

Mizan-Tepi University

Office of Vice President for Research and Community Engagement Research, Publication Ethics and Dissemination Directorate

Mizan-Tepi University Prioritized Research Thematic Areas

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Contents

1.	Background	
2.	Prioritized Research Thematic Areas of Mizan-Tepi University	
3.	Descriptions of the Prioritized Research Thematic Areas Theme 1: Agricultural Development	
•	Subtheme 1.1. Improving Crop and Livestock Productivity	
	Subtheme 1.2. Forest, Biodiversity Conservation and Climate Change Mitigation	4
	Subtheme 1.3. Food Security and Livelihood	4
	Subtheme 1.4. Agricultural Extension and Agribusiness	4
	Subtheme 1.5. Agricultural Mechanization	4
1	Theme 2: Health and Life Science	5
	Subtheme 2.1. Nutrition, Food Safety and Policy	5
	Subtheme 2.2. Infectious Diseases, Drug Resistance and Global Health	5
	Subtheme 2.3. Non-communicable Disease, Mental Health and Rehabilitative Health Services	6
	Subtheme 2.4. Environmental and Occupational Health	6
	Subtheme 2.5. Reproductive, Sexual, Maternal, Newborn and Child Health	6
	Subtheme 2.6. Pharmaceutical Sciences	7
	Subtheme 2.7. Healthcare Service Delivery: Equity, Quality and Financing	7
1	Theme 3: Manufacturing, Geo-science and Digital technology	7
	Subtheme 3.1: Manufacturing	8
	Subtheme 3.2. Mining and Geo-Science	9
	Subtheme 3.3. Soil, Water and Energy	11
	Subtheme 3.4. Digital Technology	12
T	Theme 4: Culture and Tourism Development	13
	Subtheme 4.1. Tourism resources	14
	Subtheme 4.2. Culture and its development	14
	Subtheme 4.3. Tourism Development and Management	14
	Subtheme 4.4. Tourism Marketing and Sustainability	15
	Subtheme 4.5. Welfare, livelihood and business development	15
T	Theme 5: Education and Governance	16
	Theme 5.1: Education Road-Map (curriculum)	16
	Theme 5.2. Teaching, learning and assessment methods and outcomes	16
	Theme 5.3. Access and Equity	17
	Theme 5.4. Governance, Leadership, and Management	17

Theme 5.5. Media and Communication	17
Theme 5.6. Peace and Security	18
4. Key Performance Indicators for the Strategic Goals	19
4.1. Promote Quality, Relevant and Problem-Solving Research	19
4.2. Enhance Collaboration, Partnership and Networking	20
4.3. Improve Research Facilities and Knowledge Management System	21

1. Background

In Ethiopia, research has been conducted on various disciplines in different institutions for the few decades. However, the contribution of the research outputs to the national economy and societal well-being is below the expected level. A consensus study by the Ethiopian Academy of Sciences (EAS) shows that research activities are inadequately funded and not properly integrated into the national socio-economic development issues. Further, researchers lack a multidisciplinary perspective to solve the complex socio-economic and political problems of the country (NRS-MoE, 2021). The same source also explains that this is because the structure and arrangement of research thematic areas lack integrated approach and are disintegrated into more disciplines that do not give a chance for a systemic approach. Research undertakings in Ethiopia are also characterized by a lack of strong research institutions, a lack of proper research management system, lack of reward for researchers including lower salaries. These limitations partly emanate from a lack of coherent national research policy and strategy.

Therefore, research undertakings at the national level need to be prioritized, thermalized, properly financed, integrated and streamlined to feed into the development endeavors (NRS-MoE, 2021). Thematic Research is a broad grouping of areas of research with an overarching goal addressing a priority national problem. It is a cooperative research program designed to address issues of broader context and scope than possible with individually initiated and conducted research projects that extend from knowledge to usable technology creation (Masresha, 2024).

2. Prioritized Research Thematic Areas of Mizan-Tepi University

Mizan-Tepi University (MTU) is striving hard to realize its vision of becoming one of the leading universities in Ethiopia by 2030. Several activities geared towards this target and aligned with our country's development priorities are being undertaken. Alongside the teaching duties, MTU is working aggressively on research and community engagements, focusing on projects geared towards solving society's problems. Sustainable environment, integrated agrobiodiversity conservation and utilization, indigenous knowledge and community health are at the

heart of our research operations. Our motto, Light of the Green Valley, is meant to galvanize such green initiatives. Through the various strategic cooperation platforms, the university is also actively working on diverse areas and projects.

In 2022 MoE issued a National Research Strategy document including topics for Research priority areas. It is presumed that all university priorities stem from these documents. The prioritized research thematic areas of MTU are therefore based on the key research priorities indicated in these documents. The main problems of the community identified in the thematic areas of MTU are also considered while preparing this document. This is because problem identification is the major pillar of any thematic research. Accordingly, five major prioritized research thematic areas have been identified and/or suggested. These include:

- (1) Agricultural Development
- (2) Health and Life Sciences
- (3) Manufacturing, Geo-Science and Digital technology
- (4) Culture and Tourism development
- (5) Education and Governance

3. Descriptions of the Prioritized Research Thematic Areas

This document presents a detail description of the four major prioritized research thematic areas that have been identified or suggested earlier. It also enlists sub-themes in each theme and provides researchable issues or areas on each of the sub-themes. Yet, it would be good to note that other thematic areas are not covered in this document. Details of the major prioritized research thematic areas of MTU are outlined as follows.

Theme 1: Agricultural Development

In this main theme, seven national research thematic area priorities have been identified in the 2022 MoE document. Hence, here in the context of MTU, this theme aims to work on the following sub-themes and researchable issues or areas, but is not limited to:

- Crop and Livestock Productivity Enhancement
- o Forest, biodiversity and Climate Change
- Agricultural Mechanization
- Agricultural Extension and Agribusiness
- o Food Security and Livelihood
- o Promoted sustainable product utilization; natural resources conservation and management

Subtheme 1.1. Improving Crop and Livestock Productivity

- Enhancing crop productivity: Increasing crop productivity through improved planting materials, pest and disease control mechanisms, soil fertility improvement strategies, mechanized farming technology
- Improvement of horticulture crops productivity (fruits and vegetables, root and tuber crops, spices and herbs and medicinal plants, stimulant plants like coffee and tea) appropriate mechanisms for ensuring food security and livelihood improvement
- Integrated agro-biodiversity conservation and utilization: Investigation towards conservation of endangered indigenous crop species.
- o Improving the livelihoods of pastoral and agro-pastoral communities through animal genetic resource improvement, strategies to noble feed and nutrition, Livestock product quality and safety, animal health improvement and disease control, nutritional quality enhancement and diversified agricultural practices mechanisms

Subtheme 1.2. Forest, Biodiversity Conservation and Climate Change Mitigation

- Mechanisms for reestablishing or restoration of degraded landscapes, forest and biodiversity conservation for ensuring livelihoods, wildlife management for ecotourism attraction, climate change mitigation and adaptation measures for climate change responses.
- Mechanisms for watershed development and management, integrated soil fertility and nutrient management such as management of problematic soils (Acidity, alkalinity, salinity, sodicity, vertisol, etc.) to support diversified agricultural productivity

Subtheme 1.3. Food Security and Livelihood

- Approaches for diversification of food production systems (aquaculture, crop-livestock production and non-timber forest products) to ensure food and nutrition security and enhance marketing value.
- Postharvest loss minimization through applications of innovative post-harvest technology and management

Subtheme 1.4. Agricultural Extension and Agribusiness

 Mechanisms For Marketing, Agribusiness and Enterprise Development (Value Chain Analysis, Small, Medium and other Agribusiness Development, etc.)

Subtheme 1.5. Agricultural Mechanization

- Design and prototyping of farm implements (tillage equipment, planter, harvester, sprayer, thresher, cleaner, storage, etc.)
- Design and prototyping of livestock production and product processing technologies

Theme 2: Health and Life Science

In this main theme, nine national research thematic area priorities have been identified in the 2022 MoE document. Hence, here this theme aims to work on the following sub-themes and researchable issues or areas, but is not limited to:

- Nutrition, Food Safety and Policy
- o Infectious Diseases, Drug Resistance and Global Health
- Non-Communicable Disease, Mental Health and Rehabilitative Health Services
- o Environmental and Occupational Health
- o Reproductive, Sexual, Maternal, Newborn and Child Health
- Pharmaceutical Sciences
- Healthcare Service Delivery: Equity, Quality and Financing

Subtheme 2.1. Nutrition, Food Safety and Policy

- Approaches to Solve the Nutritional Problems including Malnutrition, Micronutrient
 Deficiencies, and Prevention and Treatment of malnutrition at all levels giving Particular
 attention to developing effective strategies for nutrition interventions during pregnancy,
 lactation, early infancy, childhood, and adolescence.
- Mechanisms for improving dietary practice of the community, food safety and quality,
 together with monitoring toxic chemicals such as pesticide residues, and heavy metals.

Subtheme 2.2. Infectious Diseases, Drug Resistance and Global Health

- Strategies for Integrated Prevention and Control of Malaria, HIV, TB, Hepatitis B virus
 and Other infectious Diseases in southwest Ethiopia
- o Mechanisms to reduce drug-resistant pathogens, and reinfection of infectious disease

Subtheme 2.3. Non-communicable Disease, Mental Health and Rehabilitative Health Services

- Investigations on epidemiological patterns, diagnosis, prevention, and follow-up, to design control strategies for common emerging non-communicable human health problems to improve quality of life
- Designing Strategies to reduce mental health problems and substance use

Subtheme 2.4. Environmental and Occupational Health

- Designing Strategies reduce the health effects of populations when exposed to environmental hazards (air and water pollution, pesticides, organic solvents, dust, and physical hazards)
- Mechanisms for the provision of safe water supply, management of wastes, prevention and control of communicable diseases, zoonotic diseases and vector control, improving housing conditions, and occupational health and hygienic practices as well as safe working conditions.
- o Studies related to environmental health and safety standards, policies and regulations.

Subtheme 2.5. Reproductive, Sexual, Maternal, Newborn and Child Health

- O Approaches to improve Reproductive and sexual health issues with a particular focus on women, children, and adolescents and maternal health problems associated with preconception care, pregnancy and childbirth, nutrition and hygienic practices during pregnancy and lactation.
- Mechanisms to reduce maternal & neonatal mortality, maternal and gynecological medical disorders, congenital anomalies & under five child disease

 Strategies for controlling harmful traditional practices on young people, women, and children and gender-based violence (GBV) and means for male partner involvement in maternal health services utilization.

Subtheme 2.6. Pharmaceutical Sciences

- Designs for identifying a compound from various sources such as from medicinal plants that is therapeutically useful in curing and treating diseases.
- Mechanisms for ensuring the safety, efficacy and quality of locally produced traditional medicines and evaluating the standards and regulations of traditional healer practices.
- o Investigation of pharmaceutical care, treatment outcomes and rationality
- Effective utilization of traditional medicine through integrated scientific and Indigenous knowledge

Subtheme 2.7. Healthcare Service Delivery: Equity, Quality and Financing

 Approaches for the equity of healthcare services and problems related to service organization, leadership and use of digital health solutions and policies towards attaining a standard of healthcare delivery.

Theme 3: Manufacturing, Geo-science and Digital technology

In this theme, three main national research themes are included. For each of these themes, a wide range of national research priorities have been identified in the 2022 MoE document. Hence, in our context, this theme aims to work on the following main/sub-themes and researchable issues or areas, but is not limited to:

Manufacturing

- Creating Modern Farm and Agro-Processing Tools
- Product/Technology Development

Mining and Geo-Science

- Applied and Innovative Geoscience Research
- Earth resources exploration, extraction and processing
- Mining Impact and Geo-hazard Risk Management
- Soil, Water and Energy

o Digital Technology

- o Artificial Intelligence for Social Good
- Telecommunications
- IT Infrastructure
- Digital Economy and Inclusion

Subtheme 3.1: Manufacturing

- O Integrating research with indigenous knowledge for sustainable development of community: Research on designing and producing cost-effective, efficient farm tools like corn threshers, milk processing machines, cattle monitoring devices, and pans tailored to the specific needs of rural communities. Emphasis is placed on creating accessible and affordable technologies that support local employment programs & improve productivity.
- Enhancing Agricultural Productivity and Environmental Sustainability by Designing and Manufacturing Agricultural Machinery and Implements for Creating Modern Farming and Agro-processing tools.
- Studies focused on developing new technologies to optimize mechanized farming practices and improve irrigation systems. This includes research into innovative tools, machinery, and techniques that enhance resource management, productivity, and sustainability in agriculture.
- Integrating Research and Indigenous knowledge for Innovation, Relevant Technology
 Adaptation, Development and Transfer to the community for sustainable development.

Studies related to technology development to enhance agricultural mechanization and irrigation water management. Investigations that focus on the development of new products/processes/technology and/or Modification/improvement /adaptation of existing technology

- i) Infrastructure and Innovative Construction Solutions
- ii) Construct a durable and adaptable infrastructure that supports agriculture, construction, and mining. This includes the development of roads, storage facilities, and transport systems that can withstand environmental pressures.

Subtheme 3.2. Mining and Geo-Science

- Exploration of Geophysics and Geodynamics: Analyzing geological and tectonic settings in Southwest Ethiopia to discover mineral deposits.
- Earth System Geochemistry Studies: Investigating physical and chemical properties of the earth's surface and interior to postulate new models for understanding crust dynamics.
- Integrating geoscientific methods and innovative technologies to address challenges in mineral exploration, environmental sustainability, geo-hazard mitigation and infrastructure development.
- o Enhance infrastructure development, resource management, and environmental protection through geospatial and geotechnical insights; utilizing geoscience data to improve site assessment such as buildings, roads, bridges, and dams. Also focus on soil and rock mechanics, seismic hazard assessment, and ground stability analysis to inform safe and sustainable infrastructure design.
- o Identification of Potential Mineral Resources: Focusing on minerals like Gold and charcoal in Southwest Ethiopia, evaluating the region's suitability for small-scale mining.

- Valuable Earth Resources Discoveries: Research on industrial minerals, construction stones, coal, petroleum, and other precious minerals for industrialization and export.
- Mineral Processing Technology Optimization: Developing new techniques to enhance mineral quality, promote cost-effective and eco-friendly extraction methods, and improve processing technologies.
- Mining Management Systems and Policy Assessment: Studies on mineral quality,
 standardization, policy evaluation, and strategic planning for the mining sector.
- Sustainable Mining and Resource Extraction: Investigating the geoscientific aspects of mining and resource extraction, with a focus on minimizing environmental impact. This includes the study of soil erosion, water contamination, and land degradation caused by mining activities and the development of mitigation strategies.
- Environmental and Socio-economic Impacts of Mining: Investigation of the impact of mining activities, and management of geo-hazard risks.
- Geological and Environmental Factors in Landslides: Utilizing advanced geological and technological methods to prevent and mitigate landslides in Southwest Ethiopia.
- o Impact of Mining Activities on Infrastructure: Evaluating the effects of mining on civil infrastructure such as roads, bridges, and buildings. This includes studying how mining operations may lead to soil erosion, foundation instability, and water contamination.
- o Early Warning Systems and Disaster Preparedness for Flood Management: This focuses on evaluating the effectiveness of early warning systems for floods, looking at how these systems help communities prepare and respond.
- o The Socioeconomic Impacts of Flooding and Flood Management Strategies; this theme would focus on the socioeconomic consequences of flooding, such as displacement,

property loss, and economic disruptions, as well as the effectiveness of flood management strategies.

Subtheme 3.3. Soil, Water and Energy

- Analysis of Mineral Components in Drinking Water: Studying water quality to control waterborne diseases.
- o Innovative Drainage Design Solutions: Developing strategies for urban water management, waste disposal, and drainage systems.
- Power Generation Studies: Exploring hydropower, solar power, biogas, and sustainable energy solutions.
- Watershed Management for Soil and Water Conservation: Integrated approaches to managing watersheds to reduce erosion, enhance water storage, and improve agricultural productivity.
- Soil Erosion Control and Land Rehabilitation: Developing engineering solutions for soil conservation, erosion prevention, and land reclamation in degraded areas.
- Impact of Land Use Changes on Watershed Hydrology: Assessing how urbanization, deforestation, and agricultural practices influence hydrological cycles in watersheds.
- Water Quality Management iloooo--n Watersheds: Techniques to monitor and improve water quality through controlled agricultural practices and pollution mitigation.
- Advancing Renewable Energy Technologies and Transfer: Design, optimization, and implementation of solar, wind, bioenergy, hydropower, and geothermal systems. Assess renewable energy resource potential and develop innovative technologies for communitylevel applications.
- Enhancing Energy Efficiency and Storage Systems: Develop energy-efficient materials
 and optimize industrial and building processes to reduce consumption. Innovate energy
 storage solutions, including battery and thermal storage systems, for reliable energy
 access. Implement smart grid technologies and load management systems for efficient
 energy use.
- Hydropower and Water Management Systems: Developing efficient methods for harnessing hydropower in water resource management, focusing on the design of

sustainable dams, reservoirs, and water diversion systems. This includes optimizing energy production while maintaining ecological balance and water availability for agriculture, industry, and domestic use.

Subtheme 3.4. Digital Technology

- Exploring and Analyzing Recent Advancements in Artificial Intelligence (pattern recognition, detection, prediction, optimization and hypothesis testing) in revolutionizing healthcare services, agricultural productivity, education and tourism.
- Developing a Strategy for Implementing Machine Learning, Computer Vision, Computer Simulations and Robotic Process Automation (RPA) approaches in sectors of agriculture, education, health and tourism of southwest Ethiopia.
- Exploring and assessing the existing problems in telecommunications by indicating ways
 of increasing access to connectivity, coverage of the infrastructure and affordability and
 quality of services in southwest Ethiopia.
- Increasing current technology adoption through effective technology and knowledge transfer systems such as increased uptake of emerging telecommunication technologies (5G and beyond, software-defined networks, internet of things (IoT) and machine-to-machine communication) in southwest Ethiopia.
- Conduct a resource mapping study to identify areas lacking IT infrastructure in southwest
 Ethiopia and develop a structure for prioritizing IT infrastructure services according to
 community needs and available resources, integrating public administration, technology
 studies, and community development.
- Investigate the role of community involvement in the seamless collaboration and coordination of IT infrastructure projects and service provision between the public and private sectors.

- Investigations related to Improved Digital Technologies usability, productivity, and creativity in both the public and private spheres, to enable the efficient functioning of the economy
- Assessment regarding the use of Digital Technologies for inclusive education and Digital Technology tools for people with special needs
- Developing strategies for fostering and customizing start-ups, small and micro businesses and innovators in southwest Ethiopia to address societal economic problems by using digital technologies.
- Investigations related to Improved Digital Technologies usability, productivity, and creativity in both the public and private spheres of southwest Ethiopia, to enable the efficient functioning of the economy.

Theme 4: Culture and Tourism Development

In this main theme, nine national research thematic area priorities have been identified in the 2022 MoE document. Hence, here this theme aims to work on the following sub-themes and researchable issues or areas, but is not limited to:

- o Tourism Resources
- Culture and Its Development
- Tourism Development and Management
- Tourism Marketing, and Sustainability
- Welfare, Livelihood and Business Development
- Project Management, Accounting and Auditing
- o Public Finance and Expenditure, Business Policy, Ethics and Model

Subtheme 4.1. Tourism resources

- Mechanisms to improve utilization capacity of underutilized eco-tourism opportunities available in West-Omo, Bench-Sheko and Sheka Zones of SW Ethiopia.
- Enhancing natural tourism resources include biological (Sheka dense forest and Wurg forest (wild nature) and Omo-park in Maji-district) and physical (i.e. mountains, spectacular landscapes, escarpments, viewpoints, favorable weather, lakes, hot springs, waterfall, and natural cave in many localities of Sheka and West-Omo Zones).

Subtheme 4.2. Culture and its development

- Studies related to Heritage Conservations, Development and Management of indigenous peoples living in SW Ethiopia.
- Studies on Languages, Communications, Dialects and Folklore of the Indigenous peoples
 in SW Ethiopia as well as the interconnection between Language, society and sociopragmatics.
- Studies related to harmful traditional practice and intervention through training
- A scientific study that focuses on documenting and preserving medicinal plants, cultural artifacts and knowledge of traditional healers.

Subtheme 4.3. Tourism Development and Management

The exploitation of the available eco-tourism potentials in SW Ethiopia through promotion and advertisement of available eco-tourisms, utilization of appropriate technology, and improved infrastructure and proper ethnic violence management. Designing mechanisms for tourism administration and management to reduce the high loss of fauna reported in Omo-park. Studies that focus on Tourism Development and Management are highly required. These include

- o Integrating Tourism and Hospitality Management in Education
- Integrating Investment with (Entrepreneurship, employability, technology, digitalization and services)
- o Improving Transportation Management in Tourism and Hospitality
- o Enhancing Human Capital Development and Management in Tourism

Subtheme 4.4. Tourism Marketing and Sustainability

- Improving Tourism demand analysis and modeling through (Business Tourism and Event Marketing, tourism Value Chain Analysis and Management, Tourist Behaviors and Experiences and tourism Marketing Tools and Strategies).
- o Improving Tourism investment and management as well as sustainability of tourism hospitality and marketing
- Scale up and sustainable tourism practices by using economic valuation of tourism resources.
- Integrated intervention of the main problems evident in southwest Ethiopia in the tourism sector

Subtheme 4.5. Welfare, livelihood and business development

- Alleviating Poverty, Unemployment and Cost of Living; through enhancing resource allocation, energy demand and efficiency; food security and agricultural productivity and improving work culture, cooperative corporate governance and economics--
- Studies that focus on the magnitude and cause of youth unemployment and less of initiatives of youth to be self-employed
- Studies focusing on issues revolving around how to start and run a new business and on the development of a business plan.

Theme 5: Education and Governance

In this main theme, twelve national research thematic area priorities have been identified in the 2022 MoE document. Hence, here this theme aims to work on the following sub-themes and researchable issues or areas, but is not limited to:

- Education Road-Map (Curriculum)
- Teaching, Learning and Assessment Methods and Outcomes
- Access and Equity
- Quality, Relevance and Efficiency
- Governance, Leadership, and Management
- Media and Communication
- Peace and Security

Theme 5.1: Education Road-Map (curriculum)

- Studies related to the curriculum with a specific focus on the pros and cons of a medium of instruction and theory-practice nexus.
- Studies related to the curriculum of the nation and the SW Ethiopia regional state by giving more attention to the philosophical and psychological assumptions, relevance, development, implementation, and monitoring and evaluation.

Theme 5.2. Teaching, learning and assessment methods and outcomes

- Advanced Teaching Strategies and Impact on Student Learning Outcomes Across
 Disciplines
- Researches that focus on learning outcomes, competency-based training, teacher or trainer-related capacity, nature of teachers' preparation, and student or trainee support system and engagement issues.

Theme 5.3. Access and Equity

Access (availing education in different modalities to the public from primary to secondary schools), Equity (gender, region, disability, urban-rural, central-peripheral, education injustice) and inclusiveness (needs and talents)

- Studies related to leadership capacities, qualities, and functions required for implementing different policy options.
- Studies related to community engagement in the provision of quality education and Educational management and leadership

Theme 5.4. Governance, Leadership, and Management

- Gender gap and equity with a specific focus on early marriage and less empowerment and poor participation of women in leadership and management
- Ethnic and religious diversity and co-existence, local governance practices and challenges
- Managerial problems in cooperatives and the relationship between cooperatives and their unions
- Public service delivery system and local and zonal development following the emergence of the new Southwest Ethiopia regional state

Theme 5.5. Media and Communication

 Public relations practice and progress in the digital era, Media literacy under social media usage, Impacts of social media and mainstream media and Broadcast production with artificial intelligence

Theme 5.6. Peace and Security

- The cause and dynamics of conflicts in Pastoral areas of SW Ethiopia; Social capital in the post-conflict community; democratization process and local governance; Federalism and multiculturalism; Human rights and corruption
- Approaches to utilize indigenous knowledge and culture for conflict resolution and sustaining peace and security in the community.

4. Key Performance Indicators for the Strategic Goals

4.1. Promote Quality, Relevant and Problem-Solving Research

No.	Strategies	Key performance indicators (KPIs)
1	Integrated management	Number of research conducted on Indigenous knowledge
	and utilization of	Number of tangible and intangible Indigenous knowledge
	Indigenous knowledge	identified and documented
		o Increase the number and kinds of training/consultancy services
		offered to native/local community
		Number of pieces of Indigenous knowledge based researches
		being done with partners
2	Creating a conducive	o Increase the number of female, young and prospective
	platform for doing	researchers
	research and/or	Number of well-trained academic staff and graduate students
	improving a culture of	Number of pieces of training delivered to academic staff on
	doing research	grant writing, doing research, software-based data analysis, and
		scientific research writing and publication
		o Increase academic workshops being conducted or the number of
		seminars delivered to staff and graduate students
		o number of national and international forums organized
		o increase the number of academic staff participating in national
		and international forums
3	Enhance the coverage	o Increase the number of research proposals that passed internal
	and application of	review
	quality and problem-	o Increase the number of multidisciplinary research projects being
	solving research	conducted in the team
		o Increase numbers of problem-solving and demand-driven
		research being conducted based on an updated version of the
		national research priority areas
		Number of technology-based research being done and
		transferred to end users and communities

		Revise thematic area and employ multi-disciplinary approaches
		in research as per the national research priority areas
4	Improve research	o Increase the number of successfully completed projects on
	monitoring and	agreed time framework
	evaluation	o Improve utilization of allocated budget on agreed time
		framework
5	Improve research	o Increase the number research works being published in
	documentation,	reputable journals
	publication and	o Increase the number of completed research projects being
	dissemination	transferred to the community
		o Increase the number research works documented in the Mizan-
		Tepi university data repository system

4.2. Enhance Collaboration, Partnership and Networking.

No.	Strategies	Key performance indicators (KPIs)
1	Enhance collaboration and	Increase the number of effective partnership
	partnerships being made with	agreements with national and international bodies
	partners	Increase the areas or kinds of partnerships formed
	Increase the contribution of	Increase the percentage of contribution of externally
	external funds.	secured funds to the overall budget.
		Increase the number of research projects winning
		external fund.
2	Initiate joint research programs	Number of joint collaborative research programs
	that have a national research	initiated
	priority agenda.	
3	Encourage researchers to engage	Number of researchers engaged in joint research
	in joint research projects and	projects
	establish joint research	Number of joint research coordination working units
	coordination work units.	being established

4.3. Improve Research Facilities and Knowledge Management System

No.	Strategies	Key performance indicators (KPIs)
1	Establish research demonstration and	o Increase the number of research
	technology incubation centers	demonstration sites, laboratories and
		technology incubation centers established
2	Assess the state of research equipment	Number of assessed institutes at the
	and facilities at the national level.	national level
3	Establish modalities for the utilization	Number of established regional clusters
	of common research facilities through	with Mizan-Tepi University
	regional clustering.	
4	Create mechanisms that enhance	Number of networked national and
	information exchange among national	international research institutes with MTU
	and international agencies.	data repository center
5	Share ideas, experiences, information,	A number of research findings
	and study findings and make them	disseminated to stakeholders on time.
	available in the right place at the right	
	time.	