

Table S1. Current and potential applications of the reviewed process-based models

Applications	Soil and Water Assessment Tool	Soil and Water Integrated Model	Generalized Watershed loading Function	Annualized agricultural Non-Point Source pollution model	Hydrological simulation program-FORTRAN	MIKE-SHE	Land-Use Change Assessment	Integrated Valuation of Ecosystem Services Tradeoffs Sediment Retention model
Hydropower dams								
Environmental cost and benefits of dam removal	X	X			X	X	X	X
Environmental cost and benefits of dam construction	X	X			X	X	X	X
Environmental cost and benefits of dam operation	X	X			X	X	X	X
Economic and social cost and benefits of dam removal, construction, operation								X
Changing land use								

Environmental cost and benefits of converting forest land into agricultural land and vice versa	X	X				X	X	
Economic and social cost and benefits of converting forest land into agricultural land and vice versa	X	X				X		
Environmental cost and benefit of converting marginal land into agricultural land	X	X			X	X	X	
Economic and social cost and benefits of converting marginal land into agricultural land								

Environmental cost and benefits of changing land uses as a result of spatial planning	X	X			X	X	X	X
Economic and social cost and benefits of changing land uses as a result of spatial planning	X	X			X	X		
Environmental cost and benefits of changing crops in an agricultural landscape	X	X			X	X	X	
Economic and social cost and benefits of changing crops in an agricultural landscape	X	X			X	X		
Environmental cost and benefits of intensifying or	X	X				X	X	

reducing cropping								
Economic and social cost and benefits of intensifying or reducing cropping								
Cost and benefits of afforesting of erodible lands	X	X			X	X		X
Cost and benefits of reconfiguring agricultural land use	X	X			X	X		
Identification of optimal agricultural land use patterns based on ecological and economic considerations	X	X			X	X		
Analysing economic and financial efficiency of land use involving wildlife on private land	X	X				X		

Spatially predict soil moisture for land quality evaluation and land use planning								
Assessing the enhancement of Carbon sequestration through land use changes and planning								
Climate, flooding and risk								
Environmental cost and benefits of dikes	X	X				X	X	
Economic and social cost and benefits of dikes	X	X				X		
The associated costs and benefits of microclimate as a result of habitat alteration							X	
Managing rockfall risk through land								

use planning and analyzing susceptibility in extensive areas								
Management practices								
Identifying best management practices	X			X	X	X	X	
Evaluating management practices	X			X	X	X	X	
Cost and benefits of altering habitats								
Cost and benefits of degraded land rehabilitation	X				X	X		
Environmental cost and benefits of restoration for impaired river ecosystems								
Environmental cost and benefits of adaptation measures to the anthropic-	X	X	X	X	X	X	X	

related changes affecting directly or indirectly the water quantity and quality								
Economic cost and benefits of adaptation measures to the anthropic-related changes affecting directly or indirectly the water quantity and quality	X	X	X	X	X	X		
Environmental cost-benefits of management strategies	X			X	X	X	X	
Economic cost-benefits of management strategies	X			X	X	X		

SI Table 2. Current and potential applications of the reviewed statistical models

Applications	Simple statistical bivariate analysis	Multivariate regression model (Olive trees)	Spatial prediction
Hydropower dams			
Environmental cost and benefits of dam removal			
Environmental cost and benefits of dam construction			
Environmental cost and benefits of dam operation			
Economic and social cost and benefits of dam removal, construction, operation			
Changing land use			
Environmental cost and benefits of converting forest land into agricultural			

land and vice versa			
Economic and social cost and benefits of converting forest land into agricultural land and vice versa			
Environmental cost and benefit of converting marginal land into agricultural land			
Economic and social cost and benefits of converting marginal land into agricultural land			
Environmental cost and benefits of changing land uses as a result of spatial planning			

Economic and social cost and benefits of changing land uses as a result of spatial planning			
Environmental cost and benefits of changing crops in an agricultural landscape			
Economic and social cost and benefits of changing crops in an agricultural landscape			
Environmental cost and benefits of intensifying or reducing cropping			
Economic and social cost and benefits of intensifying or reducing cropping			

Cost and benefits of afforesting of erodible lands			
Cost and benefits of reconfiguring agricultural land use			
Identification of optimal agricultural land use patterns based on ecological and economic considerations			
Analysing economic and financial efficiency of land use involving wildlife on private land			
Spatially predict soil moisture for land quality evaluation and land use planning			X

Assessing the enhancement of Carbon sequestration through land use changes and planning			
Climate, flooding and risk			
Environmental cost and benefits of dikes			
Economic and social cost and benefits of dikes			
The associated costs and benefits of microclimate as a result of habitat alteration			
Managing rockfall risk through land use planning and analyzing susceptibility in extensive areas	X		
Management practices			

Identifying best management practices			
Evaluating management practices			
Cost and benefits of altering habitats			
Cost and benefits of degraded land rehabilitation			
Environmental cost and benefits of restoration for impaired river ecosystems			
Environmental cost and benefits of adaptation measures to the anthropic-related changes affecting directly or indirectly the water quantity and quality			

Economic cost and benefits of adaptation measures to the anthropic-related changes affecting directly or indirectly the water quantity and quality			
Environmental cost-benefits of management strategies			
Economic cost-benefits of management strategies		X	

Table S3. Current and potential applications of reviewed probabilistic and data-driven models

	Probabilistic Models	Data-driven models
Applications	Favorability function approach	Decision tree model

Hydropower dams		
Environmental cost and benefits of dam removal		
Environmental cost and benefits of dam construction		
Environmental cost and benefits of dam operation		
Economic and social cost and benefits of dam removal, construction, operation		
Changing land use		
Environmental cost and benefits of converting forest land into agricultural land and vice versa		
Economic and social cost and benefits of converting forest land into		

agricultural land and vice versa		
Environmental cost and benefit of converting marginal land into agricultural land		
Economic and social cost and benefits of converting marginal land into agricultural land		
Environmental cost and benefits of changing land uses as a result of spatial planning		
Economic and social cost and benefits of changing land uses as a result of spatial planning		

Environmental cost and benefits of changing crops in an agricultural landscape		
Economic and social cost and benefits of changing crops in an agricultural landscape		
Environmental cost and benefits of intensifying or reducing cropping		
Economic and social cost and benefits of intensifying or reducing cropping		
Cost and benefits of afforesting of erodible lands		
Cost and benefits of reconfiguring		

agricultural land use		
Identification of optimal agricultural land use patterns based on ecological and economic considerations		
Analyzing economic and financial efficiency of land use involving wildlife on private land		
Spatially predict soil moisture for land quality evaluation and land use planning		
Assessing the enhancement of Carbon sequestration through land use changes and planning		
Climate, flooding and risk		

Environmental cost and benefits of dikes		
Economic and social cost and benefits of dikes		
The associated costs and benefits of microclimate as a result of habitat alteration		
Managing rockfall risk through land use planning and analyzing susceptibility in extensive areas	X	
Management practices		
Identifying best management practices		
Evaluating management practices		
Cost and benefits of altering habitats		

Cost and benefits of degraded land rehabilitation		
Environmental cost and benefits of restoration for impaired river ecosystems		
Environmental cost and benefits of adaptation measures to the anthropic-related changes affecting directly or indirectly the water quantity and quality		X
Economic cost and benefits of adaptation measures to the anthropic-related changes affecting directly or indirectly the water quantity and quality		X

and benefits of dam removal													
Environmental cost and benefits of dam construction													
Environmental cost and benefits of dam operation													
Economic and social cost and benefits of dam removal, construction, operation													
Changing land use													
Environmental cost and benefits of converting forest land into				X		X					X	X	X

agricultural land and vice versa													
Economic and social cost and benefits of converting forest land into agricultural land and vice versa			X	X	X	X					X	X	X
Environmental cost and benefit of converting marginal land into agricultural land											X	X	
Economic and social cost and benefits of converting marginal land into agricultural land			X		X						X	X	
Environmental cost				X			X	X			X	X	X

and benefits of changing land uses as a result of spatial planning													
Economic and social cost and benefits of changing land uses as a result of spatial planning			X	X	X		X	X		X	X		X
Environmental cost and benefits of changing crops in an agricultural landscape									X		X	X	X
Economic and social cost and benefits of changing crops in an agricultural landscape			X		X				X	X	X		X

Environmental cost and benefits of intensifying or reducing cropping									X				X
Economic and social cost and benefits of intensifying or reducing cropping			X		X				X				X
Cost and benefits of afforesting of erodible lands				X	X			X		X	X	X	
Cost and benefits of reconfiguring agricultural land use			X		X				X			X	X
Identification of optimal agricultural land use patterns based on ecological				X					X		X		X

and planning													
Climate and risk													
Environmental cost and benefits of dikes													
Economic and social cost and benefits of dikes													
The associated costs and benefits of microclimate as a result of habitat alteration													
Managing rockfall risk through land use planning and analyzing susceptibility in extensive areas													
Management practices													

Identifying best management practices		X							X				
Evaluating management practices/strategies	X	X			X		X		X				
Cost and benefits of altering habitats													
Cost and benefits of degraded land rehabilitation													
Environmental cost and benefits of restoration for impaired river ecosystems		X					X						
Environmental cost and benefits of adaptation		X	X				X						

measures to the anthropic-related changes affecting directly or indirectly the water quantity and quality													
Economic cost and benefits of adaptation measures to the anthropic-related changes affecting directly or indirectly the water quantity and quality		X											
Environmental cost-benefits of management strategies	X						X		X				

Economic cost-benefits of management strategies	X						X		X				
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