TC Causality Review

Nodes\\Coding scheme

| Name | Description | Files | References |
| --- | --- | --- | --- |
| A. Research topic |  | 45 | 91 |
| Biodiversity conservation |  | 2 | 3 |
| Deforestation |  | 4 | 4 |
| Energy transition |  | 1 | 1 |
| Finance and capital |  | 2 | 2 |
| Food consumption or food security |  | 2 | 2 |
| GHG emissions |  | 2 | 3 |
| Governance and institutions |  | 4 | 5 |
| International trade |  | 15 | 18 |
| Land acquisitions |  | 2 | 3 |
| Land use and or land use change |  | 28 | 33 |
| People and Wildlife coupling |  | 2 | 2 |
| Pest control |  | 1 | 1 |
| Species invasion and migration |  | 3 | 5 |
| Technology |  | 1 | 1 |
| Tourism |  | 2 | 4 |
| Urbanization |  | 2 | 2 |
| Water transfer |  | 1 | 1 |
| B. Research objective | The research objective as described by the author in abstract and/or introduction | 45 | 74 |
| C. Research design |  | 45 | 72 |
| Both deductive and inductive |  | 2 | 3 |
| Deductive | Building generalizable statements from theories and extant literature | 17 | 23 |
| Descriptive |  | 20 | 28 |
| Inductive | Building generalizable statements from data and observations | 13 | 16 |
| D. Flows subject to analysis |  | 45 | 148 |
| Commodity |  | 18 | 26 |
| Discursive |  | 2 | 2 |
| Diseases |  | 1 | 2 |
| Energy |  | 1 | 1 |
| Environmental and biophysical |  | 8 | 11 |
| Financial exchange and investments |  | 12 | 20 |
| Human migration |  | 4 | 5 |
| Information and knowledge |  | 8 | 17 |
| None |  | 7 | 7 |
| Pests |  | 1 | 1 |
| Policy |  | 5 | 8 |
| Social dynamics |  | 1 | 1 |
| Species dispersal or animal migration |  | 4 | 7 |
| Temporal |  | 1 | 1 |
| Tourism |  | 3 | 8 |
| Trade |  | 19 | 30 |
| E. Analytical focus | Whether the focus is on material or immaterial aspects of the study object. For example, a study might analyse a material flow (such as commodities) but focus on the immaterial aspects of this commodity flow such as local attitudes in the receiving system or policital incentive structures in the sending system. | 45 | 61 |
| Both |  | 19 | 27 |
| Immaterial |  | 4 | 5 |
| Material |  | 20 | 26 |
| Unclear |  | 2 | 2 |
| F. Type of data |  | 45 | 139 |
| Biophysical data |  | 10 | 22 |
| Consumption data |  | 1 | 1 |
| Economic and socio-economic data |  | 5 | 9 |
| Fieldwork, interviews, focus groups |  | 9 | 13 |
| Forest cover data |  | 7 | 7 |
| Historical archives or literature |  | 10 | 11 |
| Official statistics |  | 11 | 17 |
| Relational data |  | 1 | 1 |
| Spatial data |  | 19 | 32 |
| Survey data |  | 5 | 5 |
| Trade data |  | 14 | 21 |
| G. Longitudinal perspective | Data is gathered for the same subjects over a period of time (can be years or decades, past or future) | 45 | 64 |
| No |  | 15 | 16 |
| Yes |  | 30 | 42 |
| H. Data source |  | 45 | 115 |
| Primary data source |  | 10 | 14 |
| Secondary data source |  | 40 | 100 |
| biophysical data |  | 8 | 12 |
| Geo data |  | 9 | 11 |
| Literature |  | 13 | 17 |
| maps |  | 9 | 11 |
| Official statistics |  | 11 | 15 |
| Social data |  | 2 | 3 |
| trade database |  | 9 | 12 |
| I. Type of interpretation |  | 45 | 101 |
| Both qualitative and quantitative interpretation |  | 15 | 39 |
| Qualitative interpretation |  | 4 | 5 |
| Quantitative interpretation | Measurements, statistical techniques | 27 | 56 |
| J. Causal statements |  | 45 | 223 |
| Banana plantation expansion is influenced by economic, environmental, political and discursive interactions with distant systems |  | 1 | 1 |
| Justification and Evidence |  | 0 | 0 |
| 2) observations from the field |  | 1 | 6 |
| Biophysical and socioeconomic telecouplings can explain treeline shifts and glacier recession which leads to new ecological zones |  | 1 | 1 |
| Justification and Evidence |  | 0 | 0 |
| 1)descriptions in other literature |  | 1 | 1 |
| 3) quantitative measurements and estimations |  | 1 | 2 |
| 5)maps |  | 1 | 4 |
| Change in land, productivity, carbonstock and habitat due to interactions between Brazil soy production and international demand, mainly China |  | 1 | 1 |
| Justification or Evidence |  | 0 | 0 |
| 4) models |  | 0 | 0 |
| Change in Russian beef production and consumption leading to telecoupling relationship with Brazil and Russian CO2 import |  | 1 | 2 |
| Community and resident characteristics affect wildlife and vice versa |  | 1 | 3 |
| Justification or Evidence |  | 1 | 1 |
| 4) models (or framework in this case) |  | 1 | 1 |
| Corporate deforestation commitments in the Amazon have led to spillover effects in the Cerrado biome |  | 1 | 4 |
| Justification or Evidence |  | 1 | 4 |
| (1) descriptions in other literature |  | 1 | 1 |
| (3) quantitative measurements or estimations |  | 1 | 1 |
| (4) models |  | 1 | 2 |
| Different climate scenarios influence global land-use projections |  | 1 | 2 |
| Justification or Evidence |  | 1 | 2 |
| (4) models |  | 1 | 2 |
| Distant actor interests influences and accelerates local land competition in Madagascar |  | 1 | 6 |
| Justification or Evidence |  | 1 | 5 |
| 2) observations from the field |  | 1 | 3 |
| 3) models (SNA) |  | 1 | 2 |
| Environmental tradeoffs of low meat and no meat diets |  | 1 | 5 |
| 3) quantitative measurements or estimations |  | 1 | 1 |
| Exchange between natural vegetation and agriculture creates a shifting mosaic in mountain regions |  | 1 | 1 |
| 2) quantitative measurements or estimations |  | 1 | 2 |
| 5) maps |  | 1 | 1 |
| Farmland restoration policy influences quality and quantity of farmland |  | 1 | 15 |
| Justification or Evidence |  | 1 | 15 |
| (1) descriptions in other literature |  | 1 | 3 |
| (3) quantitative measurements or estimations |  | 1 | 12 |
| Financial giants influence climate stability through financing channels targeting particular ecosystems |  | 1 | 5 |
| Justification or Evidence |  | 1 | 4 |
| (2) observations from the field |  | 1 | 3 |
| (3) quantitative measurements or estimations |  | 1 | 1 |
| GHG emissions change in Sovjet Union linked to agricultural production, land-use change, trade, and consumption |  | 1 | 34 |
| Evidence & justification |  | 1 | 31 |
| (1) descriptions in other literature |  | 1 | 5 |
| (2) observations from the field |  | 1 | 2 |
| (3) quantitative measurements or estimations |  | 1 | 20 |
| (4) models |  | 1 | 4 |
| Greater value of soybean exports is associated with greater deforestation in exporting countries |  | 1 | 2 |
| Justification or Evidence |  | 1 | 2 |
| (3) quantitative measurements or estimations |  | 1 | 2 |
| How change in soybean trade is driven by macroeconomics, soybean productivity, other crop productivity, pasture and forestry changes, and policy. |  | 1 | 4 |
| Justification or evidence |  | 1 | 3 |
| 3) quantitative measurements or estimations |  | 1 | 1 |
| 4) models |  | 1 | 2 |
| How past human-environment intercations has negatively affected current ecosystem services |  | 1 | 4 |
| Justification or Evidence |  | 1 | 3 |
| 4) models |  | 1 | 3 |
| How US demand for Chinese furniture is positively correlated Chinese wood imports from Congo bassin and thus tree cover loss |  | 1 | 7 |
| Evidence or justification |  | 1 | 4 |
| 1) descriptions in other literature |  | 1 | 1 |
| 3) quantitative measurements and estimations |  | 1 | 1 |
| 4) models |  | 1 | 1 |
| 5) maps or imagery |  | 1 | 1 |
| Human land use causes changes in bird distribution and migration |  | 1 | 8 |
| Justification and Evidence |  | 1 | 5 |
| 1) descriptions in other literature |  | 1 | 2 |
| x) little evidence |  | 1 | 3 |
| Human pressure, domestic institutions, climate change impacts, and telecoupled land demand by international trade is driving global land use change |  | 1 | 14 |
| Justification or Evidence |  | 1 | 13 |
| (1) descriptions in other literature |  | 1 | 11 |
| (3) quantitative measurements or estimations |  | 1 | 2 |
| Increase in forest cover due to agricultural land abandonment |  | 1 | 2 |
| Justification or evidence |  | 1 | 1 |
| 4)models |  | 1 | 1 |
| Increase in rubber plantations due to trade, prices, and increased seedling availability |  | 1 | 2 |
| Justification and Evidence |  | 1 | 1 |
| 1) desriptions in other literature |  | 1 | 1 |
| Industry ownership and geographical patterns can explain clustered wine certificaiton uptake in Chile and Australia |  | 1 | 2 |
| 2) observations from the field |  | 1 | 2 |
| 3) quantitative measurements and estimations |  | 1 | 1 |
| 5) spatial data |  | 1 | 1 |
| International food trade's effect on agricultural land-use changes |  | 1 | 6 |
| Justification or Evidence |  | 1 | 4 |
| 3) Quantitative measurements or estimations |  | 1 | 2 |
| 5) Spatial analysis |  | 1 | 1 |
| International trade's effect on biodiversity conservation |  | 1 | 2 |
| Justification or Evidence |  | 1 | 2 |
| 1) descriptions in other literature |  | 1 | 2 |
| Land use decisions as result of global food trade and policy |  | 1 | 1 |
| Justification or evidence |  | 1 | 1 |
| 4) models |  | 1 | 1 |
| Land-use impacts caused by socio-economic activities |  | 1 | 3 |
| Justification or evidence |  | 1 | 2 |
| 3) quantitative measurements and estimations |  | 1 | 2 |
| Link between panda loans, tourism and environmental effects |  | 1 | 1 |
| Link between trade interactions, supply chain structure, GM preferences and adoption of environmental certificaiton schemes |  | 1 | 8 |
| Justification or Evidence |  | 1 | 4 |
| 1) descriptions in other literature |  | 1 | 1 |
| 4)models |  | 1 | 3 |
| Location of feedbacks, bottlenecks and potential cascades within the social-ecological system of terrestrial moisture recycling |  | 1 | 13 |
| Justification or Evidence |  | 1 | 12 |
| 1) descriptions in other literature |  | 1 | 6 |
| 4) models |  | 1 | 6 |
| Locusts and locust control affect livestock grazing through various mechanisms (competition, nutritional preferences, pesticide use, nutrient cycling) |  | 1 | 3 |
| 1) literature |  | 1 | 1 |
| n.a. (causality not in focus) |  | 2 | 2 |
| Palm oil production increases due to renewable enrgy policies in the US and EU |  | 1 | 12 |
| Justification and Evidence |  | 1 | 5 |
| 1) descriptions in other literature |  | 1 | 3 |
| 3) quantitative measurements and estimations |  | 1 | 1 |
| 5) spatial analysis |  | 1 | 1 |
| Poor countries' export to wealthier countries often lead to the poorer countries stressing their lands |  | 1 | 5 |
| Justification or Evidence |  | 1 | 3 |
| 3)quantitative measurements or estimations |  | 1 | 1 |
| 4)models |  | 1 | 1 |
| 5)maps |  | 1 | 1 |
| Production of non-GM soybeans upgrades supply chains and create new conservation opportunities |  | 1 | 6 |
| Evidedence and Justfication |  | 1 | 4 |
| 1) descriptions in other literature |  | 1 | 1 |
| 4) models |  | 1 | 3 |
| Regimes in Bolivia and Brazil contribute to the intensity of a mega-drought in Colombia |  | 1 | 1 |
| 1) literature |  | 1 | 2 |
| Rice fields and rice markets co-evolve |  | 1 | 3 |
| 2) observations from the field |  | 1 | 1 |
| SAFR-SAM telecoupling causing soy expansion in SAFR |  | 1 | 3 |
| Justification or Evidence |  | 1 | 2 |
| 3) quantitative measurements and estimations |  | 1 | 2 |
| Sino-Brazilian soybean trade's effect on Brazilian production systems and risk of extreme climate |  | 1 | 7 |
| Justification or Evidence |  | 1 | 6 |
| 2) observations from the field |  | 1 | 1 |
| 3) quantitative estimations or measurements |  | 1 | 5 |
| Soybean and cattle production as coupled driver systems |  | 1 | 3 |
| Justification or Evidence |  | 1 | 3 |
| 1)descriptions in other literature |  | 1 | 1 |
| 4)models |  | 1 | 2 |
| Telecouplings of commodities, information and finance driving land use change |  | 1 | 6 |
| Justification or evidence |  | 1 | 5 |
| 2) observations from the field |  | 1 | 2 |
| 5) remote sensing |  | 1 | 3 |
| The influence of PAs and cash crop price boom on local well-being |  | 1 | 2 |
| 2) observations from the field |  | 1 | 1 |
| The telecoupling between Chinese soybean demand and Brazil's production changes land use in both countries |  | 1 | 1 |
| Justification and evidence |  | 0 | 0 |
| 1) descriptions in other literature |  | 1 | 5 |
| 3) quantitative measurements or estimations |  | 1 | 1 |
| Transnational investment increases inequality in affected communities |  | 1 | 3 |
| Justification or Evidence |  | 1 | 1 |
| (1) descriptions in other literature |  | 1 | 1 |
| UK climate change mitigation policies impact national and transnational food security |  | 1 | 2 |
| 4) models |  | 1 | 2 |
| Urbanization facilitates species invasion |  | 1 | 5 |
| Justification and Evidence |  | 1 | 3 |
| 1) descriptions in other literature |  | 1 | 2 |
| 3) quantitative measurements and or estimations |  | 1 | 1 |
| K. Source of justification for causal relationships |  | 43 | 290 |
| Conceptual construction of coupled systems |  | 5 | 10 |
| Field methods |  | 9 | 45 |
| Field inventory and measurements |  | 2 | 3 |
| Field observations |  | 1 | 1 |
| Focus group interviews |  | 4 | 4 |
| Historical interviews |  | 1 | 1 |
| Household questionnaire |  | 2 | 2 |
| Individual interviews |  | 7 | 9 |
| Participant observation |  | 2 | 2 |
| Participatory methods |  | 1 | 3 |
| Snowballing approach |  | 4 | 4 |
| Literature and existing evidence |  | 22 | 60 |
| Maps and satelite imagery |  | 10 | 26 |
| Models |  | 14 | 47 |
| Agent-based model |  | 1 | 1 |
| Causal loop diagram |  | 1 | 1 |
| Climate model |  | 1 | 1 |
| GeoApp |  | 1 | 2 |
| Global Livestock Environmental Assessment Model GLEAM |  | 1 | 1 |
| GTAP-BIO model |  | 1 | 1 |
| IO model |  | 1 | 1 |
| Land use model |  | 2 | 4 |
| Linear regression model |  | 1 | 1 |
| Logistic regression model |  | 1 | 1 |
| Multiple models integration |  | 2 | 3 |
| Multivariate logistic model |  | 2 | 2 |
| Multivariate model |  | 1 | 1 |
| Panel regression |  | 1 | 1 |
| Partial equilibrium model |  | 1 | 1 |
| Presence-only modelling |  | 1 | 1 |
| Simulation model |  | 1 | 2 |
| Stochastic actor-oriented model |  | 1 | 1 |
| SVM classification |  | 1 | 1 |
| Quantitative measurements or estimations |  | 16 | 100 |
| Decomposition analysis |  | 2 | 3 |
| Descriptive statistics |  | 1 | 1 |
| Footprint and other impact calculations |  | 4 | 4 |
| Landscape structure quantification |  | 1 | 2 |
| Matrix alebra |  | 2 | 4 |
| Quantitative network analysis |  | 1 | 1 |
| Statistical comparison |  | 10 | 21 |
| Time series |  | 3 | 3 |
| Social Network Analysis |  | 1 | 2 |
| L. Comments on telecoupling strengths & weaknesses |  | 33 | 195 |
| Direct use |  | 19 | 143 |
| Captures immaterial interactions |  | 1 | 4 |
| Challenges existing conceptual notions |  | 3 | 4 |
| Gives a holistic and integrative perspective |  | 7 | 26 |
| Illuminates unknown, unexpected, or underlying interactions |  | 8 | 15 |
| Maps distant connections |  | 15 | 45 |
| Maps multiple actor relationships | Provides a means to associate land use change (LUC) with a broad variety and multitude of actors at different scales and distant systems. | 3 | 5 |
| Maps multiple systems interactions |  | 14 | 35 |
| Provides methodological flexibility |  | 5 | 8 |
| Indirect or limited use |  | 14 | 27 |
| M. Telecoupling approach |  | 45 | 79 |
| Heuristic | Focuses on networks, actors and processes with a more open analytical entry point, telecoupling as analytical lense rather than framework | 17 | 25 |
| Not Applicable | e.g. in case TC is understood as a phenomenon it will be not applicable (e.g. only reference to TC once) | 16 | 18 |
| Structured | Presents a type of ‘checklist’ of components to include in an exhaustive analysis that encourages, though does not require, the analysis to begin from the flow of interest | 14 | 26 |
| N. Level of telecoupling engagement | Discerning between papers that integrate telecoupling as part of the analysis, with active engagement with the telecoupling elements: actors, processes, systems, flows, effects, or causes, and papers that only mentions telecoupling a few times or solely as a ''globalization'' phenomena and context ot the study object, | 45 | 125 |
| Explicit analytical engagement |  | 21 | 81 |
| Empirical application |  | 13 | 17 |
| Operationalized through existing concepts and tools |  | 8 | 31 |
| Narrative |  | 24 | 44 |