



Preventing Forest Loss, Promoting Restoration, and Integrating Sustainability into Ethiopia's Coffee Value Chains and Food Systems (FOLUR Ethiopia)

Systematic Review of Knowledge Products in Integrated Landscape Planning & Management, Coffee Value Chain Development, and Forest Conservation & Restoration

Synthesis Report

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Ministry of Planning & Development in Collaboration with Partner Universities

August 2025, Addis Ababa, Ethiopia



Acronyms

BRs	Biosphere Reserves
FOLUR	Food Systems, Land Use & Restoration
ILSPM	Integrated Landscape Planning & Management
LULC	Land Use Land Cover
MoPD	Ministry of Planning & Development
NGOs	Non-governmental Organizations
PAs	Protected Areas
RKDFPs	Research & Knowledge Development Focal Persons
RPs	Research Products

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1. Introduction

1.1 Background

Since 2023, the Ministry of Planning & Development (MoPD), in partnership with UNDP, the Ethiopian Forestry Development (EFD), the Ethiopian Coffee and Tea Authority (ECTA), and other federal and regional government agencies, is implementing a multi-sectoral intervention called 'Preventing Forest Loss, Promoting Restoration and Integrating sustainability in Ethiopia's Coffee Value chains & food Systems (FOLUR Ethiopia). This initiative forms part of the global 'Food Systems, Land Use and Restoration (FOLUR)' Impact Program, financed by the Global Environmental Facility (GEF) and led by the World Bank. It is implemented in 10 zones and 22 woredas of Oromia, Sidama, South Ethiopia and Southwest Ethiopia Regions – administrative locations largely characterized by Moist Afromontane Forest Ecosystems and coffee-based livelihoods (See Location Map under Annex A).

Knowledge management, Monitoring and Evaluation is one of integral components of the FOLUR Ethiopia Project – a function that cuts across the other three pillar components: development of an integrated landscape planning and management systems; promotion of sustainable food production practices and responsible value chains (coffee); and conservation and restoration of natural habitats through participatory forest management.

Co-development of knowledge products through research embodies the knowledge management function of the FOLUR Ethiopia project. It is underpinned by: limitations in structured knowledgebase in space & time in the three thematic areas of intervention; the need for iterative processes of knowledge-informed development planning & action, and the added value of partnering with academic institutions in development-oriented research & knowledge management.

The research and knowledge development partnership with academic institutions involves a 10-step journey including:

- A. *Identification of Partner Universities;*
- B. *Assignment of University research and knowledge development focal persons;*
- C. *Launching research & knowledge development partnership workshop;*
- D. *Launching the call for PhD research projects;*
- E. *Establishment of independent assessment panel;*
- F. *Evaluation of research proposals;*
- G. *Sign tripartite agreement (MoU) with selected PhD candidates, partner university representatives and MoPD*
- H. *Technical support & monitoring;*
- I. *Research results production & validation; and*
- J. *Publication and dissemination of knowledge products.*

Based on above grounds, the MoPD has identified and partnered with nine Ethiopian universities located in project regions to support applied doctoral research. These partner universities include: Jimma University, Hawassa University, Madda Walabu University, Arsi University, Dilla University, Bule Hora University, Mattu University, Bonga University, and Mizan-Tepi University. Each of the nine partner universities have assigned three respective focal points, totaling 27 (See Annex B) in three intervention components of the FOLUR Ethiopia initiative. The research and knowledge development focal persons are in charge to work with the project management unit to ensure effectiveness, avoid duplication, promote accountability, and supervise doctoral research processes and results.

Three rounds of workshops have been undertaken as part of such partnership journey and they helped to define the courses of joint research and knowledge development actions. The first workshop (held on the 14th of Dec 2024) paved the foundation and concluded with identification and prioritization of 32 research areas. Besides, the need for meta-analysis or systematic review was emphasized during that initial deliberation. The second partnership workshop (conducted from 14 to 15 March 2025) was intended importantly to consolidate the research themes prioritized during

the first workshop and develop a structured action plan for conducting a systematic review and/or meta-analysis of existing scientific knowledge.

During the 2nd workshop, the research and knowledge development focal persons (RKDFPs) have intensively worked to refine previous outputs and eventually proposed 5 research themes and 23 subthemes under the integrated landscape planning and management sector; 6 research themes and 18 subthemes under the coffee value chain development sector; and 6 research themes and 21 subthemes under the forest conservation and restoration sector. The RKDFPs also assumed responsibility to undertake systematic review of knowledge products in the three sectors within a defined time frame and mutually agreed criteria. Accordingly, a total of 334 scientific papers (80 in coffee development, 118 in forestry and 136 in integrated landscape management) have been reviewed from April to June 2025.

The systematic review findings have been presented during the 3rd partnership workshop that was held from 27 to 28 June 2025. This deliberation was primarily intended to validate the findings and to define the next steps, more importantly on how to move forward with launching the call for PhD research proposals. It was also agreed during this workshop to produce a report of all the three sectors. Accordingly, a synthesis of the methodologies employed, and findings of the systematic review are presented in subsequent sections.

1.2 Objectives

The main objective of the systematic review was to contribute to efficient knowledge development and management through avoiding duplication of existing research products on the three sectors (landscape planning & management, coffee value chain development and forest conservation & restoration).

The specific objectives were to:

- Document available knowledge products on the three sectors;
- Gain understanding about thematic and geographic distribution of knowledge products; and
- Assess knowledge gaps and inform generation of new knowledge in the three sectors.

1.3 Limitations

The systematic review process and its findings are not without limitations and the following are worth mentioning.

- The review was bounded to a defined timeframe (since 2010) and might have excluded some valid knowledge products that were produced before then.
- The review only covered PhD dissertations and research products published in known academic journals. Exclusion of grey literature (produced by governments, NGOs, think tanks, and research institutes) might have compromised sufficiency of our knowledge base.
- Summarizing findings into thematic & geographic scopes alone would reduce the depth of insights required to inform future research and knowledge generation efforts.

2. Methodology

2.1 Generic approach

The systematic review process started by setting overarching framework and criteria as summarized below.

Time frame: research products that have been produced since 2010 (the past 15 years) were agreed to undergo systematic review.

Geographic scope: research products that only apply to the Ethiopian context were agreed to be eligible for review.

Document class: those research products that are published in reputable journals and PhD Dissertation are eligible to be reviewed.

Document contents and limits: The following components of a specific knowledge product were agreed to be reviewed with corresponding word limits.

- Title of the research product: whole title (no word limit);
- Background of the research: 300 – 500 words;
- Geographic scope: 50 – 100 words
- Problem Statement: 150-200 words;
- Objectives: 50-150 words;
- Methodology: 150-300 words; and
- Key Findings: 150-300 words.

2.2 Specific methods

2.2.1 Data collection methods and sources

By its very nature, the systematic review process relied on extracting contents from existing research products. Globally known knowledge repositories were used as sources of data and these include: Web of Science (has high-impact journal coverage); Google Scholar (has broad academic search engine); ResearchGate (direct author engagement and full-text access); ScienceDirect and SpringerLink (for peer reviewed articles); and Scopus (for citation analysis). Unavailable articles were requested directly from authors. Techniques such as inserting key words, time range and locations including use logical operators while using search engines have been employed to identify relevant research products.

2.2.2 Methods of data analysis

The contents extracted from research products have been categorized in an excel database according to their title, geographic scope, background, problem statement, objectives, methodology, findings, and their linkages with identified research themes and subthemes. Geographic levels (settings) were first categorized for analysis as: Watersheds, Basins & Sub-basins, Biosphere Reserves & Other Protected Areas, Laboratory Experiments, Rift Valley, Woredas, Zones, Regions, City Administrations, and National levels. The number & proportions of research products in reference to pre-identified research themes and geographic levels were mapped using Excel's built-in Pivot Table tool. Consolidated findings are eventually presented in tabular summary with corresponding narrative descriptions.

3. Findings

3.1 Integrated Landscape Planning & Management Sector

The proportion of existing research products in integrated landscape planning & management (ILSPM) at regional level is very minimal (less than 1%) relative to others while high proportion at watershed and basin/sub-basin levels. This could be due to the facts that landscapes have distinct features to determine spatial units for research (Table 1).

Themes encompassing land tenure systems & governance for equitable restoration; climate change scenario modeling for resilient land use planning; geospatial tools for land resource management, soil loss quantification, landslide risk assessment, and carbon sequestration; landscape restoration impacts on food security and livelihoods; and future land use scenarios & optimization strategies have witnessed limited knowledge production (Table 2 & 3).

Table 1: Number & proportion of research products in the ILSPM sector reviewed at different geographical levels

#	Row Labels	# of RPs	Proportion (%)
1	Basin or Sub-basin	24	17.6%
2	Biosphere Reserves & Other Protected Areas	14	10.3%
3	City Administration	4	2.9%
4	National	10	7.4%
5	Region	1	0.7%
6	Watershed	33	24.3%
7	Woreda	30	22.1%
8	Zone	20	14.7%
Grand Total		136	100%

Table 2: Number & proportion of research products in the ILSPM sector reviewed under different thematic areas

#	Row Labels	# of RPs	%
1	Climate adaptation and/or mitigation strategies (e.g., conservation agriculture, agroforestry)	27	19.85%
2	Climate change scenario modeling for resilient land use planning	3	2.21%
3	Food security linkages to climate-smart practices	5	3.68%
4	Future land use scenarios and optimization strategies	3	2.21%
5	Geospatial tools for land resource management, soil loss quantification, landslide risk assessment, and carbon sequestration	3	2.21%
6	Indigenous knowledge documentation & integration into restoration	17	12.50%
7	Land cover land use dynamics and predictive modeling	8	5.88%
8	Land degradation (soil, water) and sustainable landscape rehabilitation	4	2.94%
9	Land tenure systems and governance for equitable restoration	2	1.47%
10	Land use characterization, suitability, and capability analysis	23	16.91%
11	Landscape restoration impacts on food security and livelihoods	3	2.21%
12	Small-scale irrigation systems & water-energy-food-ecosystem-cultural nexus	5	3.68%
13	Water-energy-food-ecosystem-culture nexus in informing land use planning	8	5.88%
14	Valuation of ecosystem services (e.g., carbon sequestration, water regulation)	25	18.38%
Grand Total		136	100%

Table 3: Proportion of knowledge products reviewed in the ILSPM sector under different geographic levels and thematic areas of research

#	Research Themes	Geographic levels and respective # of knowledge products reviewed								
		Basins & Sub-basins	BRs & Other PAs	City Admin	National	Region	Watershed	Woreda	Zone	Total
1	Climate adaptation and/or mitigation strategies (e.g., conservation agriculture, agroforestry)	4.41%	0.00%	2.21%	0.00%	0.00%	4.41%	3.68%	5.15%	19.85%
2	Climate change scenario modeling for resilient land use planning	0.74%	0.00%	0.00%	0.74%	0.00%	0.74%	0.00%	0.00%	2.21%
3	Food security linkages to climate-smart practices	0.00%	0.00%	0.00%	0.74%	0.00%	0.00%	0.74%	2.21%	3.68%
4	Future land use scenarios and optimization strategies	1.47%	0.00%	0.00%	0.00%	0.00%	0.74%	0.00%	0.00%	2.21%
5	Geospatial tools for land resource management, soil loss quantification, landslide risk assessment, and carbon sequestration	0.74%	0.00%	0.00%	0.00%	0.00%	0.74%	0.74%	0.00%	2.21%
6	Indigenous knowledge documentation, mapping, and integration into restoration	0.00%	1.47%	0.00%	1.47%	0.74%	0.74%	4.41%	3.68%	12.50%
7	LULC dynamics and predictive modeling	0.74%	0.00%	0.00%	0.74%	0.00%	1.47%	2.94%	0.00%	5.88%
8	Land degradation (soil, water) and sustainable landscape rehabilitation	0.74%	0.00%	0.74%	0.00%	0.00%	1.47%	0.00%	0.00%	2.94%
9	Land tenure systems and governance for equitable restoration	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.74%	1.47%
10	Land use characterization, suitability, and capability analysis	1.47%	0.00%	0.00%	2.21%	0.00%	8.09%	4.41%	0.74%	16.91%
11	Landscape restoration impacts on food security and livelihoods	0.00%	0.00%	0.00%	0.74%	0.00%	0.74%	0.74%	0.00%	2.21%
12	Small-scale irrigation systems and water-energy-food-ecosystem-cultural nexus	0.74%	0.00%	0.00%	0.74%	0.00%	0.00%	2.21%	0.00%	3.68%
13	The nexus of water-energy-food-ecosystem –culture in informing land use planning	5.15%	0.00%	0.00%	0.00%	0.00%	0.74%	0.00%	0.00%	5.88%
14	Valuation of ecosystem services (e.g., carbon sequestration, water regulation)	1.47%	8.09%	0.00%	0.00%	0.00%	4.41%	2.21%	2.21%	18.38%
Grand Total		17.65%	10.29%	2.94%	7.35%	0.74%	24.26%	22.06%	14.71%	100%

3.2 Systematic Review Findings in the Coffee Sector

Mapping of knowledge products in reference to different geographical levels (Table 4) indicates limited proportions of coffee development research at regional level and in biosphere reserves and other protected areas (10%) while relatively greater at national level (31%).

Thematic mapping of research products proved that coffee agro-forestry management and coffee-crop integration; gender mainstreaming in coffee value chain; greenhouse gas emission reduction & removals; coffee value chain commercialization; climate change modelling; and integrated pest management have shown limited research coverage relative to others (Table 4).

3.3 Systematic Review Findings in the Forestry Sector

Forestry research efforts in laboratory settings, basins & sub-basins and within the Rift Valley are identified to be very minimal (less than 1 %), while relatively high at woreda, regional, zonal and national levels respectively as shown in Table 5.

Thematic coverage of forestry research is found to be better in the areas of economic & ecological contribution of agroforestry, indigenous knowledge and forest conservation, and institutional arrangement, forest governance, and law enforcement. Yet, forest mapping based on (pristine, semi-disturbed, disturbed); non-timber forest products (NTFPs), eco-tourism, and ecosystem service valuation; site suitability for indigenous trees; bamboo propagation, tissue culture/micro-propagation protocol development; carbon sequestration and/or climate change; domestication and genetic diversity of exotic species; and forest fire management have limited number of research products (see Tables 5, 6 & 7 for details).

Table 4: Number & proportion of research products (RPs) reviewed in the coffee sector under different geographic levels & thematic areas of research

#	Knowledge Areas	Geographic Levels and Corresponding # of RPs and Proportions										Total # of RPs	% Total
		BRs & Other PAs		National		Region		Woreda		Zone			
		# of RPs	%	# of RPs	%	# of RPs	%	# of RPs	%	# of RPs	%		
1	Biodiversity conservation, Ecosystem services valuation and financing	2	2.5%	2	2.5%	2	2.5%	-	0.0%	2	2.5%	8	10.0%
2	Climate change modeling	-	0.0%	2	2.5%		0.0%	-	0.0%	1	1.3%	3	3.8%
3	Coffee – shade tree interaction from yield and quality perspective	-	0.0%	-	0.0%	1	1.3%	4	5.0%	2	2.5%	7	8.8%
4	Coffee agro-forestry management, Coffee-crop integration	-	0.0%	-	0.0%	-	0.0%	1	1.3%	1	1.3%	2	2.5%
5	Coffee quality profile mapping	1	1.3%	4	5.0%	1	1.3%	1	1.3%	4	5.0%	11	13.8%
6	Coffee value chain commercialization	-	0.0%	2	2.5%	-	0.0%	-	0.0%	-	0.0%	2	2.5%
7	Diversification of livelihoods	-	0.0%	-	0.0%	-	0.0%	2	2.5%	-	0.0%	2	2.5%
8	Gender mainstreaming in coffee value chain	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1	1.3%	1	1.3%
9	Governance in forest coffee	4	5.0%	3	3.8%	1	1.3%	4	5.0%	2	2.5%	14	17.5%
10	Greenhouse gas reduction	1	1.3%	-	0.0%	-	0.0%	1	1.3%	-	0.0%	2	2.5%
11	Integrated Pest Management to adapt to climate change	-	0.0%	2	2.5%	1	1.3%	-	0.0%	-	0.0%	3	3.8%
12	Integrating climate-smart agriculture	-	0.0%	5	6.3%	1	1.3%	4	5.0%	-	0.0%	10	12.5%
13	Integrating small-scale farmers to a sustainable niche market	-	0.0%	2	2.5%	-	0.0%	1	1.3%	5	6.3%	8	10.0%
14	Introducing traceability in the Ethiopian coffee value chain	-	0.0%	1	1.3%	-	0.0%	-	0.0%	-	0.0%	1	1.3%
15	Market efficiency and performance	-	0.0%	2	2.5%	1	1.3%	3	3.8%	-	0.0%	6	7.5%
Grand Total		8	10%	25	31%	8	10%	21	26%	18	23%	80	100%

Table 5: Number and & proportion of research products in the forestry sector reviewed at different geographical levels

#	Row Labels	# RPs	%
1	Basins and Sub-basins	1	0.8%
2	Biosphere Reserves and Other Protected Areas	19	16.1%
3	City Administration	4	3.4%
4	Lab Experiment	1	0.8%
5	National	15	12.7%
6	Region	26	22.0%
7	Rift Valley	1	0.8%
8	Woreda	33	28.0%
9	Zone	18	15.3%
Grand Total		118	100%

Table 6: Number & proportion of research products in the forestry sector reviewed under different thematic areas

#	Row Labels	RPs	%
1	Bamboo management and value chains	8	6.8%
2	Bamboo physiology, growth, ecology, and restoration	9	7.6%
3	Bamboo propagation, tissue culture/micro-propagation protocol development	3	2.5%
4	Biodiversity conservation	8	6.8%
5	Carbon sequestration and/or climate change	3	2.5%
6	Coffee based agroforestry, soil enrichment and characterization	5	4.2%
7	Conservation status of biosphere reserve, protected areas	4	3.4%
8	Domestication and Genetic diversity of exotic species	3	2.5%
9	Economic and ecological contribution of agroforestry	17	14.4%
10	Effectiveness and performance of PFM and Biosphere Reserves	1	0.8%
11	Forest cover change (historical, prospective)	6	5.1%
12	Forest fire management	3	2.5%
13	Forest mapping based on (pristine, semi-disturbed, disturbed)	2	1.7%
14	Green legacy initiative on (forest cover, livelihood, restoration)	1	0.8%
15	Indigenous knowledge and forest conservation	15	12.7%
16	Indigenous trees for urban greening	4	3.4%
17	Institutional arrangement, forest governance, and law enforcement	12	10.2%
18	Non-timber forest products (NTFPs), eco-tourism, Ecosystem service valuation	2	1.7%
19	Seed characterization, germination, provenance, establishment	9	7.6%
20	Site suitability for indigenous trees	3	2.5%
Grand Total		118	100%

Table 7: Proportion of knowledge products reviewed in the forestry sector under different geographic levels & thematic areas of research

#	Research Themes	Geographic levels and respective # of knowledge products reviewed									Total
		Basins & Sub-basins	BRs & Other PAs	City Admin	Lab	National	Region	Rift Valley	Woreda	Zone	
1	Bamboo management and value chains	0.0%	0.0%	0.0%	0.0%	4.2%	1.7%	0.0%	0.8%	0.0%	6.8%
2	Bamboo physiology, growth, ecology, and restoration	0.0%	0.0%	0.0%	0.0%	0.8%	3.4%	0.0%	0.8%	2.5%	7.6%
3	Bamboo propagation, tissue culture/micro-propagation protocol development	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%	0.0%	0.0%	0.8%	2.5%
4	Biodiversity conservation	0.0%	1.7%	0.0%	0.0%	0.0%	5.1%	0.0%	0.0%	0.0%	6.8%
5	Carbon sequestration and/or climate change	0.0%	0.8%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.8%	2.5%
6	Coffee based agroforestry, soil enrichment and characterization	0.0%	0.8%	0.0%	0.0%	0.0%	1.7%	0.0%	1.7%	0.0%	4.2%
7	Conservation status of biosphere reserve, protected areas	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	3.4%
8	Domestication and Genetic diversity	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	1.7%	0.0%	2.5%
9	Economic and ecological contribution of agroforestry	0.0%	0.8%	0.0%	0.0%	0.8%	1.7%	0.8%	8.5%	1.7%	14.4%
10	Effectiveness and performance of PFM and Biosphere Reserves	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.8%
11	Forest cover change (historical, prospective)	0.8%	1.7%	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.8%	5.1%
12	Forest fire management	0.0%	0.8%	0.0%	0.0%	0.8%	0.0%	0.0%	0.8%	0.0%	2.5%
13	Forest mapping based on (pristine, semi-disturbed, disturbed)	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%
14	Green legacy initiative on (forest cover, livelihood, restoration)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%
15	Indigenous knowledge and forest conservation	0.0%	1.7%	0.0%	0.0%	0.8%	0.0%	0.0%	5.1%	5.1%	12.7%
16	Indigenous trees for urban greening	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	3.4%
17	Institutional arrangement, forest governance, and law enforcement	0.0%	3.4%	0.0%	0.0%	0.0%	2.5%	0.0%	2.5%	1.7%	10.2%
18	Non-timber forest products (NTFPs), eco-tourism, Ecosystem service valuation	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.0%	0.0%	0.0%	1.7%
19	Seed characterization, germination, provenance, establishment	0.0%	0.0%	0.0%	0.0%	2.5%	0.8%	0.0%	3.4%	0.8%	7.6%
20	Site suitability for indigenous tress	0.0%	0.8%	0.8%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	2.5%
Grand Total		0.8%	16.1%	3.4%	0.8%	12.7%	22.0%	0.8%	28.0%	15.3%	100%

4. Conclusions and Recommendations

4.1 Conclusions

The research and knowledge development partnership in general and the systematic review process in particular have gone rigorous steps of consultation, research team engagement, and extensive literature review. Useful insights have been generated from the systematic review in terms geographic and thematic coverage of research products in integrated landscape planning and management, coffee value chain development, and forest conservation & restoration.

Forest coffee biosphere reserves such as the Kaffa, Yayu and Sheka represent significant proportions of national biosphere reserves in terms of area coverage and biodiversity. Yet, availability of knowledge products in these geographic and ecological settings are found to be minimal and entails documentation of good enough knowledge. The reasons behind limited research at regional level in coffee value chain development and integrated landscape planning & management including future directions should also be unlocked.

Thematic areas with limited research products including, but not limited to: coffee agro-forestry management and coffee-crop integration; gender mainstreaming in coffee value chain; greenhouse gas emission reduction & removals; coffee value chain commercialization; climate change modelling; and integrated pest management, forest mapping based on (pristine, semi-disturbed, disturbed); non-timber forest products (NTFPs), eco-tourism, and ecosystem service valuation; site suitability for indigenous trees; bamboo propagation, tissue culture/micro-propagation protocol development; carbon sequestration and/or climate change; domestication and genetic diversity of exotic species; forest fire management; land tenure systems & governance for equitable restoration; climate change scenario modeling for resilient land use planning; geospatial tools for land resource management, soil loss quantification, landslide risk assessment, and carbon sequestration; landscape restoration impacts on food security and livelihoods; and future land use scenarios & optimization strategies necessitate increased knowledge production.

Limitations including narrow time range of research products (15 years); exclusion of grey literature, and limiting the scope of analysis to themes and geography needed to be considered in upcoming knowledge development efforts.

4.2 Recommendations

Following presentation of systematic review findings and discussion among participants of the validation workshop (3rd round), the following areas under the three sectors (in order of priority) have been finally proposed for future research and knowledge development.

4.2.1 Recommended areas for future research in the ILSPM sector

- Land cover land use dynamics and predictive modeling;
- Geospatial tools for land resource management, soil loss quantification, landslide risk assessment, and carbon sequestration;
- Future land use scenarios and optimization strategies;
- Land use characterization, suitability, and capability analysis;
- Indigenous knowledge documentation, mapping, and integration into restoration;
- Landscape restoration impacts on food security and livelihoods;
- Climate adaptation and/or mitigation strategies (e.g., conservation agriculture, agroforestry);
- Small-scale irrigation systems and water-energy-food-ecosystem-cultural nexus;
- Climate change scenario modeling for resilient land use planning;
- Food security linkages to climate-smart practices;
- Agro-climatology for Climate-Smart Land Use Planning;

- Synergies and trade-offs between agriculture, forestry, and urban expansion;
- Valuation of ecosystem services (e.g., carbon sequestration, water regulation);
- Urban ecosystem resilience and biodiversity conservation; and
- Land quality and ecosystem health under changing land use.

4.2.2 Recommended areas for future research in the coffee sector

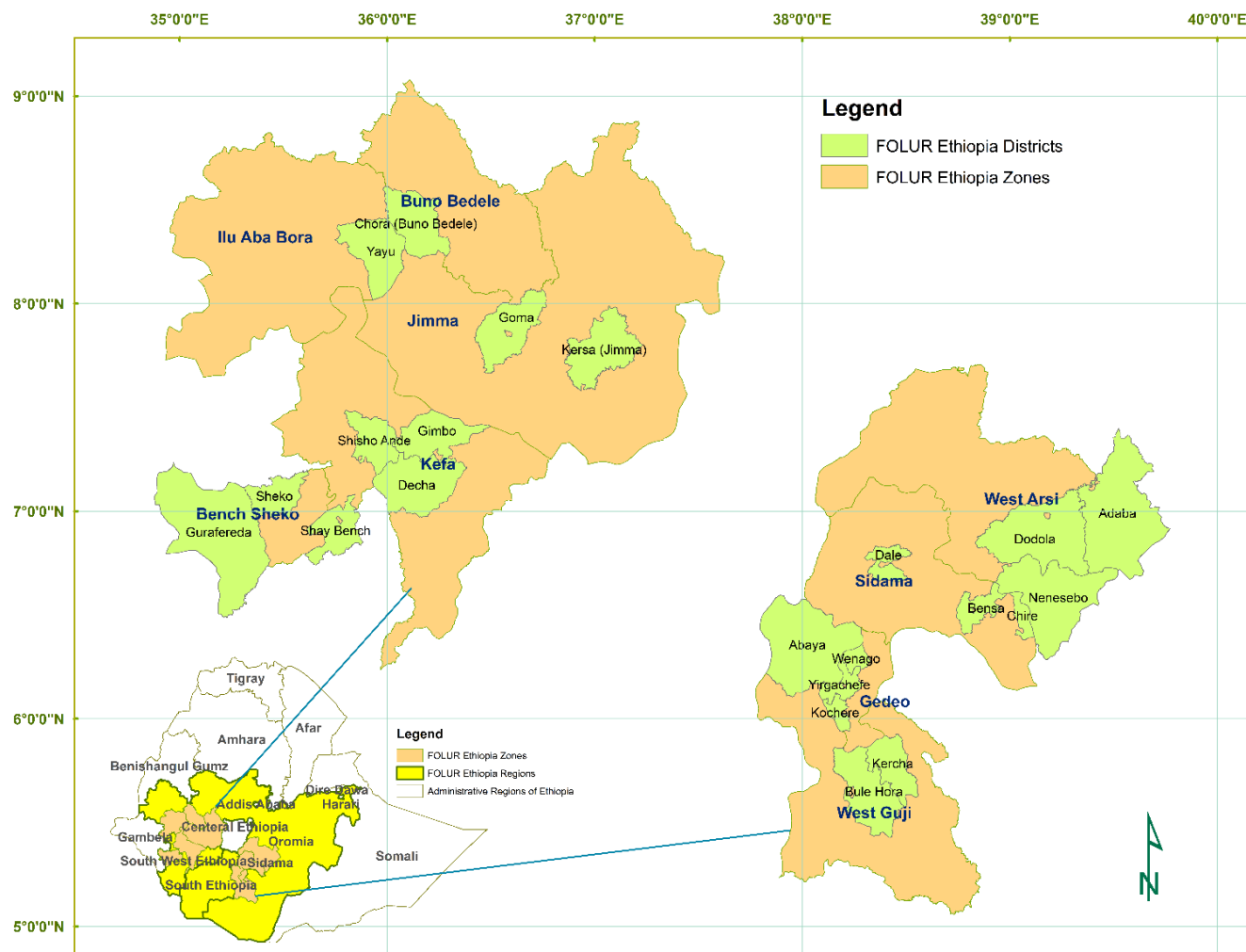
- Coffee Value Chain Analysis and Upgrading Mechanisms;
- Coffee quality characterization across the coffee growing area/quality profile mapping;
- Coffee Market Performance, Digitalization, and Intelligence;
- Tradeoff between coffee conservation and livelihood;
- Climate-Smart Agriculture (CSA), organic restoration & circular economy in coffee;
- Coffee Ecosystem Valuations;
- Gender Dynamics, Resource Control, and Access to Climate-Resilient Innovations in Forest and Specialty Coffee Value Chains;
- Coffee shade and Light quality impacts on coffee yield and quality;
- Comparative Governance Models in the Forest Coffee Landscape;
- Coffee traceability and branding for sustainable coffee production; and
- Youth-Driven Coffee Agribusiness.

4.2.3 Recommended areas for future research in the forestry sector

- Multi-dimensional aspects of the green legacy initiative;
- Regenerative Forestry: Integrating selective mature tree harvesting with ecosystem resilience and local livelihoods in natural forests;
- Optimization of coffee production with biodiversity conservation (trade-offs);
- Ecological and economic importance of Endangered indigenous tree species: seed germination, propagation, growth, livelihood, population genetic diversity, and environmental addition;
- Biosphere reserves and participatory forest management (PFM);
- National forest governance and policy analysis;
- Identification of best-performing/ matching Agroforestry components;
- Bamboo management, industrialization and value chain;
- Forest fragmentation and its diverse implications on forest, wildlife and environment;
- Forest fire ecology, management and challenges in Ethiopia; and
- Efficient propagation/tissue culture technique for bamboo, especially highland bamboo.

5. Annex

Annex A: Map of FOLUR Ethiopia Project Locations



Annex B: Research & Knowledge Development Focal Persons of Partner Universities

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