**Session Proposal**

1. Session Title

Gaining food from barren mountains: Synergistic mechanisms driven by woody oil crops for non-arable land restoration and sustainable use

1. Session Organizers

Session Organizer:

Dr. Zhongliang Huang, State Key Laboratory of Woody Oil Resources Utilization, PI of Environmental Risk Prevention and Control in Resource Utilization Processes and Innovative Eco-friendly Materials/President of Hunan Academy of Forestry, 86024096@qq.com.

Dr. Jiang Jiang, President of the College of Forestry and Grassland Science and the College of Soil and Water Conservation, Nanjing Forestry University, ecologyjiang@gmail.com.

Contact person:

Dr Xuan Zhang, Tel: 18874085985, zhangxuansherry@163.com

1. Session Description

Against the backdrop of global scarcity of arable land resources, the cultivation of woody oilseed crops (such as camellia oil, walnuts, and tung oil) on marginal non-arable land offers an ecological advantage of “not competing with grain for land”, making it a strategic choice to address the dual challenges of food and oil security and ecological governance. State Key Laboratory of Woody Oil Resources Utilization initiated this sub-forum, innovatively proposing a “comprehensive food security perspective” strategy to utilize woody oilseeds to secure food from barren mountains. The forum focuses on the systematic application of major global woody oil plants such as *Camellia oleifera*, *oil palm*, and *walnut* in non-arable areas such as mine restoration zones and rocky desertification areas. It addresses core scientific issues including the reduction of soil obstacle factors, ecological adaptability, and resource utilization potential in non-arable woody oil plant cultivation. Key discussion topics include: 1) the formation mechanisms and mitigation strategies of soil obstacle factors; 2) the regulation of the rhizosphere microenvironment and ecological adaptation mechanisms of woody oil plants; 3) soil restoration technologies and pollution control systems for degraded non-arable soils; 4) the “ecological-economic” synergistic benefit model for woody oil plant cultivation. By establishing an interdisciplinary exchange platform for non-arable land governance and green oil crop industry development, the forum aims to collectively explore theoretical frameworks and technical pathways for ecological restoration and sustainable utilization of non-arable lands.

1. Format

Oral presentation

1. Proposed Speakers

**(1) ChangZhu Li** (State Key Laboratory of Woody Oil Resources Utilization, Executive Director and Academician Candidate) innovated and improved a technical system that integrates the scientific theoretical basis, application technology, and industrial demonstration of wood-based oil utilization. He broke through key technologies such as the high-value utilization of wood-based oil resource mining, oil modification, and green and controllable conversion of by-products. The relevant results have been promoted to more than 20 provinces, cities, and autonomous regions.

**(2) Longsheng Chen** (State Key Laboratory of Woody Oil Resources Utilization, Director of the *Camellia* Oil Research Institute of the Hunan academy of forestry, and Hunan Province Advanced Worker) has focused on camellia oil breeding and ecological cultivation, developing more high-yield, high-quality, and stress-tolerant *camellia* oil varieties. The average oil yield per mu has increased from less than 10 kilograms in the past to over 40 kilograms, with the highest oil yield per mu reaching 151 pounds; He has established 37 demonstration bases nationwide, creating the “Xianglin” *camellia* oil superior variety brand, with over 6 million mu of *camellia* oil planted across the country.

**(3) Zhengquan Wang** (Professor, Northeast Forestry University) focuses on forest resource cultivation, with a particular emphasis on *red pine*, *larch*, *Korean pine*, and *broadleaf* tree species afforestation. His research has contributed to the optimization of afforestation techniques, improved forest management and operation standards, and promoted the development of forest ecology research.

**(4) Jinxing Zhou** (Professor, Beijing Forestry University) has long been committed to research on soil and water conservation and desertification control. His team's achievements, such as comprehensive sand control technology along the Qinghai-Tibet Railway and stone desertification control technology in southern karst depression basins, have been applied in ecological restoration practices.

**(5) Jianan Li** (Professor, Central South University of Forestry and Technology) established an ecological management technology system for economic forests in the red soil hilly areas of southern China. He has extensively carried out variety improvement and demonstration and promotion of supporting cultivation techniques for *camellia* oil, *jujube*, *plum*, *Chinese toon*, and other forest-based economic crops.

**(6) Wentao Jiao** (Researcher, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences) clarified the multi-factor influences on pollutant migration and transformation pathways in actual scenarios, created a low-carbon thermal remediation technology optimization method, supported a remediation output value of 1.035 billion yuan, achieved comprehensive energy savings of >10%, and promoted the development of the soil remediation industry.

**(7) Rui Xu** (Associate Professor, School of Metallurgy and Environment, Central South University; Deputy Director, Department of Environmental Science and Engineering; Hunan Province Outstanding Young Scientist) focuses on environmental biotechnology, microbiology in mining areas under adverse conditions, and ecological restoration of heavy metal-polluted soil. His research achievements include revealing microbial reduction mechanisms, identifying the roles of key microbial groups, and developing methods for assessing restoration effectiveness.

**(8) Rui Zhuo** (Associate Professor, School of Biology, Hunan University; Deputy Head, Department of Microbiology) focuses on microbial environments and energy. He has conducted in-depth research on the discovery and biological functions of white rot fungi, as well as the microbial degradation and conversion of lignocellulose and environmental pollutants.

**(9) Xuan Zhang** (Associate Researcher at the Hunan academy of forestry and core member of the State Key Laboratory of Woody Oil Resources Utilization) focuses on the remediation of heavy metal-contaminated mining areas using mycorrhizal plants. He has developed and promoted a soil ecological remediation technology for camellia oil production sites covering more than 600 acres, achieving the conversion and practical application of research results on plant stress-resistant growth-promoting agents. He has been awarded the “National First Prize for Invention and Entrepreneurship Achievements” by the China Invention Association for two consecutive years.

**(10) Guangcai Chen** (Researcher at the Chinese Academy of Forestry Sciences, one of the first batch of national forestry and grassland science and technology innovation leaders) has long been engaged in research on the principles and technologies of ecological restoration of difficult sites (such as saline-alkali land, mines, and heavy metal-polluted land), as well as forest restoration and ecological function enhancement in reservoir small watersheds. He has published two books and established three industry and local standards.

**(11) Kailiang Wang** (Researcher, Chinese Academy of Forestry Sciences) has made breakthroughs in the breeding of high-quality varieties and efficient cultivation techniques for camellia oil and thin-shelled walnuts. These techniques have been promoted across more than 5 million mu of suitable areas in Zhejiang, Jiangxi, Hunan, and other provinces. He has participated in the compilation of five monographs, including “*Camellia* Oil in China”, and has bred 22 national or provincial approved high-quality varieties of *camellia* oil and thin-shelled walnuts.

**(12) Xiongqing Zhang** (Researcher, Chinese Academy of Forestry Sciences) has focused on research related to the cultivation of artificial cypress forests. He has achieved remarkable results in constructing growth models, analyzing growth mechanisms, and revealing changes in soil microbial communities, providing important support for the precise management and sustainable development of artificial cypress forests.

**(13) Chun Gong** (Researcher and Director of the Jiangxi Academy of Forestry Sciences) has devoted himself to the study of oil-bearing woody plants such as *camellia oleifera*. He has established a technical system integrating “high-quality seedling propagation, efficient cultivation, and industrial poverty alleviation”. Across the province, he has established 11 *camellia oleifera* superior variety cuttings nurseries and over 40 standardized demonstration nurseries for high-quality seedling propagation, providing nearly 400 million high-quality seedlings in total.

**(14) Stefania Cocco** (Prof. Associato Pedologia D3A, UNIVPM Via Brecce Bianche 10 Ancona) conducted a systematic study of the dynamic changes in soil organic matter and its regulatory mechanisms on carbon sequestration, and developed a soil health assessment system based on microbial community optimization.

**(15) Kwame Antwi Oduro** (Director of CSIR-FORIG, Forest Research Institute of Ghana) has conducted systematic research on ecological restoration techniques for tropical forests in West Africa and developed community-based sustainable forest management models, significantly improving the effectiveness of local forest resource conservation.

**(16) lsaac Danso** (Director of CSIR-OPRl, Oil Palm Research Institute) successfully cultivated a new high-yield, disease-resistant oil palm variety adapted to the climate of West Africa and developed a sustainable cultivation technology system, significantly increasing oil palm yields and cultivation efficiency.

**(17) Nicola Fuzzati** (CHANEL Fragrance & Beauty - Innovation, Research & Development, Directeur Innovation et Development of Materials) has over 30 years of experience in the development and application of plant-based active ingredients. As a member of the Italian Society of Plant Chemistry, he has participated in the compilation of the European Pharmacopoeia monographs as a natural products expert.

**(18) Xiaoju Wang** (Academy Research Fellow, Åbo Akademi University) focuses on harnessing the benign properties of bio-enabled plant biopolymers to design sustainable and functional biomaterials.