**Table 1.** Studies included in the meta-analyses

|  |  |  |
| --- | --- | --- |
| **Mediterranean-type climate area** | **Country** | **Studies** |
| Mediterranean Basin | SpainItalyIsrael/Portugal/ Greece | (Abaloset al., 2012, 2013, 2014; Huérfanoet al., 2015; López-Fernándezet al., 2007; Mariset al., 2015a, 2015b; Meijideet al., 2007, 2009; Plaza-Bonillaet al., 2014; Sánchez-Garcíaet al., 2016; Sánchez-Martínet al., 2008, 2010a, 2010b; Sanz-Cobenaet al., 2012, 2014a; Tellez-Rioet al., 2015; Vallejoet al., 2005, 2006, 2014)(Alluvioneet al., 2010; Boscoet al., 2015; Castaldiet al., 2011; Pappa et al., unpublished data; Ranucciet al., 2011; Reeset al., 2013; Vitaleet al., 2013)(Helleret al., 2010; Kontopoulouet al., 2015, unpublished data; Pappa et al., 2016; Pereiraet al., 2013) |
| Australia | Australia | (Bartonet al., 2008, 2010, 2013; Liet al., 2011) |
| California | USA | (Alsinaet al., 2013; Angstet al., 2014; Garlandet al., 2011, 2014; Kallenbachet al., 2010; Kennedyet al., 2013; Konget al., 2009; Leeet al., 2009; Pittelkowet al., 2013; Schellenberget al., 2012; Simmondset al., 2015; Suddick and Six, 2013; Townsend-Smallet al., 2011; Verhoeven and Six, 2014; Zhu-Barkeret al., 2015) |
| Chile | Chile | (Hubeet al., 2016; Vistosoet al., 2012) |

**Table 2.** The number of observations (N), mean and standard deviation (SD) of cumulative N2O emissions, N application rate and experiment duration for some of the factors with a significant influence on N2O emissions from agricultural fields.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cumulative N2O emissions (kg N2O-N ha–1) | N application rate(kg N ha–1) | Experiment duration(days) |
| Water | **N** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** |
|
| Drip | 55 | 4.6 | 9.5 | 295 | 387 | 299 | 110 |
| Flooded | 14 | 0.5 | 0.8 | 161 | 59 | 277 | 106 |
| Furrow | 29 | 2.9 | 4.7 | 205 | 94 | 254 | 92 |
| Sprinkler | 55 | 3.7 | 3.3 | 226 | 75 | 186 | 99 |
| Rain-fed <450 mm | 39 | 0.4 | 0.3 | 117 | 58 | 269 | 66 |
| Rain-fed >450 mm | 40 | 2.3 | 4.8 | 153 | 125 | 253 | 131 |
| Fertilizer type |  |  |  |  |  |  |  |
| Organic-liquid | 30 | 4.8 | 5.4 | 172 | 95 | 251 | 71 |
| Organic-solid | 26 | 1.8 | 2.3 | 238 | 155 | 227 | 114 |
| Mixture | 22 | 9.8 | 13.5 | 535 | 523 | 327 | 73 |
| Synthetic | 131 | 1.7 | 3.1 | 157 | 77 | 260 | 108 |
| Inhibitor\* | 23 | 1.2 | 1.7 | 167 | 78 | 167 | 129 |
| Crop type |  |  |  |  |  |  |  |
| Maize | 56 | 4.7 | 7.0 | 323 | 298 | 223 | 129 |
| Horticulture | 36 | 3.4 | 4.6 | 182 | 67 | 231 | 125 |
| Perennial | 22 | 1.2 | 1.5 | 104 | 73 | 297 | 100 |
| Cereal | 61 | 0.7 | 0.6 | 138 | 62 | 277 | 68 |
| Rice | 14 | 0.5 | 0.8 | 161 | 59 | 277 | 106 |
| Others | 43 | 4.5 | 8.8 | 230 | 290 | 243 | 112 |

\*inhibitor refers to treatments with synthetic and/or organic fertilizers where nitrification or urease inhibitors were applied.

**Table 3**. Emission factors (EFs) used to estimate total N2O emissions in the Spanish cropping systems: current EFs according to IPCC (2006) and the new values for Mediterranean areas developed in this work for different irrigation systems. The percentages in brackets show the proportion of the area under each irrigation system in Spain.

|  |  |  |  |
| --- | --- | --- | --- |
|   | EFs | Temperate climate | Mediterranean climate |
| Current | Rain-fed crops | 1.0% | 1.0% |
| Irrigated crops | 1.0% | 1.0% |
| New EFs | Rain-fed crops | 1.0% | 0.27% |
| Irrigated furrow (27% surface) | 1.0% | 0.47% |
| Sprinkler (24% surface) | 1.0% | 0.91% |
| Drip (49% surface) | 1.0% | 0.51% |

**Table 4**. Comparison of total N2O emissions in Spanish cropping systems (MMARM, 2010) after the application of the current EFs and the new EFs obtained in this study, considering that all the irrigated crops are furrow, sprinkler or drip irrigated. The percentages in brackets show the proportion of the area under each irrigation system in Spain.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Temperate climate | Mediterranean climate | Total |
| Fertilizer N input (synth + org)(Gg N yr–1)  | Rain-fed crops | 137 | 585 | 722 |
| Irrigated crops | 13 | 664 | 678 |
| **Total** | **151** | **1249** | **1400** |
| **Current EFs** | Rain-fed crops | 1.4 | 5.8 | 7.2 |
| Total N2O emissions  | Irrigated crops | 0.1 | 6.6 | 6.8 |
| (Gg N yr–1) | **Total** | **1.5** | **12.5** | **14.0** |
|  | Rain-fed crops | 1.4 | 1.6 | 3.0 |
| **New EFs**  | Furrow (27%) | 0.0 | 0.8 | 0.9 |
| Total N2O emissions  | Sprinkler (24%) | 0.0 | 1.5 | 1.5 |
| (Gg N yr–1) | Drip (49%) | 0.1 | 1.7 | 1.7 |
|   | **Total** | **1.5** | **5.5** | **7.0** |