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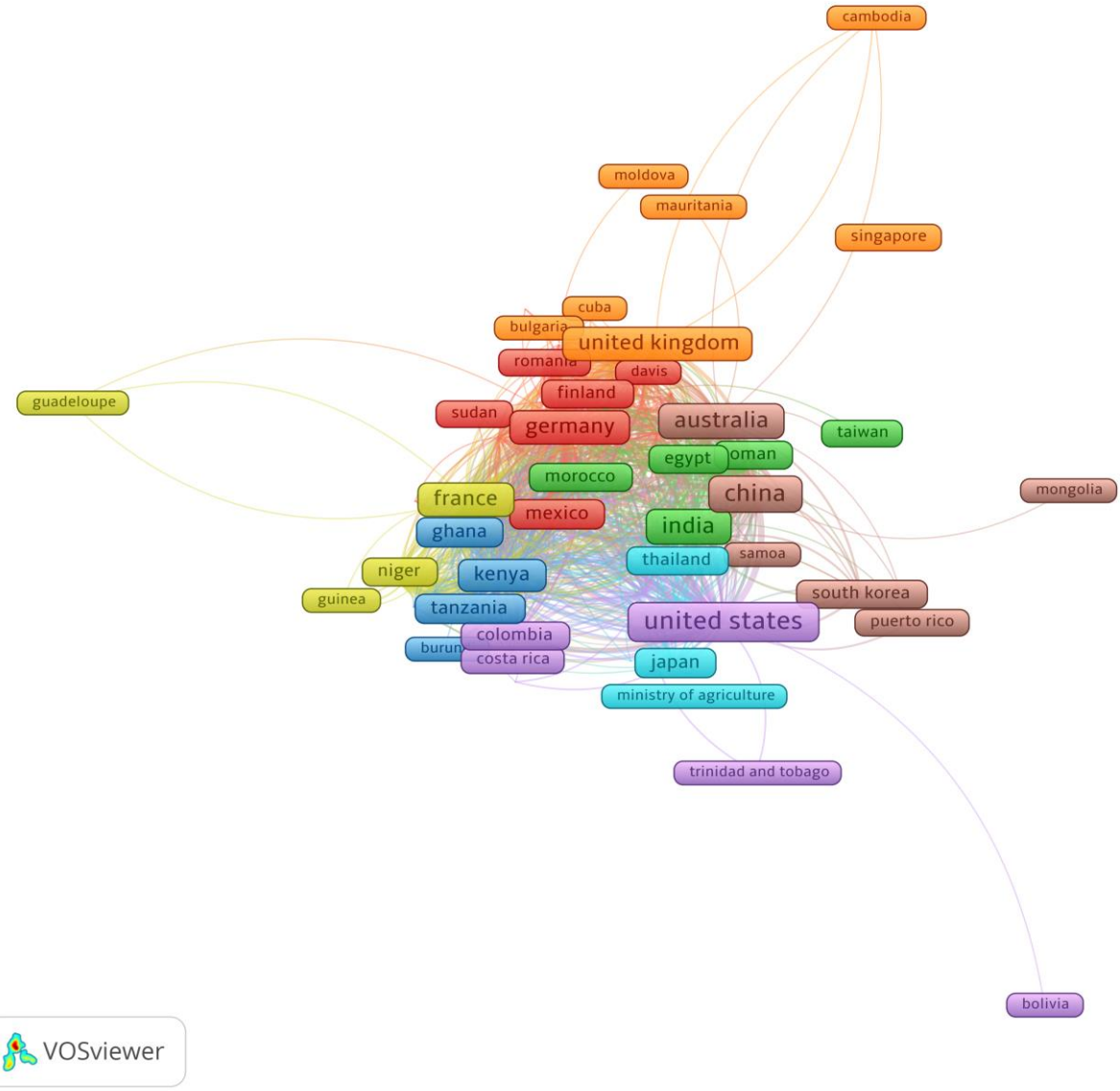
Supplementary Table 1: The topmost cited articles and journal sources on FCS-related research

No	Authors and year of publication	Title		Journal source	Citations
1	(West and Post, 2002)	Soil Organic Carbon Sequestration Rates by Tillage and Crop Rotation	2002	Soil Science Society of America Journal	2793
2	(Bandick and Dick, 1999)	Field management effects on soil enzyme activities	1999	Soil Biology and Biochemistry	1762
3	(Paustian et al., 1997)	Agricultural soils as a sink to mitigate CO_2 emissions.	1997	Soil Use and Management	1297
4	(Dabney et al., 2001)	Using winter cover crops to improve soil and water quality	2001	Communications in Soil Science and Plant Analysis	1050
5	(Tonitto et al., 2006)	Replacing bare fallows with cover crops in fertilizer-intensive cropping systems: A meta-analysis of crop yield and N dynamics	2006	Agriculture, Ecosystems & Environment	979
6	(Follett, 2001)	Soil management concepts and carbon sequestration in cropland soils	2001	Soil and Tillage Research	918
7	Estel et al. (2015)	Mapping farmland abandonment and recultivation across Europe using MODIS NDVI time series	2015	Remote Sensing of Environment	507
8	Lekberg and Koide (2005)	Is plant performance limited by abundance of arbuscular mycorrhizal fungi? A meta-analysis of studies published between 1988 and 2003.	2005	New Phytologist	446
9	Valentin et al. (2008)	Runoff and sediment losses from 27 upland catchments in Southeast Asia: Impact of rapid land use changes and conservation practices	2008	Agriculture, Ecosystem &Environment	366
10	Vilamil et al. (2006)	No-Till Corn/Soybean Systems Including Winter Cover Crops	2006	Soil Science Society of America Journal	432
11	Derpsch et al. (2014)	Why do we need to standardize no tillage research?	2014	Soil and Tillage research	401
12	(Biederbeck et al., 1994)	Labile soil organic matter as influenced by cropping practices in an arid environment.	1994	Soil Biology and Biochemistry	439
13	(Hutchinson et al., 2007)	Some perspectives on carbon sequestration in agriculture	2007	Agricultural and Forest Meteorology	415
14	(Drijber et al., 2000)	Changes in soil microbial community structure with tillage under long-term wheat-fallow management	2000	Soil Biology and Biochemistry	380
15	(Quemada et al., 2013)	Meta-analysis of strategies to control nitrate leaching in irrigated agricultural systems and their effects on crop yield.	2013	Agriculture, Ecosystems & Environment	334
16	(Bossio et al., 2005)	Soil Microbial Community Response to Land Use Change in an Agricultural Landscape of Western Kenya	2005	Microbial Ecology	363
17	(Zentner et al., 2002)	Economics of Crop Diversification and Soil Tillage Opportunities in the Canadian Prairies	2002	Agronomy Journal	334
18	(Lampurlanés and Cantero-Martínez, 2003)	Soil Bulk Density and Penetration Resistance under Different Tillage and Crop Management Systems and Their Relationship with Barley Root Growth	2003	Agronomy Journal	433
19	(McGrath et al., 2001)	Effects of Land-Use Change on Soil Nutrient Dynamics in Amazônia	2001	Ecosystems	373
20	(Yang et al., 2012)	Effects of contrasting soil management regimes on total and labile soil organic carbon fractions in a loess soil in China	2012	Geoderma	292

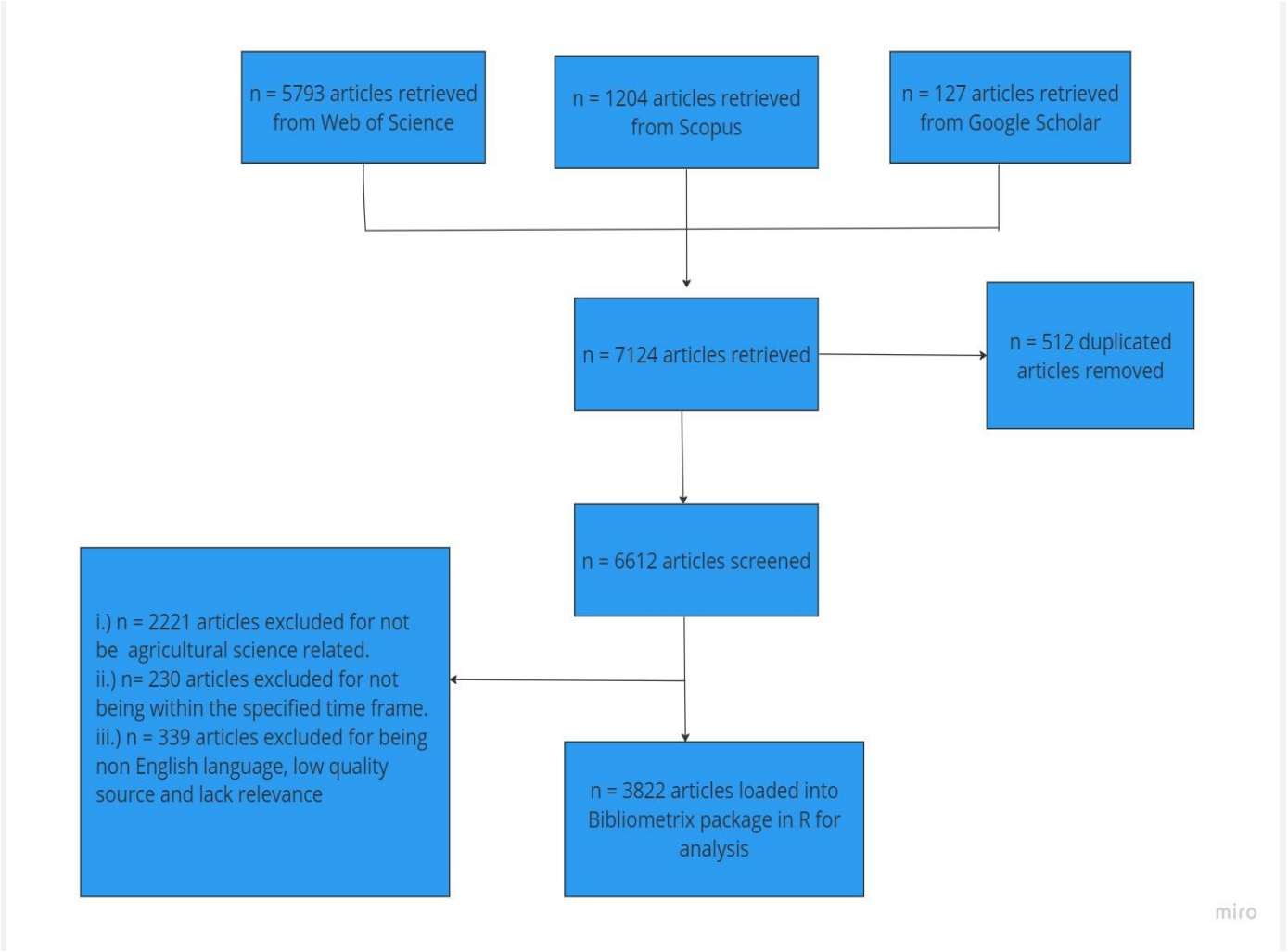
Supplementary Table 2: Different fallow duration among the cropping systems in different regions.

Region	Cropping system (CS)	Duration of CS	Fallow duration	References
Andean highland region of Bolivia	crop rotations: potato (*Solanum tuberosum L.*) then, 2 - 3 years of cereal crops such as quinoa (*Chenopodium quinoa* Willd.), barley (*Hordeum vulgare L.*), oats (*Avena sativa L.*)	2-3 years	Natural fallow (1-15 years)	(Aguilera et al., 2013)
West-central United States	crop–fallow systems with a short-season spring crop (field pea)	5 years		(Ruis et al., 2023)
Northwestern United States	Alternate wheat-fallow strips, wheat-pea rotation in wetter areas	1 year	2 years	(Granatstein, 1992)
globally	Cover crop non-leguminous fallow: cereal rye (*Secale cereale L.*), annual rye (*Lolium multiflorum* Lamarck), oat (*Avena sativa L.*), and oil seed radish (*Raphanus sativus L.*)	2-3 years	Cover cropping	(Tonitto et al 2005)
Loess Plateau of China (warm temperate zone)	Winter wheat	3 months	3 months short summer fallow	(Wang et al., 2011)
Central Amazonian Peru	maize-cassava-Musa relay-cropping	18-30 months	2-5 years	(Staver, 1989)
North-west Victoria, Australia	Wheat crops rotation and field pea	4 years	18 months	O'leary and Connor, 1997
South-eastern Australia	continuous wheat, wheat-chickpea, and wheat-fallow	20 years	varied	(Cann et al., 2020)
Sub-Saharan Africa	*Sesbania sesban*- maize rotation fallow	unidentified	2-3 years	(Partey et al., 2017)
Eastern Africa	Soil fertility improvement using *Crotalaria grahamiana, Crotalaria paulina, Tephrosia vogelli and Tephrosia candida*	unidentified	6, 12 and 18 months	(Jama et al., 2008)
Southern Africa	Relay maize with fertilizer trees	6- 8 months	20 years	(Öborn et al., 2019)

Supplementary Figure 1: Institutional collaboration on FCS related studies from 1990-2023



Supplementary Figure 2: co authorship network among the countries with active research on FCS related themes between 1990-2023.



Supplementary figure 3: Description of data retrieved from the databases and collation flow chart.

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