***Supplementary Table S3*** Nitrogen needs and yields of crops considered in Sheep’n’Crop, according to their rotational patterns.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Crops →**  **Rotational Patterns ↓** | **Rapeseed** | **Maize** | **Wheat** | **Barley** | **Mustard** | **Fodder**  **Rapeseed** |
| **PMWB** (kg N/ha) | - | 64.7 | 100.8 | 97.7 | - | - |
| **RWB** (kg N/ha) | 190.0 | - | 135.0 | 135.0 | - | - |
| **MWB** (kg N/ha) | - | 89.7 | 118.3 | 97.7 | - | - |
| **MWBMu** (kg N/ha) | - | 77.2 | 118.3 | 97.7 | 65.0 | - |
| **MWBRf** (kg N/ha) | - | 69.7 | 118.3 | 97.7 | - | 60.0 |
| **Yields** (T MS/ha) | **3.4** | **7.8** | **6.1** | **4.5** | **2.0** | **4.5** |

PMWB = rotation with six years of pasture and then maize, wheat, barley; RWB = rapeseed, wheat, barley; MWB = maize, wheat, barley; MWBMu = maize, wheat, barley, mustard as intercrop; MWBRf = maize, wheat, barley, fodder rapeseed as intercrop