

**ARUSHA REGION**

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**INTEGRATED DEVELOPMENT PLAN**

**VOLUME THREE**

**ARUSHA REGION  
MEDIUM-TERM PLAN  
1981/82-1985/86**

**Prepared By  
THE REGIONAL DEVELOPMENT DIRECTORATE  
ARUSHA REGION  
With The Assistance Of  
THE ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT**

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18th December, 1982

During the four year period beginning in July 1979 Arusha Region has been assisted by the USAID-sponsored Arusha Planning and Village Development Project in the implementation of a large number of village development activities and in the preparation of the Region's Integrated Development Plan. It is a great pleasure to me that this Plan has now been completed and that I am able to write this short forward.

The Arusha Region Integrated Development Plan includes a comprehensive description of the current status of development in the Region, an analysis of constraints to future development, and the strategies and priorities that the Region has adopted for guiding its future development. It also includes a review of projects in the Region's Five Year Development Plan as well as priority projects for long term investments.

The preparation of the Plan has involved many meetings at the Regional, District and village level, and the goals, strategies, objectives and priority projects included in the Plan fully represent the decisions of the officials involved in those meetings. I am confident that the Plan will provide a very useful frame of reference for guiding the economic and social development of Arusha Region over both the medium-term five year period and the next 20 years. The total size of the identified projects and programmes is well beyond the normal scope of the financial resources of the Regional budget. Therefore, one function of this document is also to present the necessary facts and justification for attracting assistance from potential sources outside of the Region to carry out priority projects which address the specified development objectives of the Region. The Plan is by no means exhaustive, and there is room for interested organizations to explore other potential investments. Our Plan is therefore a base for future comprehensive planning.

I would like to take this opportunity to congratulate the Regional Planning Office staff and the team from Development Alternatives, Inc., which undertook the implementation of the Arusha Planning and Village Development Project, for their hard work and many accomplishments and to thank all those Regional Government, Ministry, Parastatal, and Party officials who, in one way or another, gave them the necessary assistance and cooperation.



J. A. Mhaviile

REGIONAL COMMISSIONER  
ARUSHA

## TABLE OF CONTENTS

	<u>Page</u>
PREFACE . . . . .	xxi
THE FOURTH FIVE-YEAR DEVELOPMENT PLAN 1981/82-1985/86 . . . . .	1
Part I: A Review of the Implementation of the Third Five-Year Development Plan 1976/77-1980/81 . . . . .	3
1.1 Boundaries . . . . .	3
1.2 Area . . . . .	3
1.3 Administration. . . . .	4
1.4 Population. . . . .	4
1.5 Climate . . . . .	5
1.6 Objectives of the Third Plan. . . . .	6
1.7 Finance . . . . .	7
1.8 Summary of Development in the Region from June 1976-June 1981 . . . . .	7
1.9 Factors which Have Influenced the Implementation of Third Five Year Plan 1976/77-1980/81 . . . . .	12
1.10 Important Lessons Learned . . . . .	13
1.11 The Expectations of the Fourth Plan . . . . .	13
Part II: Productive Sectors 1981/82-1985/85. . . . .	15
<u>Livestock</u> . . . . .	15
2.0 Introduction. . . . .	15
2.1 Aims/Objectives of the Third Plan . . . . .	16
2.2 Implementation of the Aims of the Third Five-Year Plan. . . . .	17
2.3 Implementation of Livestock Projects in the Third Five-Year Plan. . . . .	17
2.4 Problems of Implementation. . . . .	17
2.5 The Fourth Plan . . . . .	17
2.6 Proposed Projects . . . . .	19
2.7 Summary of Expenditure Fourth Five-Year Plan . . . . .	30
<u>Agriculture</u> . . . . .	30
2.8 Introduction. . . . .	30
2.9 Objectives of the Third Plan-Ministry of Agriculture . . . . .	30
2.10 Targets of Production 1976/77-1980/81 . . . . .	32

2.11	Crop Service Projects . . . . .	32
2.12	Expenditure . . . . .	37
2.13	Problems which Influenced the Implementation of Agriculture Projects. . . . .	37
2.14	The Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	38
2.15	Important Matters to be Adhered to by the Fourth Plan . . . . .	38
2.16	Production Targets during the Five Years of the Plan . . . . .	39
2.17	Projects for the Fourth Five-Year Plan 1981/82-1985/86 . . . . .	40
2.18	Summary of Expenditure in the Fourth Plan 1981/82-1985/86 . . . . .	45
<u>Natural Resources</u> . . . . .		46
2.19	Introduction. . . . .	46
2.20	Expenditure during Third Five-Year Plan . . . . .	46
2.21	Objectives of the Third Plan. . . . .	46
2.22	Targets and Implementation . . . . .	47
2.23	Problems . . . . .	48
2.24	Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	49
2.25	The Projects of the Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	49
<u>Small Industries</u> . . . . .		52
2.26	The Aim of the Third Plan . . . . .	52
2.27	Production Targets. . . . .	53
2.28	Expenditure . . . . .	53
2.29	The Fourth Five-Year Plan . . . . .	53
2.30	Targets . . . . .	54
2.31	Projects. . . . .	54
Part III: Social Service Sector. . . . .		57
<u>Education</u> . . . . .		57
3.0	Introduction. . . . .	57
3.1	The Objectives of the Third Five-Year Plan . . . . .	57
3.2	Implementation. . . . .	57
3.3	Problems of Implementation in the Third Five-Year Plan 1976/77-1980/81. . . . .	60
3.4	Summary of Expenditures in the Third Five-Year Plan. . . . .	61
3.5	Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	61
3.6	Projects to be Implemented in the Fourth Five-Year Development Plan. . . . .	61

<u>Health</u> . . . . .	64
3.7 Introduction. . . . .	64
3.8 The Aims of the Third Plan 1976/77-1980/81. . . . .	65
3.9 Implementation of the Targets set in the Five-Year Plan. . . . .	65
3.10 The Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	65
3.11 The Objectives of the Ministry of Health 1981/82-1985/86 . . . . .	67
3.12 Projects of the Fourth Five-Year Development Plan 1981/82-1985/86. . . . .	68
<u>Water</u> . . . . .	74
3.13 Introduction. . . . .	74
3.14 The Objectives of the Ministry. . . . .	74
3.15 Expenditure . . . . .	77
3.16 Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	77
3.17 Objectives of the Ministry. . . . .	77
3.18 Projects of the Fourth Five-Year Development Plan 1981/82-1985/86. . . . .	78
3.19 Annual Implementation of Projects 1981/82-1985/86 . . . . .	78
<u>Culture and Youth</u> . . . . .	81
3.20 Introduction. . . . .	81
3.21 The Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	81
3.22 Projects of the Fourth Five-Year Development Plan 1981/82-1985/86. . . . .	82
Part IV: Economic Infrastructure Sectors . . . . .	85
<u>Works</u> . . . . .	85
4.0 Introduction. . . . .	85
4.1 Objectives of this Ministry under the Third Plan . . . . .	85
4.2 Implementation of the Third Plan. . . . .	85
4.3 Implementation of the Projects of the Third Plan 1976/77-1980/81 . . . . .	86
4.4 Summary of Expenditures . . . . .	92
4.5 Problems . . . . .	92
4.6 The Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	92
4.7 Projects of the Fourth Five-Year Development Plan 1981/82-1985/86. . . . .	93

<u>Lands</u> . . . . .	97
4.8 Objectives of this Ministry under the Third Five-Year Plan. . . . .	97
4.9 Project Implementation. . . . .	101
4.10 Obstacles which Influenced the Implementation of Ministerial Projects. . . . .	101
4.11 The Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	103
4.12 Proposed Projects . . . . .	103
<u>Community Development</u> . . . . .	104
4.13 Introduction. . . . .	104
4.14 Community Development Ministry. . . . .	106
4.15 The Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	106
Part V: Regional Development Fund. . . . .	109
5.0 Objectives of RDF . . . . .	109
5.1 Targets of the RDF Projects 1981/82-1985/86 . . . . .	109
Part VI: Operation Barbaig . . . . .	113
6.0 Introduction . . . . .	113
6.1 Mbulu District. . . . .	113
6.2 Hanang District . . . . .	116
Part VII: District Development Corporations. . . . .	119
7.0 Objectives of the Third Plan . . . . .	119
7.1 Implementation . . . . .	119
7.2 Hanadeco-Hanang . . . . .	119
7.3 Shiuki-Kieto . . . . .	120
7.4 Shimamo-Monduli . . . . .	120
7.5 Arudeco-Arumeru . . . . .	120
7.6 Shuma-Arusha . . . . .	120
7.7 Projects of the Fourth Five-Year Development Plan 1981/82-1985/86. . . . .	121
Part VIII: Village Projects. . . . .	127
8.0 Introduction . . . . .	127
8.1 Projects to be Implemented 1981/82-1985/86. . . . .	127

Part IX: Parastatals and National Projects . . . . .	133
9.0 Parastatals . . . . .	133
9.1 National Projects . . . . .	133
Part X: Private Sector . . . . .	139
Part XI: Summary of Estimates of the Fourth Five-Year Development Plan 1981/82-1985/86 . . . . .	141
ARUSHA RURAL PRODUCTIVITY PROJECT . . . . .	155
I. SUMMARY . . . . .	157
II. PROJECT OBJECTIVES . . . . .	161
2.1 Overall Objectives . . . . .	161
2.2 Sub-Objectives . . . . .	161
III. PROJECT BACKGROUND . . . . .	163
3.1 Introduction . . . . .	163
3.2 Brief Description of Arusha Region . . . . .	164
3.3 Development Potential . . . . .	164
3.4 Development Constraints . . . . .	165
3.5 Institutional Structures and Resources . . . . .	168
IV. PROJECT STRATEGY . . . . .	169
4.1 A Strategy of Geographic Concentration . . . . .	170
4.2 An Integrated Land and Water Resources Approach . . . . .	170
4.3 A Problem-Solving and Opportunities-Seeking Approach . . . . .	170
4.4 Emphasis on Sustainable Development . . . . .	170
V. PROJECT ACTIVITIES . . . . .	173
5.1 Developing District and Village Capabilities for Improved Land and Water Resources Utilization . . . . .	173
5.1.1 Introduction . . . . .	173
5.1.2 APVDP Accomplishments . . . . .	174
5.1.3 Sub-Component Objectives . . . . .	175
5.1.4 Sub-Component Activities . . . . .	175
5.1.5 Outputs . . . . .	177

5.1.6	Inputs . . . . .	178
5.1.7	Sub-Component Budget . . . . .	179
5.2	Adaptive Research . . . . .	180
5.2.1	Introduction . . . . .	180
5.2.2	APVDP Accomplishments . . . . .	182
5.2.3	Sub-Component Objectives . . . . .	182
5.2.4	Sub-Component Activities . . . . .	182
5.2.5	Outputs . . . . .	185
5.2.6	Inputs . . . . .	186
5.2.7	Sub-Component Budget . . . . .	187
5.3	Extension and Information . . . . .	188
5.3.1	Introduction . . . . .	188
5.3.2	APVDP Accomplishments . . . . .	189
5.3.3	Sub-Component Objectives . . . . .	189
5.3.4	Sub-Component Activities . . . . .	189
5.3.5	Outputs . . . . .	192
5.3.6	Inputs . . . . .	194
5.3.7	Sub-Component Budget . . . . .	195
5.4	Irrigation Development . . . . .	196
5.4.1	Introduction . . . . .	196
5.4.2	APVDP Accomplishments . . . . .	196
5.4.3	Sub-Component Objectives . . . . .	196
5.4.4	Sub-Component Activities . . . . .	197
5.4.5	Outputs . . . . .	200
5.4.6	Inputs . . . . .	201
5.4.7	Sub-Component Budget . . . . .	202
5.5	Range Management and Livestock Development . . . . .	204
5.5.1	Introduction . . . . .	204
5.5.2	APVDP Accomplishments . . . . .	205
5.5.3	Sub-Component Objectives . . . . .	206
5.5.4	Sub-Component Activities . . . . .	206
5.5.5	Outputs . . . . .	210
5.5.6	Inputs . . . . .	212
5.5.7	Sub-Component Budget . . . . .	213
5.6	Delivery of Inputs/Services . . . . .	214
5.6.1	Introduction . . . . .	214
5.6.2	APVDP Accomplishments . . . . .	215
5.6.3	Sub-Component Objectives . . . . .	216
5.6.4	Sub-Component Activities . . . . .	216
5.6.5	Outputs . . . . .	218
5.6.6	Inputs . . . . .	219
5.6.7	Sub-Component Budget . . . . .	219
5.7	Soil and Water Conservation . . . . .	220
5.7.1	Introduction . . . . .	220
5.7.2	APVDP Accomplishments . . . . .	220
5.7.3	Sub-Component Objectives . . . . .	221
5.7.4	Sub-Component Activities . . . . .	221
5.7.5	Outputs . . . . .	223

5.7.6	Inputs . . . . .	224
5.7.7	Sub-Component Budget . . . . .	225
VI.	IMPLEMENTATION ARRANGEMENTS . . . . .	227
VII.	ANALYSES . . . . .	229
7.1	Technical/Implementation Analysis . . . . .	229
7.2	Economic Analysis . . . . .	230
7.3	Beneficiaries . . . . .	231
VIII.	SUMMARY BUDGET . . . . .	233
ANNEX A:	PHYSICAL DESCRIPTION OF PROJECT SITE . . . . .	235
ANNEX B:	ESTIMATED COSTS AND RETURNS . . . . .	241

## LIST OF TABLES

Tables	Title	Page
1	The Area of the Region by District . . . . .	3
2	Administration . . . . .	4
3	Population Distribution in the Region. . . . .	5
4	Rainfall in the Region for the Past Four Seasons . . . . .	6
5	Allocation of Money Used to Implement the Third Five-Year Plan for Arusha Region . . . . .	8
6	Income from the Third Five-Year Development Plan . . . . .	8
7	Number of Livestock in Each District (1980 Census). . . . .	15
8	The Actual Annual Livestock Increase (Animal Units) . . . . .	16
9	Implementation of Aims of Third Five Year Development Plan . . . . .	17
10	Implementation of Livestock Projects . . . . .	18
11	Proposed Dams and Water Catchments . . . . .	19
12	Expenditure and Annual Targets for Rangelands . . . . .	20
13	Construction and Rehabilitation of Dams. . . . .	20
14	Costs for Construction and Rehabilitation of Dams . . . . .	20
15	Boreholes and Wells. . . . .	21
16	Piped Water Systems. . . . .	21
17	Costs and Targets of Water to Ardai. . . . .	21
18	Construction of Dips . . . . .	22
19	Rehabilitation of Dips . . . . .	22
20	Construction of Livestock Development Centers . . . . .	23

21	Rehabilitation of Livestock Development Centers . . . . .	24
22	Elimination of Tsetse Fly. . . . .	24
23	Centers for Improved Breeding. . . . .	25
24	Production in Milk Factories . . . . .	26
25	Grass Seed Production Plots and Improved Pastures . . . . .	26
26	Courses for Livestock Extension Staff. . . . .	26
27	Courses for Livestock Keepers. . . . .	27
28	Construction of Slaughter Facilities and Sheds for Hides. . . . .	27
29	Maasai Range Water Development Workshop. . . . .	28
30	Targets and Annual Costs of Trucks and Machines . . . . .	29
31	Target and Annual Costs of Livestock . . . . .	31
32	Summary of Expenditures Fourth Five Year Plan . . . . .	30
33	Targets of Production 1976/77-1980/81. . . . .	33
34	Production of Commercial Products 1976/77-1980/81. . . . .	33
35	Irrigation . . . . .	32
36	Pyrethrum Production . . . . .	34
37	Wheat Production . . . . .	34
38	Vegetables and Fruit Nurseries . . . . .	35
39	Survey of Farms . . . . .	35
40	Agricultural Workshops . . . . .	36
41	Soil Conservation . . . . .	36
42	Production of Oil Seeds. . . . .	36
43	Ox-Plough Training . . . . .	37
44	Annual Expenditures. . . . .	37

45	Food Crops during the Five Year Plan . . . . .	39
46	Cash Crops during the Five Year Plan . . . . .	39
47	Maize Production . . . . .	40
48	Vegetables and Fruit Nurseries . . . . .	40
49	Ox Plough Training Centers . . . . .	41
50	Prevention of Pest Damage to Crops . . . . .	41
51	Agricultural Workshops and Farm Service Centers . . . . .	42
52	Soil Conservation. . . . .	42
53	Irrigation . . . . .	43
54	Demonstration Farms. . . . .	43
55	Oil Seed Production . . . . .	44
56	Production of Drought Resistant Crops. . . . .	44
57	Construction of Workers' Quarters. . . . .	45
58	Workers Seminars . . . . .	45
59	Expenditures during Fourth Five Year Plan. . . . .	45
60	Natural Resource Activities in the Region. . . . .	46
61	Expenditures During Third Five Year Plan . . . . .	46
62	Growing of Seedlings in Nurseries. . . . .	47
63	Tree Planting in the Region . . . . .	48
64	The Targets for Production of Seedlings, 1981/82-85/86 . . . . .	49
65	Planting of Trees in the Region 1982-1985/86 . . . . .	50
66	Construction of Fisheries Centers. . . . .	50
67	Fish-Keeping in the Region . . . . .	51
68	Construction of Game Posts . . . . .	51
69	Strengthening of Bee-keeping in the Region . . . . .	52

70	Annual Expenditures for Natural Resources. . . . .	52
71	Annual Expenditures for Small Industries . . . . .	53
72	Projects . . . . .	55
73	Total and Distribution of Industries to be Planned Later. . . . .	55
74	Projected Annual Expenditure for Small Industries . . . . .	54
75	Implementation of UPE. . . . .	58
76	Construction of Classrooms . . . . .	59
77	Construction of Teachers' Quarters . . . . .	59
78	Summary of Expenditures in the Third Five- Year Plan - Education Department . . . . .	61
79	Construction of Teachers' Quarters . . . . .	62
80	Construction of Boarding School . . . . .	62
81	Uncompleted Classrooms . . . . .	63
82	Uncompleted Teachers' Quarters . . . . .	63
83	Technical College . . . . .	63
84	Ministerial Expenditures 1981/82-1985/86 . . . . .	64
85	Annual Expenditures for Ministry of Health 1976/77-1980/81 . . . . .	65
86	Health Objectives . . . . .	66
87	Services Before and After the Third Five Year Plan . . . . .	67
88	Services Built by the Government the Period of the Third Five Year Plan. . . . .	68
89	Building of New Dispensaries . . . . .	68
90	Rehabilitation of Dispensaries . . . . .	69
91	Building of MCH Clinics . . . . .	69
92	First Aid Boxes . . . . .	70
93	Building of Hospitals. . . . .	70

94	Rehabilitation of Hospitals. . . . .	71
95	Construction of Sleeping Sickness Wards. . .	71
96	Mobile Health Clinics . . . . .	71
97	Improving Environmental Cleanliness. . . . .	72
98	Community Toilets . . . . .	72
99	Rehabilitation of Health Centers . . . . .	73
100	Workers' Quarters . . . . .	74
101	Service to Health Projects . . . . .	75
102	Ratio of Health Services to People in the Region . . . . .	76
103	Water Services in Villages and the Number of People Who Get Water. . . . .	76
104	Annual Expenditures 1976/77-1980/81. . . . .	77
105	Number of Villages where Water Services Are to be Implemented 1981/82-1985/86. . . . .	78
106	Number of Villages Per District where Services are to be Implemented 1981/82-85/86 . . . . .	78
107	Rehabilitation of Water Systems. . . . .	80
108	Surveying and Plan . . . . .	80
109	Piped Water . . . . .	80
110	Boreholes . . . . .	80
111	Shallow Wells. . . . .	81
112	Building of Cultural Centers . . . . .	82
113	Research of Customs and Traditions . . . . .	83
113A	Annual Expenditures of Ministerial Funds 1985/86 . . . . .	83
114	Roads in Rural Areas . . . . .	87
115	Roads in Towns . . . . .	87
116	Construction of District Headquarters. . . . .	88

117	Fire Brigade . . . . .	89
118	Electrification of Government Headquarters .	90
119	Street Lights . . . . .	90
120	Building of Markets. . . . .	90
121	Building Brigades. . . . .	91
122	Technical Workshops. . . . .	91
123	Construction of Brigades. . . . .	92
124	Summary of Expenditures for Works. . . . .	92
125	Roads . . . . .	94
126	Construction of Bridges. . . . .	93
127	Purchases Required to Construct Bridges. . .	95
128	Technical Workshops. . . . .	96
129	Building of Markets . . . . .	96
130	Construction of District Headquarters and Expansion of Regional Headquarters. . . .	98
131	Electrification of Government Headquarters .	98
132	Workers' Quarters . . . . .	99
133	Radio Calls . . . . .	99
134	Building of Rest Houses. . . . .	100
135	Summary of Annual Estimates for Works. . . .	100
136	Surveying of Plots in Rural Areas. . . . .	102
137	Clearance and Development Plots . . . . .	102
138	Summary of Expenditures 1976/77-1980/81. . .	103
139	Surveying of Plots in Villages . . . . .	104
140	Clearing and Developing Plots in Towns . . .	105
140A	Summary of Ministerial Expenditures for Lands 1981/82-85/86 . . . . .	105
141	Community Development. . . . .	106

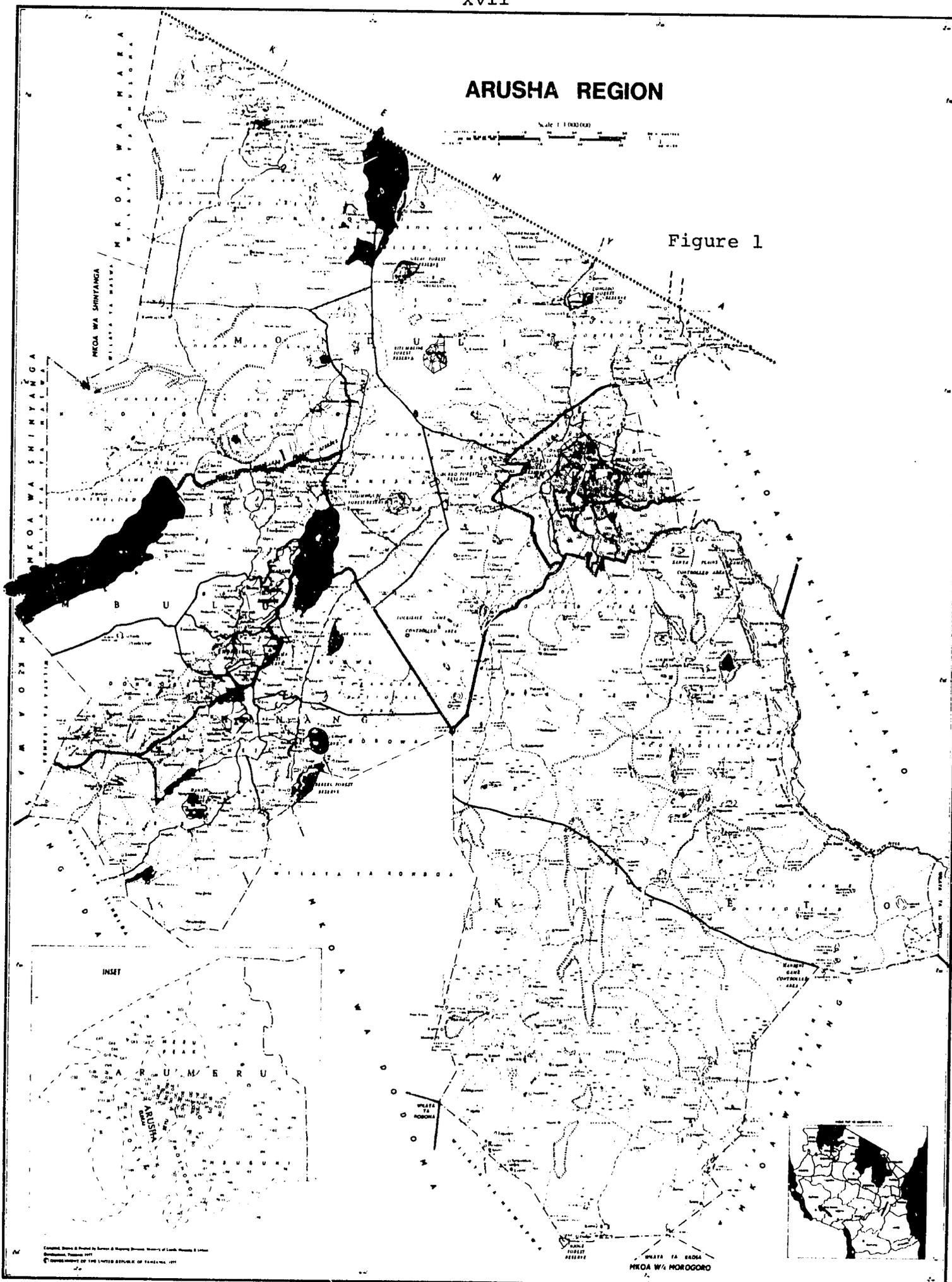
142	Strengthening Building Brigades . . . . .	107
143	Construction of Goddowns . . . . .	107
144	Seminars in Villages . . . . .	108
145	Improved Housing in Villages . . . . .	108
145A	Annual Expenditure for Community Development 1981/82-1985/86 . . . . .	108
146	Targets of RDF Projects . . . . .	110
147	Construction of Crushes . . . . .	113
148	Construction of Dips . . . . .	114
149	Workers' Quarters . . . . .	114
150	Building of Dispensaries and Clinics . . . . .	114
151	Building of Workers' Quarters . . . . .	114
152	Water Surveys . . . . .	115
153	Boreholes . . . . .	115
154	Shallow Wells . . . . .	115
155	Completion of Water Systems . . . . .	115
156	Completion of Boarding Schools . . . . .	116
157	Construction of Classrooms . . . . .	116
158	Teachers' Quarters . . . . .	116
159	Building of Latrines . . . . .	117
160	Building of Dispensaries . . . . .	117
161	Patients Ward Katesh . . . . .	117
162	Rehabilitation of Gehandu Piped Water System . . . . .	118
163	Sector Summary: Mbulu District . . . . .	118
164	Sector Summary: Hanang District . . . . .	118
165	Targets of District Development Corporations . . . . .	122

166	Funds Estimated for District Development Corporations . . . . .	125
167	Subvention Needed for the Government to Accomplish District Development Corporation Projects 1981/81-1985/86 . . .	126
168	Joint Village Ranches. . . . .	127
169	Ranches to be Started. . . . .	127
170	Annual Costs and Targets of Village Ranches. . . . .	128
171	Ox Carts . . . . .	129
172	Village Slaughter Facilities . . . . .	130
173	Village Godowns. . . . .	130
174	Village Farms . . . . .	131
175	Planting Trees . . . . .	131
176	Building Classrooms. . . . .	133
177	Building of Stores and Offices . . . . .	134
178	Building of Teacher's Quarters . . . . .	134
179	Building of Latrines . . . . .	135
180	Regional Hospital . . . . .	135
181	Piped Water System at Mto wa Mbu . . . . .	136
182	Piped Water System from Ruvu to Kiteto Central . . . . .	136
183	Piped Water System at Dongobesh. . . . .	137

# ARUSHA REGION

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Figure 1



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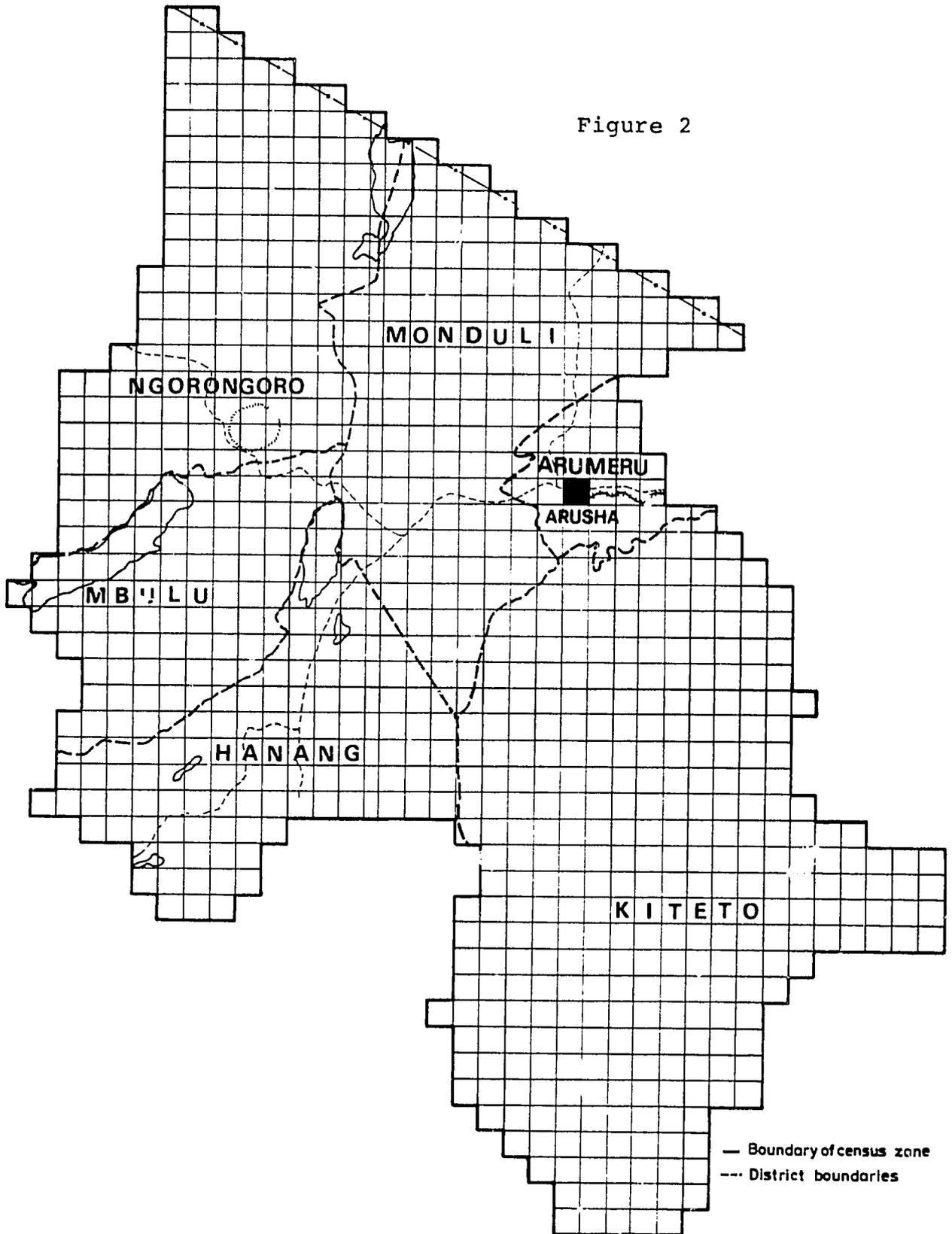
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MKOA WA MOROGORO

ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT

Livestock, Wildlife and Land Use Survey, February 1980

ARUSHA REGION AND DISTRICTS



## PREFACE

Volume Three of the Arusha Region Long-Term Development Plan covers the medium-term plan for the five year period 1981/82 to 1985/86. It consists of two components:

1. The Fourth Five Year Development Plan 1981/82-1985/86 Arusha Region; and
2. The Arusha Rural Productivity Project.

The Fourth Five Year Development Plan 1981/82-1985/86 for Arusha Region was prepared by the Regional Development Committee on January 13, 1982, and was subsequently approved by the government. The plan includes a review and evaluation of the implementation of the Third Five Year Development Plan in Arusha Region and details the projects to be carried out during the Fourth Five Year Plan for each of the sectors. The total budgeted for the Fourth Five Year Development Plan is Tshs. 331,610,900/=.

The regional and sector budget ceilings for the Fourth Five Year Development Plan were established by projecting total resources likely to be available and then allocating these resources by sector. In this process both local government and foreign donor resources were considered. The 1980/81 development budget was chosen as the base year for establishing initial projections and sector allocations, with modifications to be made after consideration of the regional strategies and priorities (Volume Two). The 1980/81 development budget for Arusha Region was Tshs. 51,190,000/=. This figure was projected to increase by 10 percent per year during the five year period. This estimate took into consideration both the serious restrictions on government funds and inflation, which is likely to have a very serious impact on the purchasing power of the development budget. The total projected amount for the five year plan was Tshs. 343,800,000/=.

After the budget discussions the final figure for the five year plan budget was Tshs. 331,610,900/=. Following the budget discussions based on the region's strategies and priorities, the revised sector allocations were set as follows:

<u>Productive Sectors</u>	<u>Percent Allocations</u>
	48.7
Livestock	19.6
Agriculture	21.1
Natural Resources	6.5
Small Industries	1.4

<u>Economic Infrastructure Sectors</u>		21.9
Works: Roads	11.2	
Works: Buildings	6.5	
Lands	1.4	
Ujamaa and Cooperatives	2.7	

<u>Social Service Sector</u>		29.5
Education	11.3	
Water	10.7	
Health	6.3	
Youth and Culture	1.2	

Within each sector the total budget in the five year plan includes projects to be funded by both local government and foreign donor funds.

The Arusha Rural Productivity Project is a four year development program designed to improve the productivity and well-being of the villagers in the six rural districts of Arusha Region. (This project is a follow-on to the Arusha Planning and Village Development Project (APVDP) sponsored by the Government of Tanzania and by the United States Agency for International Development [AID].) It is a proposal for foreign donor funding, and is thus an amendment to the five year plan, specifying a series of integrated sub-projects under the five year plan to be implemented using foreign donor funding. The total budget for the Arusha Rural Productivity Project is Tshs. 203,751,680/=.

**THE FOURTH FIVE YEAR  
DEVELOPMENT PLAN 1981/82-1985/86  
ARUSHA REGION**

## PART ONE

A REVIEW OF THE IMPLEMENTATION OF THE  
THIRD FIVE-YEAR DEVELOPMENT PLAN 1976/77-1980/811.1 Boundaries

Arusha Region is in the northern highlands. To the north of Arusha Region is the Republic of Kenya, to the east is Kilimanjaro Region, to the south is Dodoma Region, to the southeast is Tanga Region, to the west is Shinyanga Region, and to the northwest is Mara Region.

1.2 Area

Arusha Region has an area of 82,428.5 sq km. There are 78,857.5 sq km of dry surfaces and 3,571 of water surfaces consisting of lakes, rivers, and dams. The lakes are Manyara, Eyasi, Babati, Basuto, and Natron. Of the land surface 10.3 percent is agricultural land, 80.7 percent is grazing land, and 3 percent is in national parks.

The division of the region by district is as follows:

Table 1: The Area of the Region by District

<u>District</u>	<u>Area without Forest km<sup>2</sup></u>	<u>Area with Forest km<sup>2</sup></u>	<u>Total km<sup>2</sup></u>
Arusha	82.5	-	82.5
Arumeru	2,628.92	267.08	2,896.0
Monduli	13,966.98	234.02	14,201.0
Ngorongoro	13,121.15	914.85	14,036.0
Kiteto	35,149.74	6.26	35,156.0
Hanang	8,186.55	218.45	8,405.0
Mbulu	<u>6,936.87</u>	<u>715.13</u>	<u>7,652.0</u>
Total	80,072.71	2,355.79	82,428.5

### 1.3 Administration

The region is divided into seven main districts and one sub-district (Karatu):

Table 2: Administration

District	Area km <sup>2</sup>	No. of Divisions	No. of Wards	No. of Villages
Arusha	82.5	2	7	10
Arumeru	2,896.0	6	30	133
Monduli	14,201.0	3	13	37
Ngorongoro	14,036.0	3	13	29
Kiteto	35,156.0	4	16	51
Hanang	8,405.0	4	20	112
Mbulu	<u>7,652.0</u>	<u>4</u>	<u>21</u>	<u>91</u>
Total	82,428.5	26	128	463

### 1.4 Population

The region had a population of 928,478 at the time of the 1978 census. This gives a recorded population growth rate of 3.8 percent per year between the 1967 and 1978 censuses. The current estimated population growth rate is 3.8 percent per year, consisting of a 3.3 percent rate of natural increase and 0.5 percent rate of net in-migration. With this rate of growth the population of the region will increase from the current (1981) 1,035,761 to 1,256,036 by the end of the Five-Year Plan period (1986). This rapid population increase in the region reminds us that much effort and knowledge must be used in productive activities so as to make the region self-sufficient in food and to maintain and improve the level of social services. This will be accomplished through the combined efforts of government and party leaders in the region, parastatals, district development committees, villages and individuals. For the productive activities in the region to bring success, the technology used in the villages has to be modernized. The population distribution in the region is shown in Table 3.

Table 3: Population Distribution in the Region

District	1967	1976	1978	1980	1986	Current Annual % Increase
Arusha	181,728	80,057	86,845	95,245	128,567	5.0
Arumeru		219,418	234,020	252,975	308,367	3.3
Monduli	106,758	66,119	71,725	78,084	102,903	4.6
Ngorongoro		43,356	47,031	49,344	57,675	2.6
Kiteto		55,118	59,790	64,857	84,444	4.4
Hanang	286,559	213,216	236,292	249,483	319,064	4.1
Mbulu		178,631	193,775	206,712	255,016	3.5
Total	575,045	855,915	929,478	996,700	1,256,036	3.8

### 1.5 Climate

The region, which is divided into seven administrative zones, has climatic differences according to land forms. The region can be divided into two climatic regions. The Highlands (4,000-6,000 ft) have a cool climate with an average temperature of 22.5°C, the minimum temperature being 21.0°C and the maximum being 24.0°C. These highlands cover the northern area of Arusha Region. They have winter rainfall in November and December and heavy rainfall from February to May/June.

The second climatic region is the lowland area (1,500-3,000 ft). The lowland areas are warmer in general and cover the southern area of Arusha Region. The lowland area receives rains once a year between November and April. Taking an average of good years, the region gets between 800 and 1,500 mm. The average for dry years is below 350 mm. In the five years of the Third Five-Year Development Plan rainfall varied in the region, and this variability affected the production of different crops as well as pastures.

The rainfall of the last four years is shown in Table 4.

Table 4: Rainfall in the Region for the Past Four Seasons

District	1976		1977		1978		1979	
	MM	Days	MM	Days	MM	Days	MM	Days
Arusha	90.6	92	1440.0	145	1799.95	203	1361.1	222
Monduli	454.35	95	705.0	92	1011.45	118	736.1	119
Mbulu	471.3	93	1003.0	231	1130.5	282	1117.0	171
Hanang	368.98	124	824.7	143	1046.2	236	1968.2	199
Kiteto	762.2	49	301.0	26	907.2	68	1096.7	67
Arumeru					1119.5	113	879.5	106

#### 1.6 The Objectives of the Third Five-Year Plan

The objectives of the Third Five-Year Plan in Arusha Region take into account the national objectives which aim at improving the economy and the life of the people in the region by:

1. Putting more emphasis on production, especially food production, in order to enable the region to be self-sufficient in food and to have a surplus of food for export to food deficit regions.
2. Providing a better economic infrastructure in order to reduce communication handicaps and to improve the transportation of crops to enable the villages to increase their productivity.
3. Increasing and improving social services such as primary education (UPE 1977), water and health services in towns and villages.
4. Strengthening and improving the development of villages in the region by insisting on better use of their land so that they become sources of production.

## 1.7 Finance

### (a) Finance and Development

In the Third Five-Year Development Plan, the region expected to spend a total of Tshs. 131,216,059/= provided by Parliament and Tshs. 97,902,971/= from other donors making a total of Tshs. 229,119,030/= to be spent during the five years, 1976/77-1980/81. Nevertheless, by the end of this plan only Tshs. 181,450,589/25 has been used. See Table 5 for the allocation of money used to implement the Third Five-Year Plan.

### (b) Income from the Third Plan

The income derived from the Third Five-Year Development Plan mainly came from the productive sectors (agriculture, livestock, industries, and land and natural resources) (see Table 6). It is the income which went through government ministries and parastatals which we are discussing here. It has been difficult to ascertain the real income of the region in all sectors both public and private.

## 1.8 Summary of Development in the Region from June 1976 to June 1981

With the economic problems and the implementation problems which the region and the country as a whole have faced in the past five years, Arusha Region has made commendable progress in all sectors including the private sector.

In short, the progress of various sectors is as follows:

### (a) Social Services Sector:

#### (i) Education

In 1977, the region had 81,422 places for pupils from class one to class seven. The region projected that in order to accomplish UPE 177,782 places would be needed by the year 1980. In the last year of the plan (1980) the region had 184,844 places. This represents the completion of Universal Primary Education. A total of 968 classrooms and 412 teachers' quarters were also built during the five years. Regarding adult education, a total of 110,834 people who did not know how to read and write joined adult education classes and a total of 234,625 people were evaluated in different stages. Out of those, 23,372 succeeded in completing and passing stage four.

Table 5: Allocation of Money Used to Implement the Third Five-Year Plan for Arusha Region

Sector	Amount of Money Allocated	Amount of Money Spent	Percentage of Allocated Money Spent
Productive Sector	99,492,900	64,829,941.85	65%
Economic Infrastructure Sector	19,923,500	14,941,145.95	75%
Social Services Sector	41,922,500	39,981,540.50	95%
District Development Corporations	573,000	573,000.00	100%
Administration/RIDEP RDF.	36,677,500	61,124,960.95	167%
Total	198,589,400	181,450,589.25	91%

Figures are rounded.

Table 6: Income from the Third Five-Year Development Plan

Sector/Ministry	Activity	Value
1. Livestock	Selling of livestock, milk, eggs, hides and skins, etc.	470,453,469.00
2. Agriculture	Various crops	7,053,996,178.00
3. Natural Resources	Fishing, licenses, forests	12,983,792.00
4. Industries	Different products	66,993,792.00
5. Lands	Different activities for plots and farms	61,921,653.00
Total		7,666,348,884.00

1. Livestock -- without milk and animals slaughtered for domestic use.
2. Agriculture -- the value of crops together with crops used at home.
3. Natural Resources -- without income from tourism.

(ii) Health

Within the five year period the number of dispensaries has increased from 86 in 1976/77 to 158 in 1980/81. Health centers have increased from 9 in 1976/77 to 11 in 1980/81. Beds in hospitals, health centers, and dispensaries in the region have increased from 651 in 1976/77 to 1,475 in 1980/81. The aim of the health plan for 1982/83 is to increase and improve health services in the region especially in villages with most difficulties. Despite the economic problems which the country faced, especially in the fourth and fifth years of the plan, causing acute shortages of drugs, the campaign known as "a Person is Health" has brought many successes especially as far as environmental cleanliness is concerned, as in the building of latrines and better houses. In general, the third plan had the following successes:

1. Decreasing infant mortality rates (for infants in their first year) from 48 percent in 1975 to 13 percent in 1980 in Arusha Region.
2. Increasing life expectancy of a person in Arusha Region from 36 years in 1975 (national) to 51 years in 1980, compared with the national average of 45 years.
3. Increasing the number of patients in hospitals from 26,643 in 1975 to 49,663 in 1980. This is a good sign that the people have recognized the importance of modern medicine.

(iii) Water

People in this region have fully participated in the implementation of water projects in the villages in the five year period by donating or providing labor for the digging of trenches and the construction of water tanks. Generally, the self-help spirit in national building activities has gone down, sometimes when people in villages could not get services or needed materials. During this period, out of 855,284 living in villages, a total of 444,488 are getting clean water and out of 463 villages, 219 villages are getting clean water.

(b) Economic Infrastructure Sector

(i) Construction Roads

There has been commendable progress in this sector in the Third Five-Year Development Plan, e.g., roads have increased from 1,561 km in 1976 to 4,562 km in 1981. A total of 1,274 km are all weather and a total of 350 villages out of 463 villages in the region are within five km of a district road. In this period and especially before the RIDEP project started in this region, the main problems which affected the construction of roads were the adverse economic situation and lack of road construction equipment. Also the construction of the headquarters for Kiteto and Ngorongoro districts started during this period.

As regards "Operation Better Houses," a lot has been achieved in the villages especially in Arumeru, Hanang, Mbulu, and Monduli. However, the problems of lack of construction equipment and price increases of this equipment have slowed down the rate of building houses in villages. To date, there are only three districts with complete building brigades. The brigades of the remaining three districts are in various take off stages.

(ii) Land

There has been commendable progress in the survey of plots in minor towns and major towns and also settlement areas in villages. Of the estimated 4,680 plots earmarked for survey during this period, 3,579 have been surveyed. However, only 111 villages have been surveyed out of the target of 259 villages.

(c) Productive Sector

(i) Agriculture

Despite the drought which hit almost the whole country in the past three years, expansion of agriculture as well as output improved e.g., up to the year 1980/81 a total of 350,605 hectares were cultivated and these produced 706,677 tons with the value of Tshs. 1,955,632,268/= compared to 245,015 hectares which produced 560,008 tons worth Tshs. 908,967,796/= in 1975.

(ii) Livestock

Progress has been realized in this sector during this period. In the year 1976, the number of cattle was 1,574,693 (A.U); goats 211,398 (A.U); sheep 154,680 (A.U); dips 261; livestock development centers 41; crushes 259; and auctions 57. Up to the year 1980/81 Arusha Region has had a total of 1,741,451 cattle (A.U); 176,976 sheep (A.U); 241,869 goats (A.U); 261 dips; 293 crushes; 68 livestock development centers and 58 auctions. Income derived from livestock at the end of the Third plan has reached Tshs. 470,453,569/= compared to Tshs. 215,018,340/= at the beginning of the period.

(iii) Natural Resources

There has been satisfactory progress in this department within the five year period. Out of the target of growing 6.9 million seedlings, 5,264,700 seedlings were grown. Trees were grown in 2,225 hectares compared to 8,938 hectares earmarked. The areas where individuals planted trees are not included. Income derived from the activities of this ministry reached the figure of Tshs. 17,611,880/= excluding income from tourism.

(iv) Industry

Before the start of the Third Five-Year Plan, the region had 45 major industries which produced such products as cloth, food, and iron products and 102 small industries which produced cloth and various other products. This sector has expanded in the Third Five-Year Plan by increasing other industries and expanding productive activities. In the year 1975/76, small industries in the region produced goods worth Tshs. 27,783,792 compared with Tshs. 39,210,000 worth of goods produced at the end of the Third Five-Year Plan.

Progress has also been realized in the Department of Co-operatives and Community Development. There has been an increase in cooperative shops and village shops. The economic and social services sectors have been more effectively developed.

Generally, the regional GDP increased to some extent during this period from a GDP of Tshs. 1,412,259,750/= in 1975/76 when we were starting the Third Five-Year Plan to a GDP of Tshs. 1,645,281,000/= at the end of 1980. At the same time, the per capita income has risen from Tshs. 1,650 in 1975/76 to Tshs. 2,432 by the end of 1980. These incomes have not taken into consideration domestic uses.

1.9 Factors Which Have Influenced the Implementation of the Third Five-Year Plan 1976/77-1980/81

More success would have been recorded in the implementation of the Third Five Year Plan if the following problems were not encountered:

1. Scarcity of important equipment for construction purposes such as cement, iron sheets, pipes, survey equipment, etc.
2. Difficulties in communication in the rainy season when many roads are not passable and thus are an obstacle to the implementation of many projects in villages. This situation has left unaccomplished tasks every year.
3. Frequent price rises especially as far as trucks, engines, building equipment, etc. are concerned. This has increased the cost of projects compared with money allocated.
4. Lack of high level manpower, an important aspect in various sectors, has stagnated the implementation of projects.
5. A period of emergency when many trucks, engines, and other implements were mobilized toward the emergency thereby affecting the implementation of many projects.
6. Projects were not completed as scheduled because the funds were not provided as voted for.
7. Drought in many districts in the region has influenced the success of the projects especially agriculture, forestry, and livestock.
8. Poor supply of water and electricity.

### 1.10 Important Lessons

(i) In the investigation of implementation reports of the past five years 1976/77-1980/81 from the districts, villages, and district development corporations, it has been shown that good implementation has been realized in the parastatals, districts, and villages where there is effective leadership and collective leadership. It is important to strengthen effective leadership and collective leadership in the Fourth Five-Year Plan.

(ii) Looking at the problem of implementation as enumerated above, it is obvious that there is a big gap between plan formulation and plan implementation. The management and implementation of village projects is still weak, and districts have to put emphasis on implementation follow-up in villages so that we can get rid of poor implementation in the Fourth Five-Year Plan.

(iii) Due to lack of working equipment and given the financial inability of the nation and villages, we have learned that in the fourth plan we have to enhance our implementation capacity by persuading our villages to join hands and buy, for example, trucks for transporting crops, and inputs, and to insist on starting joint intervillage projects.

(iv) Although we had projects which aimed at strengthening better animal husbandry (ranches) in the Third Five-Year Plan particularly in districts with many livestock, in fact our aims did not succeed as we had expected. In the Fourth Five-Year Development Plan techniques of improving our livestock must be sought, so that our livestock keepers can look forward to livestock as an annual product. With these techniques the improvement of pastures in the surrounding areas must be given consideration.

### 1.11 The Expectations of the Fourth Plan

- To raise the standards of the residents of this region economically by raising the per capita income from the average of Tshs. 2,432 in 1980 to the average of Tshs. 2,715 in 1986.
- To enable all the 463 villages in the region to attain economic self-reliance, so that they become the center of economic development.
- To increase the present regional income (GDP) 1980 from Tshs. 1,645,281,000/= to Tshs. 1,928,594,000/= by the end of 1986.

- To increase the spread of social services such as health, water and education, especially in districts and villages with acute problems.

The aims/objectives of every sector in the development plan have been explained in the introductory part of each sector and each ministry. The Fourth Plan 1981/82-1985/86 has been estimated to cost a total of Tshs. 322,635,900/= with the following distribution:

Productive sector 50 percent, economic infrastructure 19.7 percent, and social services 30.3 percent.

**PART TWO**  
**PRODUCTIVE SECTORS**

Livestock2.0 Introduction

Along with agriculture, animal husbandry is one of the main economic activities for the residents of this region. It provides the livestock keepers with food, money, and other products derived from livestock, such as fertilizer, hides and skins, etc., as well as employment. Although it is well known that about 6 million hectares (80 percent of the area of the region) can be used for livestock keeping, only 65 percent of this can actually be used because the remaining area is infested with tsetse fly, has no water, or has been ruined by soil erosion. Because of differences in the quality of pastures and the importance of economic activities in each district, the number of livestock varies from district to district.

Table 7: Number of Livestock in each District (1980 Census)

District	Cattle		Sheep		Goats	
	Local	Modern	Local	Modern	Local	Modern
Arumeru	19,078	23,353	218,720	687	214,252	374
Arusha	8,790	726	5,839	-	6,418	-
Hanang	489,287	235	208,700	-	303,714	-
Kiteto	408,321	-	65,807	-	125,108	-
Mbulu	310,182	1,225	167,691	-	343,989	-
Monduli	334,981	15,102	187,905	-	272,376	-
Ngorongoro	234,069	273	202,037	-	229,736	-
Total	1,804,708	40,914	1,056,699	687	1,496,593	374
	1,845,622		1,057,386		1,495,967	

In the last five years 1976/77-1980/81, livestock has been increasing at the average rate of a 2.7 percent increase in "Animal Units" per year.

Table 8: The Actual Annual Livestock Increase (Animal Units)

	<u>1976/77</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>
Cattle	1,574,693	1,634,739	1,651,089	1,695,668	1,741,457
Goats	211,398	223,292	229,320	235,511	241,869
Sheep	<u>154,680</u>	<u>163,883</u>	<u>167,794</u>	<u>172,324</u>	<u>176,976</u>
Total	1,940,771	2,021,414	2,048,203	2,103,503	2,160,302

### 2.1 The Aims/Objectives of the Third Plan

Under the Third Five-Year Development Plan, the region had the aim of increasing the quality and quantity of livestock by adhering to the following:

- To increase the production of dairy cattle through artificial insemination;
- To open and strengthen stock routes and auctions so that the target of selling 10 percent of the livestock annually is realized;
- To produce better cattle for meat by crossbreeding local cattle with modern breeds;
- To reduce livestock by harvesting 10 percent annually in order to improve the quality of pastures;
- To improve pastures for meat cattle, milk goats, and sheep;
- To increase and improve water services, dips, crushes, slaughter facilities, sheds for hides and skins preservation, livestock development centers, livestock breeding stations, and colleges for training cattle keepers;
- To breed chickens for eggs and meat;
- To start industries for canning livestock products; and
- To improve markets for livestock and livestock products in general.

## 2.2 Implementation of the Aims of the Third Five Year Development Plan

In order to reach the aims and objectives of the Third Five Year Plan, various projects were formulated and implemented at a cost of Tshs. 41,619,186.75/= as follows:

Table 9: Implementation of Aims of Third Five Year Development Plan

Year	Money Allocated Tshs.	Money Used Tshs.
1976/77	22,586,690	4,699,387.40
1977/78	22,135,900	19,102,740.65
1978/79	9,318,000	6,063,021.65
1979/80	10,536,000	5,917,637.05
1980/81	<u>6,735,000</u>	<u>5,837,000.00</u>
Total	71,311,590	41,619,186.75

## 2.3 Implementation of Livestock Projects in the Third Five-Year Development Plan. 1976/77-1980/81

Table 10 shows the implementation of livestock projects for the Third Five-Year Development Plan.

## 2.4 Problems of Implementation

The problems which were faced during the implementation of livestock projects were a shortage of drugs and a shortage of vaccines. The construction projects were faced with shortages of building equipment and the problem of transporting equipment. There was also a problem of chickens and chicken feed.

## 2.5 The Fourth Plan

### Aims

The long-term national target concerning livestock is to stop the attitude of having a large herd just for the sake of it and to insist on better and modern animal husbandry. In order to achieve this long term objective, the fourth development plan aims at:

- Improving meat cattle by using better breeds (bulls).

Table 10: Implementation of Livestock Projects

	Target	Implementation	Difference (+) (-)
Construction of Livestock Development Centers	26	19	-7
Strengthening of Livestock Development Centers	5	18	+13
Building of Dips	103	30	-73
Strengthening of Dips	-	22	+22
Building of Spray Races	22	2	-20
Building of Crushes	129	119	-10
Building of Slaughter Facilities	10	3	-7
Construction of Hide Sheds	2	2	-
Construction of Centers for Better Breeds (Bulls)	10	3	-7
Construction of Dams	78	41	-37
Building of Deep Wells	43	19	-24
The Fitting of Headworks	36	19	-17
Construction of Workshops	2	2	-
Building of College for Livestock Keepers	1	1	-
Surveying and Investigation of Pastures and Water Areas	54	54	-
The Removal of Tsetse Fly (ha)	269,000	43,000	-22,600
Buying of Better Breeds (Bulls)	200	120	-80
Building of Pig Center	1	1	-
Construction of Center for Hatching Chicks	1	43% of the work is complete	-57%
Common Pastures	5	2	-3
Houses for Employees	25	8	-17
Trucks and Motorcycles	4 Trucks 13 Motorcycles	3 9	-1 -4
All-Weather Roads	210km	210km	-

- Expanding dairy cattle through the method of "stall feeding" in highland areas. This will be implemented through artificial insemination.
- Introducing joint village pastures.
- Spreading and strengthening livestock services and also developing treatment and preventive measures.
- Educating the people in good animal husbandry, for example, the planting of grass, using better breeds (bulls) and artificial insemination, providing livestock with better pastures and clean water, and utilizing (harvesting) livestock.
- Improving livestock and its products.

## 2.6 Proposed Projects

In order to accomplish the above mentioned targets the region aims at implementing the following projects which will cost a total of Tshs. 65,156,000/=.

### 1. Surveying and Plans-Tshs. 1,025,000/=

#### (a) Dams:

The aim of this project is to survey and draw plans for constructing 22 dams and 7 water catchments.

Table 11: Proposed Dams and Water Catchments

<u>District</u>	<u>Dams</u>	<u>Water Catchments</u>
Arumeru	1	-
Mbulu	5	-
Monduli	3	-
Kiteto	8	7
Ngorongoro	<u>5</u>	-
Total	22	7

#### (b) Pastures

Research and the setting up of proper systems of pastures will be done in 48 villages in the districts as follows:

Monduli 16 villages; Kiteto 16 villages; and Ngorongoro 16 villages.

Research will go hand in hand with implementation so as to have a correct picture of the Rangeland and to be able to give decisions on the integration of livestock/land pastures, stocking rates, and the carrying capacity of the pastures available, the range condition, and distribution of water in order to come up with good land use plans to develop "rangeland" to increase the feeding capacity.

Table 12: Expenditure and Annual Targets for Rangelands

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Dams	2	7	5	7	7	28
Costs	43.0	195.0	130.0	199.5	202.5	770.0
Ranches (Villages)	3	9	9	15	12	48
Costs	100.0	34.0	34.0	69.0	38.0	1025.0

2. The Construction and Rehabilitation of Dams-Tshs. 7,700,000/=

In order to reduce the distance livestock must travel to water to two miles and to increase the availability of water an average of 40-50 percent during the dry period, the region will construct 28 dams and rehabilitate 2 dams in the following districts:

Table 13: Construction and Rehabilitation of Dams

District	New Dams	Rehabilitation of Dams
Arumeru	1	-
Mbulu	5	-
Monduli	2	2
Kiteto	15	-
Ngorongoro	5	-
Total	28	2

Five dams will be constructed in joint pastures to be started by villages.

Table 14: Costs for Construction and Rehabilitation of Dams

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	4	7	5	7	7	30
Cost	356.0	1920.0	1570.0	1920.0	1934.0	7700.0

3. Boreholes-Tshs. 1,070,000/=

The aim of this project is to dig four boreholes with headworks to distribute water for livestock. Two wells will be dug at Monduli in the joint pastures of Tanganyet and Engarenaibor and one well in the pasture of Olmolot Kiteto. One well will be dug at Ilkiushiorbor in Kiteto.

Table 15: Boreholes and Wells

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	1	1	1	1	-	4
Costs	150.0	250.0	250.0	240.0	-	1070.0

4. Piped Water Systems-Tshs. 2,010,000/=

The target is to supply piped water systems to dips and group village ranches.

Table 16: Piped Water Systems

District	Dips	Group Village Ranches
Monduli	1	3
Kiteto	1	2
Ngorongoro	<u>9</u>	<u>—</u>
Total	11	5

Water will also be taken to Ardai in Monduli Livestock College. The costs and project targets per year:

Table 17: Costs and Targets of Water to Ardai

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (km)	8.5	3.75	6.45	3.0	2.0	23.7
Costs	650.0	315.0	570.0	355.0	120.0	2010.0

5. The Construction of Dips-Tshs. 4,037,000/=

The region has a total of 262 dips each of which dips an average of 18,243 livestock annually.

The target of this project is to add 35 dips so as to have a total of 297 which will each cater to 15,600 livestock annually. To accommodate the dip attendants, 9 houses will be built.

Table 18: Construction of Dips

District	Attendants' Houses	Group Village Ranches	Village Ranches	Dips
Arumeru	2	-	4	4
Hanang	3	-	2	2
Mbulu	3	-	10	10
Kiteto	-	1	4	5
Monduli	-	2	3	5
Ngorongoro	<u>1</u>	<u>3</u>	<u>6</u>	<u>9</u>
Total	9	6	29	35

Targets and annual estimates

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Dips	1	9	8	9	8	35
Houses	-	2	2	2	3	9
Costs	65.0	915.0	900.0	1100.0	1057.0	4037.0

6. Rehabilitation of Dips-Tshs. 1,878,000/=

Out of the present 263 dips, 68 are not functioning for various reasons. In the next five years the region aims at rehabilitating these dips.

Table 19: Rehabilitation of Dips

District	Number
Arumeru	10
Hanang	3
Mbulu	7
Ngorongoro	18
Monduli	20
Kiteto	10

Targets and annual costs

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Targets	20	11	14	14	9	68
Costs	844.0	313.0	331.0	250.0	140.0	1878.0

7. Construction of Livestock Development Centers-Tshs.  
2,113,000/=

The region has a total of 68 centers which service an average of 72,623 livestock per center annually. In the next five years the region aims at adding 7 centers in order to decrease the number of livestock served per center to 63,000. Thirteen houses for the attendants will also be built. The centers and houses will be built in the following districts:

Table 20: Construction of Livestock Development Centers

District	Center	Attendants' Houses
Arumeru	1	-
Hanang	2	-
Kiteto	1	4
Monduli	1	4
Ngorongoro	2	5
Total	7	13

Annual targets and costs

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Centers	-	1	2	2	2	7
Houses	-	3	3	3	4	13
Costs	-	420.0	483.0	510.0	700.0	2113.0

8. Rehabilitation Of Livestock Development Centers-Tshs.  
3,160,000/=

Out of the 68 centers, only 34 are functioning. So the target is to strengthen 25 centers by buying the necessary equipment for them and rehabilitating them.

Centers will be rehabilitated in the following districts:

Table 21: Rehabilitation of Livestock Development Centers

District	Center
Arumeru	5
Hanang	1
Mbulu	4
Ngorongoro	8
Monduli	2
Kiteto	5

Targets and annual costs

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Centers	13	5	2	3	2	25
Costs	194.0	800.0	640.0	786.0	740.0	3160.0

9. Elimination of Tsetse Fly-Tshs. 5,000,000/=

The target is to eliminate tsetse fly in an area of 20,000 hectares through bush clearing and 60,000 hectares through spraying.

Table 22: Elimination of Tsetse Fly

District	Hectares to be Cleared	Hectares to be Sprayed
Mbulu	5,000	15,000
Monduli	5,000	15,000
Kiteto	5,000	15,000
Ngorongoro	5,000	15,000
Total	20,000	60,000

Targets and Annual Costs

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Area to be cleared	200	4,800	5,000	5,000	5,000	20,000
Area to be sprayed	3,500	14,000	14,000	14,500	14,000	60,000
Costs	615.0	1,035.0	1,050.0	1,250.0	1,150.0	5,000.0

10. Preventive Medicine and Treatment for Livestock-Tshs. 3,500,000/=

This project will be financed by RIDEP. The medicine bought will be sold to livestock keepers so as to get finances to develop this project. Tshs. 1,750.0 will be spent in 1982/83 and Tshs. 1,750.0 in 1984/85.

11. Centers for Improved Breeding (bull centers)-Tshs. 1,711,500/=

The target of this project is to build 7 centers and to expand one center and to buy 171 improved breeding bulls. These centers will improve the quality of both beef and dairy cattle. Out of 171 bulls, 105 will be for group ranches for meat cattle and 66 for villages for dairy cattle.

Table 23: Centers for Improved Breeding

District	New Centers	Centers to be Expanded
Arumeru	-	1
Hanang	2	-
Mbulu	5	-

Targets and annual costs

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Grade Bulls	20	10	77	42	22	171
Breeding Centers	2	1	2	1	2	8
Costs	147.0	176.5	754.5	405.0	228.5	1,711.5

12. Production in Milk Factories-Tshs. 400,000/=

This project has the target of developing milk factories at Gallapo and Katesh by increasing the number of cattle from 22 to 100 to produce cattle for the villagers. Thirty cattle will be bought and 48 will be bred in these centers.

Table 24: Production in Milk Factories

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target Complete Phase I	20 cattle	-	10 cattle	-	30 cattle	
Costs	155.0	160.0	-	85.0	-	400.0

13. Grass Seed Production Plots and Improved Pastures-Tshs. 4,818,000/=

The target of the project is to cultivate 200 hectares of improved pasture in Valeska Estate for the villagers. Secondly to start 16 grass seed production plots in the following districts: Arumeru 3, Mbulu 6, and Hanang 7.

Table 25: Grass Seed Production Plots and Improved Pastures

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Improved Pasture (ha)	-	-	100	100	-	200
Grass Seed Plots	1	5	4	4	2	16
Costs	5.0	113.5	2,062.0	2,609.0	28.5	4,818.0

14. Courses for Livestock Extension Staff-Tshs. 2,000,000/=

The cost of this project will be met by RIDEP. The target of this project is to give seminars to 34 livestock staff annually. Also, some of the staff and government and party leaders will visit some African countries which practice animal husbandry.

Table 26: Courses for Livestock Extension Staff

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Staff	-	34	34	34	34	136
Costs	300.0	350.0	400.0	450.0	500.0	2,000.0

15. Courses for Livestock Keepers-Tshs. 1,200,000/=

The target of this project is to give courses for 600 livestock keepers for the whole period of the plan at Monduli Livestock Training Center.

Table 27: Courses for Livestock Keepers

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Livestock keepers	-	150	150	150	150	600
Costs	-	260.0	280.0	320.0	340.0	1,200.0

16. The Construction of Slaughter Facilities and Sheds for Hides-Tshs. 1,965,000/=

The target of the project is to build slaughter facilities and sheds for hides in 13 minor towns.

Table 28: Construction of Slaughter Facilities and Sheds for Hides

District	Minor Towns					
Hanang	2					
Mbulu	6					
Monduli	1					
Ngorongoro	1					
Kiteto	3					
<u>Target and annual costs</u>						
	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Slaughter facilities and sheds	1	3	3	3	3	13
Costs	40.0	400.0	450.0	500.0	575.0	1,965.0

17. Expansion of Livestock Office-Tshs. 150,000/=

The aim is to expand the regional livestock office by adding 4 more rooms for the employees of the Masai Range Project and the staff dealing with prevention of rinderpest. About Tshs. 150,000/= will be required in the year 1982/83.

18. Masai Range Water Development Workshop-Tshs. 7,800,000/=

The aim of this project is to strengthen the Masai Range workshop which will provide service to water projects and equipment concerned with livestock. The requirements for this project are caterpillar spare parts, 1 D7, 1 D6, and 2 D4 bulldozers.

Table 29: Maasai Range Water Development Workshop

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	1 D7 Spares	1 D6 Spares	1 D4 Spares	1 D4 Spares	
Costs	-	2,500.0	1,600.0	2,800.0	900.0	7,800.0

19. Loliondo Workshops-Tshs. 350,000/=

The aim is to construct the Loliondo workshop so as to give service to water machines in Ngorongoro district. This workshop will be built in 1982/83 and will cost Tshs. 350,000/=.

20. Trucks and Machines-Tshs. 11,152,500/=

This project will be financed by RIDEP. The machines to be bought will serve the following projects:

- (a) Dip projects-2 lorries and 7 land rovers
- (b) Water projects-3 lorries, 3 landrovers, 3 tankers and 4 bowsers
- (c) Surveying and research project-3 landrovers
- (d) Dairy cattle project-1 landrover
- (e) Tsetse fly elimination project-2 landrovers and 1 lorry
- (f) Rabies and Rinderpest campaign-7 landrovers and 3 lorries
- (g) Regional administration-1 landrover
- (h) Livestock health centers-57 motorcycles, 20 bicycles
- (i) Education for livestock keepers-2 cinema vans
- (j) Communications-2 radio calls
- (k) Livestock college Monduli-1 bus

Table 30: Targets and Annual Costs of Trucks and Machines

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	7 Land Rovers	7 Land Rovers	7 Land Rovers	3 Land Rovers	24 Land Rovers
	-	2 Lorries	2 Lorries	-	5 Lorries	9 Lorries
	-	-	-	1 Tanker	2 Tankers	3 Tankers
	-	19 M/Cycles	15 M/Cycles	13 M/Cycles	10 M/Cycles	57 M/Cycles
	-	2 R/Calls	-	-	-	2 R/Calls
	-	1 Bus	-	-	-	1 Bus
	-	-	1 C/Van	1 C/Van	-	2 C/Vans
	-	-	-	2 Tractors	-	2 Tractors
	-	-	-	10 Bicycles	10 Bicycles	20 Bicycles
	-	-	-	-	4 Bowsers	4 Bowsers
Costs	-	2,710.0	2,370.0	2,710.0	3,362.5	11,152.5

21. Expansion of Monduli Livestock College Tshs. 2,116,000/=

The aim is to expand the livestock college by:

- (a) Buying 50 modern dairy cattle and 40 local cattle for the development of Ardai and Tarasero pastures.
- (b) Cultivating and growing 200 acres of grass.
- (c) Building 4 bomas and 2 crushes.
- (d) Building a fence around an area of 1,500 acres.

See Table 31.

2.7 Summary of Expenditures Fourth Five-Year Plan

Table 32: Summary of Expenditures Fourth Five Year Plan

Year	Money Tshs.
1981/82	4,371,000.00
1982/83	15,437,000.00
1983/84	14,204,500.00
1984/85	18,737,500.00
1985/86	<u>12,406,000.00</u>
Total	65,156,000.00

Agriculture

2.8 Introduction

Agriculture is one of the most important economic activities in Arusha Region and it is one of the sectors which produces the most. Although the exact number or percentage of people engaged in agriculture is not known, it is estimated that about 95 percent of the residents of Arusha are agriculturists. A review of the progress of agriculture in the region within the period of the five years shows clearly that agriculture by itself has made the region earn Tshs. 470,453,469/= which is 45 percent of the regional income in this period.

2.9 The Objectives of the Third Plan-Ministry of Agriculture

The Third Five-Year Development Plan had the following objectives:

- To increase the production of food crops such as maize, wheat, beans, etc. in order to make the region self-sufficient and also to enable it to export surplus to other regions.

Table 31: Target and Annual Cost of Livestock

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	To cultivate 200 acres	Grass 50 acres	Grass 50 acres	Grass 50 acres	Grass 50 acres	Grass 200 acres
		10 cattle	10 cattle	10 cattle	10 cattle	40 cattle
	1 house	1 barra	1 barra	1 barra	1 barra	1 house 4 barras
	-	1 crush	1 crush	-	-	2 crushes
	To strengthen dams	Fence 400 acres	Fence 400 acres	Fence 400 acres	Fence 300 acres	Fence 1,500 acres
	10 engines	-	-	-	-	10 engines
Costs	707.0	320.0	330.0	369.0	390.0	2,116.0

- To increase the production of cash crops such as coffee, wheat, beans, cotton, sunflower, groundnuts, etc. in order to raise the income of the region and the nation as a whole.
- To continue and strengthen the provision of agricultural services such as the construction of godowns, land surveying, transportation of seeds and agricultural inputs, education for farmers, the canning of fruits such as tomatoes, irrigation, etc. with the aim of improving the standard of agriculture in the region.

### 2.10 Targets of Production 1976/77-1980/81

Table 33 shows that in general the production of food crops has expanded. Maize farms have expanded by 148 percent, beans by 71 percent and millet by 73 percent by the year 1979/80. The harvests have also been increasing.

The area used for growing coffee remained the same up to 1978/79 (see Table 34). By 1980/81 this area had increased by 1.5 percent. Harvests from this crop showed little increase. In general the area used for the other cash crops increased. For acreage, in the case of wheat the increase was 126.7 percent, beans 58.4 percent, cotton 496.4 percent, sunflower 35.6 percent, groundnuts 92 percent, and castor seeds 8.1 percent. The harvests from these crops have also increased. For example, the increase of wheat was 80 percent, beans 63.3 percent, and cotton 18.2 percent.

### 2.11 Crop Service Projects

In order to reach the targets set in the last five year period other projects were implemented as follows:

- Irrigation

The aim of this project was to survey and construct two irrigation furrows at a total cost of Tshs. 10,051,000/=.

Table 35: Irrigation

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target	2	-	-	-	-	2
Implementation	2	-	-	-	-	2
Costs	5,101,717.10				5,101,717.10	

Table 33: Targets of Production 1976/77-1980/81

<u>Products/Year</u>		<u>1976/77</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/1980</u>	<u>1980/81</u>
Maize	Target	-	-	-	270,967	349,215
	Implementation	127,778	161,110	188,890	317,644	277,389
	Harvests	115,000	145,000	170,000	226,940	165,785
Beans	Target	-	-	-	77,107	19,945
	Implementation	66,180	79,800	133,916	113,762	98,951
	Harvests	23,826	28,731	48,210	22,446	27,012
Millet	Target	-	-	-	72,902	37,950
	Implementation	33,540	41,668	49,000	58,011	19,947
	Harvests	33,540	41,668	49,000	38,900	8,130
Bananas	Target	-	-	-	12,287	18,195
	Implementation	30,675	31,915	32,000	27,772	13,970
	Harvests	144,171	150,000	94,054	138,680	58,927
N.B.	Target (acres)					
	Implementation (acres)					
	Harvests (tons)					

Table 34: Production of Commercial Products 1976/77-1980/81

<u>Product/Year</u>		<u>1976/77</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>
Coffee	Implementation	46,800	46,800	46,800	47,042	47,511
	Harvests	8,628	8,200	8,500	11,170	12,229
Wheat	Implementation	40,240	55,000	39,000	73,175	91,220
	Harvests	28,144	32,950	23,400	37,000	43,540
Seed Beans	Implementation	105,555	113,805	126,252	167,207	85,700
	Harvests	38,000	40,970	45,451	62,056	56,355
Cotton	Implementation	290	2,500	1,400	1,337	1,730
	Harvests	293	229	135	296	575
Sun Flower	Implementation	1,666	1,805	1,116	2,055	2,260
	Harvests	600	650	402	498	420
Ground Nuts	Implementation	1,875	1,900	1,594	3,449	3,600
	Harvests	600	600	510	196	1,625
Castor Seeds	Implementation	2,200	2,490	2,040	1,084	2,400
	Harvests	500	560	460	407	540
Pigeon Peas	Implementation	13,188	18,438	29,430	27,097	24,300
	Harvests	4,748	6,638	10,595	5,808	12,120

N.B. Implementation (acres)  
Harvests (tons)

- Pyrethrum Production

The aim of this project was to cultivate pyrethrum in an area of 265 hectares at a total cost of Tshs. 380,000/=.

Table 36: Pyrethrum Production

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target	265	-	-	-	-	265
Implementation	240	-	-	-	-	240
Costs	372,256.85					372,256.85

- Wheat Production

The aim of this project was to buy seeds and grow a total of 350 hectares costing Tshs. 180,000/=.

Table 37: Wheat Production

	1976/77	1977/78	1978/79	1979/80	1980/31	Total
Target	350	-	-	-	-	350
Implementation	350	-	-	-	-	350
Costs	179,901.45					179,901.45

- Vegetable and Fruit Nurseries

The aim of this project was to start nurseries for vegetables and fruits in the districts of the region at a cost of Tshs. 1,028,000/=.

Table 38: Vegetables and Fruit Nurseries

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target	-	2	2	2	1	7
Implementation	-	2	2	2	1	7
Costs	1,011,482.55					1,011,482.55

- Survey of Farms

The aim of this project was to survey farm areas to know the hectares and the quality of village farms at a cost of Tshs. 639,000/=.

Table 39: Survey of Farms

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target	-	13	20	6	-	39
Implementation	-	13	4	2	-	19
Costs	720,754					720,754

- Agricultural Workshops

The aim of this project was to build and rehabilitate mobile work shops to service government and village tractors in the districts at a total cost of Tshs. 3,140,000/=.

Table 40: Agricultural Workshops

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target	-	Lorry and Equipment	Tractor Equipment	-	5 Tractors 2 Lorries Equipment	
Implementation		Equipment	Equipment		Equipment	
Cost	2,951,840.90					2,951,840.90

- Soil Conservation

The aims of this project was to conserve the soil through the prevention of soil erosion by making terraces in village farms, using a total of Tshs. 2,529,600/=.

Table 41: Soil Conservation

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target (ha)	-	600	-	1,800	1,300	3,700
Implementation	-	400	-	700	-	1,100
Costs		710,509.00				710,509.00

- The Production of Oil Seeds

The aim of this project was to buy and distribute to the farmers oil seeds such as groundnuts, castor seeds, sunflower, etc. at a cost of Tshs. 519,000/=.

Table 42: Production of Oil Seeds

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target (ha)	-	3,820	-	10,918	-	14,378
Implementation	-	2,101	-	4,720	-	6,821
Costs		511,292.85				511,292.85

- Ox-Plough Training

The aim of this project was to start centers for training villagers in ox-plough cultivation in the districts in order to improve this type of farming in the region at a cost of Tshs. 180,000/=.

Table 43: Ox-Plough Training

	1976/77	1977/78	1978/79	1979/80	1980/81	Total
Target	2 centers	-	-	-	8 Bulls	-
	-	-	-	-	Planters	-
	-	-	-	-	Harrow	-
	-	-	-	-	Carts	-
	-	-	-	-	Carts	-
Implementation	1					
Costs	202,642.35					202,642.35

## 2.12 Expenditures

In the Third Five-Year Plan, the Ministry of Agriculture was authorized to spend Tshs. 21,045,000/=, but it spend only Tshs. 14,617,715/=.

Table 44: Annual Expenditures

1976/77		1977/78		1978/79		1979/80		1980/81	
Authorized	Used								
1,930.0	1,950.725	3,376.0	3,359.419	3,472.0	3,833.742	2,177.0	1,990,013	10,090,0	3,883,817

## 2.13 Problems that Influenced the Implementation of Agriculture Projects

Some of the problems that have influenced the implementation of agricultural projects are as follows:

- Too much rain and too many floods affected the quality and quantity of harvests and the implementation program.

- Due to the adverse economic situation in the world, developing countries such as Tanzania have suffered acute shortages of diesel, tractor spares, and other farm implements.
- The Ministry of Agriculture, like other ministries, was affected by the emergency situation that faced Tanzania in the last three years of this plan.

#### 2.14 The Fourth Five-Year Development Plan, 1981/82-1985/86

According to the 1978 figure, the region had 928,478 residents. The rate of increase is 3.8 percent. The region now has 1,035,761 residents and by the year 2000 the number of residents in the region will double. This situation shows clearly that in the coming years the region will not only fail to produce a surplus of food but it will also fail to be self-sufficient in food if increase in production does not equal or exceed population increase.

In order to fight this problem, the objective of the Fourth Five-Year Development Plan will be to increase the quality and quantity of both food and cash crops per acre by using modern technology and expanding cultivated areas.

#### 2.15 Important Matters to be Addressed by the Fourth Plan

- More use of farm implements, better seeds, pesticides, fertilizer, and expertise.
- More emphasis will be put on soil conservation in order to reduce soil erosion.
- Improvement of irrigation.
- The growing of oil seeds will be improved and strengthened.
- Godowns for the storage of crops will be increased.
- Agricultural Farm Centers will be built.
- Strengthening product markets and transportation including road making in villages.
- To restart the unit dealing with crop inspection of pests and diseases.
- Education for farmers is another aspect to be given due consideration.

## 2.16 Production Targets During the Five Year Plan

Tables 45 and 46 show production targets during the five year plan.

In order to implement these targets, the region has devised projects worth Tshs. 69,978,900 in five years.

Table 45: Food Crops during the Five Year Plan

Crop/Year		1981/82	1982/83	1983/84	1984/85	1985/86
Maize	T	350,000	367,000	385,000	398,550	407,050
	H	315,000	330,050	340,220	364,580	382,800
Beans	T	124,800	131,000	137,500	142,500	147,500
	H	44,930	47,160	49,500	51,300	53,100
Miliet	T	63,900	70,000	73,500	76,000	79,500
	H	46,000	50,400	52,920	54,720	57,240
Rice	T	1,050	1,100	1,800	2,500	3,200
	H	1,050	1,100	1,800	2,500	3,200
Bananas	T	14,800	14,800	14,800	14,800	15,000
	H	70,000	70,000	70,000	70,000	72,000
Cow Peas	T	1,760	1,850	1,950	2,100	2,300
	H	475	500	527	567	810

Note: T=Target (acres)  
H=Harvest (tons)

Table 46: Cash Crops during the Five Year Plan

Crop/Year		1981/82	1982/83	1983/84	1984/85	1985/86
Coffee	T	48,936	50,404	51,916	52,716	53,116
	H	12,245	12,600	12,909	13,109	13,209
Wheat	T	100,220	110,220	120,620	130,600	114,080
	H	80,176	88,176	96,496	104,480	110,000
Beans (For Seeds)	T	90,000	94,500	99,200	104,200	110,000
	H	63,000	66,150	69,440	72,940	77,000
Pyrethrum	T	3,260	3,580	3,940	4,200	4,500
	H	286	325	350	360	375
Cotton	T	1,820	1,910	2,000	2,200	2,500
	H	900	955	1,000	1,100	1,250
Sunflower	T	2,480	2,730	3,000	3,300	3,500
	H	750	819	900	990	1,050
Groundnuts	T	3,800	4,000	4,200	4,400	4,600
	H	1,710	1,800	1,890	1,980	2,070
Peas	T	21,800	19,600	17,350	15,000	15,000
	H	10,900	9,800	8,675	7,500	7,500
Castor Seeds	T	2,500	2,620	2,750	2,850	2,950
	H	910	943	990	1,026	1,062

Note: T=Target (acres)  
H=Harvest (tons)

## 2.17 Projects for the Fourth Five Year Plan 1981/82-1985/86

- To Strengthen the Production of Maize-Tshs. 14,593,000/=

Arusha Region is among the leading maize growing regions in the nation. The region has been self-sufficient in maize and has been selling the surplus to other regions. From the 1975/76 season to the 1981/82 season, the Maize Development Project has been implemented under the National Maize Project sponsored by the World Bank. The contract for this project ends in the 1981/82 season. In order for the region to perpetuate self-sufficiency and realize a surplus for this crop the project for the development of this crop has to continue.

The five year target is to expand the farming areas by 49,500 acres. Second is to increase output per acre by using modern agricultural techniques. Those efforts have an aim of increasing production of maize by 210,900 tons.

Table 47: Maize Production

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Costs (Tshs.000)	90.0	3,930.0	3,454.0	3,758.0	3,361.0	14,593.0

- Vegetable and Fruit Nurseries-Tshs. 3,883,600/=

Vegetables and fruits are products which are encouraged in the region so as to improve the health of the people through better nutrition.

The region formulated this project by providing farmers with seedlings beginning with the 1976/77 season when the Third Five-Year Plan took off. The region will develop this project during the period of the Fourth Five-Year Development Plan.

The aims to provide the people with a total of 2,483,000 seedlings within the next five years. This target will be reached by developing the present nurseries and by starting 3 others in Monduli, Hanang, and Kiteto districts.

Table 48: Vegetables and Fruit Nurseries

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	380,000	440,000	513,000	550,000	600,000	2,483,000
Cost (Tshs 000)	480.0	894.0	857.6	776.0	876.0	3,883.6

- Ox Plough Training Centers-Tshs. 700,000/=

In order to make the work of farmers easier by reducing the use of the hoe, the region will continue ox plough training. This aims to help peasants who cannot afford cultivation with tractors which, apart from being unavailable, are accompanied with the problem of lack of diesel and spare parts.

In a period of five years the target is to strengthen 2 centers in Kiteto and Monduli districts and to start three centers in Mbulu, Hanang, and Arumeru districts. This type of agriculture will enable the expansion to new areas which will be needed by the Fourth Five-Year Development Plan.

Table 49: Ox Plough Training Centers

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (Centers)	-	3	1	1	1	7
Costs (Tshs. 000)		300.0	100.0	100.0	200.0	700.0

- Prevention of Pest Damage to Crops by Animals, Birds, and Insects-Tshs. 3,122,600/=

The aim of this project is to fight harmful pests especially quelea quelea and other destructive pests which spoil harvests in godowns. Under this project guns, bullets, nets, queleatox 60 percent, and other pesticides for crop preservation will be bought.

Table 50: Prevention of Pest Damage to Crops

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Costs (Tshs. 000)	180.0	706.0	763.6	627.0	846.0	3,122.6

- Agriculture Workshops and Farm Service Centers-Tshs. 17,726,400/=

This project was started during the Third Five-Year Development Plan with the aim of helping with minor repairs of tractors. The region also has tractors under its care and it hires the tractors to farmers at reasonable costs (tractor hire service).

In the next five years, the aim will be to strengthen the already available tractor center, which will be the biggest, and to start village farm centers where farmers will easily get needed inputs, spares for tractors and ploughs, better seeds, fertilizer, and insecticides. A total of 17 centers will be started.

These centers will be started in villages in the following districts: Hanang, Arumeru, Mbulu, Monduli, Kiteto, and Ngorongoro.

Table 51: Agricultural Workshops and Farm Service Centers

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target		4	4	5	4	17
Costs (Tshs. 000)	-	5,044.0	3,348.4	4,383.0	4,951.0	17,724.4

- Soil Conservation-Tshs. 10,485,000/=

Soil erosion is a big problem which affects the region especially in Mbulu District-parts of Karatu, Arumeru-Mukulat, and Hanang-Gallapo, and Bashnet. The target in the next five years is to prevent soil erosion in an area covering 328,250 acres. Surveying, terracing, grass growing, and planting of sisal and trees will be carried out in the affected areas and in major gulleys. The following are the targets and costs during the period 1981/82-1985/86.

Table 52: Soil Conservation

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (acres)	33,250	50,000	60,000	85,000	100,000	328,250
Costs (Tshs. 000)	2,239.0	2,322.0	1,141.6	2,172.0	2,610.4	10,485.0

- Irrigation-Tshs. 14,236,300/=

The area of the region which is suitable for irrigation is 150,000 acres. At present the area used for irrigated agriculture is 50,000 acres per year. The big

irrigation areas are Mto wa Mbu, Engaruka Selale, Digodigo, and Oldonyo Sambu in Monduli District, Mang'ola and Dongobesh in Mbulu, Lemkuna and Msitu wa Tembo in Kiteto, Kiru and Dudumera in Hanang, and Sonjo in Ngorongoro.

The aim of this project is to increase crop production in the Fourth Five-Year Development Plan by irrigation especially during the dry season and whenever the rains are scanty. The plan aims at increasing the area to be irrigated from the present 50,000 to 94,625 by the end of this plan. This is an increase of 44,625 acres.

Table 53: Irrigation

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	8,225	8,500	8,700	9,200	10,000	44,625
Costs (Tshs. 000)	6,369.0	2,691.0	1,842.0	1,994.0	1,340.3	14,236.3

• Demonstration Farms for the Expansion of Agriculture in New Areas-Tshs. 531,000/=

This project aims at expanding agriculture by starting demonstration farms in the area of the Barbaig, Masai, Sonjo, and Hadzabe. This is to ensure the availability of different kinds of food to these people. These are areas whose residents are not traditionally farmers.

The target is to increase the area under cultivation from the present (1981/82) 350 acres in these areas to 1,150 by the year 1985/86. It is expected that by the third year of this plan, these people would have an interest in agriculture.

Table 54: Demonstration Farms

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (acres)	350	400	400	-	-	1,150
Cost (Tshs. 000)	131.0	200.0	200.0	-	-	531.0

- Oil Seed Production-Tshs. 2,131,000/=

This project aims to expand the production of groundnuts, sunflower, simsim, and castor seeds by 36,000 acres. The aim is to make the region self sufficient in vegetable oils.

Table 55: Oil Seed Production

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (acres)	-	26,000	10,000	-	-	36,000
Cost (Tshs. 000)	-	1,381.0	555.0	150.0	50.0	2,131.0

- The Production of Drought Resistant Crops-Tshs. 970,000/=

The aim is to get the seeds of crops which are drought resistant and to distribute them to areas which usually face drought. The seeds to be distributed include cassava, millet, sweet potatoes, and peas. The areas for production of drought resistant crops will be expanded by the addition of 1,800 acres in the next five years.

Table 56: Production of Drought Resistant Crops

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (acres)	-	1,000	800	-	-	1,800
Cost (Tshs. 000)	-	520.0	400.0	50.0	-	970.0

- Construction of Workers Quarters-Tshs. 890,000/=

The problem of workers' quarters is serious in Arusha Region particularly in the livestock districts-Kiteto, Monduli, and Ngorongoro. The aim of this project is to build 10 houses for agricultural personnel in order to enable them to perform their duties well.

Table 57: Construction of Workers' Quarters

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (houses)	-	3	2	2	3	10
Cost	-	210.0	180.0	200.0	300.0	890.0

- Workers Seminars-Tshs. 710,000/=

There is a shortage of agricultural staff. In order to improve their competence, a training project has been introduced. Apart from teaching them agriculture in general, lectures in specific fields such as crop inspection, land use planning, agro-mechanisation, irrigation, and agricultural economics will be given. Under this plan, seminars for 120 agricultural officers will be given every year from 1982/83 and the costs are as follows:

Table 58: Workers Seminars

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Cost		120.0	200.0	270.0	120.0	710.0

2.18 Summary of Expenditures in the Fourth Plan 1981/82-1985/86

Table 59: Expenditures during Fourth Five Year Plan

Year	Amount of Money
1981/82	9,489,000.00
1982/83	18,313,000.00
1983/84	13,037,200.00
1984/85	14,480,000.00
1985/86	<u>14,654,700.00</u>
Total	69,978,900.00

## Natural Resources

### 2.19 Introduction

Within Arusha Region with a total of 82,428.5 sq km, natural resources activities cover an area of 16,564.96 sq km.

Table 60: Natural Resource Activities in the Region

<u>Activity</u>	<u>Area in sq. km.</u>	<u>Percentage of Regional Areas</u>
Forests	2,533.9	3%
Wildlife conservation	10,460.0	13%
Lakes, rivers, and pools	3,571.0	4%

### 2.20 Expenditures During the Third Five-Year Plan

During the Third Five-Year plan, the ministry spent a total of Tshs. 3,359,270/= to implement various projects.

Table 61: Expenditures During Third Five Year Plan

	<u>Money Allocated Tshs.</u>	<u>Expenditures</u>
1976/77	383,000	385,347.75
1977/78	715,000	713,598.25
1978/79	892,000	1,008,194.75
1979/80	477,000	494,128.85
1980/81	<u>2,849,000</u>	<u>758,000.00</u>
Total	5,316,000	3,359,270.00

### 2.21 Objectives of the Third Plan

The objectives were as follows:

- In the forestry sector, the objectives were to conserve the available forests and to grow different trees and distribute them to villages, schools, parastatals, individuals, and farms of the natural resources department in order to fight the problems of lack of firewood and timber, and soil erosion due to strong wind, rain, and overgrazing.

- In the fisheries sector, the aims were to strengthen techniques and fishing equipment in fishing areas with the aim of increasing the amount of fish available for consumption.
- In the wildlife sector, the aim was to put emphasis on animal conservation in national parks and to insist on the use of animals in game reserves to get more income. The region has 35 species of animals numbering 1.5 million.
- The beekeeping sector was still in its budding stage and it was amalgamated to wildlife. Its aim was to spread better techniques of beekeeping to the people through the use of modern beehives in order to increase income from honey and wax for the benefit of the people.

## 2.22 Targets and Implementation

### (a) Forestry

This department had only two projects in the Third Five-Year Plan.

- Growing seedlings in nurseries; and
- Tree planting.

Table 62: Growing of Seedlings in Nurseries

<u>Year</u>	<u>Target</u>	<u>Costs</u>	<u>Achieved</u>	<u>Income</u>
1976/77	1.5 mil	172,210.80	4%	311,229.00
1977/78	1.5 mil	200,444.55	53%	478,239.00
1978/79	1.5 mil	370,213.00	99%	809,275.00
1979/80	1.2 mil	235,841.65	113%	1,073,707.00
1980/81	<u>1.2 mil</u>	<u>452,000.00</u>	<u>134%</u>	<u>1,339,477.00</u>
Total	6.9 mil	1,430,710.00	76.8%	4,011,887.00

During the entire period, a total of 6.9 million seedlings were to be grown, but only 5.3 million were grown. This was about 76.8 percent of the target.

Table 63: Tree Planting in the Region

Year	Target (hectares)	Achieved (hectares)	Percentage
1976/77	1,063	275	25.9
1977/78	1,435	350	24.4
1978/79	1,750	500	28.6
1979/80	2,215	350	15.8
1980/81	<u>2,475</u>	<u>750</u>	<u>30.3</u>
Total/Reg.	8,938	2,225	24.9

The total seedlings planted is 45 million at a total cost of Tshs. 1.9 million and income from trees reached Tshs. 4.2 million in that period.

(b) Fisheries

Aside from the fact that the region had set a target of building five fisheries centers and starting one dam for a hatchery and one for demonstration, money was not allocated and the targets were not realized. Still income from fish in the Third Five-Year Plan reached a figure of Tshs. 3 million after the sale of 1,927 tons of fish.

(c) Wildlife

The department did not receive any money for any project in the Third Five-Year Plan. The department expected income from activities concerned with the selling of tusks and hides and fines to have brought a total of Tshs. 6.4 million.

(d) Beekeeping Department

Likewise this department did not require any funds for its projects in the Third Five-Year Plan even though by the end of this period (1980/81) there were 417 beehives belonging to the department, 103 being commercial, and 193 belonging to cooperatives.

## 2.23 Problems

The problems which became stumbling blocks to the implementation of various projects of the Department of Natural Resources in the Third Five-Year Plan are the destruction of planted seedlings by fire and wild animals, lack of experts and advisers, lack of transport, unavailability of funds for some projects, and the problem of poachers.

## 2.24 Fourth Five-Year Development Plan 1981/82-1985/86

Natural resources projects in the Fourth Five-Year Development Plan will cost a total of Tshs. 21.5 million.

### The Objectives of the Department

- To strengthen "Forests are Life" campaigns;
- To start more nurseries in villages in order to increase the number of seedlings to be grown and planted and to reduce transportation costs;
- To start and increase village forests, school forests, and cooperative forests;
- To increase new fishing equipment and fish ponds; and
- To increase equipment for animal husbandry, ber production, and production of bee products.

## 2.25 Projects of the Fourth Five Year Plan 1981/82-1985/86

### (a) Forests

#### (i) Nurseries for seedlings

In this five year period , the department has a target of growing a total of 18 million seedlings at a cost of Tshs. 11 million. The annual production targets are as follows:

Table 64: The Targets for Production of Seedlings, 1981/82-85/86

<u>Year</u>	<u>Target (Seedlings)</u>	<u>Cost (Tsh.)</u>
1981/82	2.1 million	1,063,000
1982/83	3.0 million	2,635,000
1983/84	4.0 million	1,950,000
1984/85	4.4 million	2,715,000
1985/86	5.0 million	2,474,000
<b>Total</b>	<b>18.5 million</b>	<b>10,837,000</b>

#### (ii) Planting and tending of trees

A total of 10,749 hectares will be planted and tended in this period at a cost of Tshs. 5.0 million. This cost also covers the cost of buying 15 motorcycles and

7 Landrovers. Implementation in the five years is as follows:

Table 65: Planting of Trees in the Region 1981/82-1985/86

Year	Target (Hectares)	Costs (Tshs.)
1981/82	1,250	375,000
1982/83	1,688	1,657,000
1983/84	2,294	1,538,000
1984/85	2,605	863,000
1985/86	2,912	874,000
Total	10,749	5,307,000

(b) Fisheries

The region will spend a total of Tshs. 3 million in five year period in different activities concerned with fisheries. These include the buying of motor vehicles, boats, and bicycles and the building of centers. Implementation of targets is as follows:

Table 66: Construction of Fisheries Centers

Year	Target (Fisheries)	Costs (Tshs.)
1981/82	1	285,000
1982/83	4	571,000
1983/84	3	513,000
1984/85	3	431,000
1985/86	2	184,000
Total	13	1,984,000

These costs include equipment and construction of centers without the costs of bicycles and trucks.

(i) Centers for fish-keeping and ponds

The region will use Tshs. 761,000 for the construction of centers and fish ponds.

Implementation is as follows:

Table 67: Fish-keeping in the Region

Year	Target (Fish kpng. Ctrs.)	Costs (Tshs.)
1981/82	4	66,000
1982/83	3	187,000
1983/84	1	85,000
1984/85	1	120,000
1985/86	1	309,000
	—	—
Total	10	761,000

(c) Wildlife

The region will use a total of Tshs. 2.0 million to build game posts, purchase equipment, and purchase three lorries and two Landrovers. Annual implementation is as follows:

Table 68: Construction of Game Posts

Year	Target (Game Posts)	Costs (Tshs.)
1981/82	3	410,000
1982/83	3	510,000
1983/84	2	440,000
1984/85	2	340,000
1985/86	2	340,000
	—	—
Total	12	2,040,000

(d) Bee-Keeping

The region will spend a total of Tshs. 550,000/= to buy one Landrover and 500 modern beehives. Annual implementation is as follows:

Table 69: Strengthening of Bee-keeping in the Region

Year	Target (Beehives)	Costs (Tshs.)
1981/82	100	70,000
1982/83	100	270,000
1983/84	100	70,000
1984/85	100	70,000
1985/86	100	70,000
Total	500	550,000

Money for Each Year 1981/82-1985/86

In the implementation of the Fourth Five Year Development Plan the department will spend money each year as follows:

Table 70: Annual Expenditures for Natural Resources

Year	Expenditures (Tshs. 000)
1981/82	2,269
1982/83	5,824
1983/84	4,596
1984/85	4,539
1985/86	4,251
Total	21,479

Small Industries2.26 The Aim of the Third Plan

In the Third Five Year Plan the aim was to increase the regional income derived from industry by expanding existing industry and also starting new industry. To simplify the administration of these industries, the region laid down a

procedure of starting them and developing them in industrial estates.

## 2.27 Production Targets

There was no specific number of projects earmarked for implementation during this period, but generally the industrial undertakings dealt with the making and burning of bricks and tiles and expanding small industries in the industrial estates. It was estimated to use a total of Tshs. 5,000,000 during the period.

The outcome of implementation efforts is that the regional industrial estate was commenced and completed and it ably co-ordinated all industrial undertakings. Among the industries started are timber making, paper making, tomato canning, furniture making, ironworking, burnt bricks and tile making.

Apart from government efforts, SIDO has taken part in this sector by giving help to about 41 projects. The RIDEF project also helped in 14 small-scale projects in villages. All these efforts have enabled the number of industries in Arusha Region to reach 165 small industries and 16 large scale industries. Most of the industries are in Arusha town.

## 2.28 Expenditure

For the five year period, the amount estimated to be used was Tshs. 5,000,000. The amount authorized by Parliament was 2,111,000/= and out of this amount Tshs. 1,772,000 were used.

Table 71: Annual Expenditures for Small Industries

	1967/77	1977/78	1978/79	1979/80	1980/81	Total
Amount estimated						5,000,000
Amount authorized	711,000	650,000	610,000	140,000		2,111,000
Amount used	502,000	709,000	421,000	140,000		1,772,000

## 2.29 The Fourth Five Year Plan

The importance of industries in the economy of Arusha Region becomes clearer given the increase in needs and also the increase in the population and the fact that production in general has been going down. Also, available resources are not expanding, so the average amount of resources per

resident continually diminishes. For the region to be able to attain self-sufficiency it must expand the employment of people who have the ability to work in the traditional sectors of agriculture and livestock. Due to these circumstances, the region will advance the industrial sector enhancing the following:

- (a) Sectors which improve the value of agricultural and livestock products such as the canning of vegetable products.
- (b) Industries which consume locally available resources.
- (c) Industries which help to increase production in the sectors of agriculture and livestock, such as industries which make agricultural implements, tractors, etc.

### 2.30 Targets

In the next five years, the region expects to spend a total of 19,525,000 Tshs. in order to develop small industries. Tshs. 4,449,000/= will be used to develop about 29 industries which have been planned and 36 others will be planned as implementation continues. The industries already planned are bricks and tiles - three industries, carts - two industries, carpentry - one industry, ironworks - one industry, making of sweaters - one industry, Ghee making - 12, and 11 others.

### 2.31 Projects

See Table 72 and 73. 4,784,00 Tshs. will be provided by the central government while the rest will be provided by donors.

Table 74: Projected Annual Expenditure for Small Industries

Year	Money Tsh.
1981/82	1,880,000/=
1982/83	656,000/=
1983/84	656,000/=
1984/85	776,000/=
1985/86	816,000/=
Total	4,784,000/=

Table 72: Projects

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Costs (Tshs. 000)						
Bricks and tiles						
Hanang (1)	-	500.0	-	-	-	500.0
Mbulu (1)	-	-	600.0	-	-	600.0
Monduli (1)	-	-	700.0	-	-	700.0
Carpentry						
Mbulu (1)	-	100.0	-	-	-	100.0
Sweaters						
Mbulu (1)	-	-	-	100.0	-	100.0
Ironworks						
Mbulu (1)	-	50.0	-	-	-	50.0
Ghee						
Kiteto (4)	-	50.0	50.0	50.0	50.0	200.0
Monduli (4)	-	50.0	50.0	50.0	50.0	200.0
Ngorongoro (4)	-	50.0	50.0	50.0	50.0	200.0
Carts, Tailoring, Basketry, Mat-making, oil seed pressing						
Hanang (6)	913.0	-	-	-	-	913.0
Mbulu (3)	331.0	-	-	-	-	331.0
Arumeru (2)	555.0	-	-	-	-	555.0
Total	1799.0	800.0	750.0	950.0	150.0	4449.0

Recurrent Expenditure

SIDO and Seminars 260.0 449.75 449.75 449.75 449.75 2059 (Tshs. '000")

Table 73: Total and Distribution of Industries to be Planned Later

District	No.	1982/83	1983/84	1984/85	1985/86	Total
(Tshs. 000)						
Arumeru	(8)	794.0	794.0	794.0	794.0	3176.0
Hanang	(8)	776.0	776.0	776.0	776.0	3104.0
Mbulu	(7)	705.0	705.0	705.0	705.0	2820.0
Kiteto	(4)	422.0	422.0	422.0	422.0	1688.0
Monduli	(5)	439.75	439.75	439.75	439.75	1759.0
Ngorongoro	(4)	404.25	404.25	404.25	404.25	1617.0
Total	36	3541.0	3541.0	3541.0	3541.0	14164.0

**PART THREE  
SOCIAL SERVICES SECTORS**

Education

3.0 Introduction

The Third Five Year Plan in the Ministry of Education had its foundation in the Second Five Year Plan 1969/70 - 1974/75 which enabled many children to enter standard one.

It should also be recalled that the second plan enabled us to eliminate the standard four examination and ultimately to change the direction of primary school curriculum to emphasize education for self-reliance.

3.1 The Objectives of the Third Five Year Plan

The Third Five Year Plan had the following objectives:

- To make sure that children who have reached school age (7-13 years) get places in primary schools in order to implement the Party's Musoma Directive (UPE).
- To increase the teacher - pupil ratio to 1:45.
- To construct classrooms and teachers' quarters.
- To develop education for self-reliance and adult education.

3.2 Implementation

(a) In 1977 the first year of UPE there were 81,422 places from class one to class seven. The region projected that to implement UPE the region should have 177,782 pupils' places for class I - VII by the year 1980. In 1979, the region had 157,789 places which represent 88.8% of the target. Thus, UPE had not yet been achieved.

In the last year of the implementation of the Third Five Year Plan (1980) the region had reached 184,844 places which is 104% of the target. This represents the accomplishment of UPE.

The picture from 1977, the year UPE started, to 1980, the end of the Third Five Year Plan, is as follows:

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Table 75: Implementation of UPE

Class	1977	1978	1979	1980	
I	21,895	47,273	31,474	26,097	
II	17,136	26,649	46,605	26,763	
III	9,828	16,223	20,464	43,079	
IV	10,329	20,662	25,214	30,239	
V	8,117	9,474	15,875	23,954	
VI	7,192	8,661	9,478	19,519	
VII	6,925	8,034	8,679	15,193	
Total	81,422	136,976	157,789	184,844	
No. of teachers		1,553	1,888	2,350	3,662
Teacher/pupil ratio		1.52	1.72	1.67	1.50

At the end of the five year plan the teacher/pupil ratio was 1:50 compared with the target expected of 1 teacher for 45 pupils (1:45). At present the region has enough Grade C Teachers but a shortage of Grade A teachers.

(b) Construction of classrooms

In the Third Five Year Plan the region had a target of building 2,535 classrooms. In the five years, the region was given Tsh. 1,485,000 for construction of classrooms. The implementation of this project was as follows:

Table 76: Construction of Classrooms

Year	Classrooms Authorized	Implementation/ Classrooms Built	% of Implementation
1977/76	202	120	59.4
1977/78	299	265	88.6
1978/79	386	259	67.1
1979/80	334	194	58.1
1980/81	<u>271</u>	<u>130</u>	<u>47.9</u>
Total	1492	968	65.1

Construction Costs (Tshs. '000')

	1976/77	1977/78	1978/79	1979/80	1980/81
Authorized	1010.0	2420.0	1930.0	3070.0	2710.0
Used	979.219	2396.223	1794.399	3023.149	2859.425

(c) Construction of Teachers' Quarters

During the period of the Third Five Year Plan the region had a target of building 1690 teachers' quarters. The money authorized was for the building of 908 houses.

Table 77: Construction of Teachers' Quarters

Year	Houses Authorized	Houses Built	Percentage of Implementation
1976/77	166	68	41
1977/78	174	54	31
1978/79	206	130	63.1
1979/80	210	100	47.6
1980/81	<u>152</u>	<u>60</u>	<u>39.5</u>

Construction Costs. (Tshs. '000')

	1976/77	1977/78	1978/79	1979/80	1980/81
Authorized	1160.0	1218.0	1512.0	2526.0	1824.0
Used	1089.080	1168.617	1495.143	2281.333	1883.472

(d) Adult Education

In an effort to eradicate ignorance, the region improved adult education. A total of 110,834 people who were illiterate registered themselves in adult classes. From the results of evaluation in this plan a total of 23,372 people passed in stage IV.

(e) Technical Colleges

In the Third Five Year Plan, the region has had 15 technical colleges. In each of the colleges there are four skills taught - masonry, carpentry, ironworks and domestic science. Each field of skill can accommodate 20 students, so all the colleges can accommodate 1,200 students. At present there are only 446 students. This number is insignificant compared to the number of students completing primary education.

3.3 Problems of Implementation in the Third Five Year Plan 1976/77 - 1980/81

The department has faced numerous implementation problems especially in the construction of classrooms, teachers' quarters and technical colleges as follows:

- Projects dealing with the construction of classrooms and teachers' quarters depend on the labor of the people which was not adequately available in some villages and districts.
- Operation Emparmat and Barbaig prevented the completion of UPE as it was formally earmarked for completion in December 1977.
- Acute shortage of students in technical colleges.
- Lack of a special program of utilizing students who have completed primary schools and technical colleges has affected the aims and objectives of technical colleges.
- There are no regulations compelling students to attend the colleges and because graduates from these colleges have not been successful enough in life to motivate others, the colleges have few students.

3.4 Table 78: Summary of Expenditures in the Third Five-Year Plan - Education Department

Year	Money Authorized	Expenditures Tsh.
1976/77	2,170,000	2,068,290.35
1977/78	3,678,000	3,564,839.95
1978/79	3,442,000	3,289,541.95
1979/80	5,896,000	5,304,482.45
1980/81	<u>4,534,000</u>	<u>3,810,000.00</u>
Total	19,720,000	18,037,154.70

3.5 Fourth Five Year Development Plan 1981/82 - 1985/86

Aims of the Plan:

- To develop plans for construction of classrooms and teachers' quarters in order to provide the schools with permanent buildings.
- To provide primary schools with enough equipment and teachers in all classes.
- To improve and develop Inservice Courses for teachers.
- To strengthen and develop technical training.
- To develop the system of community schools in order to improve education for self-reliance.
- To expand education for the disabled and to develop adult education.

3.6 Projects to be Implemented in the Fourth Five Year Plan

1. Construction of Classrooms

Given the fact that UPE has been accomplished new schools will not be opened in the region. The main task will be the construction of 1065 classrooms, 135-Kiteto, 250-Arumeru, 241-Monduli, 266-Hanang, 100-Mbulu and 73 in Ngorongoro. In order to make implementation and supervision easy, the region expects to buy 21 lorries, 2 Landrovers and 6 motorcycles. This project will cost Tshs. 11,750,000 in five years (see Table 79).

## 2. Construction of Teachers' Quarters

In an effort to accommodate more teachers, the region expects to build 896 teachers' quarters: Arumeru, 25; Monduli, 193; Mbulu, 105; Hanang, 190; Kiteto, 120; and Ngorongoro, 63. To make implementation easy, the region will buy transport equipment that includes 4 Landrovers, 3 lorries, and 26 motorcycles. The project is expected to cost Tshs. 11,652,000.

The region will also strengthen one boarding school in Kiteto. This is a district of cattle keepers where the existing boarding schools continue although it is not government policy to open any more schools of this type except in areas of cattle keepers. This school will cost Tshs. 400,000 in five years (see Table 80).

Table 79: Construction of Teachers' Quarters

	1981/81	1982/83	1983/84	1984/85	1985/86	Total
Teachers' Quarters	110	205	208	206	167	896
Costs (Tshs. '000')	1,320	2,460	2,496	3,122	2,254	11,652

Table 80: Construction of Boarding School

	1981/81	1982/83	1983/84	1984/85	1985/86	Total
Strengthening of Boarding School	-	1	-do-	-do-	-do-	1
Costs (Tshs. 000)	-	100.0	100.0	100.0	100.0	400.0

## 3. Uncompleted Classrooms

The aim of the region in the Fourth Five Year Development Plan is to complete the buildings which could not be completed in past years. The region will complete 79 classrooms at a cost of Tshs. 930,000 (see Table 81).

Table 81: Uncompleted Classrooms

	1981/81	1982/83	1983/84	1984/85	1985/86	Total
Uncompleted Classrooms	-	14	12	26	27	79
Costs Tshs. (000)	-	150.0	150.0	300.0	330.0	930.0

4. Uncompleted Teachers' Quarters

The region will also complete 73 teachers' quarters at a cost of Tshs. 850,000.

Table 82: Uncompleted Teachers' Quarters

	1981/81	1982/83	1983/84	1984/85	1985/86	Total
Uncompleted Teachers' quarters	-	25	16	16	16	73
Costs Tshs. (000)		250.0	200.0	200.0	200.0	850.0

5. Technical Colleges

Bearing in mind the problems of developing these colleges as seen during the Third Five Year Plan, the region will strengthen these colleges by providing more equipment and looking for ways to improve attendance. Within a period of five years, the region will develop the present colleges and strengthen seven colleges. The costs of strengthening these colleges is Tshs. 1,068,000.00; the annual costs are shown in Table 83.

Table 83: Technical Colleges

	1981/81	1982/83	1983/84	1984/85	1985/86	Total
Strengthening of Technical Colleges	-	1	2	2	2	7
Costs (Tshs. 000)	-	100.0	316.0	350	302.0	1,068.0

## 6. Folk Development Colleges

The region has recommended to the ministry that one folk development college be started in Ngorongoro District.

## 7. Adult Education

After the participants have passed stage four what is needed is to give them opportunities for more advancement. In the Fourth Five Year Development Plan, the region will build 291 permanent libraries in ward headquarters. Presently, many books received by the region are preserved in temporary libraries which are most often in ward offices.

These libraries will be built as follows: Arumeru-72, Monduli-30, Mbulu-50, Ngorongoro-30, Hanang-70 and Kiteto-39. In the five year period it is estimated that the building costs will be Tshs. 9,800,000.00 for equipment. The people will do the work through self-help schemes.

Table 84: Ministerial Expenditures 1981/82-1985/86

Year	Money (Tshs. 000)
1981/82	3,800.0
1982/83	7,460.0
1983/84	8,492.0
1984/85	8,772.0
1985/86	8,826.0
Total Tshs.	37,350.0

## Health

### 3.7 Introduction

At the end of the the Third Five Year Plan, the region had 9 hospitals, 158 dispensaries, 11 health centers, and 161 first aid boxes. It had been authorized to spend a total of Tshs. 9,671,000/-, but it could only spend Tshs. 8,695,573 in this plan.

Table 85: Annual Expenditure for Ministry of Health  
1976/77-1980/81

Year	Money Authorized	Expenditures
1976/77	1,680,000	1,377,094.55
1977/78	1,877,000	1,662,449.65
1978/79	2,340,000	2,463,863.25
1979/80	2,340,000	2,137,166.00
1980/81	<u>1,334,000</u>	<u>1,055,000.00</u>
Total	9,671,000	8,695,573.45

### The Objectives of the Third Five Year Plan 1976/77-1980/81

The objective of the Ministry of Health in the Third Five Year Development Plan was to spread health services in villages, especially where such services are inadequate, and also to strengthen available services.

#### 3.8 The Aims of the Third Plan 1976/77-1980/81

In order to achieve these objectives, the region planned to increase the number of new dispensaries, increase the number of first aid boxes, build new health centers and workers' quarters, and renovate hospitals, health centers, and dispensaries (see Table 86).

#### 3.9 Implementation of the Targets Set In The Five Year Plan

The implementation of various projects enabled the region to increase health services and also to decrease the average number of people receiving various services at each facility. This was the case in 1980/81 as compared to 1976/77.

Tables 87 and 88 show the increase in these services in the past five years.

#### 3.10 The Fourth Five Year Development Plan 1981/82 -1985/86

##### Introduction

Although available statistics (Table 102) show that the number of hospital beds (including dispensaries) in the region exceeds the national average, there is a need for the

Table 86: Health Objectives

Project	76/77	77/78	78/79	79/80	80/81	Total
Building of dispensaries	6	3	5	2	1	17
Rehabilitation of dispensaries	2	3	8	7	1	21
Rehabilitation of hospitals						
● Building of theatre and x-ray unit	-	-	1	-	-	1
● Building of Wards	-	1	5	2	1	9
● Buying of Equipment	-	-	-	-	1	1
● Converting Hlth. Center To Hosp.	-	1	-	-	-	1
First Aid Boxes	60	-	-	-	-	60
Building of Health Centers	1	-	-	1	-	2
Rehab. Health Centers	-	1	5	1	4	11
Rubbish equipment	1	1	1	-	-	3
Public toilets	-	-	22	-	-	22
Drainage Furrows	1	1	-	-	-	2
Machine for making Equipment	1	-	-	-	-	1
Fence for Cemetery	-	1	1	-	-	2

region to plan for more dispensaries, health center, first aid boxes, etc. Arusha Region is one of the regions with a very high population growth rate. Within the next five years the number of residents in Arusha will be 1,256,036, and if services are not increased, each bed will serve 1,148 people: each dispensary will serve 7,950 people: and each health center will serve 114,185 instead of the present situation. Moreover, there are still people who walk a distance of more than 20 kilometers to get services in a dispensary, for not every village has a dispensary or a first aid box.

The condition of buildings also necessitates plans and projects for rehabilitation so that they can continue to give services.

### 3.11 The Objectives of the Ministry of Health 1981/82-85/86

In the period 1981/82 -1985/86 Arusha Region will aim at accomplishing the national objective of raising the life expectancy to 60 years by the year 2,000 by adhering to the following:

- a) Starting Village Health posts and servicing them.
- b) Expanding and strengthening preventive medicine and curative medicine presently available such as dispensaries, health centers, and hospitals and starting similar services where such services are not presently available.

Table 87: Services Before and After the Third Five Year Plan

<u>Project 1976/77</u>	<u>1980/81</u>	<u>Increase/Decrease</u>	
Hospitals	8	9	1
Dispensaries	86	158	72
Rural Health Centers	9	11	2
First Aid Boxes	-	1616	1616
Number of people per Hospital bed	735	849	114
Number of people per Health Center	89,000	84,407	-4,593
Number of people per dispensary	9,000	5,876	-3,124

Table 88: Services Built by the Government the Period of the Third Five Year Plan

Year	Dispensaries	Health Centers	Hospitals	First Aid Boxes
1976/77	6	3	-	16
1977/78	3	-	1	70
1978/79	4	1	-	75
1979/80	2	-	-	-
1980/81	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>
	16	4	1	161

\* Construction of 2 Health Centers has not been completed.

c) Improving education on nutrition, hygiene and general environmental cleanliness.

A total of Tshs. 20,902,000 are earmarked to be spent during this period to implement the following projects.

### 3.12 Projects of the Fourth Development Plan 1981/82 - 1985/86

#### Building of New Dispensaries-Tshs. 2,550,000/-

Arusha Region intends to build 17 new dispensaries to have a total of 175.

This will bring the number of people using one dispensary to 7,171 by 1985/86. The distribution of dispensaries is as follows: Arumeru-0, Monduli-4, Kiteto-4, Hanang-3, Mbulu-1, Ngorongoro-5.

Table 89: Building of New Dispensaries

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	3	5	5	4	17
Costs (Tshs."000)	-	450	750	750	600	2,550

Rehabilitation of Dispensaries-Tshs. 2,470,000/-

A total of 39 dispensaries will be rehabilitated through the renovation of old buildings. The district allocation is as follows: Monduli-8, Mbulu-10, Arumeru-8, Kiteto-6, Ngorongoro-6 and Hanang-6.

Table 90: Rehabilitation of Dispensaries

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	3	13	11	6	6	39
Costs (Tshs.000)	205	500	605	560	600	2,470

The Building of MCH Clinics-Tshs. 400,000/-

There are dispensaries which will be given these services so as to enable them to provide better services to all patients, including children and expectant mothers. A total of 4 clinics will be built during this period with the following distribution: Mbulu-1, Kiteto-1, Hanang-1, Ngorongoro-1.

Table 91: Building of MCH Clinics

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	1	1	1	1	4
Costs (Tshs.000)	-	100	100	100	100	400

First Aid Boxes-Tshs. 520,000/-

52 villages will be provided with first aid boxes as it is not possible to build a dispensary for every village in this five year period.

The boxes will be distributed as follows: Monduli-6, Mbulu-9, Arumeru-10, Ngorongoro-7, Kiteto-6 and Hanang-14.

**Table 92: First Aid Boxes**

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	14	14	12	12	52
Costs (Tshs.000)	-	140	140	120	120	520

**Building of Hospitals-Tshs. 2,800,000/-**

Two hospitals, one regional and one in the district headquarters of Kiteto, will be built during the five year period. The regional hospital will take the place of the present one which was built in 1926 and has very old buildings. Given the size of these hospitals, construction will be done in phases. The regional hospital will start in 1982/83 and the district in 1985/86.

**Table 93: Building of Hospitals**

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	1	-	-	1	2
Costs (Tshs.000)	-	1,200	-	-	1,600	2,800

**Rehabilitation of Hospitals-Tshs. 2,800,000/-**

In the five year period, four hospitals will be rehabilitated through major repairs to buildings, increase in the number of workers' quarters, increase in the amount of equipment, etc.

The hospitals to be rehabilitated are Mbulu-1, Kiteto-1, Monduli-1 and Arumeru-1.

Table 94: Rehabilitation of Hospitals

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	2	1	1	-	-	4
Costs (Tshs. 000)	700	900	1,200	-	-	2,800

Construction of Sleeping-Sickness Wards-Tshs. 320,000/-

Four sleeping-sickness wards will be built in Monduli District to provide services for sleeping sickness patients.

Table 95: Construction of Sleeping Sickness Wards

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	1	1	1	1	4
Costs (Tshs.000)	-	80	80	80	80	320

Mobile Health Clinics: Tshs. 1,000,000

In Arusha Region villages are separated by large areas and long distances. Given the fact that it will not be easy to begin services to all the villages at the same time, one way to serve these villages is to give them visiting health services from the district headquarters. Using vehicles with health services, these services can be taken to the villages. Two clinics will be started, one in Kiteto and one in Ngorongoro.

Table 96: Mobile Health Clinics

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	1	-	1	-	2
Costs (Tshs.000)	-	500	-	500	-	1,000

Improving Environmental Cleanliness in Towns-Tshs.  
2,160,000/-

One way of ensuring that people remain in good health is to have a program ensuring that diseases are not spread. This can be done by ensuring that the bacteria which spread diseases do not have breeding grounds or that they are destroyed as soon as they start growing so they do not reach the people. The region is thinking about developing methods of preserving good health by having enough equipment to collect sewage in special areas far from where the people stay. This includes the purchase of trucks for collecting sewage.

Table 97: Improving Environmental Cleanliness

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	-	1	1	1	3
Costs (Tshs.000)	-	-	720	720	720	2,160

Community Toilets-Tshs. 342,000/-

18 Public toilets will be built in the districts, 14 in Hanang and 4 in Mbulu. The aim is to emphasize and develop efforts to protect the people's health in the Region. Thus people can spend more time in productive activities:

Table 98: Community Toilets

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	6	4	4	4	18
(Tshs.000)	-	114	76	76	76	342

Building of Health Centers-Tshs. 800,000/-

One health center will be built in Kiteto District, and this will bring the number of health centers in the region to 12. With the population of the region having reached 1,256,036, this will bring the average per center to 104,470. This center will be built in 1985/86 at a cost of Tshs. 800,000/-.

Rehabilitation of Health Centers-Tshs. 1,320,000/-

8 health centers will be rehabilitated with major repairs to some of the buildings which have old walls, windows, floors, ceilings, etc.

The distribution of the centers is: Mbulu-2, Babati-3, Arumeru-3.

Table 99: Rehabilitation of Health Centers

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	2	1		2	1	8
Costs (Tshs.000)	270	220	230	400	200	1320

Workers' Quarters-Tshs. 2,400,000/-

In the Ministry of Health, as in other ministries, there has been an increase in the number of workers year after year, but the number of workers' quarters has remained the same. They have not increased proportionate to the increase in the number of workers. A few houses have been built whenever a dispensary or a health center has been built. In order to decrease the shortage of housing for workers which is acute in the region, the region plans to build 20 workers' quarters which include 2 in Ngorongoro, 2 in Monduli, 5 in Mbulu, 3 in Arumeru, 4 in Hanang and 4 in Kiteto.

Table 100: Workers' Quarters

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	5	5	5	5	20
Costs (Tshs.000)	-	600	600	600	600	2,400

Service to Health Projects-Tshs. 1,020,000/-

The size and number of health projects necessitates better planning for success. Implementation requires well prepared personnel, but they should as well have the necessary equipment for implementation. Otherwise the projects will just end up on paper without being implemented and bearing fruit. Moreover, when the equipment is available, it must be well maintained otherwise it will not last for the period it is supposed to last and provide the services it is supposed to provide. In general, health projects need equipment, safe places to store it, experts and technicians who will use the equipment, regular maintenance, etc. The region expects to get various equipment to ease the problem of communication and transport in the move to provide health services in its areas (see Table 101 and 102).

Water

3.13 Introduction

From the guidelines of the party and government concerning the distribution of clean water to the people, it was envisaged that by the end of the Third Five Year Development Plan 1976/77 - 80/81 people in the village should have a source of clean water not more than 5 kilometers away.

3.14 The Objectives of the Ministry

The water policy insisted that by the year 1991 every person, in spite of having a source of clean water within a distance of five kilometers, should now be only 400 meters from a source of clean water.

Table 101: Service to Health Projects

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	1 L/R 1 M/cycle	1 L/R 2 M/cycle	1 L/R 1 M/cycle	1 L/R 1 M/cycle	4 L/R 5 M/cycles
Costs (Tshs.000)		235	315	235	235	1,020

Annual Allocations 1981/82-1985/86

Year	Money Tshs.
1981/82	1,175,000/-
1982/83	5,039,000/-
1983/84	6,416,000/-
1984/85	4,141,000/-
1985/86	4,131,000/-
Total	20,902,000/-

In its implementation, the aim of the ministry has been to try to reach the target and also to provide water to 4,581,642 livestock by emphasizing research on river water sources, springs, ponds, boreholes, and shallow wells (see Table 103).

Table 102: Ratio of Health Services to People in the Region

District	No. of People Per Bed	No of People Per H/Center	No. of People Per Dispensary
Municipal	370	86,845	3,102
Arumeru	2,975	119,010	8,501
Hanang	1,836	77,097	8,260
Kiteto	-	59,790	3,737
Mbulu	474	96,888	8,074
Monduli/Ngorongoro	990	59,378	6,598

Table 103: Water Services in Villages and the Number of People Who Get Water

District	Tap Water	Bore Holes	Shallow Wells	Dams	Other Kind of Water	Without Water
Arusha	10,585	-	-	-	26,594	-
Arumeru	151,141	2,585	2,109	-	67,484	12,404
Hanang	68,347	6,348	7,291	-	92,399	44,148
Kiteto	10,486	15,006	4,381	8,031	11,136	8,129
Mbulu	61,826	9,368	13,087	-	78,140	27,570
Monduli	35,772	5,805	-	8,477	-	16,604
Ngorongoro	17,742	1,493	-	1,608	18,694	7,494
Total	355,899	40,605	26,868	18,116	294,447	116,349

At the end of the Third Five Year Plan, out of a total of 855,284 people living in villages a total of 444,488 (52%) get clean water through reliable sources, and a total of 410,796 (48%) do not get reliable water.

For the whole region, a total of 517,682 (55%) are getting clean reliable water at the end of the third plan (1980/81) compared to 38% who were getting clean reliable water at the beginning of this plan in 1976/77.

With commendable progress in the provision of water in towns and villages, the region could not reach the target of providing each person with water services at an average distance of 5 kilometers.

### 3.15 Expenditure

In the Third Five Year Development Plan, the Ministry of Water spent a total of Tshs. 12,260,815.35 to implement various water projects in the region.

Table 104: Annual Expenditure 1976/77-1980/81

<u>Year</u>	<u>Money Approved Tshs.</u>	<u>Expenditures</u>
1976/77	2,010,000	1,895,921.70
1977/78	2,835,000	2,777,302.25
1978/79	3,527,000	3,638,320.75
1979/80	1,615,000	1,645,267.65
1980/81	<u>2,454,000</u>	<u>2,304,000.00</u>
Total	12,441,000	12,260,812.35

### 3.16 The Fourth Five Year Development Plan 1981/82 - 85/86

#### Introduction

Projects of the Ministry of Water in the Fourth Five Year Plan will cost a total of Tshs. 35,525,000/-.

### 3.17 The Objectives of the Ministry

In the Fourth Five Year Development Plan, the Ministry plans to make sure that a total of 410,796 people living in villages, i.e. about 48% of all residents in villages, get clean reliable water by the year 1986 as follows:

- i) To make sure that 63 villages which do not have water sources within a distance of 5 kilometers get water sources by the end of the fourth plan.
- ii) To improve natural water sources so that the villages which depend on these natural sources can get clean water from them.
- iii) To rehabilitate and expand the 30% of the water services in the region which do not provide a clean and adequate water supply.

### 3.18 Projects of the Fourth Five Year Development Plan

In the next five year period 1981/82 - 1985/86, the Ministry expects to implement five water projects in order to complete the plan of providing clean water to all the residents in the region as follows:

Table 105: Number of Villages where Water Services Are to be Implemented 1981/82-1985/86

Year	Rehabilitation	Surveying & Plans	Piped Water System	Bore Holes	Shallow Wells
1981/82	1	16	5	7	-
1982/83	8	13	3	5	7
1983/84	6	10	8	3	7
1984/85	9	12	2	2	7
1985/86	<u>7</u>	<u>12</u>	<u>2</u>	<u>1</u>	<u>10</u>
Total	31	63	20	18	31

Table 106: Number of Villages Per District where Services are to be Implemented 1981/82-85/86

District	Rehabilitation	Surveying & Plans	Piped Water System	Bore Holes	Shallow Wells
Arusha	-	-	-	-	-
Arumeru	-	7	6	2	-
Hanang	3	21	3	1	15
Kiteto	4	8	3	8	-
Mbulu	14	13	1	1	16
Monduli	2	10	5	5	-
Ngorongoro	<u>8</u>	<u>4</u>	<u>1</u>	<u>1</u>	<u>-</u>
Total	31	63	20	18	31

### 3.19 Annual Implementation of Projects 1981/82-85/86

1. Rehabilitation of Water Systems in the Region-Tshs. 6,100,000/-

The aim of this project is to rehabilitate existing water systems in the region so that they can provide more water for the people who are being served. The ministry will spend a total of Tshs. 6,100,000 in the five year period (see Table 107).

2. Surveying and Plans-Tshs. 1,860,000/-

The aim of this project is to develop surveys for clean water sources in the region such as boreholes, shallow wells, springs, dams, etc. so that they can be improved to provide the villagers with clean water. The ministry will spend a total of Tshs. 1,860,000/- in the five year period as follows to do surveys and plans for villages water sources (see Table 108).

3. Piped Water-Tshs. 14,950,000/-

The aim of this project is to provide the people with clean piped water from sources of clean water which have been developed like springs, boreholes, etc. The ministry will spend a total of Tshs. 14,950,000/- to implement this project (see Table 109).

4. Boreholes-Tshs. 11,840,000

The aim is to drill bore holes and provide villagers with clean piped water from boreholes. The region will spend a total of Tshs. 11,840,000 in this activity (see Table 110).

5. Shallow Wells-Tshs. 775,000/-

The aim of this project is to provide the people with water from shallow wells at a total cost of Tshs. 775,000/- (see Table 111).

Table 107: Rehabilitation of Water Systems

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (villages)	1	8	6	9	7	31
Costs (Tshs. 000)	400	1850	1150	1450	1250	6,100

Table 108: Surveying and Plan

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (villages)	16	13	10	12	12	63
Costs (Tshs. 000)	250	300	360	430	520	1860

Table 109: Piped Water

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (villages)	5	3	8	2	2	20
Costs (Tshs. 000)	1750	1900	4400	4100	2800	14950

Table 110: Boreholes

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (villages)	7	5	3	2	1	18
Costs (Tshs. 000)	2440	2700	2900	2100	1700	11840

Table 111: Shallow Wells

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (villages)	-	7	7	7	10	31
Costs (Tshs. 000)	-	175	175	175	250	775
<u>Annual Implementation</u>						
Year	Money Tshs.					
1981/82	4,840,000					
1982/83	6,925,000					
1983/84	8,985,000					
1984/85	8,255,000					
1985/86	6,520,000					
Total	35,525,000					

## Culture and Youth

### 3.20 Introduction

The Ministry of Culture and Youth did not have any development project in the Third Five Year Plan 1976/77 - 1980/81.

### 3.21 The Fourth Plan

#### Objectives

To develop and make permanent the cultural activities of youths in the region by:

- Preserving art, documents and museums portraying our national culture.
- Researching traditions and customs of some of the residents of Arusha.
- Helping the youth with their economic activities.

To achieve these objectives, the following projects are suggested at a total cost of Tshs. 3,930,000/-.

### 3.22 Projects of the Fourth Plan 1981/82-1985/86

#### 1. Developing the Youth-Tshs. 96,000/-

The aim of this project is to help 40 youths of Endasak Village in Hanag to cultivate 48 hectares of maize and fruits. This project will be implemented in Hanang District in 1981/82 and it is estimated to cost Tshs. 96,000/-.

#### 2. Building of Cultural Centers-Tshs. 656,000/-.

To date the region does not have any cultural centers which are important in the development and strengthening of art. The aim of this project is to build four cultural centers in the following districts:

- |    |         |   |
|----|---------|---|
| 1. | Arumeru | 1 |
| 2. | Hanang  | 1 |
| 3. | Mbulu   | 1 |
| 4. | Monduli | 1 |

Table 112: Building of Cultural Centers

	81/82	82/83	83/84	84/85	85/86	Total
Centers	-	1	1	1	1	4
Costs (Tshs. 000)	-	112.0	179.0	180.0	185.0	656.0

#### 3. Building of Information and Documentation Centers-Tshs. 199,000/-

The aim of this project is to build a center for the preservation of various regional minutes and documents. This center will be built in Arusha. The project will be implemented in 1985/86 and it has been estimated to cost Tshs. 199,000/-

4. Research on Customs and Traditions-Tshs. 2,979,000/-

The aim of this project is to do research on the customs and traditions of three societies in this region. The societies to be researched are the Wahadzabe, Wasonjo, and Wandorobo. To facilitate this research, research equipment and one vehicle will be bought (see Table 113).

Table 113: Research of Customs and Traditions

Year	81/82	83/84	84/85	85/86	Total
Target	Purchase of one Landrover and research equipment for initial research on one society	Purchase research equipment for initial research on one society and inten. research on one society	Purchase research equipment for initial research on one society and inten. research on another	Purchase research equipment and inten. research on one society	
Costs (Tshs. 000)	1,180.0	984.0	590.0	225.0	2,979.0

Table 113A: Annual Expenditures of Ministerial Funds 1985/86

Year	Money Tshs.
1981/82	96,000
1982/83	1,292,000
1983/84	1,163,000
1984/85	770,000
1985/86	<u>609,000</u>
Total	3,930,000

PART FOUR  
ECONOMIC INFRASTRUCTURE SECTORS

Works

4.0 Introduction

This department deals with:

- a) Construction of new roads, rehabilitation of existing roads and construction of bridges.
- b) Building and supervising the building of government quarters and also rehabilitating the existing houses.
- c) Maintenance of government vehicles and equipment.

4.1 The Objectives of This Ministry Under the Third Plan

Apart from other common activities of this ministry, the objectives of this ministry in the Third Five Year Plan were as follows:

- a) To reduce transportation problems especially in villages through the construction and rehabilitation of roads. To realize this objective the region had planned to build and rehabilitate 1232 kilometers of roads. This total does not include roads which were to have been built or rehabilitated through self-help. Concerning roads in towns, the region planned to improve existing roads and also to build new roads whenever there was a necessity.
- b) To construct bridges across big rivers.
- c) To rehabilitate old buildings and build new ones.
- d) To strengthen workshops and building brigades.
- e) To construct district headquarters for Kiteto and Hanang.

4.2 Implementation of the Third Plan

- a) Roads: At the beginning of the third plan the region had roads measuring 1561 kilometers. During the period of the third plan, the region planned to increase the

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length of these roads by 1232 kilometers. By the end of the third plan, the length of regional roads was 4562 km., 504 km. of main roads, 1360 km. of regional roads, and 2698 km. of district roads. During the whole period there have been an increase of 3001 kilometers. Out of this length 660 km. have been built by development funds from the region and 2341 km. has been built by either money from the ministry or through self-help in villages.

The construction and rehabilitation of roads went hand in hand with construction of bridges and culverts.

- b) Headquarters: The construction of district headquarters for Kiteto and Hanang was completed in the third plan. Also the construction of the headquarters of Ngorongoro District which was started in this period will continue during the fourth plan.
- c) Various services: During this period various services were strengthened.
- The Fire Brigade Center in Arusha was strengthened by buying vehicles and increasing working equipment.
  - Three markets were built.
  - Workshops were strengthened by being provided with work equipment.
  - A total of 77 government quarters were electrified. Street lights were installed in some streets in Arusha.
  - Building brigades were strengthened by providing them with vehicles and working equipment.

#### 4.3 Implementation of the Projects of the Third Plan 1976 - 1980/81

##### 1. Roads in Rural Areas: Tshs. 2,009,000/=

The aim of this project was to improve and repair a total of 470 kilometers and to build 4 bridges, 7 culverts, and 1 drift as follows at a total cost of Tshs. 2,009,000/-.

Table 114: Roads in Rural Areas

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	233 km	-	168 km 4 bridges 7 culverts 1 drift	-	831 km	1232 Km 4 bridges 7 culverts 1 drift
Implementation	355 km	-	100 km 7 culverts 1 drift	-	205 km	660 km 7 culverts 1 drift
Cost (Tshs.000)	692,492	-	1,400,489	-	387,172	2,480,153

2. Roads in Towns: Tshs. 364,610/=

The aim of this project in the third plan was to improve 5,800 ft of roads, to clean and put culverts in 410 meters of furrows and to make a furrow of 2 km for sewage at a cost of Tshs. 364,610/-.

Table 115: Roads in Towns

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	5800 Ft.	410 meters 5 culverts	2 Km.	-	-	-
Achieved	9100 Ft.	410 meters 5 culverts	130 meters	-	-	-
Costs	321,807	612,399	14,075	-	-	948,281

3. Construction of District Headquarters: Tshs. 2,207,500/-

The aim of this project was to build and complete the headquarters of Kiteto and Hanang and to build stages one and two of Ngorongoro district headquarters at a total cost of Tshs. 2,207,500/- (see Table 116).

Table 116: Construction of District Headquarters

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	Completing 10 houses 10 offices Kiteto	4 Houses Hanang	Head- quarters Kiteto	Stage I Ngorongoro	Stage II Ngorongoro	
Achieved	Completion 10 houses 10 offices Kiteto	4 houses Hanang	Head- quarters Kiteto	Purchase of equip- ment only	Surveying of grounds and pur- chase of equipment	
Costs (Tshs.000)	350,390	372,456	58,538	120,985	771,705	1,674,074

4. Fire Brigade in Arusha: 224,000/-

The target of this project was to build two parking rooms and purchase two radio calls at a total cost of Tshs. 224,000/- as follows:

Table 117: Fire Brigade

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	2 rooms 2 radios	- -	- -	- -	- -	2 rooms 2 radios
Achieved	2 rooms	-	-	-	-	2 rooms
Costs (Tshs.000)	225,473	-	-	-	-	225,473

5. Electrification of Government Quarters Tshs. 280,000/-

The target of this project was to electrify a total of 93 government quarters at a total of Tshs. 280,000/- (see Table 118).

6. Street Lights Tshs. 281,000/-

The aim of this project is to electrify three streets in Arusha Town and fit 36 street lights in Monduli town at a total cost of Tshs. 281,000/- (see Table 119).

7. Building of Markets: Tshs. 265,000/-

The aim of this project is to build one large market at Kibaya and two small markets in Arusha town at a total cost of Tshs. 265,000/- (see Table 120).

8. Building Brigades: Tshs. 940,000/-

The aim of this project is to strengthen the existing brigades by buying 6 vehicles and constructing one store at a total cost of Tshs. 940,000/- (see Table 121).

Table 118: Electrification of Government Headquarters

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	24	40	-	-	29	9
Achieved	24	24	-	-	29	77
Costs	130,034	96,945	-	-	49,433	276,412

Table 119: Street Lights

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	-	electrify 3 streets	36 lights Monduli	-	-	electrify 3 streets 96 lights
Achieved	-	95%	36 lights	-	-	95% and 36 lights
Costs (Tshs. 000)	-	244,055	29,365	-	-	273,420

Table 120: Building of Markets

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	3	-	-	-	-	3
Achieved	Phase I Kibaya 1 market Arusha	-	Phase II Kibaya 1 market Arusha	-	-	3
Costs (Tshs. 000)	149,413		124,943	-	-	274,356

Table 121: Building Brigades

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	-	5 vehicles	1 store 1 vehicle	-	-	6 vehicles 1 store
Achieved	-	2 vehicles	1 vehicle & 1 store	-	-	3 vehicles 1 store
Costs (Tshs. 000)	-	544,478	420,068	-	-	964,546

9. Technical Workshops: Tshs. 145,000/-

The aim of this project is to strengthen technical workshops by adding working equipment at a total cost of Tshs. 145,000/-.

Table 122: Technical Workshops

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	-	-	Purchase of equipment	-	Purchase of equipment	-
Achieved	-	-	Purchase of equipment	-	Purchase of equipment	-
Costs (Tshs. 000)	-	-	118,499	-	79,546	198,045

10. Construction of Brigades: Tshs. 1,754,000/-

The aim of this project is to build one bridge and 11 culverts at a total cost of Tshs. 1,754,000/- (see Table 123).

Table 123: Construction of Bridgades

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	-	-	-	-	1 bridge 11 culverts	-
Achieved	-	-	-	-	8 culverts 1 bridge	
Costs (Tshs. 000)	-	-	-	-	1,324,069	1,324,069

#### 4.4 Summary of Expenditures For Works

See Table 124.

Table 124: Summary of Expenditures for Works

Year	76/77	77/78	78/79	79/80	80/81	Total
Money						
Authorized	1,754,000	1,941,000	1,661,000	517,500	3,206,000	9,079,500
Expenditures	1,720,196	2,019,746	2,165,977	120,985	2,611,925	8,638,829

#### 4.5 Problems

Implementation of the plan faced the following problems:

- a) Lack of working tools
- b) Lack of construction equipment
- c) Lack of project supervisors, especially road foremen

#### 4.6 Fourth Plan

##### Aims and Objectives

- a) To carry on efforts to reduce the problems of transportation by building 709 km. of new roads and improving 915 km. of old roads. Working equipment will also be bought.

- b) To reduce the problem of lack of offices and workers' quarters by building 30 workers' quarters, building Headquarters of Kiteto District (Engasmet), completing the headquarters of Ngorongoro District (Wasso) and expanding the regional headquarters.
- c) To strengthen transportation services and communications by building and strengthening technical workshops and 4 radio call centers.
- d) To strengthen services related to markets and accommodation by building 2 markets and 4 rest houses.

To implement these targets the region has planned to spend Tshs. 58,778,000/- during the period of the five year plan in order to implement the following projects.

#### 4.7 Projects of the Fourth Five Year Plan

##### 1. Roads in Rural Areas: Tshs. 23,477,000/-

The aim of the project is to improve 915 km. of roads and to construct 709 km. of new roads under the RIDEP project 586 km. of roads will be constructed in Mbulu, Arumeru and Hanang Districts. To serve road construction projects 20 tippers will be bought. See Table 125 for the distribution of road construction, vehicles, etc. per district.

##### 2. Construction of Bridges: Tshs. 13,618,000/-

The aim of the project is to construct 38 bridges and to rehabilitate 41 bridges. This project will be implemented on all the roads earmarked for improvement and construction during this period.

Table 126: Construction of Bridges

District	Bridges To Be Rehabilitated	New Bridges To Be Built
Arumeru	6	4
Mbulu	8	2
Hanang	8	2
Monduli	10	11
Kiteto	4	11
Ngorongoro	<u>5</u>	<u>8</u>
Total	41	38

Table 125: Roads

District	Roads To Be Improved (km)	New Roads (km)	Tippers			
Arumeru	75	15	3			
Hanang	136	40	3			
Mbulu	96	40	3			
Monduli	211	229	3			
Kiteto	193	240	3			
Ngorongoro	204	145	3			
Region	-	-	2			
Total	915	709	20			

Costs and Annual Targets						
Project	81/82	82/83	83/84	84/85	85/86	Total
Roads to be improved (km)	146	223	226	180	140	915
New Roads (km)	-	140	136	151	282	709
Tippers	-	6	5	5	4	20
Costs	762	5,786	5,850	5,908	5,171	23,477

Table 127: Purchases Required to Construct Bridges

District	L/Rover	LWB Lorry	Concrete Mixer
Monduli	1	-	-
Arumeru	1	-	-
Mbulu	1	-	-
Kiteto	1	1	-
Ngorongoro	1	1	-
Region	-	1	1
Total	5	3	1

Costs and Annual Targets

Projects	81/82	82/83	83/84	84/85	85/86	Total
New bridges	-	12	8	9	9	38
Bridges to rehabilitate	2	8	10	13	8	41
Equipment	2 lorries	1 lorry 2 l/rovers	2 l/rovers	1 l/rover 1 con/mixer	3 lorries 5 l/rovers 1 con/mixer	
Costs	270.0	4,270.0	3,072.0	3,000.0	3,005.0	13,618.0

3. Technical Workshops: Tshs. 2,032,000/-

The aim of this project is to strengthen district and regional workshops by providing them with working equipment and building new workshops in Kiteto, Ngorongoro, and Arumeru (see Table 128).

4. Building of Markets: Tshs. 800,000/-

The aim of this project is to build one market at Karatu in Mbulu District and one market at Mto wa Mbu. These are important business centers which need these services (see Table 129).

5. Construction of District Headquarters and Expansion of Regional Headquarters Tshs. 8,950,000/-

Table 128: Technical Workshops

District	Strengthening Workshops	New Workshops
Arumeru	-	1
Hanang	1	-
Mbulu	1	-
Monduli	1	-
Kiteto	-	1
Ngorongoro	-	1
Region	1	-
Total	4	3

## Annual Costs and Targets:

Project	81/82	82/83	83/84	84/85	85/86	Total
Strengthening workshops	Phase I-4	-	-	Phase II-3	Phase II-1	4
New workshops	-	Phase I-3	Phase II-3	-	-	3
Costs (Tshs.000)	366.0	586.0	520.0	340.0	220.0	2,032.0

Table 129: Building of Markets

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	Karatu Mto wa ribu Phase I	Karatu Mto wa ribu Phase II	-	-	2
Costs	-	350.0	450.0	-	-	800.0

The aim of this project is to complete the construction of Ngorongoro district headquarters which started in 1979/80 and secondly to build the new headquarters of Kiteto at Engasmet and expand the regional headquarters (see Table 130).

6. Electrification of Government Quarters: Tshs. 600,000/-

The towns of Monduli and Babati have been provided with electricity by TANESCO. The town of Mbulu has a generator which will be used to provide electricity for government quarters. The target of this project is to electrify 60 government quarters (see Table 131).

7. Workers' Quarters: Tshs. 7,271,000/-

About 70% of government servants in Arusha Region do not have accommodation. The aim of this project is to build 30 houses in order to reduce this problem. Out of these houses, many will be built in Ngorongoro and Kiteto Districts where the construction of district headquarters goes on (see Table 132).

8. Radio Calls: Tshs. 1,080,000/-

The aim of this project is to build (4) radio call centers to ease communication problems between districts and the region and between districts. These centers will be built in districts which are far from the regional headquarters (see Table 133).

9. Building of Rest Houses: Tshs. 950,000/-

The aim of this project is to build four rest houses to accommodate government workers on official duty who visit towns with no quest houses (see Table 134).

See Table 135 for a summary for the annual estimates for Works.

## Lands

### 4.8 Objectives of the Ministry Under the Third Five Year Plan

The Third Five Year Plan had the aim of developing the growth of towns through the clearing and surveying of 4,680 plots and the drawing of maps. Also, from the response of the

Table 130: Construction of District Headquarters and Expansion of Regional Headquarters

Year	81/82	82/83	83/84	84/85	85/86	Total
Targets	Ngorongoro	Ngorongoro Regional Block	Regional Block	Kiteto Regional Block	Kiteto Regional Block	3
Costs (Tshs.000)	600.0	2,950.0	2,400.0	1,000.0	2,000.0	8,950.0

Table 131: Electrification of Government Headquarters

District	Houses
Monduli	12 Houses
Babati	28 houses
Mbulu	20 houses

Annual Costs and Targets:

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (houses)	12	20	28	-	-	60
Costs (Tshs.000)	59.0	220.0	321.0	-	-	600.0

Table 132: Workers' Quarters

Region	6
Aurmeru	1
Hanang	1
Mbulu	1
Monduli	1
Kiteto	10
Ngorongoro	10

Costs and Annual Targets:

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	8	8	7	7	30
Costs (Tshs.000)	-	2,722.0	1,825.0	1,319	1,405.0	7,21.0

Table 133: Radio Calls

District	Center
Ngorongoro	1
Kiteto	1
Hanang	1
Mbulu	1

Targets and Annual Costs:

Year	81/82	82/83	83/84	84/85	85/86	Total
Centers	-	1	1	1	1	4
Costs (Tshs.000)	-	270.0	270.0	270.0	270.0	1,080.0

Table 134: Building of Rest Houses

Kiteto	1
Mbulu	1
Ngorongoro	1
Hanang	1
<b>Total</b>	<b>4</b>

Annual Costs and Targets:

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	-	1	1	1	1	4
Costs (Tshs.000)	-	200.0	200.0	250.0	300.0	950.0

Table 135: Summary of Annual Estimates for Works

Year	Money
1981/82	2,058,000
1982/83	17,354,000
1983/84	14,908,000
1984/85	12,087,000
1985/86	12,371,000
<b>Total</b>	<b>58,778,000</b>

people to living together in villages, the plan had the objective of surveying 259 villages for various activities such as livestock keeping, agriculture, commerce and industry, residences, and various other services in order to ascertain better land use.

#### 4.9 Project Implementation

##### 1. Surveying of Areas/Plots in Rural Areas

During the five year period, the region planned to survey 259 villages. By the end of June 1981 111 villages had been surveyed which is equal to 43% of the target. See Table 136 for the schedule of annual implementation.

##### 2. Clearance and Development of Plots in Towns

The region had planned to survey 4,680 plots in Arusha town and the district towns. By the end of the third plan, 3,579 plots had been surveyed. This is equal to 76.5% of the target plots.

Table 137 shows how the annual surveying of plots in towns was implemented.

#### 4.10 Obstacles Which Influenced the Implementation of Ministerial Projects

The main problems which influenced the implementation of land projects are:

1. Lack of adequate means of transport and equipment which is imported.
2. Lack of personnel, given the amount of work which is to be done in this sector.
3. Development of plans very much relies on the payment of compensation. The funds allocated for these activities are not sufficient and thus this becomes a problem as far as the development of plots is concerned.

Table 136: Surveying of Plots in Rural Areas

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	60	75	48	-	76	259
Implementation	12	23	43	-	33	111
% of Implementation	20	31	89	-	43	43

Implementation Costs:

Amount voted	188.0	903.3	566.0	288.0	670.0
Expenditures	188,198.0	903,507.0	626,482.0	4,767.0	55,334.0

Table 137: Clearance and Development Plots

Year	76/77	77/78	78/79	79/80	80/81	Total
Target	710.000	700.000	950.000	1,800.000	520.000	4,680.000
Implementation	500.000	666.000	794.000	1,189.000	430.000	3,579.000
% of Implementation	70.400	95.000	83.600	66.000	82.700	76.500

Costs of Implementation:

Estimated	300.000	210.000	99.000	2,680.000	-	3,289.000
Spent	294.388	213.902	76.763	2,100.233	-	2,685.286

Table 138: Summary of Expenditure 1976/77-1980/81

Year	Authorized	Expenditures
1976/77	488,000.00	488,586.30
1977/78	1,113,000.00	1,117,409.15
1978/79	665,000.00	723,246.60
1979/80	2,908,000.00	2,105,000.00
1980/81	<u>670,000.00</u>	<u>530,000.00</u>
Total	5,844,000.00	4,958,242.00

#### 4.11 The Fourth Five Year Development Plan 1981/82-1985/86

##### Target

The objectives of the Fourth Five Year Development Plan have their base in the Third Five Year Development Plan. The aim of the fourth plan is to survey 180 villages in order to encourage better land use. The plan also has a target of surveying 2887 plots in district headquarters and minor towns in order to enable the towns to grow in a systematic manner.

#### 4.12 Proposed Projects

##### 1. Surveying of Plots in Villages: Tshs. 2,064,000/-

Arusha region has a total of 463 villages. Out of these villages, only 111 villages have been surveyed under the Third Five Year Plan. Thus at the end of the third plan 352 have not yet been surveyed. The aim of the region is to survey all the villages. But bearing in mind the regional implementation and financial capabilities, 180 villages will be surveyed within the five years of the fourth plan 1981/82 - 1985/86, 32 villages in Arumeru, 18 in Monduli, 27 in Hanang, 65 in Mbulu, 26 in Kiteto and 12 in Ngorongoro. Bearing in mind the obstacles which came to light during the implementation of the third plan, in order to achieve this target, the problem of transportation will be reduced by buying 2 landrover pickups (see Table 139).

Table 139: Surveying of Plots in Villages

Year	81/82	82/83	83/84	84/85	85/86	Total
Villages to be surveyed	24	37	39	41	39	180
Transportation	1 Landrover Pickup	1 Landrover Pickup	1 Landrover Pickup	-	-	2 Landrover Pickup
Costs	146,000	500,000	638,000	490,000	290,000	2,064,000

2. The Clearing and Developing of Plots in Towns Tshs.  
2,686,000/-

Arusha region has 3,241 plots which have been developed in towns which are district headquarters and minor towns. The number of plots which are being developed now in the towns is 1,331. But projections proportionate to the growth of these towns require 6,000 plots by the year 1985/86. Given the implementation capabilities of the region within the five year period of the fourth plan 5,772 plots will be surveyed, and to help the Ministry achieve this target, survey teams will be strengthened by buying the necessary survey equipment. Also, to alleviate transport problems, 1 Landrover and 2 lorries will be purchased (see Table 140).

See Table 140A for Summary of Ministerial Expenditures 1981/82-1985/86.

### Community Development Ministry

#### 4.13 Introduction

In the Third Five Year Development Plan, there were no clear aims and objectives in the implementation of the activities of this ministry. The projects being implemented are those of Ujamaa and Co-operatives which are funded by the Regional Development Fund. For the whole five year period, the ministry put emphasis on training people in villages, especially village councils and shop managers, and starting village and cooperative shops. Also, various seminars were conducted in villages in order to raise economic standards, improve health, and bring success to activities connected with socialism and self-reliance in the region.

Table 140: Clearing and Developing Plots in Towns

Year	81/82	82/83	83/84	84/85	85/86	Total
Plots to be surveyed	1293	1120	1160	1042	1157	5772
Equipment	Equipment	1 Landrover	1 Lorry	1 Lorry	Equipment	1 Landrover 2 Lorries
Costs	215,000	550,000	630,000	941,000	350,000	2,686,000

Table 140A: Summary of Ministerial Expenditures for Lands 1981/82-85/86

Year	Allocation Tshs.
1981/82	361,000/-
1982/83	1,050,000/-
1983/84	1,268,000/-
1984/85	1,431,000/-
1985/86	640,000/-
Total	4,750,000/-

#### 4.14 Community Development Ministry

A special project which was also used to spread expertise and technology in villages was the building brigades. These brigades have been used to teach the people how to build better houses using cheap techniques and also using locally available materials. This project has been financed by the government for some time. It provides the necessary building and demonstration equipment. Also these brigades have been strengthened with vehicles so as to enable them to serve more villages (see Table 141).

Table 141: Community Development

Year	76/77	77/78	78/79	79/80	80/81	Total
Money Authorized	-	470,000	470,000	-	5,000,000	5,940,00
Expenditures	-	469,000	535,000	-	1,019,630	2,023,630

#### 4.15 The Fourth Plan

The projects which are being implemented will have the same objectives as in the third plan. The objective is to improve the people's ability to change their environment through courses and through demonstrations which will be copied by the villagers. Villages will also be given advice on how to start projects to raise economic standards. The projects to be developed are as follows:

1. To strengthen and expand building brigades Tshs. 2,656,000/-

Building brigades will be started in the three districts of Kiteto, Hanang, and Ngorongoro, and those of Mbulu, Monduli, and Arumeru will be strengthened. The main aim of this project is to build better houses in villages by supplying the brigades lorries and tippers for the distribution of building materials, vehicles for the supervision of projects, and equipment for various jobs such as masonry, carpentry, and iron works. Implementation is as follows:

Table 142: Strengthening Building Brigades

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (Brigades)	1	1	-	-	1	3
Costs (Tshs.000)	1556	700	-	-	400	2,656

2. Construction of Godowns: Tshs. 680,000/-

In the six districts of Arusha Region 46 godowns will be built within five years. The villages where the godowns are to be built have to take part through self-help, but they will also contribute a small amount of money. Implementation is as follows:

Table 143: Construction of Godowns

Year	81/82	82/83	83/84	84/85	85/86	Total
Target	6	10	10	10	10	46
Costs (Tshs.000)	400	70	70	70	70	680

3. Seminars in Villages: (for Villagers) Tshs. 4,619,000/-

The region will give seminars in accounting, the running and administration of shops in villages, and techniques of leadership and administration to field staff in villages, etc. The number of villagers/leaders to be taught is 1,800. Implementation is as follows:

Table 144: Seminars in Villages

Year	81/82	82/83	83/84	84/85	85/86	Total
Target Number of leaders and villagers	327	344	351	387	390	1,799
Costs (Tshs.000)	981	692	884	988	1,074	4,619

4. Improved Housing in Villages Tshs. 1,020,000/-

In the next five years, seminars will continue on the construction of better houses so that villagers can live in houses which help to raise their standard of health. Demonstration houses will be built in Monduli, Ngorongoro and Mbulu, districts.

See Table 145A for annual expenditures for Community Development.

Table 145: Improved Housing in Villages

Year	81/82	82/83	83/84	84/85	85/86	Total
Target (Houses)	1	4	4	4	4	17
Costs (Tshs.000)	60	240	240	240	240	1020

Table 145A: Annual Expenditure for Community Development 1981/82-1985/86

Year	Money (Tshs.)
1981/82	2,997,000.00
1982/83	1,702,000.00
1983/84	1,194,000.00
1984/85	1,298,000.00
1985/86	1,784,000.00
Total	8,975,000.00

## PART FIVE

## REGIONAL DEVELOPMENT FUND (RDF)

5.0 Objectives of RDF

The aim of the Regional Development Fund has always been to help with small projects dealing with production of income in the region and in the villages and also with emergency activities which influence production of income such as lack of sufficient seeds, floods, etc. In the Third Five Year Development Plan, 1976/77 - 1980/81, the region has spent a total of T.shs. 1,410,000/- to implement such projects.

In the next five year period, 1981/82-1985/86, the region expects to spend a total of T.shs. 4,657,000/- to implement 10 small scale income producing projects.

5.1 The Targets of the RDF Projects 1981/82 - 1985/86

See Table 146 for the targets of the RDF projects to be implemented in the fourth plan in the region from 1981/82 - 1985/86.

Table 146: Targets of RDF Projects

Year	81/82	82/83	83/84	84/85	85/86	Total
1. Construction of godowns	3	2	3	4	3	15
2. Regional farm (acres)	606	-	-	-	-	606
3. Workshop for tractor (RDF)	1	Equip.	Equip.	-	-	one and Equip.
4. Beekeeping (beehives)	40	80	40	120	150	430
5. Digging of shallow wells	1	1	1	1	3	7
6. Day care centers	1	Equip.	-	-	-	one and Equip.
7. Milling machines	1	1	1	2	-	5
8. Technical equipment	Equip.	-	-	-	-	Equip.
9. Emergency crops (acres)	1,000	1,500	1,800	2,000	2,000	8,300
10. Farm centers	-	3	3	2	-	8
<u>Expenditures</u>						
<u>Project</u>						
1. Construction of godowns	120	102	180	216	256	874
2. Regional farm	150	-	-	-	-	150
3. RDF tractor workshop	734	100	115	-	-	949
4. Beekeeping	40	92	50	160	200	542
5. Digging of shallow wells	40	50	65	225	344	724
6. Day care center	100	100	-	-	-	200

Table 146: (continued)

Year	81/82	82/83	83/84	84/85	85/86	Total
7. Milling machine	30	40	52	120	138	380
8. Technical school equipment	86.6	-	-	-	-	86.6
9. Emergency crops	50	60	100	131	70	411
10. Farm centers	<u>-</u>	<u>249</u>	<u>350</u>	<u>200</u>	<u>200</u>	<u>999</u>
Grand Total	1350.6	793	912	1,052	1,208	5,135.6

**PART SIX  
OPERATION BARBAIG**

**6.0 Introduction**

Operation Barbaig is a concern for Arusha Region, Dodoma, Singida, and Shinyanga. The aim is to settle 40,000 families in villages. This plan was formulated and implementation began in 1978/79. It was estimated to cost Tshs. 30,181,642 for all the regions.

Arusha Region estimated that to move 9,000 Barbaig families into 29 villages and to provide various services, the cost would be Tshs. 11,337,493. Given the large costs and implementation capabilities, it was proposed to implement the plan in three phases. Phase I 1978/79 was estimated to cost Tshs. 3,391,482, but the government authorized only Tshs. 2,868,461. Phase II was to be started in 1979/80 and to cost Tshs. 3,339,110, but that year only Tshs. 644,000 was authorized. Phase III was to cost Tshs. 4,546,000. Up to December 1979, Tshs. 1,653,000 had been provided, and Tshs. 1,619,359.00 had been spent. Money received to 1980 was Tshs. 3,130,500. These statistics show that the money authorized has been less than the targets set. In an effort to develop the Barbaig, the region has formulated the following projects at a cost of Tshs. 10,297,000.

**6.1 Mublu District**

(i) Livestock

Table 147: Construction of Crushes - Tshs. 80,000

<u>Year</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>Total</u>
Target	2	-	-	-	-	2
Costs (Tshs. 000)	50.0	30.0	-	-	-	80.0

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Table 148: Construction of Dips - Tshs. 592,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Dips	1	1	1	-	-	3
Costs (Tshs. 000)	230.0	127.0	145.0	-	-	502.0

Table 149: Workers' Quarters - Tshs. 50,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	1	-	-	-	1
Costs (Tshs. 000)	-	50.0	-	-	-	50.0

ii. Health

Table 150: Building of Dispensaries and Clinics - Tshs. 150,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	1	-	-	-	1
Costs (Tshs. 000)	-	150.0	-	-	-	150.0

Table 151: Building of Workers' Quarters - Tshs. 100,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	1	1	-	-	-	2
Costs (Tshs. 000)	50.0	50.0	-	-	-	100.0

(iii) Water

Table 152: Water Surveys - Tshs. 20,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target (Villages)	3	3	-	-	-	6
Costs (Tshs. 000)	10.0	10.0	-	-	-	20.0

Table 153: Boreholes - Tshs. 1,150,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	Phase I	Phase II	-	-	1
Costs (Tshs. 000)	-	450.0	700.0	-	-	1,150.0

Table 154: Shallow Wells - Tshs. 300,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	-	-	1	-	1
Costs (Tshs. 000)	-	-	-	300.0	-	300.0

Table 155: Completion of Water Systems - Tshs. 600,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	-	-	1	-	1
Costs (Tshs. 000)	-	-	-	600.0	-	600.0

(iv) EducationTable 156: Completion of Boarding Schools - Tshs. 500,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	1	1	-	-	-	2
Costs (Tshs. 000)	250.0	250.0	-	-	-	500.0

6.2 Hanang District(i) EducationTable 157: Construction of Classrooms - Tshs. 1,560,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	9	13	11	7	12	52
Costs (Tshs. 000)	270.0	390.0	360.0	330.0	210.0	1,560.0

Table 158: Teachers' Quarters - Tshs. 2,760,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	9	17	13	14	13	66
Costs (Tshs. 000)	360.0	680.0	640.0	560.0	520.0	2,760.0

Table 159: Building of Latrines - Tshs. 520,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	4	5	8	6	3	26
Costs (Tshs. 000)	80.0	100.0	160.0	120.0	60.0	520.0

(ii) Health

Table 160: Building of Dispensaries - Tshs. 400,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Targets	1	1	-	-	-	2
Costs (Tshs. 000)	200.0	200.0	-	-	-	400.0

Table 161: Patients Ward Katesh - Tshs. 265,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	1	-	-	-	1
Costs (Tshs. 000)	-	265.0	-	-	-	265.0

(iii) Water

Table 162: Rehabilitation of Gehandu Piped Water System - Tshs. 340,000

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Target	-	1	-	-	-	1
Costs (Tshs. 000)	-	1,340.0	-	-	-	1,340.0

Table 163: Sector Summary: Mbulu District

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Livestock	280.0	207.0	145.0	-	-	632.0
Health	50.0	200.0	-	-	-	250.0
Water	10.0	460.0	700.0	900.0	-	2,070.0
Education	250.0	250.0	-	-	-	500.0
Total	<u>590.0</u>	<u>1,117.0</u>	<u>845.0</u>	<u>900.0</u>	<u>-</u>	<u>3,452.0</u>

Table 164: Sector Summary: Hanang District

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Education	710.0	1,170.0	1,160.0	1,010.0	790.0	4,840.0
Health	200.0	465.0	-	-	-	665.0
Water	-	1,340.0	-	-	-	1,340.0
Total	<u>910.0</u>	<u>2,975.0</u>	<u>1,160.0</u>	<u>1,010.0</u>	<u>790.0</u>	<u>6,845.0</u>
Grand Total	1,500.0	4,092.0	2,005.0	1,910.0	790.0	10,297.0

**PART SEVEN  
DISTRICT DEVELOPMENT CORPORATIONS**

7.0 Objectives of the Third Plan

In the third plan, the aim of the region was to strengthen District Development Corporations in order to increase output and to make them produce a profit.

7.1 Implementation

In the third plan, implementation of the projects of some corporations was not satisfactory. Some projects were stopped during this period because they increased losses. Projects which showed signs of future progress were given more help. Due to lack of spare parts for various machines and lack of skilled workers some projects came to a standstill. So, in general, implementation was not good in the third plan.

Projects which were implemented in the third plan were as follows:

7.2 Hanadeco-Hanang

(a) Duduwera Farm:

Before 1976/77 coffee and pawpaws were grown on this farm. These crops were grown at a loss so serena was introduced. A total of 520 acres were grown in the 1976/77 and 1977/78 period and the harvest amounted to 3,275 bags worth Tshs. 294,750/-.

(b) Milling Machine:

This project has one machine which can produce between 20,000 and 25,000 kilos of flour a month. The machine also removes husks from maize. In a month it can process 15,000 to 20,000 kilos of maize and out of this between 5,000-8,000 kilos of husks can be obtained. The annual income of this project is Tshs. 396,000/-.

(c) Transport Project:

Income from this project is as follows:

1976/77	135,849.0
1977/78	264,508.15
1978/79	587,311.05
1979/80	266,178.20

7.3 Shiuki-Kiteto(a) Towel Making Project

The building is complete and machinery has been bought. Out of 20 machines, 17 have been installed. The factory is in the last stages of completion.

7.4 Shimamo-Monduli(a) Lolkisale Farm

Given the costs and drought the growing of beans was not successful. The corporation lost money because costs were not recovered.

(b) Petrol Station

Petrol stations could not be run because they did not make a profit. This project was closed in 1979.

(c) Milling Machines

The corporation has three milling machines but because of old age they have been running at a loss.

7.5 Arudeco-Arumeru(a) Agriculture Projects

From agriculture and livestock projects income has been as follows:

1978/79	463,203.50
1979/80	119,589.75
1980/81	331,044.10

(b) Sugar Factory

In the third plan work has been done to various stages including the buying of machinery.

7.6 Shuma-Arusha

Three projects have been implemented in the third plan. Out of the three two have not started functioning. Research has already been done on the Arusha Agro-Industrial Project. In the nail project, various equipment has been bought including machinery. It is only the chipping project which produces at

present. It processes 1,080 cubic feet of chipping every day and gives the corporation an annual income of Tshs. 1,350,000.

#### 7.7 Projects of the Fourth Five-Year Plan

- 1) The aim of the region in the Fourth Five-Year Plan is to strengthen projects of the district development corporations so as to make them earn a profit, to help the corporations get better qualified workers in order to achieve their targets, and whenever possible, to make sure that the corporations get working equipment for various machines.

Table 165: Targets of District Development Corporations

Corporation	Name of Project	1981/82	1982/83	1983/84	1984/85	1985/86
Shiuki	Towel Factory	-	-	-	-	-
	Factory for sawing logs	-	-	-	-	-
Shimamo	Farming-Lolkisale (acres)	1,300	1,300	1,300	1,300	1,300
	Milling Machine	-	-	-	-	-
	Factory for making spectacle frames	-	-	-	-	-
Arudeco	Coffee Project (bags)	1,050	1,634	2,072	2,212	2,212
	Livestock Project (cattle)	62	102	140	190	241
	Maize Project (acres)	500	500	500	500	500
	Beans Project (bags)	2,000	2,000	2,000	2,000	2,000
	Sisal Project (meters)	8,000	8,000	8,000	8,000	8,000
	Sugar Factory Project (tons)	-	-	1,500	1,500	1,500
Hanadeco	Dudumera Mixed Farming (acres)	450	600	600	600	600
	Milling and Husk removing machines (kilos)	500,000	500,000	500,000	500,000	500,000

Table 165: (continued)

Corporation	Name of Project	1981/82	1982/83	1983/84	1984/85	1985/86
	Transportation (trucks)	2	1	-	1	-
	Singu Estate (acres)	3,000	3,000	3,000	3,000	3,000
Shuma						
Arusha Agro-Industrial Project	Production of Animal Feeds (tons)	Half Year 20,000	40,000	40,000	40,000	40,000
	Production of Protein Concentrates for Animals (tons)	Half Year 7,500	15,000	15,000	15,000	15,000
	Piggery Units (pigs)	Half Year 4,750	9,500	9,500	9,500	9,500
	Slaughtering of Pigs (pigs)	Half Year 30,500	61,000	61,000	61,000	61,000
	Broilers (Broilers)	Half Year 240,000	480,000	480,000	480,000	480,000
	Slaughtering of Broilers (broilers)	Half Year 1,000,000	2,000,000	2,000,000	2,000,000	2,000,000
	Hatchery (chicks)	Half Year 1,000,000	2,000,000	2,000,000	2,000,000	2,000,000
	High quality Female Pigs (pigs)	Half Year 165	325	325	325	325

Table 165: (continued)

Corporation	Name of Project	1981/82	1982/83	1983/84	1984/85	1985/86
	Growing of Cereals (tons)	Half Year 11,000	22,000	22,000	22,000	22,000
	Production of Fertilizer (tons)	Half Year 2,850	5,700	5,700	5,000	5,700
Chipping Project	Production of Chippings (cubic feet)	Half Year 270,000	1,750,000	3,500,000	3,500,000	3,500,000

Table 166: Funds Estimated for District Development Corporations

Corporation	Name of Project	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Shiuki	Towel Factory	900,000	490,000	-	-	-	1,390,000
	Matress Cutting Factory	-	500,000	402,000	-	-	902,000
Shimamo	Lolkisale Farming	1,741,714	1,828,796	1,920,240	2,016,252	2,117,065	9,624,067
	Milling Machine	319,421	335,392	352,162	369,770	388,258	1,765,003
	Factory for Spectacle Frames	1,105,919	1,161,215	1,219,276	1,280,220	1,344,231	6,110,861
	Co-operative Headquarters	168,780	177,219	186,000	195,384	205,153	932,616
Arudeco	Coffee	500,130	540,834	574,890	582,098	-	2,197,952
	Livestock	254,118	266,369	250,595	271,663	186,550	1,239,295
	Maize	1,200,302	596,902	732,902	596,902	597,302	3,256,310
	Beans	515,588	487,588	487,588	487,000	515,588	2,493,940
	Sisal	186,410	186,410	186,410	86,410	186,410	932,050
	Sugar Factory	4,403,615	1,140,065	1,680,418	1,680,418	1,680,418	10,584,934
Hanadeco	Dudumera, Mixed Farming	-	285,500	246,250	110,000	60,000	701,750
	Husking and Milling Machine	-	106,000	-	-	-	106,000
	Transportation	-	700,000	-	400,000	-	1,100,000
	Singa Estate	-	-	1,690,000	-	-	1,690,000
Shuma	Chipping Project	4,416,000	-	-	-	-	4,416,000
	Arusha Argo-Industrial Project	-	9,800,000	9,888,000	12,960,000	8,152,000	40,800,000

Table 167: Subvention Needed for the Government to Accomplish District Development Corporation Projects 1981/82-1985/86 (Tshs.)

Corporation	Name of Project	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Shiuki	Towel Factory	900,000	285,000	-	-	-	1,185,000
	Factory for Cutting Logs	200,000	165,000	-	-	-	365,000
Shimamo	Farming Lolki-sale	400,000	327,000	327,200	229,000	120,000	1,403,200
	Milling Machine	-	-	-	-	-	-
	Factory for making Spectacle Frames	445,000	-	-	-	-	445,000
	Main Office	-	-	-	-	-	-
Aruceco	Coffee	400,000	300,000	-	-	-	700,000
	Livestock	100,000	200,000	-	-	-	300,000
	Maize	500,000	496,000	-	-	-	996,000
	Beans	300,000	240,000	187,588	-	-	727,588
	Sisal	-	180,000	-	-	-	180,000
	Sugar Factory	2,705,115	-	1,680,418	-	-	4,385,533
Shuma	Chipping Project	1,800,000	-	-	-	-	1,800,000
	Arusha Agro-Industrial Project	-	9,800,000	9,888,000	12,960,000	8,152,000	40,800,000
Hanadeco	Dudumera Mixed Farming	-	1,382,200	142,500	-	-	1,524,700
	Milling Machine	-	42,400	-	-	-	42,400
	Transportation	-	460,000	-	-	160,000	620,000
	Singe Estate	-	-	676,000	-	-	676,000
<b>Total</b>							<b>56,168,421</b>

**PART EIGHT  
VILLAGE PROJECTS**

**8.0 Introduction**

The region has the aim of making villages the focus of economic development. In order to realize this aim villages will start various productive and economic projects.

**8.1 Projects To Be Implemented 1981/82-1985/86**

**1. Joint Village Ranches**

At the end of the Third Five-Year Plan, the region had 4 Joint Village Ranches. The ranches are:

**Table 168: Joint Village Ranches**

<u>Ranches</u>	<u>Capacity Livestock</u>	<u>Livestock Present</u>
Leken (Monduli)	4,000	500
Embarwai (Ngorongoro)	3,000	1,000
Amei (Kiteto)	3,000	1,000
Olmoti (Kiteto)	3,000	-

Preparation of Olmoti (Kiteto) Ranch has not been finalized, and that is why it has no livestock. In the next five years, the region expects to start 7 Joint Village Ranches. Various services such as dips, water, workers' quarters, etc. will be paid for by the government.

The responsibility of the villages will be to pool cattle together. The ranches to be started are:

**Table 169: Ranches to be Started**

<u>Ranch</u>	<u>Capacity (Livestock)</u>
Tangayet (Monduli)	8,000
Mswakini (Monduli)	3,000
Ngarenaibor (Monduli)	5,000
Naberera (Kiteto)	8,000
Soitsambu (Ngorongoro)	3,000
Oldonyesambu (Ngorongoro)	3,000
<b>Total</b>	<b>30,000</b>

Table 170: Annual Costs and Targets of Village Ranches

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Targets	Running of Ranches	Running of Ranches	7 Bomas Running of Ranches	7 Bomas Running of Ranches	Running of Ranches	14 Bomas
		1,000 Cattle	-	5,000 Cattle	5,000 Cattle	11,000 Cattle
Costs Tshs. 000						
Government	120.0	120.0	160.0	160.0	400.0	960.0
TRDB	-	2,000.0	-	11,000.0	11,000.0	24,000.0

In the first five years of the plan, the main activities will be the preparation of ranches by providing them with services such as dips, crushes, water, etc. The costs of installing these services have been added to the projects which will be implemented by the Ministry of Planning. It is expected that by the year 1984/85 all the necessary services will have been installed in these ranches and livestock will be put in the ranches at that time.

### Other Expenses

Villages will contribute 1/3 of the cattle needed and TRDB will provide loans for buying 1/3 of the cattle to be fattened. The remaining 1/3 will be produced by the ranches. The costs of running the ranches until they are self-reliant will be provided by the government (see Table 170).

### 2. Village Communal Ranching

The region expects to have 80 villages which will start communal livestock keeping. The livestock keepers of the villages will pool their cattle and will take turns looking after the cattle.

### 3. Ox Carts

In the fourth plan, in order to alleviate the problems of transporting inputs and crops to and from the villages, the region aims to provide villages with ox carts at low prices.

The technique of making ox carts has been introduced to the districts under the Ministry of Community Development through the help of the APVDP. The region also expects corporations such as CDTF and OXFAM to participate in this activity.

Table 171: Ox Carts

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Sponsor						
OXFAM	-	20	20	35	45	120
CDTF	-	40	45	60	75	220
Villages						
Capabilities	-	30	35	40	50	155
APVDP	<u>20</u>	<u>45</u>	<u>60</u>	<u>50</u>	<u>50</u>	<u>225</u>
Total	20	135	160	185	220	720

#### 4. Village Slaughter Facilities

From the village revenue act of 1979, villages are authorized to run and collect revenue from slaughter facilities. In order for the villages to be able to get this revenue, 168 slaughter facilities will be built and supervised by villages themselves as follows:

Table 172: Village Slaughter Facilities

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Slaughter Facilities	18	20	30	40	60	168
Costs (Tshs. 000)	180	200	300	400	600	1,680

#### 5. Village Godowns

During this period of five years, the target is for each village to have a godown for storing future food crops. A total of 198 godowns will be built by villages through help from various corporations i.e., C.O.T.F., OXFAM, TRDB, and W.F.P. projects as follows:

Table 173: Village Godowns

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
CDF	-	6	8	10	10	34
OXFAM	5	5	5	5	5	25
Villages	5	4	4	4	4	21
TRDB	10	10	10	10	10	50
W.F.P.	-	-	10	10	-	20
APVDP	<u>8</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>48</u>
Total	28	35	47	49	39	198

## 6. Village Farms

Given the situation in the region, many villages have nowhere to expand their Ujamaa farms especially in Arumeru and Mbulu. In Kiteto and Ngorongoro districts emphasis has been laid on livestock rearing. Still the region expects to have 15,125 acres cultivated communally by 1985/86 as follows:

Table 174: Village Farms

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Villages	200	200	230	264	300	300
Acres	10,000	10,000	11,500	13,225	15,125	15,125

## 7. Planting Trees

The aim of this project is to encourage the planting of trees in villages following the national campaign to plant trees whenever possible. All 463 villages will plant trees in an area of 1,400 acres and each village will be expected to have an average of three acres by 1985/86. Annual tree planting activities are as follows:

Table 175: Planting Trees

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Villages	63	100	200	100	-	463
Acres	189	300	600	300	-	1,399
Trees	132,200	210,000	420,000	210,000	-	972,000

**PART NINE  
PARASTATALS AND NATIONAL PROJECTS**

**9.0 Parastatals**

There are a total of 29 parastatals in the region; half of those are income producing and the remaining are service providers.

At the time this plan was prepared many parastatals had not completed their plans and claimed their plans would only be available after they were reviewed by their board of directors. In any case, parastatals are special centers for producing income, and they are important contributors to the income of Arusha Region.

**9.1 National Projects**

In the Fourth Five-Year Plan, the region is expected to implement three projects as follows:

1. Primary Education-Tshs. 19,693,400/=

The World Bank is expected to construct a total of 198 classrooms, 33 stores and staffrooms, 99 teachers' quarters, and 66 toilets at a total cost of Tshs. 19,693,400 by 1985/86. The implementation of this project is as follows:

(i) Building of Classrooms-Tshs. 7,920,000/=

A total of 198 classrooms will be build in several districts in the region and annual implementation is as follows:

**Table 176: Building Classrooms**

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Classrooms	-	30	45	50	73	198
Costs (Tshs. 000)	-	1,200	1,800	2,000	2,920	7,920

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(ii) Building of Stores and Offices-Tshs. 1,326,400/=

During this period, the World Bank will pay for the building of 33 offices and stores at a total cost of Tshs. 1,326,400 and annual implementation is as follows:

Table 177: Building of Stores and Offices

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Stores and Offices	-	5	8	10	10	33
Costs (Tshs. 000)	-	250	300	380	396.4	1,326.4

(iii) Building of Teachers' Quarters-Tshs. 8,900,000/=

A total of 99 teachers' quarters will be paid for by the World Bank during this period at a cost of Tshs. 8,900,000 and annual implementation will be as follows:

Table 178: Building of Teacher's Quarters

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
House	-	15	25	29	30	99
Costs (Tshs. 000)	-	1,200	1,500	2,900	3,300	8,900

(iv) Building of Latrines-Tshs. 1,547,000/=

The Bank will also pay for the construction of 66 school latrines at a total cost of Tshs. 1,547,000 during the period of the Fourth Five-Year Development Plan. Annual implementation is as follows:

Table 179: Building of Latrines

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Latrines	-	10	15	19	22	66
Costs (Tshs. 000)	-	190	285	456	616	1,547

## 2. Health

### (i) Regional Hospital-Tshs. 200,000,000/=

The region, through the efforts of its residents and voluntary sponsors, expects to build in phases, depending on the availability of money, a regional hospital at a cost of Tshs. 200,000,000/=. Annual implementation is as follows:

Table 180: Regional Hospitals

1981/82	1982/83	1983/84	1984/85	1985/86
Drawing the plan	Collection of money	Collection of money and starting construction	Construction continues	Completing construction

## 3. Water

A total of three water projects will be implemented one in each of the districts of Monduli, Kiteto and Mbuli. A total of Tshs. 190,000,000/= will be used to implement this project as follows:

### (i) Piped Water System at Mto wa Mbu-Tshs. 40,000,000/=

A water pipe will be laid to take water from Mto wa Mbu to Mbuguni through Makuyuni at a total cost of Tshs. 40,000,000/=.

The implementation of this project will be in phases as follows:

Table 181: Piped Water System at Mto wa Mbu

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Phase	-	I Makyuni	II Mbuyuni	-	-	-
Costs (Tshs. millions)	-	30	10	-	-	40

(ii) Piped Water System from Ruvu to Kiteto Central-Tshs. 70,000,000/=

Piped water will be taken from Ruvu to Kiteto Central and distributed to all villages where the trunk main will pass. A total of Tshs. 70,000,000/= will be used in the implementation of this project and implementation will be in two phases as follows:

Table 182: Piped Water System from Ruvu to Kiteto Central

	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Phase	-	I Construc- tion of Source	II Naberera	-	-	-
Cost (Tshs. million)	-	30	40	-	-	40

(iii) Piped Water System at Dongobesh-Tshs. 80,000,000/=

Also, in Mbulu District water from Dongobesh will be distributed to Marghay, Mahetodu, Labay, and Endaharghadat at a total cost of Tshs. 80,000,000/=. Implementation will be in two phases as follows:

Table 183: Piped Water System at Dongobesh

Year	1981/82	1982/83	1983/84	1984/85	1985/86	Total
Phase	-	-	-	I Mahetodu	II Endahar- ghadat	
Costs (Tshs. millions)	-	-	-	60	20	80

**PART TEN  
PRIVATE SECTOR**

Together with normal businesses which increase the income of the region through income tax and licenses, the region has a total of 444,840 acres of different crops including coffee, maize, wheat, pyrethrum, beans, etc. under production by estate farms.

Also, there are 91 private corporations including those of religious bodies, small industries, and industries belonging to individuals. A large proportion of the region's income comes from industry.

The region has a total of 30 private industries manufacturing a variety of products including cloth, iron products, wood, food products, etc. In the Fourth Five-Year Development Plan, industries are expected to manufacture products worth Tshs. 124,481,000/=.

Given the bad economic situation in the country and throughout the world, these industries have been faced with an acute problem of raw materials and spares since the end of the Third Five-Year Plan 1976/77-1980/81, and the situation has not changed. The situation has to change in order for the industries to reach the targets set.

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PART XI  
SUMMARY OF THE ESTIMATES OF THE FOURTH FIVE YEAR DEVELOPMENT PLAN 1981/82 - 1985/86  
(Sha. '000)

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>Livestock</b>												
1) Surveying and Plans: DAMS	3.0	43.0	7.00	195.0	5.00	130.0	7.0	199.5	7	202.5	29.0	770.0
Village Ranches	3.0	100.0	9.00	34.0	9.00	34.0	15.0	49.0	12	38.0	48.0	255.0
2) Construction/ Rehabilitation: DAMS	4.0	356.0	7.00	1,920.0	5.00	1,570.0	7.0	1,920.0	7	1,934.0	30.0	7,700.0
3) Boreholes	1.0	150.0	1.00	250.0	1.00	250.0	1.0	420.0	-	-	4.0	1,070.0
4) Water System, piped (km)	8.5	650.0	3.75	315.0	6.45	570.0	3.0	355.0	2	120.0	23.7	2,010.0
5) Building												
(a) Cattle Dips	1.0	65.0	9.00	915.0	8.00	900.0	9.0	1,100.0	8	1,057.0	35.0	4,037.0
(b) Houses	-	-	2.00	-	2.00	-	2.0	-	3	-	9.0	-
6) Rehabilitation of Cattle Dips	20.0	844.0	11.00	313.0	14.00	331.0	14.0	250.0	9	140.0	68.0	1,878.0
7) Construction of Livestock Development Centers												
(a) Centers	-	-	1.00	-	2.00	-	2.0	-	2	-	7.0	-
(b) Houses	-	-	3.00	420.0	3.00	483.0	3.0	510.0	4	700.0	13.0	2,113.0
8) Rehabilitation of Livestock Development Centers	13.0	194.0	5.00	800.0	2.00	640.0	3.0	786.0	2	740.0	25.0	3,160.0
9) Eradication of Tsetse fly												
(a) Clearance (hectare)	200.0	615.0	4,800.00	1,035.0	5,000.00	1,050.0	5,000.0	1,150.0	5,000	1,150.0	20,000.0	5,000.0
(b) Insecticide spraying (hectares)	3,500.0	-	14,000.00	-	14,000.00	-	14,500.0	-	14,000	-	60,000.0	-

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SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
10) Curative and Preventative Veterinary Medicine	-	-		1,750.0	-	-		1,750.0	-	-		3,500.0
11) Breeding Centers (a) Bulls (b) Centers	20.0 2.0	147.0	10.00 1.00	176.5	77.00 2.00	754.5	42.0 1.0	405.0	22 2	228.5	171.0 8.0	1,711.5
12) Dairy Improvement Centers	Completing one center	155.0	20 cattle	160.0	-	-	10 cattle	85.0	-	-	30 cattle	400.0
13) Grass Seed Production Plots (a) Seed Production Plots (b) Improved Pasture (hectares)	1.0	5.0	5.00	113.5	4.00	2,062.0	4.0	2,609.0	2	28.5	16.0	4,818.0
14) Training Seminars for Veterinary Field Staff	-	300.0	34.00	350.0	100.00	-	100.0	-	-	-	200.0	-
15) Seminars for Livestock Keepers	-	-	150.00	260.0	150.00	280.0	150.00	320.0	150	340.0	600.0	1,200.0
16) Building of Slaughter Facilities and Hide Sheds	1.0	40.0	3.00	400.0	3.00	450.0	3.0	500.0	3	575.0	13.0	1,965.0
17) Expansion of Veterinary Offices (R)	-	-	4 rooms	150.0	-	-	-	-	-	-	4 rooms	150.0
18) Masai Range Workshop	-	-	107 spares	2,500.0	106 spares	1,600.0	104 spares	2,800.0	104 spares	900.0	4 bulldozer spares	7,800.0
19) Loliondo Workshop	-	-	1 workshop	350.0	-	-	-	-	-	-	1 workshop	350.0

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
20) Vehicles and Equipment	-	-	7 Land-rovers		7 Land-rovers		13 motor-cycles		5 lorries 2 tankers	3,362.5	3 tanker 24 Land-rovers	11,152.5
			2 lorries 19 motor-cycles 2 radio-calls 1 bus	2,710.0	2 lorries 15 motor-cycles 1 cinema van	2,370.0	1 cinema van 2 tractors 10 bicycles 7 L/rovers 1 tanker	2,710.0	10 motor-cycles 10 bicycles 4 Bowsers 3 L/rovers		9 lorries 57 motor-cycles 2 radio-calls 1 bus 2 cinema van 2 tractors 20 bicycles 4 Bowsers	
21) Expansion of Monduli Live-stock Training Center	Farming 200 acres 1 house 10 machines Strengthening the college	707.0	10 cattle 1 crush 2 Bomas Grass 50 acres 400 acres fence	320.0	10 cattle 1 Boma 50 acres grass 400 acres fence 1 crush	330.0	10 cattle 1 Boma 50 acres grass 400 acres fence		10 cattle 1 Boma Grass 50 acres 300 acres fence	390.0	40 cattle 2 crushes 5 Bomas 1 house 200 acres grass 1,500 acres fence 10 engineers	2,116.0
TOTAL	4,371.0	15,437.0		14,204.5		18,737.5		12,406.0				65,156.0

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>AGRICULTURE</b>												
1) Improving Maize Production (Acres)	-	90.0	122,400	3,930.0	202,400	3,454.0	221,800	3,758.0	279,000	3,361.0	825,600	14,593.0
2) Fruit and Vegetable Nurseries (seedlings)	380,000	480.0	440,000	894.0	513,000	857.6	550,000	776.0	600,000	876.0	2,483,000	3,883.6
3) Ox-plough Training Centers	-	-	3	300.0	1	100.0	1	100.0	2	200.0	7	700.0
4) Prevention of Pest Damage by birds, animals and insects	-	180.0	-	706.0	-	763.6	-	627.0	-	846.0	-	3,122.6
5) Agricultural Workshop and Farm Service Centers	-	-	4	5,044.0	4	3,348.4	5	4,383.0	4	4,951.0	17	17,726.4
6) Soil Conservation (Acres)	33,250	2,239.0	50,000	2,322.0	60,000	1,141.6	85,000	2,172.0	100,000	2,610.4	328,250	10,485.0
7) Irrigation	8,225	6,369.0	8,500	2,691.0	8,700	1,842.0	9,200	1,994.0	10,000	1,340.3	44,625	14,236.3
8) Agricultural Crop Trials (demonstration farms)	350	131.0	400	200.0	400	200.0	-	-	-	-	1,150	531.0
9) Oil Seed Production	-	-	26,000	1,381.0	10,000	550.0	-	150.0	-	50.0	36,000	2,131.0
10) Drought Resistant Crops (Acres)	-	-	1,000	520.0	800	400.0	-	50.0	-	-	1,800	970.0
11) Building of Workers' Quarters	-	-	3	210.0	2	180.0	2	200.0	3	300.0	10	890.0
12) Training Seminars for Field Staff	-	-	-	120.0	-	200.0	-	270.0	-	120.0	-	710.0
<b>TOTAL</b>	-	9,489.0		18,318.0		13,037.2		14,480.0		14,654.7		69,978.9

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>NATURAL RESOURCES</b>												
1) Forest Tree Nurseries (seedlings)	2,100,000	1,063.0	3,000,000	2,635.0	4,000,000	1,950.0	4,400,000	2,715.0	5,000,000	2,747	18.5	10,837.0
2) Tree Planting (hectares)	1,250	375.0	1,688	1,657.0	2,294	1,538.0	2,605	863.0	2,912	874.0	10,749	5,307.0
3) Fishery Centers	1 center 1 bicycle 1 boat	285.0	4 centers 1 L/Rover 1 m/cycle 4 boats 4 machines	571.0	3 centers 1 m/cycle 1 bicycle 2 boats 1 machine	513.0	3 centers 1 m/cycle 5 bicycles 2 boats 1 machine	431.0	2 centers 1 m/cycle 13 bicycles 1 boat	184.0	13 centers 4 m/cycles 20 bicycles 1 L/Rover 9 boats 6 machines	1,984.0
4) Fish-keeping Centers and Fish Ponds	4	66.0	3	181.0	1	85.0	1	120.0	1	309.0	10	761.0
5) Wildlife Game Posts and Vehicles for Wildlife Conservation	3 L/rovers	410.0	3 1 lorry	510.0	2 1 lorry	440.0	2 1 lorry	340.0	2 L/rover	340.0	12 5 vehicles	2,040.0
6) Bee-keeping (beehives)	100	70.0	100 1 L/rover	270.0	100	70.0	100	70.0	100	70.0	500 1 L/rover	550.0
<b>TOTAL</b>		2,269.0		5,824.0		4,596.0		4,539.0		4,251.0		21,479.0

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>INDUSTRY</b>												
1) Brick and Tiles Factory	-	-	1	500.0	1	600.0	1	700.0	-	-	3	1,800.0
2) Carpentry Factory	-	-	1	100.0	-	-	-	-	-	-	1	100.0
3) Sweater Factor	-	-	-	-	-	-	1	100.0	-	-	1	100.0
4) Ironwork Factory	-	-	1	50.0	-	-	-	-	-	-	1	50.0
5) Ghee Factory	-	-	3	150.0	3	150.0	3	150.0	3	150.0	12	600.0
6) Carts, Basketry, Tailoring, Mat Making, Oil Seed Pressing	29	1,799	-	-	-	-	-	-	-	-	29	1,799.0
		1,799	-	800.0	-	750.0	-	950.0	-	150.0	-	4,449.0
Annual Recurrent Expenditure SIDO and Seminars	-	260.0	-	449.75	-	449.75	-	449.75	-	449.75	-	2,059.0
Industries to be Formulated Later		-	-	3,541.0	-	3,541.0	-	3,541.0	-	3,541.0	-	14,164.0

T. Shs. 4,787,000 will be provided by the central government; the rest will be provided by donors.

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<u>EDUCATION</u>												
1) Building of Classrooms	248	2,480.0	283	3,430.0	257	3,070.0	151	1,510.0	126	1,260.0	1,065	11,750.0
2) Building of Teachers' Quarters	110	1,320.0	205	2,460.0	208	2,496.0	206	3,122.0	167	2,254.0	896	11,652.0
3) Completion of Classrooms	-	-	14	150.0	12	150.0	26	300.0	27	330.0	79	930.0
4) Completion of Teachers' quarters	-	-	25	250.0	16	200.0	16	200.0	16	200.0	73	850.0
5) Boarding Schools	-	-	1	100.0	-	100.0	-	100.0	-	100.0	1	400.0
6) Technical Schools	-	-	1	200.0	-	200.0	-	250.0	-	250.0	1	900.0
7) Technicians Centers	-	-	1	100.0	2	316.0	2	350.0	2	302.0	7	1,068.0
8) Folk Development Colleges	-	-	National	-	-	-	-	-	-	-	-	-
9) Adult Education Construction of Libraries	-	-	29	770.0	57	1,960.0	88	2,940.0	117	4,130.0	291	9,800.0
<b>TOTAL</b>	-	3,800.0	-	7,460.0		8,492.0		8,772.0		8,826.0		37,350.0

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>HEALTH</b>												
1) Building of Dispensaries		-	3	450	5	750	5	750	4	600	17	2,550
2) Rehabilitation of Dispensaries	3	205	13	500	11	605	6	560	6	600	39	2,470
3) Building of MCH Clinics	-	-	1	100	1	100	1	100	1	100	4	400
4) First Aid Boxes	-	-	14	140	14	140	12	120	12	120	52	520
5) Building of Hospitals			1	1,200	1	1,600	-	-	-	-	2	2,800
6) Rehabilitation of Hospitals	2	700	1	900	1	1,200	-	-	-	-	4	2,800
7) Building of Sleeping Sickness Wards	-	-	1	80	1	80	1	80	1	80	4	320
8) Mobile Health Clinics	-	-	1	500	-	-	1	500	-	-	2	1,000
<b>TOTAL CURATIVE</b>		905		3,870		4,475		2,110		1,500		12,860
<b>PREVENTIVE</b>												
1) Sewage Trucks	-	-	-	-	1	720	1	720	1	720	3	2,160
2) Public Toilets	-	-	6	114	4	76	4	76	4	76	18	342
	-	-	-	114		796		796		796		2,502

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>HEALTH CENTERS</b>												
1) Building of Health Centers	-	-	-	-	-	-	-	-	1	800	1	800
2) Rehabilitation of Health Centers	2	270	1	220	2	230	2	400	1	200	8	1,320
3) Building of Workers' Quarters	-	-	5	600	5	600	5	600	5	600	20	2,400
4) Service to Health Projects	-	-	1 L/rover 1 m/cycle	235	1 L/rover 2 m/cycles	315	1 L/rover 1 m/cycle	235	1 L/rover 1 m/cycle	235	4 L/rovers 5 m/cycles	1,020
Number of Health Centers		270		1,055		1,145		1,235		1,835		5,540
GRAND TOTAL		1,175		5,039		6,416		4,141		4,131		20,902

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>WATER</b>												
1) Surveying and Plans	16	250.0	13	300.0	10	360.0	12	430.0	12	520.0	63	1,860.0
2) Piped Water Systems	5	1,750.0	3	1,900.0	8	4,400.0	2	4,100.0	2	2,800.0	20	14,950.0
3) Bore Holes	7	2,440.0	5	2,700.0	3	2,900.0	2	2,100.0	1	1,700.0	18	11,840.0
4) Shallow Wells	-	-	7	175.0	7	175.0	7	175.0	10	250.0	31	775.0
5) Rehabilitation of Existing systems	1	400.0	8	1,850.0	6	1,150.0	9	1,450.0	7	1,250.0	31	6,100.0
		4,840.0		6,925.0		8,965.0		8,255.0		6,520.0		35,525.0

**N.B.** Surveying and Plans — figures show the village to be surveyed and for which survey plans are to be drawn.  
Piped Water Systems — figures show villages which will receive piped water.

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>CULTURE AND YOUTH</b>												
1) Administration of Youth Projects	Cultivate 48 hectares	96.0	-	-	-	-	-	-	-	-	48 hectares	96.0
2) Building of Cultural Centers	-	-	1	112.0	1	179.0	1	180.0	1	185.0	4	656.0
3) Building of Information and Documentation Centers	-	-	-	-	-	-	-	-	1	199.0	1	199.0
4) Research into Customs and Traditions	-	-	Purchased 1 L/rover	1,180.0	Equipment Rural research of one community	984.0	Equipment Initial research into one community	590.0	Equipment Intensive research into one community	225.0		2,979.0
			Initial research into one community		Intensive research into one community		Intensive research of one community					
<b>TOTAL</b>	-	96.0	-	1,292.0	-	1,163.0	-	770.0	-	609.0	-	3,930.0

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>WORKS</b>												
1) Rehabilitation of Village Roads (km)	146	762.0	223		226		180		140		915	
New Roads (km)			140	5,786.0	136	5,850.0	151	5,908.0	282	5,171.0	709	23,477.0
Equipment (Tipper)			6		5		5		4		20	
2) Construction of Bridges:												
New Bridges			12		8		9		9		38	
Bridges to be Rehabilitated	2	271.0	8	4,270.0	10	3,072.0	13	3,000.0	8	3,005.0	41	13,618.0
Equipment	-		2 LWB Lorry		1 LWB Lorry 2 L/rovers		2 L/rovers		1 L/rover 1 C/M		1 C/M 3 Lorries 5 L/rovers	
3) Technical Workshops												
New Workshops	4 Phase I	366.0	3 Phase I	586.0	3 Phase II	520.0	2 Phase II	340.0	2 Phase II	220.0	4	2,032.0
4) Building of Markets	-	-	2 Phase I	350.0	2 Phase II	450.0	-	-	-	-	3	
5) Building of District Headquarters and Expansion of Regional Block												
	Ngoro-ngoro	600.0	Ngoro-ngoro R/Block	2,950.0	Reg. Block	2,400.0	Kiteto Reg. Block	1,000.0	Kiteto Reg. Block	2,000.0	3	8,950.0
6) Installation of Electricity in Government Quarters												
	12	59.0	20	200.0	28	321.0	-	-	-	-	60	600.0

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
7) Workers' Quarters	-	-	8	2,722.0	8	1,825.0	7	1,319.0	7	1,405.0	30	7,271.0
8) Radio Call Centers	-	-	1	270.0	1	270.0	1	270.0	1	270.0	1	1,080.0
9) Building of Rest Houses	-	-	1	200.0	1	200.0	1	250.0	1	300.0	4	950.0
TOTAL	-	2,058.0		17,354.0		14,908.0		12,087.0		12,371.0		58,778.0

SECTOR / PROJECT	1981/82		1982/83		1983/84		1984/85		1985/86		TOTAL	
	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost	Target	Cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<b>LANDS</b>												
1) Surveying of Plots in Villages (villages)	24	146.0	37 1 L/rover	500.0	39 1 L/rover	638.0	41	490.0	39	290.0	180 2 L/rover	2,064.0
2) Surveying of Plots in Towns	1,293 plots	215.0	1,120 plots 1 L/rover	550.0	1,160 plots 1 lorry LWB	630.0	1,042 plots 1 lorry LWB	941.0	1,157 plots	350.0	5,772 plots 1 L/rover 2 Lorry LWB	2,686.0
<b>TOTAL</b>		361.0		1,050		1,268.0		1,431.0		640.0		4,750.0

ARUSHA RURAL PRODUCTIVITY PROJECT

## I. SUMMARY

The Arusha Rural Productivity Project is a four-year development program designed to improve the productivity and well-being of the villagers in the six rural Districts of Arusha Region, Tanzania. This Project is a follow-on to the Arusha Planning and Village Development Project (APVDP) sponsored by the Government of Tanzania and by the United States Agency for International Development (USAID). APVDP established a set of priorities and a basic strategy for the future development of Arusha Region. It assisted the Region to design and institute an evolutionary planning process involving the active participation of villagers and Ward, District and Regional officials. The APVDP tested and refined this participatory planning process by assisting the Region and Districts to implement practical village-level development activities in agriculture, livestock, natural resources, and rural industries. It assisted the Region and Districts to improve and develop domestic water systems and to rehabilitate economically important rural roads.

This proposed follow-on Project will build upon the accomplishments of the APVDP. It will direct assistance toward better management, use, and conservation of the Region's land and water resources to increase food production for the people of Arusha Region and for shipment to other parts of the nation. Project investments of manpower and finances will directly involve and benefit the small-holder farmers throughout the Region.

This paper outlines a \$21,956,000 proposal designed to improve the productivity and conservation of land and water resources for the direct benefit of the people of Arusha Region. The emphasis is on food production, taking into account macro-policy constraints. The Project strategy will insure that production increases can be sustained through the introduction of improved production methods and support which build upon the existing mixed farming systems in the diverse agro-ecological zones of the Region.

The objectives of this project will be achieved by substantial assistance to:

- A. Develop the capabilities of the Region, the six rural Districts, and villages to better plan, manage, use and protect their natural resources. Advisory assistance will be provided by a Land and Water Resources Planning Advisor to the Regional Planning Office. Six Rural Development Specialists at the Districts will provide project preparation, implementation, and management assistance. Villagers will be involved in the planning and management of their land and water resources, particularly in the design of productive activities financed by a \$4.2 million District/Village Development Fund to be provided by this Project.

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- B. Conduct adaptive research and field testing to develop improved agricultural production methods and farming systems at four adaptive research sub-centers representative of the major agro-ecological zones of the Region. Emphasis will be on improving the existing mixed crop and livestock farming systems and developing improved production technology for technicians' training and farmers' extension program.
- C. Implement a comprehensive agricultural extension program to increase the adoption of the improved production technology developed as a result of adaptive research. This activity builds upon the APVDP-assisted Pilot Extension Program: a training and visitation model that includes regular supervision, training, communication media support and operational assistance.
- D. Improve and expand small-holder irrigated crop production. Assistance will be provided for an irrigation soil and water quality testing laboratory and training of technicians in irrigation design and development of small-holder irrigation schemes on approximately 1730 hectares through three pilot-model irrigation projects.
- E. Improve pasture, range and livestock production as part of mixed farming systems and in areas suitable for extensive livestock production. Better land and water-use methods will be introduced, along with improved animal husbandry and health practices, through training and equipping the livestock extension service. Livestock-related adaptive testing and extension training at the Region's Rural Training Center will also be supported. For the three Maasai Districts, multi-purpose brigades will be established to develop improved water systems, to clear tsetse-infested areas, and to rehabilitate and construct livestock service facilities.
- F. Improve the delivery of inputs and services by providing specific inputs (short-term technical assistance, training, and technology and organizational investment). Concentration will be on the priority needs: medium-term credit, improved storage and marketing, improved seed production and distribution, and the development and production of implements, tools and processing equipment.
- G. Establish Soil and Water Conservation Units in all Districts to provide leadership and guidance for control of soil erosion and to institute basic soil and water conservation farming practices. The Project will provide funds for innovative soil and water conservation schemes and training at the village-level in all Districts.

The above activities are described in detail as the respective sub-components of this proposed Project. Combined and managed as an integrated program, these activities will emphasize the effective use of locally available manpower, facilities and natural resources. The planning, implementation and evaluation of these activities will be carried out through improved, existing Regional and District institutions and organizational procedures. Coordinated planning and implementation of practical, productive activities will result in sustainable economic and social development of Arusha Region.

## II. PROJECT OBJECTIVES

### 2.1 Overall Objectives

The overall objective of this Project is to improve the productivity and conservation of land and water resources for the direct benefit of the people of Arusha Region.

### 2.2 Sub-Objective

Sustainable achievement of the above objective will only be possible if the following sub-objectives are accomplished:

1. Improve the capabilities of District officials and villagers to manage and protect the area's natural resources.
2. Conduct adaptive research and field tests to determine the most appropriate, productive and cost-effective technologies for the diverse agro-ecological zones of the Region.
3. Develop the capabilities of the extension services to introduce improved production technologies.
4. Improve irrigation systems to increase irrigated crop production by small-holder farmers.
5. Develop an integrated, comprehensive program for livestock development.
6. Improve the delivery of productive sector inputs and services.
7. Conserve land and water resources for sustained production increases.

This project is designed to provide leadership and considerable material and financial assistance to the Region, Districts and villages to achieve the above sub-objectives. Involvement of the villagers in decision-making and securing their commitment of resources and support to the proposed development initiatives will be a major goal.

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### III. PROJECT BACKGROUND

#### 3.1 Introduction

This Project is a follow-on to the Arusha Planning and Village Development Project, (APVDP) a four year project supported by a USAID grant of \$14,591,000 and by Government of Tanzania and village contributions of \$6,472,000. APVDP was initiated in July 1979 and is now expected to end on March 31, 1983.

APVDP is an integrated rural development project with various components that address village, District and Regional needs. A major task of the APVDP has been to assist the Regional government to prepare an integrated rural development plan for the long-term growth of the Region. This planning exercise has resulted in the collection of a substantial amount of information about the Region as well as the development of a set of policies and projects to guide and contribute to Regional development.

Concurrent with this, the APVDP is providing assistance for a number of development activities in Arumeru, Hanang and Mbulu Districts. Numerous projects in agriculture, livestock, natural resources and rural industries have been identified and implemented with APVDP assistance. Also, the Project has helped to develop village water-systems and rehabilitate District road networks. Throughout, the underlying approach of the APVDP has been to improve the government-village dialogue and decision-making process.

By means of improved land-use planning, and needs and resource assessments by villagers, APVDP is helping to identify income-generating projects that can be sustained primarily through the commitment of local resources. Village, Ward and District-level procedures for project proposal preparation, review and approval, as well as monitoring and evaluation, have been established and tested; the basis for an effective system to identify, plan and implement village development projects now exists. Over 800 officials (including many from the three Maasai Districts) have been trained in planning and technical subjects which has improved the quality of local project design and implementation.

A distinctive feature of the APVDP is the "process approach" to development planning and implementation. This includes a flexible design, ongoing review as information is collected and analyzed, and a collaborative decision-making process. This approach supports the Tanzanian development strategy of growth with equity.

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### 3.2 Brief Description of Arusha Region

Arusha Region is situated just south of the equator in north-central Tanzania near Mt. Kilimanjaro. The Region covers 82,428 square kilometers and has a population of about one million people (which is expected to double by the year 2000). Ninety-five percent of the population are agriculturalists or pastoralists; the average farm size is about 2.2 hectares and per capita income is just under \$200. Administratively, the Region consists of Arusha Municipal District and six rural Districts -- Arumeru, Hanang, and Mbulu, (Agricultural Districts), and Kiteto, Monduli and Ngorongoro (Maasi Districts). These Districts are further divided into 26 Divisions, 128 Wards, and 463 villages.

### 3.3 Development Potential

Arusha Region has excellent potential for economic and social development. Much of the area receives adequate rainfall for good food crop, pasture or rangeland production. There is a wide range of micro-climates, cultivatable soils and grasslands in the Region.

A number of diverse farming activities are carried out, producing a large variety of food, fiber, industrial and animal products. A large number of basic food crops are adapted to one part of the Region or another, including maize, wheat, sorghum, potatoes, and many leguminous crops. Even though food production per capita is declining, Arusha Region is one of the few areas in Tanzania that produces a surplus of foodstuffs for shipment to other Regions. The Region generates foreign exchange from the production and sale abroad of products such as coffee and seed beans.

Certain parts of the Region are ideal for introduction or expansion of fruit production. Well-drained, warmer areas are suited to tropical or sub-tropical fruits such as payaya, banana, mango, avocado and various kinds of citrus. At higher, cooler elevation apples and pears can be grown.

Well-developed vegetable production enterprises exist in various fertile areas that have good water availability. With the introduction of improved varieties and crop cultivation practices, as well as better storage and marketing systems, the production of larger amounts of high quality vegetables and fruits is possible in Arusha Region.

The potential for irrigated farming in the Region is good. An irrigation specialist provided by the APVDP has identified a number of excellent, low-cost irrigation schemes that can be developed. Mountain springs, perennial rivers, sources of reliable ground-water and large tracts of level land exist throughout the Region. These are valuable, essentially untapped, natural resources that can be used for sustainable, increased agricultural production.

With better management, the vast natural grasslands of the Region can support a large, efficient population of livestock. There is good potential, also, to expand and improve cattle and small animal production in association with more intensive, mixed livestock and crop farming. Such practices are important as a means to increase food availability and per capita incomes and to establish stable, soil- and water-conserving farming systems throughout the Region. The adoption of appropriate, mixed farming systems technology will enable Arusha Region to develop a productive, permanent agriculture.

The potential also exists to improve the production and use of forestry products. This is essential because of the increasing reliance on wood as a fuel in the Region. In the three APVDP pilot Districts, much work has been done to establish tree nurseries, to train technicians in seedling production and care, and to increase the commitment of villagers to tree planting. The need for expansion of these activities, however, is critical. Because of the increased awareness of soil erosion problems and a greater commitment to correct them, the potential exists for long-term development of the Region through an integrated tree planting and soil conservation program.

As a result of APVDP involvement, the capabilities of government and Party officials and village leaders to identify, plan, manage and evaluate site-specific development activities have improved significantly. This corps of trained people is an important asset for planning and implementing any future economic development projects in Arusha Region.

The Regional plan, developed with considerable support from the APVDP, the chances for accelerated growth of all productive sectors. This plan outlines the development strategies and priorities of the Region up to the year 2000, based upon a detailed analysis of District and Regional natural and human resources, as well as the expressed needs of a large sampling of villagers in the Region.

Basic Regional and District infrastructure also has been improved as a result of APVDP assistance. Better roads to the productive areas now make it easier to provide input supplies and services for the rural population. More and improved livestock facilities, such as dip-tanks and veterinary centers, and the trained people to staff them contribute to the Region's potential for further development.

### 3.4 Development Constraints

Arusha Region has good development potential; however, a number of constraints prevent the full realization of this potential. This is true even though Arusha is one of the most favoured regions in Tanzania, with good natural resources, trained manpower and a well-conceived long-range development plan as a guide for economic and social improvement.

In a general sense, this Project is a structured way to remove or mitigate the existing constraints to Regional development. The sub-objectives listed above are the Project outputs which are expected to achieve this.

The major development constraints in the Region, and those to be addressed specifically by this Project, are described below.

1. Inadequate capabilities of Regional and District staff to help villagers manage and use land and water resources effectively.

The Region is richly endowed with land and water resources, but these are not well managed or protected. APVDP has made a start to solving this problem through assistance to Regional and District Planning Offices, the introduction and testing of land and water resources planning and management approaches to village development, and the preparation of planning materials for further development. The Region has been divided into agro-ecological zones, and planning units have been designated for each of the six Districts on the basis of environmental, administrative, economic and cultural criteria. The above measures will serve as a strong basis for more effective management and use of land and water.

The implementation of these measures requires the continued strengthening of the Regional and District Planning Offices, particularly in project preparation, cross-sectoral coordination and cooperation in planning and implementation, and the management, monitoring and evaluation of development activities. In addition, there remains a need to provide the data and analyses for conducting a dialogue with the national government to bring about changes that overcome such constraints as pricing, availability of inputs, marketing arrangements and parastatal performance.

2. Unavailability of research-based, improved farm production technology.

Yields of field crops, fruit, vegetables and livestock are low in the Region, particularly on small-holder farms. On many farms, unimproved subsistence production methods are used. Moreover, the Region is significantly behind other Regions in developing an information base on the local effectiveness of technologies developed by national research institutes. A major constraint to development is the lack of institutional capability to conduct appropriate adaptive research on the existing farming systems found in the Region's diverse agro-ecological zones.

3. Ineffective Extension Services for transferring agricultural knowledge to small farmers.

Although, as noted above, the development of improved production technology is needed, present levels of agricultural productivity can be increased by the application of knowl improvements. Many of these practices are not being put into practice by villagers due to shortcomings in the extension service. A start has been made on improving these services through APVDP's pilot agricultural extension projects (based on the World Bank training and visitation model). However, much remains to be done in the areas of training, extension information materials, staff management and support.

4. Inadequate development of water resources for crop production.

The region has an abundance of natural water resources which, if developed, could improve crop production through low-cost, easily managed irrigation schemes. APVDP has studied the potential for irrigated production, is conducting training for Regional and District officials in irrigation and land reclamation, and has identified several pilot irrigation schemes. Further development of irrigated crop production will require improved management of existing village systems and the establishment of new irrigation schemes through major resource investments. This type of investment will yield long-term, sustainable production increases and support national and Regional development priorities.

5. Lack of a Regional Livestock Development Policy and Program.

The Region has seen the need to establish a livestock development policy and program based on the existing land and water resources in the Region. An initial effort is being tested through APVDP-assistance for a program which focuses on the role of livestock in mixed farming systems, the better utilization and development of pasture and water resources and improved animal health care and husbandry practices. This integrated, comprehensive approach to livestock production is being developed in the Agricultural Districts and can be applied with modifications in the Maasai Districts. With over 80 percent of the Region's land used for livestock production, there is a need for continual emphasis on livestock and range-management activities.

6. Unavailability of productive sector inputs and services.

Shortages of ox-drawn farm implements, farming tools and equipment, improved seeds, pesticides, and livestock medicines, etc. are reducing outputs of the productive sectors. Other specific constraints include lack of processing equipment, marketing arrangements, medium-term (though not seasonal) credit, and storage facilities. APVDP has developed an active rural industries component which is beginning to meet these needs, but much more remains to be done if these constraints are to be alleviated.

7. Failure to conserve soil and water resources to permit sustained production increases.

Serious soil erosion is occurring in many areas because of over-grazing, improper cultivation practices, cattle tracking, poorly designed roads and ditches, removal of trees, etc. Similarly, in many areas no provision is made to intercept and store rainfall in the soil or in catchment basins by means of terraces, contour bunds, grass waterways, or forested belts in the upper watershed areas. Conservation of soil and water resources is a main development goal of the Region. APVDP funded a study on conservation measures, conducted intensive training for District officials, initiated a tree nursery and planting effort, and had carried out a number of pilot conservation schemes in the most critically affected areas. With District and village understanding and receptivity to conservation measures established, improved soil and water conservation activities can be pursued with major implementation investments.

3.5 Institutional Structure and Resources

The Regional Government has 10,000 employees, about ten percent of whom are working on the productive sectors. Administratively, considerable authority and resources are developed at the District level where planning and implementation with villages takes place. This decentralized system of government, combined with the priority placed on helping the poorer elements of society, provides a strong foundation for this development Project.

#### IV. PROJECT STRATEGY

The above constraints have been defined, and the APVDP responses have been carried out within the framework of the Region's strategies and priorities as developed during the Regional planning exercises. This statement of Regional policies (Arusha Region: Strategies and Priorities for the Year 2000) places highest priority on the directly productive sectors: agriculture, livestock and natural resources. The thrust of this Project is, consequently, the productive sectors, with four main elements in the project strategy:

- A strategy of geographic concentration;
- An integrated land and water resources approach to development activities;
- A local, problem-solving and opportunities-seeking approach to the directly productive sectors; and
- An emphasis on sustainable development benefits through better use of existing resources.

##### 4.1 A Strategy of Geographic Concentration

In the course of preparing long-term strategies under the first phase of APVDP, the six District Governments have identified primary areas of concentration for directly productive activities. Criteria used by the District Administrations to select these areas of concentration included the prevailing economic, agro-ecological, and socio-cultural patterns. Five of the Districts selected villages representative of the different agro-ecological zones in their Districts to permit replication of the tested and proven development initiatives in similar areas. The sixth District selected a large relatively undeveloped geographic area with potential. Annex A outlines the selected District areas which will be the initial areas of concentration for this Project.

##### 4.2 An Integrated Land and Water Resources Approach to Development Activities

The most critical constraints upon long-term agricultural and livestock production relate to the way land and water resources are utilized and managed. This problem is particularly severe in Arusha Region because of its rapid population growth (3.8 percent) and the resulting land pressure. The problem is compounded by the competition of agriculture and livestock for land, with declining productivity in both sectors because of the poor land and water use practices and environmental vagaries. One of the aims of this Project is to test ways to closely integrate agriculture and livestock production activities under the different agro-

ecological and social conditions of the areas of concentration selected by the Districts. This is reflected in the Regional Strategies and Priorities statement as follows:

A key to the development of these areas (of concentration) will be finding a mix of agriculture and livestock activities which give the greatest return from various agro-ecological zones and which can be sustained through better utilization and conservation of land and water resources.

APVDP has developed an approach for better planning, management and utilization of land and water resources which will guide the development of village production activities. This approach focuses on the continued development of District planning and management capabilities through work in the villages of concentration.

#### 4.3 A Local Problem-Solving and Opportunities-Seeking Approach to the Directly Productive Sectors

A strategy of geographic concentration provides an excellent framework for a local, problem-solving approach to development. This Project will use such an approach to improve agricultural, livestock and natural resources-related production. The development of specific project activities in these areas will come from village dialogue about local problems and needs -- an approach which has been a main emphasis of the first phase of APVDP. Village-level discussions have been found to be critical for responding to local community concerns and generating the resource commitments by villages necessary for sustained activities. This responsiveness to local people and specific situations will allow the Project to test a range of options for meeting villager needs.

A local, problem-solving approach does not mean, however, that either the identification of problems or solutions must always derive from villagers themselves. It is more important that villagers be committed to the action proposed than for the idea to be their own. Therefore, this Project will test alternatives or make improvements in order to develop better, more productive methods. This will be done through adaptive research and testing of technological alternatives for mixed farming systems found in the Region. Thus, the overall approach will be a combination problem-solving, opportunities-seeking approach.

#### 4.4 An Emphasis on Sustainable Development Benefits Through Better Use of Existing Resources

This Project will promote activities which yield self-sustaining development benefits. This means the better use of local resources, the adoption of appropriate technologies, a concentration on local income generating activities, and an emphasis on the conservation and protection of land and water

resources. In addition, the Project will assist the Region and Districts to make use of their human resources. Staff training and the management and logistical support provided at the District and village levels will help sustain economic development.

## V. PROJECT ACTIVITIES

This section outlines how the main constraints to improved agricultural, livestock and natural resources production will be addressed in this Project. Each sub-component is developed in the following way:

- An introduction elaborates the problems to be addressed as well as the proposed strategy.
- The work of APVDP is outlined to identify the foundation on which the proposed activities is based.
- The specific sub-component objective is specified, followed by a narrative description of the activities to be carried out.
- The anticipated outputs and necessary inputs (with a budget) are outlined.

### 5.1 Developing District and Village Capabilities for Improved Land and Water Resources Utilization

#### 5.1.1 Introduction

In its planning exercise, the Region has identified the main thrusts of its development efforts for the coming years. In sum, these include: a) highest priority of the directly productive sectors (agriculture, livestock, natural resources); b) integrated planning in geographic areas of concentration, emphasizing better utilization of land and water resources, and c) better utilization of existing local resources to help increase the likelihood of sustained development benefits.

The key to following these strategies lies with the continued development of District and village capabilities for the planning, management, implementation and evaluation of development activities. Of primary importance is the further development of land and water resource planning and management, the preparation of projects that take into account the particular circumstances (constraints and potentials) found in the villages of concentration, and better management and implementation of those projects.

Institutionally, District Planning Offices are responsible for carrying out the above tasks, working through the District functional offices. Each year, the District initiates a dialogue with villages to identify problems and possible projects which are then compiled into a District Annual Plan. These Annual Plans are reviewed at the Regional level and used to prepare a Regional Annual Plan. The Regional Annual Plan is reviewed by the Prime Minister's Officer and Parliament, and funding is released at the beginning of the fiscal year (July 1).

Considerable impact can be achieved in terms of the objectives set forth in this Project through this annual planning and implementation process. This sub-component will provide the technical assistance, training and management support necessary to continue to upgrade District and village capabilities to implement the activities proposed. It will also develop Regional and District capabilities to evaluate these activities as well as to document the need for changes in national policies and programs for sustained economic development.

#### 5.1.2 APVDP Accomplishments

Much of the research and study necessary for improved economic development has been accomplished under APVDP. The Regional planning exercise began with the definition of Regional development goals: village self-reliance, improved equity, economic growth, better integration internally and with external resources, and the conservation and protection of natural resources.

The Region adopted a planning approach based on the definition of planning units by agro-ecological zones. With the identification of 245 distinct agro-ecological zones, the Region examined the population growth-rate and movement patterns and conducted a survey of the economic activities, concerns and infrastructure of 153 out of 453 villages in the Region. Sector Background papers, assessments, and studies of certain cross-cutting issues (such as analysis of manpower resources, financial resources, materials supply) were completed. The result is 350 documents describing all aspects of the Region's development potential as well as existing constraints to the realization of that potential.

The findings from these studies were summarized and sent to the Districts to help respective District planning officers to formulate their long-term strategy and priority papers. The result was a Regional development policy paper, a five year development plan and project ideas for the next twenty years. While preparing the plan, APVDP conducted several training programs on integrated planning and project development for over 800 officials.

In addition to this major planning exercise, APVDP provided technical assistance to the Regional and District Planning Offices as well as the agriculture, livestock, natural resources, rural industry and water and road sectors. The initiation and implementation of local development activities made the planning process more realistic and laid the groundwork for the full implementation of development activities. About \$12.5 million out of the \$14.5 million available from USAID were spent in support of local development activities.

From the planning exercises, the importance of land and water resource planning was recognized by the Region, Districts and villages of concentration. APVDP tested various approaches to village development and found considerable receptivity to the

better utilization of natural resources. This experimentation led to several conclusions which are incorporated in this Project. The first is that a general land and water resource planning exercise at the local level is not effective. Rather, the best results were achieved when addressing a specific productive sector activity. The second is that integrated planning and coordination among sector extension services must be initiated at the village level. Thirdly, project preparation and implementation requires considerable technical and particularly management and organizational support. And fourthly, the most successful local development activities were ones where there was strong involvement and major resource commitments by the villages.

The above conclusions are a result of a series of ongoing, problem-specific evaluations that have been carried out by the Regional Planning Office in cooperation with the District governments. This approach has developed a knowledge of evaluation methodologies and an initial understanding of the importance of evaluation in development decision-making. In addition, APVDP has introduced computer-assisted analysis of data and trends for improved planning and management. Both of these initiatives will be continued under this Project, with the added tasks of documenting the effects of national policies on production.

#### 5.1.3 Sub-Component Objective

The objective of this sub-component is to further develop the capabilities of Districts and villages to plan, implement and evaluate directly productive sector activities in ways that more effectively utilize and conserve land and water resources.

#### 5.1.4 Sub-Component Activities

Technical direction for the overall development of this sub-component will come from the Regional Planning Office. A Tanzanian Planning Officer, with background in land and water resources planning and management, will be designated as the Project Coordinator. He will be assisted by a Land and Water Resources Advisor (Project Chief of Party) with experience in soil and water conservation in East Africa.

At the Regional level, a steering committee on directly productive sector activities will be formed, with the participation of the Project Coordinator and the Land and Water Resources Advisor. This committee will formulate the Regional strategy for increasing productivity as well as help design and oversee the

training programs necessary to increase awareness and knowledge about effective land and water resources utilization and protection. Also, through the existing Regional functional offices, improved technical support for District productive-sector activities will be accomplished.

With Regional support and direction, the main concentration of development resources will be at the District level. As under APVDP, Rural Development Specialists (RDSs) will be assigned to the District Planning Offices. (The Rural Development Specialist in Monduli also will serve as advisor to the Rural Training Center to help develop a range and livestock development program -- see E below.) The Rural Development Specialists will be qualified in project preparation, have strong management and organizational skills, be fluent in Swahili or Maasai, and have practical knowledge and experience in land and water resources development. The RDSs will have background in agriculture or livestock production as is suitable for the Districts to which they are assigned.

At the District level, a steering committee on productive activities also will be formed with a role similar to the Regional committee but with more of an operational focus. These District committees will also examine the larger questions of land and water resources use such as land tenure and the development of parastatal projects. Management and logistical assistance will be provided to the District committee by the District Planning Office.

The approach to better land and water resources utilization and protection will start with training programs for all productive sector extension staff. This will provide a common framework for village development work. At the village level, one extension service (such as agriculture) will take the lead in a village, depending on the main production interests. This will involve the development of specific projects, with emphasis on land and water resources use and conservation. As other development interests are identified, the other extension services (e.g., livestock and natural resources) will be asked to coordinate their inputs, gradually integrating from the local level upwards. As problems are identified that affect more than one village in an area, the leaders of those villages will be brought together to work out appropriate solutions.

This approach emphasizes the importance of an ongoing dialogue with villages and the evolution of integrated land and water resources planning through a problem-solving approach. This work will be reinforced by the results of the adaptive research and testing program and of the other sub-components as outlined below.

In support of village productive activities, a village development fund will be established to finance agricultural, livestock, fisheries, beekeeping, and agro-industry activities. Each District will receive annually the shilling equivalent of

\$175,000 for supporting activities in a minimum of ten villages per year. Project preparation and approval of these activities will follow the procedures of the regular annual planning process. Such a fund was established under APVDP and had proven successful in introducing and expanding local development activities and in generating village involvement and resource commitments to these activities. The amount programmed per District represents past APVDP spending levels and is within the capabilities of Districts and villages to invest effectively beyond their regular government yearly obligations.

The Project will continue the informal problem-solving approach to evaluation adopted by APVDP. It represents a low-cost, easily managed way of assessing and correcting development activities that rapidly responds to decision-making concerns and needs. In addition, the Project will continue to finance special studies and the continued development of the Region's computer-assisted, information system. Special emphasis will be on developing the data base and analysis necessary for influencing national policies and programs. For example, the data on improved farming practices as outlined in the extension sub-component below will be analyzed to provide additional information for planning price changes and the supply of agricultural inputs. This evaluation and research work will be supervised by the technical assistance team, supported by six months of short-term assistance by an information systems specialist.

In addition to the above activities, this sub-component will provide vehicle, operational, and District housing support. Overall funding for this sub-component is significant because it provides the direction, management, organization and village funding in support of the other sub-components.

#### 5.1.5 Outputs

- a. Land and water resource planning capability established in the Regional Planning Office.
- b. Regional Productive Sector Steering Committee established, providing improved support to District development activities.
- c. Training programs designed and conducted for 1,000 officers assigned to the agriculture, livestock and natural resources extension services.
- d. District Productive Sector Steering Committee established in all six rural Districts.
- e. Capabilities of District Planning Officers in the six Districts developed to prepare productive sector projects, to supervise, manage and evaluate their implementation, and to promote better land and water resource use and conservation.

- f. Projects with an emphasis on better land and water resources utilization established in ten villages per District each of the four years.
- g. Improved integration and coordination of the agriculture, livestock and natural resources extension services in each of the villages receiving assistance.
- h. An ongoing, problem-specific evaluation capability established at the Regional and District levels.
- i. Further development of the Regional information system for policy formulation, planning and monitoring, and better management and evaluation.

## 5.1.6

Inputs

- a. Technical Assistance: Land and Water Resources Planning Advisor (Chief of Party for this Project) assigned to the Regional Planning Office; Rural Development Specialists assigned to each of the six Districts to provide assistance in the implementation of all sub-components; and six months of short-term assistance for information/evaluation system development.
- b. Training: Two Regional and two District seminars (two to three days) each year; twelve weeks of intensive training in land and water resources planning and project preparation for Regional and district officials; and third country study tours (2) on the same subject.
- c. Equipment and Supplies: Four Landrovers at the Regional level for Land and Water Resources Planning Advisor, Project Coordinator, Regional Planning Office, and Regional Development Director's Office. Two Landrovers for each District for Rural Development Specialist and District Planning Office. Office equipment and supplies for the Regional Planning Office and six District Planning Offices; and computer replacement, spare parts and maintenance.
- d. Construction: Housing construction and maintenance allowance for each District to help accommodate Rural Development Specialist.
- e. District Village Development Fund: Annual allotment per District of \$175,000 for directly productive sector activities (agriculture, livestock, natural resources, rural industries).

- f. Operational and Administrative: Vehicle petrol/maintenance costs for 16 Landrovers (above) and supplemental administrative and secretarial support for Regional and District Planning Offices. 100 percent of the first two years and 50 percent the second two years (with the Government paying fifty percent) and the Government paying costs after completion of the Project.
- g. Other Costs: Special studies and evaluation to be carried out by local institutions.
- h. Inflation and Contingency: 20 percent of the above.

In addition to the above inputs, the Government will provide Regional and District Planning Office staff and their support, including the assignment of a Project Coordinator. Additional assistance and resources will be spent by the Offices of the Regional Development Director and District Development Directors and by the Party structure in their policy, supervisory, and support roles. Office space and support, transport, and housing support will be provided at the Regional and District levels. At the end of the second year, the Government will provide 50 percent of the operational expenses. Live APVDP, villages receiving support from the District/Village Development Fund will make resource commitments of at least 30 percent or a contribution of \$1.3 million.

5.1.7 Sub-Component Budget

<u>Item</u>	<u>U.S. \$(000's)</u>
a. <u>Technical Assistance</u>	3,432.0
Land and Water Resources Advisor (4 yrs. x 120 <u>480</u> )	
Rural Development Specialists (6 x 4 yrs. x 120 <u>2,880</u> )	
Information System Specialists (6 mos. x 12 <u>72</u> )	
b. <u>Training</u>	376.0
Regional Seminars (8 x 5 <u>40</u> )	
District Seminars (12 x 4 yrs. x 2 <u>96</u> )	
Land and Water Resources (12 wks. x 15 <u>180</u> )	
Study Tours (6 pers. x 2 tours x 5 <u>60</u> )	

c.	<u>Equipment and Supplies</u>	424.0
	Regional Landrovers	
	(4 x 20 <u>80</u> )	
	District Landrovers	
	(12 x 20 <u>240</u> )	
	Computer Spares	
	(20)	
	Office Equipment and Supplies	
	(7 (Reg. and Dist.) x 3 x 4 yrs. <u>84</u> )	
d.	<u>Construction</u>	600.0
	Housing Support	
	(6 Districts x 100)	
e.	<u>District/Village Development Fund</u>	4,200.0
	Directly Productive Sectors	
	(6 Districts x 4 yrs. x 175)	
f.	<u>Operational/Administrative</u>	345.0
	Vehicle Maintenance/POL	
	(16 LR x 2 yrs x 5 <u>160</u> )	
	Administrative Support	
	(7 offices x 2 yrs x 5 <u>70</u> )	
	Third and Fourth Years	
	(50 % of above, <u>11</u> with	
	Government paying 50%)	
g.	<u>Other Costs</u>	160.0
	Special Studies and Evaluations	
	(4 yrs. x 40 <u>160</u> )	
h.	<u>Contingency/Inflation</u>	1,907.4
	20% of above costs of 9,537	
	or 1,907.4	
		<hr/>
	SUB-COMPONENT TOTAL	<u>11,444.4</u>

## 5.2 Adaptive Research

### 5.2.1 In production

The productivity of small-holder farms (which average 2.2 hectares and make up 80 percent of the Region's cropland) is declining. Average yields of major crops are low throughout the Region; one result is lower per capita food availability now than ten years ago. A major reason for the low productivity of the land is the primitive agricultural technology applied on many small-holder farms. Beginning with the use of low yielding, unimproved seed through to extremely poor post-harvest storage, the farming practices in use on small farms are providing little more than a subsistence living.

Because of the high costs of foreign-produced farming inputs such as chemical fertilizers and pesticides (and the scarcity of foreign exchange to purchase them), these inputs are not generally available to small-holder farmers. Even when available, however, appropriate farming-systems technology has not been developed to use imported production inputs in cost-effective ways. For example, because of the inadequate adaptive research base, unscientific applications of fertilizers or pesticides can lead to poor crop response and lowered net returns to farmers.

A basic strategy of this Project is to develop appropriate farming-systems technology that is adapted to the diverse agro-ecological zones of the Region. Such technology will be based upon the efficient use of available imported production inputs as well as local resources. Emphasis will be on more intensive farming systems, including integrated crop and livestock production, intercropping and rotational cropping systems. The Project will support basic conservation-farming, including coordinated village activities such as contour and alternate strip-cropping, terracing, minimum and contour tillage and afforestation of potentially erodable areas.

Because the intensive farming practices suggested will not depend greatly on foreign-produced inputs or equipment, such a system of food production can be expanded and improved using locally available resources. This type of agricultural production does not aim at short-term gain. It will not be extractive but rather will work toward a balance between what is taken and what is returned to the soil. For these reasons, the intensive farming approach to be supported by this Project has the potential to be a sustainable food production system for Arusha Region now and to serve as a pilot-model for duplication in other parts of Tanzania.

Mixed farming is not new in the area. It is, in fact, the traditional method of producing food on the thousands of small-holder farms throughout the Region. Yet, despite the importance and potential of such traditional farming practices, little scientific attention has been devoted to this method of farming. No local research has been conducted to develop more productive intensive farming technologies. To date, nationally-sponsored

agricultural research programs have not seriously addressed the need for basic, simple, improved production techniques that depend for success primarily upon intelligent manipulation of locally available resources.

This project will provide substantial support to develop the institutional capability for conducting adaptive research that will explore the full range of opportunities to improve the yields and returns from intensive, mixed farming systems in the region.

### 5.2.2 APVDP Accomplishments

Economic and technical assessments of the crop and livestock sectors, as well as detailed studies of the agro-ecology of the Region, were conducted with APVDP assistance. This basic data, plus experience gained during the implementation of village and Ward-level APVDP-supported production activities, has shown the clear need for improved agricultural production technology in the Region.

In response to this need the APVDP staff designed and now are helping to implement a Pilot Extension Project in six Wards of the three Agricultural Districts of the Region. This includes the introduction of improved, basic intensive farming practices on over 160 small-holder farms. Also, the Project is providing support for about 40 on-farm demonstrations of better crop cultivation practices, using only those inputs that are generally available to small-holder farmers. This Project plans a major expansion of the work started under APVDP to develop and extend to farmers appropriate and productive farming technology.

### 5.2.3 Sub-component Objective

The objective of this sub-component is to improve the capability to conduct adaptive research and field tests to determine the most appropriate, productive, cost-effective technologies for the diverse agro-ecological zones of the Region.

### 5.2.4 Sub-component Activities

APVDP-supported activities, such as the Pilot Extension Project, are an important first step to introduce intensive, locally-adapted farming practices. It is clear, however, that systematic adaptive research is needed to improve and extend the acceptance of such farming methods throughout the Region.

This Project will establish a relatively simple, yet effective, adaptive research and testing system. The purpose is to develop the institutional capability to provide more productive, adapted agricultural technology for use by small-holder farmers in the Region. This work is intended to supplement, and not duplicate, any other nationally-supported agricultural research. In fact, the Project will actively seek to coordinate with and draw on in-country or foreign research institutions wherever research results from such places are appropriate for the conditions found in Arusha Region.

To develop a body of adapted farm production knowledge as rapidly as possible at the minimum cost, the Project will provide assistance for the establishment of four adaptive research sub-centers at the following locations:

- Sakila, in Arumeru District: located in the banana/coffee belt where integrated dairy cattle and crop production predominate; centrally located on a main road close to the Ministry of Agriculture Training Institute for Horticulture and the government Livestock Training Center.
- Karatu, in Mbulu District: a center of grain production with serious soil erosion problems; centrally located to serve the entire Karatu Sub-District.
- Dongobesh, in Mbulu District: an area of small-holder mixed grain and livestock farms representative of much of the Region and an area of irrigated farming with good potential for expansion and improvement.
- Magugu, in Hanang District: a representative area of irrigated farming and rainfed mixed crop and livestock production.

At each of these locations, an area of from 3 to 5 hectares will be obtained for the adaptive research sub-center. A senior-level District agriculturalist will be named Manager of each sub-center. The Project will provide support for the construction of a house (including an office and small storeroom) and a classroom for up to 30 trainees. Basic equipment and supplies will be made available for adaptive trials and demonstrations at each sub-center.

An overall adaptive research strategy and work program will be developed by a senior Tanzanian Agricultural Officer (to be named Director of Adaptive Research) assisted by an Adaptive Research and Extension Specialist provided by the Project. The aim will be to create the most productive, cost-effective farm production technology for the major agro-ecological zones of the Region. Adaptive research and testing to be undertaken will include:

- integrated crop and livestock production systems
- crop varieties: related to yields, availability and agro-ecological zones
- home gardening: fruit and vegetable production for home use
- crop production technology:
  - land preparation (minimum and contour tillage, timing, etc.)
  - planting (timing, depth, spacing, intercropping, tools)

- fertilizing (composts, manures, available commercial fertilizers and soil additives)
  - weeding (timing, methods, tools)
  - field pest control (natural and chemical materials, field sanitation practices, rotations, etc.)
  - mulching (use of local materials, methods)
  - crop harvesting and storage: improved on-farm structures, pest control materials, sanitation
  - farm mechanization: testing of improved, appropriate plows, harrows, weeders, etc.
- improved livestock husbandry practices for small-holder farms
  - soil and water conservation techniques
  - improved irrigated farming techniques

As quickly as possible, results of adaptive research conducted at the sub-centers will be translated into area-specific farming-systems technology "packages" for use by farmers. In many cases this will be possible after initial basic screening or testing; in other situations it may be necessary to conduct a series of tests, perhaps followed by further trials in the surrounding community, before specific recommendations can be made.

In either case, improved production technology will be introduced into the communities by means of simple demonstrations on the farms of cooperating farmers. The adaptive research staff at the Region and at the four sub-centers will assist the extension officers to design, establish, supervise and evaluate these demonstration plots. In this way researchers will work directly with extension staff and farmers to maintain a practical "hands-on" approach in developing appropriate farming technology.

Training will be provided at the adaptive research sub-centers for District and Ward-level extension officers, village leaders and farmers. Primarily this will be one-day practical sessions to teach improved cultural practices and demonstrate better production techniques and appropriate, improved farming equipment and tools. The sub-center Manager will be responsible for organizing and conducting this training but will be assisted by District specialists, the Director of Adaptive Research and the Adaptive Research Agronomist/Extension Specialist provided by the Project. Where appropriate, trips to nearby demonstration plots, irrigated fields, etc. will form part of the training program.

The adaptive research staff will pay particular attention to farmer acceptance of any improved farming practices developed. Only practices which are completely acceptable to farmers (for example, in terms of labor requirements, timing and inputs needed) will be recommended to the farming communities. In order to determine the social acceptance as well as the economic and agronomic advantages of particular farming systems, research and extension officers will collect and analyze all relevant research and demonstration results. Surveys will be made continuously to learn directly from farmers how they view particular farming problems and possible solutions to them. The aim will be to develop an on-going process of evaluation that will keep the Project responsive to farmers' needs.

As part of the the evaluation process to be established by the Project, the cost-effectiveness of different cropping and mixed farming systems will be studied. Accurate economic data will be accumulated at the adaptive research sub-centers and by means of farm surveys. The analysis of this data will be used in formulating intensive farming system recommendations for farmers.

#### 5.2.5 Outputs

- a. Four functioning adaptive research sub-centers serving to develop, test and teach improved agricultural production practices and systems.
- b. A growing body of improved, cost-effective and appropriate farm production knowledge including basic technology "packages" for small-holder mixed grain/legume intercropping and livestock farming systems for the major rainfed agro-ecological zones in the Region.
- c. Improved irrigation farming systems technology developed for major irrigated crops such as rice, onions and maize.
- d. Increased average yield from the present approximately 250 Kg. of maize per hectare to sustainable yield levels of between 1000 and 1500 Kg. per hectare on average farms using the improved, adapted technology. Corresponding improvements in the yields of other major crops.
- e. Improved economic returns from rainfed and irrigated agricultural production using more intensive farming technologies.
- f. Four, one-day training sessions conducted at each sub-center each month on rainfed agricultural practices during the five months of the growing

season each year for extension officers, village leaders and farmers for a total of approximately 8000 person-days of training.

- g. Four, one-day training sessions conducted at two of the sub-centers each month on irrigated agricultural practices during the seven dry-season months each year for a total of approximately 5600 person-days of training.
- h. A developed capability of the Region to conduct high quality adaptive research and to link such research directly to improvements on the Region's small-holder farms.
- i. Strengthened linkages with appropriate national and international research institutions, particularly the proposed USAID-supported National Farming Systems Research Program.
- j. An effective evaluation system in place and functioning to relate research and extension to the expressed needs and aspirations of the Region's small farmers.

#### 5.2.6 Inputs

- a. Technical Assistance: an Adaptive Research Agronomist/Extension Specialist with experience in commercial and intensive farming systems to serve as the advisor to the Adaptive Research Sub-component.
- b. Construction: staff housing, office space, storage facilities and classrooms at the four adaptive research sub-centers.
- c. Equipment/Supplies: farming and research tools, farm and classroom equipment and supplies for the sub-centers and for the farm-level demonstrations and trials program, Landrover for the Regional-based Director of Adaptive Research and another for the Adaptive Research Agronomist/Extension Technical Assistance Specialist. Also, one motorcycle for each of the four adaptive research sub-center Managers.
- d. Training: support for the sub-centers' training programs.
- e. Operations and Administrative: funds for program and vehicle operation provided on a declining percentage basis: first and second year, 100%;

third and fourth year, 50%. (By this means, the Regional Government is expected to be able to assume full responsibility for the adaptive research sub-centers' recurrent budgets at termination of this Project.)

In addition to the above Project inputs, the Adaptive Research Sub-component will receive substantial support from the Tanzanian Government. A senior agriculturalist at the Regional-level will be named Director of Adaptive Research to provide leadership for this sub-component. Managers will be assigned to the four adaptive research sub-centers from the relevant District staff. The land needed for the adaptive testing sub-centers will be made available by government. In addition, normal government support and services will be provided to the entire Adaptive

Research Sub-component of the Project. As Project support for the recurrent budget declines, the government will provide the necessary funds for continued, effective operation during the Project's life and after it is terminated.

#### 5.2.7 Sub-Component Budget

<u>Item</u>	<u>U.S. \$(000's)</u>
a. <u>Technical Assistance</u>	480.0
Adaptive Research/Extension Agronomist (4 yrs x 120 <u>480</u> )	
b. <u>Training</u>	68.0
Rainfed Agriculture (8000 days x \$5 per day <u>40</u> )	
Irrigated Agriculture (5600 days x \$5 per day <u>28</u> )	
c. <u>Equipment and Supplies</u>	105.6
Adaptive Research Sub-Stations (4 stations x 15 <u>60</u> )	
Landrovers (2 x 20 <u>40</u> )	
Motorcycles (4 x 1.4 <u>5.6</u> )	
d. <u>Construction</u>	240.0
Four Adaptive Research Sub-Stations (4 x 30 for houses(manager), plus 4 x 30 for classroom/storage/office <u>240</u> )	
e. <u>District/Village Development Fund</u>	---
(Covered under Sub-component 5.1)	

f.	<u>Operations and Administrative</u>	156.0
	Landrovers	
	(2 x 2 yrs x 5 <u>20</u> )	
	Motorcycles	
	4 x 2 yrs x .5 <u>4</u> )	
	Sub-Station Management/Support	
	(4 x 2 yrs x 10 <u>80</u> )	
	Third and Fourth Years	
	(50% of above or <u>52</u> ; with Government covering other 50%)	
g.	<u>Other Costs</u>	---
h.	<u>Contingency/Inflation</u>	209.9
	20% of above costs of 1,049.6 or 209.9	
	SUB-COMPONENT TOTAL	<u>1,259.5</u>

### 5.3 Extension and Information

#### 5.3.1 Introduction

An effective extension education system, to provide the leadership and guidance for on-farm adoption of improved farming practices, is critically important for the success of this Project and for development of Arusha Region's rural economy. The core of such a system exists now at the District and Ward levels. In each of the Agricultural Districts (Arumeru, Hanang and Mbulu) between 30 and 40 field extension officers (Bwana Shambas) are assigned to work with village-level extension programs. Supervision and technical assistance is provided by agriculturalists assigned to the District Agricultural Development Offices.

While the number of field extension officers is inadequate for completely effective coverage of the agricultural production areas, there is a sufficient number to begin building a workable extension system. The development of improved farming-systems technology, as described in the previous section of this paper, will be the first step toward establishment of such a system.

In addition to assisting in the development of improved agricultural production technology, this Project will provide support for a general strengthening of the entire extension system from the Regional level to the villages. Close working relationships will be developed between adaptive researchers at the four adaptive research sub-centers and the District and field extension officers. Also, in-service training in production technology and extension methodology will be conducted for the field extension officers as an integral part of the extension program.

Village-level extension program planning and implementation will be strengthened following the Pilot Extension Program model started as part of the APVDP. Extension education and information materials will be prepared to increase the rate of adoption by farmers of recommended, improved farming practices. In short, the development and adoption of appropriate, more productive farming technology by means of a structured, responsive extension system at Ward and village levels will form the basis of sustainable development of the Region's rural sector.

### 5.3.2 APVDP Accomplishments

A Technical Information and Support Unit (TISU) is functioning in the Regional Planning Office to provide support to the District planning and technical divisions (agriculture, livestock and natural resources). TISU staff have conducted a large number of training courses for field-level productive-sector extension technicians in all Districts. A series of "Field Guides" for 20 economically important crops has been prepared for use by extension officers in farm-training programs.

A Pilot Extension Project is underway in 24 villages of the three Agricultural Districts and about 160 small-hold farmers are receiving direct extension service support to introduce improved, mixed farming practices. Over forty maize demonstration plots have been established and will be used for farmer training during this growing season. For the first time, as a result of APVDP assistance, selected field extension officers are functioning within a structured and organized extension system.

Transportation, guidance, supervision and technical assistance are provided as part of a logical system to introduce improved, intensive farming technology to small-holder farmers. This Project will build upon the successful start made during the implementation of the APVDP.

### 5.3.3 Sub-component Objective

The objective of this sub-component is to develop the capabilities of the extension service to introduce improved, intensive agricultural production technologies throughout the diverse agro-ecological zones of the Region.

### 5.3.4 Sub-component Activities

TISU was established as part of the APVDP to coordinate integrated Regional Planning and serve as a functional Regional unit for integrated support of District-level productive activities. The work of TISU, and particularly the Pilot Extension Project, has been an important first step in introducing higher yielding production methods in the Region. Also, TISU has served

to foster a more integrated development approach by coordinating support for the productive sectors: agriculture, livestock and natural resources.

In this Project the major integrative function will be at two levels: the Regional level by means of a Regional Steering Committee (of which the Tanzanian Project Coordinator and the Project Land and Water Resources Advisor will be members) and the District-level, where the District Planning Officers and Project Rural Development Specialists (RDSs) will serve to coordinate and integrate the activities of the Districts' productive sector staffs. TISU, as a discrete unit, will not be necessary. By means of the overall, planning coordination of the Regional Steering Committee and the practical, functional coordination of the District teams, Project activities will be closely integrated with and supportive of the broader Regional development activities generally. (This section deals primarily with agricultural extension; livestock and natural resources extension activities are discussed in those respective sections.)

Within the guidelines developed by the Regional Steering Committee, the extension and information sub-component of the Project will undertake to establish an effective extension system throughout the Region. A senior Regional Agriculturalist will be named Director of Extension to provide the leadership for the extension program. This officer, working closely with the Project's Adaptive Research Agronomist/Extension Specialist, will formulate the policies for and supervise the expansion and improvement of the entire extension and information system.

Close working relationships will be established between these Regional extension officers and the planning and technical staff in the six Districts. The Project's RDS in each District will serve to facilitate and coordinate the extension program.

Improved agricultural production technology, developed at the four adaptive research sub-centers, will be the basis of the extension education program. Regional and District extension officers will work directly with the research program to translate adaptive research findings into practical recommendations for use on the farms in the different agro-ecological zones. Where necessary, District extension officers will be responsible for further testing of particular farming practices through an on-farm testing and demonstration program.

The Pilot Extension Program started with APVDP assistance will be expanded into all Wards of the three Agricultural Districts and into appropriate areas of the three Maasai Districts. In the expansion of the extension project into new areas, District field extension officers will meet with Village Councils and particularly with the Village Council's Sub-committee for Production. Members of this Sub-committee and the field extension officer will select the contact farmers in the village who will receive special extension assistance to introduce improved production technology. Each contact farmer will organize a farmers' extension group of up

to ten members as a permanent extension unit and contact point for the extension officer. The village Sub-committee for Production will be a key element for successful introduction and dissemination of improved production technology in the village.

In-service training of extension officers will be an important part of this sub-component. Emphasis will be on practical short-courses where improved production practices and more effective extension methodologies will be taught. Training will be a regular part of the extension officers' program; it will be related to the farming operations at particular times of the year and directly linked to the actual situations found on the farms that the extension worker visits. The classrooms, fields and research plots located at the four project-funded adaptive research sub-centers will be used for these training courses. In addition, study tours and visits to demonstration plots and farmers' fields will be used to keep the training relevant and practical.

Training of farmers and village leaders will occur primarily on the farms of contact farmers in the villages. Each contact farmer group will meet twice a month with their extension officer who will be following a 2 week schedule of 4 days/week visiting and 2 days/week for office or in-service training. These meetings will include demonstrations, discussions, etc. This kind of practical, in-the-field training of farmers and village leaders will provide not only the information needed by farmers to adopt the improved farming practices but will provide the feedback needed by adaptive researchers in order to keep all research directly related to farmers' concerns.

A comprehensive series of educational and informational materials will be developed to support the extension program. The "Technicians' Guides" prepared with APVDP assistance will be expanded to include more crops, mixed crop and livestock farming systems, home gardening and soil and water conservation practices.

For this purpose, a Media Production Center will be established at the Regional level. This will be staffed by an information specialist assigned by the Region, as well as a graphic artist, and stocked with equipment and supplies to develop and reproduce appropriate extension information materials.

Emphasis will be on simple, illustrated, single-sheet leaflets in Kiswahili for distribution to farmer extension groups and village leaders. Such material also can be turned over to the adult education and literacy program for further distribution. In addition to leaflets, the Media Production Center will prepare teaching aids such as posters and flip charts and investigate the usefulness of simple slide sets for use at farmers' meetings.

An important part of the extension and information program will be on-going monitoring and evaluation. The Project will provide support for developing appropriate ways to measure the effectiveness of the productive technologies being recommended. Base-line surveys will be conducted followed by periodic, random surveys to determine the increased yields and net returns of small-holder farmers applying the recommended improved farming technologies. Data collected will be analyzed by the adaptive researchers and extension specialists to determine what program adjustments can be made to make greater economic impact.

#### 5.3.5 Outputs

- a. A functioning agricultural extension service in all Wards of the three Agricultural Districts and in approximately two Wards of each of the three Maasai Districts where crop production is important introducing improved crop and mixed livestock and cropping farming systems technology. (Range management and rangelands livestock production extension is covered in the Livestock Sub-component section of this paper.
- b. Approximately 120 field extension officers (Bwana Shambas) involved on a daily basis in the village-level, improved agricultural extension program (an expansion of the APVDP-supported Pilot Extension Program) in all major agro-ecological zones.
- c. Regular training in technical subject-matter and extension methodology provided for all field agricultural extension officers; approximately two days training per month will provided for all the 120 officers for a four year total of 11,520 person-training days.
- d. Supervision, guidance, technical and administrative support and transportation provided for a minimum of 120 field extension officers throughout the Region. An established effective and responsive extension system will be in place.
- e. Regular extension contact with and training of farmer extension groups. Each field extension officer will contact and provide training on improved, intensive farming systems to approximately 80 farmers on a two week schedule. At the end of this Project approximately 9600 farmers will be members of farmer extension groups and receive regular extension contacts and training on improved farming technology.

- f. Improved production of major crop and livestock on small-holder farms under rainfed and irrigated systems. Increased net returns to farming enterprises as a result of introduction and adoption of adapted, improved farming technology.
- g. Mechanisms established and functioning to involve villagers directly in productive extension project selection, design and implementation. A close working relationship between the field extension officer and the village Sub-committee for Production, as well as with local Party officials, will be developed as a key means to foster more direct involvement of villagers and local leaders in development activities.
- h. At the Regional and District levels, improved capability to plan and manage a comprehensive agricultural extension system that provides effective assistance to the Region's small-holder farmers.
- i. A series of extension publications and training materials will be available and used throughout the Region in support of productive activities. The capability of the Media Production Center to design, duplicate and distribute technician's field guides, farmer leaflets, flip charts, posters and teaching slide sets will be firmly established.
- j. An extension program monitoring and evaluation system will be in place and functioning to provide the data and information to Regional and District extension administrators for an effective extension system that can adjust to changing circumstances and be sustained after termination of this Project.
- k. Closer integration of agriculture, livestock and natural resources sectors specialists and field staff at the Regional, District and Ward levels. Multi-sector extension projects planned and successfully implemented, such as improved communal cropping and livestock grazing projects, watershed protection and soil conservation measures, establishment of village woodlots, water-resources development for irrigation or livestock, etc.
- l. Close working relationships will exist between adaptive researchers and extension specialists to maintain a practical focus of all adaptive research undertaken. Feedback mechanisms from the farmers and field extension officers to the researchers will be functioning.

### 5.3.6 Inputs

- a. Technical Assistance: the Adaptive Research Agronomist/Extension Specialist assigned to the Regional Agricultural Development Office to work with the Tanzanian Director of Adaptive Research (as noted in the previous section of this paper) and a senior Regional agriculturalist named Director of Extension. In addition, short-term technical assistance will be provided to help with media design and preparation and extension support activities as necessary. An estimated ten person-months of short-term technical assistance is required.
- b. Equipment/Supplies: training and media production equipment (e.g., cameras, slide projectors, stencil cutters, typewriters and printing equipment) for the Regional Media Production Center. Also, art supplies, papers, inks and other materials and supplies needed to prepare and design information publications, leaflets, etc. A Landrover for use by the Director of Extension to supervise and support all District extension activities; six Landrovers for assignment to the District Agricultural Development Offices. Also, motorcycles (30 per Agricultural District and 10 per Maasai District -- total 120) sold to agricultural field extension officers (by means of a loan program) for their use in supporting village-level extension activities.
- c. Training: lecturers' fees, supplies, materials, transportation, food, etc. for extension seminars, short courses, study tours, field trips, etc.
- d. Operation and Administrative: in addition to vehicle maintenance, a small annual contribution to the Media Production Center and the extension and information program's recurrent budget on a declining annual percentage basis.

In addition to the above inputs, the Tanzanian Government will provide substantial support to the agricultural Extension and Information Sub-component. A senior Regional agriculturalist will be named to head the program and essentially all District and Ward-level extension officers will be phased into the program during the four year period. Space will be made available for the Media Production Center and a senior information officer assigned

to supervise the Center. In addition, normal government support and services, including necessary recurrent budget funding, will be provided to the Extension and Information Sub-component.

5.3.7 Sub-Component Budget

<u>Item</u>	<u>U.S. \$(000's)</u>
a. <u>Technical Assistance</u>	120.0
Short-term Extension Communications (10 mos x 12 <u>120</u> )	
b. <u>Training</u>	123.6
Extension (11,520 days x \$5 per day <u>57.6</u> )	
In-Country Study Tours (6 x 6 persons x 1 <u>36</u> )	
Third Country Study Tour (1 x 6 persons x 5 <u>30</u> )	
c. <u>Equipment and Supplies</u>	353.0
Landrovers (7 x 20 <u>140</u> )	
Motorcycles (120 x 1.4 <u>168</u> )	
Equipment -- Media Center ( <u>15</u> )	
Supplies -- Media Center (4 yrs x 7.5 <u>30</u> )	
d. <u>Construction</u>	---
e. <u>District/Village Development Fund</u>	---
(Covered under Sub-component 5.1)	
f. <u>Operational and Administrative</u>	315.0
Landrovers (7 x 2 yrs x 5 <u>70</u> )	
Motorcycles (120 x 2 yrs x .5 <u>120</u> )	
Extension/Media Center Support (2 yrs x 10 <u>20</u> )	
Third and Fourth Years (50% of the above or <u>105</u> ) with Government covering other 50%	
g. <u>Other Costs</u>	---
h. <u>Contingency/Inflation</u>	182.3
20% of above costs of 911.6 or <u>182.3</u>	
SUB-COMPONENT TOTAL	<u>1,093.9</u>

## 5.4 Irrigation Development

### 5.4.1 Introduction

The potential for irrigated farming in Arusha Region is substantial. In the many parts of the Region where dependable water sources are available and where these are recharged annually by rainfall of up to 1500 mm per year, significant returns are possible from investments in irrigation systems. The opportunity to double- or triple-crop higher value, out-of-season crops can increase the net returns to irrigated production three to five times over non-irrigated, single-crop production.

Many of the existing irrigation systems in the Region are poorly designed, maintained and managed. Water losses by seepage or evaporation are excessive. In many situations, irrigation water reaching fields is poorly used either because of faulty water-distribution networks or wasteful irrigated-crop production.

Generally, insufficient attention is given to selection of crops that are economically and agronomically best suited to irrigated farming. Timing and methods of field preparation and sequential planting systems to make full use of the available water often are not given sufficient consideration. Management systems for equitable distribution of irrigation water, including locally-controlled water-users' associations are typically lacking.

### 5.4.2 APVDP Accomplishments

The APVDP has supported several small-scale irrigation systems. Also a consultant irrigation specialist was brought in to conduct a thorough analysis of the potential for irrigation in the Region. As a result of this analysis and the experience gained by Regional and APVDP staff, a strategy has emerged for accelerated development of the Region's irrigation potential. This approach involves three simultaneous phases: improvement of existing systems; development of selected pilot-model, short-term, low cost new irrigation systems; and feasibility studies and expansion of two of the pilot project areas which have significant potential.

### 5.4.3 Sub-component Objective

The objective of this sub-component is to improve existing and new irrigation systems to increase production of food crops and provide higher returns to small-holder, irrigation farmers.

#### 5.4.4 Sub-component Activities

##### a. Improvement of Selected Existing Irrigation Systems

The Project will provide support to improve the productivity and cost-effectiveness of selected, high-potential, existing irrigation systems in the Region. No attempt will be made to work with all existing irrigation systems. Rather, the strategy will be to develop systems which broadly represent the major types of irrigated farming in as many areas of the Region as possible. In this way, in addition to the specific improvements made at a given location, the improved system will serve as demonstrations for teaching more productive irrigation farming techniques to extension and irrigation technicians and farmers at a number of different locations.

As a start, the Project will provide assistance for a review of existing irrigation systems in the Districts and an analysis of their features, including the number of farmers served, annual water availability and crop requirements, the management system in use, the cropping patterns and productivity levels and design and physical condition of the water-delivery and drainage network. From this analysis, improvements in the physical and management systems will be recommended for various irrigation systems on the basis of priorities established at the village, Ward and District levels.

Irrigation and extension technicians at the District and Ward-level will assist farmers in the selected irrigation systems to develop a phased program for rehabilitation of the systems and to improve the management and use of the irrigation water. Extension officers will conduct farming training and establish demonstrations on improved use of the irrigation water. Some form of water-users' associations will be established that will be responsible for management of the irrigation system and be empowered to collect reasonable water-user fees. The water-users' associations will be responsible for maintaining or expanding the irrigation system.

##### b. Development of New Irrigation Systems

The Project will develop the capability of the Regional and District staff to design, construct and efficiently manage new irrigation systems. It will provide support for training, laboratory facilities, technical assistance and the actual design, construction and management of selected pilot-model irrigation schemes in the District.

The pilot-project activities to be supported by the Project include identifying constraints to improving on-farm water management, establishing improved water control structures and practices for optimal delivery and use of irrigation water, and training

technicians and farmers in effective irrigation farming. Emphasis will be on developing the institutional capabilities to design and implement irrigation projects with the direct involvement of farmers and village leaders. The Project will seek to develop irrigation systems which are self-sustaining and which can serve as models for replication in other parts of the Region.

Three pilot areas, representative of different cropping patterns, soil conditions, and irrigation water management problems, have been identified. These are:

- Magugu-Matufa-Mapea (Kiru Valley area) in Hanang District: 400 hectare area where rice is the principal crop. The irrigation potential is high and the pilot project can easily be expanded to a total of 1200 hectares.
- Dongobesh in Mbulu District: a maize-producing area of 120 hectares in one of the driest parts of the District. There are several existing furrows from the Dongobesh River. This pilot project can be expanded to rehabilitate a total of 450 hectares.
- Mangola in Mbulu District: an area of 100 hectares located upstream on the Mangola River. Some irrigation structures exist, but these are inadequate. This pilot can be expanded to a total of 500 hectares. A major crop at this location is onions.

For each of these pilot projects, topographic maps of 1:5000 scale will be prepared. Analyses of the respective river water discharge rates and seasonal flow will be made, and dry-season soil surveys conducted. These preliminary activities, plus some short-term training of irrigation technicians in irrigation systems design and management, will be completed before the termination of the APVDP.

In order to build on the activities started under the APVDP, this Project will provide support for the completion of the identified pilot irrigation systems. It also will assist in a general strengthening of the Region's institutional capability to expand these and develop additional improved irrigation systems.

A general support to all Regional irrigation activities, and irrigation soil and water-quality testing laboratory will be established at the Regional Irrigation Department. Appropriate equipment and supplies as well as training for technicians to properly operate the laboratory will be provided.

Training will be provided for all Regional and District irrigation technicians as well as soil surveyors doing irrigation-related work. A basic four week course on irrigation and drainage

theory and practice will be conducted. This training will be followed by a two week practical design seminar/course at each of the three pilot project sites. At each location, a finished design will be completed by the end of the two week period. A short-term, consulting irrigation specialist will be provided to conduct the basic irrigation training and provide leadership to District irrigation technicians for completion of the three pilot project design.

During the design stage, meetings and discussions will be held between Party officials, Regional and District irrigation specialists and the respective village Councils and villagers to explain the purposes of, and get local commitments to, the pilot project. Extension and irrigation officers will meet with villagers to agree on and develop a suitable management system for the pilot irrigation project. An appropriate water-users' association will be established and a system for water control and for charging of equitable fees will be developed. At the same time, a plan for construction of the system, using locally available labor under the supervision of District and Regional irrigation specialists, will be agreed on and work schedules determined.

Extension and irrigation officers will assist the villagers to design more intensive water-efficient planting sequences and adopt improved farming practices. Continued extension support will be provided to each of the pilot irrigation projects once the systems are operational. The pilot projects will be used for training and for demonstrating improved irrigation farming practices to farmers from other areas.

The pilot irrigation projects will be evaluated at regular intervals and necessary adjustments made in the technical or administrative system. Expansion of the individual systems will be planned in logical, phased steps as determined by the interest and commitment of villagers and the availability of resources for construction, management, etc.

### c. Feasibility Studies

In addition to the assistance to be provided for selected existing irrigation systems and the three pilot irrigation schemes described above, the Project will provide short-term technical assistance and other support to conduct feasibility studies for the expansion of two of the pilot projects which initial field surveys indicate have excellent potential for irrigated agriculture.

The first of these is in the Kiru Valley area of Hanang District. The feasibility technical assistance team will conduct the necessary studies and carry out detailed field surveys to verify what appears to be the opportunity to expand the 400 hectare pilot irrigation project to 1200 hectares in a first phase and to thousands of hectares later on.

The possibility exists to develop such an irrigation system in planned phases by construction of an effective drainage system to remove presently excessive groundwater. The area is presently served entirely by a gravity-fed water system which means the area can be turned into a large, relatively inexpensively-developed irrigated plain, without the need for water pumping, by controlled removal of already existing groundwater.

The second feasibility study the Project will undertake is in the Mangola area of Mbulu District. This area is located at the northeast end of Lake Eyasi. In addition to the pilot irrigated project of 100 hectares, the potential exists here to develop an irrigation system that ultimately can reach 20,000 hectares by constructing a series of properly spaced groundwater interceptors across the existing slope of the land. Irrigation will be entirely by gravity thus permitting the most inexpensive type of irrigation system possible. Recharge of the system will be from rainfall and river flow. The exact area that can be irrigated will depend on the amount of available water that is recharged annually.

The feasibility study will consider the effects expansion of irrigation in the Mangola area will have upon the Hadza people (traditional gatherers living in the area) and make recommendations to minimize these effects. For example, the Hazda might be given priority consideration in the settlement plan for the area.

Project staff will use the results of the pilot irrigation projects and the feasibility studies to provide accurate information needed to plan and implement a phased development of these potentially important irrigation projects. For the feasibility studies proposed, a short-term technical assistance team consisting of an irrigation specialist, a civil engineer, a hydrologist and an agriculturalist will be needed for approximately six weeks. Also, approximately eight months of short-term technical assistance will be provided by the Project as necessary for training, assistance in design and the phased expansion of the pilot irrigation projects.

#### 5.4.5 Outputs

- a. A functioning soil and water-quality testing laboratory at the Regional Irrigation Department.
- b. All Regional and District irrigation technicians trained in mapping, contouring and irrigation systems design.
- c. Pilot-model irrigation schemes at Magugu, Dongobesh and Mangola (totalling approximately 2150 hectares) designed, constructed and operating.

- d. Demonstration of improved irrigation farming practices at the irrigation projects to a minimum of 500 farmers per year from other irrigated areas.
- e. Rehabilitation of existing irrigation systems through a phased extension program to teach improved management of irrigation systems.
- f. Improved irrigated crop production practices in use, resulting in a minimum of double the existing average yields (e.g. 850 kg/hectare for maize) and increased net incomes for approximately 1500 farmers in the pilot irrigation projects and an additional 3000 to 5000 farmers in presently existing irrigation systems.
- g. Water-users' associations established at new and existing irrigation systems to provide improved management and maintenance of the systems.
- h. Feasibility studies completed at the Kiru Valley and Mangola areas, a detailed plan for the expansion of these two pilot-irrigation projects developed, and expansion of the systems underway.
- i. All improved irrigation systems evaluated periodically and the data used to design continuing expansion and/or improvements in the systems.

#### 5.4.6 Inputs

- a. Technical Assistance: short-term consultancies of irrigation specialists for training courses and assistance in designing improved irrigation projects. Approximately eight person-months of technical assistance needed. Also, a feasibility team consisting of an irrigation specialist, a civil engineer, a hydrologist and an agriculturalist for : total of six person-months.
- b. Training: Trainers and financial assistance to provide training for Regional and District irrigation technicians and land surveyors in mapping, surveying, irrigation and drainage principles, systems design, effective irrigation scheme management and irrigation farming technology. In addition, four months of training (two officials from the irrigation unit) will be conducted to develop management and technical skills for running the irrigation testing laboratory.

- c. Equipment and Supplies: Equipment and supplies for the irrigation laboratory. One Landrover for the Regional Irrigation Officer and three for the District Irrigation Officers in the three Agricultural Districts. In addition, one motorcycle for each of the six District Irrigation Offices.
- d. Construction: Expansion and rehabilitation of existing facilities for the Irrigation Testing Laboratory.
- e. District/Village Development Fund: Costs of expansion of irrigation schemes in major areas which total 2150 hectares. APVDP anticipates development of 420 hectares with existing funds, leaving 1730 hectares for the next phase. Extra funding will come from the village development fund outlined under sub-component 5.1.
- f. Operational and Administrative: 100 percent of vehicle maintenance costs and laboratory operating funds during years one and two; 50 percent of these costs during the third and fourth years, with the Government covering the remainder and ongoing expenditures.
- g. Other Costs: Local currency costs for the two feasibility studies specified.
- h. Contingency and Inflation: 20 percent of the above costs. The Government will provide the irrigation technicians to carry out the above activities as well as their regular operating expenses. Two officials will be assigned to the Irrigation Testing Laboratory. The Government during the third and fourth year will finance 50 percent of the recurrent budget costs for this sub-component, and 100 percent of the costs after termination of the Project. In addition, village contribution will be at least 30 percent of the funds for the new irrigation systems or about \$800.

#### 5.4.7 Sub-Component Budget

<u>Item</u>	<u>U.S. \$(000's)</u>
a. <u>Technical Assistance</u>	168.0
Short-term Irrigation Specialist -- Training and Assistance (8 mos x 12 96)	
Short-term Assistance -- Feasibility Studies (6 mos x 12 72)	

b.	<u>Training</u>	140.0
	Intensive Irrigation/Drainage Courses and Training on Irrigation Systems Design (4 yr total <u>120</u> ) Irrigation Laboratory Operations Training (2 persons x 2 mos x 5 <u>20</u> )	
c.	<u>Equipment and Supplies:</u>	123.4
	Equipment for Irrigation Testing Lab ( <u>35</u> ) Landrovers (4 x 20 <u>80</u> ) Motorcycles (6 x 1.4 <u>8.4</u> )	
d.	<u>Construction</u>	30.0
	Rehabilitation and expansion of facilities for Irrigation Testing Lab ( <u>30</u> )	
e.	<u>District/Village Development Fund</u>	2,595.0
	Small-holder irrigation scheme for 1730 hectares at 1.5 per hectare ( <u>2595</u> ). Extra funds will come, if needed, from Sub-component 5.1 above.	
f.	<u>Operational and Administrative</u>	99.0
	Landrovers (4 x 2 yrs x 5 <u>40</u> ) Motorcycles (6 x 2 yrs x .5 <u>6</u> ) Laboratory Operating Expenses (2 yrs x 10 <u>20</u> ) Third and Fourth Years (50% and above or <u>33</u> , with Government paying additional <u>50%</u> )	
g.	<u>Other Costs</u>	60.0
	Local Currency costs of Feasibility Studies including logistics and institutional support (2 studies x 30 <u>60</u> )	
h.	<u>Contingency and Inflation</u>	643.1
	(20% of above costs of 3,215.4 or 643.1)	
	SUB-COMPONENT TOTAL	<u>3,858.5</u>

## 5.5 Range Management and Livestock Development

### 5.5.1 Introduction

Over 95% of the Region's people depend either directly or indirectly on the agriculture, livestock and natural resources sectors for their livelihood. The importance of livestock in the economy is evident from the fact that 60% (or approximately 49,000 km<sup>2</sup>) of the Region is actively used for livestock grazing. Livestock provide high value food products such as meat, milk and fat; they are a source of cash income and a form of insurance; and they are important in the social exchanges and cultural systems of thousands of people in the Region.

Some important trends related to land-use and livestock production have been identified during the APVDP-assisted Regional and District planning exercises. These include a rapidly increasing human population, generally low and declining agricultural and livestock production and deterioration of the land from erosion and loss of fertility. The growing population is accelerating the expansion of agriculture into traditional grazing lands. Generally, this expansion is poorly planned and in many cases the grazing lands are poorly suited to the cultivation of crops. Neither pastoralists nor cultivators benefit from these developments.

In the livestock production sector specifically, the following trends are apparent:

- a reduction of grazing land due to agricultural expansion, relegating livestock to lower potential, higher risk areas;
- extensive rangeland deterioration (the replacement of good quality forages by undesirable plant species due to overstocking);
- increasing competition for resources between wildlife and livestock as available range diminishes;
- reduced production of meat and milk in the dry season because of shortages of adequate forage;
- erosion of the soil by wind and water because of overgrazing, cattle tracking and concentration of animals at watering places;
- a few large tracts (Yaida/Eyasi, S.E. Hanang, Kiteto) and several local pockets of tsetse-infested rangeland;
- inadequate number and distribution of livestock watering points;

- inadequate supply and distribution of veterinary medicines;
- poorly developed and maintained livestock infrastructure and supporting services (dips, veterinary centers, livestock markets, extension services).

In the traditional rangelands of the Region, the major concerns of pastoralists are: security of land tenure to reduce further encroachment by agriculturalist; provision and maintenance of adequate water supplies; and availability of veterinary medicines and services. In the more highly populated areas, where mixed crop and livestock production systems are in use, the primary needs are for extension information on improved production technologies and the availability of inputs and services to intensify livestock production. This Project sub-component will provide assistance to the Regional and District livestock specialists and the villagers and traditional pastoralists to address the above livestock-related issues.

#### 5.5.2 APVDP Accomplishments

Awareness by Party and government leaders of the above situation resulted in the National Livestock Development Policy in 1981. This is designed to prevent further decline of and gradually improve the stability and productivity of the livestock sector.

Within the guidelines of the National Livestock Development Policy, APVDP has supported projects to improve the productivity of the Region's rangelands and livestock. The APVDP-assisted Kisongo Livestock Watering Project is improving livestock water availability, grazing management and resource-use conservation. In Muklat Division of Arumeru District, the ILO is assisting with soil and water conservation projects.

The national policies and livestock-related projects now underway are positive initiatives dealing with livestock issues. By the time APVDP is concluded, Village Livestock and Land Management Committees will be functioning in 7 villages in Arumeru District, 8 in Hanang and 8 in Mbulu. Under the Chairmanship of local leaders, and with Party and extension staff representation, these Committees are identifying grazing areas and formulating programs for better use of communal grazing areas. Simultaneously, 138 livestock owners in these villages have participated in an organized extension program focusing on improvement of livestock production methods and pasture management. Improved practices adopted by these model herders are disseminated in the village through extension groups of 10 persons associated with each model herder (based on the political 10 cell units) and by information channeled through the village government Sub-committee for Production and Marketing.

The Project has assisted with training programs for livestock extension staff on communal rangelands and individual holdings and has established pasture grass/legume seed multiplication plots in three Districts. The seed plots test various pasture species, are used for demonstrations and training, and provide seeds and cuttings to villagers.

Additional activities under the APVDP include the provision of equipment and supplies for District Veterinary Centers, training for two Livestock Development Officers in animal health systems and support for District-wide village land use seminars in the southern Maasai District of Kiteto. A highlight of the very popular seminars were discussions of village rights and responsibilities regarding land resources, including land tenure and village definition and implementation of the National Livestock Policy.

#### 5.5.3 Sub-component Objectives

The objective of this sub-component is to improve the production and sustainability of both intensive and extensive livestock production systems -- to increase the quantity of milk, meat, fat and hides for direct use and exchange by the Region's villagers and to reduce soil erosion and rangeland deterioration.

#### 5.5.4 Sub-component Activities

APVDP activities serve as a starting point in designing a model for a long-term, Regional range improvement and livestock management program. This Project will provide financial and technical support to refine and expand (within the original three Agricultural Districts and into the additional three Maasai Districts) the pilot-model range and livestock improvement program developed as part of the APVDP.

##### a. Strategy and Program Outline

Basic Project strategy is to implement two interrelated components: improved management and production from communal grazing areas and improved management and production from individual livestock and land holdings.

Improved management and production of communal grazing areas will be implemented through village Livestock and Land Use Committees. These Committees, under the chairmanship of village leaders, will be composed of a District or Divisional technical advisor, local extension officers from all productive sectors, ward party secretaries and respected village representatives selected by the Village Council. Committee activities supported by the Project will vary depending on local circumstances, but will include the following types of activities.

- review and assessment of village land area and land allocations and possible reallocation of individual holdings to include acreage for livestock;
- selection of livestock owners to participate in extension programs focusing on individual holdings;
- designation of areas for exclusive livestock use;
- establishment of policies and bylaws for village control of communal land and livestock grazing;
- setting aside of dry-season reserve pastures;
- development of rotational grazing plans;
- seeding of adapted legume and grass pasture mixtures e.g., Chloris gayana, Stylosanthes spp., Panicum colartum;
- planting of "living fences" and windbreaks using fodder species (e.g., Leucaena);
- provision and maintenance of cattle dips, veterinary centers;
- contouring cattle trails;
- development of animal water supplies (e.g., water catchments, springs);
- plugging of erosion gullies with field stones;
- planting trees to protect erodable areas;
- development and supervision of a program for the equitable distribution of veterinary medicines;
- promotion of proper care and sale of livestock products, e.g., hides;
- formation of village livestock purchasing and selling cooperatives;
- selective clearing of tsetse-infested rangeland.

Improved management and production from individual livestock and land holdings will be implemented through establishment of an extension education program in which extension officers work directly with selected "contact" livestock owners. Monthly evaluation/planning workshops for extension officers (coinciding

with the salary cycle) will be held at District headquarters. Subject categories for these workshops will include management and improvement of individual pastures, integration of crop and livestock systems, improved animal husbandry, epidemiology, and care and sale of livestock products. Specific on-farm activities will include:

- eradication of undesirable plant species on small pasture plots (e.g. Solanum incanum, Lippia spp., Sida spp., Barleria spp.);
- reseedling of small plots with adapted grass and legume pasture species (e.g., Chloris gayana, Panicum maximum);
- planting of forage trees on contour bunds and at the peripheries of fields and pastures;
- development of grass/legumes and cultivated crop rotation;
- development of improved methods to store animal fodder as hay, silage;
- introduction of improved animal husbandry practices (e.g., mineral supplementation, selective breeding, care of young stock).

While in most villages both components will be implemented simultaneously, emphasis will vary depending on local conditions. Thus, for example, in Maasai or Barabaig villages where extensive pastoral systems predominate, the emphasis will be on communal activities. At the other extreme, in high density villages where livestock are stall-fed, the emphasis will be on improvement of individual holdings.

#### b. Program Integration of Productive Sectors

Although the livestock department is the leading agency for implementation of this dual strategy, assistance of the agriculture and natural resources sectors will be coordinated with livestock to facilitate integrated planning and production. This "leading sector" approach supports the sectoral nature of the Tanzanian Government structure and planning processes, facilitates effective use of limited manpower and other resources, and allows emphasis of one productive form of land use according to local circumstances. Cooperation between the various groups of involved, from field extension staff and District extension coordinators to District and Regional Steering Committee members, will insure integration of the productive sectors.

c. Supporting Activities

A number of additional range and livestock activities will be supported by the Project.

1) Security of land tenure

Security of land tenure will be supported through the strengthening and exercise of village legal rights and responsibilities with respect to village land resources. This will be accomplished through village seminars (conducted under the APVDP in 52 villages in Kiteto District) and through support of village Livestock and Land-Use Committee functions.

2) Livestock water supplies

Livestock water supply development has a history of high capital costs, low success rates, and costly unreliable maintenance of large dams and deep boreholes. This Project, working through Regional and District Water Departments, will emphasize lower cost, more easily maintained water supplies from small surface catchments, shallow wells, handpumps, windmills, gravity feed systems and innovative water harvesting technologies.

3) Veterinary medicines

The Project will provide funds for veterinary medicine as an interim measure pending completion of the Finnish-funded national pharmaceutical production facility. Veterinary medicines will be sold on a commercial basis with the local currency that is generated placed in a revolving fund to be used to support extension activities.

4) Education, extension and adaptive testing

The Project will support educational programs, in-service training for extension officers, production of extension information materials, and study tours for livestock owners. Support will be provided for further development of the pasture grass/legume seed multiplication plots established as part of the APVDP and for associated adaptive testing, training and seed dissemination. In addition, the Project will strengthen the Rural Training Center at Monduli as a center for extensive livestock production systems adaptive testing and extension by providing an RDS with a livestock extension background and a mobile extension unit to the facility.

5) Multi-purpose Brigades

The Project will support the establishment of multi-prupose brigades to construct water systems, undertake selective tsetse clearing, and construct and rehabilitate cattle

dips for villages. Brigades will be formed for Monduli, Kiteto, and Ngorongoro Districts where there is a considerable need for such infrastructure. The local people are reluctant to participate in self-help efforts but are willing to finance such activities through livestock sales. (This was confirmed during extensive consultations in the three Maasai Districts during the preparation of this Project.)

The brigades will be supervised by the District Livestock Development Offices in coordination with the extension and training program. Each brigade will be supplied with a truck, a Landrover, equipment and tools. Partial operational support will be provided for the first two years, after which the brigade should be self-financing through contracts with villages. For the first two years, technical assistance will be provided by a Brigade Advisor knowledgeable about water supply development in semi-arid lands and experienced in management and organization. After this period, six months of short-term engineering assistance is planned. As with the other sub-component activities of this Project, this activity will be evaluated regularly to determine its effectiveness and what, if any, corrections or adjustments should be made.

#### 6) Carcass Meal Production

Demand for carcass meal for stock feed or human consumption has risen steadily during the past decade. Internationally, and within Tanzania, demand exceeds supply. Carcass meal can be made from any animal. It is a relatively straightforward process of cooking (destroying all pathogens harmful to animals), extracting liquids and fats, then milling and bagging. The end product is durable, and, if kept free of moisture, will last for long periods. Of all modern meat processing techniques, the hygiene requirements for making carcass meal are yet most easily met. It would not be difficult to design mobile equipment for the purpose, using wood for fuel. The feasibility of carcass meal production as a rural industry using the primary products of game cropping and culling old, diseased or drought-stricken livestock will be investigated.

#### 5.5.5 Sub-component Outputs

- a. Villages with active range management and livestock development programs:
  - Hanang District: 8 villages included by the end of the APVDP; 10 villages added each year of this 4-year follow-on Project for a total of 48 out of 112 villages in the District.
  - Mbulu District: 8 villages included by the end of APVDP; 10 villages added each year of the Project for a total of 48 villages out of 86 in the District.

- Aurmeru District: 7 villages included by the end of APVDP; 10 added each year thereafter for a total of 47 out of 131 villages in the District.
- Ngorongoro District: 5 villages added each year of this Project for a total of 20 out of 29 villages in the District.
- Kiteto District: 5 villages added each year of this Project for a total of 20 out of 52 villages in the District.
- Monduli District: 5 villages added each year of this Project for a total of 20 out of 40 villages in the District.

By the conclusion of this Project, approximately 203 villages out of the Region's 450 villages will have functioning livestock and range management programs. This is adequate coverage to permit sustained expansion and improvement of the program upon termination of foreign assistance.

- b. Establishment of adaptive research and testing capability at the Rural Training Center in Monduli.
- c. Development of a model for better land and water resources planning and management with an emphasis on extensive livestock production.
- d. Training of Regional and District extension workers on a monthly basis in methods to improve land and water use and livestock development.
- e. Establishment of a producer and extension training program at the Rural Training Center and in the villages, with approximately 4000 days of training over the life of the Project.
- f. Development and testing of a mobile training unit for reaching pastoralist villages.
- g. Equipping of Regional and District Livestock Development Offices.
- h. Establishment of a commercial veterinary medicines supply program generating local currency for the extension service.
- i. Multi-purpose brigades organized and functioning in Kiteto, Monduli and Ngorongoro Districts, constructing water systems for livestock, clearing tsetse areas, and constructing better facilities for animal health.

- j. Completion of a feasibility study for carcass meal production and other livestock and wildlife-related industries.
- k. Reduced levels of overgrazing and improved conservation and use of the Region's rangelands, with more sustainable production and greater returns to livestock producers.

#### 5.5.6 Sub-component Inputs

- a. Technical Assistance: Two years assistance from an advisor to the Maasai Districts and multi-purpose brigades, followed by six months water systems engineering assistance in supply systems suitable for semi-arid lands and six months consulting and training assistance in pasture development, animal husbandry and health.
- b. Training: Rural Training Center and village training (4000 person-days) in livestock development and better land and water resources conservation and use; monthly training for extension workers in six Districts; and a study tour for senior officials on livestock development.
- c. Equipment and Supplies: Two Landrovers for Regional staff and six Landrovers for District Livestock Development Offices. Provision and equipping of mobile training unit for the Rural Training Center, as well as operational funds for its adaptive testing program. Supply of veterinary medicines to the six Districts, with the returns used for extension service operations in each District. Equipping of the three multi-purpose brigades -- each with a truck, Landrover, and basic tools and equipment.
- d. District/Village Development Fund: Fund for each of the three Districts where the multi-purpose brigades are operating to test innovative water supply systems and tsetse clearing techniques. (Other resources are available for full-scale village development under sub-component 5.1.)
- e. Operational and Administrative: Vehicle maintenance and supply of mobile training unit; 100 percent support the first two years and 50 percent the second two years. Two years of operational support to the three multi-purpose brigades.

- f. Other Costs: Feasibility study for carcass meal production.
- g. Contingency and Inflation: Twenty percent of the above costs.

In support of this sub-component, the Government will provide the manpower and primary support for the Regional and District Livestock Development Offices. (Current staff is about 350 livestock workers.) In addition, the Government will make available the staff and resources of the Rural Training Facility in Monduli District for adaptive research and testing of extensive livestock production systems. The District public works and Water Offices will provide technical support for the multi-purpose brigades, with supervision from the District Livestock Development Offices. Funds for the brigades' activities will come from village contracts.

#### 5.5.7 Sub-component Budget

<u>Item</u>	<u>U.S.</u> <u>\$(000's)</u>
a. <u>Technical Assistance</u>	384.0
Multi-Purpose Brigade Advisor	
(2 yrs x 120 <u>240</u> )	
Short-term Assistance -- Water Systems	
(6 mos x 12 <u>72</u> )	
Short-term Assistance --- Livestock	
(6 mos x 12 <u>72</u> )	
b. <u>Training</u>	430.0
RTC and Village Training	
(4000 days x \$10 per day <u>40</u> )	
District Extension Service Training	
(6 Dists. x 15 x 4 yrs <u>360</u> )	
Study Tour	
(1 x 6 persons x 5 <u>30</u> )	
c. <u>Equipment and Supplies</u>	896.0
Landrovers-Regional and District	
(8 x 20 <u>160</u> )	
Motorcycles	
(40 x 1.4 <u>56</u> )	
Mobile Training Unit -- RTC	
(1 x 30 <u>30</u> )	
Veterinary Supplies -- District	
(6 x 50 <u>300</u> )	
RTC -- Adaptive Testing Supplies   ( <u>20</u> )	
Multi-purpose Brigades	
Trucks (3 x 40 <u>120</u> )	
Landrovers (3 x 20 <u>60</u> )	
Tools/Equipment (3 x 50 <u>150</u> )	

d. <u>Construction</u>	---
e. <u>District/Village Development Fund</u>	150.0
Maasai Districts	
(3 x 50 <u>150</u> )	
f. <u>Operational and Administrative</u>	390.0
<u>Landrover Maintenance/POL</u>	
(8 x 2 yrs x 5 <u>80</u> )	
Motorcycle Maintenance	
(40 x 2 yrs x .5 <u>40</u> )	
Mobile Training Unit	
(1 x 2 yrs x 10 <u>20</u> )	
Third and Fourth Years	
(50% of the above costs or <u>70</u> ,	
with the Government providing	
remaining 50%.)	
Multi-purpose Brigades	
Trucks (3 x 2 x 10 <u>60</u> )	
Landrovers (3 x 2 yrs x 5 <u>30</u> )	
Operational (3 x 2 yrs x 15 <u>90</u> )	
g. <u>Other Costs</u>	20.0
Feasibility Study	
h. <u>Contingency and Inflation</u>	454.0
20% of above costs of <u>2270</u> , or	
<u>454</u>	
SUB-COMPONENT TOTAL	<u>2,724.0</u>

## 5.6 Delivery of Inputs/Services

### 5.6.1 Introduction

Delivery of adequate amounts and proper types of inputs and services on a timely basis is necessary for successful development of the agriculture, livestock and natural resources sectors. Improved crop production requires appropriate farming equipment, tools, seeds and (depending on the results of adaptive research) specific kinds of fertilizers and pesticides. In the livestock sector, there is a need for animal health services, livestock dipping facilities, medicines, mineral supplements, grass and legume seeds and planting materials for pasture improvement. Large numbers of adapted species of tree seedlings are required for soil conservation purposes and for development of village woodlots.

The above are examples of specific production requirements. For the productive sectors generally, effective storage, processing, marketing and distribution systems are necessary. Also, for many enterprises, various types of production credit must be

available before significant increases in production will be possible. A basic need for an effective input and service delivery system is an established road system to facilitate the flow of supplies and products.

The overall input delivery and service network of Arusha Region is weak. Many of the required inputs and services are unavailable or only provided sporadically in the Region. Moreover, until the initiation of APVDP, there has been little adaptive testing to determine appropriate inputs and organizational arrangements for providing services.

With the initiation of APVDP, studies were done on the requirements of various sectors, identifying the most critical ones. These were addressed by the APVDP on a selective basis, including production and distribution of agricultural implements, the provision of medium-term credit, livestock veterinary supplies, agricultural processing equipment, forest and fruit tree nurseries, and the rehabilitation of the road system in the three Agricultural Districts as well as the identification of the primary roads network for servicing the productive sectors of the Region.

Under this Project, the work started by the APVDP will be continued and refined through the adaptive research and testing of agriculture and livestock production systems. Specific requirements in the areas of concentration will be identified and through better coordination and selective training and support, improvements will be made in the input-delivery and service systems. Assistance will be provided for further development of agricultural implements and processing equipment, the improvement of medium-term credit programs for rural industries and farmer purchases of ox-drawn equipment, the development of seed distribution and other input delivery systems and the improvement of storage and marketing. Other priority needs such as veterinary supplies and water supply are considered in the above sub-components.

#### 5.6.2 APVDP Accomplishments

As part of the regional planning exercise, APVDP investigated and assessed the needs and present capability of the Region to provide inputs and services (improved seed, fertilizers, pesticides, farming equipment and veterinary supplies) to the productive sectors. The role of government parastatals in providing inputs and marketing services was analyzed as were the institutional and administrative capabilities of various credit organizations. These special studies and sector background and assessment papers identified the need for more effective delivery of inputs and services which became a priority component of the Region's development strategy. Based on these studies and initial village development work, selective efforts were made to provide the necessary inputs and services.

A priority need was for ox-drawn equipment. APVDP has built and equipped a Regional Agricultural Implements Production Facility and District Assembly and Maintenance Facilities in the three Agricultural Districts. Under contract with local industries or institutions, APVDP has done the research and development for ox-carts, ox-plows, and planters. Other industries to add value to production have been established, including sixteen grain grinding mills, timber and wood working industries, brick and tile production and cottage industries. Currently, an oil seed press and "Spider" tractor are being imported from Britain to test their appropriateness.

To finance these enterprises, mechanisms have been developed with traditional lending organizations to provide medium-term credit. A loan guarantee fund has been established with the National Bank of Commerce (NBC) and an experimental lending program with the Tanzanian Rural Development Bank (TRDB). The 16 village-level projects financed to date on a loan basis have a 100 percent repayment rate, providing a firm foundation for strengthening linkages between villages and lending institutions.

In addition to the above emphasis, APVDP has increased the supply of veterinary equipment and medicines, improved and constructed cattle dips, constructed village grain storage facilities, and established tree nurseries to provide tree for foodlots and soil conservation purposes. Further APVDP is rehabilitating 296 miles of road in the three Agricultural Districts and has developed with the Region a primary roads network of about 1500 kilometers, selected on the basis of economic criteria. To further improve transport, USAID and APVDP have designed and are testing a program to sell lorries to villagers. These are all steps to improve the overall input and service delivery system of the Region. This project will continue the work started under the APVDP.

### 5.6.3 Sub-component Objective

The objective of this sub-component is to improve the Regional capability to provide production-related inputs, supplies and services throughout the rural areas.

### 5.6.4 Sub-component Activities

In conjunction with the Regional Steering Committee (including representatives of the Planning Office and the Productive Sectors), the Project Land and Water Resources Planning Advisor and the Adaptive Research Agronomist/Extension Specialist will work with parastatal representatives to help improve delivery of production-related supplies to the rural area, concentrating initially on the most critical problems. Mechanisms will be tested to enable Tan Seed to make effective delivery of seeds and fertilizers based upon the adaptive research results. This will include developing mechanisms at the local level, involving the extension staff, whereby requests for these inputs may be estimated, compiled and forwarded in a more timely fashion.

Also, based on the adaptive research and testing program, there will be the need to develop prototype agricultural implements for testing and eventual production. The Project will provide funds for contracts with local institutions for research and development, including the new Regional Agricultural Implements Production Facility. This model of contracting for prototype development with local institutions allows these producers to tailor their production to farmer needs, using locally available materials.

Another initial need will be to continue to develop the linkages with lending institutions for financing farmer purchases of ox-drawn equipment and for village rural industries. From the APVDP experience, the next step should be to strengthen Regional capabilities of TRBD and NBC in project preparation and loan administration. The Project will provide training for Regional and District staff. Also, if the loan guarantee scheme works effectively, the possibility of expansion will be considered, using a portion of the District and Village Development Fund described in sub-component 5.1.

Marketing of produce remains a problem. In its analyses, APVDP found that the marketing system of the National Milling Corporation could be strengthened through management and organizational training for its District representatives. This is illustrative of the type of training to be provided under this sub-component. Specific training requirements will be determined with the appropriate institutions.

For securing inputs and supplies and for improving marketing, there are indications that the Government will reinstitute cooperatives in the coming year. The current plan calls for the formation of village cooperatives and a regional cooperative union. This development will provide for greater farmer involvement and increased benefits to farmers from their production. The implications of this change will be studied and possible roles for the cooperatives will be developed and tested.

To improve the general availability and coordination of all necessary inputs and services, the Director of Adaptive Research, the senior agriculturist in charge of the Extension Program and Regional Project Technical Assistance Specialists will host a meeting every six months with representatives invited from all input and service suppliers to discuss in detail the on-going situation and requirements for supplies and services. Specific targets for every necessary production input and the detailed needs for services to support the development of the productive sectors will be discussed and agreed upon. Particular attention will be given to the need for forward planning to ensure timely availability of necessary supplies and services, at equitable rates, to the farmers and pastoralists throughout the Districts.

The Project will provide short-term technical assistance to improve the Region's capability to produce and deliver all necessary inputs. Such assistance can include specialists in: seed production, grain storage and marketing, transportation systems, farmers' organization and cooperatives. They will provide technical, administrative, and management training and operational assistance to develop improved input production and distribution and provision of better services. Coordination and follow-up for these activities at the District level will be done through the District Planning Offices and will be a particular responsibility of the Rural Development Specialists.

#### 5.6.5 Sub-Component Inputs

- a. A Regional coordinating group, meeting regularly, to determine the needs for critical inputs, supplies and services on a correct and timely basis and to determine the various agencies responsible for providing them.
- b. Improved delivery of production-related supplies to the rural areas.
- c. Development of model village cooperatives for improving input delivery and marketing.
- d. Training of Regional and District lending institution staff in project development and loan administration.
- e. Management and organizational training for agencies providing inputs and services.
- f. Improved seed production, storage and distribution of superior crop varieties recommended by the adaptive research sub-component.
- g. Small-scale manufacturers established and producing appropriate farming equipment and tools (based upon the recommendations of the adaptive research sub-component).
- h. Trained technicians and improved grain and other food storage, handling, and marketing facilities and systems established at all levels.
- i. Institutional credit systems established providing adequate and timely credit (primarily medium-term) by means of a loan guarantee fund or other mechanisms.

### 5.6.6 Sub-Component Inputs

- a. Technical Assistance. 12 months of short-term assistance in support of agencies providing inputs and services, including seed production and distribution, marketing, grain storage, rural industry, and rural credit systems.
- b. Training. 6 weeks for lending institutions staff in project development and loan administration, eight weeks for service agency personnel in management and organization; and four weeks of short courses as required.
- c. Equipment and Supplies. Funds for prototype research, development and testing, primarily agricultural implements, tools, and processing equipment, done under contract with local institutions.
- d. District and Village Development Funds. Funds, if needed for the loan guarantee program, will come from the Village Development Fund described in sub-component 5.1.
- e. Other Direct Costs. Studies and development of models for expanded village role in providing inputs and services.

The main inputs for this sub-component will come from the existing financial and manpower resources that provide inputs and services, with this Project providing specific interventions for improving the delivery system.

### 5.6.7 Sub-Component Budget

<u>Item</u>	<u>U.S. \$(000's)</u>
a. <u>Technical Assistance</u>	144.0
Short-term Assistance	
(12 mos x 12 <u>144</u> )	
b. <u>Training</u>	180.0
Project Development/Loan Administration	
(6 wks x 10 <u>60</u> )	
Management and Organizational	
(8 wks x 10 <u>80</u> )	
Other Short-term training	
(4 wks x 10 <u>40</u> )	

c.	<u>Equipment and Supplies</u> Prototype Development/Demonstration (4 yrs x 20 80)	80.0
d.	<u>Construction</u>	---
e.	<u>District and Village Development Fund</u>	---
f.	<u>Operational and Administrative</u>	---
g.	<u>Other Costs</u> Village Study and Role Development (30)	30.0
h.	<u>Contingency and Inflation</u> 20% of above costs of 434 or 86.8	86.8
	SUB-COMPONENT TOTAL	<u>520.8</u>

## 5.7 Soil and Water Conservation

### 5.7.1 Introduction

Soil erosion is a serious threat to the economic stability and growth of Arusha Region. High populations of people, overgrazing by livestock and present agricultural practices are leading to excessive erosion of the soil by wind and water. The situation is exacerbated by the extremely fragile, easily eroded soils found in many parts of the Region.

The removal of trees to provide fuelwood and poles and timber for construction adversely affects the stability of the soil in many of the District and Ward watersheds. Unprotected slopes are easily eroded and water catchment basins are quickly silted in. Rainwater, which under good conservation practices would enter the soil to recharge groundwater supplies, is rapidly lost to streams and rivers. Bare soil quickly loses organic matter, cohesive soil structure is lost and the water-holding capacity of the soil is reduced.

To bring about a significant improvement in the conservation of the soils and water in the Region is a long-term undertaking. The APVDP has laid some of the groundwork for this task. It is important now for this Project to continue and expand upon the work started. The objective is to establish conservation of natural resources, not as a discrete program, but as an integral part of all productive sector activities.

### 5.7.2 APVDP Accomplishments

The main accomplishment of the APVDP has been to assist the Region in assessing the critical nature of soil degradation and water loss and in developing a strategy to address the problem. A serious commitment to soil and water conservation now

exists upon which to build an effective action program. This commitment is clearly expressed in the Region's long-term development plan.

The APVDP provided a soil and water conservation specialist to review the extent of soil and water losses throughout the Region. From these field studies, specific recommendations were made to begin the process of stabilizing the soils in some of the most seriously eroded areas.

In addition, District officials participated in a soil and water conservation workshop given with APVDP assistance. One practical result has been the establishment and operation of a Soil Conservation Unit (SCU) to address the severe soil erosion problems of the Karatu area of Mbulu District. A major accomplishment of the SCU has been the establishment of contoured crop production practices on over 1200 hectares in the area.

Further conservation work continues, including the planting of grass/legume mixtures and trees along contour bunds, plugging of larger erosion gullies with field stones, planting of sisal to reduce the damage from cattle tracking and planting of trees in strategic spots to prevent further expansion of eroded areas.

APVDP is providing substantial assistance to District, Ward, and in some cases, village tree seedling nurseries. The three Agricultural Districts of the Region now have functioning nurseries which have produced and distributed millions of adapted tree seedlings to farmers and village groups in all areas. An important goal of this Project is to expand these tree nurseries and improve the planting and follow-up care of the trees.

### 5.7.3 Sub-component Objective

The objective of this sub-component is to improve the institutional capability to conserve the land and water resources of the Region for sustained and productive use.

### 5.7.4 Sub-component Activities

The Project will provide support for the establishment of a Soil and Water Conservation Unit (SCU) in each of the six Districts. This will include management and technical assistance, training, equipment and transportation. Each SCU will include representatives from the livestock, agriculture, forestry and lands departments working as a team.

Each SCU will serve as a focal point for an integrated action program to improve the use and conservation of the Districts' soil water resources. Within each District, the SCU will work with village and Ward leaders to develop an annual plan-of-work to address the highest priority resource-conservation problems. A phased series of activities will be planned and implemented under the leadership of the SCU and with the full cooperation and participation of the respective communities.

The kinds of activities to be undertaken will depend on locally identified needs and priorities. Where appropriate, cultivated land will be contoured to decrease soil erosion and to increase rainfall penetration into the soil profile. Grass and legume pasture mixtures of fodder trees (e.g., Leuceana) will be planted to stabilize the contour bunds. Inter-village cooperation to plan and implement projects to protect small watersheds, control erosion gully expansion or develop water conservation structures will be supported.

The work of the Soil Conservation Units and the District forestry, livestock and agricultural extension officers will be closely coordinated. The seedlings produced at the Project-supported tree nurseries will be provided to the SCUs for use in the soil and water conservation programs.

Livestock and agricultural extension officers will work closely with the Units to assist farmers to adopt basic conservation-farming and livestock raising practices. These practices include rotational and strip cropping, grass/tree planted protective bunds or terraces, minimum village, rotational grazing, planting of "living" fences and the provision of livestock water at strategic locations for improved livestock dispersal and management.

The Project will support innovative, experimental approaches to better soil and water conservation. Community-wide tree planting days, conservation-farmer awards and conservation-related school projects will be tried as possible models for wider adoption. Ideas for experimental conservation techniques will be solicited from Village Councils, Ward and District Party and government officials and community groups.

The Project-supported Media Production Center at the Regional headquarters will provide soil and water conservation educational and informational materials. Posters, teaching aids, leaflets, etc. will be produced for use by the SCU technicians, extension officers and Ward and village officials to teach the causes, results and prevention of soil erosion.

The Project will provide funds through the District/Village Development Fund to carry out the kinds of soil and water conservation activities illustrated above. In addition, short-term specialists will be provided to advise on remedial action needed in complex soil erosion problems, to provide training to the SCU staffs and extension officers and to provide other assistance for improved soil and water conservation as the needs are identified.

In addition to forestry activities (related to soil conservation) and other soil and water conservation activities as outlined above, the Project will assist in developing improved fisheries and beekeeping practices as part of general support to the natural

resources sector. Funds for more, natural resources activities initiated by the villages are provided through the District and Village Development Fund included in Sub-Component 5.1.

#### 5.7.5 Outputs

- a. A Soil and Water Conservation Unit (SCU) functioning in each District to provide leadership and technical guidance for village-level soil and water conservation programs.
- b. All SCU and extension staff trained in basic soil and water conservation theory and field practice.
- c. The SCUs planning and implementing projects with the livestock and agricultural extension service for integrated, improved on-farm and community-wide soil and water conservation.
- d. Greater commitment to and active participation in soil and water conservation programs by all villages in the Region. Such commitment demonstrated by provision of labor or other local resources for implementation of projects.
- e. A number of innovative soil and water conservation techniques and approaches tested and the results made available for possible duplication in additional villages and areas.
- f. A comprehensive series of soil and water conservation information and educational materials produced and in use in the work of the SCUs or the extension service throughout the Region.
- g. As a pilot-project, for demonstration and training purposes, at least one small-watershed in each District completely planned and the land protected by appropriate soil and water conservation plantings, structures and farming or grazing practices.
- h. Forestry tree seedlings nurseries functioning in all Districts and Wards and a number of villages to grow and distribute adequate numbers of tree seedlings for use in the various soil and water conservation projects.
- i. In addition to the conservation-related forestry activities of the natural resources sector, production, handling and marketing of other natural resources products such as fresh-water fish and fisheries products, honey, etc. will be increased and improved.

5.7.6 Inputs

- a. Technical Assistance. short-term specialists in various subject-matter areas to provide support for the soil conservation (and natural resources) projects, including soil and water conservation, water resources engineering, conservation extension, forestry information, fisheries, beekeeping, etc. An estimated 12-person months will be required.
- b. Training. short-courses, seminars, field days, study tours, etc. to improve capabilities of the natural resources sector staff (forestry, fisheries, beekeeping) and the staff of the Soil and Water Conservation Units.
- c. Vehicles.
  - A Landrover for the Soil and Water Conservation Unit in each District (6).
  - Three Landrovers; one each for the Regional Offices of Forestry, Fisheries, and Beekeeping.
- d. Equipment and Supplies. equipment, supplies, and materials for operation of three seedling nurseries (for conservation purposes), training and demonstrations, and experimental approaches to soil and water conservation; improved fisheries and beekeeping equipment; and supplies for testing and demonstration.
- e. District/Village Development Fund. funds established at each District to encourage innovative village-level approaches to better soil and water conservation.
- f. Operational and Administrative. vehicle maintenance costs at 100 percent during the first two years and 50 percent for the second two years, with the Government providing the other 50 percent.
- g. Contingency and Inflation. 20 percent of the above costs.

The Government will provide the supervision and manpower for the District Soil Conservation Units, with supporting assistance from the Agriculture, Livestock and Natural Resource extension services. In addition, it will provide 50 percent of the vehicle maintenance costs for the second two years of the Project and 100 percent after the Project is completed. There will also be sig-

nificant village labor contributions for the conservation activities and labor and financial resources contributions for the directly productive (fisheries, beekeeping, forestry) activities financed by the general District and Village Development Fund described in sub-component 5.1.

5.7.7 Sub-component Budget

<u>Item</u>	<u>U.S. \$(000's)</u>
a. <u>Technical Assistance</u>	144.0
Short-term Assistance -- Conservation Natural Resources (12 mos x 12 <u>144</u> )	
b. <u>Training</u>	120.0
District Conservation Training (6 Districts x 20 <u>120</u> )	
c. <u>Equipment and Supplies</u>	300.0
Equipment -- District Soil Conservation Units/Natural Resources Offices (6 Districts x 20 <u>120</u> ) District Landrovers (6 x 20 <u>120</u> ) Regional Landrovers (3 x 20 <u>60</u> )	
d. <u>Construction</u>	---
e. <u>District/Village Development Fund</u>	180.0
Funds for village conservation experiments (6 Districts x 30 <u>180</u> )	
f. <u>Operational and Administrative</u>	135.0
Vehicle Maintenance (9 LRs x 2 yrs x 5 <u>90</u> ) Years Three and Four (50% of above or <u>45</u> )	
g. <u>Other Costs</u>	---
h. <u>Contingency and Inflation</u>	175.9
20% of above costs ( <u>175.9</u> )	
SUB-COMPONENT TOTAL	<u>1,054.9</u>

## VI. IMPLEMENTATION ARRANGEMENTS

The Arusha Rural Productivity Project has been designed to support Regional development strategies and priorities. It will complement and strengthen the existing government structure and decision-making process and thereby increase the likelihood of providing self-sustaining benefits for the people of the Region.

The Project will be under the direct supervision of the Regional Development Director, with day-to-day planning, implementation and evaluation the responsibility of the Regional Planning Office. The Regional Development Director will have final implementation responsibility, and all funding decisions will be made by his office. Technical assistance will be provided to support normal, daily operations of Regional and District offices (in contrast to the IBRD model of establishing a Project Implementation Unit). Advisors will be a part of the Regional and District decision-making process. Funds for specific activities will be programmed through the annual planning cycle of the government. This approach allows the complementary planning of resource allocations from government and donors.

In this Project, major advisory assistance and resources are directed to assist with better planning and project preparation, improved management and organizational arrangements for project implementation, and on-going evaluation to assess and correct development activities. This emphasis on building District level capabilities supports decentralization and the anticipated changes in the governmental structure making the District the key development unit.

Further, the Project is designed to enable better use of Regional and District personnel through improved management and organization, more suitable technologies, training of present staff, and a plan for the government to gradually provide the recurrent costs of the Project. Project activities will concentrate on the improvement of existing facilities rather than the creation of new ones. Operations within the existing governmental systems, emphasis on District institution-building, and better use of available resources will greatly improve the chances of this Project to make a lasting economic impact in the Region.

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## VII. ANALYSES

Implicit in the design of this Project are several concepts and assumptions worth highlighting.

### 7.1 Technical/Implementation Analysis

The main thrust of this Project is to build upon existing resources in a way that leads to sustainable development benefits. The following Project design aspects are significant:

1. The Project is organized to support the existing governmental structure and planning and implementation process. It is anticipated, based on APVDP experience, that this will lead to a strong institutional commitment to the Project.
2. The technologies to be introduced by the Project rely mainly on locally available supplies, thus minimizing the foreign exchange requirements. This approach should allow sufficient increases in food production to meet the needs of the growing population of Arusha Region and allow the Region to export excess quantities to food deficit areas.
3. Although the Project, and Regional and District governments, would benefit from additional, more qualified local manpower, better results can be achieved through the training and more effective management and organization of existing personnel.
4. The thrust of the Project is to increase the production and incomes of small farmers and livestock producers. This emphasis on production and income-generating activities will lead to better living conditions for the people of Arusha Region than will investments made in social infrastructure and services.
5. The Project is designed to minimize the recurrent budget obligations of the government, with major resource commitments from the people who will benefit from the proposed activities.
6. The Project assumes a capability within the government and other local institutions to provide support for the development effort.

In the review of this proposed Project, these are some of the assumptions that should be examined and areas where agreements need to be reached before additional external investments are made. Under APVDP, there is evidence to support the above hypotheses as realistic for the current situation in the Region. Further, these concepts are incorporated in the Region's long-term development plan.

## 7.2 Economic Analysis

The benefits to be derived from widespread adoption of improved, intensive farming systems technology are many. Project-supported adaptive research and effective extension of the results of that research will increase small-holder crop yields under rainfed conditions by a minimum of 20% during the life of this Project. Because the emphasis will be on mixed livestock and crop production farming systems using locally available resources, the net returns to farmers who adopt the recommended farm technology will be at least equal to the more highly capitalized farming systems and double the returns from traditional, unimproved systems. (See Annex B.) Expansion and improvement of irrigated farming likewise will result in increased yields, total production and economic returns. Double or triple cropping of higher value crops will result in net returns at least four times greater than present levels under rainfed conditions.

Additionally, the intensive farming technology to be developed and introduced by the Project will result in better care of the land. This, coupled with Project assistance for better soil and water conservation practices generally, will result in the improvement rather than the degradation of the soil. Reduced erosion and improved storage of water in the soil will be basic to the establishment of stable, sustainable agricultural production systems in the Region. While not quantifiable, the benefits to be derived by the entire population of Arusha Region from a more productive, sustainable agriculture are significant. The kinds of agricultural systems this Project will help to establish are, in fact, essential for the continued economic and social viability of the Region.

In the important livestock and range management sector, the Project-supported activities will result in substantial benefits. A population of healthy, productive animals in balance with well-managed rangelands will mean real increases in the income and improvement in the welfare of the thousands of pastoralists throughout the Region. Regular off-take of livestock and more efficient marketing systems will benefit producers and consumers alike. Proper animal stocking-rates and better care of the rangelands will reverse the present, serious deterioration of the range. The economic and social benefits of stabilized, productive rangelands are impossible to calculate. However, because of the size and importance of this sector of the economy, the benefits to be derived are substantial and apply to the entire population of the Region.

Improved production, handling, storage and processing of fruits and vegetables, increased fish harvesting and improved beekeeping will benefit large numbers of producers and make available to consumers more and better quality food products. This Project, by improving the capabilities of all productive sector technicians to plan and assist a large number of diverse village-specific development activities, will directly increase net incomes of thousands of people. This Project, in only four years, cannot completely rejuvenate the rural economy. It will, however, establish a firm basis for significant, sustained economic development in the years ahead.

### 7.3 Beneficiaries

The wide-ranging activities of APVDP and the many levels at which it operates make it difficult to determine the number of beneficiaries. This Project shares this difficulty, but as the activities are more directed, some beneficiary projections are possible. At a minimum, this Project will work in 60% of the Region's 463 villages, assisting over 100,000 farm families to improve their production in a way that can become self-sustaining. This process involves developing the technical knowledge, management and organizational capabilities and financial resource base of individual farm families and of the village as a whole. The Project's stress on local involvement in decision-making increases the likelihood of village support and resource commitments toward sustainable benefits.

Accomplishment of the Project's objectives also depends upon improved training, management, and motivation of government and Party personnel, particularly at the District level where this Project concentrates its resources. The Project, through its training, technical assistance and the provision of resources, will directly improve the capabilities of the approximately 1,200 officials responsible for productive activities in the Region. With this assistance, it is anticipated (with confirmation from past APVDP activities) that these officials will be better able to communicate with and support the development of rural villages in Arusha Region.

## VIII. SUMMARY BUDGET

Estimated Budget by Sub-Component

<u>Sub-component</u>	<u>U.S. \$(000's)</u>
5.1 Developing District and Village Capabilities for Improved Land and Water Resources Utilization	11,444.4
5.2 Adaptive Research	1,259.5
5.3 Extension and Information	1,093.9
5.4 Irrigation Development	3,858.5
5.5 Range Management and Livestock Development	2,724.0
5.6 Deliver i Inputs/Services	520.3
5.7 Soil and Water Conservation	<u>1,054.9</u>
TOTAL	21,956.0

Estimated Budget by Type of Input

<u>Input</u>	<u>U.S. \$(000's)</u>
a. Technical Assistance	4,872.0
b. Training	1,437.6
c. Equipment and Supplies	2,282.0
d. Construction	870.0
e. District/Village Development Fund	7,125.0
f. Operational and Administrative	1,440.0
g. Other Costs	270.0
h. Contingency and Inflation	<u>3,659.4</u>
TOTAL	21,956.0

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**ANNEX A  
PHYSICAL DESCRIPTION OF  
PROJECT SITE**

## ANNEX A

## PHYSICAL DESCRIPTION OF PROJECT SITE

Arumeru District surrounds Mount Meru and has within it the separately administered Arusha Town. In area it is the smallest District, 2,858 sq. kilometers but contains the highest population, some 250,000 people at an overall density of 87.5 persons per square kilometer. On the southern slopes of Mount Meru lies the coffee/banana belt which contains about half the District's population at extremely high densities. Rainfall quickly drops off from 40" to less than 20" away from the mountain on the plains to the south and north of it. The major cash crop of the District is coffee although wheat and maize are also major crops. Livestock rearing is also important, the District herd being 189,540 AU. Despite some intensive stall raised cattle in the coffee/banana belt, overstocking and overgrazing is a great problem.

Although the District is small in size and close to Arusha, communication within the District is not good, many parts becoming isolated during the rains. However, despite poor communication, the people of this District have better access to goods and materials in Arusha than any of the other rural populations in the Region.

Hanang District, with an area of 8,405 sq. kilometers and a population of approximately 240,000, lies largely within the Rift Valley in the south of the Region. Its altitude ranges from just over 3000 ft. in the north around Lake Manyara up to over 7000 ft. above the Rift escarpment in the south west. The District has equally varied rainfall, ranging from some 40" on the upper slopes of mountains to under 15" on the plains to the east and south. The variety of crops grown reflect these variations, ranging from pyrethrum to millet and other drought resistant crops among others. The District contains over 20 percent of the Regions livestock herd but is more usually thought of as the "breadbasket" of the Region.

Two main trunk roads pass through the District (from Arusha to Dodoma and Singida and the West), and although the condition of both these roads and other feeder roads is not good, communications within the District and the rest of the Region is reasonable. The administrative structure of the District is well developed and communications between villages and the District administration is well established.

Mbulu District is situated in the western portion of the Region and contains some 200,000 people in an area of 7,620 square kilometers. The greatest majority of the District lies at an altitude of 5000 ft., but rainfall ranges from about 45" in parts to less than 20" in others in a "good" year. The eastern and

northern sections of the District suffer from high population densities leading to land shortages and degradation while a large part of the west is semi-arid and very lightly populated (low rainfall and tsetse fly discouraging development). Almost all agriculture is subsistence although in the north around Karatu, wheat and coffee are grown on estates and many subsistence farmers produce a small crop surplus for sale. Cattle ownership and consequent livestock density is high in the more populated parts of the District.

Communication within the District is generally poor, although the improvement of the main Karatu-Mbulu-Dongobesh road by APVDP has helped enormously. The Administration of the District is well established.

Monduli District, with an area of 16,061 square kilometers and a population of 68,900, is the most centrally located of the three Maasai districts. The district administrative headquarters was established in 1929, when the whole of Maasailand was separated to form a single district. Because of its central position and proximity to development centers, Monduli has the best developed infrastructure in terms of transport and communication. The two major trunk roads which pass through the district, as well as the road linking Arusha to the tourist attractions of Ngorongoro and the Serengeti, have all facilitated economic development in the district.

Kiteto District, with a land area of 32,475 square kilometers and a population of 59,800 was formed as a district in 1974 when the single Maasai district was split in two. Perhaps the most distinctive factor influencing development in the District is the enormity of the land area -- it comprises almost 40 percent of the total regional area. While the district administrative structure is fairly well established, its effectiveness is significantly constrained by the size of the land area and the problems of transport and communication. A visit to Ruvu Remit located in Moipo Division by District staff involved a round-trip to and from district headquarters of almost 600 miles over dirt roads.

Ngorongoro District is the newest Maasai District having been established in 1979. It covers 15,431 square kilometers and has a population of 47,000. This district is characterized by its remoteness due to its geographic position, poor transport and communications system, and also the fact that the government administrative structures are only now being developed and strengthened. Several important factors influence its development including the fact that over half of the District is under the Ngorongoro Conservation Area Authority with its focus on wildlife conservation and tourism; the presence of the Sonjo, a small but important ethnic group which traditionally depends on small-scale irrigated and rainfed agriculture mixed with the raising of livestock; and proximity of the District to Kenya.

## Phase II-Geographic Concentrations by District

<u>District</u>	<u>Concentration</u>
1. Arumeru	Land planning Unit "J" 622 km <sup>2</sup>
2. Hanang	Gallapo-8 villages Magugu/Kiri-16 villages Bonga-3 villages Gitting-2 villages
3. Mbulu	Zone A-Ayalabe, Kambi Simba Zone B-Kansay, Titiwi Zone C-Arri Zone D-Hayderrer, Krijomat Zone E-Endayawish Zone F-Mangola Brazani, Duguomaging
4. Monduli	Cluster A-Engaruka Chini, Selela, Esilalei/Esiriwa Cluster B-Matale/Sinoni Cluster C-Meirugoi, Ilorienito
5. Kiteto	Cluster A-Msitu wa Tembo, Kiruani, Lemkuna, Magadini Cluster B-Engassmet, Kitwai A and B
6. Ngorongoro	Cluster A-Orgosorok, Sakala, Magaiduru- Lorien Cluster B-Digodigo chini, Samunge, Kisangiro Cluster C-Oloirobi, Endulen, Esere.

**ANNEX B**  
**ESTIMATED COSTS AND RETURNS**

TABLE I

Estimated Costs and Returns to Maize Production

## Production System

	Traditional <sup>1/</sup>	Improved With Tractor <sup>2/</sup>	Improved With Oxen <sup>2/</sup>	Intensive/Organic With Oxen <sup>3/</sup>
Yield (kg/ha)	850.0	1500.0	1500.0	1500.0
Price (T.Sh.)	1.5	1.5	1.5	1.5
Gross Value	1275.0	2250.0	2250.0	2250.0
Labor	107.0	61.0	66.0	75.0
Tractor		750.0		
Oxen			300.0	300.0
Seed	21.0	175.0	175.0	175.0
Insecticide		150.0	150.0	
Weeding		200.0	200.0	100.0
Other Cash Costs	5.0	5.0	5.0	5.0
Gross Margin	1249.0	970.0	1420.0	1670.0
T. Shs/Work Day	11.7	15.9	21.5	22.3

TABLE II

Estimated Costs and Returns to Sorghum

## Production System

	Traditional <sup>1/</sup>	Improved With Oxen <sup>2/</sup>	Intensive/Organic With Oxen <sup>3/</sup>
Yield (kg/ha)	600.0	900.0	900.0
Price (T.Sh.)	1.5	1.5	1.5
Gross Value	900.0	1350.0	1350.0
Labor	120.0	93.0	93.0
Oxen		300.0	300.0
Seed	10.0	20.0	20.0
Insecticide		30.0	
Other Cash Costs		5.0	5.0
Gross Margin	770.0	995.0	1025.0
T.Shs/Workday	6.4	10.7	11.0

## ESTIMATED COSTS AND RETURNS

TABLE III

Estimated Costs and Returns to Groundnut Production

	Traditional <sup>1/</sup>	Improved With Oxen <sup>2/</sup>	Intensive/Organic With Oxen <sup>3/</sup>
Yield (kg/ha)	300.0	700.0	700.0
Price (T.Sh.)	4.8	4.8	4.8
Gross Value	1440.0	3360.0	3360.0
Labor	160.0	135.0	140.0
Cash Costs	200.0	450.0	310.0
Gross Margin	1240.0	2910.0	3050.0
T.Shs/Work Day	7.8	21.5	21.8

<sup>1/</sup> From Marketing Development Bureau Review, 1980-1981, adjusted.

<sup>2/</sup> From "An Economic Perspective of Arusha Region," M. Sargent, 1980, adjusted.

<sup>3/</sup> Based on Sargent's analysis; adjusted for typical practices to be recommended.

The data presented in the above tables are meant only to illustrate the relative estimated costs and returns using different crop production systems. Clearly, a number of assumptions are made for the simple reason that reliable economic and agronomic data are not available. On the basis of the above assumptions and calculations, however, relatively good returns are shown to be possible from the intensive, organic-type farming practices compared with the traditional and improved farming systems. A major goal of this Project is to conduct comparative tests to develop and refine the most productive, cost-effective production technologies for the Region.