Automatic feeding systems for cattle in Italy: state of the art and perspectives

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**Abstract.** The AUTOFEED project (<https://autofeed.crea.gov.it>) is a farm management project that aims at pointing out the advantages and the disadvantages of the adoption of automatic feeding systems (AFS) in cattle breeding. In this context two surveys were carried out to investigate the market offer and collect the final user impressions.

A survey on the offer that agricultural machinery market provides about AFS in cooperation with manufacturers to point out the driving variables of the purchase and installation. In parallel, the research group set up an interview for farmers already using AFS in their barns or willing or thinking of adopting them.

The market research identified 38 AFS models by 20 manufacturers with high variability of making and installation potentials ascribable to self-propelled (37%), rail-suspended (34%), these equipped with both delivering and mixing wagons, wheel-driven (11%) and belt-conveyor (16%) models. The missing 2% refers to fully automatic models currently under development and that the market doesn’t offer yet. Such an articulated offer aims at meeting the needs and the requirements of most of the livestock breeding sites. The manufacturers interview confirmed this: in 2021, in Italy, there were 101 AFS installations (self-propelled -63%, suspended-rail -26%, wheel-driven -9% and belt conveyor -2%) mainly located in Northern Italy (Trentino-Alto Adige, Lombardy and Veneto) whose driving technology depends on the orography of the sites (in mountain regions prevail the rail-suspended model while plan and hilly sites mainly foresee the adoption of self-propelled and wheel-driven robots). The dimension of the barns tends to discourage the adoption of wheel-driven and belt conveyor AFS because of the required high length of rail/belt lines.

The interview (both online and direct) provided fact-finding insights on the user feedback about this technology. Despite the still limited diffusion of AFS on the national territory, the perceived resulting advantages, compared to a traditional mixer wagon, involve various aspects of cattle breeding. Above all, farmers underlined the increase of animal welfare and performance (high dry matter intake, low animal competition and reduced waiting for feed), followed by the advantages related to workload transformation towards managerial and decisional tasks and the possible remodulation of the barn design in favor of the resting area resulting from the reduced space AFS require to move within the production site. A further positive impact is represented by a saving in terms of energy and operating costs, in line with a sustainable development of the farm and with a decarbonization of the energy system toward clean and renewable forms.