Management, commerce and industry, public health, marine transport and ports, livestock, forestry, and rangelands. This Committee should support the Ministry of Environment and Disaster Management and be part of the Ministry's outreach program to stakeholders. The Committee should be made up of **[[or "include" (in addition to the key stakeholders mentioned above)]]** experts and scientists from all Somali regions and neighboring countries. It should facilitate a networked and virtual consultation process among these specialists that will result in solutions, including recommendations to the Ministry, for the enormous environmental stresses facing all Somali regions.

International Environmental Agreements <<B>>

2.43 A key requirement for sound environmental management is adoption and effective enforcement of a suite of international, regional, and national agreements, which define the country's own responsibilities, as well as those of the international community. The international regulatory framework in Somali regions is poorly developed. Although the former central government ratified many important international conventions relating to natural resource use and management, others were only signed but not ratified. Both ratified and unratified conventions are listed in Box 2.3.

2.44 A number of gaps in the legal system also need to be addressed. For example, there is no reference **[["in the laws"?]]** to a national water act or adherence of the Contracting Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (the London Convention), the latter being especially relevant to the alleged dumping of toxic and hazardous materials in Somalia during 2004 and 2005. The most effective environmental legislative framework would probably include a mixture of enforcement and incentive measures.

Regional Cooperation <<B>>

2.45 There are other possible benefits from regional cooperation and coordination on natural resources management. For example, the Indian Ocean Whale Sanctuary and the Protocol Concerning Protected Areas and Wild Flora and Fauna in the Eastern African Region provide a framework for collaboration on the development of marine protected areas and on species conservation programs. Other possible international and regional agreements that could be beneficial (but to which Somali regions are not currently a party) include the following:

- Convention on Biological Diversity
- Ramsar Convention
- FAO Code of Conduct (which relates to the sustainable management of fisheries resources)
- UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks
- Indian Ocean Tuna Commission
- Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean

Box 2.3: International Conventions to which Somali Regions Are a Party

Conventions signed and ratified

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals
- Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment
- Protocol concerning Regional Co-operation in Combating Pollution by Oil and other Harmful Substance in Cases of Emergency
- UN Convention on the Law of the Sea
- Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern Africa Region
- Protocol concerning Co-operation on Combating Marine Pollution in Cases of Emergency in the Eastern African Region
- Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region (Nairobi Convention)

Conventions signed but not ratified

- Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water
- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and other Celestial Bodies
- African Convention on the Conservation of Nature and Natural Resources
- Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa
- Treaty Establishing the African Economic Community

Conventions not signed nor ratified but important for Somalia

- United Nations Convention to Combat Desertification (UNCCD)
- Convention on Biological Diversity (CBD)
- RAMSAR Convention on Wetlands
- World Heritage Convention

Source: UNEP, 1996.

2.46 In addition, the EC-funded project titled "Project Assistance, Capacity Building and Supervision Unit" (PACSU) is preparing a vision for future regional cooperation between Ethiopia, Kenya, and Somalia on cross-border watershed and river management for the two rivers in Southern Somalia.

Conclusions <<B>>

Common Challenges <<*C*>>

2.47 The sustainable management of natural resources and the protection of the environment discussed in this chapter face a number of serious but generally common challenges:

- Legal and institutional frameworks for environmental monitoring and management are weak.
- The devolution of legal mandates for action on environmental monitoring and management from central government to regional and local authorities is usually unclear.
- Where legal and institutional frameworks, the devolution of legal mandates, and the authority to enforce frameworks and mandates are clear, there is often limited or nonexistent implementation and enforcement capacity.
- Inadequate baseline data, absence of research, weak technical capacity, weak knowledge of natural resources and the environment hamper the implementation of environmental monitoring and management programs.

Principles for Actions to Achieve Results **<<*C*>>**

2.48 Interventions to address weaknesses in environmental management should be based on the following common principles:

- Policies, programs, and investments (public or private) that involve the use of natural resources should require an environmental assessment that confirms that neither the natural resources nor the environment will be subjected to destruction or unsustainable use, except under special circumstances such as mining.
- Incentives should be devised that would stimulate proactive, community-based natural resources management and rehabilitation projects as components in water supply and sanitation, livestock, agriculture, fisheries, and forestry projects.
- Environmental laws and the capacity of institutions to implement them should be strengthened to guard against the destruction of natural resources and ensure their sustainable use by governments and the private sector.
- Government ministries, universities, and research institutes focusing on natural resources management and rehabilitation of degraded resources should be encouraged to address the absence of baseline information, and to formulate programs for resource management and rehabilitation.

Recommendations <<B>>

2.49 Chapter 6 and Table 6.2 will summarize the proposed priority public investment. This chapter has ***recommended*** the following: **[[check paragraph cross-refs in list below afte editing]]**

- Enforce the ban on charcoal exports (paragraph 2.15).
- Intensify reforestation pilot programs in different soils and climatic environments (paragraph 2.16).

- Conduct a thorough field-based "State of the Environment" report to assess the status of the natural resources and to guide future resource management and development decisions (paragraph 2.24).[5]
- Investigate, as soon as possible, the alleged toxic waste sites on land and dumping of toxic waste at sea, including in particular the Somali coast south of Gara'ad, and establish a surveillance system(paragraph 2.34).
- Clean up, as soon as possible, the chemical contamination in the former Desert Locust Control Organization site in the Ayaha Valley (paragraph 2.36).
- Investigate the former Berbera missile base site (and other similar missile fuel storage sites) for chemical contamination and, if contamination is found, a plan for decontamination should be drawn up and implemented (paragraph 2.37).
- A broad-based Somali Environmental Coordination Committee made up of the key stakeholders for a sustainable environment should be established to support the federal Ministry of Environment and Disaster Management (paragraph 2.42).

[5] The State of the Environment Report should build on the recent IUCN Country Environmental Profile. **[[Where/how can reader access this report? Add to biblio?]]**

3. PRODUCTIVE SECTORS IN THE ECONOMY<<A>>

Agriculture Dominates the Value of Production <<B>>

3.1 **Value added in agriculture dominates gross domestic product (GDP).** The exact relative importance of the productive sectors in the Somali economy at present in terms of their estimated contribution to GDP is not known. Some assessment can, however, be made on the basis of information available for 1990 and earlier. Table 3.1 shows the contribution of a number of the most important sectors in the Somali economy to GDP; agriculture is dominant in the economy, accounted for about 64 percent of total GDP. About 52 percent of agriculture's share was generated by the livestock subsector and about 37 percent by agricultural crops including fruits. The remainder was accounted for by forestry and fisheries (9 and 1 percent respectively of agricultural GDP). Obviously these shares have changed considerably since 1990, but livestock and crops still dominate.

Table 3.1: Estimated Gross Domestic Product for 1990

Sectors/Subsectors	Projections of GDP for 1990 1985, So. Sh. (million)	Shares (percent)
Agriculture	64,470	63.6
Livestock and livestock products	33,751	33.3
of which: Change in stocks	1,992	2.0
Crop production	24,082	23.8
Forestry	5,894	5.8
Fishing	732	0.7
Mining	291	0.3
Manufacturing	4,953	4.9
Electricity and water	83	0.1
Construction	3,266	3.2
Trade and hotels	9,353	9.2
Transport and communications	6,412	6.3
Finance and insurance	446	0.4
Real estate	3,565	3.5
Government services	1,300	1.3
Other services	3,067	3.0
Imputed bank service charges	-785	-0.8
Total GDP at market prices, including stock changes	**101,338**	**97.1**

Source: World Bank, 1991.

3.2 With the substantial decline in much of the crop production activity in the South/Central areas because of the civil war associated with the destruction of irrigation systems, **[[civil war was about destruction of irrigation systems?]]** the relative importance of livestock in total GDP has probably increased since 1990. Nonetheless, a substantial part

of the decline in GDP from crops would have been compensated by increases in the value of forestry production (on account of the substantial increase in charcoal production) and the very large increase in the value of fish production.

3.3 In 1990 the nonagricultural sectors of the economy were much less important than agriculture. The most prominent were trade and hotels (9.2 percent), transport and communications (6.3 percent), and manufacturing (4.9 percent). It is difficult to gauge their current shares of total GDP but it is very likely that share accounted for by transport and communications has expanded considerably since 1990. The share of GDP accounted for by the grouping "trade and hotels" (now dominated by trade) has probably also increased on the basis of the recovery in livestock exports and the heavy reliance of the economy on imports, which would have more than compensated for the reduced hotel activity. However, the value added by manufacturing (and hence its share of total GDP today) has almost certainly declined since 1990. Clearly there are regional variations that are not consistent with these generalizations. For example, in Somaliland the share of manufacturing in the GDP may not have declined.

Agriculture the Basis for Most Exports <<B>>

3.4 The continuing importance of the productive sectors to the economy, particularly livestock, is reflected in the contribution of agriculture to exports from Somalia. Table 3.2 shows that the estimated value of livestock and animal products exports accounted for almost 49 percent of all exports in 2003 compared with about 30 percent in 1990 when banana exports were a substantial 26.2 percent of export income.

[[Please review table 3.2: OK that last row extends to 2004?]]

Table 3.2: Value of Main Merchandise Exports

	1980	1988	1990	2000	2001	2002	2003	
				(US$ million)				
Sheep and goats, live	78.8	31.2	32.8	55.2	5.7	28.4	27.5	
Wood, charcoal, and fuel wood	n.a.	n.a.	0.01	10.8	12.3	6.7	8.3	
Fish, crustaceans, and mollusks	0.8	10.1	17.3	0.9	4.6	2.1	8.2	
Hides and skins (except furskins), raw	5.9	5.6	6.3	3.8	4.9	4.6	5.2	
Chemical wood pulp, dissolving grades	n.a.	n.a.	n.a.	n.a.	3.9	19.7	4.7	
Animals of the bovine species, live	28.1	0.3	n.a.	16.2	2.5	5.3	8.2	
Sesame seeds	0.005	n.a.	2.6	0.6	1.6	0.1	1.8	
Gums and resins	3.3	4.1	5.8	1.8	1.9	2.7	1.7	
Fish, fresh (live or dead), chilled, or frozen	0.02	4.6	10.8	0.5	3.0	0.5	1.6	
Goat and kid skin leather	0.6	0.1	n.a.	0.7	1.2	1.0	0.2	
Meat of sheep and goats, fresh, chilled, and frozen	n.a.	n.a.	n.a.	2.2	0.7	0.04	0.01	
Animals, live, including zoo animals	0.1	n.a.	n.a.	6.8	0.01	0.1	0.1	
Bananas, fresh or dried	15.2	31.0	34.5	n.a.	n.a.	n.a.	n.a.	
Milk and cream	n.a.	n.a.	n.a.	0.05	0.3	n.a.	0.7	
Total exports	**160.6**	**114.8**	**131.7**	**108.5**	**61.5**	**92.0**	**84.4**	
	1980	1988	1990	2000	2001	2002	2003	2004
Total exports (estimated by the IMF)	**166.4**	**137.4**	**163.7**	**68.2**	**77.6**	**118.3**	**157.9**	**265.5**

	1980	1988	1990	2000	2001	2002	2003
				(US$ million)			

Source: World Bank, 2006. **[[NOTE: Source is CEM; everything else is note on data. Please review note below for clarity.]]**
Note: Data includes IMF Direction of Trade Statistics based on partner data. Based on Somalia's trading partners data on imports drawn from UN COMTRADE Statistics, SITC-2; subject to a wide margin of error. Includes re-exports.

3.5 The extent of increases in the values of charcoal and fish production is extremely difficult to assess, but current values can be estimated from export figures in Table 3.2. The value of recorded fish exports was estimated at US$8.2 million in 2003 compared to US$17.3 million in 1990; 1990 was an all-time high because of the recently established fish processing facilities on Somalia's north coast. Although the change represented a decline in the recorded value of exports, there has almost certainly been an increase in the value of total exports if the value of illegal fishing (reported to be about US$90 million per year) is included, even though most of the income from illegal fishing does not accrue to the Somali economy. Despite the illegality of charcoal exports, it is estimated that in 2003 the value of charcoal and fuel-wood exports was US$8.3 million compared with an estimated US$0.01 million in 1990 when strict environmental laws and regulations were in place and monitored.

Agriculture Accounts for Most Employment <<B>>

3.6 Around 70 percent of Somalis are either directly or indirectly employed in agriculture and earn all or part of their income from agriculture (including livestock and fisheries). About 50 percent are associated with the livestock sector either full time or part time. Although it is anticipated that, following a sustained peace agreement, the construction and service industries will grow quite rapidly, agriculture will nevertheless remain a core sector for the economy and hence it will remain a dominant source of employment.

4. OPPORTUNITIES AND CHALLENGES FOR AGRICULTURE

4.1 This chapter will analyze livestock and rangelands, crops and watersheds, and fisheries. It will cover a number of issues facing the agricultural subsectors currently and in the future for Somaliland, Puntland, and the South Central Somalia. The analysis will be organized as follows:

- **Vision of future development—status quo or change:** On the basis of research, fieldwork, results from workshops, and surveys in the regions, this chapter will establish a future vision for each main subsector. A range of future actions are considered, such as changes from traditional production methods to more modern techniques, different marketing systems, new regulations on private use of public resources, information systems for producers and potential investors for the private sector, or making no changes and reproducing past practices and institutions.

- **Building on the past and future initiatives:** Future strategies will take account of lessons from the past and the incentives for changing traditional approaches to more progressive strategies. There may, however, be very logical and relevant constraints to change such as current policies, production technology, and regulatory systems. These constraints will be evaluated to determine the justification, scope, and method for change and in what time frame. Finally, this section will review cross-cutting issues that are relevant to the productive sectors and the environment, as well as linkages between this and other clusters such as infrastructure.

- **Priority roles of public and private sectors:** The future roles and relative importance of the public and private sectors will need to be evaluated. In this context there will be discussion of how public policy and investment can improve the enabling environment for private investment. Questions will be raised about (i) whether activities currently performed by the public sector could or should be done by the private sector and vice versa; (ii) the constraints to action and the institutional barriers that need to be overcome to energize the government to play its role; (ii) the prospective investments by the private sector; and (iv) the prospects for public/private sector partnerships.

- **Public investment proposals:** Emphasis will be on additional public sector costs. At present public expenditures in Somalia are minimal. Some costs that should ultimately be public may currently be paid by the private sector.

Somaliland <<B>>

4.2 Somaliland has an area of about 180,000 square kilometers. Its population is unofficially estimated to be 1.7 million, of which 54 percent are pastoralists, 30 percent agropastoralists, and 16 percent urban. Clearly the agricultural sector dominates the economy of Somaliland and hence the employment of its people, since much of agriculture is labor intensive.

***Livestock* <<C>>**

4.3 Livestock represent the dominant productive activity in Somaliland, followed by crops, fisheries, and forestry. The main features of the livestock subsector in Somaliland are the significance of disease and the dependence on an almost treeless, mainly flat, and partly mountainous rangeland that is extremely sensitive to drought. Productivity under these harsh conditions, measured in terms of lambing or kidding rate, is very low at around 60 percent for mature females. The current age of turn-off is between 2 and 5 years, which means that turn-off **[[term seems to change to "turn-off" below after para 4.6; changed all "off-take" to turn-off.]]** rates are also very low at around 25 percent of the total flock/herd. Most sheep and goats are sold as live animals to Gulf countries, with an unknown number slaughtered at an abattoir in Burao registered with the UAE as suitable for export to Dubai.[6]

4.4 While there is considerable uncertainty about the number of livestock, the Food Security Analysis Unit (FSAU), as quoted in the Somali Livestock Sector Strategy (FAO/EU/WB, 2004), estimated that in 1999 Somaliland had an estimated 5.8 million head of sheep (50 percent of the estimated total sheep in all Somali regions), 4.8 million goats (30 percent), 1.3 million camels (21 percent), and less than half a million cattle (7 percent).[7] In 2000 a serious drought began that lasted until 2004, which no doubt resulted in considerable deaths. Since then it is said that there has been a remarkable recovery in livestock numbers and that they may now again be close to the 1999 levels.

4.5 **Vision for the future. <<D>>** Livestock production and exports will continue to dominate the Somaliland economy and be the most important source of household income and economic growth for decades to come. But circumstances have changed. What are those changes and what do they imply for the future pattern of livestock production in the typical northern rangelands? The main changes are the absence of the once plentiful acacia and other tree species, very little shade for livestock, increased prevalence of thorny shrubs, a harsher environment for annual and perennial grasses, substantial soil erosion, and greater

[6] No data on production and exports from the abattoir in Burao are published, but it is understood that the abattoir, constructed in mid-2004, has a slaughtering capacity of 1,250 two-year-old goats/sheep per day.

[7] The FSAU estimates of livestock numbers are according to regions in Somalia. The North West region is assumed here to be equivalent of Somaliland. The last census of livestock was in 1975 and since then estimates of livestock numbers have been made by the government of Somaliland using assumed annual growth rates of 2.4, 1.7, and 1.1 percent per year for goats, sheep, cattle, and camels; but these growth rates were not adjusted to reflect droughts and other factors that affect sheep numbers. On this basis the estimated number of sheep, goats, cattle, and camels in Somaliland in 1999 was 5.66, 10.69, 5.51, and 2.82 million respectively, which is a larger number of sheep and a much larger number of goats.

overall vulnerability of the rangelands to drought. In these circumstances it is unlikely that the sustainable carrying capacity for sheep and goats can increase much beyond current average levels, and camels are at a substantial disadvantage as they are forced to browse on shrubs rather than acacia trees. The question therefore arises whether, with the deterioration in grazing capacity of the rangelands, the historical pattern of livestock production can be sustained in the future.

4.6 This report concludes that, as a result of the substantial deterioration in rangelands, the traditional system of sheep and goat production in Somaliland—namely, selling males 3 years old—will be subject to greater risks and cost for livestock producers than in the past. Greater risks are associated with the greater probability that fodder supplies will deteriorate more quickly in a drought, and greater probability of livestock deaths than in the previous more drought-resilient rangelands. Greater costs are associated with the higher weight losses animals experience on the less-productive rangelands during normal dry seasons. This is a cost because the weight loss needs to be made up at the start of the new season. Since markets for organic, younger carcasses of sheep and goats in the Gulf are increasing, and because abattoirs have been set up specifically for this younger carcass trade, it has been concluded that pastoralists would benefit from gradual changes in flock management, production, and marketing strategies that lead to reduced grazing intensity during the dry periods of the year. The new strategies would include selling younger animals to domestic abattoirs, from which the carcass meat could be exported and sold at higher prices per unit weight on the international market. Higher prices could also lead to higher incomes for herders. This strategy would have the effect of diversifying production, increasing turn-off rates, and lowering average stocking rates.[8] A trend towards lowering stocking rates during the drier part of the year will also contribute to the long-term rehabilitation of the rangelands. To achieve this vision, which will obviously take time and may only cover parts of the rangelands, the government should improve advisory services to pastoralists to assist them with changing flock management, work with communities to eliminate practices such as enclosures that reduce grazing areas, and improve rural road networks so the younger animals can be transported by truck. Local governments also have a role in enhancing the investment climate for abattoirs.[9]

4.7 But no matter what production or rangeland management strategies are used, Somaliland will not achieve the vision of increased turn-off rate and higher incomes unless export inspection and certification are improved and made less costly than the current rolling inspection method. This will not be possible unless epizootic animal diseases are controlled. Hence a second part of the future vision is substantial improvement in animal health and the ultimate eradication of all major livestock diseases, because it will result in a more cost-effective inspection and certification system for exports and give Somaliland's livestock

[8] An explanation of this strategy is provided in paragraphs 4.11 and 4.12 below.

[9] The principle of lower age of turn-off can also be used to move younger animals (sheep, goats, or cattle) from breeding areas that may be vulnerable to overgrazing to areas where forage is more plentiful and where animals can be fattened before sale. Such specialization in land use, along with the integration of crop and animal production, is practiced in many parts of the world and aims to make the most effective use of agricultural and grazing resources during different seasons. Of course, such strategies are more likely to be feasible when diseases have been eradicated so that movement from one area to another does not subject animals to the risk of infection by an unknown disease to which they have no immunity.

producers access to world livestock markets, irrespective of the flock or herd management strategy.

4.8 **Future initiatives built on experience.<<D>>** The priorities for sustained development and income generation for most livestock enterprises in low-income countries are the quality of grazing, sound animal health, and efficient marketing. The same conclusions were reached in the Somali Livestock Sector Strategy (SLSS), which suggested that, based on past experience, the future strategy for the livestock sector in all Somali regions should be based on three pillars and one cross-cutting issue. The three pillars are (i) livestock management and diversification of production, feed supplies, and nutrition; (ii) animal health and disease control; and (iii) livestock marketing and trade. The cross-cutting issue is human resource capacity building and institutional strengthening (FAO/EU/WB, 2004). Box 4.3 in the section on Puntland discusses in more detail the genesis of the SLSS and the conclusions and actions that emerged. One of the suggestions of the SLSS was the establishment of Livestock Boards in Somaliland, Puntland, and South Central Somalia. Somaliland has led the way and a Livestock Board is now established there. The relevance of other SLSS conclusions to Somaliland is discussed below.

4.9 *Improving both grazing in rangelands and livestock management* will be a long-term process after the general destruction due to overgrazing, charcoal production, deforestation, and soil erosion. The proposal above for gradual adjustments in livestock management is consistent with the SLSS. This report suggests a seven-point strategy for the improved management of both rangelands and livestock as follows: (i) enforcement of the ban on charcoal exports; (ii) reforestation programs including the use of rapid-growing species such as *Lucaena leucophylla*; (iii) reseeding of some areas with grass species; (iv) incentives and regulations aimed at the removal of enclosures and other forms of private acquisition of public resources; (v) community control and monitoring of water points and construction of cisterns (*berkeds*) to indirectly control grazing intensity; (vi) younger turn-off of animals to reduce stocking rates during the drier seasons; and (vii) control of stocking rates in fragile areas through community and government regulation.

4.10 It is ***recommended*** that action be taken on all these strategies in the livestock producing areas in Somaliland. These elements have either already been recommended (see Chapter 2 for enforcement of the ban on charcoal exports, reforestation, and reseeding rangelands) or will be covered in subsequent sections of this chapter. The next two paragraphs will discuss the last two elements of the seven-point strategy (younger turn-off and control of stocking rates in fragile areas), changes in livestock management strategy that were suggested above in the "Vision for the future" subsection.

4.11 The proposed strategy for improved livestock management is a controversial issue. The SLSS emphasized that "Increasing productivity (that is, enhancing input/output ratios) would not only lead to tangible benefits in a greater quantity (and improved quality) of animal products but would also limit the need for a greater number of animals to feed and provide income for the human population and, therefore, present less risk to the environment and contribute to sustainable production" (FAO/EU/WB, 2004, p. 49). One way of implementing this strategy for improving productivity and reducing grazing pressures on the

rangelands is through younger turn-off of males for the existing meat market for organic carcass in Gulf countries, as suggested above.

4.12 The two simulation models presented in Annex F (Tables F1 and F2) examine the impact of younger turn-off on turn-off percentages and stocking rates. The simulations are run over six years plus a baseline year. The only difference between the two simulations is the age of turn-off—3 years for Table F1 and 2 years for Table F2. The simulations show that the average stocking rate for turn-off at 2 years is about 11 percent lower than turn-off at 3 years, and 45 percent more 2-year males are turned-off than 3-year males. Animals turned-off at 2 years are much lighter and command a lower price than 3-year-olds, but there is a premium in Gulf markets for the better-quality organic meat from younger animals. These results show that over the 6-year period, the 2-year-olds would need to fetch 70 percent or more of the price of 3-year-olds for the pastoralist to receive the same revenue, and he/she would still have the benefit of the reduced average stocking rate.

4.13 *Improving animal health is a major challenge*. The SLSS lists 20 recorded livestock diseases, including Brucellosis (*godo-welech*), Contagious Bovine Pleuropneumonia (*sambab*), foot and mouth disease (*habeb*), pox (furuk), peste des petits ruminants (*susan*), rabies (*wele*), Rinderpest (*tabakarrup*), Trypanosomiasis (*dukaan*), and Rift Valley Fever. In addition animals suffer from a range of parasites such as worms (*caal*) and ticks (*shilin).* Some of these diseases occur within short periods during the year, causing high mortality rates and high economic losses, while others, especially viral diseases, are endemic transboundary diseases that pose serious threats to neighboring countries wanting to claim disease-free status. The SLSS states that Rinderpest has the greatest impact on morbidity and mortality and has been the focus of the Pan African Campaign for the Control of Epizootics (PACE).

4.14 Like the SLSS, this report concludes that improving animal health is a crucial part of the strategy for rehabilitating the livestock subsector in Somaliland and giving producers access to world markets. Improving animal health will involve several steps. First, train the veterinarians and Community Animal Health Workers (CAHWs) who provide support to producers and give them access to appropriate drugs and other veterinary inputs. Second, systematically improve the effectiveness of export inspection, for which the current standard is the Export and Certification of Livestock for Export (EXCELEX)—the livestock export inspection program for Ethiopia, Djibouti, and Somalia. EXCELEX has been adopted and supported by the Somaliland Livestock Board. Inspection standards should be species specific, disease specific, compliant with Organisation Internationale Epizootique (OIE) regulations, and be based on knowledge of the distribution of key diseases and risks affecting livestock trade and public health. Third, Somaliland authorities ultimately will need to provide assurance that major livestock diseases are being controlled and monitored. This assurance will enhance the reputation of Somalia's livestock exports, as will inspection and certification of livestock that originate in Ethiopia**.[[Not sure where Ethiopia fits in---is this change correct?]]**

4.15 Acknowledging its budget and capacity limitations, the Ministry of Livestock has restricted its own responsibility to core functions in the livestock sector such as policy formulation and regulation, and has delegated curative services to the private sector. As a

result many former government veterinarians began to create private veterinary associations in 1992. However, most of these associations were localized in urban centers and access of pastoralists to badly needed veterinary service was scarcely improved. Currently, veterinary service delivery in pastoral areas through private veterinarians is complicated by poor infrastructure and logistical difficulties, as well as by the limited capacity of the veterinarians in terms of capital, technical equipment, and logistics to provide the needed service.

4.16 There are only about 150 professional veterinarians in Somaliland, which is too low considering its vast geographical area and large livestock population. Many of Somaliland's veterinarians are elderly and need refresher courses and additional training. To replace the aging veterinarians and train new ones, the Sheikh Technical Veterinary School was recently established. Driven by profit and anticipated high returns to their services, most private veterinary associations are presently engaged in testing export animals for brucellosis, while a large number of the remaining are employed by the Ministry of Livestock. It is ***recommended*** that the training of veterinarians and CAHWs (paraveterinarians) be a priority among capacity-building initiatives.

4.17 *Major improvements are needed in export marketing procedures.* Sheep and goats are currently exported from a variety of centers such as Hargeisa and Burao for export usually through Berbera but also through Bossaso, because port charges are much lower there than at Berbera. **[[Try: Livestock exported from Somaliland come from a wide catchment area, including the cities of Hargeisa and Burao and the Somali Region in Ethiopia. They often leave Somaliland through the port of Berbera, but also through Bossaso, which has lower port charges.]]** Animals often are not subjected to any health inspection or control measures before they enter **[[leave?]]** Somaliland. Hence the relevance of the EXCELEX system and its implied regional cooperation. But EXCELEX is expensive and has limited acceptance internationally, and therefore is not an optimal system in the long run.

4.18 EXCELEX is part of a larger project called "Support to Livestock Exports from the Horn of Africa." The project was started in the third quarter of 2003 and is funded by the Italian government and implemented by FAO. It aims to provide a veterinary certificate for livestock exported from the Horn of Africa. The inspection and certification system is based on the Hazard Analysis and Critical Control Points (HACCP) principle. An initial clinical inspection and individual animal identification at or near the point of livestock origin triggers a rolling quarantine period of 21 days. A second clinical inspection coupled with a screening for brucellosis and other communicable diseases is undertaken after the first 14 days. The third and final inspection and certification is conducted at the port of embarkation. The EXCELEX system requires the analysis of serum from animals during the screening process to verify the validity of inspection and trace identified infectious diseases to the source. The system is intended to apply to domestic and cross-border trade and covers all regions of the former Democratic Republic of Somalia, the Somali and Afar National Regional States in Ethiopia, and the Republic of Djibouti (FAO/EU/WB, 2004, p. 35). It is not clear, however,

whether the EXCELEX system is compatible with OIE codes and if it is acceptable to Saudi Arabia.[10]

4.19 Before the civil war, animals destined for export were quarantined, tested, and rested in publicly owned holding grounds (such as Qoolcadey, Haleeya, and Aroori) en route to Berbera. Since these facilities are no longer operational, animals proceed to Berbera stressed and without rest or testing. At Berbera, most of the major livestock exporters use their own holding facilities dotted throughout the urban and periurban areas, as well as the partially rehabilitated public holding ground just outside the town.[11] Sheep and goats for export must spend 2 days in holding grounds prior to shipping, whereas cattle must remain 14 days. There are no special sanitary measures or disease-control activities undertaken in the diverse private holding grounds. Government officials verify and record the number of animals, registering their arrival date and place of origin. Government-certified private veterinarians carry out Rosa Bengal tests for brucellosis.[12] Animals testing positive or that have visible physical marks (bruises, injuries, and wounds) are culled out and removed from the holding areas.

4.20 *An improved export inspection system is essential,* including more efficient marketing, improved monitoring of animal health and their fitness for export, more humane handling of animals bound for the export market, and more effective loading and transport system. Specific improvements could include improved strategic road networks for the transport of animals, improved holding facilities for animals at various inspection and certification locations as they move from production areas to markets and ports, and more effective techniques for loading animals from wharfs to boats.

4.21 The current inspection system is a tedious procedure of identifying animals during quarantine periods that are infected with specified diseases. It is hard on animals, expensive, and outdated. A Somaliland Veterinary Code has been drafted that would introduce major improvements in export inspection systems for livestock based on research by PACE and its successor, the Somalia Animal Health Services Project (SAHSP). The Code complies with the guidelines of the OIE. Annex G discusses the current inspection and certification system, the improved system based on the OIE guidelines and eradication, and the system currently used in Sudan for export of sheep and goats to Saudi Arabia.

[10] Personal communication (Ahmed Mohamed Hashi, SAHSP). **[[when? Communication only regarding Saudi Arabia question?]]**

[11] Approximately 20 percent of the 1,800 square meters was rehabilitated in 2002.

[12] Saudi Arabia, the leading importer of small stock, places special emphasis on brucellosis. Therefore, brucella testing became the focus of Somaliland certification system.

4.22 The improved system endorsed by the OIE is based on a mapping of the incidence of all major animal diseases (referred to as "List A").[13] Mapping is followed by an eradication program of the diseases, perhaps progressively by regions that can be easily quarantined. Following a successful eradication program there is continuous monitoring of the incidence of disease. Inspection (on a sampling basis) of groups of animals destined for export can then be done first within the disease-free producing area or region. Animals are tagged and within a specified time are transported to the port, where they are again inspected but without delay (that is, without the current mandatory quarantine period). If no disease is found, animals receive an export inspection certificate and are loaded on ships. This is clearly a more cost-effective and faster system, but it is based on the assumption that areas free of diseases on List A can be established and maintained. If some areas can already be declared disease free then the improved system can be adopted immediately if isolation of animals from these areas can be maintained. It is unlikely that universal eradication can be achieved within about 5–10 years. **[[Or is meaning: "Universal eradication will take about 10 years. Therefore, a decade …"]]** Therefore, a decade or so of transitional arrangements from the current to the improved system will probably be needed and hence the importance of streamlining the implementation of the current system.

4.23 The SLSS acknowledged that it is "not possible to adopt a single strategy to control the List A diseases relevant to the Somali environment and different strategies may need to be devised to control different diseases**.[[Is this where SLSS quote ends? Cite document being quoted]]** It is ***recommended*** that Livestock Boards collaborate to form an expert group with competent representation from all significant stakeholders (including producers and traders) to define and agree on transitional and longer-term livestock inspection and certification systems for all foreign markets. The expert group should aim to improve export inspection and certification standards and regain Somali access to the Saudi livestock market. The group should also explore opportunities to expand exports from any Somali region to all international markets. It is also ***recommended*** that the expert group consider the export inspection of carcass meat with a view to moving towards internationally accepted standards.

4.24 *Holding yards are miserable.* Until the improved export inspection system is universal, a number of essential services for export animals should be improved, to safeguard their welfare prior to shipment and en route to their destinations. These services include provision of water, shade, and fodder. Berbera's domestic water distribution system does not provide water to the private holding areas scattered all over the city. Livestock traders therefore either trek their animals to separate watering facilities or haul water to animals using tanker trucks. Animal holding areas near Berbera often lack shade, which becomes critical problem in the hot summer months. During these months, thousands of animals huddle under the few available trees or under fragile and primitive grass-covered structures. The provision of sufficient shade over large holding areas is costly and individual traders see no returns in investing in shade. Fodder (mostly cereal straws and hay) is transported to

[13] List A diseases in the Puntland Veterinary Law-Code are foot and mouth disease, vesicular stomatitis, Rinderpest, peste de petits ruminants, contagious bovine pleuropneumonia, lumpy skin disease, Rift Valley fever, bluetongue, sheep pox and goat pox, African horse sickness, highly pathogenic avian influenza, and Newcastle disease. This list is essentially the diseases regarded by the OIE as of significant importance to trade in animals and animal products, although it is understood that the application of the list will be flexible and take account of country circumstances.

Berbera by trucks from the hinterland, for example from Burao, and is of varying quality and maturity and offered at various prices.

4.25 *Shipping facilities are also rudimentary.* Compared with the cargo ships and dhows that dominated the trade in the past, some improvements have been achieved in shipping animals in recent years. For example, special livestock carriers for sheep and goats are currently used in Berbera. While sheep and goats walk on, camels and cattle are still loaded onto ships using cranes and ropes. This is a difficult and tedious process which stresses animals considerably. None of the livestock are insured and usually carriers are not insured because insurance for trade in Somali waters is virtually impossible to obtain. Vessels are typically ill-equipped and have poor ventilation systems, inadequate space for water and forage, and an inexperienced crew of livestock attendants. Public officials within the MoLAE argue that livestock exporters should be responsible for adequate shipping conditions for livestock. The ultimate impact of the inadequate marketing and shipping arrangements for livestock is high marketing margins, which are reflected in lower prices to producers. Table 4.1 shows the costs and also indicates that producer prices in Hargeisa (by which time producers have already incurred substantial marketing costs such as transport) are about 85 percent of the final fob price in Berbera; this is because traders selling to the export market need to discount prices paid to producers in Hargeisa. The big item in the marketing costs is the extraordinary high development tax levied at the port of Berbera.

4.26 The main constraints making the livestock subsector more efficient with less losses and higher incomes are (i) weak enforcement of stocking rate limitations and water management regulations in the rangelands; (ii) an inadequate and tedious inspection and certification process for animals destined for the export market; and (iii) inadequate training of the staff of government institutions that are responsible for enforcing regulations and conducting inspections of animals destined for export, and advising on animal health.

4.27 **Roles of the public institutions and the private sector. <<D>>** Most activities associated with the production and marketing of livestock are in the hands of the private sector. On the other hand, public institutions have the responsibility for the management of public resources. For the livestock subsector this means stewardship of the public rangelands that are available to all livestock herders. Public institutions are also responsible for providing services that ensure animal health, such as vaccination against infectious diseases. Infectious diseases in animal products negatively impact the reputation of all Somali exports. In public matters, the Somaliland Livestock Board needs to both lead and collaborate with the other Somali Livestock Boards. The role of the private sector is to adopt production methods that use natural resources sustainably and in harmony with environmental laws and regulations that have been established on the use of those resources. At the same time both private service providers and public institutions have an opportunity to provide support services to livestock producers on a charge-back basis.

Table 4.1: Costs of Livestock Marketing, Hargeisa to Berbera (2005)

Item	Sheep/Goats	Cattle	Camels
Purchase price from pastoralists at Hargeisa (US$ per head)	**25–30**	**150–200**	**250–300**
Taxes and overheads (So. Sh. per head**)**			
Sales tax (local government	1,000	5,000	10,000
MoLAE	150	1,000	1,000
Transport (Hargeisa to Berbera)	2,000	10,000	20,000
Loading charges	200	3,000	3,500
Water charges	300	1,000	1,000
Total (So. Sh. per head)	**3,650**	**20,000**	**32,500**
Total (US$ per head**)** [a]	**0.6**	**3.0**	**5.0**
Purchase cost by exporter (US$ per head)	**25.6–30.6**	**153–203**	**255–305**
Customs tax	60	400	500
Local government tax (water)	100	1,000	1,000
Local government tax (cleaning)	500	2,000	3,000
Veterinary inspection costs	10	50	50
Port charges	200	1,000	1,500
Loading charges	200	1,500	2,000
Subtotal (So. Sh. per head) **[[Subtotal of what? Where is corresponding total?]]**	**1,070**	**5,950**	**8,050**
Subtotal (US$ per head) [a]	**0.17**	**0.92**	**1.24**
Development tax (US$ per head)	**3.50**	**12.50**	**17.50**
Total costs (US$ per head)	**3.67**	**13.42**	**18.74**
Price to exporter (US$ per head, fob) 2005 (est)	**30–35**	**250**	**350**
Price to pastoralists as percent of export price	**83–86**	**60–80**	**71–86**

Source: Price to exporter based on Somalia CEM (World Bank, 2006, Annex Table 53), and supplementary information collected by the cluster mission.
a. US$1.0 = So. Sh. 6,500.

4.28 **Public investment proposals. <<D>>** A number of priority investments have been identified to address the issues facing the livestock subsector in Somaliland. These investment proposals are discussed more detail in Chapter 6. Table 6.2 contains broad descriptions of each program or project proposed and the results matrices for each area. The programs include studies to assess the technical, marketing, and social impact of gradual changes in livestock management from the traditional systems to a younger age of turn-off; assessment of market potential for key livestock products; strengthening of animal health services and their expansion into remote areas; capacity building;**[[seems redundant---all these programs build capacity?]]** reducing vulnerability of livestock to epizootic diseases; and the establishment and support for an improved export inspection and certification service. For Somaliland the total estimated cost of these project proposals over five years is US$13.1 million. An additional program for natural resources management, including the improvement of forest and rangelands, is estimated to cost US$11.5 million over five years.

***Crops and Watershed Management* <<*C*>>**

4.29 About 39,000 families are involved in crop production in Somaliland. Rainfed crops include sorghum, maize, cowpeas, groundnuts, and sesame. Irrigated crops are citrus, papaya, guava, watermelons, and vegetables such tomatoes, onions, cabbages, carrots, and peppers.[14] Cereal production declined from 35,700 tons in 1988 to 18,500 tons in 2001, or a decrease of 50 percent, due to the displacement of farming families during the civil war (ADO, undated). However, as a result of the prevailing peace and the return of displaced farmers with considerable experience in rainfed and irrigated oasis crop production, both cultivated areas and traditional crop production are expected to increase in western areas such as Awdal (World Bank, 2005 **[[a-d?]]**). There also is potential for expansion of rainfed and irrigated oasis agriculture along the entire coast from the Awdal region in the west to the mountainous parts of the Sanaag region in the east. In addition to cultivated crops, the Sanaag region has the potential to produce substantial quantities of frankincense and myrrh for export.

4.30 **Vision for the future.** <<**D**>> Agricultural crops will never be a major subsector in Somaliland, which will almost certainly remain a net food importer financed by exports of livestock, fish, and forest products. This would be an efficient strategy given the high cost of producing food in most parts of Somaliland and its comparative advantage in the production of livestock. Nevertheless there are opportunities in rainfed areas such as the Awdal region and oasis agriculture throughout the regions for the production of increased quantities of fruits, vegetables, grain crops, and fodder. The vision is for higher yields in these locations along with reduced variability of both yields and production, which should result in higher returns to investment and contribute to income generation, poverty reduction, and food security. In mountainous areas there are sound prospects for the efficient production of frankincense and myrrh, so long as problems of environmental degradation (mentioned in Chapter 1) and marketing (which is made difficult by remoteness and rough roads as well as inadequate market information) are resolved.

4.31 **Future initiatives built on experience.** <<**D**>> Irrigated oasis and rainfed agriculture based on contour bunding for soil and water conservation in the Awdal and Hargeisa regions were introduced during the colonial period. These practices were expanded and improved by the North West Agricultural Development Project funded by the World Bank in the 1970s and 1980s, and currently are sustained by the International Fund for Agricultural Development (IFAD), the Belgian Survival Fund (BSF), and other donor grants.

4.32 The civil war resulted in the displacement of many farming communities, members of which took refuge in neighboring Ethiopia. However, following the Boroma peace agreement in 1993, some recovery was achieved in both rainfed and irrigated oasis agriculture. This recovery included the Northwest Integrated Agricultural Development Project (NIADP),

[14] The area with high potential for producing crops, both rainfed and irrigable, is estimated to be about 50,000 hectares. However, currently only 15,400 hectares are rainfed and 2,000 hectares are irrigated. In order of importance, crop cultivation in the regions of Somaliland are as follows: West (9,800 hectares rainfed and 800 hectares irrigated), Togtheer (2,400 hectares rainfed and 250 hectares irrigated), Sanaag (1,800 hectares rainfed and 350 hectares irrigated), Awdal (1,350 hectares rainfed and 700 hectares irrigated), and Sool (50 hectares rainfed). Source: ADO, undated.

implemented by the BSF and IFAD, and additional support from several international and local NGOs that provided valuable technical and financial assistance to farming communities. One such initiative in the Dur-Dur Watershed of the Baqi district (Awdal region) was carried out by the NGO German Agro Action (GAA) and funded by the EU. The initiative could be expanded to the Lughaya district on the coast, where more oasis agriculture is feasible (GAA, 2006). It helped prevent soil erosion and promote watershed development, developed *wadi*[15] and oasis agriculture in mountain areas, provided women's training, and funded small rural enterprises. Investments are envisaged to build on and scale up these past and ongoing activities using proven and new technologies applied to wadi and oasis agriculture.

4.33 **[[Tried to incorporate this type of heading into text---too many heading levels.]]***Incentives for change* include a growing demand for food by an increasing urban population, as well as a growing demand for animal fodder by the pastoralists in dry season and for export livestock. These factors, together with improved technologies, provide the incentives for the intensification and expansion of production and marketing of crops for both human consumption and livestock fodder. In a food deficit area the marginal net benefits of efficient additional food production are likely to be high and hence additional investment should be economic if the focus is high-value crops such as fruits and vegetables in addition to high-quality fodder crops

4.34 *The main constraints* facing crop production are as follows: (i) arid and semiarid environment and the risk of droughts and irrigation water scarcity; (ii) lack of immediately available, up-to-date agricultural technology such as improved seeds and planting material, along with relevant inputs and services such as fertilizers, pesticides, farm equipment, and agricultural credit and extension; (iii) degradation of land in both rainfed and irrigated areas resulting from the removal of tree cover for charcoal production and the absence of soil conservation structures; and (iv) lack of access roads in some agricultural areas such as Sanaag and Awdal.

4.35 **The priority roles of public and private sectors.<<D>>** Crop production and marketing are (and should be) completely private and will continue to be so, however, there are vital roles that the public sector must play in order to enhance the productivity and the sustainability of the subsector and to create a positive environment for private sector investment in crop production, processing, and marketing. Options include the following: (i) a research and extension system funded by the public sector but implemented by universities, (such as the Faculty of Agriculture at Amoud University), the IFAD project, agricultural associations such as ADO, and international and local NGOs; (ii) improvement of rural access roads; (iii) facilitating availability of agricultural inputs by providing a favorable environment for their importation and marketing; and (iv) community-driven soil and water conservation measures (Qassim, 2006).

4.36 The government, with funding from the donor community, could establish a competitive fund for the financing, adaptation, and generation of innovative agricultural technologies. Institutions that provide agricultural services could apply for funding. In

[15] A wadi is a stream bed that is usually dry except during the rainy season, when it often forms an oasis.

addition, links could be established with the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA) and the Consultative Group for International Agricultural Research (CGIAR), centers that are backstopping **[[what centers? CGIAR and …?]]** ASARECA's regional networks, in order to access existing technologies and germplasm.

4.37 **Public investment proposals. <<D>>** On the basis of the issues facing crop production in Somaliland a number of priority project proposals for a five-year period have been designed and are ***recommended***. They are discussed in more detail in Chapter 6 and in Table 6.2 in the results matrix for Somaliland. The proposed investment program aims to improve the capacity of community, local, and national service providers to provide agricultural support services and safe water; support activities aimed at increasing agricultural and livestock production; and establish sustainable mechanisms for on-farm and off-farm income-generating schemes in rural and periurban areas. The program is an extension of activities of NIADP into the potentially high-production regions of southern Awdal, southern Western Galbeed **[[correct?]]**, northern Togdher, and northern Sanaag.

4.38 Investment is ***recommended*** in the coastal, highland, and plateau areas and would focus on enabling communities to implement watershed management, such as contour bunding, oasis irrigation, and agroforestry. The program also ***recommends*** technical support for introducing intercropping, crop rotations, and diversification of crops, including the domestication of frankincense, composting and manure utilization, fodder production and preservation, new ploughing techniques, and postharvest technology. The technical support should also facilitate introduction of a few coastal access rural roads, rural water facilities, rural financial services, and capacity building of rural government and community workers through community-driven development (CDD). **[[Wording correct?]]** Technical assistance should cover the Guban coastal plain, mountain areas, and the plateaus of all Somaliland regions. The total cost of the proposed five-year program is estimated at US$19.6million.

Fisheries <<C>>

4.39 Somaliland has a promising fishing sector in fairly good condition except for the lobster resource, which is considered to be in a state of depletion. Fresh fish are harvested out of Loado/Zaila/Berbera/Karin **[[why run together like this, not separated with commas?]]** and Las Qorey.[16] In the Loado/Zaila **[[same as Loado/Zaila/Berbera/Karin?]]**area, fishermen have penetrated the Djibouti market, where they sell their fish through informal arrangements. Fishing operations ownership, management of fishing gear, and industrial fishing are male-dominated activities. Women dominate the sale of fresh fish in local markets. There are, however, an increasing number of women who are using snap-freezing facilities and mobile freezer trucks to supply domestic markets in Burao, Hargeisa, and Berbera, and international markets in Ethiopia and Djibouti. Quantities per entrepreneur can be as high as 100 metric tons per month in both domestic and international markets.

[16] Note that there is no clear agreement whether Laas Qoray is within Puntland or Somaliland. This report has therefore chosen to discuss activities in Laas Qoray as part of both Puntland and Somaliland.

4.40 The total annual fish production potential from all boats, including local- and foreign-licensed boats, is estimated at between 13,000 and 19,000 tons for all species. Large pelagic fish such as tuna and kingfish account for 43 percent of production, compared with the total potential catch for all Somali regions of between 162,000 and 233,000 tons (see Annex H, Table H1**).** These estimates reflect the much shorter coastline that Somaliland has compared with the two other regions. Indeed, Somaliland has only 8 percent of the total EEZ. At a fob price of US$2 per kilogram based on current practices and sales in Gulf markets, the average annual value of the potential fish catch for Somaliland would be about US$32 million; but much of this is being acquired and sold by off-shore foreign vessels without a license and outside the regular channels. Compare this with the value of exports of one million sheep and goats in a year from Berbera, which could have an annual value of around US$25 million. If appropriate export certification for fish could be obtained through the establishment of modern fish processing plants, the value of the fish catch might be doubled.

4.41 **Vision for the future. <<D>>** The Ministry of Fisheries and Coastal Development envisages that the fishing industry could become a major source of employment and income generation based on a strong role by the private sector, including foreign investment (Republic of Somaliland, 2006). Strong growth of the fishing industry should be a force for poverty reduction and food security for the relatively poor Somalilanders along the north coast. This vision encompasses important roles for both artisanal fishermen **[[established usage]]** and large-scale commercial fishing enterprises, whether they be Somali or foreign financed. A strategy for the development of infrastructure (mainly jetties and navigation aids) would allow all fishing interests to realize the substantial potential of commercial fishing through on-shore processing. Infrastructure development would generate growth for Somaliland, and judicious public sector management and monitoring would ensure sustainable fishing for future generations. A Policy White Paper on Marine and Coastal Resources in Somaliland was endorsed by the then President of Somaliland on December 12, 2000. **[[add to biblio?]]** The paper sets out principles and objectives for the use of marine and coastal resources.

4.42 **Future initiatives built on experience. <<D>>** Fishing on the coast of Somaliland has had a long history and ports such as Zaila, Berbera, Karin, and Laas Qoray have been important fishing centers and the locations of substantial fish processing centers.[17] The former North East Coast Fishing Company (NECFISH) plant in Berbera, financed by the World Bank and other donors, has been leased by the Somaliland Fishing Authority to an Italian fishing company (Nicola Fishing). Preparatory works and procurement of most of the equipment and machinery required for operation of a rehabilitated fish processing plant have been completed. The company's aim is also to upgrade the fishing skills as well as improve fish handling and mechanical repair of boats and equipment among artisanal fishermen. Daily fish procurement is projected to be 5 to 7 metric tons of whole fish during the non-monsoonal fishing season, which, the PSE cluster mission was advised, will be processed, frozen, and exported by ship or air to countries in the European Community. The factory's continued operations and access to European markets will depend on regular certification by EU inspectors, who, if satisfied that the factory is in compliance with EU standards, will

[17] There are about 15 permanent settlements on the coast where fishing is the main source of livelihood.

issue periodic export certificates. The company's plan is to collect up to 100 percent of its fish requirements from about 40 local fishermen.[18]

4.43 There are a number of smaller commercial fishing ventures along the north coast that are selling frozen fish to Ethiopia and Djibouti. These ventures are within relatively short distances from Berbera and therefore have access to a range of purchased inputs and also to urban markets. These enterprises have been financed in various ways, such as local NGOs and from the diaspora. The major requirement for artisanal fishermen, who operate about 200 motorized boats off the shores of Somaliland and employ about 1,000 fishermen, will be improved facilities on shore. The nature of improvements needed will vary depending on the location. A report commissioned by UNDP in 2005 reviewed all aspects of the Somaliland fishing industry and recommended the development of the artisanal fishing industry with on-shore processing facilities and an adequate institutional framework for private sector investment (UNDP, 2005, p. 18). But costs to implement the recommendations and financing were not estimated or discussed in that report.

4.44 In order to establish control over commercial fishing off the coast, the Ministry of Fisheries and Coastal Development of Somaliland is understood to have issued long-term fishing licenses to 36 medium-size Egyptian fishing vessels, which are operating along the coast of Berbera, with an estimated average catch per boat of about 30 tons monthly. It is understood that annual licenses for these boats cost US$50,000 each. No information could be obtained about the number of other licensees but since many other boats fish in Somaliland waters it is almost certain that other commercial fishing boats such as trawlers are licensed, as well as the many boats from Yemen that specialize in collecting and transporting fish caught by Somali artisanal fishermen to Salaana for processing. Somaliland does have a surveillance capacity to monitor fishing that is taking place illegally, but this capacity is limited. Enforcement of fish licensing requirements within the EEZ is much more limited.[19]

4.45 *The main constraints to change is a lack of information about the fisheries resources off the Somaliland coast.* The change envisaged is a fishing industry that is well controlled in terms of its use of natural resources, particularly the type and volume of fish being caught and the areas in which fish may be caught within Somaliland's territorial waters. However, in order to establish the appropriate guidelines it is necessary to have information about the fisheries resources available in the seas off the Somaliland coast. Without such information the number of commercial licenses and the conditions associated with those licenses cannot be established. Similarly, information on the coastal fisheries resources will be needed to establish rules and regulations for artisanal fishermen, such as limits on catch, species that are protected, and defined fishing areas. Therefore it is ***recommended*** that a careful inventory of the fisheries resources be prepared for Somaliland's territorial waters. This

[18] As of the first week of May, 2006, the company had not started operations.

[19] Somalia has an Exclusive Economic Zone (EEZ) as defined by the United Nations Convention on the Laws of the Sea (UNCLOS) that extends 200 nautical miles. Within the EEZ the Somaliland government has the power to issue fishing licenses to all fishing vessels that are from "distant waters fishing nations." Within the EEZ is the 12-nautical-mile zone of Somali territorial waters, in which foreign fishing vessels may not fish irrespective of their license. There is also a 6-mile limit that is reserved for small-scale local fishermen.

should be incorporated into the general "State of the Environment" report recommended in Chapter 3.

4.46 **Priorities for public investment. <<D>>** The available evidence, advice from many fisheries experts, and the conclusions and recommendations in previous reviews indicate that the fisheries industry in Somaliland, while having a growing commercial on-shore fish processing industry with the potential for substantial expansion, is not providing artisanal fishermen with adequate incomes, and is receiving minimal benefits from the annual harvest of fish by foreign vessels that operate year round (often valid without licenses) within Somaliland's EEZ. Moreover there are major concerns about the impact of the intensive fishing activity by foreign vessels on the sustainability of the once-abundant marine resources.

4.47 The paper provided by the Ministry of Fisheries and Coastal Development **[[same as the Dec. 12, 2000 white paper mentioned above? Add to biblio?]]** to the PSE Cluster mission and this report suggest the development of the fisheries subsector in the short and medium term through a combination of capacity building of Somaliland authorities, improving the capacity of the Berbera College of Fisheries and Maritime Studies to train artisanal fishermen, and finally promotion of investment in artisanal and semi-industrial fish production and processing. Government should have a strengthened role in the assessment of Somaliland's marine resources, management of the fisheries resources to support a large-scale commercial fishing industry based on comprehensive licensing and monitoring of fishing techniques and harvests, and promotion of commercial artisanal fishing in villages and towns along the coast. The artisanal fishermen would be supported by providing basic public infrastructure such as simple navigation aids, jetties, and marketing facilities in coastal fishing centers; other support would include the enabling environment to stimulate private sector investment in ice making, fish processing, and boat and engine maintenance in towns such as Berbera, Maydh, Lughaye and Las Qoray. The estimated cost of the program **[[meaning all the development discussed in this paragraph, or just the investment mentioned in the previous sentence?]]** is US$5.7 million. The public investment program **[[see previous note]]** will be discussed in more detail in Chapter 6 with additional information in Table 6.2, where the matrix discusses the expected results for Somaliland from the various programs and projects that are recommended.

Puntland <<B>>

4.48 The semiautonomous State of Puntland was established in 1998 and consists of seven regions: Nugal, Bari, Mudug, Cayn, and Karkar, as well as Sool and Sanaag on the border with Somaliland. As mentioned in the discussion of Somaliland there is a dispute about the location of the boundary between Puntland and Somaliland that has not been resolved. This report will make no assumption about boundaries and hence some material in this part of the report will overlap with the coverage of Somaliland. The population of Puntland is estimated unofficially at around 1.1 million.

Livestock <<C>>

4.49 Despite the substantial increase in the importance of fishing, livestock is still the dominant economic activity in Puntland. Livestock production has increased rapidly since the end of the four-year drought in 2004 and there has been a substantial diversification of the market for Somali sheep and goats, both live animals and carcass meat, to many more Gulf countries despite the ban on the import of Somali livestock into Saudi Arabia (see Box 4.1).

4.50 As in Somaliland, there is considerable uncertainty about livestock numbers in Puntland. Nevertheless, the Food Security Analysis Unit (as quoted in the Somalia Livestock Sector Strategy) estimates about 3.45 million sheep, 7.10 million goats, 0.44 million cattle, and 1.35 million camels in Puntland.

4.51 Huge livestock losses from drought-related diseases and poor nutrition occurred during the four-year drought of 2001–04 in most parts of the Northern regions, especially in Sool, Sanaag, Nugal, and Mudug.[20] Camel and cattle losses were particularly high, with some pastoralists loosing their entire herd. They became destitute and when the drought broke they were without the necessary capital to return to their former pastoral life and also without skills to generate an alternative income. Able bodied pastoralists were forced to engage in charcoal production and unsustainable hay making operations which contributed to a further deterioration in the rangelands. Others went fishing, as had many of their forefathers following previous droughts, only to become the victim of the tsunami in December 2004. Apart from the pastoralists, livestock traders also began to look for alternative livelihoods after the drought and the Saudi ban. It is no exaggeration to say that the livestock subsector in Puntland has not yet recovered from the four-year drought, the ongoing Saudi ban, and the tsunami.

Box 4.1: Impact of the Import Bans by Saudi Arabia on the Livestock Industry

The import bans imposed on Somali livestock by Saudi Arabia have been devastating to the livestock sector and the incomes of those associated with livestock production and marketing. The first ban was imposed in 1997 and was lifted in 1999; the second ban was imposed in 2000 and is still in force. These bans were due to a suspicion that an outbreak of Rift Valley Fever in Saudi Arabia had been caused by Somali livestock. The ban caused serious problems in the short term, such as substantial declines in prices for pastoralists. On the other hand it stimulated diversification and a careful review of the real long-term reliability of Saudi Arabia as a trading partner. Some of the results were the construction of additional meatworks **[[same as abattoir?]]** like the one in Burao, and a substantial focus on trade with the UAE, predominantly through Dubai.

Prior to the ban Somalia exported 3.0–3.5 million animals per year to Saudi Arabia. Although some livestock continued to be exported to Yemen, Oman, and the UAE, which lifted their ban, the oversupply to these markets initially depressed the prices of livestock and resulted in considerable economic loss in the marketing chain, and had also negative impacts on foreign currency earnings and the revenues of both Somaliland and Puntland governments.

[20] Livestock numbers obtained from the authorities in Puntland show much higher number. Only 2001 data are available but they show that sheep and goats together amounted to 23.36 million, far higher than the 10.55 million sheep and goats in 1999 as estimated by the FSAU. A remarkable feature of the estimates by the Puntland authorities, however, was that sheep and goat numbers dropped from 23.36 million in 2001 to 10.21 million in 2003 as a result of the drought that did not break until the end of 2004.

More recent data indicate that livestock exports have recovered impressively. Sheep and goat exports have increased from 600,000 head following the ban in 2001 to about 2 million head in 2003, despite the continued ban by Saudi Arabia. The domestic prices of livestock have recovered to almost preban levels of US$138 for camels, US$80 for cattle, and US$20–30 for sheep and goats (FSAU, 2004, Annex 3; **[[not in biblio]]** FAO/WB/EU, 2004). This trend in recovery seems to be continuing based on preliminary export numbers from Bossaso and Berbera for 2004 (FSAU, 2004) **[[not in biblio]]** with a substantial increase in numbers exported from Bossaso. These increases took place despite the ban and the four-year drought in the north and the center of the country, although an unknown (but probably large) number of sheep originated from Ethiopia as well as a sizable number from the central and southern regions. The higher numbers of livestock exported from Bossaso compared to Berbera are probably due to (i) the higher port taxes levied in Berbera; and (ii) the proximity of the UAE and Oman markets to Bossaso, which became more important following the closure of the Saudi market. The Saudi market would logically be supplied by Berbera, which is closer to Saudi Arabia.

Source: FAO/WB/EU, 2004.

4.52 **Vision for the future.** Despite the problems, livestock production and exports will continue to be important to the Puntland economy, as will fishing (which may already be generating a greater contribution to GDP in Puntland than livestock if the value of unrecorded illegal fishing is included). The future of the livestock sector needs to be considered in relation to the most effective use of natural resources and improved approaches to export inspection and certification. It is not likely that sheep and goat numbers can increase much beyond current levels because the natural resource base has changed dramatically for the worse. As discussed in the section on Somaliland, the main changes are the absence of the once-plentiful acacia and other species, almost no shade for livestock, increased prevalence of thorny shrubs, a harsher environment for annual and perennial grasses, substantial soil erosion. Overall, the rangelands are more vulnerable to drought. Another negative development is the unregulated opening of roads by trucks through important grazing land, which has result in gully formation. The government needs to regulate and plan the rural road network to mitigate soil erosion and gully formation. For these reasons, that this report concludes that the sustainable carrying capacity of the rangelands for sheep and goats cannot increase much beyond current average levels, and camels are at an even more serious disadvantage—forced to browse on low shrubs rather than acacias and other trees. The question that arises is whether the historical pattern of livestock production, characterized by low turn-off rates of relatively old animals that are able to withstand the rigors of sea transport to their final market in Gulf countries, can be sustained in the future in the face of substantial environmental changes and almost inevitable droughts.

4.53 Complete empirical evidence on the livestock capacity of the rangelands in Puntland is not at hand but some information is available that indicates the severity of the problems faced by pastoralists. While the number of sheep and goat exports from Bossaso has been rising in recent years, land-cover data suggest that conditions of the Puntland rangelands in an area such as Sanaag (about 4.9 million hectares or the size of the Dominican Republic) is in a severely degraded condition. For example, Africover used aerial photography to estimate that in 2000 only 37 percent of Sanaag's area could be classified as "Very Open Trees, Shrubs and Woody Vegetation" and 52 percent was classified as "Shrub Savannah"

(http://www.africover.org/). There is little doubt that the percentage of open woodland has declined further in the years since 2000—that is, during the heyday of charcoal production. Those who traveled through Sanaag five decades ago described it as well forested with abundant pasture and wildlife. Reforestation and soil conservation can be used to achieve substantial changes but it will take considerable resources and time.

4.54 The deterioration of the rangelands has reduced carrying capacity, mainly because the protection of the nitrogen-fixing acacias no longer exists. In addition, grass will more rapidly disappear during the dry season and wind erosion will be more severe. Camels will be particularly susceptible to drought, as they no longer can browse the tops of trees and will have to compete with goats for forage from the low shrubs. This report concludes that it would be advisable to change to a more sustainable management system for livestock by placing less pressure on the more drought-prone rangelands. It is suggested that pastoralists would benefit from gradual changes in flock management, production, and marketing strategies that lead to reduced grazing intensity during the dry periods of the year. These objectives could be achieved by selling males at younger ages (about two years) to domestic abattoirs for export as carcass meat at higher prices per unit weight on the international market—and potentially higher average incomes for herders. This strategy would have the effect of increasing turn-off rates with a concurrent reduction of the average stocking rate.[21]

4.55 In traditional production systems in Puntland from the north coast to the Central Rangelands, male sheep and goats are typically turned-off for sale as live animal exports to Gulf countries at 3 years or older. Because of the deterioration of the rangelands, continuing this pattern of production will result in greater costs and higher risks of major fluctuations in production than managing for a younger turn-off, for two main reasons. First, carrying animals for long periods of time until they are ultimately sold leads to annual dry-season weight losses. These weight losses need to be made up a number of times during the subsequent season at ever slower rates compared with younger animals. Second, the older, less vigorous animals are more prone to disease and parasites. On the contrary, younger males will gain weight relatively more quickly. Even after one dry season's weight loss young animals regain weight loss relatively fast, and after their first 6 months are less prone to diseases and parasites.

4.56 Achieving this vision of a gradual change to a different flock management regime will obviously take time. It may not be applicable to all areas in the Puntland rangelands since there are probably pockets where the traditional management practices are preferred and more likely to be successful than younger turn-off. Technical and economic analysis for individual locations is clearly advised before changes in management practices are made. But, given that processing of younger sheep and goats for export to markets in the Gulf is already taking place in locations such as Galkayo, the government should improve the capacity of its own advisory services to pastoralists, as well as encourage and support private advisory services, to help pastoralists change flock management. It will also be important for communities to develop the most rational distribution and use of watering facilities for livestock, and to enhance the management of common rangelands by eradicating practices

[21] An explanation of the analytical basis for this strategy was provided in paragraphs 5.11 and 5.12 **[[check cross-refs after editing]]** above. More details are provided in Annex F.