The Challenge

Almost all scientists and policy makers acknowledge that we are living in an era of climate change and associated global challenges (GLOPAN, 2016; Godfray et al, 2010):

- The world is getting hotter - at least 2°C rise in the global average by 2050.
- The population is expanding - predicted to be 9 billion by 2050.
- Resources for production are being depleted - land and water quality and soil fertility are declining.
- Our diets are becoming more limited - we rely on a few crops for our food and animal feed needs.
- A global processed diet is unhealthy - non-communicable diseases due to over consumption now outnumber those due to under-nutrition.

We need to change our food systems – sooner rather than later – and literally transform agriculture, for the good of humankind, for health and for the planet.

The approach we focus on here is of dietary diversification through the use of “Forgotten Foods”. We propose this approach since the consumption of a diverse range of foods confers additional nutritional and social benefits than by only enhancing micronutrients into existing staple crops.

In this brief, we focus specifically on plant-based forgotten foods, since this is the remit of CFF. However, we also encourage the rediscovery and increased utilisation of animal and insect species. Together, this diversity will contribute to the “Forgotten Foods Network” being championed by CFF. We anticipate that other stakeholders more closely linked to animals, insects and marine species will advocate the increased use of such species in the diets of the future.
Introduction

Our modern diet is increasingly uniform and depends on a few ingredients from the same crops. Many of these are brought along vulnerable supply chains from a few exporting countries. Our globalised food system is at risk. We must diversify our diets with foods that provide nutrients and not just calories (Toledo and Burlingame, 2006). Such foods need ingredients from a wider range of crops (many that can be grown locally) as well as the major staples. We must put nutrition at the heart of our food systems. This is where forgotten foods – the traditional foods and crops that our ancestors ate - could play a vital role, especially in the unpredictable and vulnerable climates of the future.

Forgotten Foods

There is no single definition of forgotten foods. They include the foods that were once popular but have now been displaced by a modern global diet of uniform and processed ingredients. Many forgotten foods are niche products that remain popular in certain geographical locations and at particular times of the year. Most have been neglected by mainstream research and not benefitted from advances in technology, advocacy or marketing. There are thousands of forgotten foods that include ingredients from neglected crops, fruits and vegetables, animals and even insects as well as traditional varieties of the major staple crops. Each of these forgotten foods deserves to be evaluated to explore which can nourish future generations.

There are many reasons why foods have become forgotten:

Demographic shift

Dietary change accompanies the migration from rural to urban living. In fact it becomes a necessity since the foods commonly produced in rural areas may not be available in the urban setting. Many fruits and vegetables that are seasonal and available in abundance at the site of production, never make the journey into cities. Populations need to travel to find the foods of their past. Urban lifestyles are also associated with having less time to search for and prepare foods. Fast foods and ready meals become the first choice for many seeking to juggle long hours of work and travel. Dietary diversification suffers.

Access to forgotten foods is difficult. Supermarkets dominate the purchasing behaviour of many and dictate the types and prices of foods that are available. Cereal-based products are readily available, have long shelf life, and provide tasty, processed products that displace more diverse foods.
Supply and demand for forgotten foods

A limited supply of forgotten foods in urban centres means that they incur a higher price in a market place dominated by cheap, processed ingredients from major species. Forgotten fruits and vegetables are produced seasonally with few inputs. Many are perennials or ‘wild’ species. Yield varies between seasons depending on weather. Farm gate price is erratic in line with variable supply. Price at the peak of harvest is depressed to such an extent that produce is often given away or left to rot. The farmer questions the rationale of producing a crop for which there is little demand or income. There is no investment in the crop. The only realistic livelihood option is to switch to non-farming employment, move to urban areas in search of work or produce another crop which demands a higher price.

Postharvest technology

Forgotten and underutilised crops have not benefitted from research into improved methods of postharvest storage, transport and processing into edible foods with a longer shelf life. By their very nature, they may be non-uniform in shape and size, have hard and irregular seed coats, large stones or seeds and contain anti-nutritional components that need removing prior to consumption. These traits make them difficult and time consuming to process. Early varieties of wheat were also difficult to process. Decades of investment into breeding for uniformity and large grain size have culminated in a crop that can be fully mechanised and easily processed into flour for consumption. We can do the same for underutilised crops.

Displacement and migration

Both economic development and displacement of populations – rural to urban migrants, refugees and expatriate communities – all gravitate towards a homogenous global diet that lacks diversity.

Leaving behind one’s birth place for life in a new region, whether out of choice or necessity, is associated with a similar dietary outcome - change. Change means adopting the diet of the new home, be that a refugee camp for migrants and victims of war and unrest, or a new city for others. Inevitably, it is the poorest sectors of unsettled populations who have to make the biggest dietary changes. Processed and fast foods are cheap and readily available in most urban areas. When price dictates the diet, most people will opt for the cheapest (which is usually the least nutritious and least diverse) option. The foods of the homeland are forgotten.
Diversifying our Food Systems with Forgotten Foods

Forgotten foods can improve health and nutritional status. They have a significant role to play in the transformation of agriculture that will be necessary to counter the impacts of global warming and ensure food and nutritional security in future climates. Since the beginning of agriculture, the global population has grown from 0.1 billion to over 7 billion people (Esquinas-Alcazar, 2005). Most of that growth (from 2.4 to 7.1 billion) has occurred in the last 50-60 years.

Early agroecosystems were a complex mixture of annual crops, perennial species and animals. These “agri-silvo-pastoral” systems have largely given way to intensive segregated animal and crop farming and a greater reliance on uniform crops, varieties and systems that are less diverse than their predecessors.

The Green Revolution of the 1960s marked a turning point for agriculture and for the diversity of agricultural systems. The urgent need to ensure global food security resulted in intensively produced high yielding varieties of wheat, rice and maize at the expense of more traditional farming practices and underutilised species. This period also saw an unprecedented decline in the diversity of crop species and in the cropping systems in which they are grown.

The reduction in the diversity of species and systems has inevitable, often unintended, consequences on the range of natural biological diversity that exists within them. Dietary diversification is also compromised.

Beliefs and attitudes

Forgotten foods may be stigmatised for their link to poverty. ‘Poor man’s food’, ‘the food of women farmers’, ‘the food we used to eat before we could afford any better’ are terms associated with forgotten foods. Some of these reasons explain why they have been displaced by the foods of the majority. They have been forgotten as people aspire to a better lifestyle, away from the drudgery of food preparation to one where desirable instant foods are available.

Once the basic need to alleviate hunger is fulfilled and as populations and individuals become more affluent, values and priorities change. Nourishment for good health, sustainable and fair production and an interest in discovering ‘new foods’ become important. Foods that were once associated with poverty become desirable.

A change in mindset and re-evaluation of the foods and culinary traditions of our ancestors can help diversify global diets and feed the future.
Crop And System Diversity

There are between 300,000 and 500,000 higher plant species (Wilson, 1999; Collins and Hawtin, 1999). Of these, about 30,000 are edible and around 7,000 have been cultivated or collected by humans for food. However, fewer than 20 crops now account for more than 90% of global food production. Most edible crops have fallen by the wayside as we depend more and more on major crops such as wheat, rice and maize. Together, these staple crops provide over most of our plant-based foods, mainly as sources of starch. Apart from soybean and groundnut, legumes – the major sources of protein in poor countries – contribute less than 2.5% to the global diet.

Diversification of agriculture, of agronomic practices and of the end products, is key to sustainable production, improved health and nutritional security. Current agronomic practice is for intensive production of monocultures, with a heavy dependence on fertilisers, pesticides and irrigation to maintain high yields. More traditional agronomic practices, such as intercropping, crop rotation, agroforestry and sister planting are compatible with resilience to predicted climatic changes and diversification of agriculture (Barber, 2014; IEPS-Food, 2016).

Intensification has profoundly influenced the range and diversity of crop species and cropping systems in modern agriculture. In particular, it has displaced indigenous or ‘minor’ species and local cropping systems with more favoured ‘major’ species and uniform systems of cultivation.

Diversification of diets

A balanced diet derived from a diverse range of foods is key to optimal health and nutrition. The narrowing of diets to rely on three or four key ingredients has coincided with an increase in the incidence of diet-related diseases of over consumption. Dependence on a small number of cereal crops has led to increasing concerns about human diets that are energy-rich but nutrient-poor (Stadlmayr et al, 2011; Toledo and Burlingame, 2006). Micronutrient deficiencies are now recognized to be more widespread than energy/protein malnutrition with at least 1.5 billion people likely to be affected by one or more micronutrient deficiency (GBD, 2016). Deficiencies in key vitamins and minerals pose a serious constraint to human health and economic development (GLOPAN Foresight Report, 2016). This Report, together with the Global Nutrition Report (IFPRI, 2014) and the Kigali Declaration on Biofortified Nutritious Foods (HarvestPlus 2014), highlights the need for multiple complementary strategies to address key micronutrient deficiencies. The GLOPAN Report (2016) highlights that healthy diets comprise a diverse variety of fruits and vegetables, wholegrains, fibre, nuts and seeds, whilst limiting free sugars, sugary snacks and beverages, processed meats and salt. In short, diversification of our diets is central to good health.

Diversification of livelihood options

The cultivation of forgotten, or neglected, fruits, vegetables and other species provides a range of livelihood options for thousands of small scale farmers and processors. These crops, which are rich in minerals and vitamins, can be grown in diverse cropping systems to complement the major crops, thereby improving diets and human health. Smallholder producers and subsistence farmers in both rural and urban areas frequently grow a mix of plants to enhance their diets. Women play a vital role in producing such plants and as urbanisation increases, the peri-urban production of crops such as vegetables, fruits and herbs will increase.
Examples of forgotten foods that have been rediscovered

Almost 30 years ago, William Stevens, reporting in the New York Times, narrated the story of the lost crops of the Incas (see box below). His story brought the plight of the Incan farmers (and their forgotten crops) into the headlines and started a mini-revolution with the race to ‘discover the lost crops’. Almost 30 years ago, quinoa was unheard of outside native South American Indians and vegan circles. This tiny grain was a forgotten crop that provides highly nutritious food that could help feed the world. Today, it features on the menus of the smartest restaurants, has the prestigious title of “super food” and a price tag to match. It is the food of the moment and crops like quinoa can be the foods of the future.


Half a millennium ago in the Andes, the Incas created an agricultural wonderland. On irrigated mountainside terraces they cultivated an estimated 70 species of crops, almost as many as the farmers of Europe and Asia combined. White, yellow and purple roots. Beans that pop like popcorn. Cereal grains with twice the protein of wheat, rice or maize. Yellow, pink, red and candy-striped tubers. Potatoes with a naturally buttery taste. And a whole array of exotic fruits.

The Spanish conquistadors destroyed all that. To them the Incas were backward. They forced the Andean natives to replace crops that had held a valued place for thousands of years with European species like wheat, barley and carrots. With two exceptions, the potato and the lima bean, the lush variety of Andean agriculture sank into obscurity and was lost to the wider world. Now these “lost crops of the Incas” are being rediscovered and reintroduced around the globe as an exciting and nutritious addition to standard urban diets and a valuable source of agricultural income for the third world.

A few of the crops, particularly roots, grains and legumes, are thought to have the nutritional content, adaptability and capacity for mass production that could turn them into staple foods like the potato. But in many cases, much scientific work lies ahead before their potential can be fully developed.

A handful of Incan crops are already becoming familiar to urban shoppers in a number of countries. Incan delicacies such as the cherimoya, the sweet, juicy fruit with a creamy texture and the papaya-pineapple-banana taste; the tamarillo, or tree tomato; several varieties of multi-colored Andean potatoes; the protein-packed grain called quinoa, and a small yellow-and-purple fruit, called the pepino, or pepino dulce.

Developing Incan crops as staple foods would not only introduce variety, but would also reduce the risk of crop failure among other staples. “When a farmer is able to diversify” said Mark Dafforn, a staff associate with the study, “it makes life safer.”

“Unlike other fruits and vegetables from tropical latitudes, the Incan crops can be grown in cool temperate zones. They are especially promising as potential export crops in mountainous regions not only of South America but also of Asia and Africa,” said Dr. Vietmeyer. “They can also be grown in industrialized countries where the horticultural establishment of the world is concentrated,” he said.

Besides the cherimoya, pepino, tamarillo and quinoa, the study found a number of other “lost” Incan crops to be particularly important, promising or interesting. These are a few of them:

Arracacha - a smooth-skinned root that looks like a white carrot and tastes of celery, cabbage and roast chestnuts.

Ulluco (pronounced oo-YOU-co) - this brightly colored root comes in yellow, pink, red, purple and candy stripes. Its flesh, which varies from white to lemon-yellow, has a smooth, silky texture and a nutty taste. The future for this crop seems particularly bright. It could be grown in many upland regions of the third world and has already done well in Sri Lanka.
Where Will We Find Our Foods of The Future?

We believe that there are traditional crops waiting to be (re)discovered and improved. We cannot rely on just a few crops to feed us. Rather, we need to look beyond only major species into the diverse basket that includes the foods of our ancestors; foods that used to be commonplace in the diets of past generations but which have been neglected and forgotten by mainstream research and industry.

We need to remove the stigma associated with forgotten foods and rediscover the values that made them important. Forgotten foods have the potential to become niche foods, special foods and with a role to nourish us in the climates of the future.

We need to find foods from our past, measure their nutritional value, test their suitability for changing climates and make novel products and cuisines from them that are nutritious and desirable to consumers. With research, education and advocacy, we can help feed the future with forgotten foods. The link with research is critical. Without providing an independent evidence-base, we cannot identify and improve those forgotten foods and forgotten crops that can meet the needs of a global population in a changing world.
With a consolidated research effort and significant investment in funding, we firmly believe that the foods of our past:

Offer a range of nutrients that are lacking in the major ‘staples’ that now feed us.

Have the potential to grow in the unpredictable and changing climates of the future.

Can be used to naturally diversify diets and transform agriculture for good.

Priorities

Research

- Identify potential species and varieties that were previously cultivated but which are now difficult to find.
- Discover appropriate and sustainable methods of cultivating these species.
- Evaluate their potential to thrive under extremes of climate, on marginal soils and with limited resources.
- Assess their nutritional content, quality, safety and processing potential to replace the major staples in a number of processed foods and feeds.

Capacity building

For forgotten foods to achieve a significant role in dietary diversification and nutritional security, it is essential to include capacity building for all stakeholders involved in their value chains. This includes our elder generation which is the repository of knowledge of these forgotten species. It is essential that we capture and act on this information before it is lost for ever. Small scale and subsistence farmers and food processors, supermarkets, and the general public, will be the providers, processors and consumers of the foods of the future.

Advocacy

Forgotten foods need champions and sponsors. Through networking initiatives and global collaboration, they can help demonstrate how forgotten foods can transform agriculture for good and contribute to nutritional security through dietary diversification.
Discovering and celebrating our forgotten foods and identifying those which can feed the future needs a global effort. To meet this challenge, CFF is launching the Forgotten Foods Network (FFN) (ForgottenFoodsNetwork.org). The FFN will be an on-line resource of foods, recipes, ingredients, images, stories and scientific evidence on forgotten foods from ancient and modern crops, animal and marine species and even insects. As it expands, it will become a global repository of information on forgotten foods that links individuals, communities and researchers and transfers knowledge across generations. It aims to raise awareness, public contributions and scientific knowledge on forgotten foods that are important to people and, potentially, the world.

The Forgotten Foods Network is free to join and anyone can contribute.

Visit our website at www.forgottenfoodnetwork.org
References


Crops For the Future
Jalan Broga, 43500 Semenyih
Selangor Darul Ehsan, Malaysia

T: +6 (03) 8725 2800
E: enquiries@cffresearch.org

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