CHAPTER

# 4

# Mixed blessings: a time of hope and crisis (1960–2000)

OUTLINE




*Food and Society*
https://doi.org/10.1016/B978-0-12-811808-5.00004-0

Shortly after the war, much was achieved and greater awareness of many of the issues surrounding food and society was becoming more obvious as reflected in the number of active bodies, NGOs, civil societies and a growing number of charities. In the mind of many, perhaps one of the growing issues was that of the environment, as well as issues concerning both social and economic conditions—all this in the few decades leading up to the millennium.

## 4.1 Rachel Carson and the environment

The 1960s saw the birth and growth of modern environmentalism as we know it today and which continued with Rachel Carson's famous attack on what was seen at the time as questionable agricultural practices. Building on the slow burning yet increasing environmental movement which sprung up around the 1930s, Carson passionately shared opposition to the industrialization of the agricultural sector. Building on this and of previous notions of organic farming by Lord Northbourne, the environmental movement gained incalculable impetus from the tireless work of Rachel Carson.

### 4.1.1 Environmentalism

It can be argued that the modern environmental movement reached critical mass about this time. Indeed, with the serialization in the New Yorker of an as-yet unpublished work by Rachel Carson more people were becoming aware of the environmental issues of the day. By the time the book of the serialization "Silent Spring" came out in 1962, Rachel Carson, now a well-known writer had also become an equally outspoken social critic. The book Silent Spring, using case studies, discusses the deleterious effects that chemicals and synthetic pesticides were having on the environment. In her writings too, she publicly challenged the many ecological destructive practices. In the eyes of the public, awareness was raised and generated a lot of concern and controversy not least because as Carson so eloquently pointed out, that many of these practices would have untold effect not only on the environment potentially on humans too. Such was the controversy that Carson generated, it could not be avoided either socially or politically. In political terms it led to the creation of environmental legislation as well as the creation of agencies to regulate the use of such chemicals et cetera. Of course, one person up against the entire agricultural industry was a tough challenge and attempts to discredit Carson proved only to strengthen their position (Gibson, 2016).

One commentator, the US Supreme Court Justice William O. Douglas, was of the opinion that serialization was "the most important chronicle of this century for the human race," while another, Loren Eisely, suggested that it was a "devastatingly, heavily documented, relentless attack upon human carelessness, greed and irresponsibility." The gravity Carson's accusations were so worrisome that even President Kennedy became involved when he asked his Science Advisory Committee to investigate. The subsequent report, which came out in 1963, vindicated Carson completely. In fact, in an article written by Bruce Frisch, he commented on the fact that the President's Committee also proclaimed that there were unknown long-range risks to the environment, humans, and animals alike. Consequently, true global

environmentalism can be said to have been borne from one woman's cautionary tale, in which enough momentum was built that environmentalism now had a seat at the big table contributing to policies at all levels of government (Carson, 1962; Frisch, 1964; Baker, 2003).

Meanwhile on a related note, even the United States Science Advisory Committee (SAC) to the White House became entangled in the debate on nutrition when, at the bidding of President Johnson, the Science Advisory Committee published a three-volume tome called the "The World Food Problem" in 1967.

## 4.2 To the White House

Setting the tone and gravity of the problem, the SAC in the preamble of the report declared that

> … the problem of hunger has lingered on and the shadow of starvation and impending famine has grown ever darker. Hunger's unceasing anguish drains hope, crushes aspirations, and obstructs the generation of programs of self-help. The threat of starvation sets man against man and citizen against government, leading to civil strife and political unrest. ***SAC (1967, p. IV)***.

The White House report showed remarkable insight and perception as it elucidated many of the difficulties and challenges faced by the issues of hunger and malnutrition. Furthermore, it openly wondered whether the notion had been oversimplified and whether or not compassion fatigue and improper understanding contributed to what appeared to be a prevailing lack of progress. The report also went on to acknowledge that even though we might proclaim to have some of the answers, this did not always translate directly into successful or even appropriate policies and programs in the developing world. In sum, among the reports many and varied recommendations it advocated the need for more adaptive research and called for increased governmental aid on every level (Tables 4.1–4.4) (SAC, 1967; Gibson, 2016).

Ultimately, the close of the 1960s the development decade as it has been dubbed culminated on a high note for the United Nations with the adoption/creation of the International Bill of Rights to serve and protect against oppression or discrimination.

## 4.3 International Bill of Human Rights

The International Bill of Human Rights is not a single formal document or legislation, rather it is an informal name given to a collection of three instruments: the first is a United Nations General Assembly Resolution and the remaining two are international treaties:

- Universal Declaration of Human Rights (UDHR) 1948
- International Covenant on Economic, Social and Cultural Rights (ICESCR) 1966
- International Covenant on Civil and Political Rights (ICCPR) 1966

This turned out to be a marathon process spanning nearly 2 decades. On accepting the Declaration of Human Rights in 1948 the Commission on Human Rights then set about

**TABLE 4.1** Key dates of the period: 1960 to 65.

| Date | Key dates of the period |
|---|---|
| 1960 International Rice Research Institute (IRRI) | The Philippines along with the Ford and Rockefeller Foundations created the IRRI. IRRI was an autonomous, nonprofit rice research organization (IRRI, 2019). |
| 1960 Overseas Development Institute (ODI) | The ODI, was a leading independent think tank that worked with issues of international development and humanitarianism (ODI, 2019). |
| 1960 International Freedom from Hunger Campaign (FFHC) | In 1960, the FAO launched a 5 year campaign of International Freedom from Hunger to mobilize and cash in on non-governmental support (Osmanczyk, 2002; FAO, 2010). |
| 1960 American Freedom from Hunger Foundation (FFHF) | Founded to marshal Americans to get involved in the FAO's 5-year global Freedom from Hunger Campaign. Of note too is the joining of forces in 1979 of the FFHF and the Meal for Millions thus creating the Freedom from Hunger organization (Freedom from Hunger, 2010). |
| 1960–62 GATT "Dillon" 5th Round Geneva | The 5th GATT rounds of trade reduction reduced over $4.9 billion in trade tariffs (WTO, 2019). |
| 1961 Organization for Economic Development (OECD) | OECD worked with democratic governments and the global market economy to, among other things ensure the sustainability for economic growth (OECD, 2019). |
| 1962/3 World Food Program (WFP) | The WFP was proposed in 1961 by George McGovern, then Director of the US Food for Peace Program. The WFP's governing body, the Intergovernmental Committee (IGC) was responsible for supervision over the WFP The IGC was eventually rolled over into the Committee on Food Aid Policies and Programs (CFA). |
| 1962 The European Common Agricultural Policy (CAP) | The EEC, initially set out at the Stresa Conference (1958), where the Common Agricultural Policy (CAP) was created (1962). The main decision-making body of the CAP was the Agricultural Council. The CAP was mainly geared toward increasing agricultural productivity and food self-sufficiency. This they achieved through a combination of price supports and food import protectionism (Europa, 2010a,b). |
| 1962 FAO/WHO Codex Alimentarius Commission | The FAO/WHO Codex Alimentarius Commission was first set up to develop international food standards and guidelines (WHO/FAO, 2006; FAO, 2010). |
| 1963 The United Nations Research Institute for Social Development (UNRISD) | An autonomous UN agency conducting research on contemporary problems of development the UNRISD promoted discussion and contribution to key social development issues (UNRISD, 2010). |
| 1964–67 GATT "Kennedy" 6th Round | The Kennedy Round of the GATT negotiations ushered in the new Anti-Dumping Agreement vis-à-vis the problem of Developing Countries. Furthermore, GATT rules were also more clearly defined. The Kennedy Round was also the first time that negotiations looked beyond Tariff cuts to include non-tariff barriers to trade as well (WTO, 2019). |
| 1964 UN Conference on Trade and Development (UNCTAD) | The UN Conference on Trade and Development met in Geneva<br>To discuss the recommendation of the establishment of a permanent UN body to deal with trade in relation to development. Consequently, The General Assembly established UNCTAD as one of its permanent organs in 1964 (UNCTAD, 2002). |

TABLE 4.1 Key dates of the period: 1960 to 65.—cont'd

| Date | Key dates of the period |
|---|---|
| 1965 The United Nations Development Fund (UNDP) | With the merging of the UN Expanded Program of Technical Assistance (1949) and together with the UN Special Fund (1958) the UNDP was established in 1965, the UNDP worked on several development issues while promoting to developing countries on how best to attract and use aid effectively (Winderl, 2006; UNDP, 2010). |

*Source: Compiled from many sources including: Osmanczyk (2002); UNCTAD (2002); WHO/FAO (2006); Winderl (2006); IRRI (2019); Europa (2010a,b); FAO (2010); Freedom from Hunger (2010); ODI (2019); OECD (2019); UNDP (2010); UNRISD (2010); WTO (2019); Gibson (2016).*

TABLE 4.2 Key dates of the period: 1966 to 69.

| Date | Key dates of the period |
|---|---|
| 1966 The Institute of Development Studies (IDS) | The IDS, a leading organization of international development aimed to understand the world and to apply academic skills to real world challenges (IDS, 2019). |
| 1966 International Maize and Wheat Improvement Center (Centro Internacional de Mejoramiento de Maíz y Trigo, (CIMMYT)) | Out of the Rockefeller, Ford and Mexican collaboration research led to the founding of the Office of Special Studies to ensure food security in Mexico and beyond. An agreement, the CIMMYT was signed with Mexico's agricultural minister in 1963 which further developed into a collaboration of international researchers (Hesser, 2006; Byerlee and Dubin, 2008; Ortiz et al., 2008). |
| 1966 UN Covenant on Economic, Social and Cultural Rights and: The International Covenant on Civil and Political Rights | A rights-based approach to identity and culturism was adopted by the UN General Assembly in 1966. I was established that human rights were inherent in the dignity of human beings. Indeed, in Article 1 of each Covenant affirmed that all peoples were free to determine their own political status and have the right to pursue their own economic, social and cultural development (UN, 1966a,b). |
| 1967 The Food Aid Convention (FAC) | The Food Aid Convention (FAC) was agreed as part of the International Grains Agreement. Run by the London-based International Grains Council the FAC was intended to act as a safety net, its primary objective to ensure a minimum availability of food aid to meet emergency requirements in developing countries (IGC, 2009a,b). |
| 1968 International Grains Arrangement (IGA) | The International Grains Arrangement (IGA) comprised two separate instruments: The first was the Wheat Trade Convention, 1967 (WTC), while the 2nd introduced the Food Aid Convention, 1967 (FAC). While the WTC consults on prices, rights and obligations so the FAC provided food aid to developing Countries (Meerhaeghe, 1998; IGC, 2009a,b). |
| 1969 Indicative world Plan for Agriculture (IWP) | The IDC introduced the first detailed report on the present and future problems of agriculture (Fasbender, 1970; Goldsmith et al., 1972). |
| 1968 The First International Conference on Human Rights | The first International Conference on Human Rights was held in Teheran, Iran. |
| 1969 United Nations Population Fund (UNFPA) | The Population Commission recommended to ECOSOC an fuller, more comprehensive and expanded population program fund which was subsequently agreed and placed under the administration of UNDP (POPIN, 1994). |

*Source: Compiled from many sources including: UN (1966a,b); Fasbender (1970); Goldsmith et al. (1972); POPIN (1994); Meerhaeghe (1998); Hesser (2006); Byerlee and Dubin (2008); Ortiz et al. (2008); IGC (2009a,b); IDS (2019); Gibson (2016).*

**TABLE 4.3** Key dates of the period: 1970 to 73.

| Date | Key dates of the period |
|---|---|
| 1970 Committee on Natural Resources (CNS) | The importance of ownership of natural resources when it comes to a nations sovereignty was emphasized in 1970 when the Economic and Social Council established the Committee on Natural Resources (Osmanczyk, 2003). |
| 1971 Office of the United Nations Disaster Relief Coordinator (UNDRO) | As many nations became independent in the 1960s the UN established the Office of the UN Disaster Relief Coordinator (UNDRO). Headquartered in Geneva, its main role was that of coordinator of donors of aid and services (Osmanczyk, 2003). |
| 1971 Doctors Without Borders/Médecins Sans Frontières (MSF) | An international humanitarian organization was created in 1971 by doctors and journalists to relieve suffering around the world (MSF, 2010). |
| 1971 Earthwatch Institute (EI) | The Earthwatch Institute, an international environmental charity was formed in 1971 because of the need for new scientific research as well as promoting the public's understanding of science of environmentalism (Earthwatch, 2009). |
| 1971 The Consultative Group on International Agricultural Research (CGIAR) | Pioneering work by the Ford-Rockefeller Foundation initially led to four research centers: CIMMYT (Mexico, 1966); IITA (Nigeria, 1967); the CIAT (Colombia, 1967); and IRRI (Philippines, 1960). However, by 1970, the FAO, UNDP, and the World Bank proposed a worldwide network of agricultural research centers under a permanent secretariat. Thus, in 1971, the Consultative Group on International Agricultural Research was formed and immediately subsumed the above 4 groups. By 2006 there was a coalition of 15 International Research Centers around the globe (CGIAR, 2008). |
| 1972 The 1st UN Conference on the Human Environment | Held in Stockholm 1972, the UN's first major conference on international environmental issues was later dubbed the First "Earth Summit." It focused on the enhancement and preservation of the environment. And indeed, on recommendations of the conference the UN created the Environment Program (UNEP) to monitor changes and to encourage and coordinate sound environmental practices (Jackson, 2007). |
| 1972 Bread for the World | A group of Catholics and Protestants came together in 1972 to address the causes of hunger. Initially a small affair the group has grown exponentially together with a global remit (BFW, 2009). |
| 1972–81 The end of the Bretton Woods System | By early 1960s, the US dollar was seen as being overvalued. Under the Bretton Woods agreement however the dollar was pegged against gold. In order to slow down the wild swings in exchange rates President Nixon temporarily suspended the dollar-gold convertibility in 1971. An attempt was made to re-introduce the fixed exchange rate system however global currencies were beginning to free "float" against each other marking the beginning of a floating exchange rate system (IMF, 2010). |
| 1972 ActionAid | ActionAid was founded in 1972 to fight worldwide poverty (Actionaid, 2010). |
| 1972 World Resources Institute (WRI) | Recognizing a need for a credible research organization on the environmental, resource, population and development front on a global scale, so the World Resources Institute came into play (WRI), (WRI, 2010). |
| 1972 The UN Environment Program (UNEP) | Born out of the first so-called Earth Summit (1st UN Conference on the Human Environment) of 1972, UNEP advocated policies of education and promotion for a fair, sustainable global development usage for the environment (UNEP, 2010a,b). |

**TABLE 4.3** Key dates of the period: 1970 to 73.—cont'd

| Date | Key dates of the period |
|---|---|
| 1973 Economic and Social Commission for Western Asia (ESCWA) | In 1973 ECOSOC further developed a regional economic commission for the Middle East. Although first proposed in 1947–48 it did not come to fruition. Instead, the idea of a regional commission was revived in 1973, instead ESCWA was established to supersede the UN Economic and Social Office in Beirut (UNESOB) (EoN, 2009a; UN ESCWA, 2009; UN, 2010). |
| 1973–79 GATT "Tokyo Round" 7th Round | The Tokyo GATT Round saw a sweeping attempt to extend and improve the system of tariffs reductions and the result was the antidumping and subsidies agreement further reducing barriers to trade (Morrison, 1986; WTO, 2019). |
| 1973 Center for Research on the Epidemiology of Disasters (CRED) | CRED was created as a non-profit institution founded by epidemiologist Professor Michel F. Lechat. The focus was on training and research, particularly in the areas of relief, rehabilitation and development. In 1980 the Center was recognized as a World Health Organization (WHO) Collaborating Center (CRED, 2009). |
| 1973 University of United Nations (UNU) | UNU is the educational facility for the United Nations to promote knowledge and disseminating that information through the strengthening of individual and institutional capacities (UNU, 2009). |

*Source: Compiled from many sources including: Morrison (1986); Osmanczyk (2003); Jackson (2007); CGIAR (2008); BFW (2009); CRED (2009); Earthwatch (2009); EoN (2009a); UN ESCWA (2009); UNU (2009); Actionaid (2010); IMF (2010); MSF (2010); UN (2010); UNEP (2010a,b); WRI (2010); WTO (2019); Gibson (2016).*

**TABLE 4.4** Key dates of the period: 1974 to 79.

| Date | Key dates of the period |
|---|---|
| 1974 World Food Conference (WFC) | In response to the worsening global food situation, together with a general lack of progress in the fight against hunger, the first World Food Conference was held in Rome in 1974. The conference promoted the Universal Declaration for the eradication of hunger and malnutrition within a decade. A tall-order indeed and to help achieve this, there were calls for the creation of a ministerial-level World Food Council (WFC)* as well as recommending the reconstitution of the WFP's governing body as well as the incorporation of the International Fund for Agricultural Development (IFAD) as well as the FAO Committee on World Food Security (CFS) (UN, 1975). |
| 1974 The Worldwatch Institute (TWI) | The Worldwatch Institute was designed as an independent research organization focusing on climate and energy, food and agriculture, and the green economy (Worldwatch, 2018). |
| 1974 World Food Council (WFC) | The World Food Conference called for, and indeed established, the World Food Council to review problems affecting the world's food situation and to use its influence on governments and UN bodies and agencies alike. Eventually, the WFC recommended the creation of an inter-secretariat consultative body promoting cooperation between the four Rome-based food organizations, i.e., the FAO, IFAD, WFC, and WFP. However, in 1996, identifying and rationalizing duplicative efforts, the WFC was absorbed by the FAO and World Food Program (WFP) (CCP, 2005; EoN, 2009b). |

(*Continued*)

**TABLE 4.4** Key dates of the period: 1974 to 79.—cont'd

| Date | Key dates of the period |
|---|---|
| 1975 Committee on Food Aid Policies and Programs (CFA) | The World Food Conference of 1974 was a major milestone for food and indeed focused much attention on the issues of food and food aid. Consequently, the World Food Council's governing body; the Intergovernmental Committee's (IGC) remit was broadened to include the more general problems of food aid and related policies. The new governing body was named the Committee on Food Aid Policies and Programs (CFA) (Phillips, 1981). |
| 1974 AGRIS | AGRIS is the agricultural sciences information system created by the FAO to promote information exchange (AGRIS, 2010). |
| 1974 The International Fund for Agricultural Development (IFAD) | A specialized agency of the UN, IFAD finances agricultural development projects in the developing countries through low-interest loans and grants (Rucker, 2007; IFAD, 2019). |
| 1974 The 1st World Population Conference (UNFPA) | The first World Population Conference (held in Bucharest, 1974) adopted a World Population Plan of Action (WPPA), thus stressing the relationship between population and economic and social development (UNFPA, 2004). |
| 1974 Committee on World Food Security (CFS) | The World Food Council established the FAO Committee on World Food Security, as a forum for review and follow-up of global policies of world food security. It also promoted the use of food aid to support economic development and food security in vulnerable countries (CFS, 2008a,b; IAAH, 2008; CFS, 2011). |
| 1975 The International Food Policy Research Institute (IFPRI) | IFPRI research's sustainable solutions toward ending hunger and poverty. It is one of the 15 research centers under the umbrella of the Consultative Group on International Agricultural Research (CGIAR) (IFPRI, 2010). |
| 1975 Institute for Food and Development Policy (IFDP) AKA Food First | The IFDP analyses look for solutions to the root causes of hunger, poverty, and environmental degradation (FoodFirst, 2009). |
| 1975 FAO Global information and Early Warning System (GIEWS) | FAO's Global Information and Early Warning System (GIEWS) keeps country-specific assessments of food problems under continuous review and issues reports on the global food situation (ODI, 1997). |
| 1976 FAO's Technical Cooperation Program (TCO) | Supports the FAO by allowing greater flexibility in responding swiftly to urgent situations (TCP, 2009). |
| 1976 International Emergency Food Reserve (IEFR) | In 1974, the WFC led to the establishment of the International Emergency Food Reserve (IEFR) requiring member countries to pledge food target donations, which would be used in quick response to emergencies (ODI, 1997; EoN, 2009b; TCP, 2009). |
| 1977 The International Fund for Agricultural Development (IFAD) | Established out of the 1974 WFC, IFAD is a financial institution and specialized agency of the UN concerned primarily with financing agricultural development projects for food production in the developing countries (IFAD, 2019). |
| 1977 The Standing Committee on Nutrition (SCN) | The Protein Advisory Group was incorporated into the UN's Administrative Coordination Committee's Subcommittee on Nutrition (ACC/SCN), (Allen, 2000). The Standing Sub-Committee on Nutrition (SCN) is a forum for UN agencies, NGOs/CSOs, and partners to coordinate and cooperate on nutrition-related issues (SCN, 2009). |

TABLE 4.4 Key dates of the period: 1974 to 79.—cont'd

| Date | Key dates of the period |
|---|---|
| 1979 Action Against Hunger (ACF) | An agency born out of the need for a different kind of philanthropist, one who was; just as comfortable fighting the front line as well as in tackling the problem from the other side. It espoused a new brand of humanitarian politics that tries to influence political actors and institutions and not just mitigate the worst emergencies on the ground (ACF, 2010). Proactive, rather than reactive. |
| 1979 International Year of the Child | UNICEF creates the International Year of the Child (UNICEF, 2005). |

*Source: Compiled from many sources including: UN (1975); Phillips (1981); ODI (1997); CCP (2005); UNICEF (2005); Rucker (2007); CFS (2008a,b); IAAH (2008); Worldwatch (2018); EoN (2009b); FoodFirst (2009); IFAD (2019); SCN (2009); TCP (2009); ACF (2010); IFPRI (2010); CFS (2011); Gibson (2016).*

the task of translating the principles into international treaties. However, owing to the sheer scale of the task so the UN decided upon drafting two international agreements representing political, civil, economic social and cultural rights. Then for the proceeding near 2 decades, member states discussed, argued and debated the instruments until in 1966 consensus was finally reached. Yet this was not the end of the road as it took another 10 years to ratify the international covenants in 1976. The Bill effectively set in concrete proposals of the Universal Declaration (1948) and ultimately ushered in a new period of "rights" for all individuals (UN, 1948; UN, 1966b; Perry, 1998). Despite the length of time it took to ratify the instruments human rights were firmly on the right footing giving all self-determination in all things political and religious and is non-discriminatory in its application. This was now binding to those that ratified the treaties and the emphasis was now on the signatories to make sure that the: "… equal right of men and women to the enjoyment of all human rights." were upheld (UN, 2019).

In practicality, the two international treaties firmed up ideals and ideologies espoused in the 1948 UDHR. On the one hand the ICESCR acknowledged the right of self-determination and to:

> … social security (Article 9); their right to family life and the protection of children (Article 10); rights to an adequate standard of living, including food, clothing and housing (Article 11); good health (Article 12); a good standard of Education (Articles 13 and 14); and their full and free participation in cultural life (Article 15) *(UN, 1966a,b)*. On the other hand the ICCPR secured individuals rights to personal security and judicial fairness (article 9); a person's political rights (article 1); and the right of non-discrimination (article 4) ***UN (1966a,b); Gibson (2016)***.

Meanwhile further developments through the course of the decade was closing policy gaps and promoting multilateral corporation on many fronts.

## 4.4 Economic uncertainty

Up to the early part of the 1970s, the Bretton Woods agreement did a good job of stabilizing international currency exchange rates. However, due to US wage rises and large capital

exports, the US dollar was heating up and eventually became this overvalued and unmanageable. In response, the United States decided to de-couple from the gold standard ushering in an era of floating exchange rates. In turn nations could now renegotiate their own terms of trade allowing for more competitive global trade and the advent of true economic globalisation (McMichael, 1994). McMichael (1994) also postulated that as a result of the de-coupling, new markets and new trading partners could be established with the relatively new countries and sovereign states that emerged after the disbanding of the Cold War Bloc. This in turn further destabilised the global economy and by extension international trade (McMichael, 1994). Table 4.5 details some of the key events of the period.

Still in the early 1970s momentum for both environmental and economic sustainability had permeated into the collective public and political conscience.

**TABLE 4.5** Genetic engineering milestones of the 1970s.

| | **Biotechnological advances** |
|---|---|
| 1972 | The first cloning research was undertaken using a restrictive enzyme and ligase to form the first recombinant DNA molecule was undertaken by Paul Berg himself. |
| 1973 | Scientists Stanley Cohen, Annie Chang and Herbert Boyer successfully transferred DNA from one organism to another thus creating the very first recombinant DNA organism. |
| 1974 | In a letter to the top Journal, the Science Magazine, Paul Berg and others proposed to the National Institutes of Health (NIH) to allow a moratorium on certain DNA research (specifically recombinant DNA) until concerns of safety could be discussed and addressed. |
| 1975 | The requested moratorium on recombinant DNA research was agreed at an international meeting at Asilomar, California. |
| 1976 | Together Boyer and Swanson co-founded Genentech Inc. to research, develop as well as market products founded on recombinant DNA technology. |
| 1976 | The National Institutes of Health (NIH) released the first operational guidelines for recombinant DNA research and experimentation. |
| 1977 | Although legislative Bills to regulate recombinant DNA research was proposed in the US, none of the bills actually passed into legislation.<br>Walter Gilbert and Allan Maxam at Harvard University formulated a new approach to the sequencing of DNA using chemicals rather than enzymes.<br>Genentech Inc., developed the first protein – somatostatin – a growth hormone, also found in humans. |
| 1978 | Genentech Inc. were also fruitful in the production of human insulin and playing rDNA technology. |
| 1977 | Genetically engineered bacteria were used to successfully synthesize human growth proteins. |
| 1978 | Scientists Hutchinson and Edgell demonstrated that it was indeed possible to introduce specific mutations at specific sites in a DNA molecule. |

*Source: Compiled from Multiple Sources Berg et al. (1974); Bud (1993); Peters (1993); Dobson (1995); Najafpour (2007); Nature (2007); Styhre (2009); BioTech Institute (2010).*

## 4.5 Sustainable development

In the sprint for economic development, if left unabated, the fear was that developing countries were in danger of achieving their goals at the expense of the environment. Foreseeing this dichotomy, the first United Nations Conference on the Human Environment (UNCHE) was held in Stockholm in 1972. While it was acknowledged that the wide gap between the developed and developing countries had to be bridged, so the conference urged everybody to do so in a non-detrimental manner to the environment (Earth Summit, 2002).

Moreover, it was also understood that the issues of the environment were of global concern and as such, solutions would require international cooperation. Indeed, so important was the task that one of the outcomes of the conference was the formation of the United Nations Environmental Program (UNEP). Its remit was simple, it was to engage international networking while also encouraging the many UN agencies and NGOs to implement the UN strategies into their respective programs.

About the same time the world food crisis was looming.

## 4.6 World food crisis

The world food crisis was a complicated affair and precipitating events was a number of factors concerning the political environment, the economic background, and agricultural production issues. It began with the relatively high stocks of grain of the grain exporting countries in the late 1960s. While governments and other organizations tried to rapidly reduce such levels to more realistic ones while also trying to reduce production. While successful in part, the international grain markets were a little bit jittery. Alongside this, in 1972 for approximately 2 years, global crude oil barrel prices increased tenfold, with a knock-on effect on crude oil prices which in turn saw fertilizers increased fivefold which also impacted on grain stocks which, by this time had stabled and reduced slightly. Add to this the fact that the wealthier countries were demanding more, coupled with the exchange rate volatility due to the recent decoupling of the gold standard meant that competition in the markets was fierce. This resulted in increased prices and low production levels which effectively doubled over this period. This was a major blow for the notion of food security for all especially for net importing countries. Over the ensuing 2–3 years the situation did not get any better as global food supplies remained at uncomfortably low levels; stocks were depleting, production was slowing, and an imbalance in the terms of trade of importing countries especially all colluded to make markets, as mentioned, jittery and reactionary (Table 4.1) (Maxwell and Frankenberger, 1992; Mitchell et al., 1997; Gerster-Bentaya and Maunder, 2008; UOR, 2009).

Unfortunately, against this backdrop newly released colonial outposts were now in competition with the developing nations all eager for economic development, food and independence.

## 4.7 The developing world's debt

At the frontier of the resultant development packages the World Bank institutions began lending money and other resources to those nations affected. Such loans favored infrastructure, industry and agriculture (Carrasco and Berg, 1999a). Yet, growth and investment were uneven at best pushing more people out of agriculture and into the industrialized big cities looking for work and sustenance. Not surprisingly, rural agriculture was further impoverished to the extent that a new approach was needed by the World Bank (Carrasco and Berg, 1999a,b). In the interim period, as was already mentioned, unfair trading practices on the international market only served to create a wider gap in economic development between the developed and developing countries (CFS, 2008b). As a result self-sufficiency in developing countries was reduced drastically and dependence and reliance on the developed countries and foreign debt assistance group only increased (FAO, 1996).

### 4.7.1 Debt and economic reforms

Bearing this in mind, the World Bank maintained that a country's development, in particular its economic development need not to be traded at the expense of quality of life. As a result, the World Bank and others while still engaged in project lending financially also came up with a loan based on growth and equity. Its aims were laudable, and in line with previous institutional initiatives over the years, the World Bank group and others aim to facilitate social welfare programs with a view to decreasing absolute poverty. These welfare programs included many employment sectors including health, food and agriculture, family planning, and education. Whether intentional or not such programs integrated social welfare with food and development programs which were then intertwined with economic growth (Munasinghe, 1998; Carrasco and Berg, 1999a,b; Slusser, 2006). However, the burden of debt grew as wealth from the Oil Producing Exporting Countries (OPEC), which had seen huge increases in the early 1970s.

In a roundabout sort of way, which is beyond the remit of this book, proceeds resulting from increased oil prices filtered through the system and ended up being used to help promote growth in developing (formerly Third World) countries (Eichengreen and Lindert, 1989; Carrasco and Berg, 1999a,b). While it did help, the debt burden of the developing countries was increasing to the point where servicing the debt alone was not sustainable (Lipson, 1981; Munasinghe, 1998; Slusser, 2006).

As the decade matured, it came as no surprise that international intervention was again needed across the board. This paved the way for the 1974 World Food Conference (FAO, 2003).

## 4.8 World Food Conference (WFC) 1974

The World Food Conference took place in Rome under the purview of the United Nations FAO. Once again, much lip service was paid to the problems of food production and

consumption and yet another Declaration was added to the numerous other proceeding instruments (Maxwell and Frankenberger, 1992; Argeñal, 2007). On this score, the Universal Declaration of the Eradication of Hunger and Malnutrition, openly stated that:

> Time is short. Urgent and sustained action is vital. The Conference, therefore, calls upon all peoples expressing their will as individuals, and through their Governments and non-governmental organizations, to work together to bring about the end of the age-old scourge of hunger. ***UN (1974)***.

One good thing arising out of the conference was the understanding that the cause of food insecurity and famine were not always the result of failures of production but rather structural issues to do with social deprivation, poverty and equality. This led to the proposition echoed in so many other instruments of policy, declarations and agreements that:

> Every man, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties. ***UN (1974)***.

During the conference it was also requested that the many disparate bodies of the United Nations such as the FAO, WHO, and UNICEF should be united in their nutritional research efforts.

Other bodies that came out of the conference came with specific and important roles in the modern development of hunger and the security of food. One body in particular, the International Fund for Agricultural Development's (IFAD) remit was the financing of self-sufficient agricultural development projects (IFAD, 2019). Another, the Committee on World Food Security (CFS) was tasked with the responsibility of oversight review in production and people's access to food (CFS, 2009). Others, included the World Food Council (WFC) created to review any problems or policy issues as well as reviewing all United Nations agencies policies relating to world food security in general. The WFC was also expected to co-ordinate all UN agency policies related to food trade, nutrition, food aid as well as other related matters (UN, 1975; FAO, 2003).

All the while, great advances were being seen in the new discipline of genetics, spurred on in no small part to the work of Watson and Crick and their discovery of the structure of DNA.

## 4.9 Recombinant DNA: the arrival of genetic engineering

Leading the charge in the new pioneering field of research was Cohen and Boyer's discovery in 1973 of recombinant DNA (rDNA), more commonly known as gene splicing. In gene splicing one takes gene segments from one bacterium and transferring it into another thus replicating the jeans traits. The practice of transferring spliced genes into another organism was coined transgenic or in lay terms genetic engineering or genetic modification (GMO). This was real progress. However, irrespective of one's viewpoint genetic engineering would have enormous consequences in food technologies et cetera (Styhre, 2009). Yet, as can be seen not everybody was happy to take this on board. Indeed, many eminent biologists from the

National Research Council led by Paul Berg wrote in the "Science" magazine in 1974 of their concerns in which the group suggested:

> There is serious concern that some of these artificial recombinant DNA molecules could prove biologically hazardous … recombinant DNA molecules might be more easily disseminated to bacterial populations in humans and other species, and thus possibly increase the incidence of cancer or other diseases. ***Berg et al. (1974)***.

Such was the impact of this open letter that it led to the voluntarily moratorium on the work on recombinant DNA. At least that was until such time as a conference could be convened to discuss the consequences or potential ramifications of this line of enquiry. A year later in 1975 a conference was indeed held in California at the Asilomar Conference Center. However, not everybody was happy as the outcome allowed the continuation of this line of research albeit under the strictest of guidelines (Nobel Prize, 2010b). Following the moratorium, it was not long before research came up trumps using rDNA in the production of insulin by Genotech, the newly incorporated biotechnology company belonging to Boyers (Styhre, 2009). Other milestones (Table 4.5) of this time shows the extent and breadth of achievements that was made using this relatively new technology.

## 4.10 A decade of mixed blessings

The debt crisis of the 70s continued into the 1980s, this gave pause for thought as the borrower's domestic economies were clearly not being improved as a result of the original loans. The answer it seemed came in the form of structural adjustment policies whereby the lenders would give more money on condition that structural changes in domestic fiscal and monetary policies were made by the borrowers. For the right reasons, this neo-liberalist ideology was given much credence in the hope of freeing up the developing world and encouraging inertia, development and growth. A few key moments from this decade can be seen in Tables 4.3 and 4.8.

The 1980s also saw the growth of huge, cavernous food mountains which were being stored at considerable expense. However, of prominence during the early period of the decade seemed to be humanitarian aid.

## 4.11 Maturing humanitarianism

First generation humanitarian agencies and NGOs of the 40 and 50s tended to operate on the front-line mitigating emergencies as they happened. Second-generation agencies of the 1960s and 70s, whether new or evolved from the previous decades, sought instead engaged in "humanitarian" politics in the hope of influencing policies and political agendas more directly (Nash and Humphrey, 1987). This fundamental organizational shift in the way humanitarian agencies operated revolutionized how they interacted with governments and other stakeholders alike (ACF, 2010). About this time several UN agencies also began to foster new relationships with an ever-increasing number of aid agencies and NGOs. Even His Royal

Highness Prince El Hassan bin Talal who, up to this point, had already been fully engaged in humanitarian work. Being very active and with a long history in the field Prince El Hassan bin Talal was acutely aware of the changing landscape of humanitarianism and the stakeholders involved. To this end at the United Nations General Assembly of 1981 His Royal Highness proposed a new international humanitarian order. The motion was adopted and by the following year the GA asked the former United Nations High Commissioner for Refugees, Saddrudin Aga Khan to look into the subject among other things. Consequently, the UN proposed an independent Commission on International Humanitarian Issues. The commission would operate outside of the remit of the United Nations framework and would be composed of leading personalities in the field (IBHI, 2019). Shortly after in 1983 the Independent Commission on International Humanitarian Issues (ICIHI) and was co-chaired by HRH Prince El Hassan bin Talal and HH Prince Sadruddin Aga Khan. During this 4-year long mandate the work of the commission covered a breadth of issues from children, famine, deforestation, desertification, indigenous peoples, conflict and refugees to name but a few (IBHI, 2019). Consequently, a number of reports were produced touching on a range of humanitarian issues that were disseminated amongst the interested parties. The commission itself was succeeded in 1988 by the Independent Bureau for Humanitarian Issues (IBHI).

The following table (Table 4.6) details other events occurring around this period.

**TABLE 4.6** Key dates of the period: 1980 to 88.

| Key dates of the period | |
|---|---|
| 1980 Southern Africa Development Community (SADC) | The SADC began as a loose alliance of nine States in Southern Africa known as the Southern African Development Coordination Conference (SADCC). Its main aim was to lessen economic dependence on South Africa. Its role now was to achieve economic development and growth and alleviate poverty (SADC, 2018). |
| 1981 EuronAid | EuronAid was a European network of non-governmental organizations (NGOs). Originally founded in 1981 as a non-profit association using large food surpluses as an instrument of development policy rather than dumping on the Third World. EuronAid ceased operations in 2007 (EuronAid, 2008). |
| 1981 Amartya Sen – "Poverty and Famines" | Economist AmartyaSen's 1981 book "Poverty and Famines" set the stage turning away from contemporary thinking turning away from the one-dimensional paradigm of production and supply to one encompassing "entitlement" theory. He won the Nobel prize in 1998 for his for his contributions to welfare economics (Nobel Prize, 2010a). |
| 1981 World food day | World Food Day (WFD) was established by the FAO at the Organization's Conference in November 1979 to coincide with the date of the FAO's anniversary; 16 October (Argeñal, 2007). |
| 1982 Mercy Corps | The Save the Refugees Fund founded by Dan O'Neill in 1979 was a task force for Cambodian refugees. And teaming up with Ellsworth ("Ells") Culver in 1982 the two founded Mercy Corps with a change in remit to from solely relief assistance to on long-term solutions to poverty and hunger (MercyCorps, 2019). |

(*Continued*)

**TABLE 4.6** Key dates of the period: 1980 to 88.—cont'd

| Key dates of the period | |
|---|---|
| 1984 European Lomé III Convention | Starting in 1975 the Lomé Convention set out the principles and objectives in respect of aid, trade and politics of cooperation between the European Union and the ACP countries; African, Caribbean and Pacific Group. In 1984 the Lomé III Convention shifted its attention from simple industrial development to development including self-reliance (EC, 2009). |
| 1985 USAID Famine Early Warning System Network (FEWS NET) | USAID-funded FEWS Network (FEWS NET) is collaboration of stakeholders providing appropriate vulnerability and early warning information in emerging food security issues (USAID, 2010). |
| 1985 Global Resource Information Database (GRID) | GRID, a Division of the Early Warning and Assessment, Global Resource Information Database (DEWA/GRID) forms UNEPs global network of environmental information centers which provide access to environmental information and data useful for stakeholders or decision-makers (UN ISDR, 2006; UNEP GRID, 2008). |
| 1986 AGROSTAT | In 1986 AGROSTAT, FAO's comprehensive statistical database covering world agricultural information becomes operational changing its name in the mid 1990s to FAOSTAT (Wu, 2001; FAO, 2010). |
| 1986–93 GATT Uruguay Round 8th Round | During previous GATT rounds, people considered the agricultural exemption left out of the previous 7 rounds to be an obstacle. Therefore the inclusion of agriculture in international trade negotiations of the 8th Uruguay Round was the most substantial trade liberalization agreement in agricultural products in the trade rounds' history (WTO, 2010). |
| 1988 The Monitoring Agricultural Resources Unit Mission (MARS) | Part of the Joint Research Center (JRC) applied space technology in the acquisition of opportune information on crop areas and yields (EC JRC, 2010). |
| 1988 Intergovernmental Panel on Climate Change (IPCC) | The IPCC established by the UNEP and WMO in 1988 was to assess existing knowledge of climate change science. Looking particularly at potential impacts and possible responses. The preparation of the Assessment Reports on Climate Change is the main output of the IPCC (Agrawala, 2004; UNEP, 2010a). |

*Source: Derived from Multiple Origins: Wu (2001); Agrawala (2004); UN ISDR (2006); Argeñal (2007); EuronAid (2008); UNEP GRID (2008); EC (2009); MercyCorps (2019); EC JRC (2010); FAO (2010); Nobel Prize (2010a); SADC (2018); UNEP (2010a); USAID (2010); WTO (2019).*

## 4.12 The 1984–85 famines in Africa

The 1984/1985 famine of Ethiopia (present day Ethiopia and Eritrea) was brought on by drought and further exacerbated by civil war. The famine started in the North of the country and rapidly spread to the south. However humanitarian efforts were hindered by problems of security and insurgency. The Ethiopian government was not helping itself either, by holding back shipments of international relief from the rebel areas served only to ensure greater death toll. Together with the resultant economic collapse, the country lost over a million lives to famine and further millions more were *made* homeless and destitute. This situation served to illustrate even with sufficient food and motivated international community problems of conflict and security of aid had to be addressed (Watts, 1991; Maxwell and Frankenberger, 1992; Devereux, 2000; Ó Gráda, 2009).

It was early 1980s and once again food surpluses were back only this time the problem seems to be that much worse further highlighting a widening gap between the developed and developing countries.

## 4.13 Food mountains: the scourge of Europe

The low stocks that had previously exacerbated the global food crisis of the 1970s had finally recovered. Simultaneously, global recession reduced demand for many grains (Mitchell et al., 1997). As far as Europe was concerned this was in part driven by the EU's Common Agricultural Policy (CAP) of increased productivity and price support. While such policies were in place, they were intended to ensure availability of supply at reasonable prices as well as to boost farm incomes (UOR, 2009). However, because of the recession as well as reduced demand so stocks piled up. This was especially prevalent within the EU countries itself. They quickly followed general dissatisfaction and indignation of the millions of tons of food that were being stored and, in some cases, going rotten while there was widespread hunger and starvation across the world. This also gave EU sceptics cause for complaint and further, loud calls for CAP reform (Howarth, 2000; Dobbs and Pretty, 2001; Wakeman, 2003). This was not limited to Europe either, with many other countries suffering a similar fate including India (FAO, 1982; Chapman and Baker, 2001; Ray, 2004). In America too, although not to the same extent as the US agricultural policies were slightly different came to subsidies and farm incomes et cetera (Subramanian, 2003). Other key dates of the period are shown in Table 4.7.

**TABLE 4.7** Key dates of the period: 1990 to 95.

| Key dates of the period | |
|---|---|
| **1990** UN World Summit for Children | To this point in history the UN Summit for Children claimed the largest gathering of world leaders. The World Summit adopted a Declaration on the Survival, Protection and Development of Children as well as a Plan of Action for implementing the Declaration in the 1990s. |
| **1990** Human Development Report **(HDR)** | Till now, the development of a countries progress was measured largely in monetary Terms i.e., GDP, GNP and a few other metrics. The Human Development Report (HDR) first launched in 1990 was given the remit of placing people back at the heart of the development process. Such metrics were adjusted to include, not only metrics of monetary development but also on a suit of indicators looking at social development goals pertaining to the quality of life. |
| **1992** Department of Humanitarian Affairs **(DHA)** | In 1991, the UN General Assembly wanted to improve the overall effectiveness of their humanitarian operations and, as such, created the DHA in 1992. Also created was the Emergency Relief Coordinator (ERC) which meant coordinating with the UN Disaster Relief Coordinator, UNDRO. The same resolution also created the Inter-Agency, the Standing Committee (IASC), the Consolidated Appeals Process (CAP) (not to be confused with the Common Agricultural Policy (CAP) and the Central |

(*Continued*)

TABLE 4.7 Key dates of the period: 1990 to 95.—cont'd

| Key dates of the period | |
|---|---|
| | Emergency Revolving Fund (CERF) as coordinating bodies and tools of the ERC. In 1998, the DHA was incorporated into the OCHA (OCHA, 2011). |
| **1992** United Nations Conference on Environment and Development (**UNCED**) - The Earth Summit (**ES**) | The UN Conference (UNCED) known as the Earth Summit 1992 was a historic meeting. Taking place, 2 decades after the first global environment conference, the Earth Summit sought opinions and ways to halt the degradation of natural resources while reversing the pollution of the planet. From this meeting an 800-page document called Agenda 21, a blueprint for action in achieving sustainable development was published (UN, 1997b). |
| **1992** Commission on Sustainable Development **(CSD)** | As a result of the UN Conference on Environment and Development (UNCED) of 1992, the UN council established the CSD to review progress (UN, 1993). |
| **1992** The Center for Global Food Issues | The center for global food issues conducts research into agriculture and environmental concerns surrounding food production. It is also the Center assessing policies, and in turn heightens awareness of the environmental impacts of various food and farming systems and policies (CGFI, 2019). |
| **1992** European Commission Humanitarian Aid **(ECHO)** | The EC Humanitarian Aid department (ECHO) was established in 1992 to help provide emergency assistance to victims of natural or man-made disasters outside the EU (EC, 1996). |
| **1993** Second World conference on Human Rights | The World Conference on Human Rights was held by the UN. The rights conference since the collapse of the Cold War. The main outcome of the conference was the Vienna Declaration and Program of Action (Lawson and Bertucci, 1996). |
| **1993** Global Policy Forum **(GPF)** | Founded by an international group of citizens, through networks and coalitions the GPF aimed to create a more equitable and sustainable global society (GPF, 2009). |
| **1994 FAO's** The Special Program for Food Security **(SPFS)** | The new Program was launched to boost food production through National and Regional Programs (FAO SPFS, 2009). |
| **1994** Food Security Analysis Unit **(FSAU)** | The FSAU sought to provide nutrition and livelihood security, initially for the Somali people. It began in 1994 funded by USAID/OFDA and was managed by WFP (FSAU, 2010). |
| **1995** International Grains Council **(IGC)*** | The International Grains Agreement of 1995 linked two Conventions the Grains Trade Convention (GTC) and the Food Aid Convention (FAC). However, by 1995 GTC, the International Wheat Council (IWC) became the International Grains Council (IGC), in full recognition of all coarse grains rather than just wheat (IGC, 2009a,b) |
| **1995** Oxfam International | Founded in 1995, Oxfam International is a collection of approximately13 organizations supporting humanitarian programs throughout the world (Oxfam, 2018). |
| **1995** The World Trade Organization **(WTO)** | In 1993 GATT was updated. The 75 existing members as well as the EC became the founding members of the WTO which took over from GATT. Its new 150 + members were to supervise and further liberalize international trade. Its 150 members account for over 97% of world trade (Wahlberg, 2008; WTO, 2019). |

*Sources: Compiled from Multiple Origins: UN (1993); EC (1996); Lawson and Bertucci (1996); UN (1997a,b); Oxfam (2018); Wahlberg (2008); FAO SPFS (2009); GPF (2009); IGC (2009a,b); CGFI (2019); FSAU (2010); WTO (2019); OCHA (2011).*

## 4.14 A changing concept of food security: entitlement theory

With the arrival of Nobel prize-winning welfare economist Amartya Sen whose book, "Poverty and Famines" (Sen, 1981a) challenged the status quo when it came to food security, people started to listen. Indeed, in his book he questioned many of the prevailing assumptions and argued that even if the country produces enough food for everybody it is still possible that many thousands or even more will go hungry as a result of poverty and/or with little or no access to food (Sen, 1981b). The notion that poverty acted as a cause of hunger was not a new idea in fact the UN had several anti − poverty programs aiming to combat this very same problem. However, what was new was that Sen posited his own Entitlement Theory rather than the seemingly singular preoccupation by the UN and some aid agencies on education and supply-side policies. Sen's entitlement theory places more emphasis on socio-behavioral coping and response strategies that are sometimes more firmly based in cultural social systems than in the availability of food (Maxwell and Frankenberger, 1992; CFS, 2007). In his theory, Sen further elaborates on the entitlement theory suggesting that access to food can be established in one of several ways. Firstly, is Directly through either growing the food for themselves through farm, marginal lands or local gardens. Secondly, it is through Exchange, this refers to the idea of bartering or trading and even buying food with sufficient funds. Lastly, is Transfer, which results in the receipt of food aid, or gifted food by friends or extended families or through inheritance whether food or finance. Thus, in Sen's view, hunger and famine are not solely about the aggregate supply of available food or even poverty alone, instead his notion suggests it's a lack of Entitlement that is at the center of food insecurity (FAO, 1970; Maxwell and Frankenberger, 1992; Sen, 1997; FAO, 2003; CFS, 2007). This notion was to entirely change the way that food security was viewed from then on, so much so that while the 1974 World Food Conference's original fears rested on volume and stability of food supplies so with Sen's insight the FAO expanded their notion of food for all to incorporate the concept of access into their definition of food security:

> … ensuring that all people at all times have both physical and economic access to the basic food that they need ***FAO (1983)***.

The World Bank also incorporated the same concept into their definition suggesting that people should have:

> … access of all people at all times to enough food for an active, healthy life … ***World Bank (1986)***.

Consequently, access now became a central tenet in the fight against hunger and famine. Put another way Sen's entitlement theory was a way of establishing people's capability of converting their various entitlements; financial, land, social etc. into food.

## 4.15 Hidden hunger

Hidden or Silent Hunger as it is sometimes called are terms that are both used to define circumstances in which the intake of food is sufficient enough so as not to allow for the

detection of clinical symptoms. But is still insufficient for a good and healthy life style, with it the lack of energy intake or a lack of other nutritional deficiencies of micronutrients et cetera, silent hunger can go undetected and go on to cause major problems in later life (Kruif, 1926, Breckenridge, 1942; Macy and Williams, 1945; McGovern, 1969; Allen, 2000; Scrimshaw, 2003). As has been discussed, during the 1970s it had already been established that iron, vitamin A and iodine were all more prevalent than protein energy malnutrition however the problem did not receive enough attention and subsequently remained on the policy fringes.

By now, the term hidden or silent hunger was firmly established as a disorder of insufficient micronutrients and was a term also used to describe the millions of silent sufferers around the world. By the mid-1980s it was time however to redress the balance and place micronutrients firmly in the mix of international nutrition programs. Although iodized salt had been in play for a long time especially in the efforts to combat cretinism and goiter, it seemed that initial enthusiasm had waned somewhat and efforts to keep Up with the iodized salt program had to be renewed in order to keep iodide and deficiency disorders (IDD) at bay. Vitamin A was another one that was on the radar of aid agencies, especially so after a massive study of 25,000 children by Sommer and colleagues in Aceh, Indonesia concluded that a huge 34% reduction in child mortality rates was attributed to vitamin A supplements alone (Sommer et al., 1986; UNICEF, 2004).

## 4.16 Single cell protein's partial success

In previous decades, the promise of single cell proteins (SCP) and the fact they might be able to become a mainstream source of protein became a moot point in the 1980s. This was because marked improvements in crop production and plant breeding witnessed increasing agricultural output. Couple this with the lowering of the trade barriers, especially after the Uruguay round of the General Agreement on Tariffs and Trade (GATT), the first time in the many decades of GATT talks that agriculture was in fact included. As barriers to international trade were lowered so new trading partners helped reshape the global food supply chain. Back to SCP's, and the coupling of both the increased agricultural output, crossbreeding, and globalized trading meant that the market price for plant proteins had dropped to the point where the idea of mainstream single cell proteins became virtually obsolete. However, there was one success that made it all the way to the market and that was Quorn. During the 1960s and 70s Rank Hovis McDougall's research team found they had a lot of waste starch. This proved to be very useful as a substrate to grow single cell proteins and after much research they came across the fungus mold, Fusarium venenatum. After much rigorous testing Quorn was given a safe bill of health in 1985 and by 1994 it was launched onto the market as a meat free alternative mycoprotein (Ugaldea and Castrillob, 2002).

While this was a small success for single cell protein alternatives to meat so the growing biotech industry witnessed the first genetically modified organisms (GMO's) to help improve certain traits in plants.

## 4.17 Genetic engineering gains momentum

The decade of the 1980s was a good time for genetic engineering. What really helped was a new method of genetic amplification called the Polymerase Chain Reaction (PCR). It was a great breakthrough as it expedited the process of modern genetic engineering. Traditionally bacteria were used to amplify certain DNA sequences creating millions of copies, a necessary process in the work of genetic engineering. However, in 1983 Kary Mullis developed the Polymerase Chain Reaction which achieved the same results in a few short hours thus negating the need for bacterial alternatives.

This method of DNA cloning was built on decades of research and helped expedite rDNA technologies where the insertion of DNA material from one organism into another was simplified. In turn, the private sector was not stupid either and it didn't take them long before they could see the full potential of genetic engineering variously described as transgenetic, transgenic, genetic modified organism GMO's etc.

The first GMO plants to benefit from this new technology were the tobacco plants. It was discovered in 1983 that by transgenically splicing Agrobacterium tumefaciens vectors into the tobacco plants, more robust cell growth was witnessed (An, 1985; Vlasák and Ondřej, 1992). On the strength of the research and successes of the previous few years so private companies were now working at tremendous pace donating lots of resources into researching the commercial potential benefits of the sector. This is borne out of the fact that in America alone between 1987 and 90 the USDA issued close to 100 permits for the field testing of genetically modified crops. Indeed, under testing at that time were new or improved varieties of alfalfa, cantaloupe melons, corn, cotton, cucumbers, potatoes, soybeans, rice, squash, tomatoes, tobacco, and walnuts (Table 4.8) (Swaminathan, 1990).

## 4.18 Agriculture and the GATT rounds

Promoting international trade through the reduction of tariffs and quotas and other barriers to trade the general Agreement on Tariffs and Trade (GATT) came together periodically since 1949, as shown below:

- Annecy Round: 1949
- Torquay Round: 1951
- Geneva Round: 1955–56
- Dillon Round: 1960–62
- Kennedy Round: 1962–67
- Tokyo Round: 1973–79
- Uruguay Round: 1986–94

The meetings were held periodically in an effort to roll back oppressive instruments of international fair trade in an effort to even out the playing field – especially for the developing countries. The Uruguay round of negotiations finally came to an end in 1994 after 8 years of negotiations with the result that saw for the first time the full integration of agricultural trade issues. This effectively opened the door to a whole new batch of global opportunities. At the

TABLE 4.8 Genetic engineering milestones of the 1980s.

| Date | Advances in genetics |
|---|---|
| 1980 | The US Supreme Court decided that genetically altered life forms (organisms) can in fact be patented. |
| 1981 | Scientists at Ohio University fashioned the first transgenic animals by splicing genes from animals into mice. Simultaneously the first gene-synthesizing machines were now being developed. |
| 1982 | Humulin, the name given to Genentech's insulin drug for humans was produced. It was also a milestone in the fact that it was the first biotech drug to be approved by the Food and Drug Administration for human use. |
| 1983 | The Polymerase chain reaction (PCR) was a process invented by Kary Mullis and others at Cetus Corporation in Berkeley, California. Rather than using traditional bacteria to cultivate multiple copies of DNA genes Mullis and colleagues pioneered the use of heat and enzymes to produce unlimited copies of genes and gene fragments – in the process becoming an important tool in biotech research and development worldwide. |
| 1984 | The DNA fingerprinting technique was created by Alec Jeffrey's to identify individuals. By now too the first genetically engineered vaccine was also developed. |
| 1986 | The first field trials of GMO tobacco plants (tobacco) were conducted also the first biotech-derived interferon drugs for the treatment of cancer, are produced. |
| 1987 | Advanced Genetic Sciences' Frostban, was the first authorized use of genetically altered bacterium to inhibit the formation of frost on plants like strawberry's and potatoes were field tested. In other news, Calgene, Inc. received a patent for the DNA sequence that is employed to extend the shelf-life of fruit and vegetables. |
| 1988 | Geneticists Philip Leder and Timothy Stewart applied and were given the first ever patent for a genetically altered animal, (mouse). |
| 1989 | The Human Genome Project started. It was an enormous effort to map out the sequence of the human genetic code. Also, the mapping of other animals' genomes was organized by two bodies - the U.S. Department of Energy and the National Institutes of Health.<br>Scientists also created a recombinant vaccine to guard against the deadly rinderpest virus, which to date was responsible for the death of millions of cattle in developing countries. |

*Source: Compile from multiple sources Bud (1993); Peters (1993); Dobson (1995); Najafpour (2007); Nature (2007); Styhre (2009); BioTech Institute (2010).*

same time, GATT itself was being updated or phased out being replaced, rolled into a new body – the World Trade Organization (WTO) in a concerted effort to further liberalize international trade (Warnock, 1997).

The timing couldn't be better in light of some ongoing undesirable practices such as continuing to support price support and protectionist policies. The common agricultural policy (CAP), as previously discussed in relation to Food Mountains, cost the CAP in the region of 20% of the entire CAP's annual budget of around 30 billion Euros at the time. And that's not all a further 28% was earmarked for export subsidies.

However, amid loud and public criticisms of the CAP's use of resources, so the EU CAP proposed certain reforms. Beginning in 1992 and continuing into the decade to 1997 the European Commission eventually offered a roadmap outlining the future direction of policies pertaining to agriculture, including the CAP among other reforms.

Indeed, this was in line with the growing liberalization of world trade as well as the many obstacles or challenges of the European Union's (EU) eastward expansion. The roadmap was packaged as an action plan—Agenda 2000 to provide a new financial framework in order to strengthen policies and to continue with agricultural reform which had incidentally begun in 1988 and 1992 (EU, 2010).

Meanwhile, the continuing inconsiderate use of the earth's resources in regards to global climate change, deforestation and an overall general disregard for the sustainability of the natural resource base brought the notion of environmentalism, once again to the fore.

## 4.19 Earth Summit: environmentalism

People were so concerned in fact that it led to calls, at the highest levels, to take action. The result was the UN Conference on Environment and Development (UNCED) in 1992, also known as the Rio Earth Summit. As it happened, the Summit turned out to be the first in a series of global conferences concentrating on economic and social development through sustainable solutions (Earth Summit, 2002). Solutions that would halt, slow-down or even stop and reverse the deterioration of the Earth's natural resources. Lessening the impact of humanity's toll on the environment while maintaining development goals, the summit promoted a sustainable development program - Agenda 21, to be overseen by the Commission on Sustainable Development (CSD) (UN, 1993; UN, 1997b; Earth Summit, 2002; Jackson, 2007). Agenda 21 was an idea that espoused cooperative worldwide responsibility for the environment irrespective of blame in which, acting locally, on both large and small projects, would collectively introduce worldwide improvements. In the field of food, concern was given to the potential of further degeneration of land, marine waters, biota and biodiversity. The conference was an epic effort of determination to address major concerns of a growing environmentalist movement and with its Agenda 21 document, it essentially bound food in particular that food security to untold future policies of sustainability and environmentalism (UN, 1992). The major outcomes of Agenda 21 touched on many socio-economic aspects of life in general. These included the cooperation between developing and developed countries in an effort to reduce poverty and to protect and promote health and vitality among peoples. It also played a role in conservation of natural resources by vowing to protect Earth's many environmental ecosystems through an integrated approach to better land resource management, more sustainable agriculture, the protection of biological diversity, to combat deforestation as well as protecting and managing fresh water and marine resources. With such laudable aims it was understood that between the United Nations and the various humanitarian groups and other NGOs that they had to engage in the frontline of things which invariably involved working closely with indigenous populations, inclusive of women and children (UN, 1992). Another underreported outcome of the Rio Earth Summit were the NGOs and a noticeable growth in their powerbase. Historically, NGO's came in all flavors, shapes and sizes. Their budgets, mandates and accountability were all varied, yet as a collective they roused sufficient support between themselves and the influence policy will help ensure governments adopted agreements et cetera.

## 4.20 Genetic engineering comes of age

With the many advances made in genetic engineering in the previous decade the 1990s finally bore fruit for the fledgling commercial technology. In 1994, for instance the first commercial transgenic product was Monsanto's rDNA version of the natural cow growth hormone Bovine Somatotropin (BST). The product was an immediate success.

rBST, also known as bovine growth hormone (BGH) helped boost milk production by an amazing 25%. Another product, this time by the US company Calgene (later acquired by Monsanto), introduced a genetically modified tomato which had a longer shelf life by effectively slowing down the ripening process. This new tomato called the Flavr Savr became the first commercially grown product to be granted a license for human consumption (Hoban, 1995; Schneider and Schneider, 2010). Two years later, Monsanto transgenically introduced the bacterium bacillus thuringiensis (Bt) into corn and by doing so boosted corn's own internal pest deterrent. In this way, Monsanto introduced the first Bt corn requiring little or no pesticide during growth. However, perhaps Monsanto's most famous genetically engineered product of the time, were the corn and soya plants whereby Monsanto had altered to be resistant to glyphosate. Roundup, or Roundup Ready, was Monsanto's trade name for Glyphosate. Glyphosate is an herbicide that is usually sprayed around plants and was particularly good at killing a broad spectrum of weeds. Thus, by introducing the genes into soya and corn, farmers could now effectively save time and money by spraying the whole field indiscriminately (Roberts, 2008).

However, all was not well, as enthusiasm, from the general public, was hampered by the growing fear that came with every new patent.

Consequently, people began to protest, and it was not a local affair, all around the world people were raising public awareness and fear of such foods hampering their general acceptance. Worse to come, that is and articles began to appear regularly in newspapers et cetera worldwide (O'Neil, 1992). As the backlash became stronger, so one adventurous group of innovative German protesters led a walking protest with a banner containing a very interesting menu comprising genetically altered foods:

**Starters**
Smoked trout fillets with the gene for human growth hormone
Tomato salad with flounder-fish gene
**Main course**
Grilled chicken with bovine growth hormone gene
and baked potato with scorpion gene
**Dessert**
Melon with virus gene

This menu was not a figment of their overactive imaginations either. As it turned out, all these foods had had in fact been developed by genetic engineers (Blythman, 1993). Indeed, such was the feeling among the general public that it led one observer to suggest:

> If they want to sell us Frankenfood, perhaps it's time to gather the villagers, light some torches and head to the castle. ***Lewin (1992)***.

**TABLE 4.9** Genetically modified organisms, come of age.

| | |
|---|---|
| **1990** | Calgene Inc. saw the first field trials of genetically engineered cotton plants to endure use of the herbicide Bromoxynil<br>GenPharm international, Inc. created the first transgenic dairy cow able to produce human milk proteins for infant formula |
| **1993** | The Food and Drug Administration (FDA) of the United States declared that genetically engineered foods were not inherently dangerous and subsequently did not require special regulation. Meanwhile George at Washington University researchers successfully Kloehn human embryos provoking protests from politicians, ethicists and critics around the world |
| **1994** | The first to market genetically engineered food product, Calgene's Flavr Savr tomato was approved by the US FDA |
| **1995** | A European research team identified a human genetic defect which appeared to underlie the most common cause of deafness |
| **1996** | UK government announces that 10 people may have become infected with the BSE agent through exposure to beef |
| **1997** | Scottish scientists clone Dolly the sheep using DNA from adult sheep cells |
| **1998** | Scientists at Japan's Kinki University clone eight identical calves using cells taken from a single adult cow |

*Source: Compiled from multiple sources Nature (2007); Huckett (2009); BioTech Institute (2010); Dennis et al. (2010).*

Furthermore, while Paul Lewin was the first person to label such foods as "Frankenfoods"; nevertheless, it was a turn of phrase that was repeatedly seen in the tabloids time and time again. By 1998 this backlash had reached the European Union and in response to fears and public demand several EU countries held an unofficial moratorium on the importation and approval of new varieties of GM crops (Table 4.9) (EC, 2000).

In the meantime, food-related issues were gathering increasing momentum and in 1996 the FAO held the World Food Summit to discuss global hunger.

## 4.21 World Food Summit (WFS)

At the time of the 1996 World Food Summit (WFS), the global food situation, in terms of hunger and malnutrition was considered tight, that is to say, supply and demand were almost in equilibrium. Couple that with reduced stock holdings, higher prices and a subsequent decline in food aid and it comes as no surprise that hunger and malnutrition persisted (FAO, 1996). It was also thought that once again, by bringing together heads of State further suffering could be alleviated. Yet, as with many such conferences the WFS aimed to renew their aims and objectives with commitment at the highest political level. Furthermore, it also intended to raise more awareness within the media and the public once again the effort to highlight the sheer scale of the global problem. The Summit was not a wasted affair however as it drew on a great deal of empirical evidence that had been accumulated over the previous decades. Supplemented with research from Sen and others and finally, in the minds of many, established the full complexity and multi-dimensionality of the food situation as it is

understood today. The notion that hunger and malnutrition could be dealt with in isolation of wider national or global issues had long since been debunked yet for some it was only now that the full concept was only just being fully realized. In short measure the Summit essentially established the fundamental fact that above all else, poverty eradication was incumbent on improving the food situation. The summit also skillfully underscored the notion that a rights-based approach to food, one that engaged not only in economic or issues of resource resources, was the only way forward (Food Summit, 1996; UN, 1997a; Argeñal, 2007).

Consequently, in 1996 World Food Summit adopted both the Rome Declaration as well as the Plan of Action. Lastly, one of the explicit aims of the summit was to halve the total number of undernourished people by 2015 − and considering the estimated number of undernourished people during the specified timeframe topped 800 million people, it was a promise that never materialized (Table 4.7) (FAO, 2003).

## 4.22 Footprints and ecological accounting

As with promises of progress in any other field so there has to be some kind of benchmarking in the environmental sense too. Indeed, the idea of environmental accounting was becoming mainstream during this period as more and more people, governments, and NGOs needed to benchmark their promises against actual progress. It was intuitive too, taking stock either quantitatively or qualitatively of natural resources, as well as any social, physical or economic impacts is inherent in any business model. And looking after the environment was now big business. Beginning in the 1970s amidst concerns over the environment:

> was the simple epiphany that all renewable resources came from the Earth and that as yet there was no tally or accountability as to what was being taken, replenished or destroyed. ***Gibson (2016)***.

Consequently, books, articles and academic papers on proposals and methods of ecological accounting began to appear with more and more frequency (Krebs, 1972; Hannon 1973, 1985; Stearns and Montag, 1974). From here the notion of ecological accounting took several parts. However, of the more familiar methods was the "foot printing" or more precisely, ecological foot-printing method popularized by Mathis Wackernagel and William Rees in 1990 and further established in their 1996 book on the subject (Rees, 1992; Wackernagel and Rees, 1996). In the foot-printing method of accounting, calculations can be made at the individual, country or globally and can be defined as:

> … how much biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and to absorb the waste it generates using prevailing technology and resource management practices … ***GFN (2010)***.

Using this method, the ecological footprint is measured in units of global hectares on a per person per year basis. To arrive at this figure the demands placed on the Earth's resources are divided by the capacity of the Earth to support such demands - on a per hectare basis. From

here the popularity of this simple, but definable notion helped found the Global Footprint Network in 2003. Indeed, in the words of Gibson (2016):

> "…similar measures spring boarding from such concepts were also the water and carbon footprints which collectively combine to form a powerful arsenal in the field of ecological accounting. ***Gibson (2016)***.

On political level too, there were increasing calls to incorporate such accounts into a country's macroeconomic System of National Accounts (SNA). This was not a new call-to-arms either as back as 1976 ideas for a system of national environmental accounting had already been proposed (Peskin, 1976). In other areas, Table 4.10 highlights other things going on in the period surrounding the mid- to late 1990s.

**TABLE 4.10** Key dates of the period: mid-late 1990s.

| Key dates of the period | |
|---|---|
| **1996** World Food Summit (**WFS**) | It was generally understood for the 1974 World Food Conference goals that they would need to be accelerated. Once again as in so many conferences the 1996 World Food Summit renewed its promises for global commitment to eliminate hunger and malnutrition. It would achieve this by raising awareness among decision-makers such as, the media and with the public too. The Summit culminated in the Rome Declaration on World Food Security and the World Food Summit Plan of Action. It also pledged to cut the number of hungry to about 400 million by 2015 (UN, 1997a,b). |
| **1996** ReliefWeb | Spurred by the idea that timely and reliable information during any particular crises was critical to improving and maximizing responses. ReliefWeb came onto the scene. The group also operated on the premise that transparency and accountability were paramount in building trust (which some agencies seem to have forgotten) among the humanitarian relief agencies, NGOs and the (ReliefWeb, 2019). |
| **1997** The UN Development Group **(UNDG)** | In 1997 the UN Development Group (UNDG) took on the role of coordinating and harmonizing the 32 UN funds, programs, agencies, departments, as well as offices that independently or co-dependently worked for the social and economic development community (UNDG, 2009). |
| **1998** The Office for the Coordination of Humanitarian Affairs **(OCHA)** | In 1998 the DHA was reorganized becoming the OCHA. Its remit was expanded to coordinate policy development and humanitarian responses of the UN agencies, funds and NGOs. It primarily works via the Inter-Agency Standing Committee (IASC) chaired by the ERC (OCHA, 2011). |
| **1998–2008** Food and Nutrition Technical Assistance **(FANTA)** | The Food and Nutrition Technical Assistance (FANTA) project was a 10-year project to improve knowledge, program development, policy, strategy, implementation and monitoring within the field of food and nutrition. The Project was funded by USAID and was renewed in 2008 for a further 5 years (Copeland et al., 2002; POPLINE, 2010). |
| **1999–2004** Food Insecurity and Vulnerability Information and Mapping **(FIVIMS)** | FIVIMS helps countries comprehend, through sectoral analyses as well as evidence-based analyses, the underlying causes of food insecurity. This is further aided by the KIDS Database. The database is a set of interlinked international databases which is used for information exchange networking called - The Key Indicators Database System (KIDS). The KIDS database effectively allowed the dissemination and analyses of FIVIMS among numerous other datasets (CFS, 1998; FAO/GIEWS, 2006; FIVMS, 2008). |

*Sources: Compiled from Multiple Origins: UN (1997a,b); CFS (1998); Copeland et al. (2002); FAO/GIEWS (2006); FIVMS (2008); ReliefWeb (2019); POPLINE (2010); OCHA (2011).*

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