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Authors: Giuliani, Alessandra, Karagöz, Alptekin, and Zencirci, Nusret

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Emmer (*Triticum dicoccon*) Production and Market Potential in Marginal Mountainous Areas of Turkey

***Alessandra Giuliani*[1]*, *Alptekin Karagöz*[2], *and Nusret Zencirci*[3]**
** Corresponding author: giuliani.ale@gmail.com*
[1] Bioversity International, Via dei Tre Denari, 472/a, 00057 Maccarese, Rome, Italy
[2] Art and Science Faculty, Biology Department, Aksaray University, 68100 Aksaray, Turkey
[3] Art and Science Faculty, Biology Department, Abant Izzet Baysal University, 14280 Gölköy, Bolu, Turkey

*Underutilized plant species play a fundamental role in the livelihoods of poor communities living in harsh environments such as mountain areas, although they only have a small share in production and trade. Emmer (*Triticum dicoccon*) is a typical example of an underutilized species suitable for development in mountain areas; it is important for food security and cultural value and has a very limited market share. This paper investigates the state of the market for emmer in mountainous areas in Turkey, where it is still produced. As is the case for many underutilized species, emmer is disappearing due to low yield compared to modern cereal varieties. Emmer is still grown in Turkey's mountains because of its hardiness and place in local food traditions; however, its competitiveness and persistence may be at risk because of changes in taste and the increased impact of global and regional markets.*

We examine the role of emmer production on mountain community livelihoods in Turkey and review potential market opportunities that may enhance the competitiveness of this underutilized crop, as happened, for example, in Italy. We surveyed market chain actors in Kastamonu and Sinop provinces in the Black Sea region, where few other crops are profitable because of poor soils. In Sinop province, emmer is less used and not marketed; in Kastamonu province, it is marketed and appreciated in local food traditions. Difficulties in processing, limited marketing, and lack of consumer demand are key factors in the decline of emmer cultivation. Despite emmer's adaptability to poor soils and its low input requirements, lack of market opportunities is a key factor restraining its revival and maintenance. However, there is a new market potential associated with emmer's nutritional and health properties; with growing appreciation by niche consumers, opportunities to maintain this valuable species are emerging.

Keywords: *Underutilized plant species; emmer; agrobiodiversity; market chain; consumption; farmers' livelihoods; marginal mountainous areas; Turkey.*

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Introduction

Increased reliance on major food crops has been accompanied by a shrinking of the food basket that humankind has relied upon for generations (Prescott-Allen and Prescott-Allen 1990). The narrowing base of global food security is limiting livelihood options for the rural poor, particularly in marginal areas. The decline of agricultural biodiversity has increased the level of vulnerability among users, particularly among poorer populations. For many poor people, crop diversity is a necessity for survival rather than a choice, particularly in times of climate change and food crisis. Landraces contain the genetic diversity utilized for the generation of new and improved crop varieties and are used for plant breeding. Many farmers continue to rely on them for their nutrition and their livelihood (Bellon 2009). Nevertheless, it is also often believed that economic development in terms of increased access to input and markets, income diversification, and reduction of risk vulnerability have a negative effect on farm agrobiodiversity (Bellon 2004; Van Dusen and Taylor 2005). The economic dilemma for smallholder farmers in developing countries is quite clear. The social insurance benefits derived from maintaining high crop genetic diversity are not rewarded in many current markets; hence farmers lack incentives to conserve this diversity (Pascual and Perrings 2007; Kontoleon et al 2009).

While modern crop production primarily involves only hundreds of the many thousands of food plants known globally, ethnobotanic surveys indicate that thousands of underutilized species are still found wild or are cultivated. Most underutilized species, often neglected by researchers and policy-makers, are in danger of disappearing due to agronomic, genetic, economic, and cultural factors (Eyzaguirre et al 1999; Padulosi et al 2002). Research has shown that underutilized species play a fundamental role in the livelihoods of poor communities

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BOX 1: Emmer in Italy: An example of increased production and market

Emmer has been cultivated for centuries by farmers in the Italian mountains (Apennines) under harsh environmental conditions because of its high adaptability. With the introduction of durum wheat, emmer almost disappeared, and its cultivation was reduced to a few thousand square meters in the 1970s (Di Napoli and Marino 2001). Ten years later, and increasingly in the early 1990s, emmer regained its popularity. Presently, around 2500 ha of emmer are cultivated in Italy (Buerli 2006) with a yield of about 3.5 tonne/ha (Troccoli and Codianni 2005).

The reasons for the rediscovery of emmer include growing interest in its nutritional content, increasing attention to local traditions and ancient foods from consumers, and a growing interest in agrobiodiversity conservation and diversification of cropping systems. Emmer is considered a healthy food due to its high protein level and antioxidant capacity (Table 1) compared to wheat (Grausgruber et al 2004; Serpen et al 2008). Because of its great adaptability, it is very suitable for organic production and hence for certification as an organic food. Market success has been made possible in the last 25 years by a number of interventions.

Some pioneer farmers recognized the potential of emmer early on, linked to history, folklore, and land, and they started to market it to tourists visiting emmer regions in the traditional form of crushed grains for prepared soups. These farmers were able to develop useful techniques, help launch the product on a larger scale, and build small but efficient enterprises developing several products other than the traditional one (Negri 2003). Agrotourism activities focusing on serving and selling locally produced food products to visitors considerably supported market development (Buerli 2006). Emmer production and conservation were supported by national research initiatives on *ex situ* and on-farm conservation, value addition, and sustainable marketing (Hoeschle-Zeledon et al 2009). At a political level, this was also translated into support for the development of remote rural areas and the improvement of mountain people's livelihoods. Finally, the processing industry, such as flour processors and big millers, started to manufacture a variety of emmer products at a large scale, targeting the "health food" niche market and, increasingly large channel markets, such as supermarkets.

Emmer flour can substitute for wheat flour in most bakery products: breads, pasta, sweet and savory biscuits, and cakes (Stallknecht et al 1996). Modern cooks have rediscovered the full flavor of whole-grain emmer pasta and bread, and a number of famous restaurants have picked up emmer dishes (Hoeschle-Zeledon et al 2009). In San Lorenzo in Campo (Marche), an emmer enterprise opened the *farroteca*, a restaurant exclusively serving dishes based on emmer, using traditional and new recipes. Decortication and polishing methods have been developed (Cubadda et al 2001). Being a hulled cereal, emmer is processed like rice, using rice-processing equipment. With this process, dehulling yields about 58% of the pearled grains.

The production of emmer has become increasingly widespread, both in its traditional areas in the central Apennines, as well as in other regions in northern and southern Italy where it has recently been introduced, also at lower elevations (Padulosi et al 1996). This has created strong market competition and caused a loss of competitiveness in traditional areas (Salamini et al 2002; Porfiri 2003).

living in harsh environments, as a source of income, nutrition, and medicinal remedies based on traditional knowledge. However, these species contribute little of commercial value to world production and trade compared to agricultural commodities; moreover, they have unexploited potentials (Gruère et al 2009).

Investigations of markets—including social, cultural, economic, and policy aspects—are needed to find ways of fostering sustainable conservation and use of underutilized species. This can help assess how to better promote use of these species and how to improve organization of the market in order to allow more equitable distribution of income along the market chain (Giuliani 2007).

The present study analyzes the production, consumption, and marketing of emmer (*Triticum dicoccon*) in Turkey along these lines, with the objective of understanding the constraints and opportunities for emmer production and marketing, and the impact on the livelihoods of the mountain communities still producing it. Our study aims at understanding the reasons why this ancient cereal, like many other underutilized species, has come into disuse and is slowly disappearing from the market. This trend in Turkey is compared with the reverse tendency in Italy, where—like other countries in Western Europe—increasing demand for emmer is seen nowadays in diversified products on the market. In this paper, we report the Italian emmer story as an example (Box 1). Once fallen into underuse and abandoned, emmer has experienced a comeback in Italy as a high-value product demanded on the market. This was made possible thanks to a combination of interventions put in place by various actors to promote emmer, support smallholder producers, and improve the conservation of genetic resources (Padulosi et al 1996).

Methods

The study area was identified according to preliminary research on emmer cultivation in Turkey at the Central

TABLE 1 Some key differences between emmer and durum wheat. TE = trolox equivalent.

Trait	In emmer	In durum wheat
Total antioxidant capacity	19.00–23.84 mmol TE/g	15.42 mmol TE/g
Mean protein values	19.05%	16.79%

Research Institute for Field Crops (CRIFC) in Ankara (Karagöz 1996; Karagöz and Zencirci 2005), which indicated that the Kastamonu and Sinop provinces in the Black Sea region are 2 of the remaining areas in the country still producing emmer (Figure 1). A household survey of emmer farmers' livelihoods was conducted in 28 villages in the 2 provinces, using semistructured questionnaires and focus group discussions with small groups of farmers from the same village. Using purposive sampling methods, we conducted 50 in-depth household interviews. Information related to the production and marketing of emmer products was gathered through interviews with key informants, such as the market chain actors, government officials from the Provincial and County Agricultural Directorates of Kastamonu, Sinop, Boyabat, and Araç, the Turkish Export Union, the Food Engineering Department of Hacettepe University in Ankara, and a big wheat flour and pasta factory in Ankara. The market chain analysis was conducted using elements of the market mapping approach, looking at the product flow, market chain actors and their relationships, and the enabling environment (Albu and Griffith 2005).

The results of the survey for production and marketing in the 2 provinces were then compared. The information about the Italian case was collected through a literature review and brief visits to emmer-producing areas in the Marche, in Italy.

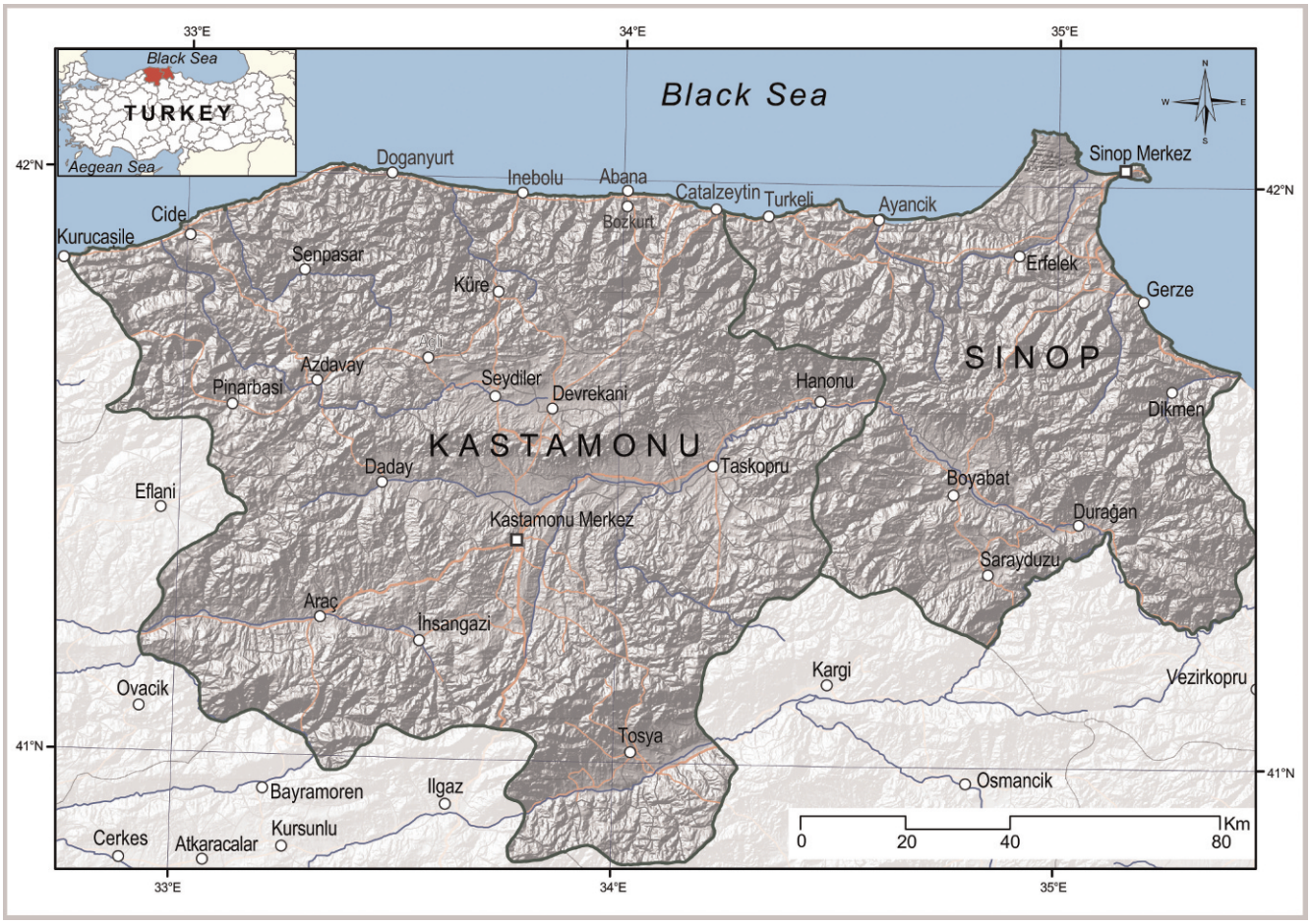
Emmer in Turkey

Emmer is a *hulled* wheat. This term is used to define three cultivated wheat species: einkorn (*Triticum monococcum*), emmer (*Triticum dicoccon*), and spelt (*Triticum spelta*), the kernel of which retains its hull during harvest. The cultivation of emmer began in the Fertile Crescent in the Near East some 10,000 years ago, where it was the main food source, together with barley, until the beginning of the 20th century, when its cultivation started to decrease and was substituted by common and durum wheat, which had easier cleaning processes and higher yields. The species almost disappeared in the second half of the 20th century (Di Napoli and Marino 2001). As in the rest of Europe, emmer in Turkey decreased radically from the beginning of the last century (Gökgöl 1939). Today, the cultivation of emmer is restricted to only a small zone in Kastamonu and Sinop provinces, in the Black Sea region. In these areas, the elevation changes very rapidly, from 0 to 2000 m in about 15 km. They are considered harsh mountainous zones, and the conditions are variable. Precipitation in the Kastamonu-Sinop region is between 400 and 800 mm per year.

The mountainous districts of Erfelek, Gerze, Durağan, and Boyabat (Sinop province, 1000–2000 m) where emmer is produced are inhabited by very poor households who continue to grow emmer in marginal and steep areas. Infrastructure is very restricted, and access to city and town markets is very hard. The roads to the mountain villages are not paved. Most of the districts in the province of Kastamonu are situated between 600- and 1200-m elevation. Emmer is produced in the districts of Devrekani, Kastamonu, İhsangazi, and Araç. Production conditions for emmer farmers in Kastamonu are better than in Sinop province due to the lower elevation and lower lands, by comparison with the steep cultivated areas in Sinop. There is more market activity for emmer, but these emmer producers nonetheless belong to the poorer segment of Turkey's population. The traditions and level of life in Kastamonu city are similar to those in the villages of the province. That is probably the reason why there is still a demand for emmer on the city market. In Kastamonu, the citizens have kept the food traditions of the area. According to recent data, the total cultivation area of hulled wheat in Turkey is 4289 ha, and the total production is 6341 tonnes (t) (while total wheat acreage is 8,490,000 ha) (SIS 2007). Unfortunately, Turkish statistics do not differentiate emmer from hulled wheat. The production is reported as "spelt wheat."

Emmer is known by the Turkish name *siyez*, while *kaplica* is the name for hulled wheat (Karagöz 1996). In the past, it was widely used for human consumption, in particular, for bread making. Now, however, there are no data on the consumption of emmer in Turkey. Everywhere in the country, emmer has been replaced by the consumption of modern wheat varieties, which have greater appeal and lower prices. Currently, emmer is considered the food of the poor. It is only in the provinces surveyed that it is still consumed, albeit in small quantities. Until about 40 years ago, emmer was widely consumed in these provinces as bulgur or bread. Today, in the villages of Sinop province, emmer is mainly used for animal feed, and it is very rarely used to make bread or bulgur for those who do not have access to modern wheat varieties and consume what they cultivate on their small patch of land. A different trend appears in Kastamonu province, where emmer is marketed and consumed every day as bulgur (cracked and parboiled grains), sometimes considered healthier and tastier than wheat bulgur.

FIGURE 1 The study area: Kastamonu and Sinop provinces in Turkey. (Map by CRIFC)



Emmer farmers' livelihoods

Emmer is produced by subsistence farmers living in the mountain areas of Sinop and Kastamonu provinces (Figure 2). Farmers inhabiting remote mountain areas in Turkey belong to the poorest segment of the population (IFAD 2002). The survey results showed few differences in the 2 provinces (Table 2). Hence, the results reported in this section are the total average for all households interviewed in the 2 provinces.

The average household size is 8.4 persons. Most of the household heads completed only primary school, while 10% are illiterate. Farmers from Sinop province live in wooden houses, and only one quarter of them own a tractor, while in Kastamonu province, all the farmers interviewed live in concrete houses and own a tractor, a plough, and a threshing machine. The farmers interviewed cultivate 6.4 ha on average. An average of only 7% of the cultivated land is irrigated. If we compare the average amount of land owned and rented by the farmers in the 2 provinces, interesting differences can be seen. In Sinop, none of the farmers interviewed rent any land. Emmer producers own similar amounts of land in both provinces (5 ha on average). In terms of total cultivated land, farmers in Kastamonu have significantly more cultivated land (T test at 95%).

Farmers cultivate an average of 1.5 ha of rain-fed emmer on about 25% of the total cultivated land. The difference in emmer cultivation areas between Sinop and Kastamonu provinces is not statistically significant. The average emmer yield is 1.2 t/ha in a normal year (0.5 in bad years and 2.0 in very good years). Due to its high adaptability and resistance to harsh environments in the mountain areas of Kastamonu and Sinop province, emmer brings greater yields than other cereals. Wheat yield in marginal areas of Turkey is 1 t/ha (Kücükozdemir et al 2008). All the farmers use their own grain, and 70% exchange seeds with other farmers within their own village or nearby villages.

All farmers have a wooden storage facility for their emmer. The workers all belong to the household. On average, they invest about 25% of their working time in

FIGURE 2 Village of emmer farmers in Sinop province. (Photo by Alessandra Giuliani)

emmer production. Despite the low income generated by emmer production, this figure shows the marginal but important role that emmer plays in the household economy in this region. Emmer cultivation techniques are transmitted from generation to generation without any formal training. The major problem faced by emmer farmers is threshing, due to the hulled grain, followed by transport of harvested grain from the steep fields to the mountain villages.

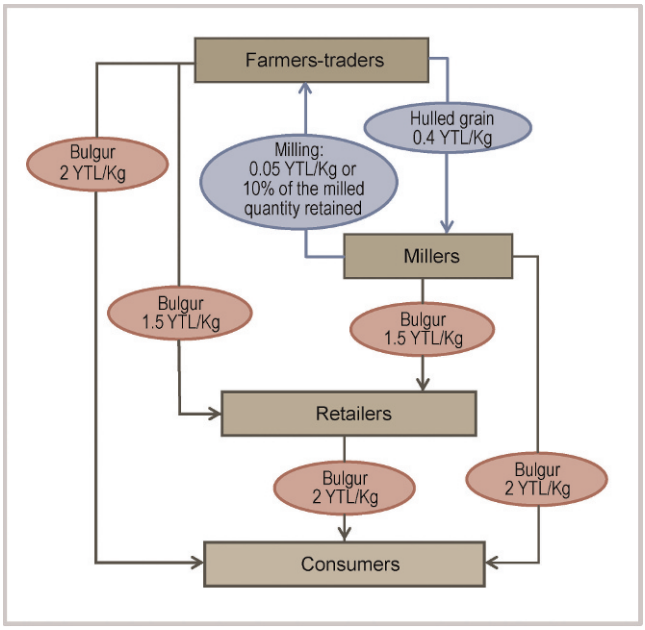
Market chain analysis

Our survey revealed that one third of the emmer produced is used for human consumption; the rest is used for animal feed. Our market chain analysis focused only on emmer produced for human consumption. The farmers growing emmer are: (1) farmers growing it for household consumption only; and (2) farmer–traders who grow it for household consumption and sale.

TABLE 2 Household (HH) survey of emmer farmers in Kastamonu and Sinop provinces.

Variables	Kastamonu province	Sinop province
Average HH size	8.1 people	8.5 people
% illiteracy per HH	5%	15%
Total cultivated land	7.7 ha	5.1 ha
Owned	5.0 ha	5.1 ha
Rented	2.7 ha	0 ha
Rain-fed cultivated land	91%	95%
Cultivated emmer	1.1 ha (14.3%)	1.9 ha (37.3%)
Emmer yield per year	1.4 t/ha	1 t/ha
% working time invested in emmer production/year	22%	28%

FIGURE 3 Emmer bulgur market chain in Kastamonu province.



As there are only farmers in Sinop province, no market chain exists. The market chain exists in Kastamonu and involves a few actors: farmer–traders (the producers), millers, retailers, and, of course, consumers, shown in Figure 3. There is no collaboration among producers and no organization between producers and other actors. The farmer–traders have their product milled by millers, and then they sell the emmer bulgur directly to the consumer on the market. Sometimes, the farmer–traders sell the bulgur to retailers, who sell it to the consumers. Millers buy the emmer from farmer–traders and resell it to retailers and sometimes directly to consumers. Millers are key actors in the market chain, given their information about demand and trends.

Most farmer–traders are women, usually from better-off households. The farmer–traders (with the help of their children) sell the bulgur to the consumer at the farmers' market and occasionally to retailers. The farmers and farmer–traders usually boil and dry the grains before bringing them to the millers for dehulling and milling to get the final bulgur. For this service, the millers keep 10–15% of the final product. On rare occasions, farmers pay for milling in cash at a price of about 50 YTL (Turkish New Lira; 1 YTL = 0.64 US$) per tonne of emmer grain. If millers buy grain from farmers for later sale to a trader or directly to consumers, they pay an average price of 0.40 YTL per kilogram of hulled grain.

During dehulling and milling, about 40–50% of the product is lost. Consumers buy emmer bulgur for 2 YTL/kg, which is almost double the price of wheat bulgur. Retailers buy the emmer bulgur directly from the farmers at 1.5 YTL/kg, which allows them a mark-up of 25% (excluding the shop costs), since they sell it for the same price as the farmer–traders (2 YTL/kg). Wheat bulgur is sold by farmers to retailers for 0.75 YTL/kg (rice for 1.2 YTL/kg). Only the actors in direct contact with consumers (ie farmer–traders) consume about 40% of the bulgur produced and sell the rest. The average quantity sold per year per farmer–trader is 330 kg of bulgur. The main opportunity seen by the farmer–traders is the general preference shown by the consumers for emmer bulgur over wheat bulgur in the area. The main constraints are the great labor demand in threshing, handling, and processing.

The few millers who still mill emmer are located in Boyabat district in Sinop province on the border of Kastamonu province. They are small-scale millers (Figure 4). The millers process the emmer into bulgur (dehulling and milling preboiled, dried grains). In most cases, they use an old millstone machine powered electrically. The millers are also emmer bulgur consumers, and they sell emmer to farmers who come to the mill or occasionally to a trader. On average, traditional millers process about 3 tonnes of emmer per season, representing about 1% of all milled cereals. The quantity of emmer milled depends mainly on consumer demand. The major problem for the millers is the long process involved in milling hulled grains. For this reason, big modern mills in Kastamonu and Sinop provinces do not process emmer, and many millers with modern equipment refrain from (or have abandoned) milling emmer.

We found retailers of emmer bulgur, who were selling emmer bulgur at a stall in the farmers' market together with other cereal and legume grains, only in Kastamonu town. In town, we found some shops—the *zahireci*—where emmer bulgur was sold. The retailers buy a small share (about 10 to 20 kg from each farmer every year) of emmer bulgur from the farmer–traders who come to the market and do not want to spend time selling the product. Sometimes, these farmers exchange their emmer bulgur for wheat or sugar. The retailers can get up to 1000 kg of emmer bulgur per year. The largest retailer we interviewed was supplied with emmer bulgur by one sole miller who provides him with 1 tonne every year. The major problem for the retailers is that demand seems to decrease year by year, even though there are niche consumer groups emerging. The quality of the product is decreasing because of the use of electric and modern mills. Some retailers and some millers stated that stone mills using water or wind energy produced a better-tasting bulgur.

Marketplace and consumer preferences

Emmer is still sold in the form of bulgur in the farmers' market (or women's market, a market where farmers from the province come to the town market to sell their produce twice a week) in Kastamonu city (Figure 5), but not in the markets in small villages. Farmer–traders producing emmer bulgur travel 5–30 km twice a week to

FIGURE 4 Emmer milled by a traditional miller in a village in Kastamonu. (Photo by Alessandra Giuliani)

come to the city market. The bulgur is sold in small quantities on the market only during the month of September, after harvesting, for a total of 1 to 3 tonnes of emmer bulgur per farmer–trader each year.

Consumers buying emmer bulgur at the farmers' market in Kastamonu are farmers coming from the surrounding villages located in lowlands, or people from the city. There are two emerging consumer groups buying emmer bulgur: citizens from Istanbul and Ankara and people with cholesterol problems. A young trader in Kastamonu told us: "promotion of emmer should be based on highlighting the content of higher fiber and the low level of carbohydrates, as well as attractive packaging and high-quality cleaning of the product."

Emmer bulgur is never served in restaurants but is only prepared at home with traditional recipes. Emmer bulgur is not sold on the market in Sinop province, where it is generally not known. Boyabat market (at the border with Kastamonu Province) is an exception. Here, emmer can be found from time to time. Moreover, in the market of Soguksu, in the district of Erfelek at 1400-m elevation, some farmers said that they used to trade emmer bulgur, but they no longer do it owing to lack of demand.

Opportunities and challenges for the development of production and marketing

Several enabling and inhibiting factors determine the constraints and opportunities relating to the marketing of emmer in Turkey. These are summarized in Table 3.

FIGURE 5 Emmer bulgur sold in Kastamonu market. (Photo by Alessandra Giuliani)

Conclusions and discussion

As in many similar cases, emmer has been pushed out of production by higher-yielding and more profitable crops. In Turkey, emmer is still cultivated for its high adaptability to poor soils by farmers who live in marginal areas in Kastamonu and Sinop provinces in the Black Sea region, at 1000–2000 m. Cultivation of high-yielding crop varieties in these regions requires high inputs that these poor farmers cannot afford. In Turkey, emmer is still consumed in the form of bulgur. In Sinop, it is little consumed by farmers and not marketed, while in Kastamonu, it is marketed and consumed by farmers and city inhabitants.

The emmer market chain is short and simple; there are no producers' or traders' organizations. The laborious milling process for hulled grains constitutes a major constraint to processing. Together with the greater consumer preference for modern wheat varieties, this factor has contributed to the gradual decline of the cultivated area and the shrinking market.

Nonetheless, there is evidence of a new attitude toward healthy food, particularly among urban residents. This translates into a potential niche market for emmer, linked to its valued nutritional properties and its appreciated flavor. These market traits, combined with its adaptability to harsh environments, make emmer a valuable but as yet unexploited resource for securing the livelihoods of poor rural communities in marginal areas. As in the Italian experience, the national research community, policy-makers, and local municipalities should foster the development of production and marketing for emmer. Research activities targeted to agronomic improvement, characterization, and value addition, as well as marketing and promotion events, would help improve these poor producers' livelihoods and conserve the genetic pool of traditional emmer landraces *in situ*.

In particular, research activities on the nutritional properties of emmer, also based on genetic diversity, should be continued in order to adapt the right processing methods and improve the quality of the final product. By partnering with the private sector (millers), modern emmer products that suit the tastes of urban consumers can be developed. Diversification in emmer products in the flour industry can be encouraged through examples coming from countries that successfully produce emmer products. In the case of Italy, the marketing of a value-added product in a higher-value

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TABLE 3 Opportunities and challenges in producing and marketing emmer in Turkey.

Level	Enabling factors	Inhibiting factors
Research	• Preliminary results in Turkey show positive properties for cholesterol and diabetes • Intraspecific diversity of emmer is recognized as playing a role in adaptation to different environmental conditions • Promising initial research on emmer characterization	• Limited research (due to lack of funds and resources) on nutritional properties and no official results demonstrated in Turkey • Lack of genetic studies on emmer diversity in Turkey
Technology	• Emmer bulgur processed in old stone mills maintains a better taste • Modern technology to process emmer is already available and known in other countries (using rice processing machines)	• Current technology renders processing difficult and time consuming • Lack of proper processing technology to improve the quality of emmer bulgur • Lack of quality control
Production	• Emmer is suitable for organic production and can produce good yields in harsh environments	• Lack of national support/incentives for the production of emmer
Market organization	• The production of emmer is suitable for poor small-scale producers • Emmer is a product that can diversify livelihood strategies, nutrition, and income generation among the rural poor	• Poor market transparency: Emmer producers are far from processors/traders; millers decide on quantities to trade on the market • Poor infrastructure: Emmer producers are far from markets • Farmers' migration to the cities and changes in lifestyle are leading to the disappearance of emmer producers
Marketing	• Appreciation from consumers at Kastamonu market and increasingly among niche markets among town-dwellers • Growing market share in Turkey for organic and "health" products • Interest in emmer products shown by Turkish pasta and flour companies	• Very low local consumption • Lack of good packaging and storage
Promotion	• Traditionally recognized as "health food" • Growing awareness in Turkey of the beneficial properties of emmer (cholesterol and diabetes) • Organization of Hulled Wheat Bulgur Festival in 2008 by the government and municipality of İhsangazi	• Image of emmer as "food of the poor"

market—using a 'private sector' partner in the food industry—is functioning well. In Turkey, as well, there is a good potential for creating win–win solutions for the benefit of poor emmer producers, conservation of land races, as well as the benefit of private sector actors.

However, strong consumer demand for emmer products is still missing. An active public awareness campaign targeted at consumers should be put in place by local governments, with the involvement of nongovernmental organizations and farmers' organizations. It should aim to change the poor image that emmer products still have. Policy-makers have a crucial role in spreading information about the dietary benefits of emmer through the media, campaigns, and *ad-hoc* education programs. An initial attempt at public awareness action was the first Hulled Wheat Bulgur Festival organized in August 2008 by the Municipality of İhsangazi (Kastamonu Province), which is foreseen as a regular event. Good examples exist of public awareness campaigns reversing current trends of underutilized plant species. To cite one example, pomegranate production and consumption was largely increased thanks to public promotion activities organized by the producers and the Ministry of Agriculture in Turkey. As for most underutilized species, like emmer in Turkey, a combination of public–private interventions is the key to promoting these valuable resources for sustainable use and conservation.

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