**The Role of Traditional Diets in Promoting Food Security for Indigenous Peoples in Low- and Middle-Income Countries: A Systematic Review**

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**Abstract**

*Ensuring Food security within Indigenous communities may depend on ensuring the continuation of access to traditional food resources. A systematic literature review focused on traditional diets and food security for indigenous peoples in Low- and Middle-Income Countries (LMICs) examined the role of such diets in relation to food security and other factors. Thirty-seven studies matching the inclusion criteria were identified through literature searches, and thematic analysis applied to identify important findings. The results indicate that traditional foods have a significant role in promoting and maintaining food security, as well as in the preservation of cultures and the environments in which these are embedded. The research suggests that there is a need to promote and preserve traditional food knowledge within indigenous peoples.*

*Keywords: Indigenous peoples; LMICs; traditional foods; food security*

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**Highlights**

* Traditional foods may promote food security for indigenous peoples in LMICs.
* Thirty-seven papers were identified through a systematic review process.
* Traditional food resources were an important part of indigenous people’s diets.
* Traditional foods were closely linked to the role of women in promoting food security.
* Traditional foods were important to ecosystem preservation, medicine, and culture.

**Introduction**

To date, there has been no universally recognised definition of “indigenous people” by scholars or international institutions. Based on the United Nations Permanent Forum on Indigenous Issues, Indigenous peoples are defined as “inheritors” who inhabited a country or geographical region at the time when people of different cultures or ethnic origin arrived. Indigenous peoples have unique culture relating to people and the environment. Another definition is provided by Cobo's work on the Problem of Discrimination against Indigenous Populations (UNPFII, 2010, p. 4). The working definition is as follows: *“Indigenous communities, peoples, and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal system*”. It has been noted that many indigenous peoples are the guardians of their local environment, natural resources, and the associated biodiversity linked to ecosystems (Mamo, 2020).

There are about 476 million indigenous people worldwide, representing more than 6 per cent of the world's population (World Bank, 2020). They have custodial responsibility for conserving 80 per cent of the planet’s biological diversity (FAO, 2021). As part of this, most indigenous peoples are linked to traditional food systems, each of which contain between 70 and 100 or more traditional plant species (Kuhnlein *et al.,* 2006). Traditional food systems are socially, culturally, and economically important, particularly in maintaining the well-being and health of indigenous people (Bhat, 2012). Traditional food crops tend to be less destructive to the environment compared to some of the environmental impacts associated with conventional food production, which may be linked, among other things, to activities which result in deforestation, water pollution, and global climate change (FAO, 2017). Importantly, these traditional foods meet cultural needs in preserving traditional cuisine and ways of life, and maintain local communities’ cultural heritage (Durst and Bayasgalanbat, 2014). Indigenous peoples have been witnesses to climate change since the beginning of the Anthropocene era. Consequently, they have developed effective solutions and practices for the conservation of biodiversity and climate change mitigation in relation to conservation of plant species included within traditional diets (Mamo, 2020). At least 54.6 million metric tonnes of carbon (MtC), or 24 per cent of the total carbon contained in the world's tropical forest, is protected by indigenous peoples and communities (Rights and Resource Initiative, 2016). Notably, indigenous peoples are frequently among the first to experience the direct impacts of climate change, although they themselves make little contribution to greenhouse gas emissions (United Nations, 2008).

Over the last twenty years, the world has recognised that indigenous peoples require mechanisms and structures to accommodate their rights to improve the quality of their life. An example includes establishing the United Nations Permanent Forum on Indigenous Issues (UNPFII) in 2000, and the 2007 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (World Bank, 2020). These are significant steps in ensuring the world is aware of the problems faced by indigenous peoples, and have contributed to an essential aspect of the Sustainable Development Goals (SDGs), such as *leaving no one behind*. Attaining, for example, SDG 2 (zero hunger) and SDG 15 (life on land) are contingent on conserving traditional diets (United Nations, 2021). Food security and the acquisition of food resources represent a significant concern for many indigenous peoples. Recent data suggest that indigenous peoples account for 15 per cent of the poorest people globally (UNDP, 2019). Despite the richness of traditional knowledge of their food systems, which has been established over thousands of years (Johns *et al.,* 2013), indigenous peoples still face food shortages, poor diets, and, as a consequence, chronic diseases, such as obesity and diabetes (Egeland and Harrison, 2013).

Research has suggested that there have been massive dietary shifts across the globe in relation to diets. This phenomenon has been described as *“nutrition transition”* (Popkin, 2006), and describes a change from the consumption of traditional diets towards more westernised diets, which are more energy-dense and high in sugar, salt, and saturated fats. Increased consumption of the latter has contributed to the increase in the rates of obesity and overweight in many parts of the world (Popkin *et al.,* 2012). Despite awareness within indigenous peoples about the health benefits of traditional foods, the consumption of these foods is low, due to local peoples preferences for the convenience of modern foods (Ghosh-Jerath *et al*., 2018; Kasimba *et al.,* 2018; O'Meara *et al.,* 2019). Furthermore, traditional foods are now perceived to be, for many indigenous peoples, “poor people’s food”, with most people having established a preference for processed carbohydrates and fatty foods, which may further compromise public health (Kuhnlein *et al.*, 2013). Thus, a challenge in the field of promoting traditional foods for indigenous peoples is not only to ensure the availability of the foods for their daily consumption, but also to revitalise the awareness and knowledge of indigenous people about the health benefits, environmental benefits, and the sense of identity and belonging of their own traditional food sources.

This paper aims to establish, through the application of a systematic review, the extent to which traditional foods may have a role to play in food security and cultural and ecosystem preservation for indigenous peoples, and to identify barriers to, and facilitators of, their promotion and adoption.

**Methods**

A search strategy was developed to identify the relevant literature, tailored to the search requirements of five databases: Scopus, ProQuest, Web of Science, EBSCOhost (CAB Abstracts), and Google Scholar. Table 1 presents the relevant keywords and keyword combinations considered for used in the searches. All searches included papers published between 2000 to 2020. All articles with a publication date before 2000 were excluded to ensure that the current state of the art in relation to the research question (within a timeframe of 20 years) was assessed. The year 2000 was considered as appropriate, as it coincides with the establishment of UNPFII. For pragmatic reasons, only articles published in English were included. The full list of search terms used to search for each database is provided in the Appendix.

Table 1. Keywords considered for the searches.

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| --- | --- |
| Keywords | Synonyms |
| Traditional diets | Traditional food, indigenous food |
| Indigenous Peoples | Aboriginal |
| Food security | Food resilien\*, food safety, food availability, food sufficiency, food insecurity |

Table 2. Inclusion and Exclusion Criteria.

|  |  |
| --- | --- |
| Inclusion | Exclusion |
| Empirical (qualitative and quantitative) study, published in a journal | Conference abstracts or proceedings, review papers, letters to the editor, reports, news articles, dissertations |
| English Language | Language of publication other than English |
| Articles from 2000 – 2020 | All articles before 2000 |
| Articles describing research conducted within Low- and Middle- Income Countries (LMICs) based on the list from World Bank (2019) | Articles describing research conductedoutside LMICs |
| The study population are the Indigenous Peoples in LMICs | The study population does not include indigenous peoples in LMICs |
| The study focuses on traditional foods, at least mention one type of traditional food; plants or animals | The focus of study is inclusively non-traditional foods |
|  | Duplicate Study |

This review is based on journal articles, (the “peer-reviewed” literature) and books, research reports, and conference papers (the “grey” literature) (Table 2). The selection criteria were based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement (Moher *et al.,* 2009) and modified PICO framework for qualitative questions (Population: Indigenous peoples; Interest: traditional diets to promote food security; Context: Low- and Middle-Income Countries) (Murdoch University, 2021).

The search mainly focused on mapping existing literature on the traditional foods of the indigenous peoples in social, agricultural, biological, and environmental sciences. After duplicates were deleted, a total of 1,799 records were identified.

The search focused on Low- and Middle- Income Countries (LMICs) using the World Bank definition of 2019. Thus, an article that focused on the role of traditional foods in the diets of indigenous peoples from countries that did not meet the definition for LMICs was excluded. Titles and abstracts of the articles were checked to ensure the quality and relevance of academic literature to be included in the next stage review process. A careful evaluation of each research paper was subsequently carried out. Following the initial screening of titles and abstracts, 1,664 articles were excluded, with 135 full-text articles reaching the full screening stage. After each of these 135 articles were assessed against the inclusion and exclusion criteria, 31 articles remained. Six additional records from the grey literature were identified through other sources by contacting key authors in the field and publications related to the review. A thematic analysis was done using NVivo R1 software to identify themes that highlighted the various dimension of indigenous people’s food and food security. The Prisma diagram (Diagram 1) summarises inclusion and exclusion criteria applied at every stage. The items selected for review are provided in Table 3.

Diagram 1. Prisma Diagram.

Records identified through database searching  
(n = 2,031)

## Identification

## Eligibility

## Included

## Screening

Records after duplicates removed  
(n = 1,799)

Records screened *(Title and abstract)*  
(n = 1,799)

Records excluded  
(n = 1,664)

Full-text articles excluded, with reasons:

(n= 104)

* Data not collected within LMICs countries: n= 4
* Topic of research not relevant to research questions n= 43
* Empirical data not presented n= 18
* Duplicate populations: n= 9
* Sample size not included: 14
* Non peer-reviewed: 16

Full-text articles assessed for eligibility

(n = 135)

Studies eligible for inclusion

(n= 31)

Additional records identified through other sources  
(n = 6)

Studies included  
(n = 37)

Table 3. Number of papers included in the review by database searched.

|  |  |
| --- | --- |
| Source | Number of Peer-Reviewed Articles |
| Scopus | 5 |
| ProQuest | 9 |
| Web of Science | 5 |
| Google Scholar | 5 |
| CAB Abstract | 7 |
| Additional References (Books) | 6 |
| **Total** | **37** |

**Results**

Through thematic analysis, six overarching themes were identified following the in-depth assessment of the articles and materials included following the initial screening. The most frequently coded theme was *the promotion of traditional food resources,* with 62 per cent of articles (n = 23) exploring this subject. The *contribution of traditional food to food and nutrition security* was investigated in 57 per cent of articles (n = 21), while issues related to the *role of women in the indigenous peoples* were investigated in 35 per cent (n = 13) of the articles. The *role of traditional foods in preserving ecosystems and biodiversity* was studied in 35 per cent (n = 13) of articles, while articles focusing on issues related to the *use of traditional food as medicine* were studied in 30 per cent (n = 11) of articles. Lastly, 24 per cent (n = 9) of articles *investigated the role of traditional foods in preserving indigenous people’s culture*. The articles included in each theme are summarised in Table 4. Figure 1 illustrates the total number of the articles in the included studies by year of publication. Overall, it can be seen that the trend remained fairly constant. However, there is an increase number of articles in 2009 and 2018 in which the themes discussed were food security and the promotion of traditional foods.

Table 4. Results of thematic coding.

|  |  |
| --- | --- |
| Theme/Focus | Number of Articles |
| 1. The promotion of traditional food resources | 23 |
| 1. The contribution of traditional food in food and nutrition security | 21 |
| 1. The role of women in the indigenous community | 13 |
| 1. The role of traditional foods in preserving ecosystems and biodiversity | 13 |
| 1. The use of traditional food as medicine | 11 |
| 1. The role of traditional foods in preserving the culture of indigenous peoples | 9 |

Figure 1. Total articles in the included studies by year of publication.

**Theme 1. The promotion of traditional food resources (n=23)**

Most of the articles that included research falling within this theme emphasised the need to increase indigenous peoples’ awareness, in particular in the case of younger people, about the types and variety of traditional food resources, food consumption patterns, and the importance of local food systems to the environment, and the inclusion of traditional foods in diets. Despite evidence that indigenous peoples are aware of the role and importance of traditional food resources, the consumption of these foods is low (Durst and Bayasgalanbat, 2014; Gewa *et al.,* 2019; Ghosh-Jerath *et al.,* 2018) and potentially regarded by the members of indigenous peoples as the ‘food of poor people’ (Durst and Bayasgalanbat, 2014; Ellena and Nongkynrih, 2017; Mwema and Crewett, 2019). There are many traditional food resources that are included in the communities’ diets. Examples include green leafy vegetables in Africa and India (Ghosh-Jerath *et al*., 2018; Mwema and Crewett, 2019; Shava *et al.,* 2009; Singh *et al.,* 2012; Singh *et al.,* 2007); Ugali (sometimes referred to as the “meat of Africa”; (Noack and Pouw, 2015); Yams or Wild Dioscorea (Padhan *et al.,* 2018; Paul *et al.,* 2018), Kair and minor millets in India (Durst and Bayasgalanbat, 2014; Rinya, 2017; Shashidhar and Kumaraswamy, 2009; Singh and Singh, 2011; Vunyingah and Kaya, 2016), edible insects in Ghana (Anankware *et al.,* 2016), and seaweeds throughout the Pacific region (Swanepoel *et al.,* 2020). However, there is evidence of a transition from a varied traditional based diet to a more limited number of foods (Donn *et al.,* 2015; Ellena and Nongkynrih, 2017), which has also negatively affected the nutritional quality of diets of people with communicable diseases such as HIV/AIDS in Zimbabwe (Moyo *et al.,* 2017). It has been argued that traditional food-based knowledge must be safeguarded and maintained (Duthie-Kannikkatt *et al.,* 2019), by continuously educating younger members of the community regarding the importance of traditional food systems (Ellena and Nongkynrih, 2017; Kuhnlein *et al.,* 2009). This is mainly because indigenous people and their children may remain heavily dependent on forest resources and subsistence farming for their diet, with locally produced fruits, vegetables, and animal-sourced food comprising an important part of their diet (Reyes-Garcia *et al.,* 2018).

A common element that emerged from the analysis conducted within this theme was that traditional food resources were essential for indigenous peoples because they provided source of essential micronutrients. However, in spite of the fact that many traditional foods are nutrient-dense, people did not consume these foods, which subsequently led to inadequate nutrient intake. Consequently, the literature indicates that there is a need for the preservation and promotion of indigenous peoples’ capacity to continue to consume their traditional foods and maintain traditional diets and their traditional food practices (UNPFII, 2010).

**Theme 2. The contribution of traditional food in food and nutrition security (n=21)**

This theme identified arguments relating to how traditional foods positively correlate with indigenous peoples’ food and nutrition security. The articles indicate that, in the past, various traditional foods have played a key role in household food security and dietary diversity (Finnis, 2007; Longvah *et al*., 2017; Shava *et al*., 2009; Singh *et al.,* 2013). Various traditional foods have been shown to contain essential micronutrients, such as calcium, missing from the diets of some people in the global south (Ghosh-Jerath *et al*., 2018; Longvah *et al*., 2017; Nandal and Bhardwaj, 2015; Padhan *et al*., 2018; Paul *et al*., 2018; Shava *et al*., 2009; Singh *et al*., 2012; Vunyingah and Kaya, 2016). Child undernutrition and micronutrient deficiencies are some of the problems that have arisen in indigenous peoples despite the abundance of cultivated and wild food resources in the region (Chyne *et al.,* 2017; Nandal and Bhardwaj, 2015). This suggests that the impacts on indigenous people’s children eating habits should be carefully evaluated (Reyes-Garcia *et al.,* 2018). There is evidence that younger people are deprived of traditional foods and diets, and they increasingly depend on western processed foods (Kuhnlein *et al*., 2009). Another problem is related to the incidence of HIV/AIDS, which has threatened community-based resources by limiting the transmission to young generations of agricultural knowledge and food security practices. As community knowledge owners die of AIDS, their local knowledge and experiences are taken with them, thus eroding the foundation of sustainable food security for the community and the household (Lyana and Manimbulu, 2014). Whether the Covid-19 pandemic will have similar impacts remains a topic for future research.

The value of food security and healthy nutrition lies in improving physical and emotional health (Moyo *et al.,* 2017; Noack and Pouw, 2015). Food security for indigenous peoples has been affected by various environmental changes such as contamination, degradation, climate change, urban growth, and modern agricultural practices (Erni, 2015; Finnis, 2007; Kuhnlein *et al.,*,2013; Meldrum *et al*., 2018). Another important issue which has emerged from this literature is related to land rights. There is a strong connection between land rights and food security, where the displacement of indigenous peoples from their land of origin can disrupt household food security, and act as a barrier to attaining livelihoods and accessing resources (Mamo, 2020). Several studies have found that traditional food crops are particularly resilient to adverse local environments, which suggests that they have an important role in ensuring food and nutrition security, particularly during the course of a natural disaster (Gewa *et al.,* 2019; Meldrum *et al.,* 2018; Shava *et al.,* 2009). The continuation of indigenous people’s traditional knowledge represents an important priority to ensure food and nutrition security.

**Theme 3. The role of women in the indigenous community (n=13)**

The importance of women within indigenous communities as potential promotors of traditional foods in diets emerged as an important theme in the analysis. Women are primarily involved in the transfer of knowledge about wild edible plants and small crops, and their cultivation, use, preparation for food use, and processing, to the next generation (Ellena and Nongkynrih, 2017; Lyana and Manimbulu, 2014; Narayanan and Kumar, 2007; Ravera *et al*., 2019; Singh *et al*., 2012; Singh *et al*., 2013). Women are also generally responsible for marketing the traditional food products which they produce, and for deciding what foods their children consume (Durst and Bayasgalanbat, 2014). Women may perceive that traditional foods are an important component of children’s diets partly because traditional foods are perceived to be natural, with no chemical additives (Kuhnlein *et al.*,2013). In many parts of the world, women have supported the conservation and domestication of culturally important plant species used in food and medicine (Singh *et al*., 2007). However, despite their important role in cultivating the land, planting crops, harvesting, and preserving food, women, in general, have limited rights to land ownership in many communities (Vunyingah and Kaya, 2016), and do not “own” food since men control its production and distribution. Despite women having knowledge relevant to promoting food security (Wane, 2003), women were often not acknowledged or were undervalued in relation to attaining and maintaining food security and traditional food for diets (Kuhnlein *et al.,* 2013; UNPFII, 2010). Therefore, recognizing the importance of the role of women in food supply chains, and removing barriers and facilitating enablers to women’s full participation in the economy are central to developing sustainable food systems and achieving food and nutrition security (Swanepoel *et al.,* 2020).

**Theme 4. The role of traditional foods in preserving ecosystems and biodiversity (n=13)**

The contributions of indigenous peoples to ecosystem management and sustainable development are increasingly understood and appreciated, particularly in relation to their knowledge about the natural environment and time-proven practices of hunting, gathering, fishing, pastoralism and agriculture (Erni, 2015). Local wild foods contribute to the ecosystem's dietary diversity and resilience (Chyne *et al.,* 2017; Gewa *et al.,* 2019; Meldrum *et al.,* 2018; Paul *et al.,* 2018). For example, Kair has the soil-binding capacity and can improve the soil fertility of sand dunes and reduce soil alkalinity, thus contributing to environmental sustainability (Singh and Singh, 2011). However, the impact of climate change on the environment currently represents a severe threat to indigenous peoples, and there is a need to diversify the food base to a broader range of food crops to increase system resilience (Durst and Bayasgalanbat, 2014; Mamo, 2020; Shava *et al.,* 2009). At the same time, a large number of traditional and sustainable agricultural practices and food species are being lost as intensification and monoculture are introduced (Finnis, 2006). Deforestation of indigenous people’s territories is tied to carbon dioxide emissions associated with the destruction of natural habitats (Mamo, 2020). One of the most significant challenges threatening the continuation of local seed diversity are human generational changes. Young people as well as older generations must take responsibility for protecting and preserving their land rights and the local seeds they hold (Duthie-Kannikkatt *et al.,* 2019; Ravera *et al.,* 2019).

**Theme 5. The use of traditional food as medicine (n=11)**

Indigenous peoples recognise the nutritional value and health benefits that their traditional crops can provide (Durst and Bayasgalanbat, 2014; Moyo *et al.,* 2017; Nandal and Bhardwaj, 2015; Narayanan and Kumar, 2007; Padhan *et al.,* 2018; Paul *et al.,* 2018). However, traditional foods are being replaced by less healthy, processed foods in the diet (Durst and Bayasgalanbat, 2014; Moyo *et al.,* 2017; Singh *et al.,* 2007; UNPFII, 2010), driving increases in obesity (UNPFII, 2010), heart disease, stroke, diabetes, and other ailments (Singh *et al.,* 2007). Some traditional foods are still consumed in order to cure disease and improve health, such as leaves from *Banko* (*Solanum spirale)* that are used in curing malaria, balancing blood sugar, and high blood pressure (Singh *et al.,* 2012), cardiac and gastric illness (Singh and Singh, 2011, Paul *et al.,* 2018), and cosmetic medicine from flowers, such as the moringa tree (Durst and Bayasgalanbat, 2014). It is important to recognize that there are many aspects of traditional food as medicine which can be incorporated into modern healthcare (UNPFII, 2010). However, in some cases, reliance on traditional foods may result in nutritional deficiencies. For example, frequent consumption of traditional foods such as Pike Pila and Tap, a local version of sodium bicarbonate, may neutralise the nutrition and micronutrients of other food items because of their alkaline properties. Hence, overreliance on some traditional foods may also be problematic from a nutritional perspective (Rinya, 2017).

**Theme 6. The role of traditional foods in preserving the culture of indigenous peoples (n=9)**

Food has both practical and cultural functions. Food that affects people's growth and development, (and has nutritional value) may also contribute to socio-cultural activities, and spiritual life (Anankware *et al*., 2016; Duthie-Kannikkatt *et al*., 2019; Lyana and Manimbulu, 2014; Rinya, 2017; Singh *et al*., 2007). The consumption of insects in Ghana (Anankware *et al.,* 2016), Ugali in Kenya (Noack and Pouw, 2015), and other traditional foods are not dependent on only taste and nutritional value (Anankware *et al.,* 2016), but also represent a foundation on which people’s cultural identity and adaptive practices associated with traditional foods are built (Duthie-Kannikkatt *et al.,* 2019). Cultural diversity is a factor that has been identiﬁed as one of the primary drivers of traditional biodiversity (Singh *et al.*, 2013).

**Discussion**

This analysis provides a comprehensive, systematic review of the available literature on traditional diets and food security for indigenous peoples in LMICs. Thirty-seven studies were identified within the existing literature, and thematic analysis has led to identifying six major themes. The study found that traditional foods have a significant role in promoting and maintaining food security, and the cultural and environmental preservation of indigenous cultures. The review suggests there is a need to promote and preserve the knowledge held about traditional foods by indigenous peoples, within communities and beyond, and that this is becoming more urgent as knowledge and skills are decreasingly passed down through generations.

The issue of traditional food security for indigenous peoples is not only an issue for LMICs. For example, indigenous peoples of the United States and Australia may also experience similar impacts on food security in relation to the loss of traditional food for diets. Indigenous peoples of Australia have higher rates of food insecurity and diet-related disease than other Australians (Lee and Lewis, 2018), while in the United States they face chronic illnesses associated with inadequate nutrition, including obesity and diabetes (Banna and Bersamin, 2018). There is no single answer to the problem of food insecurity. It is important to promote traditional food species, not only for the cultural purposes but also because of their potential to contribute to maintaining food security and the balance of the ecosystem in indigenous peoples and the resources which they manage.

Climate change is major problem faced by indigenous peoples globally. One of the main concerns is related to rapid biodiversity loss that is accelerating across the globe with negative consequences for human well-being (Howard and Pecl, 2019). Despite the vulnerability of indigenous peoples to climate change, indigenous communities lead the way in adapting to climate change through novel and traditional practices, such as the Climate-Ready Tribes Initiative in India (Schramm *et al.,* 2020). Recent research from Australia also suggests that co-production between scientific and Indigenous Knowledge has been helpful in generating adaptation pathways for indigenous peoples attached to their traditional lands and are, therefore, highly exposed to the effects of climate change (Hill e*t al*., 2020).

The relationship between food security and indigenous peoples can be understood through their way of living. This is reflected by the concept of cultural relativism, where the individual's own beliefs, values, and practices should be understood based on that person's culture, and should not be judged according to another person’s criteria (UIA, 2017). Thus, non-indigenous peoples should be aware of the differences and the uniqueness of the culture and values; therefore, they can understand and appreciate more of the abundant knowledge of the indigenous peoples, curated by both men and women, and how this can be used to promote food security.

**Conclusion**

The continuity of traditional food practices is important for indigenous peoples in LMICs, and elsewhere. This is due to the role traditional diets have in maintaining and promoting food and nutrition security, preserving ecosystems and biodiversity, as medicine, and preserving culture of indigenous peoples. Women in indigenous people’s community play a significant role in ensuring the transfer knowledge about the variety of traditional crops to the young generation, and this requires greater recognition. Greater cooperation between international agencies and indigenous peoples globally is may be needed to develop effective policies to promote traditional foods for diets, due to the complexity of the associated issues, and impact pathways.

*Future research*

While the importance of traditional foods and food security for t indigenous peoples is identified in the analysis. However, various themes emerged during the analysis, but were not included in the initial search terms, including those relating to biodiversity, gender analysis, and traditional food as medicine. These are topics that are interrelated with our research and are connected to the SDGs on biodiversity and gender, but were not be systematically addressed in this review, representing a limitation of the research. There is therefore an opportunity for future research to be conducted in these areas specifically, which would deliver evidence for policymakers and communities to develop comprehensive policies and impact pathways regarding the role of traditional foods across multiple targets, including gender equality and conservation of biodiversity. Further, there is infrequent comparison between indigenous people in LMICs and developed countries with respect to traditional diets. A greater understanding of the role of traditional diets in general, and the contribution these make to the SDGs will improve scholars and policy makers’ understanding of the importance of the role of traditional diets globally.

*Limitations of the study*

There are limitations to this review. *First*, the search only returned items from English-language databases. Although the indigenous people represent less than 6 per cent of the global population, they speak over 4,000 languages (United Nations, 2019). Research published in languages other than English has been excluded from this study for pragmatic reasons, but the authors recognise that the English language is not the only available source of information. *Second*, studies on the subject are extensive, but the report was limited to 20 years to ensure the relevance of the results to current issues in food security was addressed. Extending the timeframe might reveal more relevant information, for example about how traditional diets which have now disappeared have contributed to biodiversity, food security and culture.

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| Table 5. List of included studies | | | | | | | | | | | | |
| No | | Paper | | Country | Sample Size | | Method | Traditional Foods | | Publication Type | | Peer-Reviewed |
| 1 | | Swanepoel *et al* (2020) | | Kiribati | 49 | | Structured interviews | Seaweed | | Journal article | | Yes |
| 2 | | Ravera *et al* (2019) | | India | 330 | | Ethnographic; in-depth interview, survey | Millets, maize | | Journal article | | Yes |
| 3 | | Mwema and Crewett (2019) | | Kenya | 201 | | Household survey | African Indigenous Vegetables (AIVs): spider plant, African nightshade, Cowpeas, vegetable Amaranth, Pumpkin leaves | | Journal article | | Yes |
| 4 | | Gewa *et al* (2019) | | Kenya | 220 | | Longitudinal study | Sorghum, millet, cassava, Amaranthus leaves, spider-plant leaves, jute mallow, sweet potato leaves, cassava leaves, African nightshade leaves, cowpea. | | Journal article | | Yes |
| 5 | | Duthie-Kannikkatt *et al* (2019) | | India | 38 | | Interviews, FGD, participatory field-research | Indigenous millets, pulses, oilseeds, and vegetable seeds | | Journal article | | Yes |
| 6 | | Reyes-Garcia *et al* (2018) | | Bolivia, Congo, Indonesia | 405 | | Mixed method | Fruits and green leafy vegetables, legumes | | Journal article | | Yes |
| 7 | | Paul *et al* (2018) | | India | 13 | | Survey | Dioscorea (Yam) | | Journal article | | Yes |
| 8 | | Padhan *et al* (2018) | | India | 8 | | Minerals and heavy metals content analysis | Dioscorea (Yam) | | Journal article | | Yes |
| 9 | | Meldrum *et al* (2018) | | Bolivia | 193 | | Mixed method; Household survey | Oca, papalisa, isano, bitter potatoes, wild relatives of quinoa and canahua | | Journal article | | Yes |
| 10 | | Ghosh-Jerath *et al* (2018) | | India | 143 | | Household and dietary survey | Indigenous varieties of green leafy vegetables | | Journal article | | Yes |
| 11 | | Rinya (2017) | | India | 180 | | Cross-sectional survey | Edible leafy, leafy vegetables, herbs, berries | | Journal article | | Yes |
| 12 | | Moyo *et al* (2017) | | Zimbabwe | 10 | | In-depth interview | Wild  vegetables; mushrooms, green leaves, pumpkin leaves and wild fruits such as uxakuxaku, umtshwankela, umviyo, umnyi, and marula fruit | | Journal article | | Yes |
| 13 | | Longvah *et al* (2017) | | India | 1201 | | Community-based cross-sectional descriptive study; FGD, Food Insecurity Experience Scale | 137 cereals and millets, 97 fruit and vegetable crops | | Journal article | | Yes |
| 14 | | Chyne *et al* (2017) | | India | 1103 | | Community-based cross-sectional study | Job’s tears (*Coix lacryma*), millets, sohphlang (Flemingia vestita), jalynniar, sohshang (Eleagnus caudate), tit syiar (Clavvulina sp), tit tyndong (Gomphus floccus) | | Journal article | | Yes |
| 15 | | Vunyingah and Kaya (2016) | | Cameroon | 80 | | Participatory and case study | Sorghum | | Journal article | | Yes |
| 16 | | Anankware *et al* (2016) | | Ghana | 2000 | | Interviews, FGD, participant observation | Palm weevil, termites, ground cricket, grasshopper, scarab beetle, field cricket, shea tree caterpillar, house cricket, locust | | Journal article | | Yes |
| 17 | | Noack and Pouw (2015) | | Kenya | 215 | | Semi-structured interviews, household survey, FGD, community timeline | Ugali, sorghum, millet, cassava | | Journal article | | Yes |
| 18 | | Nandal and Bhardwaj (2015) | | India | 205 | | Survey, interview | Aonla, Date palm, Sitaphal, Ber, Khirani, Jamun, Pilu, Ker, Kachri, Khejri pods, Phog, Bael, Tamarind | | Journal article | | Yes |
| 19 | | Lyana and animbulu (2014) | | Tanzania, Congo | 5 | | Documentation analysis, in-depth interview, FGD | Fumbwayiyaka, Kikongo, lingala, young wild yam stems, wild amaranthus, fungus, mushrooms, cassava | | Journal article | | Yes |
| 20 | | Singh *et al* (2013) | | India | 531 | | FGD, interview, “recipe contest” | 55 plant species; 34 plant species as part of ethnomedicinal practices | | Journal article | | Yes |
| 21 | | Singh *et al* (2012) | | India | 25 | | Interview, FGD | Onger, poi, dhenki saag, marsang, ongin, kalmu, rori | | Journal article | | Yes |
| 22 | | Singh and Singh (2011) | | India | 260 | | Interview, FGD | Kair (Capparis decidua) | | Journal article | | Yes |
| 23 | | Shava *et al* (2009) | | Zimbabwe | 6 | | Ethnography study; in-depth unstructured interviews | Maize, pumpkin, marrow, squash, Indian or Chinese mustard, Rape, Okra, Sweet cane, Sorghum, Calabash, sweet potato, pearl millet, Pigweed, cowpea, bamabara groundnut | | Journal article | | Yes |
| 24 | | Shashidhar and Kumaraswamy (2009) | | India | 114 | | Participatory rural appraisal, personal observations | Finger millet | | Journal article | | Yes |
| 25 | | Singh *et al* (2007) | | India | 140 | | Interviews, FGD | soybean, bamboo shoot, *lai patta*, tree bean, *rai* | | Journal article | | Yes |
| 26 | | Narayanan and Kumar (2007) | | India | 366 | | interviews | 102 species of wild edible greens | | Journal article | | Yes |
| 27 | | Finnis (2007) | | India | 104 | | ethnographic fieldwork; semi-structured interviews, participant observations | minor millets; samai, thenai, varagu, cambu, ragi | | Journal article | | Yes |
| 28 | | Wane (2003) | | Kenya | 177 | | Interviews, questionnaire | millet vegetables and legumes such as cowpeas, pigeon peas, garden peas, kidney beans, white beans, and lentils | | Journal article | | Yes |
| 29 | | Donn *et al* (2015) | | Democratic Republic of Congo, Cameroon, Gabon | 724 | | Questionnaire, interviews | wild green leafy vegetables, legumes, yam | | Journal article | | Yes |
| 30 | | Ellena and Nongkynrih (2017) | | India | 228 | | ethnographic and ethnobotanical research tool; FGD, interviews | millets, pickled bamboo shoots, sohphie | | Journal article | | Yes |
| 31 | | Finnis (2006) | | India | 54 | | semistructured interviews, dietary diversity focus groups, conceptual mapping exercises, one-day dietary recalls, mealtime observations, and participant-observation. | Tapioca, millets | | Journal article | | Yes |
| Six Additional References | | | | | | | | | | | | |
| No | **Author** | | **Country** | | | **Title** | | | **Traditional Foods** | | **Publication Type** | |
| 1 | Kuhnlein *et al* (2009) | | Worldwide with specific case study from LMICs: India, Federated States of Micronesia, Nigeria, Kenya | | | Indigenous peoples' food systems: the many dimensions of culture, diversity and environment for nutrition and health | | | Giant swamp taro, banana, seeded breadfruit, yam cultivar, green leafy vegetables, nut, finger millet, barley, foxtail millet, sorghum, amaranth, Bambara groundnut, whistling thorn, yellow maize, African breadfruit | | Book | |
| 2 | UNPFII (2010) | | Worldwide | | | State of the World's Indigenous Peoples | | | Local taro plant, fish, ringed seal and caribou (First Nations) | | Book | |
| 3 | Kuhnlein *et al* (2013) | | Worldwide with specific case study from LMICs: India and Federated States of Micronesia | | | Indigenous Peoples' Food Systems & Well-being: Interventions & policies for healthy communities | | | Sorghum, chickpea, lentil, black gram, green leafy vegetables, banana, fish, breadfruit, giant swamp taro, coconut products | | Book | |
| 4 | Durst and Bayasgalanbat (2014) | | Worldwide with specific case study from LMICs: Bhutan, Vietnam, Cambodia, Lao PDR, Indonesia, Philippines, India, | | | Promotion of underutilized indigenous food resources for food security and nutrition in Asia and the Pacific | | | Indian gooseberry, moringa oleifera, garlic, onion, soy bean, sago, Esomus metallicus, millets, fresh pomelo, Garcinia indica | | Book | |
| 5 | Erni (2015) | | Asian countries with specific articles from LMICs: Bangladesh, Cambodia, India, Indonesia, Lao PDR, | | | Shifting Cultivation, Livelihood and Food Security | | | Fruit and cashew orchards, rubber gardens, various vegetables and herbs, ginger, turmeric, barley, fox tail millet, sorghum, yam, sesame | | Book | |
| 6 | Mamo (2020) | | Worldwide | | | The Indigenous World 2020 | | | Local crops, fish | | Book | |

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**Appendix A (Search Terms for Five Databases)**

|  |  |  |
| --- | --- | --- |
| Search # | Query | Number of Articles |
| ***Scopus***  *(26/05/2020)*  *# 1* | "traditional food\*" OR "indigenous food\*" OR "traditional diet\*" AND "Indigenous People\*" OR "primitive" OR "orang asli" OR "native" OR "aboriginal" AND "food security" OR "food resilien\*" OR "food safety" OR "food availability" OR "food sufficiency" | 89 |
| *# 2* | "traditional food\*" OR "indigenous food\*" OR "traditional diet\*" AND "Indigenous People\*" OR "primitive" OR "orang asli" OR "native" OR "aboriginal" AND "food security" OR "food resilien\*" OR "food safety" OR "food availability" OR "food sufficiency" | 5 |
| *(29/05/2020)*  *# 3* | "traditional food\*" OR "indigenous food\*" OR "traditional diet\*" AND (indigenous OR native OR primitive OR "orang asli" OR aboriginal) AND people\* AND (security OR insecurity OR resilien\* OR safety OR availability OR sufficiency) AND food\* | 118\* |
| ***ProQuest*** *(26/05/2020)*  *# 1* | ("traditional food" OR "traditional foods") OR ("indigenous food" OR "indigenous foods”) OR ("traditional diet" OR "traditional diets") AND ("indigenous people" OR "indigenous peoples") OR "primitive" OR "orang asli" OR "native" OR "aboriginal" AND "food security" OR "food resilience" OR "food safety" OR "food availability" OR "food sufficiency" | 253,734 |
| *# 2* | ("traditional food" OR "traditional foods") OR ("indigenous food" OR "indigenous foods”) OR ("traditional diet" OR "traditional diets") AND ("indigenous people" OR "indigenous peoples") OR "primitive" OR "orang asli" OR "native" OR "aboriginal" AND "food security" OR "food resilience" OR "food safety" OR "food availability" OR "food sufficiency" | 4,448 |
| *(28/05/2020)*  *# 3* | "traditional food\*" OR "indigenous food\*" OR "traditional diet\*" AND (indigenous OR native OR primitive OR "orang asli" OR aboriginal) AND people\* AND (security OR insecurity OR resilien\* OR safety OR availability OR sufficiency) AND food\* | 1,029\* |
| ***Web of Science***  *(28/05/2020)*  *# 1* | ("traditional food" OR "traditional foods") OR ("indigenous food" OR "indigenous foods”) OR ("traditional diet" OR "traditional diets") AND ("indigenous people" OR "indigenous peoples") OR "primitive" OR "orang asli" OR "native" OR "aboriginal" AND "food security" OR "food resilience" OR "food safety" OR "food availability" OR "food sufficiency" | 514,211 |
| *(29/05/2020)*  *# 2* | "traditional food\*" OR "indigenous food\*" OR "traditional diet\*" AND (indigenous OR native OR primitive OR "orang asli" OR aboriginal) AND people\* AND (security OR insecurity OR resilien\* OR safety OR availability OR sufficiency) AND food\* | 186\* |
| ***Google Scholar***  *(28/05/2020)*  *# 1* | ("traditional food" OR "traditional foods") OR ("indigenous food" OR "indigenous foods”) OR ("traditional diet" OR "traditional diets") AND ("indigenous people" OR "indigenous peoples") OR "primitive" OR "orang asli" OR "native" OR "aboriginal" AND "food security" OR "food resilience" OR "food safety" OR "food availability" OR "food sufficiency" | 17,500 |
| *(29/05/2020)*  *# 2* | "traditional food\*" OR "indigenous food\*" OR "traditional diet\*" AND (indigenous OR native OR primitive OR "orang asli" OR aboriginal) AND people\* AND (security OR insecurity OR resilien\* OR safety OR availability OR sufficiency) AND food\* | 17,000 |
| *#3* | "traditional diet\*" AND "indigenous people\*" AND "food security" | 511\* |
| ***EBSCOhost***  ***(CAB Abstracts)***  *(29/05/2020)*  *# 1* | "traditional food\*" OR "indigenous food\*" OR "traditional diet\*" AND (indigenous OR native OR primitive OR "orang asli" OR aboriginal) AND people\* AND (security OR insecurity OR resilien\* OR safety OR availability OR sufficiency) AND food\* | 187\* |

\* *Recommendation Search*