CHAPTER 7 ENVIRONMENTAL AND SOCIAL STUDIES

7.1 Review of ESIA Report

7.1.1 Project of Concerns

The project of concern within the previous ESIA constitutes the road improvement of Arusha – Moshi – Holili by strengthening the existing pavement, widening and realignment of the carriageway, shoulders and drainage structures. The Project also includes construction of a ring road for through traffic to Arusha Central District through the outskirt of Arusha municipality and Arumeru District. The road section from Arusha towards Usa River is to be widened to accommodate dual carriageway (four lanes traffic). In addition, the spur road to Kilimanjaro International Airport (KIA) will be strengthened.

The Project also involves traffic safety improvement on various sections of road with infringed sight distance (sharp horizontal and vertical curves), which are prone to accidents, accommodation of non- motorized traffic and improvement of axle load control facilities.

The existing 6.5 m carriageway, 1.5 m shoulder Arusha - Moshi – Holili road will be widened to 7.0 m carriageway with 2 m shoulders. The proposed road and Arusha - Usa River road sections road will have double carriageways of bituminous surfacing of 7 m width and 2 m shoulders, while the road section between Arusha and Usa River will be of dual carriageways.

All bridges (except those for dual carriageways) will consist of two lanes, with foot path (with guard rails) on both sides. There will be road side and cross drains as required. It is anticipated that the proposed road for the Arusha – Holili section will mostly follow the existing horizontal alignment. The pavement will be of asphalt concrete.

7.1.2 Backgrounds

This ESIA has been carried out in accordance with AfDB Environmental and Social Assessment Guidelines, Tanzania's Environmental Management Act (2004), EIA and Audit Regulations (2005), and Environmental Assessment and Management Guidelines of the road sector.

According to AfDB categorization, the Project lies in Category 1, which requires a full Environmental and Social Impact Assessment, including the preparation of an Environmental and Social Management Plan. The Tanzanian Environmental Impact Assessment and Audit (2005) regulations also classifies the Project as Type A (Transport and Infrastructure – Construction, expansion or rehabilitation of new trunk roads), which requires a full Environmental Impact Assessment.

7.1.3 Environmental Approval and Form 5

Environmental License of this Project was approved by NEMC on 30th September 2014 (No. 1155

EC/EIS/1434 of.30th of September 2014). According to the Article 41, Part IX (period of validity) of Environmental Management Act (Act No. 20 of 2004), the project owner and/or proponent shall re-register with the NEMC in the event that an environmental impact assessment certificate has been issued but no development has started within three years. Road improvement construction activities of this proposed project have already been initiated between Arusha and Tengeru.

According to Article 35, Part VII of this Act, where there are design changes after the environmental certificate is issued, the project owner shall apply for further approval of these design changes, using the Form 5 specified in the Third Schedule to these Regulations as follows,

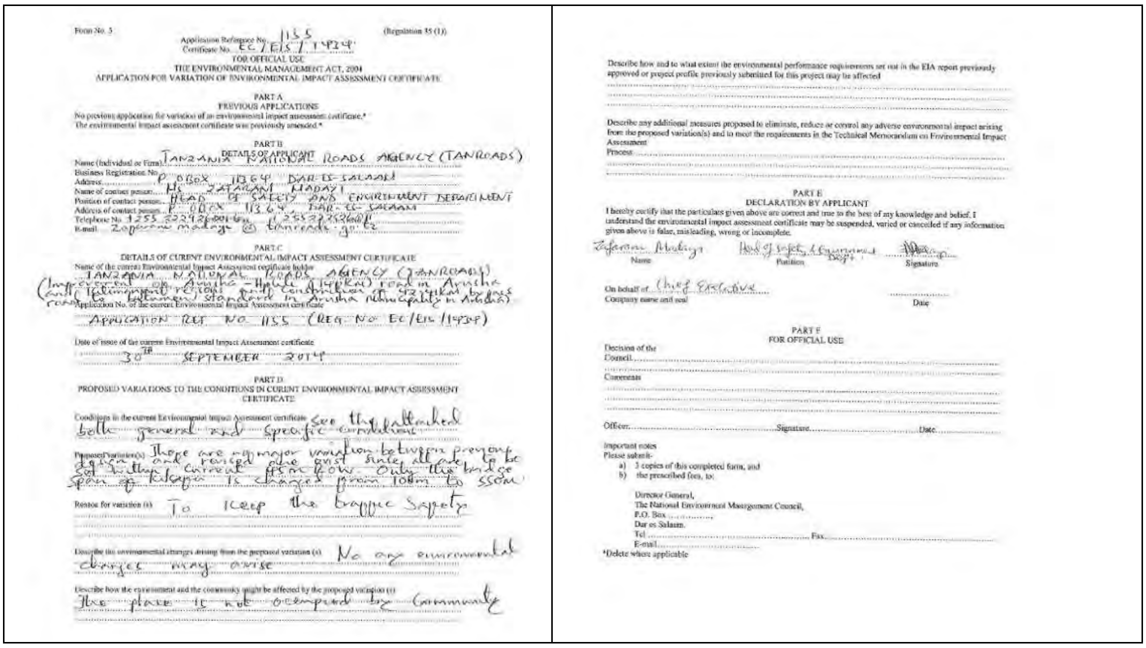
(1) Where circumstances arise which compels or requires a developer or proponent to vary the terms and conditions under which an environmental impact assessment certificate has been issued, the holder of the certificate shall apply for a variation in accordance with the format in Form 5 specified in the Third Schedule to this Regulation accompanied by a prescribed fee".

(2) The Minister may issue a certificate of variation of an environmental impact assessment certificate in Form No. 6 set out in the Third Schedule to this Regulation.

(3) A variation of an environmental impact certificate issued under these Regulation may be issued without the holder of the certificate submitting a fresh environmental impact statement if the Council is satisfied that the Project if varied would comply with the requirements of the original certificate.

(4) Where an environmental impact assessment is required for variation of the environmental impact assessment certificate the provisions of Part IV of this Regulation shall apply.

Form 5 of this proposed road improvement project was prepared, and then, was submitted to NEMC from TANROADS on May 16 (Mon), 2016, and its review by NEMC is on-going. Basically, the proposed road improvement project between Tengeru and Holili is planned to be conducted within RoW =45 m road space, already designated by TANROADS, so there is no significant design change except for the bridge design at Kikafu (its span length is lengthened from 100 m, originally set in F/S and D/D to 560 m, proposed by the JICA Study Team).


Form No. 5 (Regulation 35 (1))

Application Reference No. 1155
Certificate No. EC/EIS/1434
FOR OFFICIAL USE
THE ENVIRONMENTAL MANAGEMENT ACT, 2004
APPLICATION FOR VARIATION OF ENVIRONMENTAL IMPACT ASSESSMENT CERTIFICATE

PART A
PREVIOUS APPLICATIONS
No previous application for variation of an environmental impact assessment certificate.*
The environmental impact assessment certificate was previously amended.*

PART B
DETAILS OF APPLICANT
Name (Individual or Firm) TANZANIA NATIONAL ROADS AGENCY (TANROADS)
Business Registration No.
Address P. O BOX 11364 DAR-ES-SALAAM
Name of contact person
Position of contact person HEAD OF SAFETY AND ENVIRONMENT DEPARTMENT
Address of contact person P. O BOX 11364, DAR-ES-SALAAM
Telephone No.
E-mail

PART C
DETAILS OF CURENT ENVIRONMENTAL IMPACT ASSESSMENT CERTIFICATE
Name of the current Environmental Impact Assessment certificate holder
TANZANIA NATIONAL ROADS AGENCY (TANROADS)
Application No. of the current Environmental Impact Assessment certificate
APPLICATION REF NO. 1155 (REG. NO. EC/EIS/1434)
Date of issue of the current Environmental Impact Assessment certificate
30th SEPTEMBER 2014

PART D
PROPOSED VARIATIONS TO THE CONDITIONS IN CURENT ENVIRONMENTAL IMPACT ASSESSMENT CERTIFICATE
Conditions in the current Environmental Impact Assessment certificate See the attached both general and specific conditions
Proposed variation(s)
Reason for variation (s) To keep the traffic safety
Describe the environmental changes arising from the proposed variation (s) No any environmental changes may arise
Describe how the environment and the community might be affected by the proposed variation (s)

Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected

Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process

PART E
DECLARATION BY APPLICANT
I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental impact assessment certificate may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.
Name Position Signature
On behalf of Chief Executive
Company name and seal Date

PART F
FOR OFFICIAL USE
Decision of the Council
Comments
Officer Signature Date
Important notes
Please submit-
a) 3 copies of this completed form; and
b) the prescribed fees, to:
Director General,
The National Environment Management Council,
P.O. Box
Dar es Salaam.
Tel Fax
E-mail
*Delete where applicable

Source: JICA Study Team

Figure 7.1.1 PDF Copy of Form 5, submitted from TANROADS to NEMC

7.1.4 Review of ESIA

(1) Overall Review

A comprehensive review of previous ESIA, EMP and RAP reports was conducted, based on JICA Guideline for the Social and Environmental Considerations (published in 2004, revised in 2010, hereinafter referred to as "JICA Guideline"). Typical remarks, obtained from this review work, are summarized in the following section. Basically, contents of this ESIA, EMP and RAP are thorough and no big gap was recognized from a JICA Guideline's perspective since AfDB and JICA has similar environmental and social guideline policies.

The following data was not summarized within this ESIA Report,

a) Existing traffic accidents

b) Existing ambient air quality

c) Existing levels of noise and vibrations

d) Domestic water quality

e) Secondary data obtained from village government were not reliable since data collected are not updated frequently particularly those concerning demography, livestock and agricultural production trends.

Furthermore, the schedule of several field studies coincided with the farming period which negatively affected villagers' attendance to public consultation meeting. Besides, participation by women was not satisfying since majority of women were more involved in farming activities and household chores.

(2) Consultation Process

1) Consultation with Statutory Bodies

The table below summarizes the outline of the consultation process with statutory bodies, conducted within previous ESIA study.

Table 7.1.1 Consultation with Statutory Bodies

	Date	Statutory Body	Meeting Topics
1	16 March 2010	DED – Arusha DC	Presenting the project and request for support from his technical staff
2	16 March 2010	Ag. Municipal Director	Presenting the project and request for support from his technical staff
3	16 March 2010	NEMC – North Zone Coordinator	Presenting the project and request for support from his technical staff
4	16 March 2010	NEMC – North Zone	Accompanied the consultant during site visit to the proposed ring road
5	17 March 2010	DNRO – Meru DC	Existing environmental problems, flora/fauna profile along the project road, existence of any endangered tree species, possible impact of the project & mitigationmeasures
6	17 March 2010	DWE - Meru DC	Domestic water supply profile in the project area, locations & distribution of domestic water utilities along & across the project road
7	17 March 2010	Civil Technician - Meru Dc	- do -
8	17 March 2010	Water Technician – Meru DC	- do -
9	17 March 2010	Water Technician – Meru DC	- do -
10	17 March 2010	DPLO – Meru	District socio-economic profile, development programs that are likely to be affected by the project
11	17 March 2010	Ag. DCDO – Arusha DC	Impact of the project to the socio- economic development of communities

	Date	Statutory Body	Meeting Topics
12	17 March 2010	Land officer – Arusha DC	Land issues e.g. land uses, land registration, impact of the project to land issued
13	17 March 2010	DPLO – Arusha DC	District socio-economic profile, development programs that are likely to be affected by the project
14	17 March 2010	DWE – Arusha DC	Domestic water supply profile in the project area, locations & distribution of domestic water utilities along & across the project road
15	17 March 2010	DLNRE – Arusha DC	Existing environmental problems, flora/fauna profile along the project road, existence of any endangered tree species, possible impact of the project & mitigationmeasures
16	18 March 2010	DE	Existing sources of construction materials
17	18 March 2010	In charge of Pangani Basin Water	Water resources within the project impact zone
18	18 March 2010	AUWSA – Technical Manager	Discussed on the layout of water supply & sewerage network within the impact zone
19	18 March 2010	DE – Arusha	Existing sources of construction materials, accompanied the consultant during site visit to the proposed ring road
20	18 March 2010	Technician – VTTP _ Arusha DC	
21	19 March 2010	Arusha Municipal Council - Urban Planner	Boundaries of Arusha Municipal
22	19 March 2010	MCDO – Arusha Municipal	Impact of the project to the socio- economic development of communities
23	19 March 2010	Environmental Engineer – Arusha Municipal Council	Impact of the project to the environment
24	19 March 2010	Acting DED – Hai	Presenting the project & request for support from his technical staff
25	19 March 2010	DPLO – Hai DC	District socio-economic profile, development programs that are likely to be affected by the project
26	19 March 2010	Ag. DWE – Hai DC	Domestic water supply profile in the project area, locations & distribution of domestic water utilities along & across the project road
27	19 March 2010	Ag. DCDO – Hai DC	Impact of the project to the socio- economic development of communities
28	19 March 2010	Head LNRE – Hai DC	Existing environmental problems, flora/fauna profile along the project road, existence of any endangered tree species, possible impact of the project & mitigation measures
29	23 March 2010	AUWSA – Sewerage Engineer	Discussed on the layout of water supply & sewerage network within the impact zone
30	23 March 2010	AUWSA - Customer Support & Services	- do -
31	24 March 2010	DNREO – Moshi DC	Existing environmental problems, flora/fauna profile along the projectroad, existence of any endangered tree species, possible impact of the project & mitigation measures
32	24 March 2010	DE – Moshi DC	Domestic water supply profile in the project area, locations & distribution of domestic water utilities along & across the project road
33	24 March 2010	DE – Moshi DC	- do -
34	24 March 2010	MWSA - Ag Technical Manager	Discussed on the layout of water supply and sewerage network within the impact zone
35	25 March 2010	Civil Engineer– KADCO – KIA	Impact of the project to the airport
36	26 March 2010	MUWSA – Technician	Accompanied the consultant to indicated locations where water pipe lines are close or cross the project
37	29 March 2010	DED – Rombo	Presenting the project and request for support from his technical staff

	Date	Statutory Body	Meeting Topics
38	29 March 2010	Ag. DE – Rombo	Domestic water supply profile in the project area, locations & distribution of domestic water utilities along & across the project road
39	29 March 2010	KILIWATER Company	- do
40	29 March 2010	DEMO – Rombo	Existing environmental problems, flora/fauna profile along the projectroad, existence of any endangered tree species, possible impact of the project & mitigation measures
41	26 August 2010	General Manager	Introduction of the project, possible impacts of the project & possible mitigation measures
42	30 August 2010	Airport Manager	- do -
43	30 August 2010	Senior Super intendant of Prison	- do -
44	31 August 2010	Commanding Officer for TPDF - KJ 977	- do -

Source: Environmental and Social Impact Assessment (ESIA) for the Improvement of Arusha – Holili (140 Km) Road in Arusha and Kilimanjaro Regions, TANROADS, 2012

2) Public Consultation

Table below summarize the outline of community-based public consultation process, conducted within the previous ESIA study.

Table 7.1.2 Outline of Public Consultations

	Date	Time	Venue	# of Participants	
				Village	Participants
1.	Thursday, 25 March 2010	09:40 – 11:20	Bomang'ombe	Hai Mjini ward	66
2.	Friday, 26 March 2010	15:30 – 17:30	Kwasadala	Kwasadala	62
3.	Monday, 29 March 2010	11:20 – 12:30	Kiborironi	Kiborironi	19
4.	Tuesday, 30 March 2010	14:10 – 15:43	Holili	Holili	52
5.	Tuesday, 30 March 2010	12:30 - 13:30	Himo	Himo	49

Source: Environmental and Social Impact Assessment (ESIA) for the Improvement of Arusha – Holili (140 Km) Road in Arusha and Kilimanjaro Regions, TANROADS, 2012

(3) Environmental Management Program (EMP)

Environmental management and monitoring programs were developed for the pre-construction, construction and operation phases, respectively. The construction phase is assumed to last almost three years and relevant environmental management program and monitoring plan have been developed within this framework. Also, there is no specific time limit and relevant bodies shall conduct their own EMP-related activities for the entire operation period.

7.1.5 Resettlement Action Plan (RAP)

(1) RAP-related socio-economic surveys and major findings

The main objective of the census and socio-economic survey, conducted within the RAP study of the Project, was to prepare an inventory of all the affected assets and affected households and then to estimate the extent of resettlement impacts due to project implementation and prepare RAP for compensation and assistance. The initial census surveys and consultations were conducted between February and March 2012 this could be followed by second round of consultations. All affected assets and households were identified first, followed by preparation of inventory of all affected assets during filed surveys.

These surveys revealed that the PAPs are mainly small-scale framers with limited sources of income, low levels of education, and with high dependency factor. Male-headed households are common (87%) among the PAPs although 13% of all households were female-headed and none were child-headed. The female and child-headed households indicate high levels of poverty, and are thus likely to face greater degrees of vulnerability because of social and economic dislocations

brought about by the Project. In terms of access to social service facilities such as health, primary and secondary schools, this was found difficult although there were some variations between the facilities. The surveys' results also show that women do have substantial decision making powers in matters relating to finances, education of child, health of child, purchase of assets, day to day activities and social functions within the households. Majority of PAPs have more than one source of income and the main income source is agriculture (77%) followed by self-employment/business (59%). Only 1% of the sample households reported to be earning less than one dollar a day which is below the poverty line.

(2) Valuation of Compensation for Losses

In total, within this AfDB-funded road improvement project, 444 Households will be affected out of which 243 are from Arusha and 201 are from Kilimanjaro region. Total compensation cost is about TZS **24,115,103,000** (see Table below).

Table 7.1.3 Summary of Valuation Results

Road Section	Amount in TZS
Arusha Region	21,257,872,000
Kilimanjaro Region	2,856,231,000
Total	24,115,103,000

Source: Environmental and Social Impact Assessment (ESIA) for the Improvement of Arusha – Holili (140 Km) Road in Arusha and Kilimanjaro Regions, TANROADS, 2012

The valuation for the compensation for the AfDB-funded road improvement project was conducted, applying a "depreciation" policy for the calculation of buildings and/or structures, located inside of RoW. Depreciation rates, used within this valuation, varies between 10 % (relatively new) and 30 % (relatively old one).

In Tanzania, "cut-off-date" of any public infrastructure development project is defined as the date when the valuer contacts PAPs and explains the project outline, land-take process and other relevant issues to them. In this AfDB-funded road improvement project, the "cut-off-date" was defined as July 10th 2012.

(3) Monitoring and Evaluation

RAP implementation is one of the central components of this Project and its monitoring is critical to solving challenges or obstacles in the areas of mobilization, compensation, relocation etc. The monitoring and evaluation procedures will include external and internal evaluation of the compliance of the implementation with objectives and methods as agreed, and monitoring of specific situations. A set of verifiable indicators will be used to monitor and evaluate the implementation of resettlement and compensation plans.

A project implementation unit with the assistance from the Consultants and an NGO will be responsible for internal monitoring. External monitoring shall be used to carry out independent bi-annual review of RAP implementation and project evaluation. External monitoring and evaluation can be done by independent researcher, consulting agency, university department or an NGO.

Evaluation of RAP implementation shall assess the compliance with objectives and methods stated in RAP and also laws, regulations and safeguard policies. It shall also i) assess the consultation procedures that took place at individual and community level, together with the Central and Local Government levels in the affected municipalities and districts; ii) assess whether fair, adequate and prompt compensation has been paid; iii) evaluate the impact of the compensation on income and standard of living; and v) identify actions as part of the on-going monitoring to improve the positive impact of the program and mitigate its possible negative impact if any. The following are the suggested reporting requirements:

The Consultants responsible for facilitating RAP implementation will prepare monthly progress

reports on resettlement progress activities;

TANROADS shall also monitor RAP implementation and prepare quarterly reports; and

An external monitoring agency should submit bi-annual reports directly to TANROADS and determine whether or not RAP goals have been achieved and livelihoods have been restored and suggest suitable recommendations for improvement.

7.1.6 Summary of ESIA, EMP and RAP Review

ESIA, EMP (environmental monitoring plans included) are comprehensive, but following field data and/or information are not incorporated,

a) Existing traffic accidents

b) Existing ambient air quality

c) Existing levels of noise and vibrations

d) Domestic water quality

e) Secondary data obtained from village government were not reliable as data collected are not updated frequently particularly those concerning demography, livestock and agricultural production trend.

Regarding vibration, no environmental standard is implemented in Tanzania and thus, no equipment is available therein. So, it is recommended to carry out relevant on-site field surveys such as roadside air quality, noise and the water quality analysis in order to improve contents of previous ESIA and EMP, and make those reports more persuasive ones.

Upon reviewing the contents of RAP-related compensation valuation study, all compensation prices, summarized in that valuation report, were calculated using the depreciation policy (10-15 % depreciation rate, applied for the valuation of relatively new houses and 30 % for the relatively old houses). In the JICA Guideline, "no depreciation" policy is implemented for the valuation of the compensation for any JICA-funded projects. Currently, JICA and TANROADS continue the negotiation in that JICA is requesting TANRODAS to incorporate JICA's compensation policy for the valuation of all PAPs identified within this road improvement project.

7.2 Brief Descriptions of Existing Environment

The following figures summarize the photographic records of current environmental and social conditions along the project sites. The topography of the project site is characterized by slightly undulating, rolling hills with steep slopes, which are dissected by several perennial and seasonal rivers, with short sections of flat land. The majority of the Arusha – Holili Road lies in the Pangani catchment area, with ranges of mountains, which are sources of most of rivers between the Arusha and Moshi road section in the north of the road. Both the Kikafu and Wona Rivers are major perennial rivers crossing the project road alignment, and a local riverine ecosystem has developed at both river banks of these perennial rivers.

The underlying geology of the area surrounding the project road is composed of typically alkaline volcanic; olivine basalt, alkali basalt, phonolite, trachyte, nephelinite, and pyroclastics. Surface soils are derived entirely from volcanic materials and are mainly volcanic ash, sometimes overlying stream deposits. There are four main types of soils: namely Sodi-luvic Chernozems (soil with accumulation of high activity clays and high base saturation), Eutric Leptosols (very shallow soils over hard rock), Eutric Nitisols (deep, dark red, brown, or yellow clayey soils), and Eutric Cambisols (weakly or moderately developed soil).

The project site is divided into three climatic zones, namely the upper, middle, and lowland zones. The upper zone lies between 1,350 m and 1,800 m above seas level (asl) and has average annual rainfall of 1,000 mm, while the middle zone lies between 1,000 m (asl) and 1,350 m (asl) a mean

annual rainfall of 500 mm. The lower zone lies below 900 m (asl) and receives an average annual rainfall of below 300 mm. The climate of both Arusha and Kilimanjaro Regions are characterized by two rainy seasons - from March to June, and during November and December. The climate of both regions is modified by the presence of the mountain ranges, with mean annual precipitation ranging from 400 mm in the lowlands to more than 1200 mm in the highlands, and more than 2000 mm in mountainous areas. The temperature of both regions is variable depending on topo-sequence. Highlands are much cooler than lowlands with temperatures ranging between 15˚C and 30˚C. Lowland maximum temperatures go as high as 40˚C during the dry season. January to March are the warmest months.

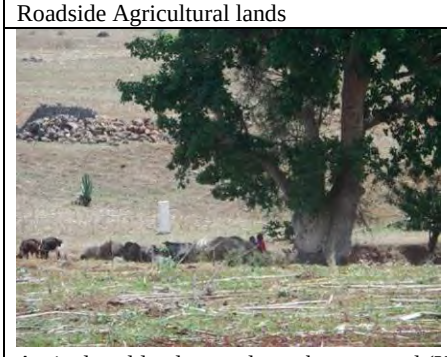
The Land use along the project site can be divided into six categories; namely settlements (residential and institutional), agriculture, transport corridor, recreation (or garden), water bodies (rivers), and undisturbed areas [undeveloped or covered by woodland, scrubland and grassland]. Farming is generally on a small scale mainly food crops (subsistence farming) are planned. However, large scale farming can also be observed in some road sections. Lands of new bypass sections (Kikafu and Himo-Holili) manly consist of agricultural and bare lands. Power transmission line have been set up around the new bypass section (Himo-Holili).

The flora along the project road is characterized by mosaics of scrubland, grasslands, semi-arid scrubland and woodlands, riverine trees, and exotic strip trees and shade tree vegetation. Various vegetation zones can be distinguished along the proposed road section, such as mosaics of scrubland, grasslands, semi-arid scrubland and woodlands, riverine trees, and exotic strip trees and shade tree vegetation. Most of the natural vegetation has been lost or replaced by exotic trees due to land clearing for settlements and agriculture. While grassland vegetation was observed almost everywhere along the road, exotic shade trees and street strip vegetation were observed within settlement areas and the riparian zone. Riverine trees were observed on river banks, while scrubland and woodland vegetation can be observed in areas with semi-arid climate.

The main fauna of the area for which the project road passes consist of domestic animals such as livestock, dogs, chicken, water loving birds, and several fish species. Other aquatic creatures include toads, and monitor lizards. Non zero grazing livestock keeping is commonly practiced by the Maasai in the Kilimamoto – Rwetabura, Kisongo – Kiseriani, and Katiti – Kwasadala road sections. The project road alignment does not traverse any protected ecosystem. According to discussions held at TAWIRI, IUCN and WWF in 2015, there used to be major trans-regional migration corridor for wildlife, encompassing Tanzania and Kenya along north-south direction (i.e., cross the current Arusha-Holili Road) before the implementation of large-scale development projects such as the mining of Tanzanite, Kilimanjaro International Airport and other road projects. After the completion of those development projects, those regional migrations of wildlife tend to switch along the west-east direction, almost parallel to the current Arusha-Holili road alignment.

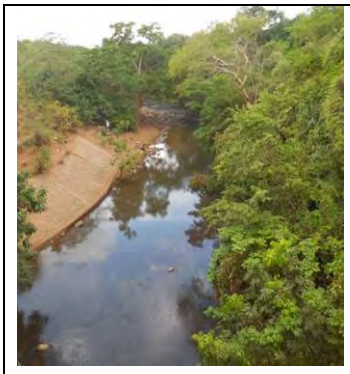
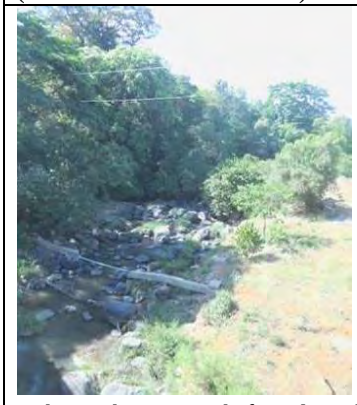
The project road traverses 57 perennial and seasonal rivers in total. While most of the rivers in Arusha, Arumeru and Moshi Districts are perennial, all the rivers in the Hai/Siha and Rombo districts project area are seasonal. In addition, a large number of open channels that are used for vegetable garden, orchards, paddy, banana, flower farms are crossed by the project road at several points.

The level of social services such as water, medical services, and education is relatively good. Although, most of the villages have primary and secondary schools, the schools have insufficient staff to cope with increasing enrolment. The communities have access to medical services, mainly dispensaries. The majority of the communities have safe source of domestic water supply.

 On-going road widening (AfDB) around Tengeru	 Roadside market at Tengeru
 Roadside Agricultural lands	 Roadside view between Usa and Kikafu
 Agricultural land around new bypass road (Kikafu)	 Overview of new bypass road (Kikafu)
 Roadside inside of Moshi urban area	 Land use around new bypass road (Himo-Holili)
 Power transmission line at new bypass section (Himo-Holili)	 Roadside Condition round Holili

Source: JICA Study Team

Figure 7.2.1 Photo Records of Current Tengeru – Holili Road (photo taken in December 2015)

 Kikafu River (upstream side)	 Kikafu River (downstream side from river side hill)
 Tributary between Kikafu and Moshi (upstream side) (S 3.326144° E37.260869°)	 Tributary between Kikafu and Moshi (downstream side) (S 3.326144° E37.260869°)
 Tributary between Kikafu and Moshi (upstream side) (S 3.345295° E37.317030°)	 Tributary between Kikafu and Moshi (upstream side) (S 3.345295° E37.317030°)
 Wona River at Himo (upstream side)	 Wona River at Himo (downstream side)

Source: JICA Study Team

Figure 7.2.2 Photo Records of Current River Crossing Points along Tengeru – Holili Road (photo taken in December 2015)

7.3 Policies, Legal and Administrative Framework

7.3.1 Policies and Strategies

(1) National Environment Policy, 1997

The National Environment Policy (NEP, 1997) is the main policy, governing environmental management in the country. The policy addresses both natural and social environmental issues, and adopts the key principle of the sustainable development. This policy requires EIA to be mandatory for all development projects which are likely to have significant environmental impacts. The intention is to ensure that the development projects are implemented in an economically sustainable manner while safeguarding environmental and social issues for the benefit of the present and future generations.

(2) National Policy on HIV/AIDS, 2001

Relevant objectives of the policy are, (i) the prevention of the transmission of HIV/AIDS, (ii) to enhance sectoral roles through participation and financial support, and (iii) to promote and participate in research on HIV/AIDS, including the dissemination of scientific information and the development of HIV vaccine. The policy formulation is the result of the Government's effort with the technical support from the World Health Organization Global Program on AIDS (WHO-GPA) that led to the establishment of National HIV/AIDS Control Program (NACP) under the Ministry of Health. One of the government strategic initiatives is to establish Tanzania Commission for AIDS (TACAIDS) under the Prime Minister's Office. The Commission provides the leadership and the coordination of national multi-sectoral response to the HIV/AIDS epidemic. The management functions, institutional and organizational arrangement of TACAIDS are outlined in the National Policy.

The Policy identifies HIV/AIDS as a global disaster, hence requiring concerted and unprecedented initiative at local, national and global levels. It recognizes HIV/AIDS as an impediment to development in all sectors, in terms of social and economic developments with serious and direct implication on social services and welfare. Thus, the policy recognizes the linkage between poverty and HIV/AIDS, as the poor communities of the society are very vulnerable. This policy is relevant to the Project because during project implementation phase, the influx of people such as construction workers around the project area may accelerate the spread of the disease.

(3) National Human Settlements Development Policy, 2000

The overall goal of the policy is to promote development of sustainable human settlement and to facilitate provision of adequate and affordable shelter to all people, including the poor. The policy outlines a number of objectives including the environmental protection within human settlement and protect natural ecosystem against pollution, degradation and destruction with the aim of attaining sustainable development. The major issues in the policy include (i) poor management of solid and liquid waste, leading to environmental deterioration, (ii) emission of noxious gases from vehicles and industrial activities as a major cause of air pollution in urban areas, (iii) encroachment into fragile and hazardous lands (river valleys, steep slopes and marshlands leading into land degradation, pollution of water sources and others, (iv) increasing dependence on fuel wood and charcoal as a main source of energy in human settlements leading into depletion of forests, hence environmental deterioration and air pollution, and (v) unauthorized sand mining in river valleys leading into environmental hazards

This policy is relevant to the Project since during construction of the road, solid as well as liquid wastes are likely to be generated. During the construction phase, residents living in the neighborhood of the project are likely to be affected due to the deterioration of the ambient air quality by smokes and dust due to increased movement of construction machinery, equipment and vehicles. Improved accessibility to forests is likely to increase due to improved road and hence increased harvesting of trees for firewood, charcoal and timber production.

(4) National Land Policy, 1995 (Revised in 1997)

The National Land Policy recognizes the need for protecting environmentally sensitive areas. The policy emphasizes the protection of the environment and natural ecosystems from the pollution, the degradation, and the physical destruction. In addition, the policy recognizes the importance of social services such as water, roads, energy, and the solid waste management for the environmental protection. Finally, the policy identifies the need for the conservation and the preservation of prehistoric/historic sites and buildings.

During the construction phase, water supply utilities (water pipe lines and domestic water points), electricity power lines and transformers are likely to be relocated to pave way for construction works.

(5) The National Water Policy, 2002

The policy objective is to develop a comprehensive framework for the sustainable management of the national water resources. In this case, the policy recognizes the need to protect the water sources against pollution and the environmental degradation. The policy recognizes the role of the road transport system as one of the effective tool in the implementation of the water resource management activities.

The proposed road project could result into degradation of the water resource if not carried properly. In this case, the project management are required to ensure that the pollution of water resource is avoided or minimized during the road construction phase.

(6) National Gender Policy (1992), Revised in 2002

The policy calls for equal opportunity for all to participate and implement development activities without gender bias and identifies environmental degradation as one of the major factors that increase burden to women, especially in rural areas, where women have to walk long distances to fetch water and fuel wood. During the construction phase, the contractor will be advised to ensure that as much as possible men and women are given equal opportunities during the recruitment of construction workers.

(7) National Transport Policy, 2003

The policy has seven objectives and goals, of which one is relevant to this Project. The objective which is relevant to this Project calls for sufficient emphasis on all aspect of the environment protection and management at the design, development, and operation stages of the transport infrastructure, to ensure the sustainability through the implementation of meaningful environmental studies such as IEE and/or EIA.

(8) The National Strategy for Growth and Reduction of Poverty (2003)

The National Poverty Reduction Strategy (NPRS) is a national organizing framework for putting the focus on poverty reduction on the country's development agenda. The strategy emphasis is on the growth momentum to fast track the targets of the vision 2025 for high and shared growth, high quality livelihood, piece, stability and unity, good governance, high quality education, and international competitiveness.

Among the issues which the strategy aims at, which are relevant to this Project are the development of infrastructure such as roads while paying attention to mainstreaming cross-cutting issues such as the environment, HIV/AIDS, gender, employment, and the settlement.

(9) Tanzania`s Property and Business Formalization Program, 2004

Tanzania`s Property and Business Formalization Program (TPBP) or in Kiswahili "Mpango wa Kurasimisha Rasilimali na Biashara za Wanyonge Tanzania (MKURABITA)" was founded to empower the marginalized majority in the informal sector so that they can use their properties and

business assets and other opportunities in the modern market economy, and thus increase their income. Under such facilitation, they can effectively participate in the reduction of income poverty and contribute to the attainment of Medium Development Goals (MDG) targets. Notably, both MKUKUTA and MKURABITA are interrelated economic interventions affected by the government in an effort to provide relief to the Tanzania masses of medium and lower ranks. Among the strategies of MKURABITA are preparation and development communication systems in rural areas that will enable the coordination of formalization of properties and business assets of the program. The proposed project is in line with the program as it addresses one of the strategies entailed – development of the regional communication systems.

(10) JICA Environmental Policy

1) Basic Concept

The greatest responsibility of humanity is to provide a rich and diverse global environment for the future generations. The increasing scale and diversity of man's activities have resulted in several serious environmental issues, such as global warming, depletion of the ozone layer, air and waste pollution, soil contamination, deforestation, and desertification - all of which risk the future of humanity. JICA is determined to protect our global environment that is extremely vital for the survival of mankind and natural life on earth. It also seeks the balance among environmental conservation, social prosperity, and sustainable development.

2) Basic Policy Guideline

As stated in the "Law on General Rules of JICA," JICA's mission is to "contribute to the promotion of international cooperation and to the sound development of Japan and the international socio-economy by contributing to the development or reconstruction of the economy and society, or economic stability of overseas regions which are in the developing stage." This is particularly through global environmental protection in compliance with environmental laws and regulations. Furthermore, in order to prevent and reduce negative environmental impacts that result from JICA's activities, JICA will utilize an environmental management system and shall work continuously to improve it. The system will be based on the following policies:

(i) Promotion of environmental measures through international cooperation activities

Based on the Japanese Government's ODA policies, JICA will promote cooperation activities for the protection and improvement of the environment. JICA will continue to (a) promote international cooperation and projects that contribute to environmental protection in developing countries; and (b) mitigate any adverse environmental impacts of development programs and projects in accordance with the guidelines for environmental and social considerations.

(ii) Promotion of activities for general environmental awareness

With the aim of raising public awareness, JICA collects information about environmental issues. JICA will continue (a) to carry out promotional and educational activities by introducing JICA's programs on environmental issues, (b) to conduct surveys and research on environmental issues, and develop relevant proposals; and (c) to implement continuous training through seminars and guidance programs for JICA all employees and personnel engaged in JICA's activities.

(iii) Promotion of environmentally friendly activities within JICA offices and other JICA facilities

JICA promotes environmental programs to reduce any negative impacts caused by its activities at offices and other facilities. JICA will continue (a) to promote waste reduction, resource and energy conservation, recycling, and (b) to procure environmentally friendly products based on the "Law on Promoting Green Purchasing" and other relevant laws and regulations.

(iv) Compliance with environmental laws and regulations

JICA will consistently adhere to relevant environmental laws and regulations. This Environmental Policy will be communicated to all employees and personnel who work in or on behalf of JICA, and also be publicized.

7.3.2 Legal Framework

(1) The Constitution of Tanzania

The Policy, legal framework to address the social dimensions, impacts and implications of the Project is based on the following articles of the Constitution of the United Republic of Tanzania of 1977:

Article 24 (1): Subject to provisions of the relevant laws of the land, every person is entitled to own property, and has a right to the protection of his property held in accordance with law.

Article 24 (2): It shall be unlawful for any person to be deprived of property for the purposes of nationalization or any other purposes without the authority of law which makes provision for fair and adequate compensation.

Therefore, the payment of the compensation is both a legal and constitutional right under Article 24 of the Constitution of the United Republic of Tanzania of 1977.

(2) Environmental Management Act, 2004

The Environmental Management Act (EMA) No 20, which was enacted in 2004, governs environmental management issues including EIA requirements in the country. The Act stipulates that any developers of projects to which EIA is required to be carried out by the law shall undertake at his own cost EIA before commencing the Project. The Act also defines environmental management tools of a general scope to facilitate consistent policing and enforcement such as (i) Environmental Impact Assessment (EIA), which helps to identify and minimize possible impacts from a proposed development before commencement, (ii) Environmental Monitoring for compliance with set standards, and (iii) Environmental auditing, which evaluates how well environmental organizations, management and equipment are working.

(3) Water Resource Management Act, 2009

The Act, which repeals the Water Utilization (Control and Regulation) No 42 of 1974, provides for institutional and legal frameworks for the sustainable management and development of the water resources, outlines principles for the water resources management, and provides for the prevention and control water pollution, participation of stakeholders and the general public in the implementation of the water policy. The following sections are relevant to this Project:

Section 10: Vests ownership of all water in the United Republic of Tanzania Section 34: Prohibits anthropogenic activities within 60 m from the water resources (note: tributaries included).

Section 39: Requires that a land owner or an occupier takes all reasonable measures to prevent water source pollution.

During the construction phase, contractors will be obliged to prevent polluting the water resources and/or tributaries.

(4) Land Act of 1999

This Act regulates land allocation including those in villages. It specifies that all land continues to be public property. Land is vested in the President as Trustee for and on behalf of all the citizens of Tanzania. The Acts also recognizes land as a property and has value.

Section 156 of the Land Act 1999 requires compensation be paid to any person for the use of land of which he/she is in lawful or actual occupation as a communal right and with respect to a way leaves. These include (i) any damage suffered in respect of trees, crops, and buildings as result of creation of way leave, and (ii) damage due to surveying or determining the route of that way leave. It is the responsibility of the governmental bodies such as Ministries, Local Government Authorities or corporate bodies, that apply for right of way to pay the compensation.

(5) The Land Acquisition Act 1967

Under the Land Acquisition Act, 1967, the President may, subject to the provisions of this Act, acquire any land for any estate or term where such land is required for any public purpose.

Land shall be deemed to be acquired for a public purpose where it is required, for example, for exclusive Government use, for general public use, for any Government scheme, for the development of agricultural land or for the provision of sites for industrial, agricultural or commercial development, social services, or housing or; where the President is satisfied that a corporation requires any land for the purposes of construction of any work which in his opinion would be of public utility or in the public interest or in the interest of the national economy, he may, with the approval, to be signified by resolution of the National Assembly and by the order published in the Gazette, declare the purpose for which such land is required to be a public purpose and upon such order being made such purpose shall be deemed to be a public purpose; or in connection with the laying out of any new city, municipality, township or minor settlement or the extension or improvement of any existing city, municipality, township or minor settlement; etc.
Upon such acquisition of any lands, the President is compelled on behalf of the Government to pay in respect thereof, out of money provided for the purpose by Parliament, such compensation, as may be agreed upon or determined in accordance with the provisions of the Land Acquisition Act, 1967.
The President may also revoke a right of occupancy if in his opinion it is in public interest to do so. Accordingly, the land for which a right of the occupancy has been revoked reverts back to the Government for re-allocation pursuant to the existing needs. Though the land belonging to the government, some changes on the land may have taken place. Land has its value to the owner; therefore, any lands taken from the users have to be compensated. Based on this act the villagers affected by the Project are claiming that they should be compensated for the lost farms and land used for residential purposes.

(6) The Land Use Planning Act, 2007

Under the provisions of the Town and Country Planning Ordinance, the President is also empowered to acquire any land for a project of public interest. The 1956 ordinance after its revision in 1961, states:
Section 45 (1): Where it appears to the President that it is necessary to acquire any land within a planning area for the scheme applicable thereto and agreement for the acquisition thereof between the Local Authority and the owner of such land cannot be reached, the President may acquire such land under any law relating to the compulsory acquisition of land.
Section 45 (2): Without prejudice to the generality of the provision of subsection (1) of section 45, the power of the President hereunder shall extend to the acquisition of land which has not been developed in accordance with the scheme applicable thereto which, in his opinion, it is necessary to acquire in order to secure its good development or the proper, orderly and continuous development of a planning area or any part of it or the good development of neighboring land.
Section 45 (3): Without prejudice to the provisions of any law relating to the compulsory acquisition of land, the purposes for which land may be acquired under the provisions of this ordinance shall be deemed to be the public purposes.
Under **Section 50 (ii)**, the value of any land within a Planning Area shall, for the purposes of determining the amount of compensation payable, be deemed to be the value of such land on the material date together with the value of any development carried out thereafter with planning consent.
Section 52, on compensation for injury caused by scheme, allows that any person whose land is affected by any scheme and suffers loss thereof, or whose mining rights or forestry rights are rendered abortive by operation of a scheme shall upon proper claim be entitled to recover as compensation from the local government authority the amount by which his land is decreased in value in so far as it was reasonably incurred, the amount of abortive expenditure or the loss or injury suffered. Under **Section 56 (1)**, a claim for compensation shall be made by serving upon the local government authority a notice stating the grounds of claim and amount thereof, within six months from the date of the emergence of such scheme provision or as it may be specified in the scheme.

(7) Occupational Health and Safety Act No. 5 of 2003

Mainly, this act deals with regulation of health, safety, and welfare of workers in factories and workplaces while setting standards for the health, safety, and welfare.
According to the Act, the contractors will be required to, (i) appoint safety and health representative and committee, (ii) register their workplace (campsite, borrow pit and quarry sites) before operation, (iii) provide safety precautions, (iv) ensure health and welfare of workers, and (v) ensure proper handling of hazardous materials/chemicals and process.

(8) HIV and AIDS (Prevention and Control) Act, 2008

According to the Act, it is the duty of every person, institution and organization living, registered, or operating in Tanzania to (i) promotes public awareness on causes, modes of transmission, consequences and control of HIV and AIDS, and to (ii) reduce (a) the spread of HIV and AIDS, (b) prevalence of STIS in the populations, and (c) adverse effects of HIV and AIDS.

The Act also gives the duty to employers and private sectors in order to (i) integrate or prioritize HIV and AIDS in their proceedings and public appearances, and (ii) to advocate against stigma and discrimination of people living with HIV and AIDS. According to this Act, during road construction, the contractor will be obliged to (i) promotes public awareness on causes, modes of transmission, consequences and control of HIV and AIDS, and (ii) to develop and implement the program to prevent and control the spread of HIV/AIDS and STIs

(9) Road Act, 2007

The following sections are relevant to the proposed road project:

Section 29: Specifies that the road reserve is exclusive for the use of the road, development and expansion or any related activities. According to the Act, the road authority may permit any persons or authorities to temporarily place public utilities such as lighting, telegraph, adverts, telephone, electric supplies and posts, drains, sewers, and mains only in such cases where such use do not hinder any future use of the road reserve by the road authority.

Among the public utilities within the road reserve are water supply domestic points. Such utilities are likely to be affected by the Project.

Section 33: The road authority shall ensure to the safety of road users during the design, construction, maintenance, and operation of a public road by providing sidewalks, overhead bridges, zebra crossings and other matters related thereto.

Section 30: Stipulates that the road authority is responsible for the protection of environment as well as the waste disposal.

(10) Employment and Labor Relations Act, 2004

Section 5 of the Act prohibits employment of children under the age of fourteen years. A child at the age of 14-year old and above may only be employed for light works, which are not likely to cause harm to the child's health and development, and does not prejudice the child's attendance at school, participation in vocational orientation or training program approved by the competent authority or the child's capacity to benefit from the instruction received. The act also prohibits employment of a child under the age of eighteen year-olds in any work site where work conditions may be considered hazardous.

7.3.3 Regulations

(1) Environmental Impact Assessment and Audit Regulations, 2005

Environmental Impact Assessment and Audit Regulations provide rules relative to the procedures for and carrying out of environmental impact studies and environmental audits as provided for

under the Environmental Management Act (2004). They prohibit the carrying out of projects without an environmental impact assessment required under the Environmental Management Act and define the contents and form of an environmental impact assessment and the basic principles of an environmental audit. A developer shall apply for an environmental impact assessment certificate in the form as prescribed by these Regulations. The final decision on an environmental impact assessment shall be taken by the Minister. The Regulations also provide for public hearings in relation with environmental impact assessments and appeal against decisions of the Minister.

(2) The Land Regulations, 2001

This regulation is made under the Land Act No 4 of 1999. According to the regulation, the following are eligible for compensation/resettlement:

- ✓ Holder of right of occupancy (Section 22 of the Land Act of 1999);
- ✓ Urban or suburban land acquired by the President under Section 60 of the Land Act, 1999.

Sub-section 2 of Section 9 applies to all applications or claims for compensation against government or Local Government authority, public body, or institution. According to **Section 10 (1)**, the compensation shall take the form of:

- ✓ Monetary compensation
- ✓ Plot of land of comparable quality, extent and productive potential to the land lost;
- ✓ A building or buildings of comparable quality, extent and use comparable to the building or buildings lost
- ✓ Plants and seedlings
- ✓ Regular supplies of grain and other basic foodstuffs for a specified time.

Within this proposed road improvement project, it was agreed that the compensation of affected properties will be in monetary terms. The regulation applies to any applications or claims for compensation by any persons occupying land and shall include (i) the value of un-exhausted improvements on the occupied land, and (ii) the grazing land.

The regulation states: "basis for assessment of the value of any land and un-exhausted improvement shall be the market value of such land". The market value is arrived at by the use of comparative method proved by actual recent, sales of similar properties or by the use of the income approach or replacement cost method, in case the property is of special nature and not saleable. According to the regulation an assessment of the value of land and un-exhausted improvements is done by a qualified Valuer and verified by the Chief Valuer of the Government or his and/or her representative. The compensation issues include (i) the value of un-exhausted improvement, (ii) the disturbance allowance; transport allowance; accommodation allowance, and, (iii) the loss of profits, to be described as follows,

Accommodation allowance

Accommodation allowance is estimated by assessing the market rent of the building and multiplying it by thirty-six months.

Loss of profit

Loss of profit is estimated by assessing the net monthly profit of the business carried out on the land (evidenced by audited accounts where necessary and applicable) and multiplying by thirty-six months.

Disturbance allowance

Disturbance allowance is calculated by multiplying value of the land by average percentage rates of the interest offered by commercial banks on fixed deposits for twelve months at the time of the loss of interest in the land.

Transport allowance

Transport allowance is determined by taking actual costs of transporting twelve tons of luggage by

rail or road (which ever cheaper) within twenty kilometers from the point of the displacement. No payment shall be made for the transport allowance, accommodation allowance, and the loss of profit for unoccupied land at the date of loss of interest on land.

Interest

Interest is determined by average percentage rates of interest offered by commercial banks on fixed deposits and will be recoverable until such compensation is paid (Sub-section 3 of Section 13). The following procedures outlined in **Section 6** of the regulation shall apply:

- ✓ Publication of notice by Commissioner for lands on the public notice board;
- ✓ Notification of the occupier of the land;
- ✓ Submission of claims for compensation by occupier;
- ✓ Physical appearance of occupier on specified date, time and place where assessment is to be made
- ✓ Valuation for compensation by Commissioner or the authorized officer
- ✓ Preparation of compensation schedule and submission of the schedule with claim for compensation to the Compensation Fund.
- ✓ Verification and acceptance of rejection of payment by the Fund within not more than 30 days from the date of receipt of claim.

If the person does not agree with the amount or method of payment or dissatisfied with time taken to pay compensation, he/she may be able to appeal to the High Court. The high court shall determine the amount and method of payment and make any additional costs and inconveniences incurred.

A relevant study shall be conducted within the EIA in order to comply with the legislation by ensuring (i) prompt compensation is paid for acquired land or damaged properties, and (ii) project formulation will involve a qualified Valuation Officer and follow all procedures as outlined in the Land (Compensation Claims) Regulations (2001) and the Land (Assessment of Value for Compensation) Regulations (2001).

7.3.4 Gap Analysis of Tanzanian Laws and JICA guidelines on Resettlement and Compensation

The implications of legal rights to property and/or title to the implementation of any possible involuntary resettlement, including compensation packages and eligibility criteria was evaluated. In addition, Tanzania's policies and legislation vis-à-vis JICA's guidelines on involuntary resettlement was reviewed (see Table below).

Table 7.3.1 Summary of Gap Analysis of Tanzanian Laws and JICA Guidelines on Resettlement and Compensation.

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement and compensation policy of proposed project
1	Involuntary resettlement and loss of means of livelihood are to be avoided where possible by exploring all viable alternatives. (JICA GL)	N/A	No relevant provision and/or sentence regarding the avoidance of loss of livelihood is recognized.	Design of proposed road improvement plan shall be developed by exploiting all feasible alternative while minimizing the loss of means of livelihood.
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	N/A	No relevant provision and/or sentence regarding minimizing impact is recognized.	Design of proposed road improvement plan shall be developed by exploiting all feasible alternative while minimizing the impact regarding the population displacement.

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement and compensation policy of proposed project
3	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	N/A	No relevant provision and/or sentence regarding payment of sufficient compensation as well as livelihood restoration is recognized.	Appropriate compensation and livelihood restoration program shall be developed based on comprehensive socio-economic survey.
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	According to Tanzanian Law, where asset and/or property is not new the compensation of the asset considers the replacement cost being depreciated to derive at depreciated replacement cost which is equivalent to a market value.	The depreciation factor, introduced within compensation scheme of Tanzania, reflects the accumulated obsolescence which the asset has suffered as a result of passage of time, use abuse, change in taste, technological wear and tear and any other factors that may adversely affect the continue running/ using it compared to similar new assets. This is not consistent with JICA GL.	Compensation must be based on the full replacement cost as much as possible.
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	Compensation and other kinds of assistance must be provided prior to displacement (Tanzanian Law).	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be applied.
6	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	Relevant resettlement action plan is prepared, and then, explained to PAPs.	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be applied.
7	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	Sensitization meeting and/or explanation is held with affected people during design stage. Within this AfDB-funded project, public consultation meetings were held at each community as well as explanation of project outline and compensation were explained to each affected people during valuation study.	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be applied.
8	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Explanations of public consultation shall be given in a form, manner, and as per language that are understandable to the affected people.	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be applied.
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action	Constructive participation of affected people shall be promoted within development and	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement and compensation policy of proposed project
	plans. (JICA GL)	implementation of resettlement action plans.		applied.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	Under Land Acquisition Act, where there is a dispute or disagreement regarding : (a) the amount of compensation ; (b) right to acquire the land, (c) the identity of persons entitled to compensation ; (d) application of Section 12 to the land ; (e) any right privilege or liability conferred or imposed by this Act ; (f) appointment of compensation between the person entitled to the same and such dispute or disagreement is not settled by the parties concerned with six weeks from the date of publication of notice that the land is required for a public purpose the Minister or any persons holding or claiming any interests in the land may institute a suit in the High Court of Tanzania for the determination of dispute. In practice, the Government tries to resolve grievance through public meeting with the affected persons.	Tanzanian law does not provide for the establishment of grievance redress mechanisms specific to particular resettlement cases.	Grievance redress mechanism for site-specific lad take cases shall be established with its appropriate monitoring scheme.
11	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP4.12 Para.6)	Affected people are to be identified and recorded as early as possible during RAP-related study, to be conducted at planning stage.	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be applied.
12	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para.15)	The land Acquisition Act 1967, the Land Act 1999, and the Village Land Act 1999 state clearly that land owner with or without formal legal rights, are entitled to claim full, fair and prompt compensation. Tanzanian law does not recognize tenants as being entitled to compensation.	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be applied.
13	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	Section 10(1) of Land Regulation (2001) stipulates that compensation shall take the form of (1) monetary compensation, (2) plot of land of comparable quality,	No major gap recognized.	Both relevant Tanzanian laws/regulations and JICA GL are to be applied.

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement and compensation policy of proposed project
		extent and productive potential to the land lost, (3) a building or buildings of comparable quality, extent and use comparable to the building or buildings lost, (4) plants and seedlings, and (5) regular supplies of grain and other basic foodstuffs for a specified time.		
14	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	No relevant provision and/or sentence regarding vulnerable groups is recognized.	No relevant provision and/or sentence regarding vulnerable groups is recognized.	Sufficient supports for the transition period between displacement and livelihood restoration shall be provided.
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8)	No relevant provision and/or sentence regarding vulnerable groups is recognized.	No relevant provision and/or sentence regarding vulnerable groups is recognized.	Appropriate attention and/or considerations shall be paid to vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities and others.
16	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	No relevant provision and/or sentence regarding the categorization of RAP preparation regarding the scale of possible land-take and/or resettlement is recognized.	No relevant provision and/or sentence regarding the categorization of RAP preparation regarding the scale of possible land-take and/or resettlement is recognized.	Sufficient discussions for the preparation of RAP report regarding the scale of possible land-take and/or resettlement shall be conducted with TANROADS prior to construction.

Source: JICA Study Team

7.4 Environmental Screening and Scoping

7.4.1 Environmental Checklist

Based on current environmental and social conditions of the project area as well as the project outline of the proposed road improvement project, the JICA environmental checklist (road project, checklist 7) has been filled out (see Table below). The JICA-funded road improvement project between Tengeru and Holili (total distance = 102.1 km) is to be conducted within the existing road space of RoW = 45 m, already designated by TANROADS. There are two four-lane sections, i.e., (i) Tengeru – Usa (the distance = 9.3 km), and (ii) Kibosho – Kiboriloni (the distance = 8.6 km). The bridge span of Kikafu bridge is to be extended from the previous 100 m to the proposed 560 m with a resultant bridge design change, and the new bypass section at Kikafu (bridge included) is to be a four-lane section (the distance = 4.0 km). The entire road alignment, mentioned above, is classified into the following four road sections, i.e., (i) Tengeru – Usa, (ii) Usa – Kikafu, (iii) Kikafu – Moshi and (iv) Moshi -Holili. Besides, the access road to KIA is included within this road improvement project.

Table 7.4.1 Environmental Checklist (Road Project: Checklist 7)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) Y (b) Y (c) Y (d) N	(a) ESIA reports are already prepared by AfDB fund in 2014. (b) ESIA Reports have been approved in September 2014. (c) Yes (d) No
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) Relevant stakeholder meetings have been held (44 meetings for statutory bodies and 5 for local communities). (b) Most of comments are related within compensation for land-take process and reflected to the entire project implementation.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) N	(a) No alternative road improvement plans exist.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken? (b) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	(a) N (b) N	(a) Temporal roadside A/Q degradation due to dust and vehicular emission may occur, but manageable by proper implementation of EMP. (b) No facilities nor industrial areas with large emission loading exist.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? (c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?	(a) N (b) N (c) N	(a) Temporal water quality degradation at tributaries crossing the proposed road alignment may occur during both construction and operation phases, and relevant effluent treatment plans are to be developed within EMP of the proposed road improvement study in order to meet environmental standards of Tanzania. (b) Risk of contamination on nearby water resources and irrigation channel may increase during both construction and operation phases, and relevant effluent treatment plans and mitigation measures are to be developed within EMP of the proposed road improvement study in order to meet environmental standards of Tanzania. (c) Waste water treatment plan and relevant effluent treatment plans are to be developed within EMP of the proposed road improvement study in order to meet environmental standards of Tanzania.
	(3) Wastes	(a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations?	(a) Y	(a) Certain amounts of construction wastes are to be generated during both construction and operation phases, and relevant waste treatment plans are to be developed within EMP of the proposed road improvement project in order to meet environmental standards of Tanzania.
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) Y	(a) EMP will be developed, addressing roadside noise and vibration issue during both construction and operation phases in order to meet environmental standards of Tanzania .
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) Y	(a) Both river banks strip zones (i.e., 60 meters away from the high water level of river of concerns) are regarded as protected zone (EMA2004).

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? (e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? (f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	(a) N (b) N (c) Y (d) Y (e) N (f) N	(a) No primeval forests, tropical rain forests, ecologically valuable habitats and others exist. (b) No protected habitats of endangered species designated by the country's laws or international treaties and conventions occur. (c) There are several riverine ecosystems aromh tributaries crossing project road alignment. If significant ecological impacts on those local ecosystems are anticipated, adequate protection measures shall be taken to reduce the impacts on those ecosystems within EMP development. (d) Adequate protection measures are to be taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock within EMP development. (e) No. (f) No.
	(3) Hydrology	(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	(a) Y	(a) Due to some earthwork, local hydrological systems such as run-off pattern would be changed..
	(4) Topography and Geology	(a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? (c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	(a) N (b) N (c) N	(a) There are some soft ground on the route that may need some soil cutting. Adequate measures are to be considered to prevent slope failures or landslides, where needed. (b) There are possibilities that civil works, such as cutting and filling will cause slope failures or landslides at several river crossing points such as Kikafu. Adequate measures are to be taken to prevent slope failures. (c) There is a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites, and adequate measures are to be taken to prevent soil runoff therein.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?(d) Are the compensations going to be paid prior to the resettlement?(e) Are the compensation policies prepared in document?(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?(g) Are agreements with the affected people obtained prior to resettlement?(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?(i) Are any plans developed to monitor the impacts of resettlement?(j) Is the grievance redress mechanism established?	(a) Y(b) Y(c) Y(d) Y(e) Y(f) Y(g) Y(h) Y(i) Y(j) Y	(a) Several roadside houses are identified inside of RoW=45 m space. However, due to the implementation of COI (Corridor of Impact) policy, no demolition of those roadside PAPs is to be carried out. Additional land is expected to be acquired for new bypass road sections, and compensation reports for those new bypass section (final report) were summarized in July 2012 with official stamps of Ministry of Land (cut-off-date is July 10th, 2012). Within those reports, 121 and 38 land owners were listed for land take process of Kikafu and Himo-Holili Bypass Sections, respectively. Land-take process of those new bypass section is still on-going, and currently those reports are examined by Ministry of Finance, GoT (as of May 2016).(b) Relevant explanations and information were provided within its valuation survey at each land owner by TANROADS.(c) Official resettlement plan including compensation plan for new bypass sections, mentioned above, was prepared by TANROADS with directions of Ministry of Land based on road improvement plan.(d) Payment is to be done before the resettlement.(e) Relevant resettlement policies are to be documented.(f) Comprehensive social considerations addressing these issues are to be developed.(g) Agreement is to be made prior to resettlement.(h) Comprehensive organizational framework is to be established.(i) Outside monitoring plan is developed within RAP report.(j) GRM is to be developed.
	(2) Living and Livelihood	(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts? (b) Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary? (c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? (d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)? (e) Is there any possibility that roads will impede the movement of inhabitants? (f) Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?	(a) N (b) N (c) Y (d) Y (e) N (f) N	(a) Basically, this project is to be conducted within RoW = 45 m, already declared officially. New road sections (i.e., Kikafu and Himo-Holili) consist of agricultural and bare lands. EMP addressing this issue is to be developed. (b) Same as above. (c) There are some possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project. Adequate considerations are to be addressed within EMP development. (d) There are possibilities that the project will worsen local traffic conditions (e.g., traffic congestion and traffic accidents). Adequate measures are to be addressed within EMP and construction schedule development. (e) No (f) No

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(3) Heritage	(a) Is there a possibility that the project will damage the local archaeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) No
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) No.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected?	(a) N/A (b) N/A	(a) No ethnic minority communities exist. (b) Same as above.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) N (b) Y (c) Y (d) Y	(a) EMP addressing this issue is to be developed. (b) Same as above. (c) Same as above. (d) Same as above.
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a) EMP addressing this issue is to be developed. (b) Same as above. (c) Same as above.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a) Y (b) Y (c) Y (d) Y	(a) EMP addressing this issue is to be developed. (b) Major monitoring items are to be determined based on field surveys conducted within this road improvement study (e.g., roadside noise and A/Q, W/Q). (c) EMP addressing this issue is to be developed. (d) Same as above.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).(b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).	(a) N(b)	(a) Not likely that proposed road improvement project requires forest sector checklist.(b) There are some power transmission line at new bypass road section (Himo-Holili). Necessity of references to checklist of other sectors are to be discussed after road improvement project is finalized.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) Not likely to have negative trans-boundary issue by implementing the proposed JICA-funded road improvement project.

1) Regarding the term “Country's Standards” mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made. In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

Source: JICA Study Team

7.4.2 Environmental Scoping

The table below summarizes the environmental scoping results of the proposed road improvement project.

Table 7.4.2 Environmental Scoping

Environmental Factor		Phase			Comments
		Pre-Construction	Construction	Operation	
Socio-Cultural Environment					
1	Involuntary Resettlement	B	D	D	TANROADS has already started relevant land-take negotiation for the entire road improvement project (RoW = 45 m) and partial road improvement between Arusha and Tengeru is on-going. However, several PAPS still exist between Tengeru and Holili within RoW = 45 m. Besides, land-take negotiations for new bypass sections (Kikafu and Himo-Holili, RoW = 60 m) have not been initiated yet (valuation of the new bypass road sections have been completed by TANROADS). Further land-take negotiation is required for the implementation of the proposed road improvement project between Tengeru and Holili.
2	Local Job Market and Economy	B	B	D	As mentioned earlier, further land-take negotiation is required. If some land owners request for land-for-land based approach and/or relocation, it is essential to prepare the compensation of physical relocation as well as recovery of livelihood. During the construction period, there may be some negative impacts on the local economy, due to worsened local traffic condition temporarily.
3	Land use and Utilization of Local Resources	D	D	D	N/A
4	Social Institutions	D	D	D	N/A
5	Existing social infrastructures and services	D	D	D	N/A
6	The poor and Indigenous ethnic groups	D	D	D	N/A
7	Misdistribution of benefits and damage	D	D	D	N/A
8	Cultural Heritage	D	D	D	N/A
9	Local Conflict of interests	D	D	D	N/A
10	Water use/or water rights	D	D	D	N/A
11	Sanitation	D	B	C	Some topographic change is expected to occur during both construction and operation phases. As a result, risk of occurrence of local inundation due to the temporal worsening of local run-off condition and resultant outbreak of waterborne or insect-borne diseases such as dengue will likely increase to some extents.
12	Infectious Disease (e.g., HIV.AIDS)	D	B	C	As mentioned earlier, risks of an outbreak of waterborne or insect-borne diseases such as dengue or malaria will increase.
Bio-Physical Env					
13	Topography	D	B	B	Due to earthwork, some topographic change is expected to occur during construction phase.
14	Groundwater	D	B	D	Temporal water quality degradation during construction period may occur.

Environmental Factor		Phase			Comments
		Pre-Construction	Construction	Operation	
15	Soil Erosion	D	B	B	Due to earthworks, there is a risk of local soil erosion and/or landslides, in particular, at river crossing points during both construction and operation phases.
16	Hydrology	D	B	B	Due to earthworks, there is a possibility of disruption to local run-off water.
17	Coastal ecosystem	D	D	D	N/A
18	Flora/Fauna and biodiversity	D	B	D	Several local riverine ecosystems occur at tributaries (e.g., Kikafu and Wona Rivers) crossing the proposed road alignment. Both riverbank strips (60 meters away from water front at high water level) of all perennial rives crossing project alignment are categorized as protected areas (EMA 2004).
19	Meteorology	D	B	C	Due to some changes of local topographic and hydrological conditions, mentioned above, the risk of local meteorological change will increase.
20	Landscape	D	C	C	N/A
21	Global warming	D	B	C	Temporal increase of regional CO2 emission, due to the temporal increase of local traffic volume and usage of certain amount of mortar is expected to occur during construction phase.
Pollution					
22	Air Quality	D	B	B	Baseline roadside air quality conditions are in good condition (see Section 7.5 for more detailed descriptions of field roadside noise study). Temporal degradation of roadside air quality condition due to the temporal increase of local traffic volumes is expected to occur.
23	Water Quality	D	B	C	Baseline water quality conditions of several rivers crossing project alignment (e.g., Kikafu and Wona Rivers) are in good condition (see Section 7.5 for more detailed descriptions of field roadside noise study). Risk of temporal water quality degradation of nearby tributaries and/or well will increase during the construction phase.
24	Soil Contamination	D	B	B	Risk of soil contamination due to accidental spill of chemicals will increase during both construction and operation phases.
25	Waste	D	B	B	Certain amount of construction wastes is expected to occur. Amount of soil dumping is to be minimized by optimized earthwork balance.
26	Noise/Vibration	B	B	B	Baseline roadside noise conditions are not in good condition (see Section 7.5 for more detailed descriptions of field roadside noise study). Temporal degradation of roadside noise/vibration condition due to the temporal increase of local traffic volumes is expected to occur.
27	Ground subsidence	D	D	D	N/A
28	Obnoxious smell	D	B	C	Risk of obnoxious smell (e.g., compost smell) due to the occurrence of unexpected local inundation and/or degraded run-off will increase during both construction and operation phases.
29	Sediment/Benthos	D	B	B	Due to the increase of risk of soil erosion at all river crossing points, mentioned above, risk of sediment and resultant water quality degradation downstream of all tributaries crossing the proposed road alignment will rise.
30	Accidents	D	B	C	Risk of traffic accidents and worsened local traffic jam due to the temporal increase of local traffic volume.

Note A: significant, B: major, C: unknown, D: less significant
Source: JICA Study Team

7.5 Environmental Surveys and Preliminary Studies

7.5.1 Introduction

As mentioned earlier, environmental approval for the proposed road improvement project was already issued by NEMC in 2014, and road widening activities have commenced between Arusha and Tengeru. The spatial scope of the proposed JICA-funded road improvement project covers the section between Tengeru and Holili, and has some changes in design works (e.g., Kikafu bridge).

Based on findings, obtained from the technical site conducted in December 2015 and review results of previous ESIA, EMP and RAP reports, ToR of the supplemental environmental and social study is described. The study area of this supplemental study covers both direct and indirect areas, to be influenced by the construction and operation activities of the proposed road improvement project.

7.5.2 ToR Development of Additional Environmental and Social Consideration Study

Based on preliminary environmental scoping results, summarized in the following tables, review results of previous ESIA, EMP and RAP and findings of the technical site visit as well as a revised road improvement plan, conducted by the JICA Study Team, a draft ToR for the additional environmental and social study was developed. Basically, this ToR development was carried out abiding by IEE/EIA Law and/or relevant environmental regulations of Tanzania and JICA Guidelines. The table below summarizes major tasks of the additional field study to be required for the proposed road improvement project.

Table 7.5.1 Major Tasks of Additional Environmental and Social Consideration Study

	Major Tasks to be conducted
1	Roadside Air Quality and Noise Survey
2	Water Quality Survey
3	Preliminary Biological Environmental Study
4	Review and Updating of Past RAP study
5	Socio-Economic Study for newly identified PAPs
6	Preparation of Entitlement Matrix
7	Pubic consultation (and/or community meeting for Land Take)
8	Support TANROADS in Preparation of Form # 5 regarding the Updating of Road Improvement.

Source: JICA Study Team

More detailed descriptions of this ToR are attached in Appendix A. Based on this developed ToR, relevant field surveys were conducted from January 2016 for three months. Major survey results are described in the following sections separately.

7.5.3 Field Survey Results

(1) Roadside Air Quality Survey

1) Survey Outline

In order to investigate the current roadside air quality condition of Tengeru – Holili Road, a 24-hour continuous roadside air quality survey was conducted at a point 22.5 meters away from the centerline of the project alignment along the current road. Within this measurement, air quality parameters, PM10, CO, NO and NOx, are of concern. Based on the current traffic condition of Tengeru – Holili Road and the outline of the proposed road improvement project, five points were chosen for this measurement. The following tables summarize the outline of this air quality measurement. Traffic volume by vehicle type was also counted during this air quality

survey.

Table 7.5.2 Air Quality Measurement.

Total number of survey points = 5. Measuring period: March/15/16 - March/24/16	
Parameter	PM10, CO, NO and NOX
Equipment	PM10: Casella Microdust Pro particulate monitor model 176000A. CO, NO and NOX: Portable desktop gas analyzers type GMI Visa and KANE900 Plus

Source: JICA Study Team

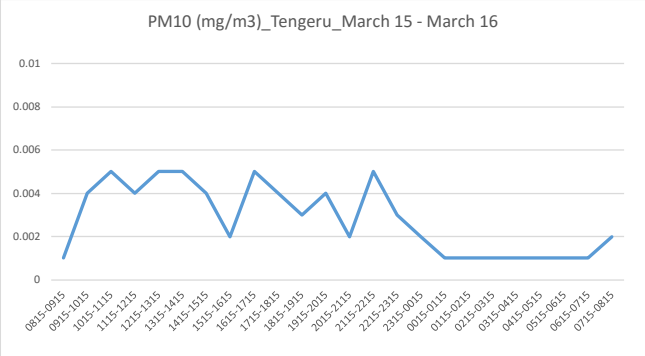
Table 7.5.3 Measurement Point Location (Air Quality)

Site #	Location (approx.)	GPS Coordinate
1	Tengeru	S 03° 22’ 27.0’’, E 036° 47’ 19.8’’
2	Boma Ng’ombe	S 03° 20’ 18.0’’, E 037° 07’ 49.2’’
3	Moshi	S 03° 20’ 42.5’’, E 037° 23’ 47.0’’
4	Himo	S 03° 23’ 34.2’’, E 037° 32’ 30.4’’
5	Holili,	S 03° 22’ 42.4’’, E 037° 37’ 49.0’’

Note: Roadside noise survey is also carried out at same points.
Source: JICA Study Team

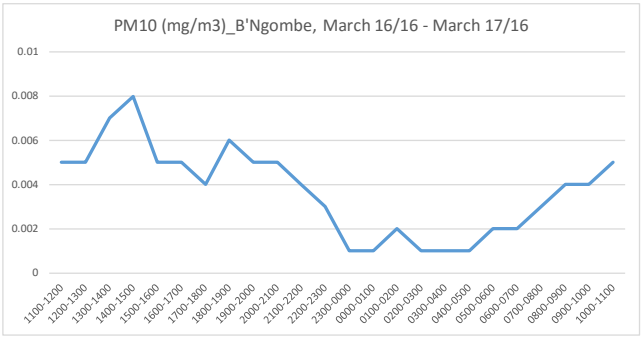
2) Results and Discussions

The following figures show the time variation of PM10, measured at each sampling points.



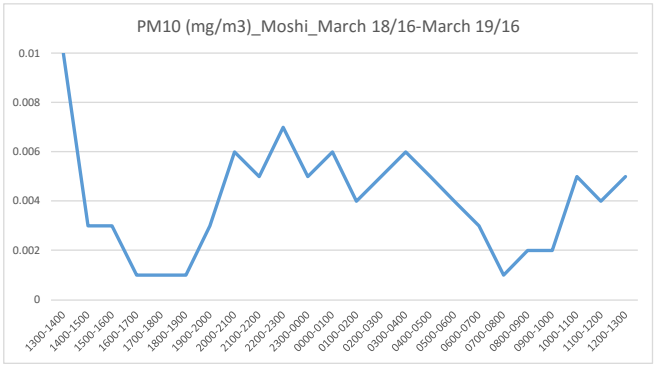
Source: JICA Study Team

Figure 7.5.1 Time Variation of PM10 (mg/m^3), measured at Tengeru



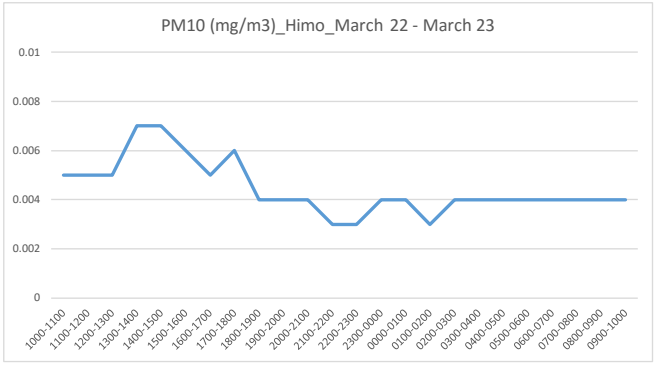
Source: JICA Study Team

Figure 7.5.2 Time Variation of PM10 (mg/m^3), measured at Boma Ng’gombe



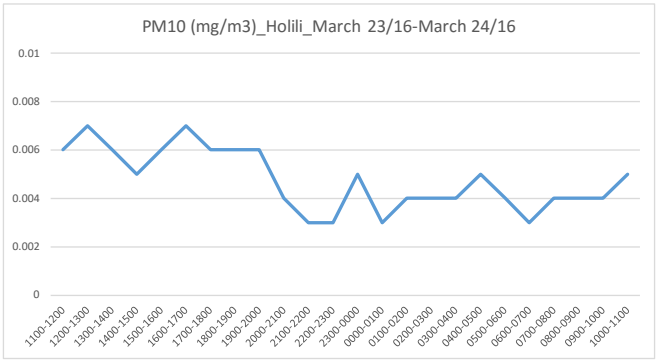
Source: JICA Study Team

Figure 7.5.3 Time Variation of PM10 (mg/m^3), measured at Moshi



Source: JICA Study Team

Figure 7.5.4 Time Variation of PM10 (mg/m^3), measured at Himo



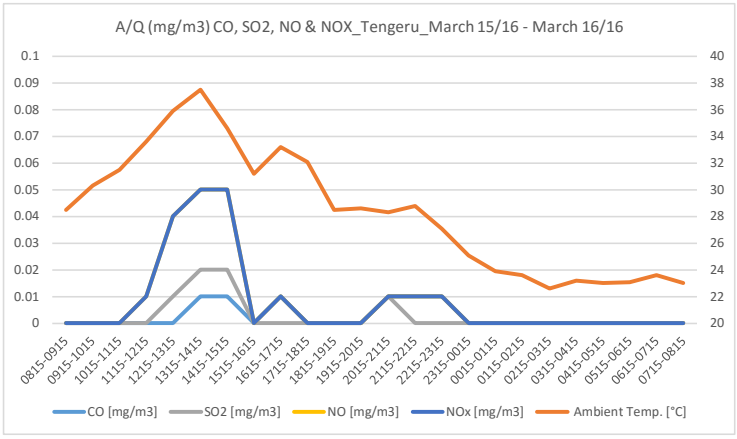
Source: JICA Study Team

Figure 7.5.5 Time Variation of PM10 (mg/m^3), measured at Holili

From these figures, it can be seen that roadside air quality (PM_{10}), measured at 5 points, show several peaks, corresponding to morning, noon and evening, but below 0.01 mg/m^3 except one measured PM_{10} value at Moshi (13:00 – 14:00). Those are below both ambient air quality standards of Tanzania and WHO Guideline value (PM_{10})[1].

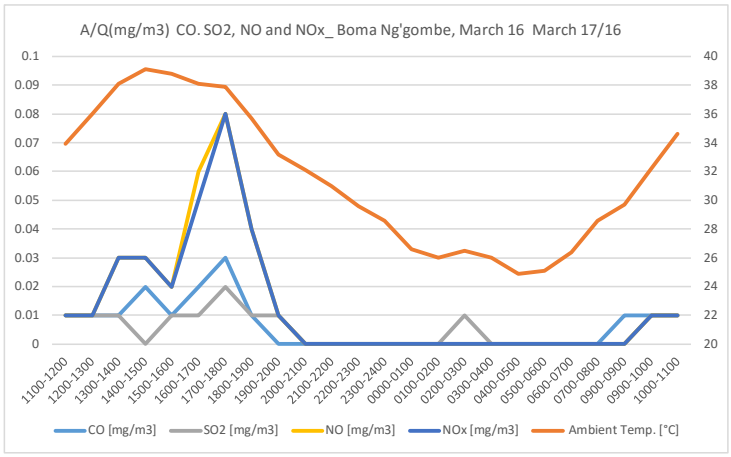
Besides, all roadside air quality results bar PM10, obtained from this measurement are shown in following figures.

[1] Ambient Air Quality Standard of Tanzania (PM_{10}) : 60 to 90 µg/Nm3 (0.05 – 0.116 mg/kg)
WHO Guideline: 50 ug/m^3 for 24-hours



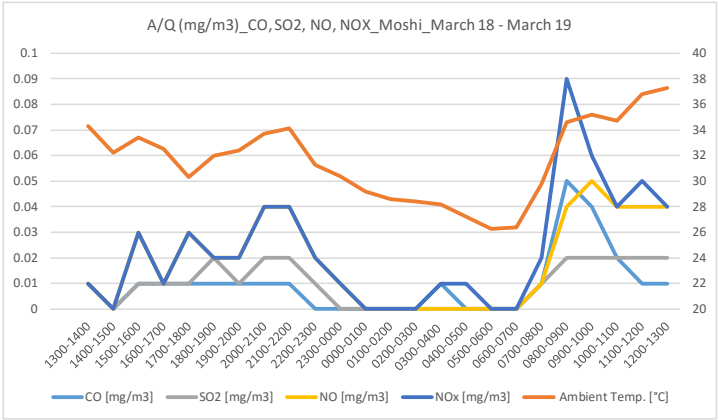
Source: JICA Study Team

Figure 7.5.6 Time Variation of CO, SO2, NO and NOX (mg/m^3), measured at Tengeru



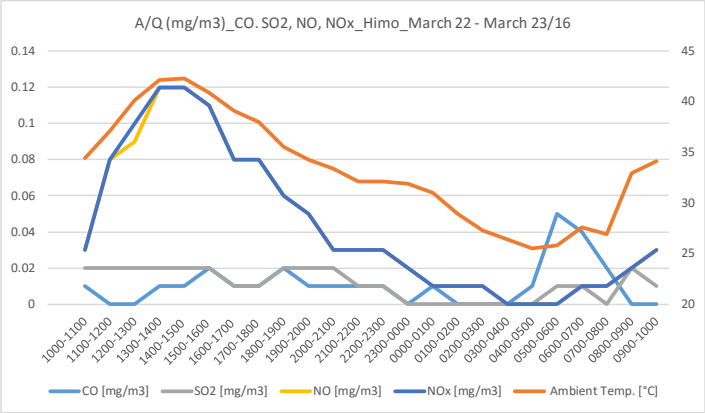
Source: JICA Study Team

Figure 7.5.7 Time Variation of CO, SO2, NO and NOX (mg/m^3), measured at Boma Ng'gombe



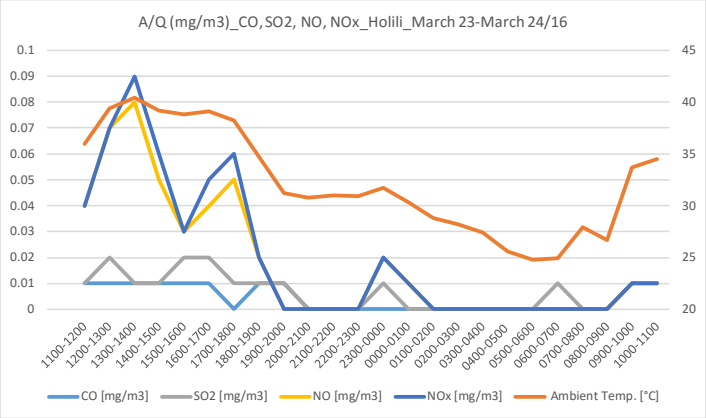
Source: JICA Study Team

Figure 7.5.8 Time Variation of CO, SO2, NO and NOX (mg/m^3), measured at Moshi



Source: JICA Study Team

Figure 7.5.9 Time Variation of CO, SO2, NO and NOX (mg/m^3), measured at Himo



Source: JICA Study Team

Figure 7.5.10 Time Variation of CO, SO2, NO and NOX (mg/m^3), measured at Holili

From these figures, it can be seen that roadside air qualities, measured at 5 points, show several peaks, corresponding to morning, noon and evening, but below 0.1 mg/m^3. Those are below both ambient air quality standard of Tanzania and WHO guideline values[2]. So that, it can be concluded that the current roadside air quality condition between Tengeru and Holili is in a good state.

(2) Roadside Noise Survey

1) Survey Outline

In order to investigate the current roadside noise condition of Tengeru – Holili Road, 24-hour continuous roadside noise survey was conducted at point 22.5 meters away from the centerline of the project alignment along the current road. Within this measurement, noise parameter, Leq, is of concern. Based on the current traffic condition of Tengeru – Holili Road and the outline of the proposed road improvement project, five points were chosen for this measurement. The following tables summarize the outline of this noise measurement. Traffic volume by vehicle type was also counted within this noise survey.

[2] Ambient Air Quality Standards of Tanzania
SOx: Daily average of hourly values shall not exceed 0.1 mg/kg and 0.5 mg/Nm^3 for 10 minutes.
CO: A maximum permitted exposure of 100 mg/Nm^3 for periods not exceeding 15 minutes.
NOx: 150 µg/Nm^3 for 24–hours average value and/or 120 µg/Nm^3 for 8 hours
WHO Guideline
NO_2: 200 ug/m^3 for 1-hour mean.
SO2: 20 ug/m^3 for 24-hours and 500 ug/m^3 for 10-minutes

Table 7.5.4 Noise Measurement.

Total number of survey points = 5. Measuring period: March/15/16 - March/24/16	
Parameter	Leq
Equipment	Clas Ohlson Digital Sound Level Meter Type 36-1604, Model ST-805 with measurement range of 30 - 130 dB(A). Meter meets ANSI S1.4 type 2 standards and conforms to IEC 651 type 2

Source: JICA Study Team

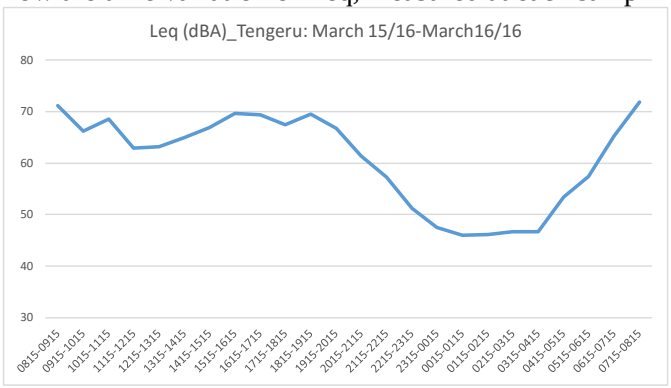
Table 7.5.5 Measurement Point Location (Noise)

Site #	Location (approx.)	GPS Coordinate
1	Tengeru	S 03° 22’ 27.0’’, E 036° 47’ 19.8’’
2	Boma Ng’ombe	S 03° 20’ 18.0’’, E 037° 07’ 49.2’’
3	Moshi	S 03° 20’ 42.5’’, E 037° 23’ 47.0’’
4	Himo	S 03° 23’ 34.2’’, E 037° 32’ 30.4’’
5	Holili	S 03° 22’ 42.4’’, E 037° 37’ 49.0’’

Note: Roadside air quality surveys are also carried out at same points.
Source: JICA Study Team

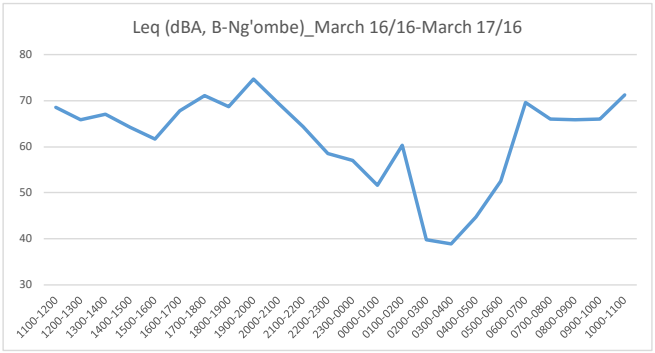
2) Results and Discussions

The figures below show the time variation of Leq, measured at each sampling points.



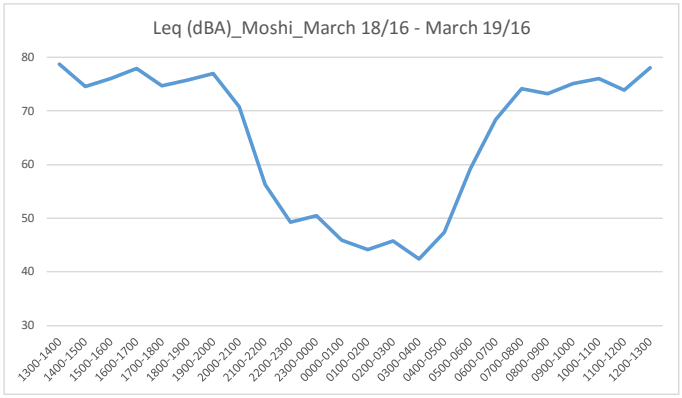
Source: JICA Study Team

Figure 7.5.11 Time variation of Leq (dBA), measured at Tengeru



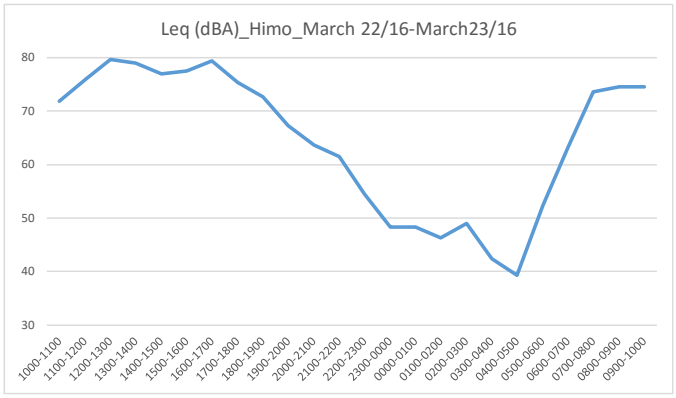
Source: JICA Study Team

Figure 7.5.12 Time variation of Leq (dBA), measured at Boma Ng’gombe



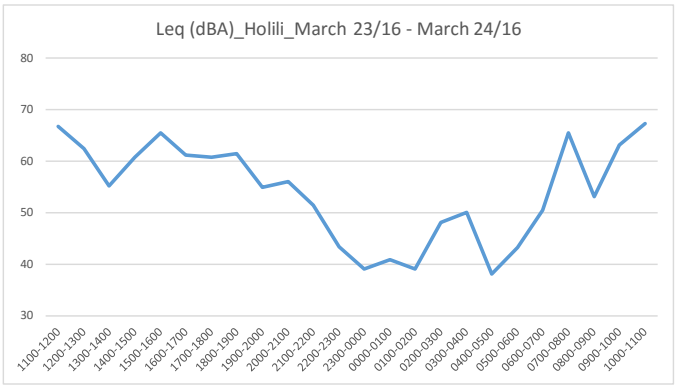
Source: JICA Study Team

Figure 7.5.13 Time variation of Leq (dBA), measured at Moshi



Source: JICA Study Team

Figure 7.5.14 Time variation of Leq (dBA), measured at Himo



Source: JICA Study Team

Figure 7.5.15 Time variation of Leq (dBA), measured at Holili

From these figures, it can be seen that roadside noise, measured at 5 points, show several peaks, corresponding to morning, noon and evening, and, sometime reach more than 70 dBA. In addition, the noise measured at 5 points during off-peak hours also exceeds more than 40-50 dBA. Based on the noise standards, implemented in Tanzania[3], the maximum permissible noise levels at the

[3]Noise standards of Tanzania

	Noise Limit (dBA)	
	Day	Night
Any building used as hospital, convalescence home, home for the aged, sanatorium and leaning institutions, conference rooms, public library and environmental and recreational site	45	35
Residential Area	50	35

residential and the mixed residential areas at day time are 50 and 55 dBA, respectively.

The table below summarizes the Ld (daytime-averaged Leq) and Ln (night time-averaged Leq), calculated based on the noise survey results. As summarized in this table, current roadside noise condition at all five survey points are not in good state, so future roadside noise condition would be worsened if the local traffic volume would increase during both construction and operation phases. Thus, it would be wise to prepare for several mitigation measures such as the roadside vegetation and others, that would be applicable to the local condition.

Table 7.5.6 Summary of Ld and Ln

	Ld (6:00 am – 10:00 pm)	Ln (10:00 pm – 6:00 am)
Tengeru	67.7	51.5
B-Ng'ombe	68.8	55.2
Moshi	75.4	51.8
Himo	75.5	49.6
Holili	62.4	44.8

Source: JICA Study Team

(3) Water Quality Survey

1) Survey Outline

In order to grasp the current water quality condition at major tributaries such as Kikafu and Wona Rivers crossing the proposed road alignment, the field measurement of the water quality is carried out. Within this measurement, eleven parameters, listed in the table below, are of concern. Upon considering the topographic features of study area, results of several field observations and interviews with local research groups such as TAWIRI, 8 points were chosen as sampling points for this measurement. Among them, six points are used for the surface water quality measurement while remaining two for the groundwater. Actual measurements were carried out in March 2016. The tables below summarize the outline of this water quality measurement.

Table 7.5.7 Water Quality Measurement.

Total number of sampling points = 8. Measuring period: March 2016	
Parameter	pH, Conductivity, Total Dissolved Solids, Turbidity, Temperature, TSS, DO, BOD, COD, E-Coli-form, Total Coli-form
Lab	Analyzed at Ngurdoto Defluoridation Research Station Water Laboratory. Note that pH, Electric Conductivity, TDS, temperature and DO were analyzed on site.

Source: JICA Study Team

Table 7.5.8 Measurement/or Sampling Point Location

Site #	Location (approx.)	Coordinate
Surface Water		
1	Upstream side of current bridge over the Wona River	S 03° 23' 19.692" E 037° 32' 39.347"
2	Bridge site over the Wona River	S 03° 23' 28.554" E 037° 32' 43.383"
3	Downstream side of the current bridge over the Wona River	S 03° 23' 35.625" E 037° 32' 46.223"
5	Upstream side of current bridge over the Kikafu River	S 03° 18' 52.170" E 037° 13' 15.370"
6	Bridge site over the Kikafu River	S 03° 19' 8.270" E 037° 13' 4.964"
7	Downstream side of current bridge over the Kikafu River	S 03° 20' 2.918" E 037° 13' 14.971"
Subsurface Water		
4	Elimo Secondary School, Himo	S 03° 23' 44.696" E 037° 32' 16.177"
8	Kwa sadala	S 03° 18' 24.076" E 037° 12' 20.896"

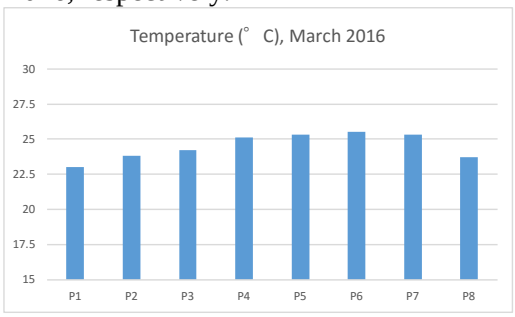
Source: JICA Study Team

Mixed residential (with some commercial and entertainment)	55	45
Residential and Industry/small scale production and commerce	60	50
Industrial area	70	60

Note that Day 6:00 am – 10:00 pm and Night 10:00 pm – 6:00 am

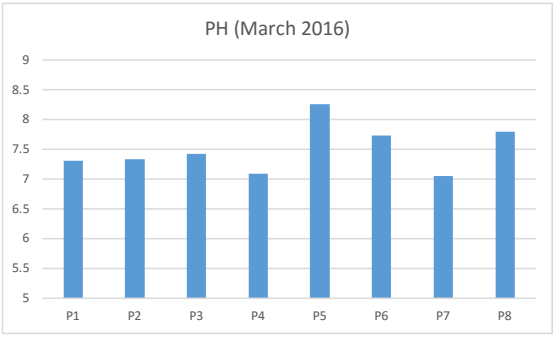
2) Results and Discussions

The following figures show measured water quality analytical results of Temperature, pH, TDS (total dissolved solid), turbidity, TSS, Electric Conductivity, DO, BOD, COD, E-Coli and Total Coli, conducted in March 2016, respectively.



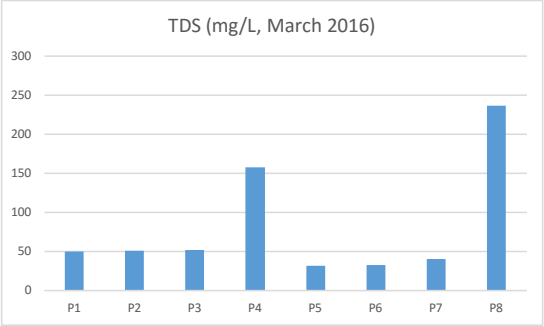
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.16 Water Quality Survey Results (Temperature, measured in March 2016)



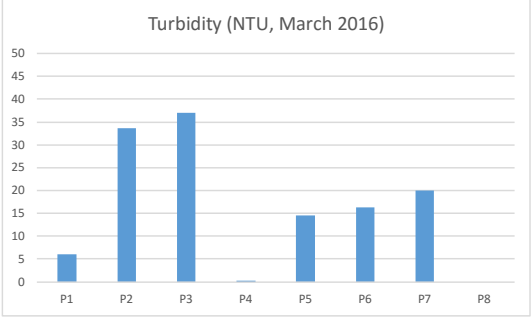
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.17 Water Quality Survey Results (pH, measured in March 2016)



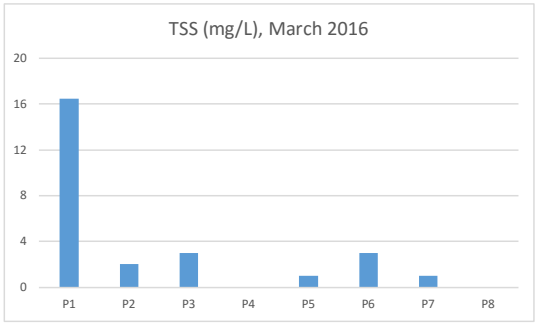
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.18 Water Quality Survey Results (Total Dissolved Solid, measured in March 2016)



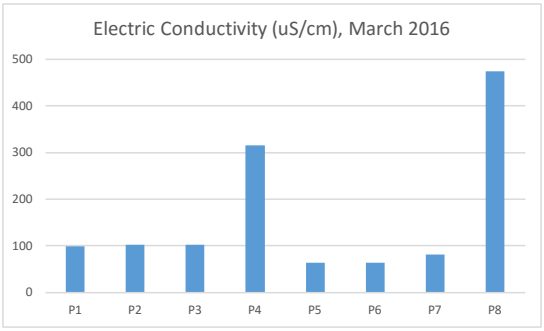
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.19 Water Quality Survey Results (Turbidity, measured in March 2016)



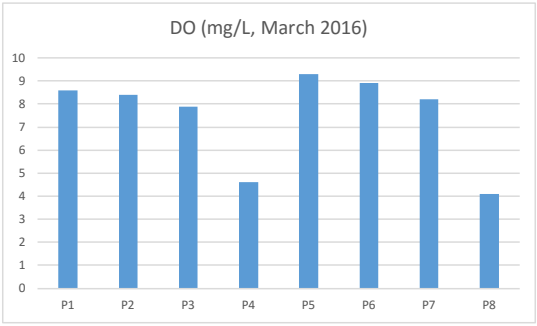
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.20 Water Quality Survey Results (TSS, measured in March 2016)



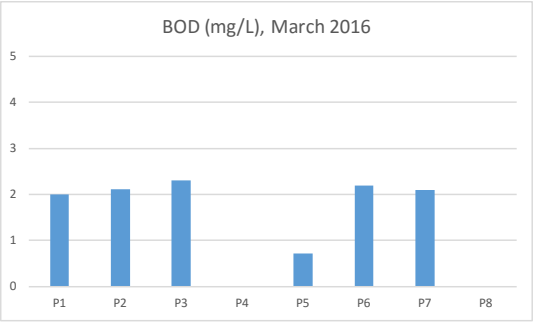
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.21 Water Quality Survey Results (Electric Conductivity, measured in March 2016)



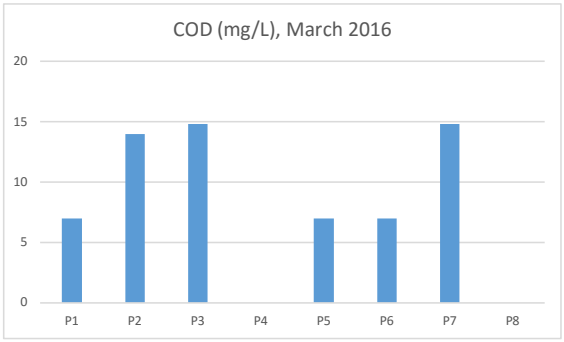
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.22 Water Quality Survey Results (DO, measured in March 2016)



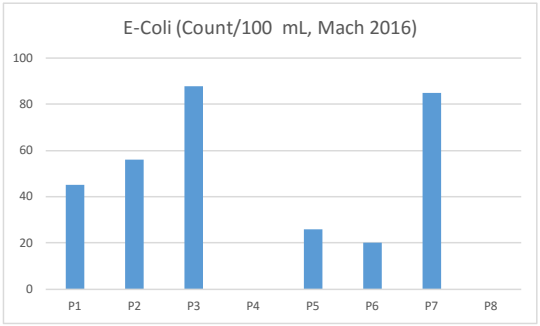
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.23 Water Quality Analytical Results (BOD, March 2016)



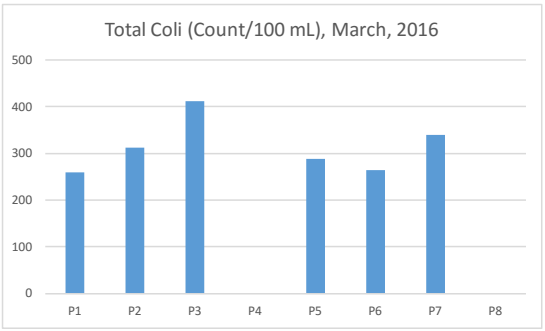
Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.24 Water Quality Analytical Results (COD, March 2016)



Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.25 Water Quality Survey Results (E-Coli, measured in March 2016)



Note that P4 and P8 are values measured at borehole (sub-surface water).
Source: JICA Study Team

Figure 7.5.26 Water Quality Survey Results (Total Coli, measured in March 2016)

From these figures, most measured water quality parameters were below the water quality standards for river water, applicable in Tanzania[4]. So, it can be said that the river water quality,

[4] Water Quality Standards of Receiving Waterbody

	Maximum Permissible Concentration		
	Category 1	Category 2	Category 3
Suspended Matter (turbidity)	Discharge of effluents shall not cause formation of sludge or scum in the receiving water.		
Temperature	Discharge of effluents shall not raise the temperature of the receiving water by more than 5ºC.		
Total dissolved solids (mg/L)	2,000	2,000	No limit
pH	6.5-8.5	6.5-8.5	6.5-9.0
DO (mg/L)	6	5	3
B.O.D – 5days, 20ºC (mg/L)	5	5	10

Category 1: Water suitable for drinking water supplies, swimming pools, food and beverage manufacturing industries, pharmaceuticals manufacturing industries or industries requiring a water source of similar quality.
Category 2: Water suitable for use in feeding domestic animals; in fisheries, shell cultures, recreation and water contact

measured within this study at all six sampling points (i.e., Kikafu and Wona Rivers) is in good condition.

Laboratory results of sub-surface water quality show that pH values of all samples are to a certain degree lower than those obtained for surface water. In addition, all BOD, COD and Coli-form values are considerably low.

(4) Review and Updating of Past RAP study

1) Survey Outline

As mentioned in Section 7.1, a RAP study was conducted within the F/S and D/D, and 444 PAPs were identified. Based on that study result, TANROADS initiated the land-take process with PAPs, identified within RoW = 45 m road space. During the technical site visit, conducted in December 2015, it was found that the current RoW = 45 m space between Arusha and Holili is cleared but several PAPs are still identified therein.

As part of the Study, a supplemental PAP survey was undertaken. Within this supplemental PAP counting, direct measurement from the centerline of the project alignment was conducted in order to determine whether roadside houses and/or structures of concern are located inside of RoW = 45 m boundary or not. This supplemental PAP counting consists of the following two steps, i.e., (1) preliminary PAPs counting (conducted in February 2016), and (2) verification PAPs counting (May 2016).

2) Counting Results

Within this preliminary PAP counting, sixteen (16) PAPs were identified. Then, based on this preliminary counting result, the verification work was conducted in May 2016, and it is confirmed that eight (8) PAPs are located within the RoW = 45 m of the proposed road improvement project. Table below summarizes the inventory of eight (8) PAPs, identified within the RoW = 45 m road space.

Table 7.5.9 List of PAPs, identified within RoW = 45 m Space

	Site Descriptions	Overview
1	Building (60.8 m^2 = 16 m x 3.8 m) accommodating hardware, bar, food vendors (kiosk)	
2	Part of building (119.7 m^2 = 13.3 m x 9 m) accommodating Voda phone shop – 1.5 m falls within the road reserve	

sports.
Category 3: Water suitable for irrigation and other industrial activities requiring water of standards lower than those of water in category 1 and 2.

3	Part of building (325.6 m^2 = 29.6 m x 11 m) (Ofisi ya Jimbo la Vunjo NCCR)	
4	Whole Building (18.0 m^2 = 9.0 m x 2.0 m) and land (15.0 m x 7.5 m)	
5	Part of structure, Kiosk, concrete poles secured with wire mesh, trees & land (495 m^2 = 66.0 m x 7.5 m)	
6	Part of building (75.6 m^2 = 18.0 m x 4.2 m) which accommodates retail shop, food vendors, bar, barber shop & kiosk	
7	Part of building (70.68 m^2 = 11.4 m x 6.2 m) accommodating bar and shop	

8	Part of structure (208 m^2 = 32.5 m x 6.4 m) accommodating saloon, cosmetics, electronics shop.		

Note: Area to be affected, written in "Site Description", is an estimate of the study team.
Source: JICA Study Team

All PAPs, identified within this verification exercise, were located at the marginal area of RoW boundary since all owners of those buildings acknowledge the proposed road improvement project. So, possible affected areas would be few since all owners have taken precautionary measures in order to minimize potential losses of their properties already. The COI (Corridor of Impact) method was applied to the Project. Thus, no land-take nor demolition of those identified PAPs will occur within this road improvement project. Location map of those identified PAPs are attached in Appendix B.

(5) Socio-Economic Study for newly identified PAPs

1) Summary of identified PAPs

A socio-economic survey was conducted for the identified 8 PAPs, mentioned in the previous section. On-site interviews were conducted with 6 PAPs but not for the remaining two due to the absence of owners. From this survey, all PAPs identified could be categorized as "commercial" and "self-employed". Most structures were built before the cut-off-date date declared by TANROADS.

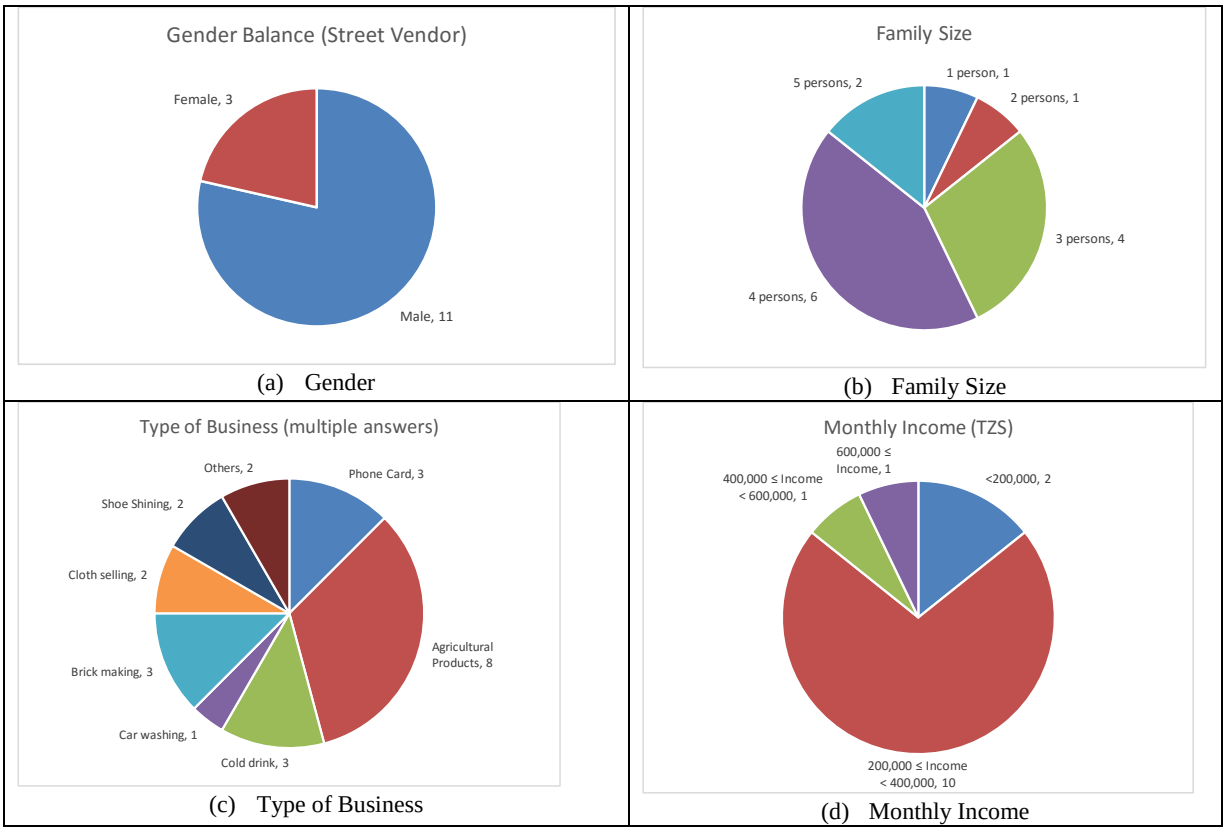
(6) Preliminary Interview-based Survey with Street Vendors

1) Introduction

Several roadside markets occur between Tengeru and Holili, and interview-based preliminary socio-economic survey is conducted at the roadside market at Tengeru. Within this survey, 14 interviews were conducted in April 2016.

2) Study Results

The following figures show the survey results of this preliminary socio-economic survey for the street vendors at Tengeru. Most business owners have three (3) to four (4) family members, and selling of phone cards, agricultural products, fruits and cold drinks and monthly incomes vary between 100,000 and 750,000 TZS.



(a) Gender (b) Family Size

(c) Type of Business (d) Monthly Income

Source: JICA Study Team

Figure 7.5.27 Socio-Economic Survey for Street Vendor (Tengeru)

(7) Summary of PAH for New Bypass Construction

1) Introduction

Two new bypass roads of Kikafu (L = 4,000 m) and Himo-Holili (L = 5,000 m) sections are to be constructed within this proposed road improvement project, so that relevant land acquisition is to be taken at those two new bypass sections. Areas of concern for the two proposed bypass sections are 4,000 m of Kikafu Section (RoW = 60 m) and 5,000 m in total between Himo and Holili (RoW = 60 m), respectively. A RAP-related study (valuation of assets) for those sections was conducted by TANROADS in 2012. Its RAP final report (Valuation Report) is in the examination process at the Ministry of Finance (MoF) (as of May 2016). From these studies, 157 PAHs (119 PAHs for Kikafu and 38 for Himo-Holili) were identified for those two bypass construction projects. More detailed information for those PAHs are described in the following sub-section. Also, a relevant entitlement matrix and more detailed break-down information of each PAH is summarized in the following section.

2) Summary of PAHs

The following tables summarize PAH-related statistics, summarized based on valuation reports, mentioned above.

Table 7.5.10 Project Affected Households (PAHs) and Project Affected Persons (PAPs)

Total Project Affected Households (PAHs)	157 HH / N/A persons *	Legal: 157HH / N/A persons
		Illegal: 0 HH/ 0 persons
PAHs which need to be resettled (as resident)	0 HH / 0 persons	Legal: 0 HH / 0 persons
		Illegal: 0 HH / 0 persons
PAHs which do not need relocation (land acquisition, relocation of non-resident structures)	157 HH / N/A persons *	Legal: 157HH / N/A persons
		Illegal: 0 HH / 0 persons
Business owners who need relocation	0 persons	
Business owners who do not need relocation	0 persons	

*Note: The figure indicates the number of landowners along Kikafu (119 owners) and Himo-Holili (38 owners) whose land to be located in the bypass section and acquired. A further survey, including socio-economic survey for the landowners/employees/tenants to be affected by land take of the bypass section will be conducted during Detailed Design stage and a total number of PAHs/PAPs will be updated through the said survey.

Source: Valuation for compensation purposes for properties affected by upgrading multi-national: Tanzania/Kenya: Arusha-Holili/Taveta – Voi Road Project, TANROADS, 2012

Table 7.5.11 Structures and Improvements

Structures	Residential: 0 CIBEs (commercial, industrial and business enterprises): 0 Institutional: 0 Social/Religious (graves, churches): 0
Improvements	Fence: N/A Gate: N/A Others: N/A

Source: Valuation for compensation purposes for properties affected by upgrading multi-national: Tanzania/Kenya: Arusha-Holili/Taveta – Voi Road Project, TANROADS, 2012

Table 7.5.12 Crops and Trees

Agricultural field	346,474.8 m^2
Trees	Fruit bearing: 9 Timber, non-fruit, bearing: 0 Plants/cash trees: 1,916

Source: Valuation for compensation purposes for properties affected by upgrading multi-national: Tanzania/Kenya: Arusha-Holili/Taveta – Voi Road Project, TANROADS, 2012. Detailed information of trees to be compensated are attached in Appendix C.

Table 7.5.13 Total Areas to be Acquired

Total	Details
Total areas: 346,474.8 m^2	Government: 0 m^2 Private: 346,474.8 m^2

Source: Valuation for compensation purposes for properties affected by upgrading multi-national: Tanzania/Kenya: Arusha-Holili/Taveta – Voi Road Project, TANROADS, 2012

(8) Income Restoration

1) Background

"COI (Corridor of Impact)" was applied to the Project, so that, no PAP is to result within this project. Land Acquisition is to be taken at two new bypass sections of Kikafu and Himo-Holili sections. So, development of proposed project may cause an adverse impact on the livelihoods of project affected land owners of those two sections. It will also have negative impact on the socio-cultural systems of affected communities. Restoration of pre-project levels of income is an important part of rehabilitating individuals, households, and socio-economic and cultural systems in project affected areas. The basic objective of income restoration activities is that no project-affected person shall be worse off than before the project. To achieve this goal, preparation of Income Restoration (IR) programs under a Rehabilitation Action Plan should be designed in consultation with the affected persons and they should consent to the programs designed to benefit them.

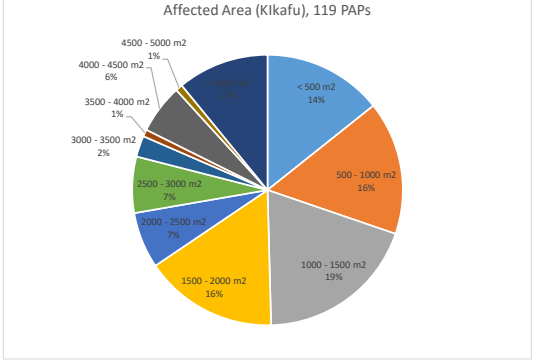
The construction of two (2) new weighting stations, one (1) roadside station and four (4) new

intersections are under consideration (not finalized yet, as of May 29, 2016). These construction works may require additional land take process and relevant socio-economic study, and resultant income restoration plans therein.

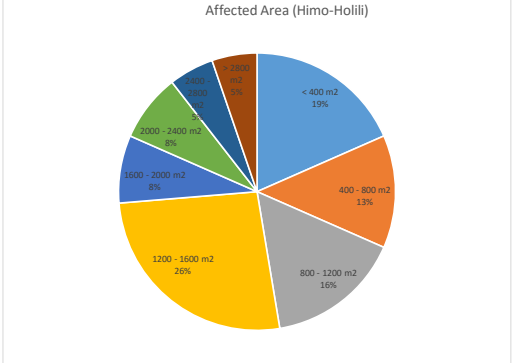
2) Income Restoration Measures Under Project Resettlement Policy

Areas of concern are two proposed bypass sections that are 4,000 m of Kikafu section and 5,000 m in total between Himo and Holili, respectively. Most of the areas of concern for the proposed bypass road construction are used for agriculture.

A RAP-related study for those sections was conducted by TANROADS in 2012. According to those study reports, 157 land owners (119 for Kikafu bypass section and 38 for Himo-Holili bypass section) were identified and the compensation cost is 1.416 billion TZS for Kikafu and 339 million TZS for Himo-Holili (1.755 billion TZS in total). The following figure shows the size of each affected property at both Kikafu and Himo-Holili sections. From this, 72 % of the spatial scale of affected land is less than 2,500 m^2 (Kikafu) and 74 % is less than 1,600 m^2 (Himo-Holili). So, it can be assumed that those local agricultural activities therein are for their own livelihoods, since the size of the land is relatively small and no Loss-of-Profit related compensation appeared in the Valuation Report (TANROADS, 2012). Currently, its RAP final report is undergoing an examination process by the Ministry of Finance (MoF) (as of May 2016).



Kikafu Section (119 PAPs)



Himo-Holili (38 PAPs)

Source: JICA Study Team

Figure 7.5.28 Spatial Scale of Each Affected Land

A further survey, including socio-economic conditions of owners such as cultivators/ tenants/ sharecroppers affected by the Project need to be conducted along the bypass section during the detailed design and an abbreviated RAP be prepared incorporating revised Income Restoration Plan, where necessary.

3) Income Restoration Options Preferred by PAPs

General consent to the Project as well as compensation plan for land-take were obtained for the construction of the new bypass road and confirmed from land owners by TANROADS officials and Valuers of local government (Moshi Municipality) during the RAP-related study, mentioned above. All owners preferred cash-compensation for the possible land take.

4) Institutions Linkages for Income Restoration

Social Management Unit (SMU) of TANROADS will play a proactive role to mobilize PAPs to get some vocational skills training for land owners losing their business and income. The local NGOs, to be engaged in the implementation of the RAP, will ensure that the PAPs are facilitated to minimize disruption to their social network and normal work pattern. For Income restoration, it is important that available skills with the PAPs is identified and further upgraded. The NGO will conduct a survey among the PAPs with options of various skills related to the resource base of the area and available market and accordingly select trades for training. Based on the training, the NGO will identify income-generating activities for sustainable economic opportunities. This

would include establishing forward and backward linkages for marketing and credit facilities. The NGO in consultation with the PAPs, Social Management Unit Officer of TANROADS and district administration and other stakeholders in institutional financing and marketing Federations will prepare micro-plans for IR activities.

In case of creation of alternative livelihood schemes, felt needs of the target group population will be studied and prioritized through people's participation. Further, these options will be tested for their viability against available skills, resource base of the area and available appropriate technology. Suitable alternative livelihood schemes will be chosen finally, where training on upgradation, capital assistance, and linkages can be provided for making these pursuits sustainable for the beneficiaries or the target groups. The PAPs are required to participate in developing feasible long-term income generating schemes. The long-term options are expected to be developed during the implementation of the RAP and also supported by government assistance.

5) Steps in Income Restoration

Basic Information on IR activities of PAPs is expected to be available from the census and socioeconomic surveys. Based on this information, IR activities can be planned. IR activities are of the following two types, i.e., (i) Short-term, and (ii) Long-term. More detailed descriptions for each IR option are summarized as follows,

(i) Short-Term IR Activities

Short-term IR activities are intended to restore PAP's income in the periods immediately before and after relocation focusing on providing short term measures such as:

a) Promoting PAP access to project-related employment opportunities such as work under the project construction and maintenance contractors.

b) Support in job finding for selected PAPs within the proposed road improvement projects (during both construction and operation phases).

It would be useful to mention selected local human-resource hiring schemes within clauses of the contract form of the proposed road improvement project.

(ii) Long Term IR Activities

SMU of TANROADS will coordinate with District Administration including tribal development and social welfare departments to assure PAPs access to all existing government schemes that can contribute to income restoration. It would be effective to hire PAPs within the proposed road improvement projects (during both construction and operation phases). For instance, several periodical activities such as road maintenance works, including cleaning ditches, tree planting, earthwork and others that would not require high-skilled knowledge nor skill are to be generated after completion of the project.

6) Basis for Identification of Alternative IR Scheme

Keeping in view the resource base of the PAPs and also the socio-economic characteristics and preferences, the SMU of TANROADS and the NGO engaged in the implementation will have to chalk out individual IR schemes. The factors to be considered are:

- Education level of PAPs
- Skill possession
- Likely economic activities in the post displacement period
- Extent of land left
- Extent of land purchased
- Suitability of economic activity to supplement the income
- Market potential and marketing facilities

The SMU of TANROADS will work with the NGO and liaison with the district administration to dovetail government's poverty alleviation schemes.

7) Non Land-based Income Restoration Schemes

As land in project corridors is scarce, non-land based IR schemes will be important entitlement modes. Potential non-land based rehabilitation options include provision of employment opportunities through the Project during the construction period and involvement in road maintenance activities after the completion of the project. As mentioned above, a further survey, including one on socio-economic conditions of owners that are cultivators/ tenants/ sharecroppers affected by the Project was conducted along the bypass section during the detailed design and an abbreviated RAP prepared incorporating revised Income Restoration Plan, where necessary.

8) Institutions

The Institutions for IR schemes include TANROADS, local government staff, NGO and PAP groups. The various line departments featuring in distribution of loan cum subsidy and training will issue specific government resolution or government order to that effect. Where necessary, the Project should consider special allocations for that purpose and the SMU should develop strong links with local government development agencies by involving them while planning for IR scheme for PAPs.

9) Monitoring of IR Schemes

Monitoring of IR schemes will be carried out along with the monitoring of other components of RAP by an outside agency contracted for that specific purpose. The contract will specifically provide for regular (every six months) monitoring of income restoration of PAPs. The monitoring will be carried out based on economic indicators.

IR schemes will also be internally monitored by the partnering NGO. The SMU will field a team consisting of its representatives, representatives of influential segments of affected villages, educated youths, and representatives of beneficiary PAPs. The SMU will submit quarterly reports. Based on monitoring corrective adjustments will be undertaken.

10) Plan for Income Restoration

After completing the all necessary ground activities, the NGO will prepare income restoration plans for PAPs based on its field observations and survey outcome. The income restoration plan shall be discussed with the respective PAP, TANROADS officials and the concerned government departments prior to execution.

(9) Preliminary Biological Environmental Survey

1) Study Outline

The overall objective of this study is to conduct a preliminary biological environmental study along the Arusha-Holili Road improvement project. The study also seeks to cover the following specific objectives;

i) To provide the latest biological information on the following issues;

The latest migration pattern of wildlife around the study area; roadkill statistics of wildlife along the road section between Arusha and Holili; Information of local aquatic fauna of the Kikafu and the Wona Rivers around the crossing point of the proposed bridge construction; past and on-going conservation activities (e.g., set-up of fence along road) around the study area; poaching and/or illegal lumbering around the study area; and list of major environmental NGOs in Tanzania.

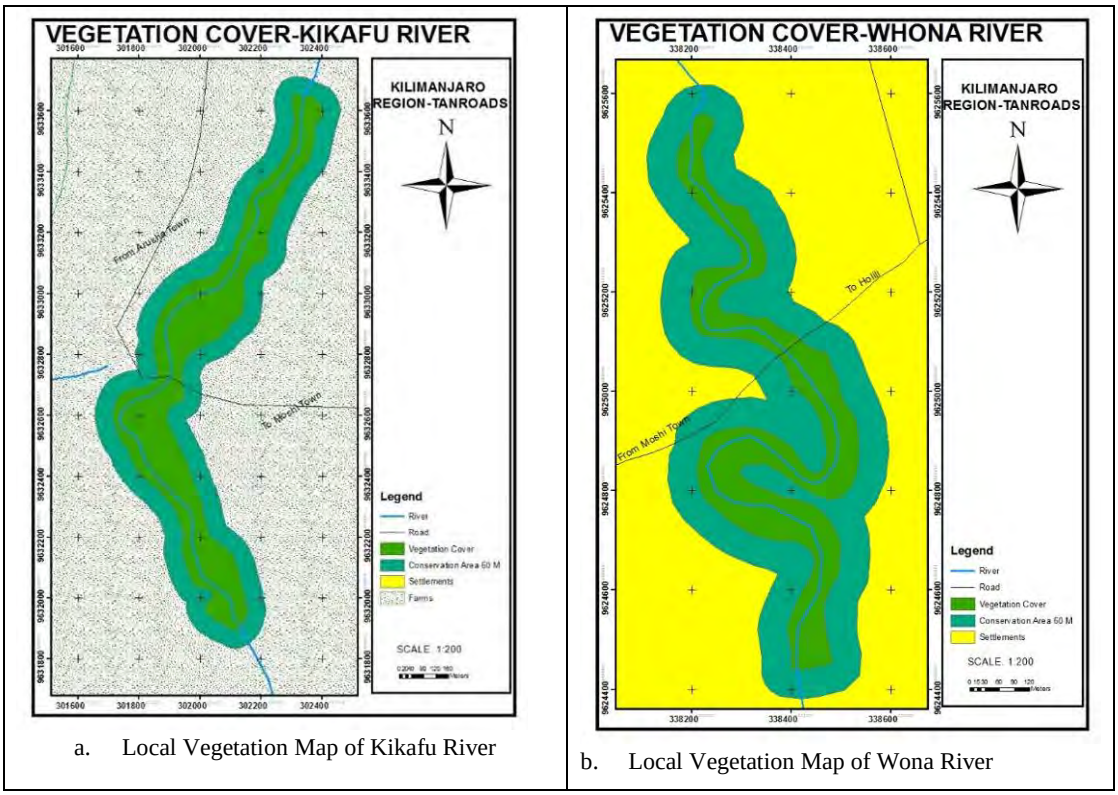
ii) To provide the latest local information regarding the occurrence of wildlife around the project site, by conducting interviews with local peoples. Other information gathered were observation of wildlife (observation date and site (rough GPS info also), type and number of wildlife, drinking points for wildlife (if they exist) and community-based conservation efforts (if they exist).

2) Study Finding

a) Vegetation Pattern

Various vegetation zones can be distinguished along the proposed road section such as mosaics of

scrubland, grasslands, semi-arid scrubland and woodlands, riverine trees, and exotic strip trees and shade tree vegetation. Most of the natural vegetation has been lost and/or replaced by exotic trees due to land clearing for settlements and agriculture. While grassland vegetation was seen almost everywhere along the road, exotic shade trees and street strip vegetation was seen within settlement areas and the riparian zone. Riverine trees are seen on river banks, while scrubland and woodland vegetation was seen in areas with semi-arid climate. The forest belt covers a major part of the mountainous areas, i.e., Kilimanjaro and Meru Mountains. Most of the forest alongside the mountains are conserved as forest reserves. The forest belt is characterized by a high diversity of forest types, because of the wide altitudinal range (from 1,300 m to 3,300 m) and the climatic differences between the slopes. Mount Kilimanjaro and Mount Meru can be described as lush vegetation islands emerging in the study area. The following figures show the overall vegetation and/or land use maps for crossing points of the Kikafu and the Wona Rivers as well as the entire road section between Arusha and Holili.

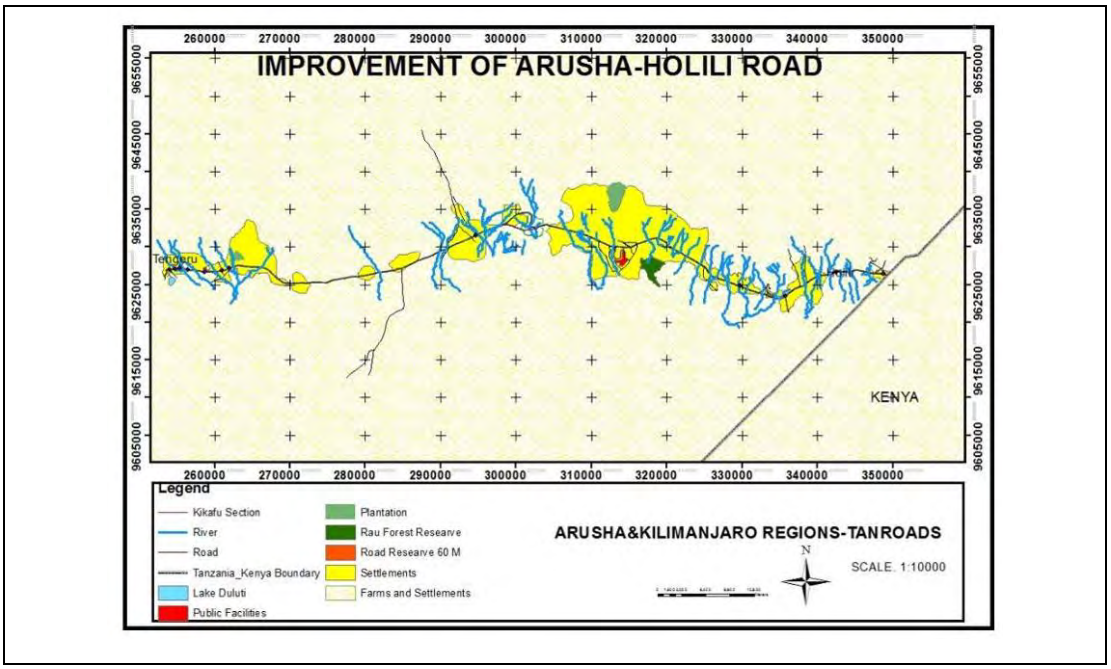


a. Local Vegetation Map of Kikafu River

b. Local Vegetation Map of Wona River

Source: JICA Study Team

Figure 7.5.29 Local Vegetation Map of Kikafu and Wona Rivers



Source: JICA Study Team

Figure 7.5.30 Vegetation Map of Project Area

b) Latest Migration Pattern of Wildlife around the Study Area

Here, for simplification, the wildlife corridor is referred to as an unprotected area with no legally protected status, or an open area, or a Game Controlled Area (GCA) between two or more protected areas such as national parks, game reserves, forest reserves and/or nature reserves. These are areas outside the protected areas that animals use for a significant length of time but that do not connect two protected areas. Based on the findings generated out of this study, apparently there is no existing wildlife corridor for large animals across the Arusha-Holili improvement project. However, the Study found that a road is an important wildlife corridor, particularly for dispersal and migration of the birds, amphibians, reptiles and primates.

Further information from existing literature shows that several decades ago (estimated around 50-100 years ago) areas around Boma Ng'ombe (kwa wasomali) in Hai district there was a wildlife corridor for wild animals especially ungulates migrating from West Kilimanjaro to Simanjro District Council which hosted Tarangire National Park and Mkungunero Game Reserve. It was reported that migration was primarily attributed by searching for grazing fields where during the dry season animals were migrating down south to Simanjiro and would return back to West Kilimanjaro during rainy season. This is regarded as one of the unconfirmed wildlife corridors as it is poorly documented and it is not clear if it is still in use.

Also several primates exist around areas of the bridge on the main Arusha to Moshi road over the Kikafu River. They have been observed migrating from the upper to downward stream of the river. For instance, the Blue Monkeys (*Cercopithecus mitis*) have been frequently seen on the bridge. It is a pest in the shambas and also in the conifer plantations of the western and north-eastern slopes where large numbers are shot by the Forest Project authorities (Grimshaw & Foley, 1991). In recent years, road casualties of the Aardwolf (*Proteles cristatus*) have been seen at the Kikafu River (980 m) in 1993. A putative hybrid baboon (*Papio hamadryas*) has also been seen from the Kikafu River area. Recently both spotted and stripped Hyena (*Crocutta crocutta*) have been observed around Boma Ng'ombe area in Hai District Council.

c) Local aquatic fauna of the Kikafu River and the Wona River

The most comprehensive description of Kilimanjaro´s region-wide fauna was published nearly a

hundred years ago, following an expedition led by the Swedish naturalist Sjöstedt (1909). It was reported that about 2,500 plant species and 179 birds' species, (some of them are endemic) occurred at that time. More recent studies show that there are major diversities of fauna in different rivers flowing from the mountain side of Mt Kilimanjaro (both Kikafu and Wona Rivers included), in particular, more species of invertebrates, compared with vertebrate diversity. Also several riverine bird species have been recorded alongside both rivers (Hemp et. al. 1999) reflecting the high diversity of bird habitats therein.

The assessment by Dallas et. al. (2006) provides useful data on the aquatic fauna life of both the Kikafu and the Wona Rivers, where it appears that fewer than five species of fish are present. There was also no sign of the various trout species introduced during the colonial era. According to local sources, these rivers have been fished using traditional fishing gears and methods which is entirely affecting the life of other biodiversity. Invertebrates are common, especially during the wet season when potentially 20-30 taxa are to be expected. For example, from the Kikafu River, Dallas et al (2006) report on 'a reasonable diversity of invertebrates' in both seasons, with a total of 23 taxa recorded, including four families of mayflies, as well as dragonflies, caddis flies, beetles and flies. They also report on a single species of fish, the small minnow (*Garra dembeensis*), which has adapted to living in fast flowing streams.

Wona River supports a diverse assemblage of flatworms, crabs, water-mites, four families of mayflies, dragonflies, bugs, caddis flies, beetles (including *Elmidae* and *Psephenidae*) and flies, with a total of 16 taxa recorded. Fish included the ubiquitous air-breathing *Clarias gariepinus*, two species of Tilapia (*T. sparrmanii*) and one other (species not given), the Cyprinodont killifish (species not given), with the *Cyprinidae Labeo sp.* (species not given) and *Brycinus sadleri* also have been identified.

Since mammals of ecological significance do not occur in both rivers, the field survey focused on avifauna. The following species of birds such as Queleaquelea, Forest Hornbills, Flying Pigeon, Doves, Wrens and Weaverbirds, were recorded, roosting near trees in the study area. The table below summarizes the local flora/fauna, identified within this preliminary survey. The following figures show photo records of existing local vegetation at the Kikafu and the Wona Rivers, respectively.

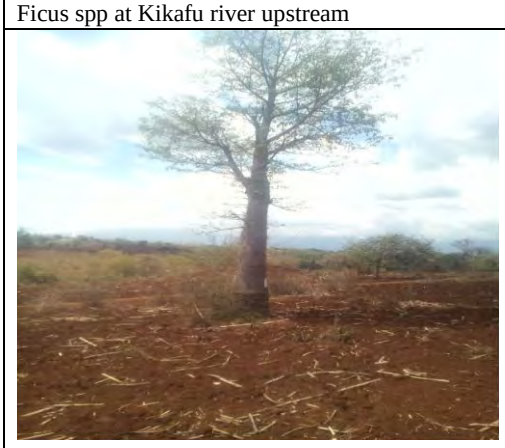
Table 7.5.14 List of Local Flora/Fauna found along Kikafu and Wona Rivers

SN	Scientific name	Common name	Local name	Class	IUCN Status
1	Varanus spp	Monitor Lizard	Kenge	Reptile	Not found in Red List
2	Numididae	Guinea fowls	Kanga	Bird	Same as above
3	Pelecanus	White Pelican	Ndege maji	Bird	Same as above
4	Bubulcus ibis	Cattle eaglet		Bird	Same as above
5	Achatinoidea spp	Snail	Konokono	Amphibian	Threated invertebrates
6	Gekkonidae ssp	Gecko	Mjusi	Reptile	Not found in Red List
7	Lithobates clamitans and Rana clamitans	Toads	Chura	Amphibian	Vulnerable
8	Alopochen aegyptiaca	Egyptian Goose	Njiwa	Bird	Not found in Red List
9	Coturnix coturnix	Common Quail	Kware	Bird	Vulnerable
10	Chlorocebus	Monkey	Ngedere	Mammal	Not found in Red List
11	Caelifera	Grasshopper	Panzi	Insect	Vulnerable
12	Rhopalocera	Butterflies	Kipepeo	Insect	Least threatened
13	Various spp	Caterpillar	Kiwavi	Insect	Not found in Red List

Source: JICA Study Team

Ficus spp at Kikafu river upstream

Accacia spp at Kikafu river neighbourhoods



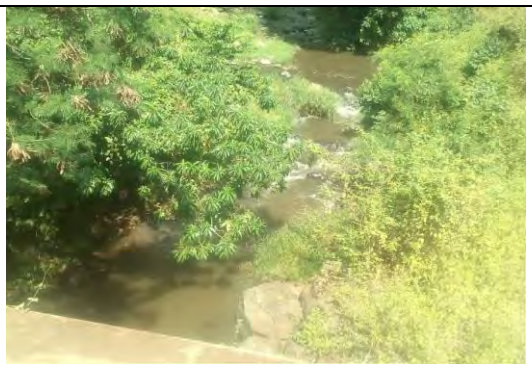
Adansonia digitata found at Kikafu river neighbourhoods

Riverine vegetation at old Kikafu bridge

Source: JICA Study Team

Figure 7.5.31 Photo Records of Local Vegetation (Kikafu River)

Ficus spp (Mikuyu) trees found along Wona River



Wild mangoes found along Wona river

Cocus spp at Wona River neighborhoods

Ficus spp, Acacia spp and other riverine vegetation

Source: JICA Study Team

Figure 7.5.32 Photo Records of Local Vegetation (Wona River)

d) Roadkill Statistics of Wildlife along the Road Section between Arusha and Holili

In the early 1970s, as the traffic volume of the road between Arusha and Holili was growing, incidences of road kill have also increased very rapidly. Recent literature shows that there are quite a number of accidents involving animals, both domestic and wildlife animals along the road. Unfortunately, there was no official record and/or statistics of the wildlife roadkill. Further consultation with local communities revealed that domestic dogs (*Canis lupus familiaris*), were reportedly most likely to be hit by vehicles, followed by frogs (amphibians), birds (Aves) and snakes (reptiles). Accidental killing and high vehicle speeds were viewed as the main cause of road kill, followed by darkness, slow movement, bad weather, and animal behavior. Interviews with drivers within the study areas reveal that dogs, frogs and birds are most commonly road-killed animals.

e) Past and On-going Conservation Activities around the study area:

There are quite a number of on-going conservation activities alongside the study area. Amongst those activities are: i) sustainable land management practices, ii) participatory forest management, iii) environmental education, and iv) awareness raising activities which are conducted in both respective districts.

7.6 Environmental Impact Assessment

7.6.1 Environmental Impact Assessment

The table below summarizes the environmental scoping and impact assessment results of the proposed road improvement project.

Table 15 Environmental Scoping and Impact Assessment

Environmental Factor		Scoping		Impact Assessment		Comments
		Pre-Construction Construction	Operation	Pre-Construction Construction	Operation	
Socio-Cultural Env						
1	Involuntary Resettlement	B/D	D	B/D	D	TANROADS has already started relevant land-take negotiation for the entire road improvement project (RoW = 45 m) and partial road improvement between Arusha and Tengeru is on-going. However, several PAPS still exist between Tengeru and Holili within RoW = 45 m. Besides, land-take negotiations for the new bypass sections (Kikafu and Himo-Holili, RoW = 60 m) have not been initiated yet (valuation of the new bypass road sections have been completed by TANROADS). Further land-take negotiation is required for the implementation of the proposed road improvement project between Tengeru and Holili.
2	Local Job Market and Economy	B/B	D	B/B	D	As mentioned earlier, further land-take negotiation is required. If some land owners request for land-for-land basis process and/or relocation, it is essential to prepare the compensation of physical relocation as well as recovery of livelihood. During the construction period, there may be some negative impacts on the local economy, due to the temporally worsened local traffic condition.
3	Land use and Utilization of Local Resources	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on the land use and utilization of local resource.

Environmental Factor		Scoping		Impact Assessment		Comments
		Pre-Construction Construction	Operation	Pre-Construction Construction	Operation	
4	Social Institutions	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on social institutions.
5	Existing social infrastructures and services	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on existing social infrastructure and services.
6	The poor and Indigenous ethnic groups	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on the poor and indigenous ethnic groups.
7	Misdistribution of benefits and damage	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on distribution of benefits and damage.
8	Cultural Heritage	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on the cultural heritage.
9	Local Conflict of interests	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on local conflict of interests.
10	Water use/or water rights	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on water use/rights.
11	Sanitation	D/B	C	D/B	B	Some topographic changes are expected to occur during both construction and operation phases. As a result, risk of occurrence of local inundation due to the temporal worsening of local run-off conditions and resultant outbreak of waterborne or insect-borne diseases such as dengue will increase to some extents.
12	Infectious Disease (e.g., HIV.AIDS)	D/B	C	D/B	B	As mentioned earlier, risk of outbreak of waterborne or insect-borne diseases such as dengue or malaria will increase.
Bio-Physical Env						
13	Topography	D/B	B	D/B	B	Due to earthworks, some topographic changes are expected to occur during the construction phase.
14	Groundwater	D/B	D	D/B	D	Temporal water quality degradation during construction period may occur.
15	Soil Erosion	D/B	B	D/B	B	Due to earthworks, the risk of local soil erosion and/or landslide will increase, in particular, at river crossing points during both construction and operation phases.
16	Hydrology	D/B	B	D/B	B	Due to earthworks, the risk of disruption of local run-off water will increase.
17	Coastal ecosystem	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on coastal ecosystem.
18	Flora/Fauna and biodiversity	D/B	D	D/B	D	Several local riverine ecosystems occur at tributaries (e.g., Kikafu and Wona Rivers) crossing the proposed road alignment. Both riverbank strips (60m away from the water front of high water level) of all perennial rivers crossing project the alignment is categorized as water resource protected areas (EMA 2004). (Note that an environment approval is not required as a condition of project implementation.
19	Meteorology	D/B	C	D/B	B	Due to some changes of local topographic and hydrological conditions, mentioned above, the risk of local meteorological change will increase.
20	Landscape	D/C	C	D/B	B	Due to some topographic changes caused by earthwork, impacts on local visual resources are expected to occur.

Environmental Factor		Scoping		Impact Assessment		Comments
		Pre-Construction Construction	Operation	Pre-Construction Construction	Operation	
21	Global warming	D/B	C	D/B	B	Temporal increase of regional CO2 emission, due to the temporal increase of local traffic volume and usage of certain amount of mortar is expected to occur during the construction phase.
Pollution						
22	Air Quality	D/B	B	D/B	B	Baseline roadside air quality conditions are in good condition (see Section 7.4 for more detailed descriptions of the field roadside noise study). Temporal degradation of roadside air quality condition due to the temporal increase of local traffic volumes is expected to occur.
23	Water Quality	D/B	C	D/B	B	Baseline water quality conditions of several rivers crossing the project alignment (e.g., Kikafu and Wona Rivers) are in good condition (see Section 7.5 for more detailed descriptions of the field roadside noise study). Risk of temporal water quality degradation of nearby tributaries and/or wells will increase during the construction phase. Risk of water quality degradation due to soil erosion from unprotected slopes, created by the road construction work, will be increased during operation phase.
24	Soil Contamination	D/B	B	D/B	B	Risk of soil contamination due to accidental spill of chemicals will increase during both construction and operation phases.
25	Waste	D/B	B	D/B	B	Certain amounts of construction waste is expected to occur. Amount of soil dumping is to be minimized by optimized earthwork balance.
26	Noise/Vibration	B/B	B	B/B	B	Baseline roadside noise conditions are not in good condition (see Section 7.5 for more detailed descriptions of the field roadside noise study). Temporal degradation of roadside noise/vibration condition due to the temporal increase of local traffic volumes is expected to occur.
27	Ground subsidence	D/D	D	D/D	D	During both construction and operation period, there may be less significant impact on ground subsidence.
28	Obnoxious smell	D/B	C	D/B	B	Risk of obnoxious smell (e.g., compost smell) due to the occurrence of unexpected local inundation and/or degraded run-off will increase during both construction and operation phases.
29	Sediment/Benthos	D/B	B	D/B	B	Due to the increased risk of soil erosion at all river crossing points, mentioned above, the risk of sediment and resultant water quality degradation at downstream side of all tributaries crossing the proposed road alignment will increase.
30	Accidents	D/B	C	D/B	B	Risk of traffic accident and worsened local traffic jam due to the temporal increase of local traffic volume, mentioned earlier, will increase. Similarly, risk of traffic accident and worsened local traffic jam due to the increase of local traffic volume, will be increased during operation phase.

Note A: significant, B: major, C: unknown, D: less significant
Source: JICA Study Team

7.6.2 Environmental Management Directions

The table below summarizes the fundamental directions of environmental issues, evaluated as "A" and/or "B" within the preliminary environmental scoping and impact assessment results of the proposed road improvement projects.

Table 16 Summary of Environmental Management Directions

	Environmental Issue	Mitigation/Management Policies
1	Involuntary Resettlement	TANROADS has already started relevant land-take negotiations for the entire road improvement project (RoW = 45 m) and partial road improvement between Arusha and Tengeru is on-going. However, several PAPS still exist between Tengeru and Holili within RoW = 45 m. However, due to the implementation of the COI (Corridor of Impact) policy, no demolition nor resettlement for those PAPs will occur. Besides, the land-take process for new bypass sections (Kikafu and Himo-Holili) have not yet been completed (valuation of the new bypass road sections has been completed and its final reports were prepared by TANROADS in July 2012). Currently, contents of those valuation reports are examined by Ministry of Finance (MoF). After its approval by the MoF, TANROADS plan to initiate the actual land-take negotiation process with each land owner (as of May 2016).
2	Local Job Market and Economy	Comprehensive compensation scheme covering recovery of livelihood shall be developed.
11	Sanitation	- To develop monitoring systems, in particular, an intensive daily field inspection system during the rainy season, in order to find out the occurrence of local inundation at an early stage. - A local field drainage system shall be well-designed in order not to avoid long-term inundation. An anti-mosquito outbreak EMP shall be developed. - To develop periodic medical seminars for construction workers for disease prevention.
12	Infectious Disease (e.g., HIV.AIDS)	
13	Topography	- Environment-friendly facility designs and/or layout shall be developed. In particular, special attention shall be paid to the local drainage system as well as vegetation system in order to minimize the impact of local hydrological balance changes. - To include a description of the practices to be employed to ensure that the quality of the runoff leaving the construction site is compliant with water quality standards - To implement appropriate facilities such as sedimentation ponds in drainages and glass plantation areas at early construction phases in order to deal with any soil from land preparation works - To implement sediment control structures to be regularly monitored and maintained throughout construction phases
14	Groundwater	
15	Soil Erosion	
16	Hydrology	
18	Flora/fauna and biodiversity	
19	Meteorology	
22	Air Quality	- To establish periodic roadside air quality monitoring program (e.g., PM2.5, PM10, NOx, CO) during both construction and operation phases. - To describe practices, the contractor will follow to minimize phase air quality impacts during both construction and operation phases. This generally would include commitments with respect to equipment maintenance, equipment operating procedures, dust control and so on.
23	Water Quality	- To implement methods in order to avoid contaminating local drainages and ponds with waste and wastewater which may be mixed with concrete and other chemicals. - To establish periodic water quality monitoring programs (e.g., DO, BOD, COD, pH and others) during both construction and operation phases.
25	Waste	- To determine how to deal with liquid and solid waste generated from construction works, such as burning, land filling, off-site disposal, recycling and so on - To implement methods to minimize areas to be disturbed by accumulating waste - To determine how to handle sewage, refuse and other liquid and solid waste will be handled at construction sites.
26	Noise・Vibration	- To implement appropriate manners for minimizing noise generated throughout construction phases, such as of determining operating hours and any possible abate measurement. - To notify possibilities of generating noise and making some disturbances around the project area, especially residential areas. - To establish periodic roadside noise/vibration monitoring program (e.g., Leq and L10) during both construction and operation phases.
28	Obnoxious Smell	- To implement appropriate waste management systems during both construction and operation phases

	Environmental Issue	Mitigation/Management Policies
30	Accidents	- To address how the contractor will handle, safely store and utilize hazardous materials. - To address how waste from hazardous materials usage will be disposed off in an environmentally safe manner. - To address common preventive action and procedures against any event of accidents on site to be determined by the contractor prior to the construction phase. - To implement programs for all the workers of instructing how to handle fuel, lubricating oil, hydraulic fluids and any other hazardous chemicals. - To list equipment to be used on site by construction workers in emergency cases. - To implement worker health, safety and environment training programs, safety precautions and procedures which all the construction workers are required to take prior to their construction works.

Source: JICA Study Team

7.7 Revision of EMP

7.7.1 Revision of EMP

(1) Environmental Management Program

The revised version of the environmental management program is shown in the table below, prepared for the pre-construction, construction and operation phases, respectively. The EMP review was conducted based on EPA, summarized in ESIA Report (TANROADS, 2012).

Table 7.7.1 Environmental Management Program (Pre-Construction)

Impact	Mitigation	Responsible Institution	Period	Cost Estimates (TZS)	Clause in Standard Specification
1. Establishment of Construction Campsite					
i) Creation of employment	Unskilled labor to be dominated by local people. At most, approximately 300 workers/day will work for this road improvement project during construction phase.	EAC, TANROADS, Contractor Supervising Consultants, village governments,	During pre-construction period	NA	NA
ii) Loss of vegetation at campsite	Several construction camps and/or yards are to be set-up (e.g., two yards (1.5 ha each) for road improvement and 2 – 2.5 ha for Kikafu bridge construction). Exact location of those camp and/or yard are not determined yet, but avoidance of unnecessary removal of vegetation, replacement of removed vegetation by original species, top soil shall be stockpiled to be used for vegetation during site reinstatement, cleared trees & grass to be used to make compost to support plant growth during re-vegetation.	EAC, TANROADS, Contractor, Supervising Consultant, local authorities,	Ditto	Purchase of tree seedlings for 200 tree seedlings @ TZS 1,000 seedling = 200,000/= Cost of 80 litres of fuel to run a tipper vehicle for transport of seedlings for 7 days @ TZS 1,600/litre = 896,000/= Employing 10 labors for transporting and transplanting tree seedling for 7 days @ TZS 10,000/day = 700,000/= This labor will be in charge of tree transplanting to be conducted at "Loss of vegetation at riverine ecosystem", next column. Site management, including irrigating tree seedling: Employing 5 labors/site for 6 months/year during dry seasons for 1 year	NA

				@ TZS 250,000 TZS/month = 7,500,000/= This management will also cover tree transplanting to be conducted at "Loss of vegetation at riverine ecosystem", next column	
iii) Loss of vegetation at riverine ecosystem	• Conduct local biological environmental survey along the project alignment, in particular, several riverine ecosystems, remained along tributaries crossing project alignment (e.g., such as biological surveys, conducted at Kikafu and Wona Rivers). • Avoidance of unnecessary removal of vegetation, replacement of removed vegetation by original species, top soil shall be stockpiled to be used for vegetation during construction phase.			Employ biological environmental expert for riverine environmental survey for major perennial rivers crossing alignment for 20 days @ 80,000 TZS/day = 1,600,000/=	NA
iv) Water quality of tributaries and channels	• Conduct comprehensive water quality analysis at tributaries and/or channels crossing project alignment (e.g., obtain baseline data for both rainy and dry seasons). • Summarize water quality-related sensitive areas along project alignment (e.g., intake points of irrigation for agricultural lands).		Ditto	The cost is covered under Clause 1704 (Prevention of water pollution)	1704
v) Loss of aesthetic quality	Compost green cutting & food wastes, fertile top soil to be stockpiled for re-vegetation, demolition materials to be used for reinstatement of pits, metal wastes to be given freely to local metal scrap dealers in Arusha & Moshi, cement bags & paper boxes to be treated by burying or burning, plastic & hessian bags to be burnt, sanitary wastes to be disposed on site by pit latrines.	EAC, Contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1713 (Cleanup and disposal of waste material)	1713
vi) Noise and vibration	• Summarize appropriate roadside noise standards based on both roadside land-use condition and Tanzanian noise standards. • Summarize noise-related sensitive areas along project alignment (e.g., school, hospital, religious places and others). • Proper maintenance of construction equipment, use of ear plugs by construction staff	EAC, TANROADS, Contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1709 (Noise abatement)	1709
vii) Pollution of ambient air by dust	• Summarize appropriate roadside A/Q standards based on both roadside land-use condition and Tanzanian A/Q standards. • Summarize A/Q-related sensitive areas along project alignment (e.g., school, hospital, religious places and others). • Sprinkling water on the access road to material borrow sites	EAC, TANROADS, Contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clauses 1707 and 1708 (Dust abatement and Abatement of air pollution)	1707 and 1708
viii) Traffic accidents	Installation of speed bumps, limiting project vehicles to speeds of 60 Km/hr. Record of 20 death toll/year at existing Kikafu Bridge site is reported by statistics. Design of safety measures at existing Kikafu Bridge to be determined with careful engineering study during Detailed Design.	EAC, Contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1500 (Accommodation of traffic)	1500

Table 7.7.2 Environmental Management Program (Construction)

Impact	Mitigation	Responsible Institution	Period	Cost Estimates (TZS)	Clause in Standard Specifi-cation
1. Extraction and Delivery of Construction Materials					
i) Loss of vegetation	Where possible, use existing pit sites before opening new ones, minimize site clearing, stock fertile top soils to be used for re-vegetation of borrow pits, borrow pits and/or riverbank protected zones, to be rehabilitated by backfilling with top soils & re-vegetating with original plant, cleared trees & grass to be used to make compost to support plant growth during re-vegetation, allow undisturbed buffer of 3 m from endangered trees – DNROs offices should be involved.	EAC, TANROADS, contractor, Supervising Consultant, local authorities,	During construc - tion period	Purchase of tree seedlings for 200 tree seedlings @ TZS 1,000 seedling = 200,000/= Cost of 80 litres of fuel to run a tipper vehicle for transport of seedlings for 7 days @ TZS 1,600/litre = 896,000/= Employing 10 labors for transporting & transplanting tree seedling for 7 days @ TZS 10,000/day = 700,000/= Site management, including irrigating tree seedling: Employing 5 labors/site for 6 months/year during dry seasons for 1 year @ TZS 250,000 TZS/month = 7,500,000/=	
ii) Noise and vibrations	• Machinery & equipment to be properly maintained & fitted with exhaust mufflers, work face of pits & quarries to be oriented away from nearby settlements. • Compute both daytime and nighttime roadside noise levels (i.e., Ld and Ln, respectively) based on measured noise level periodically, and then check computed Ld and Ln values are below environmental standards.	EAC, TANROADS, contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1709 (Noise abatement)	1709
iii) Pollution of ambient air	Sprinkling water on road & access roads to construction material borrow sites, covering transporting trucks, switch off machinery when not in use, provide workers & ensure use of dust masks. Check periodically measured A/Q parameter are below environmental standards.	EAC, TANROADS, contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clauses 1707 and 1708 (Dust abatement and Abatement of air pollution)	1707 and 1708
iv) Deterioratio n of water quality in nearby tributaries and/or channels	Set up proper on-site treatment system of effluents, to be discharged from borrow sites. Conduct periodical water quality study based on study results of water quality study, to be conducted within pre-construction phase.	EAC, TANROADS, contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1704 (Prevention of water pollution)	1704
v) Deterioratio n of visual and scenic quality	Sprinkling water regularly on access & project roads, create vegetated visual screen between pits & public road for pits close to road, new borrow pits will be located a minimum of 100 from project road	EAC, TANROADS, contractor, Supervising Consultant, local authorities,	Ditto	Covered above.	1713
vi) Risks of accidents to animals & humans	During construction borrow pits & quarry site to be fenced; all borrow pits & quarries to be rehabilitated, slopes trimmed, & proper landscaping done after completion of construction. Safety measures at existing Kikafu	EAC, TANROADS, contractor, Supervising Consultant, local	Ditto	Purchase of 400 m of fencing wire per pit/quarry @ TZS 150,000 per 100 m roll for 20 (estimated)b sites =	NA

	Bridge, including installation of warning signs, lighting, setback of the guardrails, climbing lanes to be taken as part of the Project at the initial stage of the construction,	authorities,		12,000,000/= Purchase of 160 timber fencing post/site @ TZS 5,000/post = 23,200,000/= Employing 20 labors/site for fencing works for 2 weeks TZS 10,000/day = 2,800,000=	
vii) Soil erosion	Deep pits quarries to be preferred to shallow pits, control measures for runoff (e.g., drainage swales) to be put in place to redirect surface runoff away from access roads	EAC, TANROADS, contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1704 (Temporal erosion control)	1704
viii) Impacts related to blasting, drilling & rock excavation	Storage facilities & personnel handling explosives shall to be in accordance to Occupational & Safety Health Act, drilling sites for blasting to be clearly marked with flags, where possible large charges to be divided into smaller multiple time delayed charges, equipment & machinery to be kept in good working condition & free of fluid leaks	EAC, TANROADS, Contractor, Supervising Consultant, local authorities,	Ditto	NA	NA
2. General Earthworks					
i) Creation of employment	Unskilled labor to be dominated by local people. At most, approximately 300 workers/day will work for this road improvement project during the construction phase.	EAC, TANROADS, Contractor, Supervising Consultant, village governments,	Ditto	NA	NA
ii) Loss of roadside vegetation & farmlands	Compensation of trees with commercial values, perennial crops, & farmland, confine clearing of vegetation in the construction corridor, based on study results of local biological study, to be conducted within preconstruction phase, avoidance of unnecessary removal of vegetation, affected surfaces to be reinstated by re-vegetating with natural species appropriate to the area, cleared trees & grass to be used to make compost to support plant growth during re-vegetation, confine construction to between 12 m & 15 m to protect endangered tree species – DNROs offices should be involved.	EAC, Contractor, Supervising Consultant, DNRO,	Ditto	Purchase of tree seedlings for 200 tree seedlings @ TZS 1,000 seedling = 200,000/= Cost of 80 litres of fuel to run a tipper vehicle for transport of seedlings for 4 weeks @ TZS 1,600/litre = 3,584,000/= Employing 50 labors for transporting and transplanting tree seedling for 7 days @ TZS 10,000/day = 3,500,000/= Site management, including irrigating tree seedling: Employing 20 labors/village for 6 months/year during dry seasons for 1 year @ TZS 250,000 TZS/month = 30,000,000/=	NA
iii) Roadside soil erosion	Limiting the extent of disturbance & stabilizing soil surface immediately. Preservation of existing vegetation by confining construction activities to road alignment, establishing perennial vegetative cover on all areas that are not paved, or covered by permanent structures, diverting storm water from undisturbed area, breaking long slopes with temporary diversion, maintaining grades (slopes) to minimize velocity of sheet flow over disturbed area,	EAC, TANROADS, Contractor, Supervising Consultant, DNRO,	Ditto	The cost is covered under Clause 1704 (Temporal erosion control)	1704

	installation of barriers such as sediment traps to control erosion along river banks, installation of gabions, areas adjoining rivers to be left undisturbed as buffers, Construction across rivers to be done during dry season, use of silt fence				
iv) Displacement & loss of roadside properties	Compensate properties within 60 m RoW road space at both Kikafu & Himo-Holili New Bypass Sections	EAC, Supervising Consultant, local authorities, properties owners,	Ditto	TZS 1,519,000,000/= (Kikafu) TZS 354,200,000/= (Himo-Holili)	
v) Destruction/ disruption of public utilities	Contractor shall be careful not to damage domestic water & irrigation channels, carefully remove pipe lines which cross road before commencement of construction works & reinstate after completion. Schedule construction across irrigation channels to coincide with rainy season to avoid minimize stress to crops, repair irrigation channels immediately after construction	EAC, TANROADS, Contractor, Supervising Consultant, local authorities, District Water Engineers for Arusha, Arumeru, Hai, Moshi, & Rombo, AUWASA, MUWSA, KiliWater, A to Z Textile Mills Ltd,	Ditto	NA	1214
vi) Roadside noise & vibrations by construction equipment & machinery	Proper maintenance of equipment & machinery, use of earplugs to operators of machinery & equipment. Compute both daytime & nighttime roadside noise levels (i.e., Ld & Ln, respectively) based on measured noise level periodically, and then check computed Ld & Ln values are below environmental standards.	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clause 1709 (Noise abatement)	1709
vii) Deterioration of roadside air quality by dust & fumes	Sprinkling of water regularly on construction site, switch machinery & equipment when not in use, use of dust masks by workers, adequately fine tuning engines to reduce air pollution by smokes. Check periodically measured A/Q parameter are below environmental standards.	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clauses 1707 and 1708 (Dust abatement and Abatement of air pollution)	1707 and 1708
viii) Deterioration of water quality in nearby tributaries and/or channels	Set up proper on-site treatment system of effluents, to be discharged from construction sites. Check periodically measured W/Q parameter are below environmental standards.	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clause 1704 (Prevention of water pollution)	1704
ix) Generation of Solid & liquid wastes	Green cutting to be used for composting, blocks, concrete, sand, gravel, & aggregate wastes to be used to reinstate borrow sites, steel reinforcement to be given freely to local people, cement bags & paper bags to either be burnt or buried, hessian bags to be burnt, owners of properties allowed to salvage useful demolition materials prior to demolition, mobile toilets to be provided at active construction sites	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clause 1713 (Cleanup and disposal of waste material)	1713
x) Road traffic congestion & accidents (all along the road & black spots)	Constructing alternative river & drainage crossing before demolishing existing bridges (e.g., 20 death toll/year at existing Kikafu Bridge site), culverts etc, providing alternative deployment of personnel to manage traffic at construction sites,	EAC, TANROADS, Contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1500 (Accommodation of traffic)	1500

	installation of physical barriers & guards to protect employees & communities from physical hazards, posting of signboards to notify public of about potential dangers. Restricting public from getting close to operational plants, shielding all moving plants & machinery for safety reasons				
xi) Increased consumption of energy & natural resources	Limiting unnecessary idling of construction machinery & equipment & adequately tuning of their engines	EAC, TANROADS, Contractor, Supervising Consultant, local authorities,	Ditto	NA	NA
xii) Resource use conflict	Construction campsite to be sited away from existing settlements, camp to be furnished with all necessary social services to minimize interactions of workers with local communities	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	NA	NA
xiv) Reduction in River Flows	Abstraction of water for construction not done from rivers used for irrigation & domestic purposes	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	NA	NA
3. Construction across rivers and natural drainage systems					
i) River bank erosion during riparian construction (areas adjoining all rivers)	Based on study results of local biological environment study, areas adjoining rivers to be left undisturbed as buffers, construction across rivers to be done during dry season, disturbed river banks & heads in neighborhood of bridges to be stabilized by riverine grass.	EAC, TANROADS, Contractor, Supervising Consultant, local authorities,	Ditto	The cost is covered under Clause 1704 (Temporal erosion control)	1704
ii) Surface water & soil pollution	• Isolation of concrete works from watercourses, avoidance of concrete handling equipment near watercourses, restricting servicing and/or re-fuelling of equipment at yard, construction equipment working near riverbanks to be well serviced to ensure that there is no oil leakage, excavated & other materials to be stockpiled far from water courses. • Set up proper on-site treatment system of effluents, to be discharged from construction sites. • Conduct periodical water quality study based on study results of water quality study, to be conducted within pre-construction phase.	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clause 1704 (Temporal erosion control)	1704
iii) Sub-surface water pollution	• Isolation of concrete works from water recharge area, restricting servicing and/or re-fuelling of equipment at yard, construction equipment working near water recharge area to be well serviced to ensure that there is no oil leakage, excavated & other materials to be stockpiled far from water recharge area. • Set up proper on-site treatment system of effluents, to be discharged from construction sites. • Conduct periodical water quality study based on study results of water quality study, to be conducted within pre-construction phase.		Ditto	The cost is covered under Clause 1704 (Prevention of water pollution)	1704
iv) Surface water flow modification	Properly designed bridges & culverts to ensure are capable to sustain possible peak water flows, construction across rivers to be done	EAC, TANROADS, Contractor, Supervising	Ditto	The cost is covered under Clause 1703 (Landscape preservation)	1703

	during dry season	Consultant,			
v) Modification of Water table (across all flood plains for rivers)	Boundaries of flood zone properly studied & used to design cross drains to minimize ponding on one side of embankments, fill materials to be borrowed from raised hillocks rather than adjacent to road alignment.	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	NA	NA
4. Construction of roadside drainage systems					
i) Increased risk of roadside soil erosion	Minimizing areas of ground clearance by re-vegetation, during excavation store top soil to be used for reuse on slopes to form top soil, avoidance of unnecessary disturbance steep slopes	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clause 1704 (Temporal erosion control)	1704
ii) Disruption of community access (at settlements & road junctions)	Provision of temporary concrete slabs to enable pedestrians & motorists gain access to their business & residential premises.	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clause 1500 (Accommodation of traffic)	1500
5. Concrete work in the construction of bridges and other drainage structures					
i) Health problems associated with handling of cement and cement (bridges and other drainage structures)	Use of Protective Gears • Use of alkali-resistant gloves • Use of coveralls with long sleeves & full-length trousers • Use of water proof boots • Use of dust masks • Use of eye safety protection	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	Purchase of 1,500 alkali-resistant gloves @TZS 6,000/glove = 9,000,000/=	NA
	Work practices • Mix dry cement in well ventilated areas • Work upwind from dust sources • Use ready-mixed concrete instead of mixing on site • When kneeling on fresh concrete, use dry board or waterproof kneepads to protect knees from water that can soak through fabric Remove jewelry such as rings & watches because wet cement can collect under them			NA	NA
	Hygiene • Skin in contact with wet cement is washed immediately with large amounts of cool clean water • Provide adequate hygiene facilities on site for workers to wash hands & face at end of job & before eating, drinking, smoking, or using toilet			Purchase of 200 safety eye goggles @TZS 10,000/ goggle = 2,000,000/= Purchase of 1,500 gum boots @TZS 30,000/boot = 45,000,000/=	NA
ii) Soil and water pollution by concrete wastewater	• Concreting is not done if rain is forecast • Concrete slurry/waste water not allowed to enter storm water system • Concrete slurry/ waste water are collected or diverted to grass or bare soil. • Slurry control is put in place before concreting is started • Concrete slurry/waste water runoff is diverted using sandbags, soil or other materials, to grassed area, pit or bare ground to soak in • Conduct periodical water quality study based on study results of water quality study, to be conducted within pre-construction phase.	EAC, TANROADS, Contractor, Supervising Consultant,	Ditto	The cost is covered under Clause 1704 (Prevention of water pollution)	1704
6. Operation of construction campsite					
i) Generation of solid &	Metal wastes to be collected, transported & given freely to metal scrapes collectors in Arusha & Moshi,	EAC, TANROADS, Contractor,	Ditto	The cost is covered under Clause 1713 (Cleanup & disposal	1713

liquid wastes	Used oil to be treated by composting, sanitary wastes to disposed of by latrines with soak away pits, printer toner & cartridges to be transported to Dar & given freely to refilling agents, used motor batteries to be given freely to local people for running radios, prior to demolishing buildings property owners to be allowed to salvage useful construction materials, empty bitumen drums to be given freely to local people for storing agricultural produce & water, plastic bottles to be collected & transported to Arusha & Moshi for recycling, degradable wastes such as cement paper bags, & paper box to be buried or burnt	Supervising Consultant,		of waste material)	
ii) Fire & explosion risks at quarry	Fire extinguishers appropriately placed in workshops, prohibit smoking in hot work areas			Purchase of 30 dry powder (CO_2) fire extinguishers @TZS 150,000/unit = 4,500,000/=	NA
iii) Risks of leakage of hazardous materials	Fuel to be transported in special fuel tankers equipped with fire extinguishers, fuel storage tanks at site to be installed in containment, fuel station equipment service bay & pits will be concrete paved & provided with drains, refuelling to be done by pump, refuelling of equipment to be closely supervised to avoid leaks, if leakage occurs it will be cleaned up by absorbent materials such as polypropylene boom or saw dusts, chemicals stored in locked place, use special refuelling & topping up lubes			NA	NA
iv) Generation of human sanitary wastes	Construction of sanitation facilities. At most, approximately 300 workers/day will work for this road improvement project during the construction phase.		Ditto	Included within mobilization cost already.	NA
7. HIV/AIDS					
i) Increased infection rate of HIV/AIDS	Provision of health education to the communities (VCT, ARVs, regular supply of condoms to communities, support initiatives by NGOs, CBOs to fight HIV/AIDs	EAC, TANROADS, Supervising Consultant, Contractor, District Councils, Communities, CBOs, NGOs,	Ditto	L/S amount of TZS 50,000,000/=	NA
8. Closure of the project, including campsites (Demobilization Phase)					
i) Generation of Solid & liquid wastes	• Used motor oil and batteries, packing materials, metal wastes, concrete wastes & other demolition materials to be treated & disposed of as described in 6.(i) above • Paper & timber pallets/boxes will be disposed of by burning. Possibility of recycling them by giving them to the local people	EAC, TANROADS, Contractor, Supervising Consultant, roadside communities	Ditto	The cost is covered under Clause 1713 (Cleanup and disposal of waste material)	1713
ii) Deterioration of ambient air quality	• Sprinkling water on access roads to dump sites, covering transporting trucks, provision of masks. • Conduct periodical roadside air quality study based on study results of roadside air quality study, to be conducted within pre-construction phase.		Ditto	The cost is covered under Clauses 1707 and 1708 (Dust abatement and Abatement of air pollution)	1707 and 1708

Source: JICA Study Team

Table 7.7.3 Environmental Management Program (Operation)

Impact	Mitigation	Responsible Institution	Period	Cost Estimates (TZS)	Clause in Standard Specification
1. Operation of the road					
i) Improved ambient air quality	Enhance by timely & proper maintenance of road Conduct periodical roadside air quality study based on study results of roadside air quality study, to be conducted within pre-construction phase.	EAC, Contractor, TANROADS, roadside communities, DNRO, local communities	Throughout its operation phase	NA	NA
ii) Improved roadside noise environment	Enhance by timely & proper maintenance of road Implement proper vehicle I/M operation. Conduct periodical roadside noise study based on study results of roadside noise study, to be conducted within pre-construction phase.			NA	NA
iii) Improved hydrology & drainage	Enhance by timely & proper maintenance of road			NA	NA
iv) Reduced VOC	Enhance by timely & proper maintenance of road			NA	NA
v) Reduced travel time and costs	Enhance by timely & proper maintenance of road			NA	NA
vi) Increased traffic accidents along Moshi Town and Usa – Tengeru Section	Provision of "Zebra" crossings, speed restraining humps with warning signs at all potential black spots, & bus stop at all village centers.			Integral part of road design, covered already.	NA
vii) Reduced traffic along Arusha – Holili road	Impact will be enhanced by ensuring timely & proper repair & maintenance of road.			NA	NA
					TOTAL TZS 2,079,176,000/=

Note: minimum wage of labor in Tanzania is calculated, based on information, listed in Africapay.org/Tanzania. (http://www.africapay.org/tanzania/home/salary/minimum-wages)
Source: JICA Study Team

(2) Environmental Monitoring Plan

The tables below summarize the outline of the environmental monitoring plan, prepared for the pre-construction, construction and operation phases, respectively. Annual implementation cost (estimated) of this proposed monitoring plan is summarized in the following table.

Table 7.7.4 Environmental Monitoring Plan (Pre-Construction Phase)

Parameter/ Activity	Monitoring Frequency	Sampling Area	Measurement Unit/ Method	Target Level /Indicator	Responsibility
1. Flora	Once during mobilization	Campsite	Visual observation	Clearing of vegetation confined to campsite	Supervising Consultant, EAC, TANROADS, ESM
2. Flora/Fauna	Twice during mobilization, representing both rainy & dry seasons.	Riverine Ecosystem	Visual observation	Clearing of vegetation confined to construction site	
3. Noise	Twice during mobilization, representing both rainy and dry seasons.	Several key points such as 5 noise survey points, set up within this study.	24-hour continuous measurement at site, 22.5 m away from centerline of project centerline.	Environmental standards of noise, implemented in Tanzania, and/or WHO guideline.	

4. Air Quality	Twice during mobilization, representing both rainy and dry seasons.	Several key points such as 5 A/Q survey points, set up within this study.	24-hour continuous measurement at site, 22.5 m away from centerline of project centerline.	Environmental standards of air quality, implemented in Tanzania, and/or WHO guideline.	
5. Water Quality	Twice during mobilization, representing both rainy and dry seasons.	Several key points such as 8 W/Q sampling points, set up within this study. Recommendable to have additional points at other channels and/or perennial tributaries	Laboratory analysis.	Environmental standards of water quality, implemented in Tanzania, and/or WHO guideline.	
6. Recruitment of construction staff	Once during mobilization	Temporary office sites, all village government office, local people in all villages	Interview with contractor, village government leaders & local people. Particular attention to be made on landowners/ employees/ tenants affected by land acquisition of the bypass section in Kikafu and Himo – Holili	Unskilled labor dominated by local people, minimum complains from local people	Supervising Consultant, EAC, TANROADS, ESM
7. Fight against HIV/AIDS	Once during mobilization	All villages in project area	Reports from medical officers on reported cases of death from HIV/AIDS in villages, CBOs, reports spot checks in selected villages	Rate of HIV/AIDS diseases infection is reduced from current 3.6% rate No. of death cases do lessen from existing rate in project area	Communities, CBOs, NGOS, District council, consultant, TANROADS, project management,
8. Community forums for RAP implementation	Once during mobilization	Communities around two new bypass sections.	Community meeting and GRM establishment	Smooth land- take and no complaints from land owners.	Communities, CBOs, NGOS, District council, consultant, TANROADS, project management,

Source: JICA Study Team

Table 7.7.5 Environmental Monitoring Plan (Construction Phase)

Parameter/ Activity	Monitoring Frequency	Sampling Area	Measurement Unit/ Method	Target Level/Indicator	Responsibility
1. Ambient Air Quality					
1) Control of air pollution due to dust generation	Twice/month	Material borrow sites, along material route settlements (depends on construction stage) settlement & active construction sites	Visual observation – color of buildings & vegetation, interview with local people & laborers, dust level meter	Construction, material & process sites, & detours sprinkled with water frequently, insignificant complains from local people, insignificant discoloration of buildings & vegetation, $PM_{2.5} \leq 25$ $\mu g/m^3$	Supervising Consultant, EAC, TANROADS, ESM
2) Control of air pollution due to emission from construction equipment	Twice/month	Material borrow site	Visual observation and discussion with casual laborers.	Material & construction process equipment properly tuned	Supervising Consultant, EAC, TANROADS, ESM
3) Control of roadside air pollution	Once/month	Several key points such as 5 A/Q survey points, set up within this study.	24-hour continuous measurement at site, 22.5 m away from centerline of project centerline.	Environmental standards of air quality, implemented in Tanzania, and/or WHO guideline.	Supervising Consultant, EAC, TANROADS, ESM
2. Noise and Vibration					
1) Control of noise & vibration due to construction activities	Twice/Month	Settlements in neighborhood of active construction sites	Observation & interview with local people, noise level (dBA)	Below human tolerance, noise level ≤ 50 (residential zone, daytime) and/or 55 dBA (mixed zone, daytime)	Supervising Consultant, TANROADS, ESM
2) Control of noise & vibrations due to construction equipment	Twice/month	Stationery material process site (concrete mixer)	Observation and interview with local people	Construction equipment properly tuned & fitted with mufflers	Supervising Consultant, EAC, TANROADS, ESM
3) Control of roadside noise & vibration environment	Once/month	Several key points such as 5 noise survey points, set up within this study.	24-hour continuous measurement at site, 22.5 m away from centerline of project centerline.	Environmental standards of noise, implemented in Tanzania, and/or WHO guideline.	Supervising Consultant, EAC, TANROADS, ESM
3. Land Care					
1) Control of soil erosion	Twice/month especially rainy seasons.	Active construction sites with steep slope, especially	Visual observation	Areas of disturbance limited by minimizing clearing vegetation, stabilizing soil surface immediately after construction, implementation of control measures (breaking slopes, swales, diverting storm water from undisturbed areas)	Supervising Consultant, EAC, TANROADS
2) Prevention soil pollution due to oil spillage	Twice/month	Material borrow & process sites (pits & concrete mixer)	Visual observation	Absence of spillage, equipment well maintained	Supervising Consultant, EAC, TANROADS,
4. Flora					
1) Control of loss of vegetation at material	Twice/month construction & during handing over	Material borrow sites	Visual observation	Clearing of vegetation confined to material source areas, cleared vegetation	Supervising Consultant, EAC, TANROADS,

borrow sites	of project			compensated	
2) Control of loss of vegetation on road sides and detours	Twice/month	Active construction site, especially road section with acacia woodland strip	Visual observation	Clearing of vegetation confined to construction corridor, cleared trees compensated	Supervising Consultant, EAC, TANROADS,
3) Control of loss of riparian vegetation	Twice/month	Active construction, river crossing sites.	Visual Observation	Unnecessary removal of vegetation cover avoided, cleared vegetation cover compensated	Supervising Consultant, EAC, TANROADS,
4) Afforestation	Month during & after clearing of vegetation	Sections where there has been road realignment	Preparation of tree seedlings nurseries, number of trees plants, management of planted trees	Right tree seedlings raised in nurseries, and then, planted, villages communities involved in afforestation, area of trees planted is equal or more than that cleared during realignment	Supervising Consultant, EAC, TANROADS, DNROs, & village government leaders
5. Surface Water Regime					
1) Control of water flow speed	Twice/month	Active construction river crossing – all rivers used for irrigation & domestic purposes	Visual observation	Insignificant alteration in flow and pattern	Supervising Consultant, EAC, TANROADS,
6. Water Quality					
1) Prevention of contamination of water courses by oil spillage & concrete waste water/ slurry	Twice/month	Active construction river crossing sites during construction across all major perennial rivers & those used for domestic purpose	Visual observation for any sign of floating hydrocarbon products (thin film, rainbow sheen) on water course, pH for contamination by concrete, visual observation for any sign of dead fish	No oil leakage from equipment working near water course, equipment not serviced nor refueled near water course, concrete paving not done during rains, concrete waste water/ slurry prevented from entering storm water systems, no hydrocarbon product floating on water courses, pH ≤ 10% deviation from baseline, no fish death observed.	Supervising Consultant, EAC, TANROADS,
2) Control of sedimentation of water courses	Twice/month	Active construction river crossing site- all river crossing	Visual observation, NTU for turbidity.	Measures to control sedimentation of river systems, implemented, absence of material stock near river banks, NTU ≤ 10% deviation from baseline	Supervising Consultant, EAC, TANROADS,
3) Control of water quality of nearby surface & sub-surface water	Once/month	Several key points such as 8 W/Q sampling points, set up within this study. Recommendable to have additional points at other channels and/or perennial tributaries	Laboratory analysis.	Environmental standards of water quality, implemented in Tanzania, and/or WHO guideline.	Supervising Consultant, EAC, TANROADS,

7. Health and Safety					
Use of safety gears (ear plug, dusk masks, gum boots, & eye protection glasses)	Twice/month	Material source & process sites (quarry, stationery machines, & concrete processing & pouring sites) – bridge, escarpment road sites	Visual observation & interview with casual laborers	All staff at material source & process sites equipped with ear plugs, dust masks, boots, eye protection glasses	Supervising Consultant, EAC, TANROADS
8. Traffic movement and minimization of congestion					
N/A	Monthly	Active constructive site	Visual observation	Traffic management personnel present. Minimum traffic congestion road signs adequately placed	Supervising Consultant, EAC, TANROADS
9. Visual and Aesthetic Quality					
1) Control of accumulation of debris from demolition & material wastes	Twice/month	All village settlements	Visual observation	Debris collected & disposed of as required	Supervising Consultant, EAC, TANROADS
2) Control loss of visibility due to material stockpiles	Twice/month	Material stockpiles	Visual observation	Materials stockpiles do not obstruct or impair vision	Supervising Consultant, EAC, TANROADS
10. Traffic Accident					
N/A	During construction across area	Current Kikafu Bridge site (20 death toll/year by statistics), Moshi, Usa-Tengeru & other areas with dense settlements	Visual inspection	Speed restraining humps constructed across area	EAC, TANROADS, DNRO and WMAs management communities
11. Land Take					
Periodical community meeting for RAP	Twice/year	Communities round two new bypass section	Community meeting. Implementation of GRM	Support income restoration of ex-land owners (e.g., hiring ex-land owner into project-related jobs during construction phase).	Communities, CBOs, NGOS, District council, consultant, TANROADS, project management,
12. Demolition Phase					
1) Waste Disposal	During demobilizatio n	Campsite	Visual observation	Wastes collected & disposed as required	Supervising Consultant, EAC, TANROADS
2) Restoration of borrow pits	Every 6 months	All borrow sites	Visual observation	All BPs reinstated, no erosion, vegetation developing well	

Source: JICA Study Team

Table 7.7.6 Environmental Monitoring Plan (Operation Phase)

PARAMETER/ ACTIVITY	MONITORING FREQUENCY	SAMPLING AREA	MEASUREMENT UNIT/METHOD	TARGET LEVEL /INDICATOR	RESPONSIBILITY
1) Control of roadside air pollution	Once/month throughout operational life	Several key points such as 5 A/Q survey points, set up within this study.	24-hour continuous measurement at site, 22.5 m away from centerline of project centerline.	Environmental standards of air quality, implemented in Tanzania, and/or WHO guideline.	Supervising Consultant, EAC, TANROADS, ESM
2) Control of roadside noise environment	Once/month throughout operational life	Several key points such as 5 noise survey points, set up within this study.	24-hour continuous measurement at site, 22.5 m away from centerline of project centerline.	Environmental standards of noise, implemented in Tanzania, and/or WHO guideline.	Supervising Consultant, EAC, TANROADS, ESM
3) Income restoration of ex-land owners, employees, tenants	Once/year	Communities round two new bypass section	Community meeting. Implementation of GRM	Support income restoration of ex-land owners, employees, tenants (e.g., hiring ex-land owner into project-related jobs during operation phase).	Communities, CBOs, NGOS, District council, consultant, TANROADS, project management,
4) Traffic accidents	End of construction period	Approaches to all black spots – school children crossing, & settlements	Visual observation	Zebra crossing, speed restraining humps & warning sign boards provided at & approaches to all black spots	EAC, TANROADS, Traffic Police
4) Accumulation of debris, silt & materials wastes on road sides & cross drains, HIV/AIDS incidence rate, traffic accidents (including road kills)	Throughout operational life	All roadside drains	Visual observation	1) Regular de-silting & removal of debris on drains 2) Absence of material wastes on road sides	EAC, TANROADS,

Source: JICA Study Team

Table 7.7.7 Cost Estimates (annual) for Implementing Monitoring Plan

	Items	Cost (TZS)
1	Per diem for 10 days at site/month x 12 months (EM for TZS 80,000/day)	9,600,000
	Per diem for 10 days at site/month x 12 months (Assistant EM for TZS 50,000/day)	6,000,000
2	Transport from DES to Sites twice/month for 12 months (TZS 60,000/trip)	1,440,000
3	Monitoring fee for EM (field work and report writing: TZS 6,000,000/month) for 12 months	72,000,000
4	Monitoring roadside noise (5 points, set up within supplemental study: 24 hour-continuous, TZS 500,000/point) for 12 months	30,000,000
	Monitoring roadside vibration (5 points, set up within supplemental study: 24 hour-continuous, TZS 500,000/point) for 12 months Purchase of digital vibration meter	30,000,000
	Monitoring roadside air quality (5 points, set up within supplemental study: 24 hour-continuous, 5 parameters such as PM_{10}, CO, NO, NOx and SO_2, TZS 500,000/point) for 12 months	30,000,000
	Monitoring water quality of Kikafu and Wona rivers (sampling and analysis of 12 parameters (pH, Conductivity, Total Dissolved Solids, Turbidity, Temperature, TSS, DO, BOD, COD, HC, E-Coli-form, Total Coli-form; TZS 120,000/sample) for 12 months.	34,560,000
Total		213,600,000

Source: JICA Study Team

7.8 Revision of RAP

(1) Introduction

As discussed in the PAP counting survey, due to the implementation of "COI" for the proposed road improvement project, no PAP existed within the RoW = 45 meters road space. However, the land-take process for two new bypass sections (Kikafu and Himo-Holili) were on-going and actual land-take negotiations are to be conducted after the approval of valuation final reports by the Ministry of Finance.

In this section, the latest PAP-related information for these two bypass constructions are summarized, based on the review result of valuation reports prepared by TANROADS. Upon reviewing the valuation reports, mentioned earlier, 157 land owners (119 for Kikafu and 38 for Himo-Holili) exist, and all of them selected monetary compensation for the land-take.

(2) Entitlement Matrix

The following tables summarize the entitlement matrix for new bypass constructions (Kikafu and Himo-Holili Sections, respectively), part of the proposed road improvement project between Tengeru and Holili.

Table 7.8.1 Entitlement Matrix (Kiafu Bypass Section)

Item No.	Type of loss	Entitled Persons(Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines	Responsible Organization
1.	Loss of agricultural land, pond, ditches and orchards etc.	Within previous RAP study (2012), 119 land owners who have the land title to be affected by the project, are identified.	Compensation package covers (i) value of un-exhausted improvement, (ii) disturbance allowance; transport allowance; accommodation allowance, & (iii) loss of profits (see Sub-section 7.3.3 "Regulation" (2) "The Land Regulations, 2001" for more detailed descriptions). Unit prices, used for compensation valuation are set based on nearby local real estate & commodity prices periodically.	Valuation report is in approval process by Ministry of Finance, GoT. Once approved, TANROADS plans to initiate relevant land-take negotiation process as well as community meetings for PAPs (as of May 2016).	TANROADS.
2.	Loss of access to cultivable land by owner cultivator/ tenant/ sharecropper	N/A (Further survey, including socio-economic conditions survey of owner cultivator/ tenant/ sharecropper affected by the Project to be conducted along the bypass section during Detailed Design and abbreviated RAP to be prepared incorporating revised Livelihood Restoration Plan, where necessary)	N/A	N/A	N/A
3.	Loss of homestead/ residential/ commercial/ CPR plots by owners/Authorities	"COI (Corridor of Impact)" is applied for this proposed road improvement project, and, no PAP is to be generated within COI of road space of this project.	N/A	N/A	N/A

4.	Loss of Trees/ Perennials/ fish stocks	Loss of trees are valuated and already incorporated within the compensation package, summarized within Column 1, entitled "Loss of agricultural land, pond, ditches and orchards etc."	N/A	N/A	N/A
5.	Loss of residential /commercial structure by owner(s)	"COI (Corridor of Impact)" is applied for this proposed road improvement project, and, no PAP is to be generated within COI of road space of this project.	N/A	N/A	N/A
6.	Loss of residential /commercial structure by squatters and unauthorized occupants	Ditto	N/A	N/A	N/A
7.	Loss of access to Residential houses/ commercial structures (Owners/rented or leased)	Ditto	N/A	N/A	N/A
8.	Loss of business by CBEs due to dislocation	Ditto	N/A	N/A	N/A
9.	Loss of Income and work days due to displacement	Ditto	N/A	N/A	N/A
10.	Poor and vulnerable households	Ditto	N/A	N/A	N/A
11.	Displacement of community structure(CPR)	Ditto	N/A	N/A	N/A
12.	Temporary impact during construction	Ditto	N/A	N/A	N/A
13.	Unforeseen impact	N/A (Further survey, including socio-economic conditions survey of owner cultivator/ tenant/ sharecropper affected by the Project to be conducted along the bypass section during Detailed Design and abbreviated RAP to be prepared incorporating revised Livelihood Restoration Plan, where necessary)	N/A	N/A	N/A

Source: JICA Study Team

Table 7.8.2 Entitlement Matrix (Himo-Holili Bypass Section)

Item No.	Type of loss	Entitled Persons(Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines	Responsible Organization
1.	Loss of agricultural land, pond, ditches and orchards etc.	Within previous RAP study (2012), 38 land owners who have the land title to be affected by the project, are identified.	Compensation package covers (i) value of un-exhausted improvement, (ii) disturbance allowance; transport allowance; accommodation allowance, & (iii) loss of profits (see Sub-section 7.3.3 "Regulation" (2) "The Land Regulations, 2001" for more detailed descriptions). Unit prices, used for compensation valuation are set based on nearby local real estate & commodity prices periodically.	Valuation report is in approval process by Ministry of Finance, GoT. Once approved, TANROADS plans to initiate relevant land-take negotiation process as well as preparation of community meetings for PAPs (as of May 2016).	TANROADS.
2.	Loss of access to cultivable land by owner cultivator/ tenant/ sharecropper	N/A (Further survey, including socio-economic conditions of owner cultivator/ tenant/ sharecropper affected by the Project to be conducted along the bypass section during Detailed Design and abbreviated RAP to be prepared incorporating revised Livelihood Restoration Plan, where necessary)	N/A	N/A	N/A
3.	Loss of homestead/ residential/ commercial/ CPR plots by owners/Authorities	"COI (Corridor of Impact)" is applied for this proposed road improvement project, and, no PAP is to be generated within COI of road space of this project.	N/A	N/A	N/A
4.	Loss of Trees/ Perennials/ fish stocks	Loss of trees are valuated and already incorporated within the compensation package, summarized within Column 1, entitled "Loss of agricultural land, pond, ditches and orchards etc."	N/A	N/A	N/A
5.	Loss of residential /commercial structure by owner(s)	"COI (Corridor of Impact)" is applied for this proposed road improvement project, and, no PAP is to be generated within COI of road space of this project.	N/A	N/A	N/A
6.	Loss of residential /commercial structure by squatters and unauthorized occupants	Ditto	N/A	N/A	N/A
7.	Loss of access to Residential houses/ commercial structures (Owners/rented or leased)	Ditto	N/A	N/A	N/A

8.	Loss of business by CBEs due to dislocation	Ditto	N/A	N/A	N/A
9.	Loss of Income and work days due to displacement	Ditto	N/A	N/A	N/A
10.	Poor and vulnerable households	Ditto	N/A	N/A	N/A
11.	Displacement of community structure(CPR)	Ditto	N/A	N/A	N/A
12.	Temporary impact during construction	Ditto	N/A	N/A	N/A
13.	Unforeseen impact	N/A (Further survey, including socio-economic conditions of owner cultivator/ tenant/ sharecropper affected by the Project to be conducted along the bypass section during Detailed Design and abbreviated RAP to be prepared incorporating revised Livelihood Restoration Plan, where necessary)	N/A	N/A	N/A

Source: JICA Study Team

(3) Key actions need to be taken during the detailed design stage

During the detailed design stage, a supplemental socio-economic survey should be conducted to the land owners within RoW of 60m for the new bypass sections, who would be required for compensation. Based on the survey result, RAP should be reviewed and revised, and these land owners should be compensated following the revised RAP. There is a high possibility that tenants and/or seasonal employees of land owners might lose means of livelihood temporarily or permanently due to land take by the Project. Thus the RAP should be reviewed and revised when tenants and/or seasonal employees of land owners are found and mitigation measures should be prepared and taken in order to restore their livelihoods during the course of the Project.

Further land-take may occur due to the improvement of intersections and/or junctions, construction of weigh station, roadside station ("Michi-no-eki") and others (see the table below). More detailed analysis is to be conducted to define affected area by the project and its ownership and a supplemental socio-economic survey, if necessary, should be conducted to the land owners during the detailed design stage of this proposed road improvement project

Table 7.8.3 Summary of Possible Land-Take

	Quantity (m^2)	Unit Cost (TZS/m^2)	Amount ('000 TZS)
Kikafu	240,000	4,500	1,080,000
Holili	300,000	4,500	1,350,000
Roadside	20,000	4,500	90,000
Weigh Station	45,000	10,000	450,000
Junction (KIA, Moshi*2, Kikafu)	7,350	10,000	73,500
Total			3,043,500

Source: JICA Study Team

7.9 Public Involvement

7.9.1 Introduction

A series of sensitization meetings for this proposed road improvement project were initiated between June 20th, 2016 and June 25th, 2016 (see Table below). Basically, meetings consisted of the following two types, i.e., (i) meetings at District Level where participants from the general community were not invited, and (ii) meetings at Ward Level where participants from the general community were invited. In each meeting, "COI (Corridor of Impact)" policy, applied to the Project, was well-explained to all participants, and all participants understood that no demolition of houses, buildings nor structures but several land takes for the new bypass construction would occur within the road space along the proposed alignment.

Table 7.9.1 Outline of Sensitization Meetings

	District/Ward	Date & Time	Number of Participants
1	Rombo District (DED)	June 20, 2016, Started at 11:00	26
2	Himo Ward	June 20, 2016, Started at 14:35	64
3	Makuyuni,Ward	June 21, 2016, Started at 15:00	70
4	Masama Kusini and Kwa Sadala Villages	June 22, 2016, Started at 10:00	76
5	Hai District	June 22, 2016, Started at 11:00	25
6	Moshi Rural District	June 22, 2016, Started at 15:00	25
7	Arumeru District	June 24, 2016, Started at 09:30	26
8	King'ori Ward	June 24, 2016, Started at 14:40	56
9	Nashoni, Kikatiti and Sakila Chini Villages	June 24, 2016, Started at 17:00	82
10	Maji ya Chai Ward	June 25, 2016, Started at 10:00	50
11	USA River (Mji Mwema, Ngarasero, USA Madukani and Magaridishu Hamlets)	June 25, 2016, Started at 13:00	21
12	Makumira Center, Poli Ward, Ndatu Village	June 25, 2016, Started at 14:40	49

Source: JICA Study Team

More detailed descriptions for each sensitization meeting, held so far, are summarized in the following sections.

The project outline and JICA Guideline's policy, in particular, "no depreciation" policy were explained to all identified PAPs within both PAP counting and socio-economic surveys, conducted within this supplemental study.

7.9.2 Rombo District

The following table summarizes the meeting outline, held at Rombo District on June 20, 2016.

Table 7.9.2 Summary of Sensitization meeting held at Rombo District

Date: June 20, 2016, Started at 11:00 Venue: Rombo District Council, District Commissioner's Meeting Room Number of Participants: 26 persons Agenda: 1. Opening of the Meeting 2. Introduction 3. Explanation of the Tengeru – Holili road upgrading project Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others 4. Formation of Grievance Committee (GRC) at District Level 5. Questions and Answers 6. Closing of the meeting


Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box summarizes issues raised during this meeting.

District Land Officer: We understand "COI (Corridor of Impact)" policy is applied within this road improvement project. Just in case, if there is house and/or structure, to be affected by the proposed road improvement project, will people with properties inside road reserves be compensated?

TANROADS: According to the Land Acquisition Act of 1967 and Land Act 1999, they were not supposed to be compensated but according to the guidelines of possible financial supporter, PAPs within RoW = 45 meters road reserve will be compensated accordingly for Land and Loss of properties if identified.

District Community Development Officer: As we know Tengeru – Holili road upgrading project will pass through several wards. Are we going to have GRC for each ward or only one?

TANROADS: Each ward will have their own Grievance Redress Committee of which the member composition is as we have explained earlier.

7.9.3 Himo Ward

The table below summarizes the meeting outline, held at Himo Ward on June 20, 2016.

Table 7.9.3 Summary of Sensitization meeting held at Himo Ward

Date: June 20, 2016, Started at 14:35
Venue: Holili Ward Office
Number of Participants: 64 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others
4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting


Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box summarizes the issue raised within this meeting.

Land officer: We understand "COI (Corridor of Impact)" policy is applied within this road improvement project. Just in case, if there is house and/or structure, to be affected by the proposed road improvement project, will the people with properties inside road reserves be compensated? TANROADS: According to the Land Acquisition Act of 1967 and Land Act 1999, they were not supposed to be compensated but according to the guidelines from the financier (JICA) PAPs within 45-meters road reserve will be compensated accordingly for Land and Loss of properties if identified.

Opinion survey was conducted to grasp of the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.4 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	38	
2	Please raise hand if any of your land properties to be affected".	3	2 – Farms 1 – Undeveloped Plot
3	(For the person who raised hand in previous question only). How many peasant/sharecroppers and/or tenant farmers each land owner has?	4	Two farm landowners, identified in pervious question, has two of each (in total, they have four peasants.

Source: JICA Study Team

7.9.4 Makuyuni Ward

The following table summarizes the meeting outline, held at Makuyuni Ward on June 21, 2016.

Table 7.9.5 Summary of Sensitization meeting held at Makuyuni Ward

Date: June 21, 2016, Started at 15:00 Venue: Makuyuni Ward Office, Himo Center Number of Participants: 70 persons Agenda: 1. Opening of the Meeting 2. Introduction 3. Explanation of the Tengeru – Holili road upgrading project Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others 4. Formation of Grievance Committee (GRC) at District Level

5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box summarizes the issue raised within this meeting.

Question 1: We understand "COI (Corridor of Impact)" policy is applied within this road improvement project. Just in case, if there are some houses and/or structures, to be affected by the proposed road improvement project, i.e., located within additional 7.5 meters (caused by the change of RoW = 45 m to RoW = 60 m) width as an extension of road reserve, will they be compensated?

TANROADS: It would depend on the nature of the proposed road design specifically. If the design will result into road shifting its original centerline and cause properties outside 22.5-meter width to be affected, then, they will be compensated.

Comment/Opinion: Information about this meeting was supposed to be distributed to the public earlier so that many project affected persons could attend the meeting so as to hear what has been elaborated especially on the issue of evaluation and compensation.

Question 2: We understand "COI (Corridor of Impact)" policy is applied within this road improvement project. Just in case, what if someone's house has been impacted by the project half way (partially), will he/she been compensated for the whole house?

TANROADS: It depends on which part of the house has been touched by the project impact. For instance, if the project will take connecting parts of the whole house, say, walls, it means it can no longer referred to be as building. So this kind of case is supposed to be compensated for the whole house.

Question 3: This is the hypothetical question. We understand "COI (Corridor of Impact)" policy is applied within this road improvement project. Just in case, if there are some PAPs to be impacted by the proposed project partially, will the depreciation be accounted in compensation?

TANROADS: If there would be some PAPs, identified within the proposed road improvement project, the depreciation policy may be applied according to Tanzanian Laws and regulation (not determined yet).

An opinion survey was conducted to grasp the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.6 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	46	N/A
2	Please raise hand if any of your land properties to be affected".	N/A	N/A
3	(For the person who raised hand in previous question only). How many peasant/sharecroppers and/or tenant farmers each land owner has?	N/A	N/A

Source: JICA Study Team

7.9.5 Masama Kusini and Kwa Sadala Villages

The following table summarizes the meeting outline, held at Kwa Sadala Ward Office on June 22, 2016.

Table 7.9.7 Summary of Sensitization meeting held at Kwa Sadala Ward Office

Date: June 22, 2016, Started at 10:00
Venue: Kwa Sadala Ward Office
Number of Participants: 76 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
   Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others
4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box summarizes the issue raised within this meeting.

Question 1: Will local farms, located along the alignment of new Kikafu Bypass Section be compensated?

TNAROADS: Basically, all PAPs identified within RoW = 60 meters road space of new bypass section, are qualified to receive compensation, and compensation will be done based on Land Act Sects 1 & 4 of 1999 and Road Act of 2007, which stipulate that whenever the road project affects any local farms and/or properties during its construction, they will be compensated accordingly

Question 2: When will the compensation processes start?

TANROADS: We would like to initiate relevant compensation process soon.

An opinion survey was conducted to grasp the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.8 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	76	
2	Please raise hand if any of your land properties to be affected".	38	
3	How many peasant/sharecroppers and/or tenant farmers each land owner has?	152	Each landowner has 4 peasants during their cultivating works. In total, 152 peasants work for them.

Source: JICA Study Team

7.9.6 Hai District

The table below summarizes the meeting outline, held at Hai District on June 22, 2016.

Table 7.9.9 Summary of Sensitization meeting held at Hai District

Date: June 22, 2016, Started at 11:00
Venue: Hai District Council, District Commissioner's Meeting Room
Number of Participants: 25 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
   Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others
4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. Followings box summarizes issues raised during this meeting.

Comment from Hai D.C: Compensation process have to be considered carefully and PAPs have to be paid on time, fairly. Also, the awareness concerning Tengeru – Holili road construction project have to be raised broadly to the community as much as possible so that the implementation of this project will not be raise quarrels with them.

Question 1: We understand "COI (Corridor of Impact)" policy was applied within this road improvement project. Just in case, what if someone's house has been impacted by the project half way will he/she be compensated for the whole house?

TANROADS: It depends on which part of the house has been touched by the project impact. For instance, if the

project will take connecting parts of the whole house, say, walls, it means it can no longer referred to be as building. So this kind of case is supposed to be compensated for the whole house.

Question 2: We understand "COI (Corridor of Impact)" policy was applied within this road improvement project. Just in case, what if someone's houses are located within 7.5 meter width areas, will those PAPs be compensated?

TANROADS: Yes. We are still waiting for the government to collect enough funds for that compensation. Basically, the site of concern located within 7.5 meters (between ROW=45 m and RoW=60m) would have negative impacts and is not compensated yet, that PAP will be qualified to be compensated.

Question 3: According to the current statistics, road projects sometime stimulate the transmission of both STDs and HIV. Do you have any strategic plan addressing that issue?

TANROADS: TANROADS's projects always take deep considerations for HIV transmission issue. We plan to provide appropriate education and workshops for both HIV and STDs prior to the project implementation. To achieve this, we will hire specialists and/or contract special institutions for implementing relevant education programs for both workers and communities about HIV and STDs.

7.9.7 Moshi Rural District

The following table summarizes the meeting outline, held at Rombo District on June 20, 2016.

Table 7.9.10 Summary of Sensitization meeting held at Moshi Rural District

Date: June 22, 2016, Started at 15:00 Venue: District Commissioner's Meeting Room of Moshi Rural District Council Number of Participants: 25 persons Agenda: 1. Opening of the Meeting 2. Introduction 3. Explanation of the Tengeru – Holili road upgrading project Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others 4. Formation of Grievance Committee (GRC) at District Level 5. Questions and Answers 6. Closing of the meeting


Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. Followings are issues raised during this meeting.

Question 1: From Moshi rural District the next meetings will be held at Hai District. Now we understand the outline of this proposed road improvement project. Will Moshi City People be noticed, too?

TANROADS: We all know awareness has to be given to all people surrounding the project. This time, we come here for Project Affected Persons. That's why we are also formulating Grievance Redress Committee at each district and ward level.

Question 2: We understand "COI (Corridor of Impact)" policy was applied within this road improvement project. Just

in case, what if someone's house has been impacted by the project half way will he/she be compensated for the whole house?

TANROADS: It depends on which part of the house has been touched by the project impact. For instance, if the project will take connecting parts of the whole house, say, walls, it means it can no longer referred to be as building. So this kind of case is supposed to be compensated for the whole house.

Question 3: We understand "COI (Corridor of Impact)" policy is applied within this road improvement project. Just in case, if there are some houses and/or structures, to be affected by the proposed road improvement project, i.e., located within additional 7.5 meters (caused by the change of RoW = 45 m to RoW = 60 m) width as an extension of road reserve, will they be compensated?

TANROADS: It would depend on the nature of the proposed road design specifically. If the design will result into road shifting its original centerline and cause properties outside 22.5-meter width to be affected, then, they will be compensated.

Question 4: According to the current statistics, road projects sometime stimulate the transmission of both STDs and HIV. Do you have any strategic plan addressing that issue?

TANROADS: TANROADS's projects always take deep considerations for HIV transmission issue. We plan to provide appropriate education and workshops for both HIV and STDs prior to the project implementation. To achieve this, we will hire specialists and/or contract special institutions for implementing relevant education programs for both workers and communities about HIV and STDs.

7.9.8 Arumeru District

The following table summarizes the meeting outline, held at Arumeru District on June 24, 2016.

Table 7.9.11 Summary of Sensitization meeting held at Arumeru District

Date: June 24, 2016, Started at 9:30
Venue: Arumeru District Council, District Commissioner's Meeting Room
Number of Participants: 26 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
   Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others
4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. Followings are issues raised during this meeting.

Question 1: When will Project Affected Persons start to be compensated? TANROADS: As soon as we finish forming Grievance Redress Committee. Then, the next process is to start delivering the compensation schedule.

7.9.9 King'ori Ward

The following table summarizes the meeting outline, held at King'ori Ward on June 24, 2016.

Table 7.9.12 Summary of Sensitization meeting held at Kikatiti Center

Date: June 24, 2016, Started at 14:40 Venue: King'ori Ward Office Number of Participants: 56 persons Agenda: 1. Opening of the Meeting 2. Introduction 3. Explanation of the Tengeru – Holili road upgrading project Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others 4. Formation of Grievance Committee (GRC) at District Level 5. Questions and Answers 6. Closing of the meeting
 

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box summarizes the issue raised within this meeting.

Comment: It is likely that the proposed road project will create may job opportunities. Those job opportunities created during the road construction especially along King'ori center should be given to villagers of King'ori. Question 1: Along the extended beacons of TANROADS, some people use areas between 22.5 meters (RoW = 45 m) and 30 meters (RoW = 60 m). They say that TANROADS gives them permit to use. How that is happen while people have not yet been compensated? TANROADS: No one is allowed to use the area within that 7.5 meters width (i.e., areas between RoW = 45 m and RoW = 60 m) since compensation wan not completed yet. So that area is not owned by TANROADS. What TANROADS said to households and/or owners of that 7.5 meters width is not to develop new construction since evaluation has been conducted already. Question 2: We understand "COI (Corridor of Impact)" policy was applied within this road improvement project. Just in case, what if someone's houses are located within 7.5 meter width areas, will those PAPs be compensated? TANROADS: Yes. We are still waiting for the government to collect enough funds for that compensation. Question 3: When will the project start to be implemented? TANROADS: Right after all relevant compensation issues for PAPs are settled down, then, the construction can start.

An opinion survey was conducted to grasp the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.13 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	56	N/A
2	Please raise hand if any of your land properties to be affected".	-	N/A
3	How many peasant/sharecroppers and/or tenant farmers each land owner has?	-	N/A

Source: JICA Study Team

7.9.10 Nashoni, Kikatiti and Sakila Chini Villages

The following table summarizes the meeting outline, held at Maji ya Chai Ward on June 24, 2016.

Table 7.9.14 Summary of Sensitization meeting held at Kikatiti Center

Date: June 24, 2016, Started at 17:00
Venue: Kikatiti Center
Number of Participants: 82 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
   Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others
4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box summarizes the issue raised within this meeting.

Question 1: Will local farms, located along the alignment of new Kikafu Bypass Section be compensated?

TNAROADS: Basically, all PAPs identified within RoW = 60 meters road space of new bypass section, are qualified to receive compensation, and compensation will be done based on Land Act Sects 1 & 4 of 1999 and Road Act of 2007, which stipulate that whenever the road project affects any local farms and/or properties during its construction, they will be compensated accordingly

Question 2: Along the extended beacons of TANROADS, some people use areas between 22.5 meters (RoW = 45 m) and 30 meters (RoW = 60 m). They say that TANROADS gives them permit to use. How that is happen while people have

not yet been compensated?

TANROADS: No one is allowed to use the area within that 7.5 meters width (i.e., areas between RoW = 45 m and RoW = 60 m) since compensation wan not completed yet. So that area is not owned by TANROADS. What TANROADS said to households and/or owners of that 7.5 meters width is not to develop new construction since evaluation has been conducted already.

Comment from Village Chief: The notice of this sensitization meeting seems to be late since we can't see peoples from nearby villages.

Question 3: When will the project start its implementation?

TANROADS: Soon after compensation process end.

An opinion survey was conducted to grasp the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.15 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	80	N/A
2	Please raise hand if any of your land properties to be affected".	-	N/A
3	How many peasant/sharecroppers and/or tenant farmers each land owner has?	-	N/A

Source: JICA Study Team

7.9.11 Maji ya Chai Ward

The following table summarizes the meeting outline, held at Maji ya Chai Ward on June 25, 2016.

Table 7.9.16 Summary of Sensitization meeting held at Maji ya Chai Ward

Date: June 25, 2016, Started at 10:00
Venue: Maji ya Chai Ward Office
Number of Participants: 50 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
   Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others
4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box

summarizes the issue raised within this meeting.

Question 1: Along the extended beacons of TANROADS, some people use areas between 22.5 meters (RoW = 45 m) and 30 meters (RoW = 60 m). They say that TANROADS gives them permit to use. How that is happen while people have not yet been compensated?

TANROADS: No one is allowed to use the area within that 7.5 meters width (i.e., areas between RoW = 45 m and RoW = 60 m) since compensation wan not completed yet. So that area is not owned by TANROADS. What TANROADS said to households and/or owners of that 7.5 meters width is not to develop new construction since evaluation has been conducted already.

Question 2: We understand "COI (Corridor of Impact)" policy was applied within this road improvement project. Just in case, what if someone's houses are located within 7.5 meter width areas, will those PAPs be compensated?

TANROADS: Yes. We are still waiting for the government to collect enough funds for that compensation.

Question 3: We understand "COI (Corridor of Impact)" policy was applied within this road improvement project. Just in case, what if someone's house has been impacted by the project half way will he/she be compensated for the whole house?

TANROADS: It depends on which part of the house has been touched by the project impact. For instance, if the project will take connecting parts of the whole house, say, walls, it means it can no longer referred to be as building. So this kind of case is supposed to be compensated for the whole house.

An opinion survey was conducted to grasp the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.17 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	46	N/A
2	Please raise hand if any of your land properties to be affected".	-	N/A
3	How many peasant/sharecroppers and/or tenant farmers each land owner has?	-	N/A

Source: JICA Study Team

7.9.12 USA River (Mji Mwema, Ngarasero, USA Madukani and Magaridishu Hamlets)

The table below summarizes the meeting outline, held at USA River Area on June 25, 2016.

Table 7.9.18 Summary of Sensitization meeting held at USA River Area

Date: June 25, 2016, Started at 13:00
Venue: USA River Area
Number of Participants: 21 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
   Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others
4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The attendance list (hand written) of this meeting is attached in Appendix D. The following box summarizes the issue raised within this meeting.

Question 1: Some people use areas between 22.5 meters (RoW = 45 m) and 30 meters (RoW = 60 m). They say that TANROADS gives them permit to use. How that is happen while people have not yet been compensated?

TANROADS: No one is allowed to use the area within that 7.5 meters width (i.e., areas between RoW = 45 m and RoW = 60 m) since compensation wan not completed yet. So that area is not owned by TANROADS. What TANROADS said to households and/or owners of that 7.5 meters width is not to develop new construction since evaluation has been conducted already.

Question 2: What width of the road carriage will be constructed?

TANROADS: The road construction will be implemented, based on the "COI (Corridor of Impact)" except for some areas with new road section such as Kwa Sadala along the Kikafu Bridge where the road will pass along local farms.

An opinion survey was conducted to grasp the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.19 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	21	N/A
2	Please raise hand if any of your land properties to be affected".	-	N/A
3	How many peasant/sharecroppers and/or tenant farmers each land owner has?	-	N/A

Source: JICA Study Team

7.9.13 Makumira Center, Poli Ward, Ndatu Village

The following table summarizes the meeting outline, held at Makumira Center, Poli Ward, Ndatu Village on June 25, 2016.

Table 7.9.20 Summary of Sensitization meeting held at Makumira Center, Poli Ward, Ndatu Village

Date: June 25, 2016, Started at 14:40
Venue: Poli Ward
Number of Participants: 49 persons
Agenda:
1. Opening of the Meeting
2. Introduction
3. Explanation of the Tengeru – Holili road upgrading project
Details of Road Improvement Project, "COI (Corridor – of – Impacts)" policy, and others

4. Formation of Grievance Committee (GRC) at District Level
5. Questions and Answers
6. Closing of the meeting

Source: JICA Study Team

In general, all participants welcomed the proposed road improvement project and expect its construction to start since most of them are the closest beneficiaries of the proposed project. The following box summarizes the issue raised within this meeting.

Question 1: Some people use areas between 22.5 meters (RoW = 45 m) and 30 meters (RoW = 60 m). They say that TANROADS gives them permit to use. How that is happen while people have not yet been compensated?

TANROADS: No one is allowed to use the area within that 7.5 meters width (i.e., areas between RoW = 45 m and RoW = 60 m) since compensation wan not completed yet. So that area is not owned by TANROADS. What TANROADS said to households and/or owners of that 7.5 meters width is not to develop new construction since evaluation has been conducted already.

Question 2: We understand "COI (Corridor of Impact)" policy was applied within this road improvement project. Just in case, what if someone's houses are located within 7.5 meter width areas, will those PAPs be compensated?

TANROADS: Yes. We are still waiting for the government to collect enough funds for that compensation.

Question 3: When will the project start to be implemented?

TANROADS: After relevant compensation of all PAPs are done, then, the construction can start

Comment: We people of Makumira would recommend to be given the first priority for new jobs alongside our area (Makumira).

An opinion survey was conducted to grasp the attendance of peasants/sharecropper and/or tenant farmer (see Table below).

Table 7.9.21 Summary of Public Opinion Survey

No.	Questions	Responds	Remarks
1	Please raise hand if any of you are not commune chief, nor TANROADS officials but simply either of residents, house owners and/or landowners	45	N/A
2	Please raise hand if any of your land properties to be affected".	-	N/A
3	How many peasant/sharecroppers and/or tenant farmers each land owner has?	-	N/A

Source: JICA Study Team

APPENDIX A TOR OF BASELINE ENVIRONMENT AND SOCIAL SAFEGUARD SURVEY

A.1 Outline

A.1.1 Survey Area

All Environment and Social Safeguard Surveys shall be conducted along 100 km of the road section between Arusha (Tengeru) and Holili (Kenyan Boarder) in Arusha and Kilimanjaro Region, where JICA considers to finance for improvement works of the said section. The objectives of these surveys is to provide supplemental information to the ESIA and RAP reports which were prepared in 2013 by EAC consultants. The environmental license for this project has been approved and obtained in 2014, thus, the scope of these surveys does not require any works for licensing.

A.1.2 Counterpart Agency and Key Persons to Contact

TANROADS

Director of Project

Head of Road Safety and Environment

A.1.3 Survey Items

A selected consulting firm is required to perform the following six environmental and social surveys,

(1) Roadside Air Quality and Noise Survey

(2) Water Quality Survey

(3) Preliminary Biological Environmental Study

(4) Review and Updating of Past RAP study

(5) Socio-Economic Study for newly identified PAPs

(6) Preparation of Entitlement Matrix

(7) Pubic consultation (and/or community meeting for Land Take)

(8) Support TANROADS for Preparation of Form # 5 regarding the Updating of Road Improvement.

The details for those surveys, mentioned above, shall be described in the following sections.

A.2 Roadside Air Quality and Noise Surveys

A.2.1 Survey Outline

The continuous 24-hours roadside noise and air quality measurements shall be carried out along the project road alignment in order to obtain the baseline data. Exact measurement points are to be determined throughout discussions with competent agencies and/or concerned organizations, but are planned to be set up inside of major towns (i.e., urban areas) such as Tengeru, Boma N'gombe, Moshi, Himo and Holili.

Table 1 summarizes the outline of this roadside noise and air quality field survey. Those roadside surveys shall be conducted at the same site either of Tuesday through Thursday.

Prior to the survey, availability of the past and current roadside noise and air quality data shall be collected from competent agencies and/or organizations, which will be used to improve the credibility of the baseline data collection work of this study.

Table 1 Outline of Roadside Noise and Air Quality Survey

Parameter	Descriptions
Noise	24-hour continuous, (Leq, traffic volume by vehicle type) × 5 points along the project road
Air Quality	24-hour continuous, (NOX, dust (PM10), traffic volume by vehicle type) × 5 points along the project road

A.2.2. Survey Results

The following information and/or results should be documented in the survey report which is to be submitted to the JICA Study Team by the selected consulting firm.

1) Survey sheet (original).

2) Photographs of survey activities (three photos/ one survey point, see photos below).

The height of noise meter shall be set between 1.2 – 1.4 m

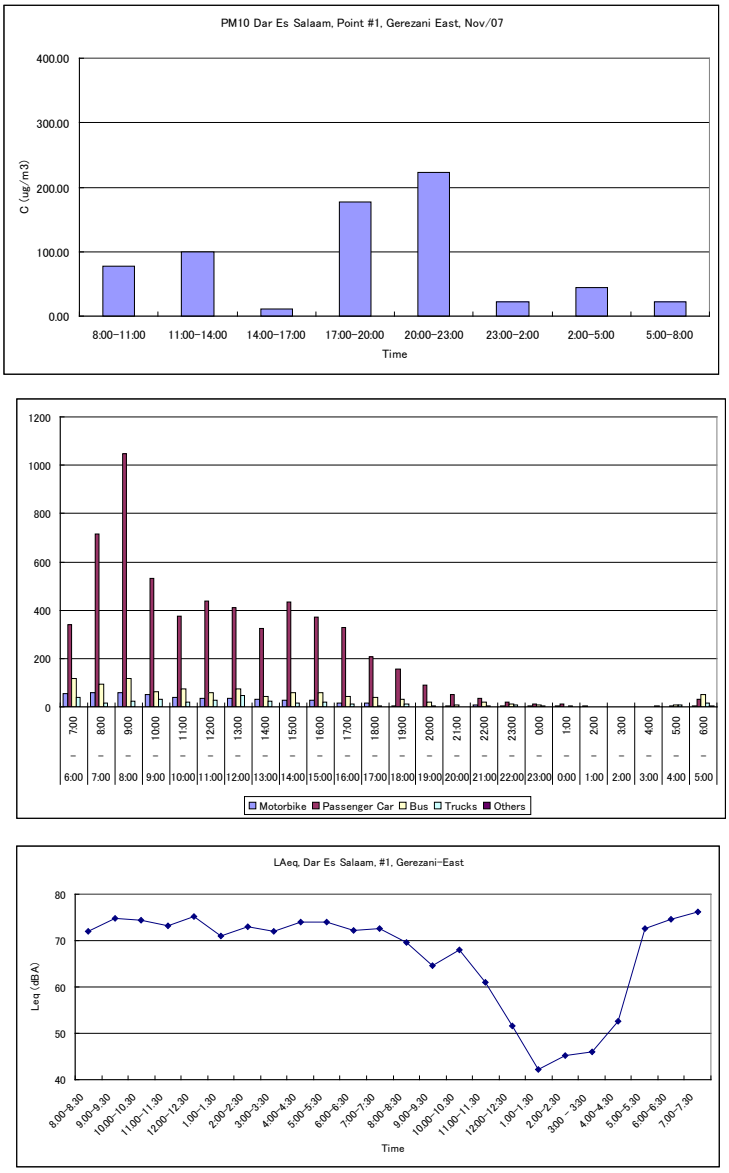
Photo Records of Past Roadside Air Quality and Noise Survey, conducted in Tanzania

3) Measurement records (e.g., comments on weather condition)

4) Digital data of the survey records (using MS- Excel).

5) GPS info of each survey point.

6) Laboratory Analytical Results (original)



Study Output Sample

A.3 Water Quality Survey

A.3.1 Survey Outline

Water sampling points shall be selected based on the surrounding environment such as geological and hydrological conditions. 8 sampling points in total shall be designated in/around major nearby tributaries such as the Kikafu River and the Wona River (6 for major tributaries while remaining 2 for the groundwater). Exact sampling points are to be determined through discussions with the JICA Study Team as well as the competent agencies and/or organizations. There are 19 perennial and 26 seasonal rivers crossing the road between Arusha and Holili.

Ten parameters such as pH, turbidity, DO, BOD, COD, conductivity, temperature, SS, E-Coli form and Total Coli form are of concern.

Available current water quality data from the competent agencies and/or organizations, is to be examined to improve the credibility of the whole water quality data collected by this study.

A.3.2 Survey Results

The following information and/or results should be documented in the survey report which is to be submitted to the Study Team by the selected consulting firm.

1) Survey sheet (original).

2) Photograph of each surveying activity (three photos/ one survey point).

3) Measurement records (e.g., comments on surrounding environment condition)

4) GPS info of each survey point

5) Laboratory Analytical Results (original)

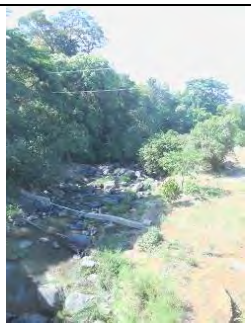
 River crossing the road between Kikafu – Moshi	 River crossing the road between Kikafu and Moshi
 Site numbering shall be conducted (example 1)	 Site numbering shall be conducted (example 2)

Photo Records regarding the water quality sampling

A.4 Preliminary Biological Environmental Study

There are several major environmental reserves and/or national parks near the project site. Current RoW of this Arusha-Holili Road does not intervene the designated boundaries of those reserved areas, but possibilities of existence of wildlife' migration paths still exist.

A.4.1 Collection of Latest Local Biological Information

Selected Consultant shall collect the latest information of following environmental issues,

a) Latest Migration Pattern of Wildlife around the study area

b) Roadkill Statistics of Wildlife along the Road Section between Arusha and Holili.

c) Information of local aquatic fauna of the Kikafu River and the Wona River around the crossing point of the proposed bridge construction

d) Past and On-going Conservation Activities (e.g., set-up of fence along road) around the study area

e) Poaching and/or illegal lumbering around the study area

f) List and Organization Chart of Environmental Organizations in Tanzania

g) List of Major Environmental NGOs in Tanzania

A.4.2 Interview-based Information Collection

Selected consultant shall collect latest local information regarding the occurrence of wildlife around the project site, by conducting interviews with local peoples (e.g., 30 peoples). Followings are major interview items to be confirmed within this interview-based study,

(1) Observation of Wildlife (observation date and site (rough GPS info also), type and number of wildlife)

(2) Observation Point Map

(3) Drinking Points for Wildlife (if exist)

(4) Community-based conservation efforts (if exist)

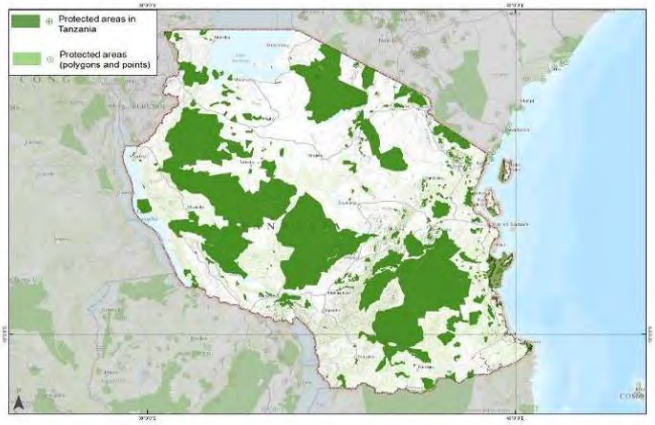


Figure 1 Location f Protected Area in Tanzania

Those interviews shall be conducted for the person who lived roadside of the project road alignment more than 15 - 20 years and are familiar with local biological environment therein.

A.4.3 Preparation of Vegetation Map (River Crossing Point)

Local vegetation map shall be prepared, using GIS framework at two river crossing points, i.e., both bridge crossing points at the Kikafu River and the Wona River (see photos below). New Kikafu Bridge is planned to be constructed at different river crossing point near to the existing one.

Kikafu River

Wona River

Specification of this map is summarized as follows,

Map coverage: 100 meters away from both riverine (both waterfront lines) at rainy season x 200 meters strip-shaped area (i.e., 200 meters x (200 meters + River width))

Information coverage: Local vegetation, major trees, house, drinking points and other important riverine landmarks that wildlife approach and/or use.

A.4.4 Preparation of Overall Vegetation Map

Overall roadside vegetation and/or land use map shall be prepared for entire road section between Arusha and Holili (see Figure 2, output sample).

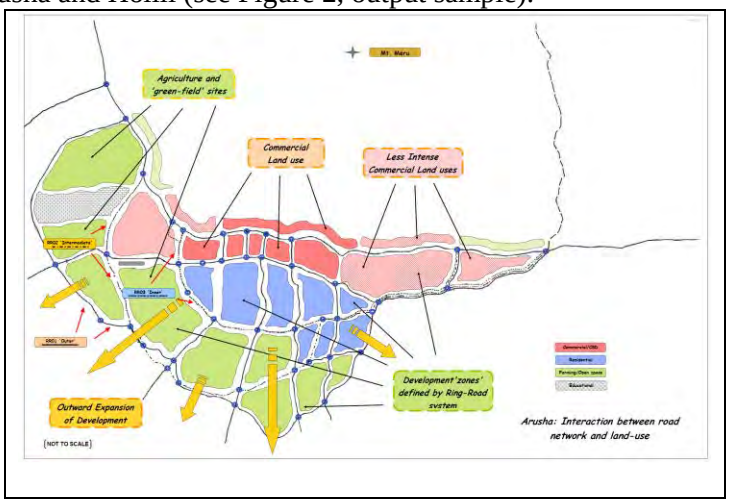


Figure 2 Overall Vegetation and/or Land Use Map around Arusha (sample)

A.5 Review and Updating of Past RAP studies

RAP report based on previous road design work was already prepared and amount of compensation for each item are summarized by TANROADS in 2014. Almost 1 years has passed and most of PAPs identified within RoW = 45 meters road space around Arusha were relocated and compensated, although some PAPs still exist within RoW = 45 meters road space, so that, updating of compensation cost, summarized within that report, shall be conducted. Selected consultant shall review past RAP report, prepared by TANROADS, and then, updating all compensation-related information using the latest market price and local social customs.

Throughout a series of discussion with TANROADS, it is informed that several RAP-related compensation studies were conducted by Regional Offices of TANROADS (Arusha and Kilimanjaro), and some of those reports were officially approved by Ministry of Land.

It is also informed that RoWs, used within some compensation studies, conducted by Regional Offices of TANROADS, are of 60 meters.

Those information is not verified yet by the JICA Study Team (as of December 17, 2015). So Selected Consultant shall conduct a direct review of those reports, and then, take photocopies of relevant information, summarized within those reports by contacting Head of Road Safety + Environment, TANROADS as well as Arusha and Kilimanjaro Regional Offices of TANROADS. If CD-ROMs of those report exist, copies of those CD-ROMs shall be taken with permissions of TANROADS.

Then, based on those literature review results, selected consultant shall conduct field-based verification (cross-checking of possible PAPs for the proposed road improvement projects) while summarizing the entitlement matrix.

Again, selected Consultant shall conduct comprehensive review of all those reports, take photocopies of relevant information and/or copies of those CD-ROMs shall be prepared with permission from TANROADS, and then, submitted to the JICA Study Team.

Table 2 summarizes the list of the compensation unit price, established for the land-take process for BRT project of Dar Es Salaam. Selected Consultant shall collect relevant information of the compensation unit price, established for the RAP-related compensation studies for Arusha – Holili road improvement project, conducted by TANROADS.

Table 2 List of Compensation Unit Prices, established for BRT Project for Dar Es Salaam

		Replacement Item	Unit	Compensation rate in TZS
1	A	Land, unbuilt, CBD	m2	50,000
	B	Land, unbuit, planed area other than CBD		30,000
	C	Land, unbuilt, unplanned area		10,000
2	A	Building, framed structure, concrete blocks infill, high quality finishing and services	m2	400,000 – 600,000
	B	Building, block construction, high quality finishing		200,000 – 300,000
	C	Building, block construction, poor quality finishing		150,000 – 200,000
	D	Building constructed of mud and poles, iron sheet roof, sand cement screed floor		100,000 – 150,000
	E	Building constructed of mud and poles, iron sheet roof, compacted earth floor		50,000 – 100,000
3	A	Kiosk, or storage room attached to building structure, good construction quality/material	m2	100,000
	B	Kiosk, or storage room attached to building structure, medium construction quality/material		80,000
	C	Kiosk, or storage room attached to building structure, poor construction quality/material		60,000
4	A	Verandah, concrete slab roof, cement screed floor	m2	80,000
	B	Verandah, corrugated iron sheet roof, cement screed floor		60,000
5	A	Steps, floor tiles finishing	m2	N/A
	B	Steps, sand cement screed finishing		50,000
6	A	Parking space, paved blocks floor finishing	m2	40,000
	B	Parking space, concrete slab floor finishing		60,000
7	A	Fence, reinforced concrete columns, concrete blocks infill with grill	M	180,000
	B	Fence, concrete blocks with grill		150,000
	C	Fence, concrete blocks 4 courses		80,000
	D	Fence, barbed wire on concrete poles		60,000
	E	Fence, other materials (makuti)		10,000
	F	Hedge		10,000
8	A	Inspection Chambers	piece	80,000
	B	Standard septic tank		1,000,000
9	A	Storage tanks, plastic, over head on concrete tower	1,000 –	800,000

	B	Storage tanks, plastic, over head on metal tower	10,000 L	500,000
	C	Storage tanks, concrete underground		1,000,000
10	A	Pumps, gasoline, manual	piece	2,500,000
	B	Pumps, gasoline, electric		5,000,000

Source：DCC, Consultancy Services for the conceptual design of a long term integrated Dar Es Salaam BRT System and Detailed Design for the Initial Corridor, Annex Volume 8, Impact Analysis and Mitigation, 2007

Those updated results shall be summarized, using the template of "Entitlement Matrix", to be prepared by the JICA Study Team.

Beside the compensation items, listed in past RAP study, conducted by TANROAD, JICA's entitlement matrix requires information regarding 13 RAP-related items. Selected Consultant shall collect relevant information in order to complete this "Entitlement Matrix". More detailed descriptions for the preparation of the Entitlement Matrix is to be summarized later.

A.6 Socio-Economic RAP-related Study for identified PAPs

Several PAPs are identified within the road project of TANROADS (it is reported that 194 people in total are to be affected based on preliminary counting results by JICA). However, as mentioned earlier, that RAP-related study was conducted in April 2014, so that it is better to conduct updating of those study contents.

Based on those study results as well as literature review results of relevant past RAP-related compensation study reports, conducted by Regional Offices of TANROADS, Selected Consultant shall update the inventory of PAPs, to be affected by the proposed road improvement project, and then, conduct following two RAP-related subtasks,

1) Inventory survey

2) Interview survey (Socio-Economic Survey)

Subtasks 1) and 2) aim to identify profiles of households living in the Study Area and to clarify the profiles of their inventories. More detailed descriptions of each survey are to be provided separately in the following subsection.

A.6.1 Inventory Survey

According to the road improvement plan, prepared by the JICA Study Team in December 2015, there are two (2) types of road sections, i.e., (i) two-lane section, and (ii) four-lane section. Besides, there is new road sections (i.e., bypass), also. On-site PAP counting survey shall be conducted, reflecting the attribute of each local road improvement plan with the following RoW,

1) 2-lane section: Count all buildings existed within RoW = 45 m road space (except new road (i.e., bypass) section between Himo and Holili and other rod sections)

2) 2-lane section of new road (bypass) section between Himo and Holili and others (e.g., approach roads of Kikafu Bridge): Count all buildings existed within RoW = 45 m road space and buildings located between RoW = 45 m and 60 m:

3) 4-lane section: Count all buildings existed within RoW = 45 m road space and buildings located between RoW = 45 m and 60 m (Moshi Urban section included).

Table 3 summarizes directions of this inventory survey (i.e., on-site PAPs counting survey).

Table 3 Summary Directions for PAPs Number Counting

	Number of PAPs	
	Within 45 m	Between RoW 45m and RoW 60m
2-lane section bar new road	○	N/A
2-lane section for new road	○	○
4-lane section	○	○

○ : On-site PAP counting surveys are needed.

As mentioned earlier, this proposed road improvement plan between Tengeru – Holili consists of following two parts, i.e., (i) 2-lane and (ii) 4-lane sections and followings four road sections will be 4-lane,

(1) 14+100 - 22+333 of AutoCAD File, "Tengeru-Usa"

(2) 0+000 - 1+100 of AutoCAD File, "Usa-Holili"

(3) 39+000 - 43+100 of AutoCAD File, "Usa-Holili"

(4) 53+500 - 62+100 of AutoCAD File, "Usa-Holili"

Otherwise, remaining road parts will be two-lane and relevant PAP counting for this road section shall be conducted with RoW=45 m, mentioned above. Some road sections between Himo and Holili and approach road to new Kikafu Bridge will be completely new road.

Inventory survey (subtask 1) includes an on-site measurement of the distance between the centerline of the project road alignment and the nearest boundary of the identified building, mentioned above, to confirm whether the identified building is located either of

(i) Within RoW (45 m)

(ii) Between RoW (45 m) and RoW (60 m)

(iii) Beyond RoW (60 m).

Using those drawing outpour information, Selected Consultant shall conduct on-site PAP Counting Survey. The exact number of affected buildings as well as attributes of those identified buildings are unknown yet, so that additional on-site PAP attribute confirmation activities shall be also conducted based on this drawing.

Based on this on-site PAP counting and/or identification activity, the inventory of PAP including attribute of each identified PAP (e.g., the owner of the household) is to be prepared. Survey sheets for this inventory survey is to be prepared by JICA Study Team. Selected Consultant shall provide followings study results of this inventory survey,

1) Survey sheet with photo of identified PAP

2) Location map of identified PAP

3) Inventory of identified PAP

A.6.2 Interview Survey (Interview-based Socio-Economic Survey)

Using the list of identified PAPs, developed within previous subtask1, interview-based socio-economic survey shall be conducted. Questionnaires, to be used for this socio-economic survey, consist of questions related to inventory of properties such as house, farmlands, buildings, crops and household profiles. Survey sheet is prepared by the JICA Study Team. All survey results shall be summarized, using the survey results of Socio-Economic Survey.

Those study results shall be summarized, using the template of "Entitlement Matrix", to be prepared by JICA Study Team.

It is informed that communities and/or group of households of following tribes such as Hadzabe,

Berabaig/Datooga, Akie, Sandawe and Maasai (under certain circumstances, as many have assimilated into broader Tanzanian society) may occur around the project alignment and/or within the RoW (60 meters at maximum). Selected Consultant shall be careful and report within the study results of this socio-economic survey.

Explanation of Compensation Policy of JICA Guidelines.

Also, Selected Consultant shall explain to the identified PAP that the relevant compensation of possible land-take would be conducted based on JICA's policy (i.e., no depreciation is to be taken within the valuation of the buildings to be affected within this proposed road improvement project if this road improvement project is to be funded by JICA).

Confirmation of Willingness to Support the proposed road improvement project

After this explanation, Selected Consultant shall ask each identified PAP whether they will support this proposed road improvement project as follows,

1) Unconditional support

2) Conditional support (ask reasons to identified PAP)

3) Unconditional objection

A.7 Preparation of Entitlement Matrix

A.7.1 Collection of Latest Local Property Information

Latest information of local properties such as real estates by type (commercial-based) shall be collected.

	Urban Area	Suburban (or country side)
Arusha		
Tengeru		
Boma N'gombe		
Moshi		
Himo		
Holili		

A.7.2 Entitlement Matrix

Study results, obtained from Task (3),"Review and Updating of Past RAP study and Task (4), "Socio-Economic Study for newly identified PAPs," shall be summarized, using the template of "Entitlement Matrix", to be prepared by the JICA Study Team. Selected Consultant shall develop and complete this "Entitlement Matrix".

The following two Entitlement Matrices shall be prepared based on comprehensive literature review and updating works of past RAP studies (Task 2.4) and study results of socio-economic study (Task 2.5),

(1) Entitlement Matrix 1 (RoW = 45 meters)

(2) Entitlement Matrix 2 (RoW = 60 meters bar contents of Entitlement Matrix 1, mentioned above)

Entitlement Matrices with/without the price depreciation shall be prepared.

A.10 Public Consultation (Community Meeting for Land Take)

A.10.1 Public Consultation for PAPS

In order to disseminate the study outline, the draft ToR of the environmental survey and the findings of the survey, five (5) one-day public consultations (and/or community meeting for the

land take) along the project alignment, are conducted by the Selected Consultants. All potential PAPs shall be invited to these consultations (and/or meetings), and all their willing for the land-take processes and their preferred compensation types (e.g., cash, land, opportunities and others) shall be confirmed.

This public consultation is to be conducted after the official approval of the road improvement plan of the road section between Tengeru and Holili by both TANROADS and JICA. The drawing, prepared in December 2015 by JICA Study Team, is not the final one. The exact number of this public consultation (or community meetings) shall be determined based on study results of socio-economic RAP-related study to be conducted within this study and discussions with TANROADS and the JICA Study Team.

At least three (3) consultants will work at each public consultation as the facilitator, the computer/equipment operator and note taker.

Meaningful public notice using local newspaper, radio, TV, government circular, poster, website of TANROADS and others shall be conducted with consents of both TANROADS and JICA Study Team. The attendance of TANROADS Officials (e.g., Dar Es Salaam Headquarter and TANROADS Regional Offices) are required for this public consultation. So that, careful coordination among TANROADS, JICA, JICA Study Team and relevant stakeholders shall be required for the successful and smooth implementation of the public consultation.

All the expenses, including the copy of presentation materials, the hall charge, transport expenses and per diem of the participants, and meal/drinks are payable by the Selected Consultant and should be included in the cost proposal.

Also, all the discussion at the public consultations will be recorded. Relevant photos (10 photos/meeting) and minutes of the meeting (English) are prepared by the Selected Consultant. The presentation materials are prepared by the JICA Study Team. Also, selected Consultant shall translate presentation material s into Ki-Swahili as per requested while preparing for the summary of stakeholder meeting sheet.

Recently, “Gender” and/or “WID (Women in Development” have become one of important keywords, and the development of the stakeholder meetings (and/or community meetings) for all PAPs reflecting these concepts would play vital role within this road improvement project.

Specific plan is not developed yet, but one of ideas is to held some special focal group sessions only for women within this stakeholder meeting with female facilitators. This special meeting is only for women and/or ladies who do not have much chances to express their opinions in the public. Selected Consultant shall prepare the stakeholder meeting program considering these WID-related aspects through the meetings with TANROADS and the JICA Study Team before its actual implementation.

A.10.2 Interview with Street Vendors

Several local markets of street vendors are identified along the project road alignment (see photo bellows), and some of their commercial activities would be affected by the road widenings of the proposed road improvement project.

Photo Records of Roadside Street Vendors (Tengeru)

Selected Consultant shall have interview with them (20 street vendors) asking following questions,

(1) Name, Address, Contact Phone Number, Photo

(2) Frequency and Outline of their Business Activities

(3) Responses and/or options they can take if their current business activities are affected by the road widening of the proposed road improvement project. (e.g., option to move to nearby new place with and/or without difficulties, and other options)

A.11 Support TANROADS for Preparation of Form # 5 regarding the Updating of Road Improvement.

There would be certain amounts of changes in road improvement design of Arusha-Holili Road, and then, TANROADS shall prepare for the Form # 5 for the review of the environmental approval that TANROADS already obtained (EMA, 2004). Selected Consultant shall support TANROADS for the preparation, submission of Form # 5 to NEMC and conduct relevant follow-up works for the smooth review by NEMC.

A.12 Delivery of Study Reports

Study results of Socio-Economic Study for newly identified PAPs, Entitlement Matrix, and pubic consultation (and/or community meeting for Land Take) shall be delivered by January 31, 2016. Full set of study final report shall be delivered by March 31, 2016.

APPENDIX B LOCATION MAP OF PAP IDENTIFIED WITHIN ROW = 45 M

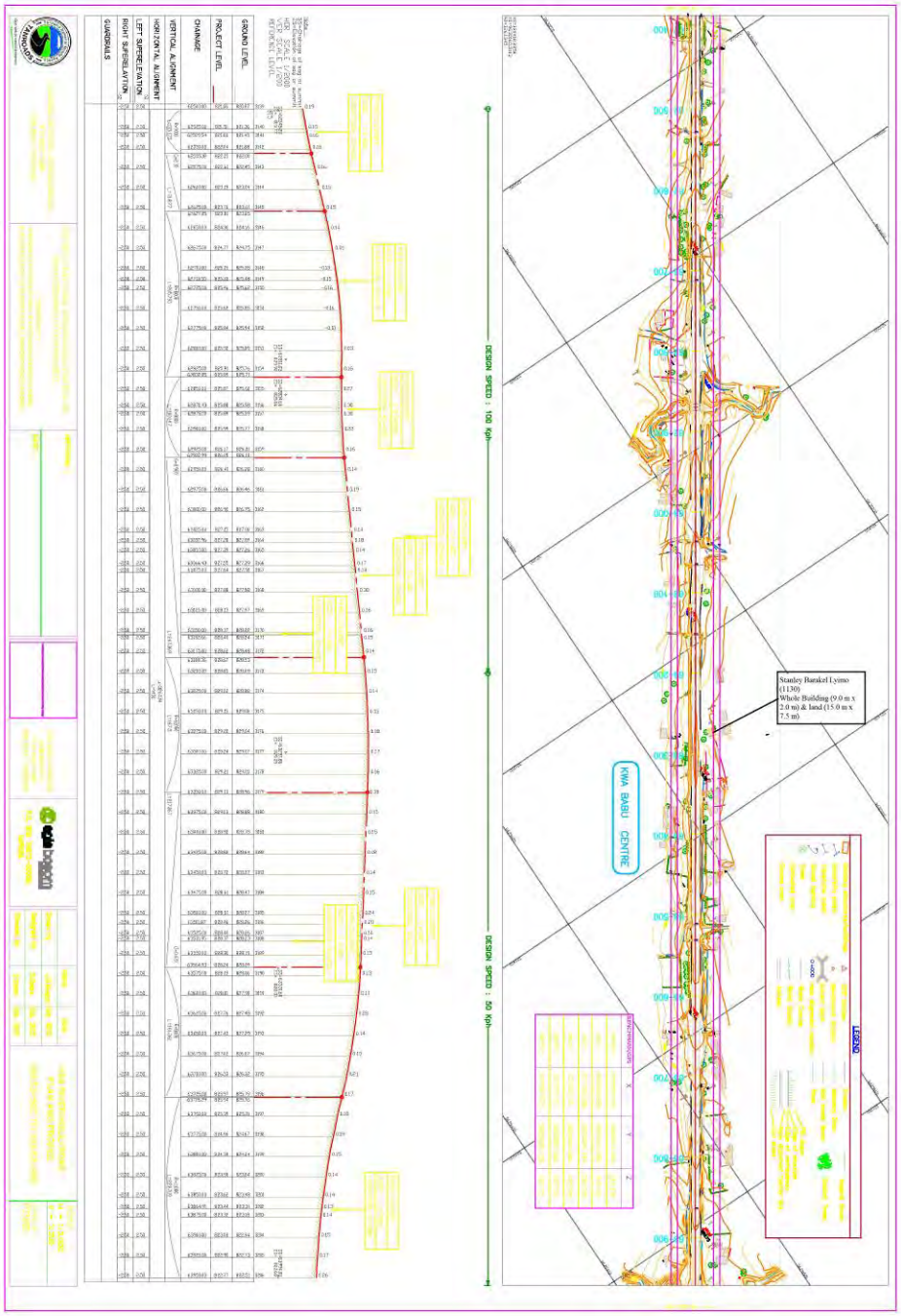


Figure B1 Location of PAP, identified within RoW = 45 m

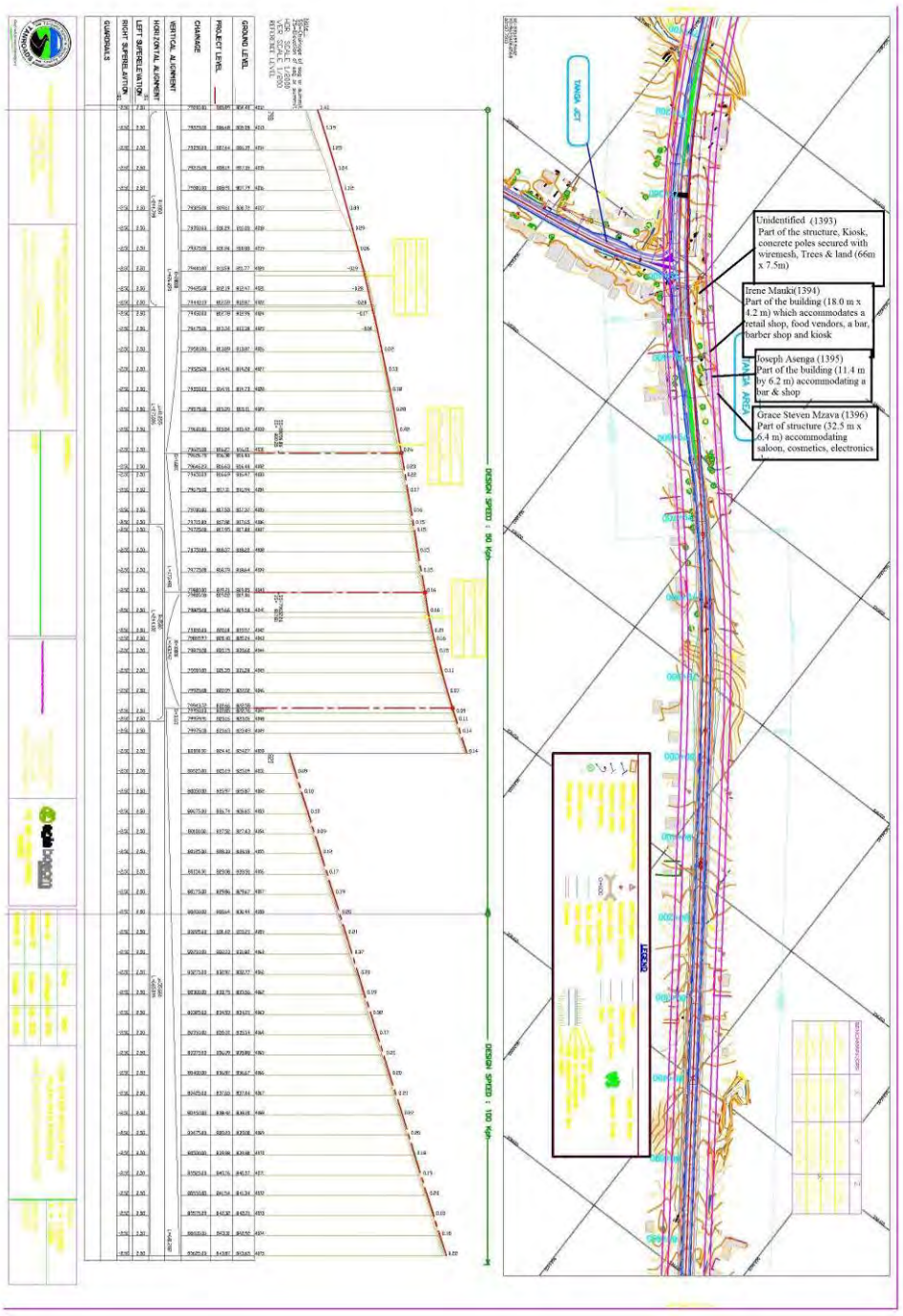


Figure B2 Location of PAP, identified within RoW = 45 m

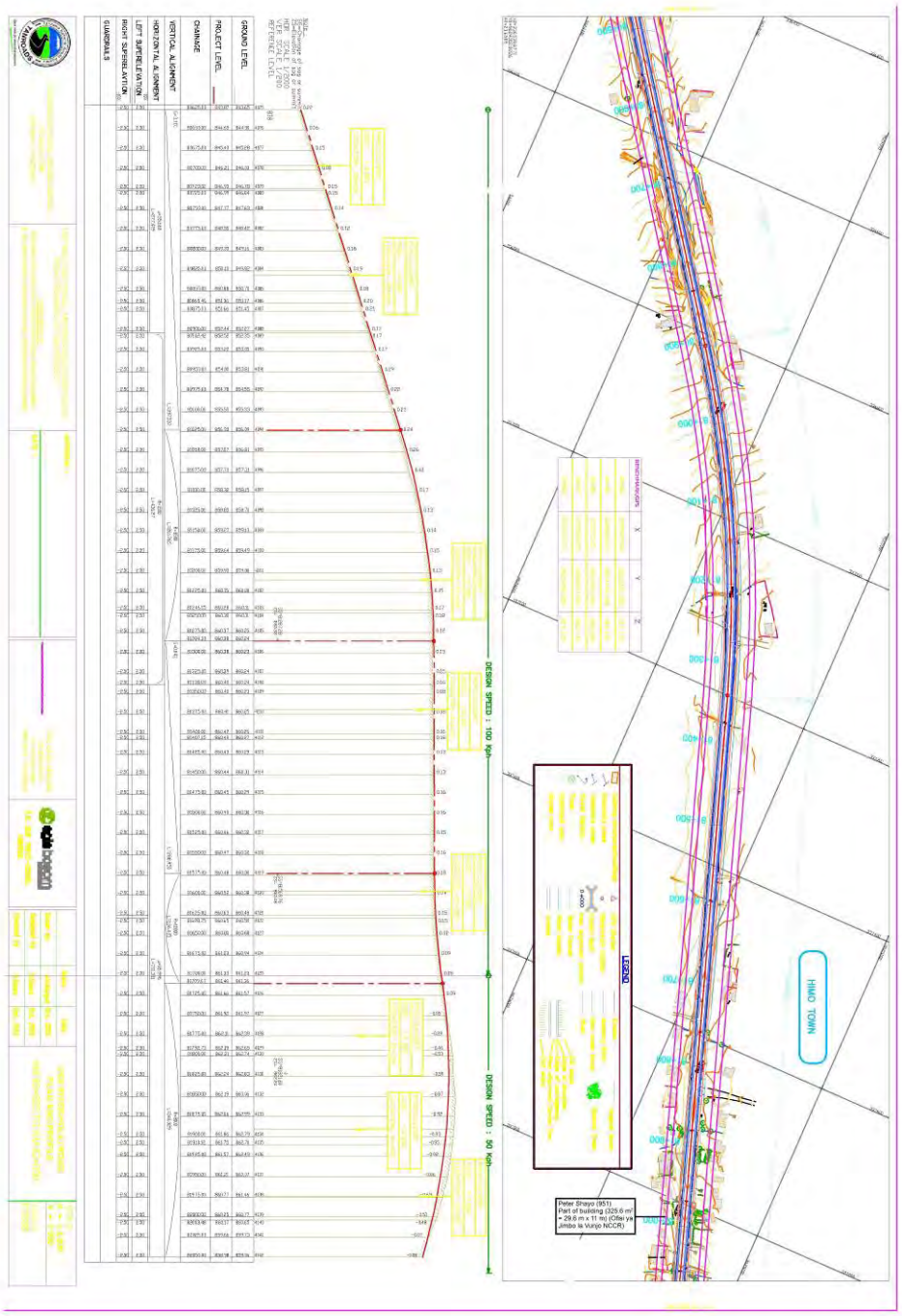


Figure B3 Location of PAP, identified within RoW = 45 m

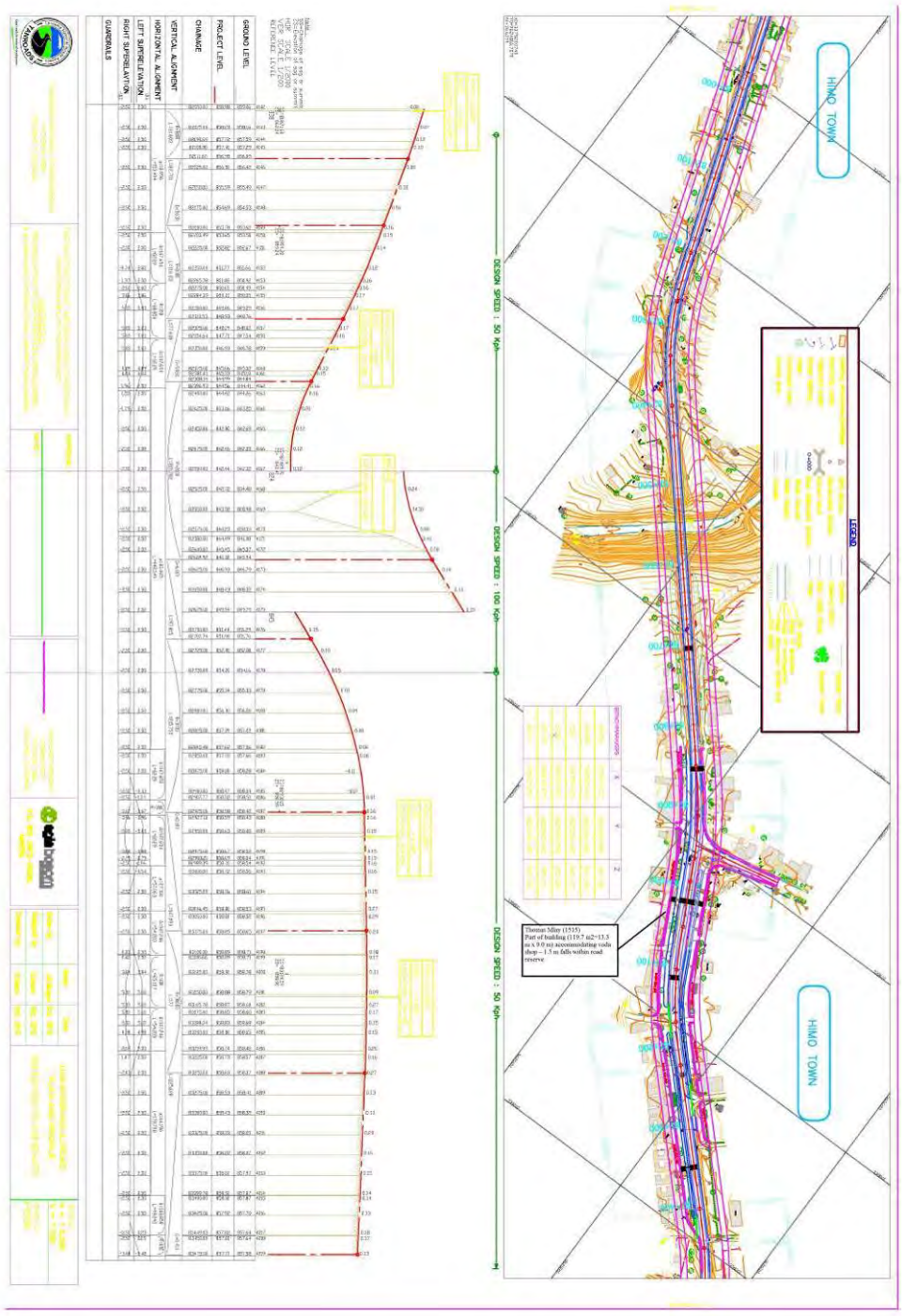


Figure B4 Location of PAP, identified within RoW = 45 m

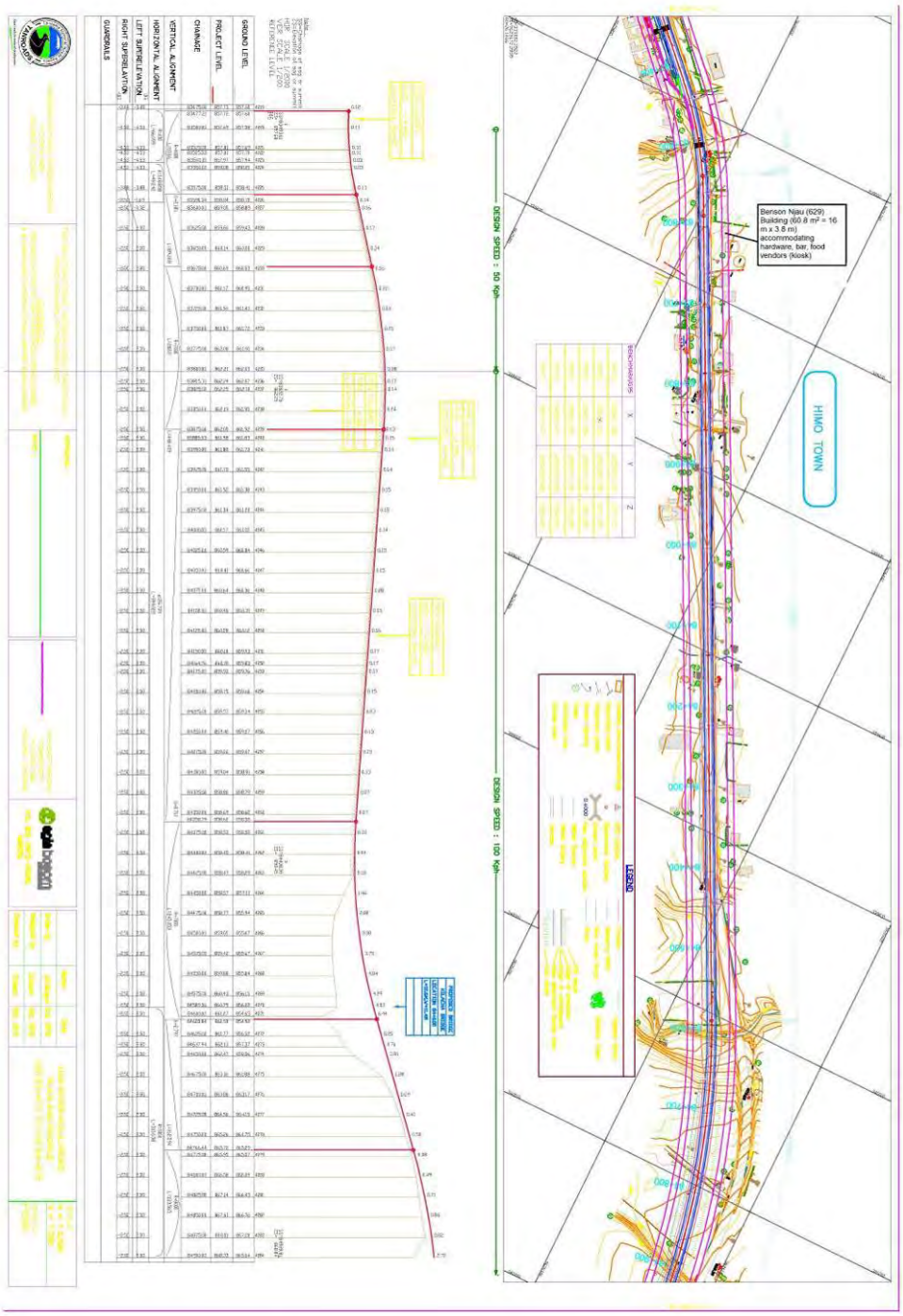


Figure B5 Location of PAP, identified within RoW = 45 m

APPENDIX C SUMMARY OF ASSETS TO BE COMPENSATED FOR NEW BYPASS CONSTRUCTION

Tables C1 and C2 summarizes breakdown of PAHs to be entitled for the compensation, summarized within the report, entitled "Valuation for compensation purposes for properties affected by upgrading multi-national: Tanzania/Kenya: Arusha-Holili/Taveta – Voi Road Project" (TANROADS, 2012).

Table C1 Summary of PAHs to be entitled for Compensation (Kikafu)

Id#	Affected area (m2)	Id#	Affected area (m2)	Id#	Affected area (m2)	Id#	Affected area (m2)
1	1,164	31	109	61	1,059	91	1,614
2	328	32	262	62	1,435	92	2,051
3	1,188	33	3,250	63	1,625	93	13,461
4	465	34	1,638	64	1,247	94	631
5	1,478	35	1,821	65	824	95	2,340
6	1,710	36	3,439	66	1,161	96	9,073
7	1,357	37	1,382	67	2,204	97	1,841
8	2,850	38	2,393	68	4,168	98	1,466
9	2,077	39	575	69	695	99	2,585
10	325	40	2,221	70	1,715	100	1,469
11	187	41	111	71	1,723	101	5,287
12	1,864	42	8,935	72	1,063	102	942
13	720	43	4,496	73	1,671	103	4,254
14	5,822	44	2,345	74	13,250	104	2,808
15	1,891	45	564	75	1,283	105	1,785
16	4,222	46	1,204	76	1,277	106	1,497
17	2,820	47	3,012	77	1,019	107	1,544
18	726	48	1,246	78	621	108	675
19	4,906	49	243	79	1,440	109	2,753
20	1,944	50	534	80	1,810	110	4,149
21	1,202	51	1,957	81	1,416	111	329
22	605	52	1,676	82	9,406	112	141
23	1,707	53	600	83	2,664	113	7,054
24	2,023	54	4,437	84	15,612	114	992
25	5,408	55	816	85	2,835	115	361
26	83	56	991	86	22,328	116	165
27	1,075	57	736	87	3,663	117	353
28	924	58	5,666	88	2,636	118	1,507
29	223	59	163	89	5,617	119	180
30	1,428	60	809	90	4,178		

Note: Total = 295293.9 m^2

Source: JICA Study Team.

Table C2 Summary of PAHs to be entitled for Compensation (Himo-Holili)

ID#	Affected Area (m2)	ID#	Affected Area (m2)	ID#	Affected Area (m2)	ID#	Affected Area (m2)
1	2,280	11	2,954	21	6,400	31	900
2	2,703	12	1,920	22	1,250	32	1,320
3	300	13	2,368	23	950	33	990
4	207	14	1,558	24	1,200	34	714
5	167	15	2,100	25	1,200	35	510
6	354	16	780	26	1,536	36	427
7	1,258	17	740	27	1,512	37	378
8	897	18	349	28	320	38	899
9	805	19	1,800	29	1,274		
10	2,565	20	1,890	30	1,408		

Note: Total = 51180.9 m^2
Source: JICA Study Team.

Tables C3 and C4 summarizes breakdown of trees to be compensated, summarized within the report, entitled "Valuation for compensation purposes for properties affected by upgrading multi-national: Tanzania/Kenya: Arusha-Holili/Taveta – Voi Road Project" (TANROADS, 2012).

Table C3 Summary of Trees to be Compensated (Kikafu)

	Tree Type and No.								
	Cassava tree	Paw paw tree	Alovera Stem	Shade tree	Cow Pee clusters	Sisal Clusters	Rubber Tree	Orange Tree	Guava Tree
1	1	2	3	47	9				
2				3					
3				19		2			
4		1		2		2			
5				2		4			
6				5					
7				5					
8				15					
9				38					
10									
11									
12				7					
13						7			
14				2		61			
15				2		5			
16				1		47			
17									
18						1			
19				1		12			
20				1		6			
21						8			
22				1		10			
23				2		4			
24				2		8			
25				1		3			
26				1		2			
27						4			
28						4			
29									
30				1		2			
31									
32							1		
33				16			1	2	1
34						6			
35						4			
36						4			

37				3					
38				6					
39				1					
40						5			
41									
42				1		5			
43						2			
44				1		2			
45				37					
46									
47				1					
48									
49				1		5			
50									
51				1					
52									
53									
54									
55									
56									
57				2		30			
58				2					
59									
60									
61				1					
62						5			
63									
64				1					
65				1					
66				1					
67				1					
68				2					
69				1					
70									
71									
72						6			
73						8			
74				1		11			
75						9			
76						16			
77						13			
78									
79				1		20			
80						60			
81				1		40			
82				7		38			
83				3		23			
84				9					
85									
86				5					
87				1		4			
88				2		28			
89				4		106			
90				17		185			
91						2			
92									
93						4			
94									
95									
96				2		3			
97						13			
98									
99									
100						3			
101						8			
102						1			

103						3			
104									
105						1			
106						5			
107						2			
108									
109						4			
110				1					
111									
112									
113				17					
114				1					
115						1			
116						10			
117						31			
118				1		61			
119									
Total	1	3	3		9	979	2	2	1

Source: JICA Study Team

Table C4 Summary of Trees to be Compensated (Himo-Holili)

	Tree Type and No.									
	Cassava tree	Paw paw tree	Mtopetoe Tree	Shade tree	Cow Pee clusters	Sisal Clusters	Garavelie Tree	Mchongoma Tree	Ashock Tree	Mbore Tree
1				55		15				
2				51		120				
3										
4				5						
5										
6				5						
7				3						
8										
9										
10				3						
11				7						
12				2						
13				8						
14				8						
15				4						
16				8						
17										
18										
19				12						
20				4						
21				8						
22				8						
23				1						
24		1		9		2				
25				9						
26	26			31	21	14	26	49		
27									6	
28				1					16	
29		2		4					13	
30			1	14					2	2
31				8						
32				12						
33										
34				8						
35				2						
36										
37										
38				8						
Total	26	3	1	298	21	151	26	49	37	2

Source: JICA Study Team

APPENDIX D TERMS OF REFERENCE FOR AN EXTERNAL MONITORING AGENCY FOR TENGERU-HOLILI ROAD IMPROVEMENT PROJECT

(1) Project Background

The Governments of Tanzania have intended to conduct a road imprvemet between Arusha and Holili. The project of concern constitutes the road improvement of Arusha – Moshi – Holili by strengthening the existing pavement, widening and realignment of the carriageway, shoulders and drainage structures. The proposed project also includes construction of a ring road for through traffic to Arusha Central District through the outskirt of Arusha municipality and Arumeru District. The road section from Arusha towards Usa River is to be widened to accommodate dual carriageway (four lanes traffic). In addition, the spur road to Kilimanjaro International Airport (KIA) will be strengthened.

The proposed project also involves traffic safety improvement on various sections of road with infringed sight distance (sharp horizontal and vertical curves), which are prone to accidents, accommodation of non- motorized traffic and improvement of axle load control facilities.

The existing 6.5 m carriageway, 1.5 m shoulder Arusha - Moshi – Holili road will be widened to 7.0 m carriageway with 2 m shoulders. The proposed road and Arusha - Usa River road sections road will have double carriageways of bituminous surfacing of 7 m width and 2 m shoulders, while the road section between Arusha and Usa River will be of dual carriageways.

All bridges (except those for dual carriageways) will consist of two lanes, with foot path (with guard rails) on both sides. There will be road side and cross drains as required. It is anticipated that the proposed road for the Arusha – Holili section will mostly follow the existing horizontal alignment. The pavement will be of asphalt concrete.

"COI (Corridor of Impact)" is applied for this proposed road improvement project, so that, no PAP is to be generated within this proposed project except the two new bypass construction sections. Certain amount of land acquisition is to be taken at two new bypass sections of Kikafu and Himo-Holili sections, so that the proposed road improvemnet project will require supplemental land acquisition which will affect 157 land owners according to the valuation report, conducted by TANROADS(2012). TANROADS will implement land acquisition and resettlement activities following the updated RAP to meet the requirements of lenders. TANROADS seek to engage an independent External Monitoring Agency (EMA) to undertake monitoring and evaluation of the RAP implementation process.

(2) Key Objective of External Monitoring

Monitoring is an integral part of the resettlement process. The External Monitoring Agency (EMA) will review implementation process as per set policies and criteria in the RAPs report, assess the achievement of resettlement objectives, the changes in living standards and livelihoods, restoration of the economic and social base of the project affected people, the effectiveness,

impact and sustainability of entitlements, the need for further mitigation measures if any, and to learn strategic lessons for future policy formulation and planning.

(3) Scope of Work

The scope of work of the External Monitoring Agency (EMA) will include the following activities,

1. To develop specific monitoring indicators for undertaking monitoring of the Resettlement Action Plans (RAPs).
2. To review and verify the progress in land acquisition/resettlement implementation of the Project.
3. Identify the strengths and weaknesses of the land acquisition/resettlement objectives and approaches as well as implementation strategies.
4. Evaluate and assess the adequacy of compensation given to the APs and the livelihood opportunities and incomes as well as the quality of life of APs of project-induced changes.
5. Identification of the categories of impacts and evaluation of the quality and timeliness of delivering entitlements (compensation and rehabilitation measures) for each category and how the entitlements were used and their impacts and adequacy to meet the specified objectives of the Plans. The quality and timeliness of delivering entitlements, and the sufficiency of entitlements as per approved entitlement matrix.
6. Provide a summary of whether involuntary resettlement was implemented (a) in accordance with the RAPs, and (b) in accordance with the stated policy.
7. To review the quality and suitability of the relocation sites from the perspective of the both affected and host communities.
8. Verify expenditure & adequacy of budget for resettlement activities.
9. To analyze the pre-and post-project socio-economic conditions of the affected people. The methodology for assessment should be very explicit, noting any qualifications.
10. Review results of internal monitoring and verify claims through sampling check at the field level to assess whether land acquisition/resettlement objectives have been generally met. Involve the affected people and community groups in assessing the impacts of land acquisition for monitoring and evaluation purposes.
11. To monitor and assess the adequacy and effectiveness of the consultative process with affected people, particularly those vulnerable, including the adequacy and effectiveness of grievance procedures and legal redress available to the affected parties, and dissemination of information about these.
12. Identify, quantify, and qualify the types of conflicts and grievances reported and resolved and the consultation and participation procedures.
13. Describe any outstanding actions that are required to bring the resettlement activities in line with the policy. Describe further mitigation measures needed to meet the needs of any affected person or families judged and/or perceiving themselves to be worse off as a result of the Project. Provide a timetable and define budget requirements for these supplementary mitigation measures.
14. Describe any lessons learned that might be useful in developing the new national resettlement policy and legal/institutional framework for involuntary resettlement.
15. Verifying internal reports by field-checking delivery of compensation to PAPs, including the levels and timing of the compensation; readjustment of land; preparation and adequacy of resettlement sites; construction of houses; provision of employment, the adequacy of the employment, and income levels; training; special assistance for vulnerable groups; repair,

relocation, or replacement of infrastructure; relocation of enterprises, compensation, and adequacy of the compensation; and transition allowances;

16. Interviewing a random sample of PAPs in open-ended discussions, to assess their knowledge and concerns about the resettlement process, their entitlements, and the rehabilitation measures;
17. Observing the functioning of the resettlement operation at all levels, to assess its effectiveness and compliance with the RAP;
18. Checking the type of grievance issues and the functioning of grievance redress mechanisms by reviewing the processing of appeals at all levels and interviewing aggrieved PAPs:
19. Advising TANROADS regarding possible improvements in the implementation of the RAP.

(4) Methodology and Approach

The general approach to be used is to monitor activities and evaluate impacts ensuring participation of all stakeholders especially women and vulnerable groups. Monitoring tools should include both quantitative and qualitative methods. The external monitor should reach out to cover,

- PAPs who had property, assets, incomes and activities severely affected by Project works and had to relocate either to resettlement sites or who chose to self-relocate, or whose source of income was severely affected.
- PAPs who had property, assets, incomes and activities marginally affected by Project works and did not have to relocate;
- PAPs by off-site project activities by contractors and sub-contractors, including employment, use of land for contractor's camps, pollution, public health etc.;

Supplemented by Focused Group Discussions (FGD) which would allow the monitors to consult arrange of stakeholders (local government, resettlement field staff, NGOs, community leaders, and, most importantly, APs), community public meetings: Open public meetings at resettlement sites to elicit information about performance of various resettlement activities.

(5) Other Stakeholders and their Responsibility

1. Responsibility of the executing Agencies (EAs)

The EAs through their Project Implementation Unit (PIU) will ensure timely supply of background references, data and other necessary information to the EMA and provide access to project sites and relevant places to let the EMA implement external monitoring activity.

2. Responsibility of the Implementing organization(s)

Organizations that will assist EAs in implementing land acquisition and resettlement activities will provide information required by the EMA at site and at their Project Offices. It will on behalf of EAs ensure free access to project sites and related areas and the database on land acquisition and resettlement activities.

(6) Team Composition of the External Monitoring Agency

The EMA should focus on the data collection, processing and analysis to pinpoint problem areas and weaknesses, and to light on deserving measures to achieve the objectives on schedule are the special interest of the subject. Thus, there is a need for a dedicated monitoring team with adequate gender representation. Further, it is essential that the central team or field-level coordinators responsible for monitoring, are skilled and trained in data base management, interview technique, and social and economic/finance. Keeping in mind these criteria, the team should ideally include:

Position/expertise	Qualification and experience
1. Team Leader/ Implementation Specialist	Master in social science with 10-year working experience in social impact assessment including census and socioeconomic surveys, stakeholders' consultation, and analyzing social impacts to identify mitigation measures in compliance with social safeguard policies of the international development financing institutions and national legislations. Experience of preparing resettlement framework and action plans and implementation of plans for externally financed projects is essential.
2. Social Impact Specialist	Master in social science with 5-year working experience in social impact assessment including census and socioeconomic surveys, stakeholders' consultation, and analyzing social impacts to identify mitigation measures in compliance with social safeguard policies of the international development financing institutions and national legislations. Experience of preparing resettlement framework and action plans and implementation of plans for externally financed projects is essential.
3. Data Analyst	Graduate with working experience and knowledge of software such as SPSS (Statistical Package for the Social Sciences)

(7) Time Frame and Reporting

The EMA will be employed over a period of 3 years with intermittent inputs from the professional team to continue 2 years after completion of the RAP implementation.

Quarterly and annual monitoring reports should be submitted to TANROADS with copies to JICA. An evaluation report at the end of the project should be submitted to TANROADS and concerned parties with critical analysis of the achievement of the program and performance of EAs and implementing organizations.

The external monitors will provide monitoring and evaluation report covering the following aspects:

- Whether the resettlement activities have been completed as planned and budgeted;
- The extent to which the specific objectives and the expected outcomes/results have been achieved and the factors affecting their achievement or non-achievement;
- The extent to which the overall objective of the Resettlement Plan, pre project or improved social and economic status, livelihood status, have been achieved and the reasons for achievement/non achievement;
- Major areas of improvement and key risk factors;
- Major lessons learnt; and
- Recommendations.

Formats for collection and presentation of monitoring data will be designed in consultation with EAs.

(8) Qualification of the External Monitoring Agency

The EMA will have at least 10 years of experience in resettlement policy analysis and implementation of resettlement plans. Further, work experience and familiarity with all aspects of resettlement operations would be desirable. NGOs, Consulting Firms or University Departments (consultant organization) having requisite capacity and experience on the same can qualify for services

Interested agencies should submit a proposal to TANROADS with a brief statement of the approach, methodology, and relevant information concerning previous experience on monitoring of resettlement implementation and preparation of reports.

The profile of its agency, along with full signed CVs of the team to be engaged, must be submitted

along with the technical proposal.

(9) Budget and Logistics

The budget should include all expenses such as staff salary, office accommodation, training, computer/software, transport, field expenses and other logistics necessary for field activities, data collection, processing and analysis for monitoring and evaluation work. Additional expense claims whatsoever outside the proposed and negotiated budget will not be entertained. VAT, Income Tax and other charges admissible will be deducted at source as per Government laws.

APPENDIX E MONITORING FORM FOR LAND ACQUISITION (DRAFT)

Monitoring Form for Land Acquisition

As of 2016/7/19

Progress of Land Acquisition

	Mintom	Lele	(Expected) Date of Completion
Vacation of Land(% of progress)			Oct-17
Number of Affected Households			

Procedures

Procedure	Date	Submission of Moritoring Report	Internal Monitoring	External Monitoring
Institutuional Arrangement		2016 (3rd qtr)		
Establishment of Project Management Unit		2016 (3rd qtr)		
Establishment of Grievance Redress Committee		2016 (4th qtr)		
Detailed Measurement Survey (DMS) and Replacement Cost Survey (RCS)		2016 (3rd qtr)		
Bidding and Contract Process to hire independent agency		2016 (3rd qtr)		
Start of DMS & RCS		2016 (3rd qtr)		

Grievance Redress

	Grievance received	Grievance resolved	Note (if any)
1			
2			
3			

Public Information Meeting

	Agenda	Date	Place	Number of Participants
1	Sensitization Meeting	2016/6/20	Rombo District	26
2	Same as above	2016/6/20	Himo Ward	64
3	Same as above	2016/6/21	Makuyuni Ward	70
4	Same as above	2016/6/22	Masama Kusini & Kwa Sadala Villages	76
5	Same as above	2016/6/22	Hai District	25
6	Same as above	2016/6/22	Moshi Rural District	25
7	Same as above	2016/6/24	Arumeru District	26
8	Same as above	2016/6/24	King'ori Ward	56
9	Same as above	2016/6/24	Nashoni, Kikatiti & Sakila Chini Villages	82
10	Same as above	2016/6/25	Maji ya Chai Ward	50
11	Same as above	2016/6/25	USA River (Mji Mwema, Ngarasero, USA Madukani & Magaridishu Hamlets)	21
12	Same as above	2016/6/25	Makumira Center, Poli Ward, Ndatu Village	49

Income Restoration Program

	Content of Activity	Date	Place	Number of Participants
1				
2				
3				

APPENDIX F ENVIRONMENTAL CERTIFICATE, APPROVED BY NEMC

GN. No. 349

THE UNITED REPUBLIC OF TANZANIA

ENVIRONMENTAL IMPACT ASSESSMENT

Certificate

[Section 92(1) of the Environmental Management Act No. 20 of 2004]

Application Reference No. 1155
Registration No. EC/EIS/1434
This is to Certify that

M/S. TANZANIA NATIONAL ROADS AGENCY (TANROADS)

of P. O. BOX 11364, DAR ES SALAAM

has this day been granted an Enviromental Impact Assessment Certificate for the proposed project/Activity titled. IMPROVEMENT OF ARUSHA-HOLILI (140KM) ROAD IN ARUSHA AND KILIMANJARO REGIONS AND CONSTRUCTION OF 42.41KM BYPASS ROAD TO BITUMEN STANDARD IN ARUSHA MUNICIPALITY, IN ARUSHA REGION

to be implemented/carried out at ARUSHA AND KILIMANJARO, ARUSHA, ARUMERU, HAI MOSHI AND ROMBO DISTRICTS, ARUSHA AND KILIMANJARO REGIONS

This certificate shall remain in force during the whole lifecycle of this specific project unless henceforth revoked or suspended.

General conditions and terms attached to this certificate are set out herein behind and specific conditions are annexed.

Dated this 30TH day of SEPTEMBER 2014

Hon. Eng. Dr. Binilith Satano Mahenge (MP)
Minister of State, Vice-President's Office - Environment

Figure F PDF Copy of Environmental Certificate, approved by NEMC in 2014

CHAPTER 8 PRELIMINARY COST ESTIMATE

8.1 Preliminary Project Cost Estimate

8.1.1 Basic Concept

(1) Study Section

The study section for preliminary cost estimates is the road project between Tengeru and Holili and the KIA access road, totalling 107.9 km.

(2) Base Cost

In order to estimate the project cost by section, cost estimation of previous F/S and D/D is referred to as a base cost. The outline of the previous F/S and D/D is summarized in the table below.

Table 8.1.1 Basic Information on Cost Estimation in Previous FS

Study	Number of lane	Length	Estimated Year
FEASIBILITY STUDIES AND DETAILED ENGINEERING DESIGN OF THE MULTINATIONAL ARUSHA – HOLILI/TAVETA – VOI ROAD Revised Final Cost Estimation: Contract 1 –lot1 SAKINA – TENGERU (Cost Estimation Contact 1)	4 lane	14.1km	2015
FEASIBILITY STUDIES AND DETAILED ENGINEERING DESIGN OF THE MULTINATIONAL ARUSHA – HOLILI/TAVETA – VOI ROAD Final Cost Estimation: Contract 3 USA – HOLILI (Cost Estimation Contact 3)	2 lane	99.64km	2013

Source: JICA Study Team

(3) Condition for Cost Estimation

The conditions for preliminary cost estimation of the road project are summarized below;

Table 8.1.2 Conditions for Cost Estimation

Item	Condition
Anticipated Date	May, 2016
Exchange Rate	1 USD = 2,192.1 TZS 1 USD =109.9 JPY
Price Escalation Rate	FC: 1.6% LC: 7.6%
Physical Contingency	Construction: 7.5% Consultant: 5%
VAT	18%

Source: JICA Survey Team

8.1.2 Methodology of Cost Estimate

For cost estimation during the Project, unit cost is calculated by work items, including general works, drainage works, road works and box culvert and bridge works. To calculate these unit costs, cost estimation in the previous F/S and D/D is referred to as a base cost. The methodology and approach of cost estimation in the Study is summarized below.

(i) Cost items in the previous F/S and D/D were divided into six work items and calculated in km per cost item as summarized in the following table.

Road section of Contract 1 is located in an urbanized area, however, road section of Contract 3 is in a rural area. Contract 1 requires a relatively larger amount of civil works, like a dual carriageway, drainage, structure and relocation of existing utilities for the project, and for that reason, unit cost of Contract 1 differs from that of Contract 3.

Table 8.1.3 Unit Cost based on Previous Cost Estimation

(Unit: USD in 2016 value)

NO.	DESCRIPTION		Cost Estimation Contact 1 SAKINA – TENGERU	Cost Estimation Contact 3 ARUSHA – HOLILI
Applied section		Unit	TENGERU - USA	USA – HOLILI KIA access
1	General	USD/km	468,279	48,647
2	Drainage	USD/km	309,693	57,418
3.1	Road: Clearing	USD/km	30,095	15,890
3.2	Road: Earthworks	USD/km	91,521	181,597
3.3	Road: Pavement	USD/km	805,203	590,112
3.4	Road: Ancillary Roadworks	USD/km	31,715	16,377
3.5	Road: Cattle Grids and Axle Weigh	USD/km	-	39,177
3.6	Road: Landscaping and Grassing	USD/km	-	2,323
4	Box Culvert	USD/km	268,812	54,252
5.1	Bridge	USD/km	63,201	43,566
5.2	Street Lighting	USD/km	54,159	-
6	Dayworks	USD/km	56,150	7,045

Source: JICA Study Team

Note: For adjustment of price escalation from 2013 to 2016, the ratio (1.11) based on the IMF indicator is applied.

(ii) Nine typical cross sections (X0 to X8) were developed, considering the number of lanes, size of median, and with/without service road/footpath.

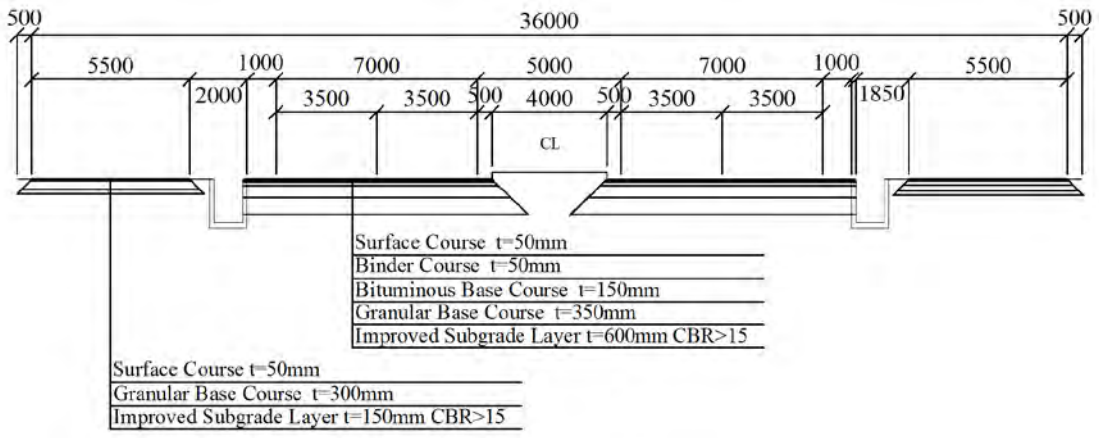
Table 8.1.4 Applied Typical Cross Section

Cross Section	Contents	Applied Section
X0	4 lane road divided by 4m median with service roads on both sides	Tengeru-Usa
X1	4 lane road divided by 4m median	Usa-Holili
X2	4 lane road divided by 4m median with service road and footpath on one side	Usa-Holili
X3	4 lane road divided by 4m median with service road and footpath on both sides	Usa-Holili
X4	4 lane road divided by 4m median	Usa-Holili
X5	2 lane road on existing road	Usa-Holili
X6	2 lane road	Usa-Holili
X7	2 lane road with service road and footpath for both sides	Usa-Holili
X8	2 lane road	KIA access road

Source: JICA Study Team

Note1: X1 and X4 apply the same cross section but the pavement design of these two differs, depending on the estimated ESAL (with more ESAL of X1 than X4).

Note2: X6 and X8 apply the same cross section but the pavement design of these two differs. X6 applied to the bypass section and X8 applied to KIA access road, referring to the estimated ESAL and pavement design proposed by F/S and D/D.



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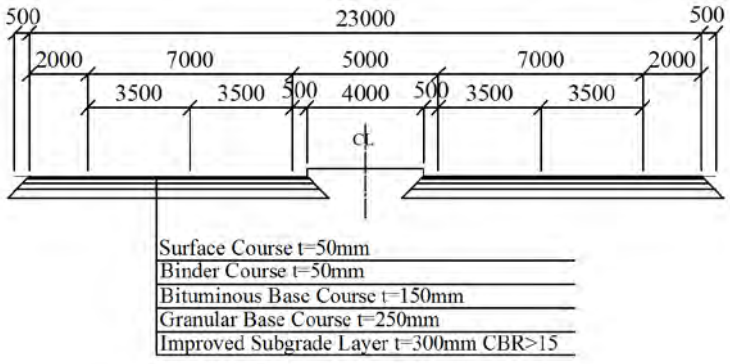

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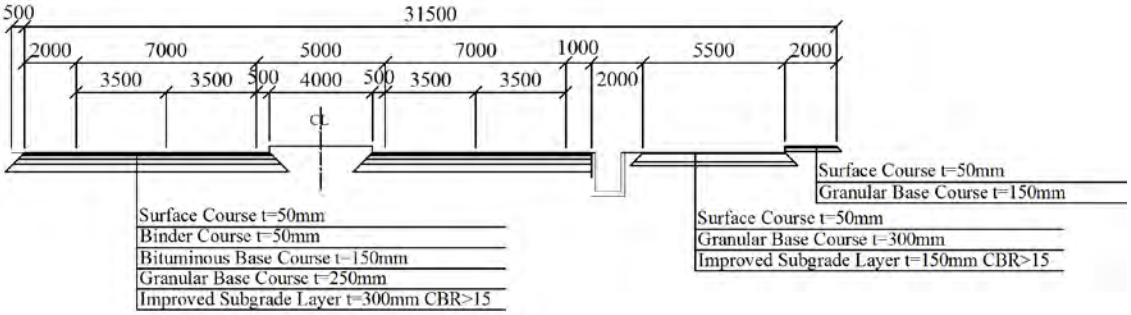
Source: JICA Study Team

Figure 8.1.1 Typical Cross Section (1)



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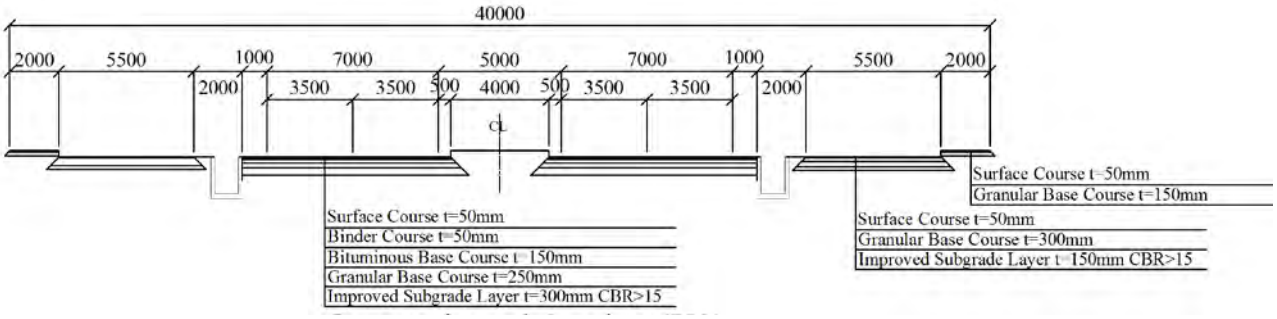

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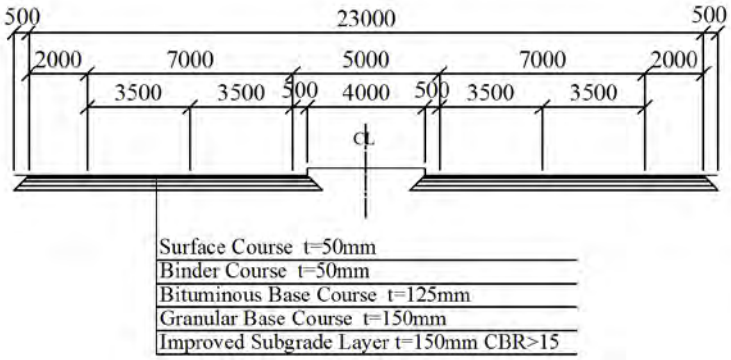

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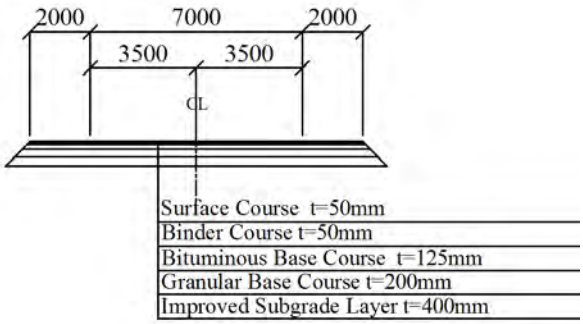

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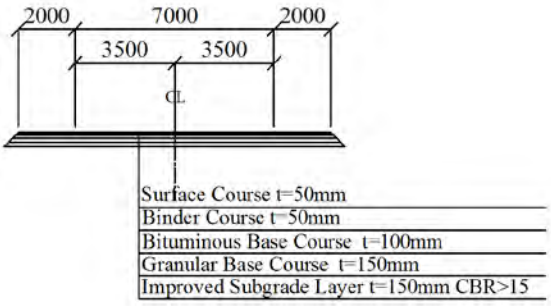
Source: JICA Study Team

Figure 8.1.2 Typical Cross Section (2)



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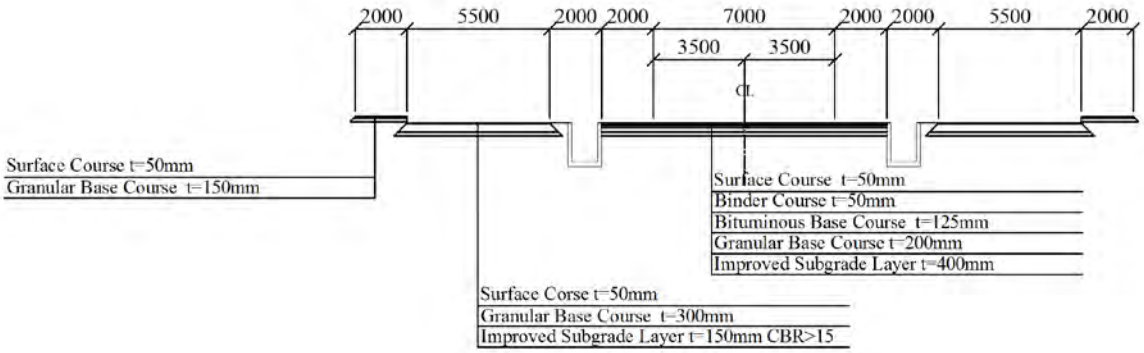

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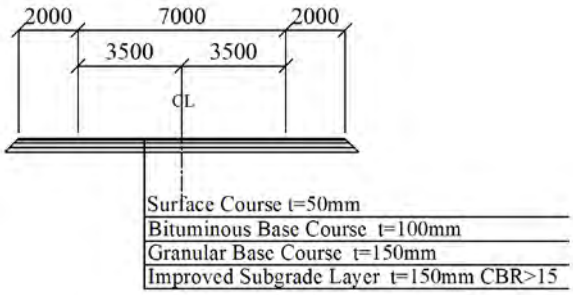

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Source: JICA Study Team

Figure 8.1.3 Typical Cross Section (3)

(iii) Considering road width (Comparing typical cross section road width (X1 to X8) to the original typical cross section road width (X0)), unit costs for a typical cross section are prepared and summarized in the table below.

Table 8.1.5 Unit Cost for Typical Cross Section

(Million USD in 2016 value)

Cross Section	Unit cost for a road		Unit cost for a bridge	
	Million USD/km	USD/m^2	Million USD/m	USD/m^2
X0	3.39	94	0.06	4,200
X1	2.48	103	0.08	3,400
X2	3.49	109	0.08	3,440
X3	3.38	95	0.08	3,440
X4	2.26	98	0.08	3,440
X5	1.71	155	0.04	3,440
X6	1.46	132	0.04	3,440
X7	2.62	87	0.04	3,440
X8	1.28	116	0.04	3,440

Source: JICA Study Team

Note: Regarding "Earth work", the volume of the work differs according to topography. Therefore, an additional safety factor of 50% is applied. Regarding "Clearing", this category mainly includes removal of existing pavement. Therefore, road width ratio is not applied.

(iv) In order to estimate the bridge section excluding Kikafu Bridge, the bridge unit cost is applied to the following section. For Kikafu Bridge, the cost estimation (assuming the Kikafu Bridge is a three span continuous PC Extradosed bridge plus PC box girder bridge) is referred in Chapter 5.

Table 8.1.6 Location of Bridge

Section	KM Post	Crossing Name	Bridge Length (m)
Tengeru-Usa	15+400	Kilala River	10.60
	17+859	Upper Tengeru River	25.00
	19+922	Makumira River	81.60
	20+855	Kigera Kubwa River	46.10
Usa-Holili	0+200	Magdarisho River	10.60
	0+936	Usa River	25.00
	4+783	Maji ya Chai River	10.60
	30+988	Sanya River	20.60
	47+359	Weruweru River	50.00
	54+243	Karanga River	65.00
	58+920	Rua River	20.60
	65+012	Kisanja River	10.60
	78+175	Mabungo River	15.60
	84+636	Kilacha River	10.60
	84+936	Sangana River	10.60
	86+100	Kimisho River	41.80

Source: JICA Study Team

8.2 Result of Project Cost Estimate

The total construction cost of the Project is estimated by applying the unit cost of each work item, preliminary BOQ and the detailed project cost estimates of sections tabulated. Given the above conditions, the total project cost was estimated at 549.6 million USD, with a construction cost of 320.9 million USD.

Table 8.2.1 Construction Cost Estimation by Package

Package	Base Cost		
	FC USD ('000)	LC USD ('000)	Total USD ('000)
Package-1: 47.2km Tengeru - West Kikafu and 5.7km KIA Access Road	74,597	46,889	121,486
Package-2: 4.0km West Kikafu –East Kikafu including 560 m Kikafu Bridge, and Roadside Station	47,406	35,606	83,012
Package-3: 50.9km East Kikafu- Holili	71,728	42,563	114,290
Packege-4: Safety measure at vicinity of existing Kikafu Bridge	720	1,352	2,073
Total	194,450	126,410	320,860

Source: JICA Study Team

Table 8.2.2 Preliminary Construction Cost Estimate

Section	Length(km)	No.	Starting Point	Case-2: 4 lane(Tengeru-Usa,Kikafu,Moshi), 2lane(other)															
				X-secion No.		Unit cost for road	FOREIGN	LOCAL	Unit cost for bridge	FOREIGN	LOCAL	Amount for road (million USD)	Amount for bridge (million USD)	Amount for each section (million USD)	Road Foreign	Road Local	Bridge Foreign	Bridge Local	FOREIGN	LOCAL
Tengeru - Usa(Usa East)	8.23			0	4 lane	3.39/km	0.66/km	0.34/km	0.07/m	0.33/m	0.67/m	27.9	10.9	38.8	18.4	9.3	3.6	7.3	22.0	16.6
							0.66/km	34%		33%	67%	3.0		3.0	2.0	1.0	0.0	0.0	2.0	1.0
Usa(Usa East) - KIA	24.30	1	0 + 0	0	4 lane	3.39/km	0.66/km	34%	0.07/m	33%	67%	0.8	0.7	46.2	0.5	0.3	0.2	0.5	0.7	0.7
		2	0 + 225	0		3.39/km	0.66/km	34%	0.07/m	33%	67%	1.3	0.0		0.8	0.4	0.0	0.0	0.8	0.4
		3	0 + 600	0		3.39/km	0.66/km	34%	0.07/m	33%	67%	1.7	1.7		1.1	0.6	0.6	1.1	1.7	1.7
		4	1 + 100	5	2 lane	1.71/km	0.64/km	35%	0.05/m	33%	67%	3.2	0.0		2.1	1.1	0.0	0.0	2.1	1.1
		4	3 + 0	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	3.1	0.5		2.0	1.1	0.2	0.3	2.1	1.4
		5	4 + 800	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	3.2	0.0		2.0	1.1	0.0	0.0	2.0	1.1
		6	6 + 650	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	0.3	0.0		0.2	0.1	0.0	0.0	0.2	0.1
		7	6 + 800	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	6.2	0.0		4.0	2.2	0.0	0.0	4.0	2.2
		8	10 + 450	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.3	0.0		0.8	0.5	0.0	0.0	0.8	0.5
		9	11 + 220	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	13.3	0.0		8.5	4.6	0.0	0.0	8.5	4.6
		10	18 + 991.48	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.7	0.0		1.1	0.6	0.0	0.0	1.1	0.6
		11	20 + 0	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	7.3	0.0		4.7	2.6	0.0	0.0	4.7	2.6
KIA - West Kikafu	14.70	12	24 + 300	5	2 lane	1.71/km	0.64/km	35%	0.05/m	33%	67%	13.5	0.9	27.0	8.7	4.7	0.3	0.6	9.0	5.3
		13	32 + 200	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	3.1	0.0		2.0	1.1	0.0	0.0	2.0	1.1
		14	34 + 0	7		2.62/km	0.66/km	33%	0.05/m	33%	67%	2.9	0.0		1.9	1.0	0.0	0.0	1.9	1.0
		15	35 + 100	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.5	0.0		0.9	0.5	0.0	0.0	0.9	0.5
		16	35 + 950	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	5.2	0.0		3.3	1.8	0.0	0.0	3.3	1.8
Kikafu	4.00	17	39 + 0	4	4 lane	2.26/km	0.65/km	35%		55%	45%	9.0	67.4	76.4	5.8	3.1	37.1	30.3	42.9	33.5
East Kikafu - West Moshi	10.50	18	43 + 0	5	2 lane	1.71/km	0.64/km	35%	0.05/m	33%	67%	6.9	0.0	20.2	4.4	2.4	0.0	0.0	4.4	2.4
		19	47 + 50	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	2.6	2.3		1.7	0.9	0.8	1.5	2.5	2.4
		20	48 + 600	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	2.0	0.0		1.3	0.7	0.0	0.0	1.3	0.7
		21	49 + 750	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	4.2	0.0		2.7	1.5	0.0	0.0	2.7	1.5
		22	52 + 220	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.6	0.0		1.0	0.6	0.0	0.0	1.0	0.6
		23	53 + 150	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	0.6	0.0		0.4	0.2	0.0	0.0	0.4	0.2
West Moshi - East Moshi	2.56	24	53 + 500	1	4 lane	2.48/km	0.65/km	34%	0.08/m	33%	67%	2.2	5.2	13.5	1.4	0.7	1.7	3.5	3.2	4.2
		25	54 + 380	2		3.49/km	0.65/km	34%	0.08/m	33%	67%	0.6	0.0		0.4	0.2	0.0	0.0	0.4	0.2
		26	54 + 544	1		2.48/km	0.65/km	34%	0.08/m	33%	67%	0.5	0.0		0.3	0.2	0.0	0.0	0.3	0.2
		27	54 + 733	3		3.82/km	0.66/km	34%	0.08/m	33%	67%	5.0	0.0		3.3	1.7	0.0	0.0	3.3	1.7
East Moshi - Himo	24.15	28	56 + 55	1	4 lane	2.48/km	0.65/km	34%	0.08/m	33%	67%	8.0	1.6	51.4	5.2	2.7	0.5	1.1	5.8	3.8
		29	59 + 260	3		3.82/km	0.66/km	34%	0.08/m	33%	67%	4.2	0.0		2.8	1.4	0.0	0.0	2.8	1.4
		30	60 + 370	1		2.48/km	0.65/km	34%	0.08/m	33%	67%	0.8	0.0		0.5	0.3	0.0	0.0	0.5	0.3
		31	60 + 705	3		3.82/km	0.66/km	34%	0.08/m	33%	67%	4.6	0.0		3.0	1.5	0.0	0.0	3.0	1.5
		32	61 + 900	5	2 lane	1.71/km	0.64/km	35%	0.05/m	33%	67%	2.2	0.0		1.4	0.8	0.0	0.0	1.4	0.8
		33	63 + 200	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.5	0.0		1.0	0.5	0.0	0.0	1.0	0.5
		34	64 + 100	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	8.9	0.5		5.7	3.1	0.2	0.3	5.9	3.4
		35	69 + 300	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.7	0.0		1.1	0.6	0.0	0.0	1.1	0.6
		36	70 + 300	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	0.3	0.0		0.2	0.1	0.0	0.0	0.2	0.1
		37	70 + 500	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	0.6	0.0		0.4	0.2	0.0	0.0	0.4	0.2
		38	70 + 850	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	2.5	0.0		1.6	0.9	0.0	0.0	1.6	0.9
		39	72 + 300	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.0	0.0		0.7	0.4	0.0	0.0	0.7	0.4
		40	72 + 900	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	0.3	0.0		0.2	0.1	0.0	0.0	0.2	0.1
		41	73 + 100	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.1	0.0		0.7	0.4	0.0	0.0	0.7	0.4
		42	73 + 750	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	3.5	0.0		2.2	1.2	0.0	0.0	2.2	1.2
		43	75 + 800	6		1.46/km	0.64/km	36%	0.05/m	33%	67%	1.5	0.0		0.9	0.5	0.0	0.0	0.9	0.5
		44	76 + 800	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.9	0.0		1.2	0.7	0.0	0.0	1.2	0.7
		45	77 + 900	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	2.2	0.7		1.4	0.8	0.2	0.5	1.7	1.2
		46	79 + 200	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.7	0.0		1.1	0.6	0.0	0.0	1.1	0.6
Himo - Holili	13.69	47	80 + 200	5	2 lane	1.71/km	0.64/km	35%	0.05/m	33%	67%	2.6	0.0	24.7	1.6	0.9	0.0	0.0	1.6	0.9
		48	81 + 700	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.4	0.0		0.9	0.5	0.0	0.0	0.9	0.5
		49	82 + 500	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	0.5	0.0		0.3	0.2	0.0	0.0	0.3	0.2
		50	82 + 800	7		2.62/km	0.66/km	33%	0.05/m	33%	67%	1.3	0.0		0.9	0.4	0.0	0.0	0.9	0.4
		51	83 + 300	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	0.9	0.0		0.5	0.3	0.0	0.0	0.5	0.3
		52	83 + 800	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	1.0	0.0		0.7	0.4	0.0	0.0	0.7	0.4
		53	84 + 400	6		1.46/km	0.64/km	36%	0.05/m	33%	67%	2.9	1.9		1.9	1.0	0.6	1.3	2.5	2.3
		54	86 + 400	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	2.7	0.0		1.8	1.0	0.0	0.0	1.8	1.0
		55	88 + 0	6		1.46/km	0.64/km	36%	0.05/m	33%	67%	2.9	0.0		1.9	1.0	0.0	0.0	1.9	1.0
		56	90 + 0	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	4.0	0.0		2.6	1.4	0.0	0.0	2.6	1.4
		57	92 + 350	5		1.71/km	0.64/km	35%	0.05/m	33%	67%	2.6	0.0		1.7	0.9	0.0	0.0	1.7	0.9
KIA access road	5.75			8	2 lane	1.28/km	0.64/km	36%	0.05/m	33%	67%	7.3	0.0	7.3	4.7	2.6	0.0	0.0	4.7	2.6
					1)	Construction Cost Total								308.6	138.6	74.0	46.0	48.2	184.6	122.2

Note: The construction cost in the above table only includes road construction costs and excludes cost for (i) Packege-4: (safety measure at vicinity of existing Kikafu Bridge), (ii) roadside station and (iii) weigh station
Source: JICA Study Team

8.3 Cost Estimate of Maintenance Works

8.3.1 Operation and Maintenance

Road maintenance works are categorized into the following two types.

(i) Routine maintenance

(ii) Periodic maintenance

1) **Routine maintenance**

Routine maintenance includes road cleaning: removal of trash, debris, soil, stone etc. including mowing and cleaning of drainage facilities. The frequency may vary from once a day to once 3 months, according to necessity. Localized repairs of pavement and shoulder damages, such as resealing, pothole patching, reshaping of side drains are included.

2) **Periodic maintenance**

Periodic maintenance includes overlay of the existing pavement or roadway to maintain surface features and structural integrity for continued serviceability. Specific activities to be performed after 10 years of operation include the removal/replacement of damaged parts.

Table 8.3.1 Maintenance Works and Frequency

Maintenance Type		Purpose	Maintenance Work
Routine	Every week	Patrol	Visual inspection
	Every 3 months	Seasonal Inspection	Visual inspection by inspection vehicle
	Every 3 months	Road cleaning	Mowing grass, Removal of trash and sediments in side ditches, culverts etc.
	After defects found	Repair of minor defects on pavement	Repair cracks and pothole
Periodic	Based on pavement condition	Replacement/Repair of parts	Overlay of pavement Replacement of water proof layer
	Every 5 years	Periodic Inspection	Detail inspection
	Every 10 years	Replacement/Repair of parts	Replacement of expansion joint for small bridge
	Every 20 years		Replacement of expansion joint for Extradosed bridge Repair of PC girder
	Every 75 years		Replacement of Stay Cable

Source: JICA Study Team

8.3.2 Maintenance Cost

Routine operation and maintenance, and maintenance item/interval/unit cost for periodic maintenance are shown in Table 8.3.2.

Table 8.3.2 Maintenance Cost by Package

(Unit: USD)

Item	Frequency	Package-1	Package-2	Package-3
Routine operation and maintenance				
Routine O&M （inc. repair of pavement）	Every year	110,000	14,000	96,000
Periodic maintenance (Road)				
Overlay	Based on IRI	9,500,000	1,000,000	8,200,000
Periodic maintenance (Bridge)				
Periodic inspection	5 years	69,000	168,000	61,000
Replacement of water proof layer	Same as OR	311,000	815,000	207,000
Replacement of expansion joint	15 years	1,184,000	718,000	1,171,000
Repair of PC girder	20 years	1,765,000	4,508,000	1,313,000
Replacement of PC Cable	75 years	-	1,088,000	-

Source: JICA Study Team

CHAPTER 9 PRELIMINARY PROJECT EVALUATION

9.1 Economic Evaluation

9.1.1 Project Cost

(1) Project Cost

Based on the preliminary project cost estimates and socio-economic benefits generated by the Project, economic feasibility of the project is tested through conventional economic analysis. Economic project cost is prepared annually, excluding price contingency and taxes, for economic analysis as shown in the following table, based on preliminary cost estimation and tentative project schedule, explored in Chapter 8.

Table 9.1.1 Preliminary Project Cost

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
FC	0.0	1.4	8.1	73.5	58.9	61.3	12.2	0.1	1.2	0.0	216.6
LC	0.0	1.4	4.9	42.3	32.7	32.3	6.3	0.0	0.6	0.0	120.6
Total (million USD)	0.0	2.8	13.1	115.8	91.6	93.6	18.5	0.1	1.8	0.0	337.2

Source: JICA Study Team

Note: Project cost consists of construction cost and DD/SV cost.

(2) Standard Conversion Factor

For the economic analysis, all project costs and benefits need to be valued at their opportunity costs to the economy. A standard conversion factor (SCF) was prepared accordingly as a compatible tool to convert financial prices to economic prices.

For economic analysis, project cost is divided into tradable goods or non- tradable goods, and corresponds to foreign and local currency respectively. Economic price of non-tradable goods is calculated using the following SCF.

$$SCF = \frac{I + E}{(I + Di) + (E - De)}$$

Where,

SCF: Standard Conversion Factor,
I: Imports in C.I.F. price,
E: Exports in F.O.B. price,
Di: Import Duties, and
De: Export Duties

Based on the above formula and the following figures in the table, average SCF of Tanzania has been calculated at 0.933 for the last five years. For economic evaluation, SCF is applied to domestic portions of project cost to be converted to border price.

Table 9.1.2 Trade and Duties of Tanzania

	2010	2011	2012	2013	2014
Export of goods and services (billion TZS)	8,218	10,952	13,076	12,524	15,477
Export duties (million TZS)	0	0	0	0	0
Import goods and services (billion TZS)	12,769	19,015	20,342	22,045	23,747
Import duties (billion TZS)	1,670	1,980	2,176	2,492	2,826
SCF	0.926	0.938	0.939	0.933	0.933

Source: JICA Study Team prepared based on World Development Indicators (World bank) and Tanzania Revenue Authority

(3) Operation and Maintenance Cost

Annual routine and periodic maintenance cost is estimated for both the road section and Kikafu Bridge as described in Chapter 8 and is summarized in following table[1].

Table 9.1.3 Annual Operation and Maintenance Cost

Elapsed Years	O&M cost (million USD)	Elapsed Years	O&M cost (million USD)	Elapsed Years	O&M cost (million USD)
1	0.22	11	0.22	21	0.22
2	0.22	12	0.22	22	0.22
3	0.22	13	0.22	23	0.22
4	0.22	14	23.32	24	23.32
5	0.53	15	0.53	25	0.53
6	0.22	16	0.22	26	0.22
7	0.22	17	0.22	27	0.22
8	0.22	18	0.22	28	0.22
9	0.22	19	0.22	29	0.22
10	1.87	20	12.83	30	1.87

Note: Operation and maintenance cost includes overlay cost.
Source: JICA Study Team

9.1.2 Project Benefit

As the socio-economic benefits generated with implementation of the project, the following benefits are considered.

(i) Travel time saving by the project. With implementation of the Project, the number of lanes on the New Kikafu Bridge and some road sections such as Tengeru - Usa and Moshi Town will be expanded from the current two lanes to four lanes, with capacity of the road sections also expanded. Increase of road capacity alleviates traffic congestion and driving speed of vehicles is improved consequently. Reduction of travel time saves time related costs of vehicles, passengers and loading commodities on to trucks.

[1] The following table summarizes total maintenance costs of the project by maintenance item/its frequency. Overlay costs include overlay cost and partial cutting overlay cost.

Item	Frequency	Total (million USD)
Routine operation and maintenance		
Routine O&M（inc. repair of pavement）	Every year	0.22
Periodic maintenance (Road)		
Overlay	Based on IRI	18.70
Periodic maintenance (Bridge)		
Periodic inspection	5 years	0.30
Replacement of water proof layer	Same as overlay	1.33
Replacement of expansion joint	15 years	3.07
Repair of PC girder	20 years	7.59
Replacement of PC Cable	75 years	1.09

(ii) Reduction of travel distance by construction of new Kikafu Bridge. The New Kikafu Bridge will provide about a 2km shorter bypass, in comparison to the existing route at/around Kikafu Bridge. Reduction of travel distance saves fuel and other distance related vehicle costs.

(iii) Road user cost saving by road surface improvement. Road user costs including vehicle operating costs and time related costs are affected by the condition of road surface. Thus, using HDM-4 model, reduction in road user costs is anticipated.

(1) Time and distance related benefits

Travel time saving and travel distance reduction is calculated by vehicle-wise, vehicle-km and vehicle-hour with/without the project. Vehicle-km and vehicle-hour are calculated by traffic assignment of forecasted future traffic volume with /without the project road network. Travel time saving and reduction of distance travelled are converted to generalized cost by time-value and VOC as shown in the following table. Time value and VOC are based on the F/S in 2011 and updated to 2015 price by GDP deflator.

Table 9.1.4 Time-value and VOC in 2015

	Motorcycle	Passenger Cars	Small Buses	Large Buses	Light Trucks	Medium Trucks	Trailers
Time Related VOC (USD / vehicle-hour)	1.66	6.63	18.71	45.07	20.72	40.37	86.70
(1) Crew Cost	0.30	0.72	6.16	9.96	5.81	9.11	9.68
(2) Passenger Cost	0.73	4.26	8.40	22.61	0.00	0.00	0.00
(3) Vehicle Opportunity Cost	0.63	1.65	4.15	12.50	3.78	14.79	42.13
(4) Time Value of Loading Commodity	0.00	0.00	0.00	0.00	9.00	13.10	28.15
Distance Related VOC (USD / vehicle-1,000 km)	31.7	321.5	242.9	401.6	268.6	519.1	1,021.6
(5) Fuel Cost	12.9	99.6	131.4	153.5	125.0	210.8	435.3
(6) Oil Cost	1.0	2.2	2.2	5.0	2.8	5.4	5.8
(7) Tire Cost	2.8	10.8	10.8	37.0	23.5	90.1	188.0
(8) Depreciation Cost	12.1	179.7	76.4	169.6	92.9	165.6	299.6
(9) Sub Total (5)-(8)	28.8	292.3	220.8	365.1	244.2	471.9	928.7
(10) Overhead Cost, 10% of (9)	2.9	29.2	22.1	36.5	24.4	47.2	92.9

Source: JICA Study Team

With regard to the time value of loading commodity, time value is re-calculated using the following formula. A concept of this formula is that the money saved due to transport time reduction can be reinvested due to early delivery of the cargo.

$$OC = \frac{Vc}{Wc} \times Lw \times Ir$$

Where,

OC: Opportunity Cost of Cargo per Truck,

Vc: Value of Cargo,

Wc: Weight of Cargo,

Lw: Average Gross Loading Weight per Truck, and

Ir: Interest Rate (short-term prime lending rates of banks).

Based on the trade volume and value of Tanzania in 2014 by UN Comtrade database, value of

commodity per ton is calculated as shown in the table below. Average loading weight by type of commodity and truck is calculated using the results of the road side truck interview survey carried out in JICA (2014) Comprehensive Transport and Trade System Development Master Plan in Tanzania.

Table 9.1.5 Value of Commodity and Loading Average Net Loading Weight by Type of Truck

HS Code	Description of Commodity	Loading Commodity USD/ton	Average Net Loading Weight (ton per truck)		
			Light Truck (2 Axles)	Heavy Truck (3+ Axles)	Trailers
01-05	Animal & animal Products	2,939	3.4	-	21.6
06-15	Vegetable Products	852	4.8	15.2	25.7
16-24	Foodstuffs	995	7.1	10.8	22.6
25-27	Mineral Products	681	5.1	9.6	24.8
28-38	Chemical & Allied Products	1,700	10.9	9.5	25.1
39-40	Plastics Rubbers	1,897	5.0	6.0	15.3
44-49	Raw Hides, Skins, Leather & Furs	1,353	4.5	1.5	23.8
50-63	Wood & Wood Products	814	5.1	18.0	15.6
64-67	Textiles	1,467	2.9	-	22.8
68-71	Footwear / Headgear	1,759	8.8	13.3	23.1
72-83	Stone / Glass	3,695	5.0	17.9	22.6
84-85	Metals	1,216	3.5	4.5	12.0
86-89	Machinery / Electrical	6,517	-	-	19.0
90-97	Transportation	3,710	6.9	9.4	19.8
98-99	Miscellaneous	3,448	-	17.0	28.0

Source: JICA Study Team

As the short-term interest rate, overnight rate indicated in following table is applied. Average interest rate between December 2013 and December 2014 is 8.39%.

Table 9.1.6 Interbank Cash Market Rates

Year	Month	Overnight (%)
2013	Dec	8.26
2014	Jan	11.43
	Feb	6.53
	Mar	5.45
	Apr	6.93
	May	6.94
	Jun	10.43
	Jul	14.35
	Aug	10.43
	Sep	4.34
	Oct	8.29
	Nov	9.67
	Dec	11.66
Average		8.39

Source: Monthly Economic Review (January 2015), Bank of Tanzania

Opportunity cost of cargo per truck is computed and adjusted to the 2015 price by the GDP deflator of Tanzania as shown in following table. According to the traffic survey in the MP, empty truck ratio is 19.1% (2 axles rigid truck), 20.5% (3 and more axles rigid truck) and 19.3% (semi/full trailers), therefore, gross opportunity costs are reduced. A time value of loading commodity per truck is applied to gross opportunity cost of cargo per truck.

Table 9.1.7 Time Value of Loading Commodity by Truck

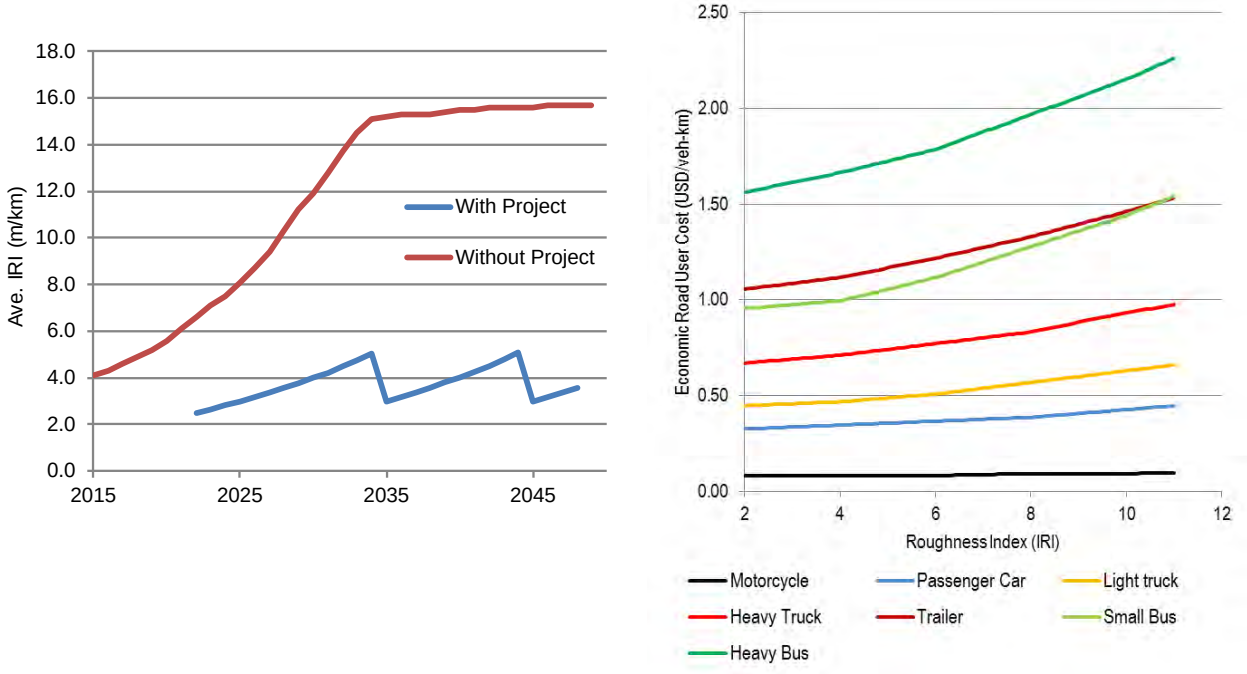
Type of Truck	Opportunity cost of Cargo (USD/hour per truck)	
	Net (excl. empty truck)	Gross (incl. empty truck)
Light Truck (2 Axles)	11.13	9.00
Heavy Truck (3+ Axles)	16.47	13.10
Trailer (Trailer)	34.89	28.15

Source: JICA Study Team

(2) Road condition related benefit

For estimation of the benefit generated by improvement of road pavement by the project, deterioration of pavement and road user cost by IRI are formulated as shown in following figures based on annual IRI computed by HDM -4 and HDM Road User Cost Model.

For the forecast of IRI by HDM4, various input data are required. For the road network, link length is actual road length by link, pavement and environmental conditions as the inter-state arterial road are defined by adequate values based on samples of HDM4. Forecasted traffic volume by road link and type of vehicle also input to HDM4. Vehicle weight by type of vehicle also required and defined by actual vehicle weight. Pavement structure type including CBR is also selected based on samples of HDM-4, referring to the pavement design explored in Chapter 5. HDM4 estimates future IRI based on given conditions by road link, and weighted average IRI by link length is employed as average IRI. Estimated IRI is adjusted to 2.5 at just completion of the project, and 3.0 for year of overlay.



Source: JICA Study Team

Figure 9.1.1 IRI of with/without Project (left) and Road User Cost in 2015 price (right)

9.1.3 Evaluation Criteria

As indicators of the economic feasibility of the project, the followings are calculated.

(1) Economic Internal Rate of Return (EIRR):

The EIRR is calculated as the rate of discount for which the present value of the net benefit stream becomes zero, or at which the present value of the benefit stream is equal to the present value of the cost stream. For a project to be acceptable the EIRR should be greater than the economic opportunity cost of capital.

$$\sum_{t=0}^{n} \frac{B_t - C_t}{(1+r_i)^t} = 0$$

where,

n: Evaluation period,

Bt: Benefit at year "t",

Ct: Cost at year "t", and

ri: EIRR.

(2) Net Present Value (NPV)

The difference between the present value of the benefit stream and the present value of the cost stream for a project. The net present value calculated at the discount rate should be greater than zero for a project to be acceptable.

$$NPV = \sum_{t=0}^{n} \frac{B_t - C_t}{(1+r)^t}$$

where,

n: Evaluation period,
B_t: Benefit at year "t",
C_t: Cost at year "t", and
r: Discount rate.

(3) Benefit Cost Ratio (BC Ratio)

The ratio of the present value of the economic benefit stream to the present value of the economic costs stream, each discounted at the economic opportunity cost of capital. The ratio should be greater than 1.0 for a project to be acceptable.

$$BCRatio = \frac{\sum_{t=0}^{n} \frac{B_t}{(1+r)^t}}{\sum_{t=0}^{n} \frac{C_t}{(1+r)^t}}$$

where,

n: Evaluation period,
B_t: Benefit at year "t",
C_t: Cost at year "t", and
r: Discount rate.

9.1.4 Assumption of Economic Evaluation

(1) With Project and Without Project

In the Benefit-Cost Analysis, two scenarios, "With Project" and "Without Project" are assumed in order to evaluate the proposed Arusha-Holili Road. Through comparison of these two scenarios, it is evaluated whether or not the benefit of savings in transport costs "With project" can recover

the costs of the proposed project in view of the national economy.

"With Project" is defined as a four lanes for Tengeru – Usa River, Kikafu Bridge and Moshi Town (two lanes for other road section).

(2) Implementation Schedule and Project Life

The Project life is considered to be 30 years after the opening of Arusha-Holili Road to the public in 2022, which will take it to 2051 and it is expected that there will be six-year design/construction period from 2016.

(3) Discount Rate

The discount rate is established at 12%, the same figure applied to the previous F/S in 2011.

9.1.5 Results of Economic Evaluation

Based on the above assumptions, an economic analysis was conducted and results are shown in the following table. The EIRR is calculated at 23.1% and NPV is 455.6 million USD. As a result, the project is evaluated as economically viable.

Table 9.1.8 Results of Cost Benefit Analysis

EIRR	Net Present Value (million USD)	B/C
23.1%	455.6	3.10

Note: Discount Rate applied to the Study is 12% p.a.
Source: JICA Study Team

Table 9.1.9 Economic Cash Flow

(Unit: USD Million)

	Year	Economic Cost			Economic Benefit				Net	NPV
		Investment Cost	O&M Cost	Total Cost	Distance Saving	Time Saving	Road User Cost Saving	Total	Cash Flow	
	2016	2.70	0.00	2.70				0	-2.70	-2.70
	2017	12.72	0.00	12.72				0	-12.72	-11.36
	2018	112.94	0.00	112.94				0	-112.94	-90.03
	2019	89.37	0.00	89.37				0	-89.37	-63.61
	2020	91.44	0.00	91.44				0	-91.44	-58.11
	2021	18.08	0.00	18.08				0	-18.08	-10.26
1	2022	0.11	0.22	0.33	1.66	0.30	26.73	28.70	28.37	14.37
2	2023	1.72	0.22	1.94	3.54	0.09	64.74	68.38	66.44	30.05
3	2024	0.00	0.22	0.22	3.77	0.14	75.71	79.62	79.40	32.07
4	2025	0.00	0.22	0.22	4.01	0.21	90.69	94.92	94.70	34.15
5	2026	0.00	0.53	0.53	4.27	0.32	109.75	114.35	113.82	36.65
6	2027	0.00	0.22	0.22	4.54	0.50	135.72	140.76	140.55	40.40
7	2028	0.00	0.22	0.22	4.84	0.76	169.25	174.84	174.63	44.82
8	2029	0.00	0.22	0.22	5.15	1.16	200.35	206.66	206.44	47.31
9	2030	0.00	0.22	0.22	5.48	1.78	207.42	214.68	214.46	43.88
10	2031	0.00	1.87	1.87	5.83	2.72	214.08	222.63	220.76	40.33
11	2032	0.00	0.22	0.22	6.21	4.16	218.33	228.69	228.47	37.27
12	2033	0.00	0.22	0.22	6.61	6.36	225.01	237.97	237.75	34.63
13	2034	0.00	0.22	0.22	7.03	9.73	228.90	245.66	245.44	31.92
14	2035	0.00	23.32	23.32	7.48	14.89	288.05	310.42	287.10	33.33
15	2036	0.00	0.53	0.53	7.94	15.67	284.68	308.28	307.76	31.90
16	2037	0.00	0.22	0.22	8.42	16.49	282.98	307.90	307.68	28.48
17	2038	0.00	0.22	0.22	8.94	17.36	279.59	305.88	305.66	25.26
18	2039	0.00	0.22	0.22	9.48	18.27	276.17	303.92	303.70	22.41
19	2040	0.00	0.22	0.22	10.06	19.23	271.01	300.30	300.09	19.77
20	2041	0.00	12.83	12.83	10.68	20.24	262.32	293.24	280.41	16.49
21	2042	0.00	0.22	0.22	11.33	21.30	256.46	289.09	288.87	15.17
22	2043	0.00	0.22	0.22	12.02	22.42	247.56	282.01	281.79	13.21
23	2044	0.00	0.22	0.22	12.75	23.60	238.68	275.03	274.81	11.51
24	2045	0.00	23.32	23.32	13.53	24.84	288.05	326.42	303.10	11.33
25	2046	0.00	0.53	0.53	14.36	26.14	284.68	325.18	324.65	10.84
26	2047	0.00	0.22	0.22	15.24	27.52	282.98	325.74	325.52	9.70
27	2048	0.00	0.22	0.22	16.17	28.96	279.59	324.71	324.49	8.63
28	2049	0.00	0.22	0.22	17.15	30.48	276.17	323.81	323.59	7.69
29	2050	0.00	0.22	0.22	18.20	32.09	271.01	321.30	321.08	6.81
30	2051	0.00	1.87	1.87	19.31	33.77	262.32	315.40	313.53	5.94

EIRR	23.1%
NPV	455.6
B/C Ratio	3.10

Discount Rate = 12%

Source: JICA Study Team

9.1.6 Results of Sensitivity Analysis

A sensitivity analysis is carried out with the following two assumptions: (i) traffic demand along the project road decreases by 10% and 20% and (ii) initial investment cost (construction cost) of the project road increases by 10% and 20%. The results of the sensitivity analysis, as summarized in the following table, even in most unfavourable case for investment of the project road (20% less traffic demand and 20% increase in construction cost) the EIRR is calculated at 18.7% and NPV is 278.8 million USD. As a result, the project is evaluated as strongly economically viable.

Table 9.1.10 Result of Sensitivity Analysis

EIRR		Construction Cost	
		Increase by 10%	by 20%
Traffic Demand	Decrease by 10%	20.9%	19.9%
	by 20%	19.6%	18.7%

NPV (million USD)		Construction Cost	
		Increase by 10%	by 20%
Traffic Demand	Decrease by 10%	367.2	346.1
	by 20%	300.0	278.8

B/C		Construction Cost	
		Increase by 10%	by 20%
Traffic Demand	Decrease by 10%	2.54	2.34
	by 20%	2.26	2.08

Source: JICA Study Team

9.2 Quantitative Effect

Quantitative effects expected by the projects are summarized in following table.

Table 9.2.1 Quantitative Effects by the Project

Link ID and Name		Link Length (km)		Base Line in 2015			Target in 2024 with project (3 years later of completion)		
		in 2015	in 2024	Traffic Volume		Ave. Speed	Traffic Volume		Ave. Speed
				Veh./ day	PCU / day	(km/h)	Veh./ day	PCU / day	(km/h)
515	TENGERU - USA WEST	17.30	17.30	12,287	15,640	15.5	18,400	23,000	41.8
512	USA WEST - USA EAST	1.39	1.39	9,429	12,213	25.3	13,800	17,500	46.1
510	USA EAST - KIA JCT (KILIMANJARO / ARUSHA BDR)	22.48	22.48	6,544	8,737	50.0	9,300	12,200	38.2
505	KIA JCT (KILIMANJARO / ARUSHA BDR)- BOMANGOMBE	10.58	10.58	5,296	7,010	56.0	9,500	12,300	37.7
500	BOMANGOMBE - KWASADALA	3.00	3.00	7,044	9,256	48.3	10,100	13,100	35.2
495	KWASADALA -KMT (KILIMANJARO MACH. TOOLS)	8.91	6.76	7,044	9,256	48.3	12,300	15,900	25.5
490	KMT (KILIMANJARO MACH. TOOLS) KIBOSHO RD JCT	7.60	7.60	8,793	11,502	27.3	13,800	17,700	9.6
485	KIBOSHO RD JCT - MOSHI	5.14	5.14	10,452	12,674	24.0	16,300	19,400	44.6
480	MOSHI - KIBORILONI	2.32	2.32	15,524	18,618	7.1	24,500	28,800	37.1
475	KIBORILONI - SANGO	7.00	7.00	7,285	9,776	46.5	9,800	13,000	35.5
470	SANGO - KAWAWA	3.43	3.43	7,285	9,776	46.5	9,800	13,000	35.5
465	KAWAWA - UCHIRA	3.73	3.73	7,285	9,776	46.5	9,800	13,000	35.5
460	UCHIRA - HIMO JCT	5.74	5.74	7,285	9,776	46.5	9,800	13,000	35.5
2220	HIMO JCT - HIMO	3.55	3.55	5,480	6,892	56.4	7,600	9,500	47.6
2225	HIMO - KILACHA	2.26	2.26	1,804	2,198	72.5	3,500	4,200	65.7
2230	KILACHA - TARAKEA JCT	5.03	5.03	1,804	2,198	72.5	2,600	3,200	69.1
2233	TARAKEA JCT - HOLILI CUSTOMS (TANZANIA/KENYA BDR)	3.82	3.82	1,420	1,680	74.2	2,700	3,100	69.4
	Weighted Average			7,524	9,760	32.2	11,300	14,400	32.4

Source: JICA Study Team

CHAPTER 10 CONCLUSION AND RECOMMENDATION

10.1 Conclusion

The Study aims at confirming the feasibility of the road improvement project between Tengeru and Holili and the access road to Kilimanjaro International Airport, as well as conducting supplementary studies to fulfil requirements set to meet the JICA financial support criteria. As a result, during the course of reviews on previous F/S and traffic, environment and engineering analysis in the Study, the following points were concluded and with which both Tanzania and Japanese parties agreed in the course of consultative meetings during the Fact Finding and Pre-Appraisal Missions of the Project.

(a) Traffic Demand

Based on the traffic survey and comprehensive traffic demand forecast, the traffic volume along the project road is projected to increase at around 6% to 7% per annum between 2015 and 2035. A large number of traffic is projected between Tengeru and Usa and Moshi Town where the projected traffic demand exceeds 20,000 PCU/day in 2025 and 40,000 PCU/day in 2035.

(b) Dual Carriageway Sections

Both parties agreed that dual carriageway would be accommodated; (i) between Tengeru and Usa (9.3km), (ii) new Kikafu Bridge (4.0km), (iii) Moshi Town (8.6km), totalling to 21.9km, based on a multi criteria analysis considering investment cost, environment, commencement of the Project, and traffic demand forecast. The remaining sections should remain as a single carriage way until traffic demand increases and level of service of the project road worsens to an unsatisfactory level.

(c) Bridge Type for New Kikafu Bridge

Two bridge types for the main span of the new Kikafu Bridge, namely Pre-stressed Concrete (PC) Extradosed Bridge and Steel Tied Arch Bridge, were selected as optimum bridge types through multi criteria analysis. During the Fact Finding Mission in December 2015, Tanzania side expressed their preference for the PC Extradosed Bridge mainly due to its maintenance free nature and both parties agreed that PC Extradosed Bridge is selected as an optimum bridge type for new Kikafu Bridge.

(d) Cross Sectional Option for New Kikafu Bridge

A parallel two-lane single bridge for new Kikafu Bridge was presented as a cross sectional option, demonstrating its advantages in terms of early opening to the traffic and traffic safety. Tanzania side expressed their preference for an integrated four-lane dual bridge due to its lower construction cost and both parties agreed that the integrated four-lane dual bridge be selected for the cross sectional option of new Kikafu Bridge.

(e) Superstructure Options for New Kikafu Bridge

PC upper and lower decks with a corrugated steel web and composite trussed web were presented

as optional superstructures for the new Kikafu Bridge, demonstrating its advantages in terms of reduction in dead weight which contributes to a cost-saving foundation. Tanzania side expressed their preference for and both parties agreed to the standard PC box as an optimum superstructure for new Kikafu Bridge, due to inferior quality assurance of the joints of the concrete decks and steel web as well as higher technical capacity in maintenance of the steel required for the said optional superstructures.

(f) Pavement Design

Against the backdrop of pavement failure cases and its ongoing analysis by JICA, the Study recommends not to apply stabilization in construction of base/subbase course and apply granular materials, such as crushed fresh rock and crushed stones. The Superpave mix design method was proposed to replace existing Hveem and Marshall methods. The Superpave mix design ties asphalt binder and aggregate selection into the mix design process, and considers traffic and climate as well.

(g) Environmental Baseline Survey and Possible Environmental Impact

In the course of the Study, a series of environmental baseline surveys were conducted: (i) Roadside Air Quality Survey, (ii) Roadside Noise Survey, (iii) Water Quality Survey, (iv) Preliminary Biological Environmental Study and (v) Socio-Economic Study for potential PAPs. The results of baseline surveys and analysis on adverse impacts caused by the Project implies that, except noise, those environmental items are below both the ambient standard of Tanzania and WHO guideline values, and that the current environmental condition between Tengeru and Holili is in good or acceptable condition. Both parties agreed to monitoring parameters and standards for air quality, water quality, noise and vibration and, soil following the proposed Environmental Monitoring Plan in the Study.

(h) Right-of-Way (RoW) and PAPs

Both parties confirmed that for the purpose of implementation of the Project, a RoW of 60m is for two new bypasses (new Kikafu Bridge with its approach section and section between Himo and Holili) and RoW of 45m is for the existing road section from Tengeru to Kikafu and from Kikafu to Himo. Both parties confirmed that a Corridor of Impact (COI) would be applied to the Project in order to mitigate adverse impact on involuntary resettlement, accordingly, there is no involuntary resettlement within current RoW of 45m. Apart from RoW of 45m for existing road section, there are PAPs (mainly land owners) within RoW of 60m for the new bypass sections, who would be required for compensation.

(i) Project Implementation Plan

Considering the manageable size of the Project, the following four packages are proposed: Package-1: 47.2km Tengeru - West Kikafu and 5.7km KIA Access Road, Package-2: 4.0km West Kikafu –East Kikafu including 560 m Kikafu Bridge, and Roadside Station, Package-3: 50.9km East Kikafu- Holili and Package-4: Safety measure at vicinity of existing Kikafu Bridge.

An implementation plan was prepared under the following assumptions: 9 months for procurement of a detailed design consultant, another 9 months for the detailed design of Package 1 and 3 and 12 months for Package 2 and 4 plus 12 months for tender assistance and 33 months for civil works of Package 1 and 3 and 36 months for Package 2 and 6 months for package 4. Assuming a loan agreement is made in October, 2016, the Project would be completed and open to traffic between mid-2021 (Package 1 and 3) and end-2021 (Package 2).

(j) Project Cost Estimate

Given the following conditions: exchange rate (1 US dollar = 2,192.1 TZS), price escalation rate (FC: 1.6% and LC: 7.6%), physical contingency (construction: 7.5% and consultant: 5%) and VAT (18%), the total project cost was estimated at 549.6 million USD, including a construction cost of 320.9 million USD.

(k) Project Evaluation

Time saving and user cost saving were calculated as economic benefits derived from the Project and project cost was converted to economic costs and distributed annually according to the proposed implementation plan, and all benefits/costs were computed to on a spreadsheet for economic analysis. An economic analysis was conducted and the EIRR is calculated at 23.1% and NPV is 455.6 million USD. As a result, the Project was evaluated as economically viable.

10.2 Recommendation

In order to realize smooth implementation of the Project, there are several recommendations and requirements which need to be fulfilled during the detailed design and implementation stages. A few recommendations are summarized below.

(a) Pavement Design

Pavement design should be reviewed during the detailed design stage based on the latest traffic demand forecast as well as axle load investigation data. A Superpave and/or granular base course applied to the service road and footpath design could be excessive against the standards and that also needs to be reviewed during the detailed design stage. At the same time, availability of crushed fresh rock and crushed stones applied as base/subbase course material should also be confirmed during detailed design stage. Accordingly, further investigations with support from TANROADS laboratory engineers should be necessitated during the detailed design stage.

(b) Roadside Station

A Roadside Station was proposed to be part of the Project and which would be constructed beside the new Kikafu Bridge approach by converting a construction camp yard after of the new Kikafu Bridge. A detailed plan of effective operation and utilization of the Roadside Station should be developed during the detailed design and construction supervision stages.

(c) Overloading Control

During the Pre-Appraisal Mission, Tanzania side expressed their concerns on the issue of overloading control along the project road and both parties agreed that the issue of overloading be addressed and the existing weigh station should be replaced with a newly procured static weigh bridge with a weigh-in-motion system. This is to be installed around 2km west of Himo Junction. Specifications and design of the weigh station, including those of the static weigh bridge and weigh-in-motion system should be prepared during the detailed design stage.

(d) Land Acquisition for Roundabout/Roadside Station/Weigh Station

The Study recommends the installation of roundabouts at several junctions along the project road and these include junctions at KIA, Kikafu and Moshi Town. The Study also recommends to install a new weigh station near Himo Junction and develop a Roadside Station near new Kikafu Bridge. Further investigations should be carried out during the detailed design stage to determine the additional land (and its ownership) to be acquired for these planned roundabouts, Roadside Station and weigh station.

(e) Community Access Road

Community development should be promoted by providing local access roads connecting to the project road which benefits the local communities. In this context, both parties agreed that a certain amount of provisional sum should be secured for each package to provide better access between the project roads and community facilities, such as market, clinic, school, etc. and included as part of the Project in the detailed design stage.

(f) Environmental and Social Consideration

During the detailed design stage, a supplemental socio-economic survey should be conducted to the land owners within RoW of 60m for the new bypass sections, who would be required for compensation. Based on the survey result, RAP should be reviewed and revised, and these land owners should be compensated following the revised RAP.

There is a high possibility that tenants and/or seasonal employees of land owners might lose means of livelihood temporarily or permanently due to land take by the Project. RAP should be reviewed and revised when tenants and/or seasonal employees of land owners are found and mitigation measures should be prepared and taken in order to restore their livelihoods during the course of the Project.