

## 16. Food-feed competition and feed self-sufficiency of Chinese dairy farming

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Ruminants are identified as particularly suitable for circular food systems since they can utilise grass resources and roughages that humans cannot or do not want to eat, while generating valuable animal products. Traditionally, dairy farming in China was performed by “low-input, low-output” smallholders, with crop residues, leftovers, and grass representing major feed resources. In recent years, the intensification and specialisation of dairy farms has caused crop and dairy production to be geographically separated, and nowadays most Chinese dairy farms rely heavily on imported feed, consisting of a large amount of feed grains. As a result, dairy farming in China developed towards “high-input, high-output” systems that potentially lead to more food–feed competition (FFC) than pasture-based systems in, for example, European countries. Given the current debate about sustainable food systems and the role of livestock in such systems, developments in the Chinese dairy sector can be debated. To date, however, detailed insights and quantitative data on FFC and feed self-sufficiency (FSS) of dairy farms in China is lacking. We used bottom-up data from a survey among 48 dairy farms in Henan, north-central China, between October and December 2020, in which herd sizes ranged from 115 to 4289 heads. Human-edible protein conversion ratios (HePCR), defined as the amount of protein in cattle feed that is potentially edible for humans over the amount of edible protein in milk and meat, were calculated to assess FFC, and compared among farm typologies. Results showed that HePCR varied from 1.0 to 3.5, with an average of 2.3, indicating that FFC commonly occurs on these surveyed farms. Farms with higher milk yields and moderate concentrate use performed better in HePCR. Because most farms are landless or have a small piece of land only, the on-farm FSS is 2%, with other 58% originating from local areas, 22% from other regions, and 17% from overseas (dry matter basis). The import of feed indicates potential environmental burden nationwide and globally. Our findings call for the reconsideration of the current development pathway of Chinese dairy sector, and for an increased recognition for the role that dairy cattle could play in circular food systems in China. Actions are needed to improve the utilisation of local resources and explore by-products and human-inedible biomass as dairy cattle feed.



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