Supplementary Materials

Table S1. Literature review of MCDM models used in forest management.

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
1	Eggers et al. (2019) [36]	Empirical	2019	Sweden	Simple Multi-Attribute Rating Technique (SMART)	13	**Economy (4):** Net present value (in Swedish Krona (SEK)/ha), Total harvest (10^3 m^3 over bark/ha/year), Growth (m^3/ha/year), Growing stock (m^3/ha). **Ecological (4):** Mature forest with a high proportion of hardwoods (%), Old forest (%), Large diameter trees (trees/ha), Fresh deadwood (m^3/ha). **Social (3):** Sparse forest (%), Clear-cut area (%), Mature forest (%). **Reindeer husbandry (2):** Forest with arboreal lichen (%), Forest area dominated by twisted pine (%).	Ten forest management scenarios: Reserve allocation scenario, Longer rotation period scenario, Shorter rotation period scenario, More hardwoods scenario, Continuous cover forestry scenario, Climate change adaptation scenario, Increased nature conservation scenario, Strong increase in nature conservation scenario, Intensive scenario, Business as usual scenario.
2	Sari (2021) [37]	Empirical	2021	Turkey	Analytical Hierarchy Process (AHP), Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), VIKOR	17	**Topographical (4):** Aspect, Slope, elevation, Municipality topography. **Climatic (5):** Average temperature, Average precipitation, Evaporation, Solar radiation, Humidity index, Wind. **Environmental (6):** Land use, Distance to urbanised areas, Distance to buildings, Distance to rivers, Distance to power lines, Distance to roads. **Forest Structure (2):** Vegetation type, Biomass density.	Seven solutions: FFS, D_i^*, D_i^-, C_i^*, S, R et Q.
3	Long *et al.* (2023) [81]	Empirical	2023	China	CASA model, AHP, Fuzzy comprehensive evaluation combined with entropy weight method	13	**Biodiversity (3):** Genetic diversity, Species diversity, Ecosystem diversity. **Socioeconomic (3):** Forest product sales, Gross domestic product, Total population. **Cultural entertainment (2**): Education, Tourism. **Others (5)**: Net primary productivity of forest ecosystems, Topography, Landforms, Climate, Natural disasters	Different forest management scenarios for the Saihanba park, such as sustainable logging, enhanced conservation, silvicultural techniques, etc. Different geographical areas within the Saihanba park to compare, based on their topographic, climatic characteristics, tree species composition, etc. Different tree species compositions in the forest stands of the park, by varying the represented species (hardwoods, conifers, local or introduced species, forest product)

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
4	Yamada and Yamaura (2017) [82]	Empirical	2017	Japan	Bayesian Network Model (BN)	4	Wood production Protection against soil erosion Biodiversity preservation Carbon retention	Current zoning Zoning to enhance biodiversity Zoning to enhance wood production
5	Wolfslehner and Harald (2011) [83]	Empirical	2011	Austria	Cognitive Mapping (CM), Analytic Network Process (ANP)	35	**Environment (26):** Forest area (10^3 ha), Growing stock (10^3 m^3), Age structure/area even aged (10^3 ha), Carbon stock (tons), Air pollutants/exceeding limits (Number), Soil condition, Defoliation (%), Forest damage/area (10^3 ha), Increment and fellings (10^3 m^3), Roundwood (10^6), Non-wood goods (10^6), Services (10^6), Forests under management plan (%), Tree species composition/area (10^3 ha), Natural regeneration/area (10^3 ha), Naturalness (10^3 ha), Introduced tree species - invasive (10^3 ha), Deadwood (m^3/ha), Genetic resources (ha), Landscape patterns, Threatened forest species (number), Protected forests (10^3 ha), Protective forests – ecosystem (10^3 ha), Protective forests – infrastructure (10^3 ha), Forest holdings (10^3 number). **Economic (3):** Contribution to the gross domestic product (%), Net revenue (€/ha), Expenditures for services (10^3 €). **Social (6):** Forest sector workforce (10^3 number), Occupational safety/accidents (number/10^4), Wood consumption/annual (m^3/inhabitant), Trade in wood/annual balance (10^6 m^3), Energy from wood (%), Accessibility for recreation (%), Cultural and spiritual values.	Various industrial sectors or activities
6	Xiao *et al.* (2022) [84]	Empirical	2022	China	AHP, DART Model	23	**Ecological: (6)** Ecological integrity value (on 1–5 scale by expert assessment), Carbon fixation and oxygen release value (area x carbon sequestration coefficient	Various industrial sectors or activities

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
							(T/year)), Biodiversity protection (1–5 scale by expert assessment), Local culture protection (on 1–5 scale by expert assessment), Pleasant value (on 1–5 scale by expert assessment), Education and science value (on 1–5 scale by expert assessment). **Potential evaluation index: (5)** Protected area (hectometer^2), Proportion of technical personnel (%), Industrial R&D density (10^4 yuan), Ecological constraints (on 1–5 scale by expert assessment), Environmental protection management ability (on 1–5 scale by expert assessment). **Economy: (4)** Gross industrial output value (10^4 yuan/year), Local financial support (10^4 yuan/year), Investment absorption ability (10^4 yuan/year), Market share (%). **Social (7):** Average employee salary (yuan), Annual employment (number), Technical training (on 1–5 scale by expert assessment), Policy support (on 1–5 scale by expert assessment), Industry relevance (on 1–5 scale by expert assessment), Regional competitiveness (on 1–5 scale by expert assessment), Market demand (on 1–5 scale by expert assessment).	
7	Vaghela *et al.* (2018) [85]	Empirical	2018	India and Australia	Normalized Difference Vegetation Index (NDVI) thresholding approach	5	**Ecological (5):** Mangrove density, human pressure, erosion/accretion, availability of saline water, and proximity to industries and ports	Healthy, moderate health, prone to degradation, and unhealthy
8	Tüdeş and Kumlu (2017) [86]	Empirical	2017	Turkey	AHP	6	**Ecological (6):** Geological, tectonic, and hydrological data, agricultural land use, slopes, distance to settlement areas, and distance to highways	Restricted, very low suitability, low suitability, moderate suitability, high suitability, and very high suitability

9	Tsiaras and Papathanasiou (2018) [87]	Empirical	2018	Greece	Preference Ranking Organisation Method for	6	**Economy (2):** Cost (€), expected revenue (€). **Social (2):** Working hours (h/10^3 m^2), Waiting periods for the first yield or	Fourteen agroforestry systems: Apple-corn, Apple-medick, Cherry-corn, Cherry-medick, Chestnut-

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
							production years. **Environmental (2):** Water demands (mm/10^3 m^2) and fertiliser (kg/10^3 m^2).	corn, Chestnut-medick, Dogwood-corn, Dogwood-medick, Olive-corn, Olive-medick, Pomegranate-corn, Pomegranate-medick, Walnut-corn, Walnut-medick
					Enrichment Evaluation (PROMETHEE)			
10	Tanim *et al.* (2022) [88]	Empirical	2022	South Carolina	Fuzzy logic-based normalisation, TOPSIS and entropy weighting techniques	20	**Hydroclimate (5):** Number of coastal hazard events, Hurricane track density, Surge height, Rainfall intensity, Sea-level rise. **Physical (4):** Land use, Available water storage, Elevation, Distance from the coast. **Socioeconomic (3):** Social vulnerability index, Number of historical and archaeological structures, Cost of fatalities. **Ecological (3):** Species richness, Shellfish harvesting, Turtle. **Shoreline (5):** Rate of shoreline change, Tide range, Significant wave height, Coastal slope, Beachfront stability.	Six coastal counties: Charleston, Colleton, Mount Pleasant, Cape Romain, Myrtle Beach and Beaufort County
11	Shang *et al.* (2012) [89]	Empirical	2012	USA	PROMETHEE	6	**Economy (2):** Estimated cost, Average Forest value. **Ecological/Environment (2):** Mean fire-return intervals, Average habitat suitability for eastern wild turkey. **Forestry/Land Management (2):** Total harvested age cohorts, Pine plantation areas.	Four alternative management scenarios: protecting ecosystem health, sustaining habitats for native communities, providing sustainable forest products, and providing non commodity ecosystem services.
12	Schaduw (2020) [90]	Empirical	2020	Indonesia	Criteria Decision Making Analysis (MCDMA) and Rapid Appraisal of Mangrove Ecosystem Sustainability (RAPMECS)	34	**Ecological (16):** Beach index, Island isolation index, Core zone area index, Utilisation zone area index, Coral reef area index, Mangrove area index, Mangrove degradation index, Coral reef degradation index, Tidal riding index, Slope index, Wave height index, Flow velocity index, Water quality index, Abrasion index, Seawater flood index, and Erosion index. **Social and economic (9):** Population growth index, Population	Five alternatives level: very good, good, moderate, bad, and very bad

							density index, Community participation index, Community intelligence index, Education level index, Community income	

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
							index, Economic remoteness index, Bunaken national park impact index, and Building density index. **Institutional (9):** Planning quality index, Coordination quality index, Implementation quality index, Monitoring quality index, Evaluation quality index, Regulatory compliance index, Infrastructure readiness index, Higher education role index, Community assistance index.	
13	Samari *et al.* (2012) [47]	Empirical	2012	Iran	AHP	10	**Community participation and involvement (2):** Beneficiaries' participation in the planning process, Beneficiaries' participation in the implementation process. **Extension services and capacity building (6):** Ability in recruiting local extension agents, Ability in recruiting specialised extension agents, making use of research findings, using diversified training methods, Ability in developing extension programs, Ability in implementing extension programs. **Management approach and beliefs (2):** Belief in decentralised extension management, Belief in the role of local leaders in managing forests.	Extension: Cooperative extension, public extension, and privatised extension
14	Sahraei *et al.* (2023) [91]	Empirical	2023	Iran	Hybrid Fuzzy-DEMATEL-ANP (FDANP) and AHP	10	**Climate and weather (4):** Precipitation, Wind, Temperature, Solar radiation. **Topography (2):** Elevation, Slope. **Vegetation indices (3)**: Normalised difference vegetation index (NDVI), Normalized difference snow index (NDSI), Normalized difference moisture index (NDMI). **Land use/Land cover (**LULC) **(1)**	Five classes of level including 'Very High', 'High', 'Medium', 'Low', and 'Very Low'
15	Reza *et al.* (2013) [92]	Empirical	2013	Malaysia	Expert judgement and scoring process	8	**Ecological indicators (8)**: Habitat/patch size, Habitat/patch quality, Patch connectivity, Road density, Food availability, Proximity to water, Elevation, Pressure and Encroachment	Low (1) to high (3) for different criteria for four species
16	Reinhardt *et al.* (2020) [93]	Empirical	2020	USA	AHP	5	**Ecological/Conservation (1):** Proximity to areas of conservation interest. **Economy (1):** Economic benefit of treatment. **Infestation/Spread (2):** Distribution estimates, Known report density. **Recreation/Access (1):** Proximity to trails.	Common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnus*), garlic mustard (*Alliaria petiolata*), multiflora rose (*Rosa multiflora*), and knotweeds (*Polygonum spp. or Reynoutria spp.)*

17	Ortiz-Urbina *et al.* (2022) [65]	Empirical	2022	Spain	Pairwise comparison matrices (PCMs) and AHP	2	**Socioeconomic (2):** Representativity in the decision-making problem, number of stakeholders in the landowner and the association's groups.	Landowner, associations, firms, ecologists

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
18	Ngo and Sakai (2011) [94]	Empirical	2011	Vietnam	Qualitative Multi-Criteria Analysis (MCA) approach	21	**Improvement of awareness and capacity building (3):** Propaganda and mobilisation, Training in forest management and protection, Educating violators within the community. **Organisational systems (4):** Setting up the structure of the organisation, Assigning role and responsibility, Cooperation among members within the system, Cooperation with related stakeholders. **Forest protection patrols activities (4):** Patrol schedule, Implementation of the patrol, Number of participants, Identifying route of the patrol. **Effect of forest protection (3):** Reducing violation cases, Forest fire, Discovering and treating violation cases. **Forest care and development (3):** Taking care of forest, Forest's plantation, Reforestation. **Other required supports from relevant departments (4):** Guideline documents for treating violation cases, Guideline documents of simple sylviculture techniques, Legalisation of organisation, Establishing funds for forest protection and development.	Forest reserve model and stable forest model
19	Naskar *et al.* (2022) [95]	Empirical	2022	India	AHP and TOPSIS	10	**Geographic variables (5):** Latitude, Longitude, Elevation, Slope, Aspect. **Climatic variables (4):** Humidity, Temperature, Wind Velocity, Rainfall. **Land use/Land cover (LULC) (1):** LULC	Very high, high, medium, low, and very low vulnerability final forest fire susceptibility zones.
20	Merganič *et al.* (2022) [96]	Empirical	2022	Slovakia	Weighted Summation Method (WSM) and Pareto Front Technique	4	**Ecological/Biological variables (4):** Soil expectation value, Shannon's index of species diversity, and height to diameter ratio	Different harvest-regeneration variants
21	Martínez *et al.* (2019) [97]	Empirical	2019	Spain	AHP and Goal Programming (GP)	19	**Land use/Management (13):** Conservation use, Development, Governance, Guarantees, Simplification, Connectivity, Participation, Local development, Hunt/fishing, Agroforestry, Scientific research, Tourism, Leisure, Education, Fire. **Environmental components (6):** Landscape, Geology, Water, Atmosphere, Flora, Fauna.	Two Spanish protected areas: Parque Natural de Lago de Sanabria y alrededores and Parque Natural de los Arribes del Duero.

22	Marques *et al.* (2017) [98]	Empirical	2017	Europe	SADfLOR Pareto Frontier module	4	**Ecological (4):** Average wildfire resistance of the forested landscape over the planning horizon, average adjusted resistance of the forested landscape over the planning horizon, forested landscape wildfire resistance in period t and forested landscape adjusted resistance in period t.	Management planning criteria: net present value, pine sawlogs, eucalyptus pulpwood, chestnut sawlogs,

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
								average carbon storage, volume of the ending inventory, fuel treatment costs, area of each forest management program, and wildfire risk
23	Kucukarslan *et al.* (2023) [99]	Empirical	2023	Turkey	AHP, Fuzzy AHP (F-AHP), PROMETHEE	19	**Work accident statistics (5):** Area affected by forest fire per employee, Occupational accident frequency rate, Work accidents weight rate, Damage weighted occupational accidents, frequency rate. **Risk assessment statistics (2):** Total risk amount as a result of risk assessment, Total residual risk amount after corrective actions. Occupational Health and Safety (**OHS) activities (7):** OHS control/audit, Corrective actions, Preventive actions, Number of near misses, Unsafe environment detections, Unsafe behaviour detections, Periodic control deficiency detections. **Training and health control activities (5):** OHS training, Periodic health checks, OHS meetings with management participation, Education, health check deficiencies.	Ten forest management directorates
24	Khosravi *et al.* (2019) [100]	Empirical	2019	Iran	Decision Making Trial and Evaluation Laboratory (DEMATEL), ANP DEMATEL-based ANP (DANP)	13	**Area and spatial requirements (3):** Home range size, Landscape connectivity among habitat patches, Extent of occurrence. **Heterogeneity and umbrella efficiency (3):** Habitat diversity covered by species range, Species diversity covered by species range, Sensitive habitats covered by species range. **Vulnerability and sensitivity (2):** Sensitivity to habitat fragmentation, Sensitivity to climate change. **Ecology and species characteristics (3):** Functional and ecological significance, Rarity, Feasibility of monitoring. **Socioeconomic significance (2):** Social acceptance, Conflict with humans.	Ten carnivore species are: Leopard, Asiatic cheetah, Caracal, Wild's cat, Sand's cat, grey wolf, Golden jackal, Red fox, Sand fox, Blandford's fox

25	Khorrami and Kamran (2022) [101]	Empirical	2022	Iran	Fuzzy AHP	5	Normalised difference water index, Carotenoid reflectance index, Normalised difference vegetation index, Plant senescence reflectance index, and Photochemical reflectance index	Forest health conditions in different regions
26	Jalilova *et al.* (2011) [102]	Empirical	2011	Kyrgyzstan	AHP	37	**Maintenance of forest ecosystems (5):** Area of forest ecosystems, Fragmentation of forest ecosystems, Representative samples of existing ecosystems, Conservation of soil resources, Maintenance of water resources. **Maintenance of forest biodiversity (5):** Number of threatened species, Number of species	Management strategy I: Developed by foresters, focused on forest production, protection, and policy

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
							dependent on forests, State of in situ and ex situ conservation efforts, Degree of naturalness of forest populations, Abundance of selected indicator species. **Improvement of forest health and vitality (5):** Area of forest affected by anthropogenic factors, Area of forest affected by natural factors, Defoliation of forest populations, State of forest populations, Forest regeneration. **Productive functions of forests (5):** Area of forest available for wood production, Standing stock, Annual increase in standing stock, Area of forest available for non-wood production, Forest product revenues. **Protective functions of forests (5):** Area of protective forests, State of damage regulation services, State of soil protection services, State of water protection services, Carbon stock and carbon sequestration. **Socioeconomic functions and conditions (7):** Value of wood and non-wood products, Value of forest services, Net income, Degree of recycling of forest products, Direct employment in forestry, Indirect employment, Cultural, social and spiritual needs. **Legal and institutional frameworks (5):**	issues. Management Strategy II: Developed by researchers, focused on socioeconomic and ecological measures. Management Strategy III: Developed by ecologists, focused on biodiversity conservation, forest health, and maintenance of forest ecosystems. Management Strategy IV: Developed by administrative workers, focused on socioeconomic and policy issues.

							Clarity of land tenure and property rights regimes, Consistency of policies and laws, Effectiveness of law enforcement, Public participation in forest management, Planning for sustainable forest management.	

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
27	Malekmohammadi and Jahanishakib (2017) [103]	Empirical	2017	Iran	AHP	3	Importance of threat, Severity of ecosystem services, Probability of occurrence	Different threats to the wetland ecosystem, such as agricultural activities, water requirements, tourism, settlements, mining activities, population growth, and drought
28	Jahani *et al.* (2015) [104]	Empirical	2015	Iran	Artificial Neural Network (ANN) modelling	33	**Ecological factors (10):** altitude, slope, aspect, vegetation types, soil depth, soil drainage, soil erosion vulnerability, geology type, mean annual temperature, mean annual precipitation. **Associated factors with forest degradation (21):** Overgrazing, trail construction, tree cutting, road construction, logging, skidding, soil compaction, recreational overuse, waste pollution, tubing under roads, road damages, high-voltage cabling, reforestation, distance to the road, distance to trail, distance to livestock husbandry, distance to log depot, density of livestock, reforested areas, seed sown areas, volume of tree cutting. **Degradation indicators (2):** Rate of erosion index, Rate of surface litter erosion	Comparison of the current forest project with an alternative forest project that had lower environmental impacts by manipulating certain forest management activities based on the sensitivity analysis results.
29	Hayati *et al.* (2012) [105]	Empirical	2012	Iran	Delphi method, AHP, Spatial Multi-Criteria Evaluation (SMCE)	8	**Environmental (8):** Ground slope, Lithology, Distance from the stream network, Distance from faults, Landslide susceptibility, Erosion susceptibility, Geology, Soil texture	Nine Road network alternatives

30	Hajizadeh *et al.* (2022) [106]	Empirical	2022	Iran	SWARA (Weight of forest ecosystem functions) SAW (Simple Additive Weighting) ARAS (Additive Ratio Assessment) TOPSIS	4	Regulatory function, information function, production function, and habitat function	Two indigenous communities of the Shiadeh and Diva Forest ecosystems
31	Gourabi and Rad (2013) [107]	Empirical	2013	Iran	AHP Expert Choice 11 software (for implementing AHP), Geographic Information System (GIS)	8	**Ecotourism (8):** Number of sunny days, Average daily temperature, Relative humidity, Slope, Direction (aspect), Soil texture, Water resources, Vegetation density.	Favorable, unfavorable and intermediate

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
32	Ghorbanzadeh *et al.* (2019) [108]	Empirical	2019	Iran	Geographic information system multi-criteria decision-making (GIS-MCDM), AHP and ANN	33	**Social vulnerability (22):** Age, Gender, Occupation, Population density, Average life expectancy, Accessibility to healthcare facilities, Accessibility to emergency services, Education level, Income level, Access to social support networks, Language barriers, Disability, Ethnicity, Housing quality, Homelessness, Mobility Limitations, Community cohesion, Social isolation, Knowledge about fire prevention, Previous experience with wildfires, Awareness of evacuation routes, Level of community engagement. Infrastructural vulnerability (11): Road network density, Accessibility to roads, Proximity to fire stations, Proximity to emergency shelters, Proximity to water sources, building materials, Building code compliance, Fire protection infrastructure, Access to telecommunications, Access to electricity, Access to alternative energy sources.	Forest Fire Risks Classes

33	Feng *et al.* (2016) [109]	Empirical	2016	China	AHP and Cluster Analysis (CA)	12	**Forest quantity (1):** Forest coverage rates. **Forest productivity (4):** Forestry land utilisation rates, Stock volume per unit area, Stock quality, Stock volume increment. **Forest structure (5):** Stand origin structure, Forest category structure, Tree species structure, Age group structure, Canopy structure. **Forest health (2):** Forest viability, Forest's calamity.	Four groups using CA based on the similarity of their forest resources characteristics
34	Ezquerro *et al.* (2023) [110]	Empirical	2023	Spain	Extended Goal Programming (EGP)	10	Old-growth stock (m^3), Gini index, Bird's habitat quality, Standing deadwood (m^3), Area harvested by the silvicultural alternative 1 (ha), Area harvested by the silvicultural alternative 2 (ha), Area harvested by the silvicultural alternative 3 (ha), Area harvested by the silvicultural alternative GTR (ha), Area no harvested (ha), Average rotation length (years)	Baseline scenario, declaration of the National Park, current management plan and National Park in 2070

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
35	Eyvindson *et al.* (2011) [111]	Empirical	2011	Canada	GP	7	**Economy (3):** Net income (€) for the first 5-year period, Net income (€) for the second 5-year period, Value of growing stock at the end of a 10-year period (€). **Forest Structure (4)**: Regeneration cutting area (ha), Total wood volume at the end of a 10-year period (m^3), Mature forest area at the end of a 10-year period (ha), Volume of broad-leaved trees at the end of a 10-year period (m^3).	Seven different harvesting intensities and constraints
36	Etemad *et al.* (2018) [112]	Empirical	2018	Iran	GP	14	Negative deviation from goal value, the weight allocated to each deviation, [1 to 10: total stock, beech stock, hornbeam stock, oak stock, alder stock, other species stock, sequestrated carbon, growth, labour and net present value (NPV), [1 to 5: indicates decision variables such as beech, hornbeam, oak, alder and other species], Minimum total feasible stock (m^3*ha^{-1}), Minimum feasible stock of each species, Minimum	No applicable

							feasible carbon sequestration ($t*ha^{-1}$), Minimum feasible growth per hectare, Minimum feasible personnel or labour, Minimum suitable NPV (10^4 Iranian Rials), Coefficient of sequestrated carbon, Coefficient of growth, Coefficient of labour, Coefficient of NPV.	
37	Estrella *et al.* (2014) [113]	Empirical	2014	Ecuador	Iterative ideal point thresholding (IIPT), compromise programming (CP), balanced compromise programming (BCP)	4	Water conservation, soil protection, carbon storage and monetary income	Distribution of land use types

Table S1. (Continued).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
38	Drăgoi *et al.* (2015) [114]	Empirical	2015	Romania	AHP	18	**Private benefits (2):** Stumpage price growth, non-wood products. **Social benefits (3)**: Easy access in case of an accident, Access to remote properties, and tourism. **Private costs (3):** Investment, Fuel consumption, Road maintenance. **Social costs (4):** Water protection, Landscape, Habitat disturbance, Earth movement. **Risks (6):** Constructor's bankruptcy, cash default, Landslides, Broken bridges, Illegal cuttings, Risk quotient.	Long to shorter hauling distances for the first alternative
39	Deng *et al.* (2023) [77]	Empirical	2023	China	Best – Worst Method (BWM) and the VlseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR) method	13	**Environment (5):** Rate of increase in area of clearcutting, Rate of increase in afforestation survival, Rate of increase in area of tending trees, Rate of increase in wood production, Rate of increase in carbon contributions from forest trees. **Society (4):** Rate of increase in social welfare assets such as forest recreation and tourism, Rate of increase in the number of employees in forestry enterprises, Rate of	The past five years

							increase in tax payments, Rate of increase in product quality assurance costs. **Economy (4):** Rate of increase in forestry income, Rate of increase in productive biological assets, Rate of increase in income from forest management, Rate of increase in forestry research and development project inputs.	
40	de Sousa Xavier *et al.* (2015) [115]	Empirical	2015	Portugal	CP	13	**Agri-economic (11):** Dimension (very small farm, small farm, medium/big farm), Specialisation (agriculture, mixed, Forest), Type of farmer, Entrepreneurial singular producer, Other forms and enterprises, Labour (family labour, non-family labour). **Environmental (2):** Biophysical units, Biodiversity	Multiple stakeholders in a risky situation
41	Chiteculo *et al.* (2022) [116]	Empirical	2022	Angola	AHP and GIS-based spatial multi-criterion decision	4	Elevation slope (%), Soil type, Flow accumulation geology, Aspect	Alternative routes for road construction to provide access to forest zones, forest plantations, and existing forest roads

Table S1. (End).

N°	Authors (Year)	Type of study	Year	Country	Models/Methods	Number of indicators	Indicators	Alternatives
42	Chakraborty *et al.* (2019) [117]	Empirical	2019	China	AHP	13	**Climatic variables (5):** Maximum temperature, minimum temperature, precipitation, solar radiation, and wind speed. **Geomorphic variables (4)**: Elevation, slopes, geomorphology, and lithology. **Edaphic variables (2):** Soil moisture and soil salinity. **Floral condition (1):** Normalised difference vegetation index (NDVI). **Demographic (1):** Population	Different locations within the study
43	Cammerino *et al.* (2023) [118]	Empirical	2023	Italy	AHP and GIS application	11	Forest categories, forest management, terrain slopes, distance from the road, geomorphological hazard, landslide risk, protected natural reserve, protected wild species, footpaths and hiking pathways, panoramic road, places of cultural interest.	Forest functions: Productive, Protective, Naturalistic, Tourist.
44	Çalışkan (2017) [119]	Empirical	2017	Turkey	Spatial TOPSIS (S-TOPSIS)	5	Avalanche risk, Proximity to rivers, Soil quality, Geology/lithology and Slope	Two alternatives: Current Forest Road Route, and environmentally sound forest road routes.

45	Caglayan *et al.* (2020) [120]	Empirical	2020	Turkey	AHP	12	**Physical/Environmental (5):** Elevation, Slope, Aspect, Land cover, Canopy closure. **Accessibility/Proximity (2):** Distance to recreational areas, Accessibility. **Recreational activity (5):** Intensive activity area, Scenic beauty (Water movement, Water amount, Negative man-made effects, Positive man-made effects).	1118 forest stands in the Belgrad Forest
46	Buğday *et al.* (2019) [121]	Empirical	2019	Turkey	Modified AHP (M-AHP), Fuzzy Inference System (FIS), Logistic Regression (LR)	9	**Topographic (3):** Elevation, Slope, Aspect. **Geologic (1):** Lithology. **Proximity (3):** Distance to faults, Distance to streams, Distance to roads. **Terrain indices (2):** Topographic wetness index, Stream power index.	Four groups