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Nutrient cycling and efficient use of resources are issues of concern for the future of sustainable livestock systems. A deep analysis of nutrient flows involved in the functioning of meat and dairy sheep farming systems (**FS**) was undertaken using the Ecological Network Analysis (**ENA**) method. Farm autonomy, efficiency and productivity performances were assessed. As part of the TrustFarm project (ERANET), the La Fage INRAE experimental farm (Aveyron, France) was the case studied. It is composed of two sub-systems comprising: (1) a dairy sheep flock (600 Lacaune ewes), under semi-intensive conditions and mostly fed with on-farm fodder; and (2) a meat flock (280 Romane ewes) extensively reared on rangelands and complemented in winter with on-farm fodder. A historical dataset (2015-2019) was used to represent nutrient flows (i.e. nitrogen, N) between FS components (i.e. flocks, feeds, effluents, crops, grasslands and rangeland). Outcomes on annual farm' balance revealed that internal N flows between components (excluding inputs, outputs and losses) are responsible for half of the nutrient cycling, which is mainly concerned by forage distribution, forage autonomy representing around 80%. In a counter-intuitive way, on-farm fodder distributed to meat flock covers almost half of requirements despite grazing on rangelands all year round. In the same line, dairy flock' N outputs are mostly determined by lamb exports, rather than milk production which is supposed to be the objective of dairy production (46 vs 14%). The farm' N use efficiency was 52%, with high variability between system components, meat flock presenting a better efficiency than dairy flock (139 vs 90%), whereas rangeland and effluent components showed the lowest values (23 and 43%). These preliminary results on nutrient balance provide a different, complementary approach to analyse performances at different scales of the FS. It contributes to deeper analyses of nutrient cycling aiming to adjust management practices for designing more sustainable and agroecological systems.