

PART I

Nutritional Science, Famine and Food Aid in South Asia

The Limits of Famine Relief: Colonialism, Nutritional Science, and the Indian Social Service Movement, 1890s–1930s

Abstract

The regulation of the amount and type of food to be consumed in state institutions during famines is a part of the history of famine relief in colonial South Asia that has so far received only marginal attention. The chapter traces the evolution of famine rations and wages from the late nineteenth century to the interwar period against the backdrop of advances in nutritional science and the increasing involvement of Indian social service organisations in the mitigation of famine.

Keywords: Nutritional Science, Famine Relief, Social Service, Wallace R. Aykroyd

1.1 Introduction: Colonial Famine Relief in British India

The British Encounter of Famine in India

Famines convoyed the East India Company's advance into South Asia. In the hundred-plus years that passed between the Bengal famine of 1770 and the South Indian Famine of 1876–78, colonial responses to famine in India were ad-hoc and varied greatly.¹ Until the draft of the Provisional Famine Code of 1883, British administrators had no rulebook to consult when dealing with famines. Instead, they relied on a body of assumptions and theories. After the famine in Bengal of 1770, when the regulation of the grain trade had exacerbated rather than staved off the famine, the free market paradigm won influence among British administrators. Driven by the conviction that it was inadvisable to interfere with the Indian food economy in times of famine, administrators placed their trust in the self-regulatory forces of the market, theorised by political economists Adam Smith (1723–90) and David Ricardo (1772–1823).² Keeping the interference in famine to a minimum was also advocated by the adherents of Thomas Robert Malthus (1766–1834), whose writings on population growth cast famines as a necessary check against overpopulation.³ *Laissez-faire* governed colonial administrative reactions to famine for the remainder of the colonial period, but the administrative response to famine widened considerably.⁴ Changing notions of colonial governance coupled with the recognition that famines

threatened the expansion of the colonial state fuelled British interventions into famine in India.⁵ Famines caused mass migration, resistance to tax collectors and crime that posed new problems to the colonial administration. In addition, the loss of tax revenues during and in the wake of famines provided a strong economic incentive to mitigate collective starvation.⁶ “The humanitarian discovery of hunger”, as James Vernon has demonstrated, created additional pressure on the colonial administrators to reconsider their stance towards famine.⁷ The influence of philanthropists and humanitarians gained considerable momentum towards the end of the nineteenth century, when developments pertaining to the print media and the improvement in communication facilitated the mobilisation of empathy for the famine-afflicted in distant parts of the world.⁸ Finally, the growing interest in the relationship between meteorology and food scarcity formed the basis for the colonial state’s intensifying response to famines.⁹

From the mid-nineteenth century onwards, the colonial answer to famines relied on a three-pronged approach. The state employed parts of the famine-stricken population capable of hard manual labour on public works. It provided doles of cash or grain and meals free of charge to the elderly, infirm and young children (so called “gratuitous relief”), and advanced loans to cultivators.¹⁰ Until the end of the nineteenth century, the priority was to alleviate famines through labour, for which “famine workers” received a subsistence wage. Under the influence of the free market paradigm, the provision of labour was favoured to circumvent even more direct interventions in the market, such as regulating food prices and importing grain into scarce regions.¹¹ Making labour a prerequisite for state assistance also followed utilitarian reasoning. Colonial administrators considered the employment of the famine-afflicted population to build railways, roads and irrigation tunnels useful for the advancement of infrastructure and communication networks and thus for the modernisation of India.¹² The expansion of India’s railway networks even ostensibly prevented local food shortages from turning into famines by enabling trade between provinces; it also helped the consolidation of the colonial state by facilitating troop movements.¹³ After all, it was consistent with colonial assumptions about Indian culture and society to enforce famine-affected populations to work. Believing that Indians were shirkers by nature, work was supposed to encourage industriousness and became a pillar of colonial attempts of moral reform.¹⁴

Prison Diets and the Search for Minimum Requirements

Whether assistance took the form of wages, food or cash doles, the size of rations was a central concern of the colonial administration. Efforts to determine the level of famine relief were embedded in larger questions about the nature and limits

of the colonial state's responsibility to its citizens and fuelled colonialism's foray into the rule of bodies.¹⁵ The colonial state's attempts at mitigating famine involved managing the population, categorising and controlling it, with the regulation of the starving population's food consumption being an essential part of the process.¹⁶ Like poor relief in Britain, colonial famine relief in India was based on the firm belief that government support needed to be unattractive. British colonial officers in India endeavoured to keep famine relief to a minimum in order to discourage those purportedly undeserving of government assistance from seeking relief, to protect the integrity of the market and avoid high government expenditure.¹⁷ Since colonial famine relief only aimed at providing the worst affected parts of society with enough food to merely survive famines, knowledge of the food requirements of labouring populations was essential to set the level of relief. This knowledge had been generated primarily in the context of prisons.¹⁸

Poor and monotonous meals were a pillar of the disciplinary regime of prisons and a part of the punishment of inmates.¹⁹ The revolt of prisoners against such practice and high mortality rates among them led to a rethinking of dietary regimes in Indian prisons. Medical opinion further fanned this change.²⁰ Surgeon Major William Robert Cornish (1828–97) studied prison diets in Madras in the 1860s. He became part of a group of physicians who advocated to abandon the punitive nature of diets and to preserve the health of inmates through proper nutrition. He discouraged critics who claimed that dietary improvement was too costly, explaining that a healthy body was the prerequisite for labour productivity and prevented future medical expenses.²¹ Cornish substantiated his claims with studies of diets in and out of prisons, and estimates of food requirements of prisoners and workers.²² In so doing, he applied a method that was common at the time. To study dietary requirements, physicians simply observed the diets and health of different societal groups to determine dietary standards.²³

In comparing the diets of prisoners and the labouring population of Madras, Cornish noted that prisoners ate poorer than workers outside of penal institutions. (Whereas the daily diets of labourers in Madras commonly included 32 to 40 ounces of cereal and 2 to 3 ounces of pulses and meat, fish and vegetables each, prisoners received between 24 and 28 ounces of grain and little supplementary foods.²⁴) This imbalance, while keeping with the disciplinary regime of prisons, endangered the health of inmates, according to Cornish. Under the influence of chemical food science, the methods for determining adequate diets were already becoming more sophisticated at the time of Cornish's study. From the 1840s onwards, chemists and physiologists emphasised the balance of carboniferous and nitrogenous elements of meals. This also reflected in the studies of prison diets in India. *The Sanitary Condition and Discipline of Indian Jails* of 1860 noted that "dietaries ought never to

be estimated by the rough weight of their constituents, without distinct reference to the real nutriment in these, as determined by physiological and chemical inquiry.”²⁵ With regard to prison diets, medical officers in India acknowledged that in addition to size, the composition of diets was also crucial for adequate nutrition.²⁶

Such medical knowledge on food requirements was of no concern to Lieutenant Governor of Bengal Richard Temple (1826–1902) who was sent to Madras in 1877 to gain back control over escalating famine conditions in the province.²⁷ The failure of the South-West monsoon in southern India had signalled famine in the Madras Presidency in mid-1876. Drought started to diminish harvests in the South and the grain surplus yielded in other parts of India was exported to England instead of being used to alleviate food scarcity in Madras. Famine conditions spread unhindered across Mysore, the Bombay Deccan into the North Western Provinces and culminated in the worst famine India had seen in decades.²⁸ Before Temple's arrival in Madras in 1877, the Viceroy of India, Lord Robert Lytton (1831–91), had instructed him to apply fiscal stringency and prudence. Following the example of Bombay, where administrators had introduced a cut in the size of famine rations, Temple restricted the maximum amount of food that people labouring on governmental famine relief works could purchase daily to 16 ounces (1 pound) of grain. The Temple Wage, as it became known, was insufficient by any contemporary standard.²⁹ Cornish, being the Sanitary Commissioner of Madras, pointed out that the amount of food allocated to famine labourers was 8 ounces short of prisoners' diets and even lower than the minimum requirements Temple himself had determined in Bengal three years earlier.³⁰ Although Cornish and other medical officers urged that rations be increased and supplemented with meat or fish and vegetables, in particular protein-rich pulses, the Temple Wage remained in place for three months.³¹ Temple's management of famine in Madras significantly contributed to the exorbitant mortality during the crisis that claimed the lives of six to ten million people.³² By limiting famine rations of workers to one pound of grain, Temple wilfully ignored scientific opinion. This was not a one-off decision or administrative glitch. Temple set the tone for decades to come. Although the Indian famine codes that were drafted and reformed between 1883 and 1901 (and subsequently revised on a provincial level) made concessions to medical opinion, they prescribed a wage system in which the earnings of labourers still fell at, and even below, the Temple wage. This somewhat unacknowledged afterlife of the Temple wage is the subject of the following discussion which demonstrates that the gap between contemporary dietary standards and famine relief became built into the administrative response to famine.

1.2 The Indian Famine Codes and the Administration of Food During Famine

The Famine Codes

In the aftermath of the South Indian Famine, the colonial government tasked the Famine Commission of 1878–80, also known as the Strachey Commission, to formulate a set of general principles on state-sponsored famine relief.³³ The document became the basis of the Provisional Famine Code of 1883, which in turn served as a blueprint for the provincial famine codes that were gradually adopted across British India in the following years. The government of British India introduced further amendments to the famine codes in 1892 and 1893 and two additional famine commissions were summoned in 1898 and in 1901 to survey the relief responses of provincial governments. They provided recommendations for the famine codes' adjustment. Famine commissions commonly reflected on methods already used across India to achieve a more unified response. Their reports reveal that differences continued to prevail in the administration of famine relief in British India. This was not least because the famine codes were lengthy documents and established a complex administrative system that local administrators had trouble following in detail. After the last colonial (all-) India Famine Commission of 1901, provincial governments continued to introduce changes to the famine codes by assembling additional committees in the aftermaths of famines. In the following discussion, I review the famine codes' system for allocating food and, where available, use additional sources to trace how aid practice deviated from the famine codes.

Debates on the size and quality of relief rations in general, and of wages in particular, surfaced in the report of the Strachey Commission and gained further traction in the 1890s, when they became part of the reports of subsequent famine commissions. The Strachey Commission suggested a (slightly) higher standard in future famines. Deviating from the Temple wage, it recommended a daily ration of 1.25 pounds to 1.5 pounds of grain or flour for famine workers.³⁴ The Provisional Famine Code of 1883 also added a portion of pulses, vegetables, oil or ghee (clarified butter), salt and other condiments.³⁵ The increase of rations, though minimal, was a concession to the demands of Cornish and other medical officers. However, the diet affordable to famine workers continued to violate (what was then considered) basic food requirements, both in terms of its nutritional composition and size.³⁶ This violation of nutritional standards in colonial famine relief was in consonance with the famine codes' underlying principles. To prevent public works from absorbing labour rather than providing a last resort, labourers needed to earn less (and eat worse) on famine relief works than outside governmental institutions. Studies on diets and food requirements assisted in establishing a benchmark against which the level of famine relief was to be set. To fix the exact level of famine

Table 1. Ration Sizes according to the Provisional Famine Code of 1883
Based on a table provided in the report of the Indian Famine Commission, 1898, 256.

Descriptions of ration.		For a man.		For a woman.		For children.
		lb	oz.	lb	oz.	
Full	Flour of the common grain used in the country, or cleaned rice	1	8	1	4	$\frac{3}{4}$, $\frac{1}{2}$ and $\frac{1}{4}$ according to age and requirements.
	Pulse	0	4	0	4	
	Salt	0	$\frac{1}{2}$	0	$\frac{1}{2}$	
	Ghi or oil	0	1	0	$\frac{1}{2}$	
	Condiments and vegetables	0	1	0	1	
Minimum	Flour of the common grain used in the country, or cleaned rice	1	0	0	14	$\frac{3}{4}$, $\frac{1}{2}$ and $\frac{1}{4}$ according to age and requirements.
	Pulse	0	2	0	2	
	Salt	0	$\frac{1}{3}$	0	$\frac{1}{3}$	
	Ghi or oil	0	$\frac{1}{3}$	0	$\frac{1}{3}$	
	Condiments and vegetables	0	$\frac{1}{2}$	0	$\frac{1}{2}$	
Penal	Flour of the common grain used in the country, or cleaned rice	0	14	0	12	Not stated.
	Pulse	0	1	0	1	
	Salt	0	$\frac{1}{4}$	0	$\frac{1}{4}$	

rations—the minimum that workers needed to sustain themselves—the famine codes adopted a simple intake-output equation. Rations aimed to compensate the exact amount of energy lost through physical activity. The benchmark for ration sizes was the “ordinary working male”—an approach that was not only used in the colonial administration of famine relief. In the context of institutional feeding programmes in South Asia and beyond, nutritionists and administrators used the “average man” or “average worker” to estimate food needs. Although nutritionists knew that the approach fell short of calculating individual needs, the bureaucratic requirements of institutional feeding ostensibly rendered such simplification necessary.³⁷ The method neglected physical differences among men, but the use of the male body as a benchmark particularly disadvantaged women and children. Their diets were deducted from the male average.³⁸ Consequently, the famine codes allocated “a little less” food than the “average working male” to women; children received a mere fraction (see table 1).³⁹ Although the way in which the gender gap

was enacted changed during the revision of the famine codes, it was not abolished. The Indian Famine Commission of 1901 not only endorsed unequal pay, it further altered the wage system, widening the gender gap and even reducing women's absolute earnings.⁴⁰ To better understand how much famine workers were entitled to consume and why this system often prevented them from even accessing the rations prescribed, we need to turn to the wage system of the famine codes.

Cash for Work: The Wage System

The principle upon which the Government of India has framed the scale of wages embodied in the Code is that the wage should be the lowest amount sufficient to maintain health under given circumstances. *While the duty of the Government is to save life, it is not bound to maintain the labouring community at its normal level of comfort.* To do so would be unjust to other sections of the community, besides prolonging the period for which the labouring population would cling to relief works.⁴¹

Provisional Famine Code, 1883

Populations employed at public works during famine were given a cash payment to enable them to buy food at the nearest market or government-controlled shops. Thus, while the famine codes detailed dietary components (see table 1), what famine workers purchased with their cash payments was not controlled. Nutritional recommendations had therefore only a limited influence; the demand for an increase of green vegetables for instance could work in favour of higher wages, but would not guarantee consumption of the particular food item.

Since 1883, the colonial management of public works during famines rested on three wage units: the full, minimum and penal wage (see table 1). In addition, the Provisional Famine Code defined three categories of labourers (A, B and C) and distinguished them by expected productivity. Wages, hence, were tied to colonial estimates of labour productivity which meant that unrealistic expectations on the one hand and underperformance on the other hand diminished wages. This system was in consonance with the idea that workers did only need to consume (and were only entitled to) the amount of energy wasted through work. Consequently, the first generation of the famine codes (1883–1898) categorised all “able-bodied” men and women as class A and B workers. Class A consisted of labourers “accustomed” to the work demanded of them who were entitled to the full wage. Class B labourers were unaccustomed to the work. Class C labourers on the other hand included men and women who were unsuited for hard manual labour but fit to carry out “light employment.” To reduce the earnings in accordance with (expected) productivity, the maximum wage of Class B and C labourers amounted to 75 per cent of the earnings of Class A. The first generation of Indian famine codes worked with a

bottom line of wages, i.e. the minimum wage, which was set at 16 ounces of grain for men and 14 ounces of grain for women. Hence, men's wages ranged from the full wage of 24 ounces to the minimum wage of 16 ounces, while women earned a maximum of 20 ounces and a minimum of 14. Two further restrictions ensured that workers were never to eat more than the energy lost through physical labour. First, what was considered the refusal to work resulted in the penal ration that was even less than the minimum wage.⁴² Second, wages were adjusted in accordance with performance. Underperformance resulted in a percentual cut of wages.⁴³

Contemporaries in the 1890s noted that administrators often applied the penal wage and fined workers excessively even when the reasons for a labourer's unproductivity were beyond their control, for instance when weather conditions prevented work.⁴⁴ This was also noted by the second and third famine commissions.⁴⁵ The threat of going without a day's earnings intensified after the minimal wage was abolished in response to mounting opposition against this safeguard in 1901. Opponents argued that a bottom line for wages bred idleness among the workers and the Indian Famine Commission of 1901 concluded that "the evidence of the demoralizing effect of the minimum wage is overwhelming."⁴⁶ It established a system of payment by results (that was already followed in different provinces across India at the time) that entailed a maximum limit to daily earnings but no minimum.⁴⁷ Hence, no check prevented wages from falling to and even below the much-criticised Temple wage.⁴⁸

Red tape prevented workers from receiving their subsistence wage in more ways than one. The colonial government introduced the "grain equivalent" in 1893 which meant to simplify the administration of wages and resulted in a decoupling of wages from the market price of food commodities.⁴⁹ Prior to the grain equivalent, famine administrators used the market price of every item of the famine ration to set wages. Now they only needed the grain price to do the same. The grain equivalent was computed by multiplying the weight of the grain ration with a predetermined factor; the cash payment in turn was calculated on the basis of the grain equivalent and the grain price. The wage thus calculated intended to cover the costs of all items of the ration.⁵⁰ This meant that officials started to determine wages independent of the actual prize of pulses and other supplementary food items. Now, whether workers were able to buy their food ration depended on the administrators' use of the actual grain price and presupposed that the prices for supplementary foodstuffs (pulses, condiments, oil and vegetables) did not fluctuate. The gap between the grain price used as the basis of wages and the actual market prize of grain widened after additional reforms of the grain equivalent were made in 1901. Prior to the reform, colonial administrators were instructed to consult the nearest market price of grain to calculate wages. Now the grain price was set for entire districts. The standardisation of district wages intended to prevent the

migration of workers within a district to public works that offered better rates, but it carried the risk that grain prices on local markets exceeded fixed district-level estimates, thereby resulting in a cut of famine rations.⁵¹ Thus, with the introduction of the grain equivalent and its later reform, wages could crunch to an extent that famine rations fell far below estimated food requirements. When the costs for food items rose above general estimates, workers failed to afford the entire ration. If prices dropped, the labourer was left with a little margin in excess. While in theory the system could lead to benefits for famine workers, even slight reductions of the meagre wages amplified suffering and hardship, risking the health and lives of the famine-afflicted in government-care. Contemporaries identified additional flaws. Although the famine codes stipulated that payments needed to be made daily at best, but at least fortnightly, the lack of available cashiers resulted in delayed payment. Workers were therefore forced to borrow money to buy food and the interest payments reduced their purchasing power and thus the food they consumed.⁵² In other words, the wage system of the famine codes did not guarantee that workers consumed the diets they were entitled to on paper.

“Gratuitous Relief”: Aid in Poorhouses and Relief Kitchens

Apart from employing the famine-affected population, the colonial state provided gratuitous aid during famine periods. Gratuitous relief took the form of meals, doles of cash and uncooked food that was given free of charge or at subsidised prices. In addition to people who were too weak to labour on public works, the Provisional Famine Code of 1883 listed “idiots and lunatics”, “cripples”, “blind persons” and parents taking care of a sick infant as suitable recipients.⁵³ In light of the frailty of these sections of society, testing their needs through the demand of hard manual labour was considered inappropriate. However, the fear that relief was given to people undeserving of state assistance remained omnipresent. The second and third Indian famine commissions emphasised the careful inspection of villages in order to assure that relief did only reach the needy. When famine was imminent but had not yet been officially declared, district officers were to prepare lists of people, who needed to apply for gratuitous relief during famine. An inquiry into “the applicants’ whole circumstances” was recommended to avoid too much relief being given.⁵⁴ Gratuitous aid was provided through kitchens built in proximity to public works to assist dependants of famine workers; a mix of cooked food, cash and grain doles was handed out in villages. The most common form of administering gratuitous relief in India in the second half of the nineteenth century, however, was the poorhouse.⁵⁵ People travelling to relief works at times sought temporary refuge in poorhouses; the bulk of people kept at such institutions, however, was admitted without consent and kept there by force.⁵⁶ Poorhouses were used to control “paupers” and “wanderers”

and although they were meant to shelter only those too frail to labour, the colonial administration still used the institution to promote industriousness. Inmates able to perform “light work” were demanded to fetch water, sweep, grind grain, repair fences or even made to do stone-breaking—remunerated tasks attributed to inmates according to a colonial understanding of gender and caste.⁵⁷ Poorhouses rendered inquiries into indigence obsolete, because the institution itself was considered a deterrent. A means to deter the “undeserving poor” from seeking admission to poorhouses and relief kitchens was to serve pre-cooked meals, a practice which gradually replaced the prior use of grain and cash doles. It was in the 1860s, as Sanjay Sharma notes, that the practice of using prepared meals “stepped out of colonial prisons and became the defining feature of poorhouses.”⁵⁸ The provision of prepared meals was adapted from the management of prisons and applied first in poorhouses before it was also used in villages and on public works. Whereas the introduction of messing to prisons in the 1840s had resulted in riots of captives in Bengal and was eventually abandoned, it was retained as part of colonial famine relief.⁵⁹ In line with the logic of deterrence that was already in use in other areas of colonial famine relief, the food provided in poorhouses and relief kitchens was intentionally plain. On top of that, it was rarely sufficient. The Famine Commission of 1878–80 recommended a ration size of one pound of grain for men and reduced rations for women and children. This was overhauled in 1898, when the second famine commission recommended an increase of gratuitous rations for non-working adults—men and women alike.⁶⁰ The third commission, however, re-introduced a gender differentiation, which led to a decrease of gratuitous rations for women, who were now eligible to less than non-working men.⁶¹

The high mortality among inmates of poorhouses during the famine of 1896–97 prompted the Famine Commission of 1898 to instruct medical officers to exert greater flexibility in administering food in these institutions.⁶² Although the “special dietary needs” of recipients of gratuitous relief were now considered, rations remained poor even in the early twentieth century. Thus, the Bombay Famine Relief Code of 1912 differentiated three diets: an ordinary diet (consisting of rice and pulses), a milk diet, and a *conji* (a form of thin milk gruel) diet.⁶³ The Famine Code of Bihar and Orissa of 1930 recommended the provision of pulses and *chapatis* (flat bread), and for those unable to digest the bread, boiled rice and *dal* (lentils). The weakest received a soup made out of flour, water and salt.⁶⁴ In parts, the poverty of diets was called for by the physical condition of inmates that prevented them from properly digesting food; in many cases, poorhouses had turned into infirmaries. However, poor and tasteless diets were also part of the disciplinary regime of colonial famine relief.

The provision of meals instead of doles of cash or grain intended to facilitate the identification of needs through another mechanism. Since caste regulated the

consumption of food in India in complex ways that were not always transparent to the state, colonial officials assumed that the provision of meals required those seeking help in government institutions to risk violating caste norms. In doing so, colonial officers commonly overlooked other reasons for the widespread reluctance to accept government relief that ranged from the insufficiency of rations and the fear of being kept in poorhouses involuntarily, to the overall punitive measures employed by the colonial state to administer relief in these institutions.⁶⁵ Colonial administrators' frequent mentioning of "caste prejudice" and the exceptions they made to preserve caste discrimination by allotting doles of grain and cash to the "respectable classes", fuelled a gradual rethinking of the use of cooked food. The Indian Famine Commission of 1898, taking notice of this practice, sanctioned such exceptions "in order to guard against the possibility of deserving persons, who from caste or other prejudice cannot accept cooked food, being excluded from all relief although they really require it."⁶⁶ The famine codes began to make room for the assistance of "respectable persons"—Indians of high caste and class who were not expected to seek relief at government-institutions— as well as *pardanashin* women (women observing *pardah*, living in seclusion), through doles of cash and uncooked food. In poorhouses, however, where meals were still served, Indian cooks and overseers were now employed to observe caste rules to soften opposition against colonial famine relief— a practice that had already been in use before the famine codes adopted it.⁶⁷

The colonial state started to give greater emphasis to the diets of children during famines in the 1890s and began to stress the importance of kitchens to provide relief to them. Although kitchens were considered more expensive than providing parents with cash or grain doles, the Indian Famine Commissions of 1898 and 1901 recommended the use of kitchens to alleviate starvation among children. Instead of giving relief in the form of additional allowances to parents, the direct provision of food to children was championed, because it allowed greater control of children's food consumption. As Nadja Durbach observed, this change of practice was linked to the British "strategy of colonial development" that wished Indian children to grow into healthy adults to maintain the colony's economic productivity and guarantee future resource extraction. The colonial state emphasised the alleged failure of Indian parenthood in general and of Indian motherhood in particular and staged itself as children's guardian.⁶⁸ As we shall see in the following section, the colonial claim of mitigating starvation among children more effectively through providing them with meals rather than channelling relief through their parents had detrimental effects. As nutritional experts in Madras would soon point out, colonial relief did not prevent malnutrition among children nor irreversible damage to their health.

1.3 Famine Relief and Nutritional Reform in the Early Twentieth Century

The flaws of the Indian famine codes, which had contributed to high mortality in the 1890s, carried over into the twentieth century. Yet local administrators and provincial governments recurrently succeeded throughout the next decades to contain scarcities and prevent high-mortality during famines. The following example, although not generalisable, points to the importance of the decision of local administrators to deviate from the famine codes and, as a result, to grant higher wages and larger rations. The increasing gap between the system of famine relief outlined in the famine codes and actual aid practice provides part of the explanation why famines proved less deadly in early twentieth-century India. Nutritional science and medical opinion, although resulting in little adjustment of the famine codes, nevertheless influenced relief practice. It was in particular the amplification of nutritional opinion through Indian social workers and political activists which helped modify aid practice.

The partial failure of the monsoon in 1907 led to drought and poor harvests in parts of the United Provinces (of Agra and Oudh). “Men who had known the course of Indian famines since the seventies told me that unless rain came within a fortnight that year’s famine would be worse than any that India had suffered”, wrote the British correspondent Henry Woodd Nevinson (1856–1941).⁶⁹ Famine conditions soon reached a troubling dimension. With thirty million people out of the total population of forty-eight million afflicted by famine, contemporaries were undoubtedly reminded of the famines of the last century.⁷⁰ In 1907/8, the Lieutenant Governor of the United Provinces, John Hewett (1854–1941), oversaw the anti-famine policies of the provincial government. Under the guidance of Hewett, the government reacted promptly and managed to keep famine mortality low. Hewett’s success resulted from major deviations from the United Provinces Famine Code that governed the administrative response to famines in the province. Instead of adhering to the chronology of administrative activities that the code prescribed, Hewett acknowledged that the sharp rise in grain prices already impeded people’s access to food and ordered the use of gratuitous relief at a time when “test works” still probed the existence of famine conditions.⁷¹ Apart from doling out aid gratuitously at an early stage of the famine, the government allowed gratuitous relief to exceed usual limitations. Whereas the Indian Famine Commission of 1901 had advised to cap gratuitous relief at 42 per cent of the total of people on government assistance, the average adopted in 1907/8 was 54 per cent. In the district of Mirzapur, where people living in the secluded hill tracts and hinterlands suffered severely, the number rose to 67 per cent.⁷² Apart from Hewett’s decision to widen the circle of recipients of gratuitous relief, the government also provided larger rations. As “the scale of the diet prescribed by the Famine Code was discovered early in the year to be insufficient; a revised and more liberal scale was therefore

prepared under medical advice”, noted the official government report of 1908.⁷³ As government policies prevented that starvation weakened the population, only a handful of poorhouses were opened.⁷⁴

The UP famine of 1907/8 illustrates changes in famine relief in India in the early twentieth century. Not only did the responses of provincial governments to famine change, but the Servants of India Society (SIS), which would become an important Indian provider of famine relief in the following decades, made its debut by sending three of its members to Mirzapur during the famine.⁷⁵ The founder of the SIS, Gopal Krishna Gokhale (1866–1915), had started to devise his plans to launch an organisation devoted to social service in the aftermath of the famines of the 1890s, and eventually inaugurated the SIS in Poona (today’s Pune) in 1905.⁷⁶ The importance of the assistance provided by the SIS cannot be established in numbers as its relief efforts were marginal in comparison to that of the colonial state. The SIS remained a small organisation. Exercising a strict selection of applicants, it would grow from four members in 1905 to nineteen members in 1917.⁷⁷ Despite the small size of the organisation, and its limited resources at hand to relieve famine, it provided crucial impulses for the reform of colonial famine relief, substituted it and held colonial officers accountable when they failed to mitigate hunger.

In response to the famine in UP, volunteers of the SIS opened their headquarters in the centre of Mirzapur in July 1908. After that, they began to tour villages to inspect the situation and compiled lists of those in need of assistance. They issued tickets to those identified as needy and after a month and a half, the volunteers ran four relief centres, which catered for an estimated 3,000 persons daily. The assistance consisted of doles of food, money and clothes and concentrated on widows, orphans and other children, who were currently without government assistance.⁷⁸ The volunteers also opened poorhouses, which intended to cater for the weakest. The famine relief of the SIS in general and the management of poorhouses in particular resembled the colonial system. This resemblance also showed in the enforcement of caste. The SIS assigned “lower classes” with sanitary work and with bringing fuel to the poorhouses, whereas Brahmin women were tasked with preparing food. Meals were provided according to caste-divisions and a mixing of groups was prevented.⁷⁹ Gopal Krishna Devadhar (1871–1935), a founding member of the SIS and the leader of the mission, enthused that the poorhouses created a “*real home* where people were made to breathe the atmosphere of real love and affection and where some efforts were made to give the inmates an idea of a better and higher life.”⁸⁰ Rather than love and affection, however, the SIS exerted control to ensure that the famine-afflicted took up the expected routine. As Devadhar himself noted:

Work in the Poor-House was in no way smooth and pleasant. People had to be trained to get up early and to be clean before going to their appointed work. Children had to be forcibly

taken from their mothers to be sent to school [...] In fact for the first fortnight we had to be very strict, rigid and at times cruel.⁸¹

The relief work of the SIS during the year 1907/8 demonstrates that colonial anti-famine policies left an imprint on non-governmental famine relief in India, as Indian organisations copied and adapted the famine codes in their own relief efforts. By the turn of the twentieth century, colonial anti-famine policies in India were widely regarded as a standard of modern famine relief in- and outside the subcontinent.

Watchdogs and Critics: The Role of Indian Social Service Organisations

Members of the SIS were not uncritical of the rules and regulations enshrined in colonial anti-famine policies. They used the famine codes to hold local governments accountable, recommended changes of the famine codes and oversaw their reform. After the SIS had started to provide famine relief in 1907/8, mitigating famine became an important part of the organisation's commitment to social service. The expansion of this strand of activities also reflected in the growing geographical scope of its famine relief. Whereas volunteers of the SIS initially concentrated on relieving distress in UP, they soon travelled to other parts of India to alleviate famine.

Alarmed by the current food situation in Orissa in 1920, the SIS sent one of its members to the province. Amritlal Vithaldas Thakkar (1896–1951), a trained engineer who had joined the SIS in 1914 at the age of forty-five had received his training from Devadhar and became an ardent follower of Gandhi.⁸² After gathering experience in famine relief from 1914–20, Thakkar took the lead in the famine relief operations of the SIS in different parts of India. Thakkar arrived in Orissa in May 1920 and spent the initial two weeks travelling across the province to assess the situation. After inspecting nineteen villages in total, he concluded that acute starvation was rampant in Orissa.⁸³ Unlike the timely response of the UP government to famine in 1907/8, the government of Bihar and Orissa ruled out the possibility that people in the province died of starvation and attributed the rise in excess mortality to diseases. Based on his inquiries, Thakkar estimated that at least 3,000 people had died of hunger in Orissa and accused local officers of concealing starvation.⁸⁴ The widely reputed Oriya social reformer and *swadeshi* activist Gopabandhu Das (1877–1928) likewise penned a report that incriminated the Bihar and Orissa government, charging it with “criminal neglect of duty” in the *Modern Review*.⁸⁵

Indian social reformers, using the print media to amplify their criticism, held colonial administrators accountable if they failed to respond to famine swiftly and adequately. This was also the case in the Madras Presidency, where a drought called the SIS again to action less than a year after its volunteers had travelled to

Orissa. In 1921/2, parts of Madras were gravely affected by the serial failures of the south-west and north-east monsoons. Irrigation networks failed to prevent the drought from destroying harvests.⁸⁶ In 1921, R. Suryanarayana Rao, member of the SIS and the Social Service League of Madras, was deputed to the region to assess the situation and to oversee the relief work of Indian relief agencies. Although the government of Madras responded swiftly, declared famine in the districts Bellary and Anantapur and opened relief works in March of the same year, Rao argued that the participation of Indian organisations in the relief effort was crucial. Rao was a vocal critic of the Indian famine codes. According to Rao, the flaws of the famine code and thus the official response to famine rendered the relief work of Indian organisations “absolutely necessary to avoid suffering.”⁸⁷ In 1921, Indian relief providers, including the SIS, operated cheap grain shops, distributed *conji* to children and milk to babies and offered medical comforts and clothing in parts of Madras.

The famine of 1921/2 marked the beginning of a prolonged period of agricultural crisis in the Madras Presidency. Madras was gravely affected by the global depression that led to a credit crisis in the province and rendered the agricultural population vulnerable to famine.⁸⁸ Between 1922 and the beginning of World War II famine visited parts of Madras five more times, in 1924, 1931–32, 1934–35, 1937–38 and 1938–39.⁸⁹ In this period, members of the SIS took part in the administration of relief and pushed for the reform of the Madras Famine Code.

Rao had offered his services to the committee that evaluated the relief operations on behalf of the government of Madras for the first time in 1921. He led an expedition of the committee members to the famine-affected areas and made concrete recommendations for the revision of the provincial famine code.⁹⁰ The *Servant of India*, the weekly of the SIS, summarised Rao's recommendations for its readers, helping to bring his demands to the attention of a wider audience.⁹¹ Improving the wages of famine workers emerged as one of Rao's key concerns. He cited nutritional studies that outlined the minimum requirements of prisoners to substantiate his demands for a rise in the earnings of labourers on famine relief works. Comparing the diets in prisons and on public works during famine, Rao noted that not only were Indian prison diets grossly insufficient in terms of calories and vital nutrients, but famine workers received even less. Rao concluded that “a convict is treated better than a hard-working honest cooly”—an observation which had been made recurrently from the mid-nineteenth century, without leading to a major revision of the wage system of the famine codes.⁹² Whereas jail diets had gradually improved in India, the nutritional content of famine relief remained static.⁹³ Medical officers had long advocated that famine labourers received the same (if not better) diets than prisoners, yet famine workers still lived on rations that were inferior in both quantity and quality. The rejection of the demand to align the diets of famine workers and prisoners was commonly justified with the different duration of state assistance for

these two groups. Famine relief was only intended to tide over brief periods. In the event of famine, the temporary nature of state assistance legitimised diets that were known to cause malnutrition if given over a longer period of time. In other words, diets sustaining famine sufferers for weeks and months were not applicable to prisoners who served longer sentences.⁹⁴ As will be shown below, medical opinion in the interwar period demonstrated that in areas where populations recurrently fell back on government assistance, the health of famine-sufferers, in particular children, was severely affected by this policy.

The committee tasked to advise on the revision of the Madras Famine Code in 1921 was inclined to some of Rao's recommendations. The government of Madras however refused to implement them. Rao continued to lobby persistently for a general overhaul of the Madras Famine Code. After a decade and a half of studying the consequences of colonial anti-famine policies in Madras, Rao found a more conducive political environment in 1938. At the first elections under provincial autonomy in Madras in 1937, the Indian National Congress had won a landslide victory.⁹⁵ Rao joined the Madras Famine Code Revision Committee in 1938, when parts of Madras were still in the midst of a famine.⁹⁶ Alarmed by the scale of the famine that affected several districts at once, the committee evaluated the current response and reached the conclusion that a "bolder policy" was needed.⁹⁷ It offered far-reaching recommendations for the reform of the provincial famine code, such as the abolition of the grain equivalent and the increase of wages and rations.⁹⁸ It noted that women workers received an insufficient amount of calories and that children's rations lacked fat. It also pointed out that the allowances of vegetables were lower than in jail diets and thus generally insufficient.⁹⁹ These minute recommendations were overshadowed by the demand of a more fundamental change. The committee recommended that the preamble of the Madras Famine Code broadened the duties of the government in times of famine.

It must also be remembered that while the main object of state intervention is to save life, it is non the less essential to maintain people in good health to prevent physical deterioration and dispiritedness among them so that they may be in a position to resume their ordinary pursuits with advantage to themselves and the State on the advent of better times.¹⁰⁰

In a departure from the earlier wording, this amendment was intended to introduce a duty on the part of the government to preserve the health of starving populations rather than to prevent their (immediate) death. The committee's recommendations resulted in an overhaul of the famine code, which became known as "the liberalisation of the principles underlying famine relief."¹⁰¹ Whereas the change to the preamble was adopted, it remains unclear to what extent the celebrated liberalisation of famine relief led to a substantial change of relief practice—in particular

since the onset of World War II geared India's economy towards British war needs. The revision did not end Rao's efforts to improve the state's famine response either. In 1939, during another outbreak of famine in the Ceded Districts, Rao again travelled to the affected areas to document whether officials implemented the changes made to the Madras Famine Code in the previous year.¹⁰²

The Rise of Nutritional Science in the Interwar Period

Provincial governments sought the advice of nutritionists with increasing regularity in the interwar period to evaluate anti-famine policies. Their influence however remained limited. In 1935, when Wallace R. Aykroyd (1899–1979) became the director of the Nutrition Research Laboratories in Coonoor, he advised the committee summoned to assess the recent famine and provide recommendations for the reform of the Madras Famine Code. Aykroyd and his colleague B.G. Krishnan had toured the famine-afflicted districts in Madras to study the health of children in labour camps and noted the gross Vitamin A-deficiency of children's diets.¹⁰³ In response to his findings, Aykroyd proposed the inclusion of a larger portion of green vegetables in famine rations to counter the prevalence of deficiency diseases, but his recommendations were not taken up by the government. Little had changed when three years later, in 1938, Reginald Passmore (1910–99), an expert on energy metabolism and a colleague of Aykroyd at Coonoor, took up the role as the official nutritional adviser of the Madras Famine Code Revision Committee.¹⁰⁴ Passmore reiterated Aykroyd's earlier findings on the deficiency of children's diets, which he attributed to "the continued use of the grain equivalent and inadequate supervision of the kitchen and stores."¹⁰⁵ Following on from Aykroyd's earlier research, Passmore studied the effects of gratuitous relief on children in the district of Bellary in Madras. His study found that 35 per cent of the 1,175 children examined suffered from Vitamin A-deficiency which was likely to result in their stunted growth and development.¹⁰⁶ The findings of Passmore stood out for two reasons. First, they threw light on the flawed nature of a colonial rhetoric that had presented the state as a surrogate parent. The fact that colonial anti-famine policies fed children in Bellary on diets that caused stunted growth reveal the failure of colonial *in loco parentis*.¹⁰⁷ Second, the nutritional expert noted that the official definition of famine in India as a short and exceptional situation was misleading. Given the frequency of famine in Bellary, children, on average, lived on famine relief three to four times for a period of six months before reaching adulthood. The provision of diets designed to prevent (immediate) death but not tailored to maintain health had serious consequences for children's development.¹⁰⁸ Despite this alarming finding, Passmore concluded that it was not possible to bring children's rations into line with nutritional ideals

and proposed a diet that, although improved, continued to violate nutritional standards.

It should be realized that the recommendation of the above diet schedule modified from the present Code cannot be a source of satisfaction to the nutrition worker. It contains no first-class protein, and children reared on it will not reach their full size, or acquire an optimum physique. The schedule represents no permanent standard or ideal; it should be taken as a purely temporary compromise with the economic conditions. The best that can be said for it is, that, if accepted and put into practice, a marked improvement on the present condition of children in the Bellary famine camps would result.¹⁰⁹

This was not the new “bold policy” which the committee wished to adopt in 1938. In accordance with the organising principle of the famine codes that had long pledged “to maintain health” but not “the normal level of comfort”, Passmore argued that relief rations of children needed to be poorer than children’s diets in “normal times”.¹¹⁰ In other words, the general prevalence of malnutrition among children in the district of Bellary—“the normal level of comfort” in colonial parlance—mandated that children’s diets fell below nutritional standards in times of famine. Although the advancement of knowledge on food requirements and malnutrition diseases allowed nutritionists and social reformers to present evidence to prove that colonial famine relief violated nutritional standards, such findings did not challenge the economic logic of colonial famine relief. Feeding children affected by famine on diets that complied with nutritional standards was considered beyond the capacity of the colonial state.

Beyond Famine: Debating Nutritional Health in the Interwar Period

The decision of nutritionists to study the effects of famine relief on the health of children was no coincidence. Children and mothers moved into the focus of nutritional scientists in the interwar period when the recognition of high infant mortality in India sparked a new wave of scientific inquiry.¹¹¹ At the time nutritionists were invited in Madras to consult on the colonial management of food during famine, famines were no longer considered the primary manifestation of starvation in India. Nutritional studies of the interwar period revealed a major flaw in the colonial response to starvation which neglected the general prevalence of mal- and undernutrition outside the context of famines. Nutritionists demonstrated the general state of malnourishment in colonial India, arguing that the focus on famine-induced starvation obscured micronutrient deficiencies. The poor nutritional health of India’s population, leading health officers opined, rendered Indians prone to diseases and was no less lethal than outright famines.¹¹² High mortality

rates among children and infants were traced to maternal malnutrition. The nutritionists' discovery of the long-lasting impact of mothers' poor health on the physical and mental development of children struck a chord with Indian social reformers and politicians who now strove to prevent the grim vision of a nation suffering under a debilitated population.¹¹³ Poor maternal health challenged nationalist tropes of a strong and unwavering Mother India and led to efforts to improve the nutritional health of Indian women.¹¹⁴ Whereas Indian social reformers and politicians flagged the need for nutritional education, the task to improve the diets of children and mothers became a tenet of the work of newly founded women's organisations.¹¹⁵ Volunteers of the Seva Sadan (Mission to the Women of India) in Poona for instance began carrying out annual exhibitions of the Baby and Health Week Association that educated middle- and lower-class audiences about healthy diets and foods.¹¹⁶ The Seva Sadan initially concentrated on promoting the education of abandoned high-caste Hindu wives and widows, but later engaged in the welfare of working-class women as well.¹¹⁷ In 1927, the Theosophist and suffragist Margaret Cousins (1878–1954) founded the All-India Women's Conference (AIWC) in Poona, which soon after took up the task of improving the health of mothers and children. Nutritional education assumed a more prominent role in the programme of the AIWC especially after 1931, when it adopted a scheme to enlist public support for the improvement of child and maternal health.¹¹⁸

Although the colonial administration began to acknowledge that malnutrition constituted a major public health concern in India in the interwar period, it discouraged debate on its political and economic causes and constructed malnutrition as a medical problem. As Sheila Zurbrigg has convincingly argued, the recourse to a medical nutritional discourse allowed colonial administrators to deny the state's responsibility in producing and mitigating malnutrition in India by attributing imbalanced diets to ignorance and custom. Colonial rhetoric established Indian food habits, that were supposedly the result of "backward" culture, as the cause of malnutrition in India. It also denied that sections of the Indian society failed to fill their stomachs even in the absence of famine conditions.¹¹⁹

In terms of Indian food habits, health officers and nutritionists in India were particularly concerned over the "poor rice diet" that, in neglect of regional and local differences, was commonly associated with South India and Bengal. The rice diet that consisted largely of rice and pulses, was allegedly less nutritious than a diet that included wheat and meat. Claims about the nutritional inferiority of rice, especially in its milled and polished form, gained weight after David McCay published the results of his study of jail diets in 1912. The professor of physiology at Calcutta's Medical College provided a dietary explanation of the martial race theory that linked the consumption of rice to the allegedly poor physique of Bengalis and South Indians. He attributed the supposed superior physique of

Sikhs, Rajputs and Pathans in northern India to a diet that consisted of wheat and animal products and, thus, was richer in protein.¹²⁰ In 1926, Robert McCarrison conducted his widely cited rat experiment that assessed the effects of different diets on the health of rodents and drew conclusions about the result of such food consumption in humans. According to McCarrison, his findings validated the long-claimed inferiority of the Indian rice diet.¹²¹ In 1937, researchers at Coonoor built on McCarrison's previous work, when they fed "typical Indian diets" to suckling rats in order to study the prevalence of mortality of their offspring. They found a corollary between the "poor rice diet" fed to lactating rats and the early death of their progeny.¹²² Apart from investigating the prevalence of malnutrition, researchers also tested possible remedies. Aykroyd and his colleagues for instance stepped outside the laboratory in 1937 to test the suitability of protein supplements in improving the health of children. The experiment demonstrated that the health of children proved unaffected when they were fed soybean food supplements, but those who consumed milk powder not only gained weight but also proved healthier in general.¹²³ Skimmed milk powder had no nutritional advantage over fresh milk, but an economic one: as a by-product of the dairy industry, it was considerably cheaper than milk and thus was more suitable for the large institutional feeding programs that Aykroyd envisioned in India.¹²⁴ Milk was also much easier to store and to transport in its powdered form. A main caveat however remained. India did not produce sufficient quantities of milk powder for large-scale domestic use and would have to import substantial quantities. Although available at a low price outside India, an import duty of twenty per cent (from within the British Empire) and thirty per cent (from outside the British Empire) made imported milk powder expensive. Aykroyd therefore strongly argued for the end of import duties but failed to persuade the colonial regime.¹²⁵ In the following years, the world's leading nutritionists reiterated the importance of milk, either in its liquid or powdered form, in the human diet. This group included Aykroyd, who in 1940 again concluded that "milk is the best supplement to rice diets."¹²⁶ In India, the nutritional superiority of milk was not only flagged by British nutritionists. In 1936, Narasinh Narayan Godbole (1887–1984), Professor at the Benares Hindu University who had attained his doctoral degree in Berlin with a dissertation on the molecular composition of peanut oil, concentrated on establishing the advantages of consuming milk in comparison to meat.¹²⁷ His study, titled *Milk. The Most Perfect Food*, was the brain-child of the three-time president of the Indian National Congress, social reformer and leading figure of the Hindu Mahasabha Madan Mohan Malaviya (1861–1946).¹²⁸ Malaviya explained in the foreword of the book that the study was inspired by the recent surge of global interest in milk, which neglected India's traditional knowledge on the matter. Consequently, Malaviya had tasked Godbole with reminding the international scientific audience that the use of milk had long been advocated

by Hindu medical practice and tradition.¹²⁹ Godbole, in fulfilment of his task to educate his readers about the older Indian knowledge on the advantages of milk, outlined in detail why Indian vegetarians should increase the intake of milk to consume more protein. As he merged ayurvedic and allopathic knowledge to advance his argument, he dwelt in length on the benefits of a strict Hindu vegetarian diet. Referring to the abstinence of Indian Hindu vegetarians from meat and eggs, he propagated the superiority of Hindus and Jains over European vegetarians, as well as over meat-eating British colonizers, Indian Muslims and Sikhs.¹³⁰ Thereby, Godbole turned long-held racial hierarchies (and the findings of McCay's earlier nutritional study) upside down and propagated a "vegetarian humanitarian ethic" that condemned meat-eaters for the death of living-beings.¹³¹

While Godbole's Hindu nationalist leanings undergirded his writing, the importance that nationalists awarded to the consumption of milk was much wider. One of India's most vociferous vegetarians, M.K. Gandhi, had recently begun to embrace the consumption of milk. Curiously, Gandhi strove in his lifetime to eliminate milk from his own diet. He had initially opposed milk consumption in his earlier experiments with veganism but returned to milk consumption after he had contracted dysentery in 1918. Gandhi decided to consume goat rather than cow milk, and at first only tentatively referred to his dependence on the white liquid, arguing that he needed milk to acquire the physical strength needed to carry out his political struggle. He later, however, turned into a vociferous advocate of milk—a change of mind, which was influenced by his frequent exchange with nutritionists who convinced him of the benefits of consuming adequate amounts of proteins. In the interwar period, Gandhi emphasised the importance of milk in the Indian diet, which was meant to supply Indians with the physical and mental strength needed to shake off colonial rule.¹³²

An important stimulus for the growing interest in milk in India and beyond was a publication by Cicely Williams (1893–1992). In 1935, Williams, who worked as a colonial medical officer in the Gold Coast region, recognised a series of symptoms in her younger patients that were not recorded in the medical textbooks available to her.¹³³ She described her discovery of a severe form of protein-malnutrition among children and borrowed a term from the Ga language to label it: kwashiorkor. The term kwashiorkor translated into "disease of the deposed child", which resulted from early weaning and often caused the death of the child affected by it.¹³⁴ Williams noted the success of treating protein-malnutrition through the feeding of milk powder. In the aftermath of Williams's findings, new international nutritional standards attributed importance to milk consumption. In the 1930s, the League of Nations Health Organisation (LNHO) suggested "a daily intake up to one litre per day for pregnant and nursing women, as well as to provide an abundant supply for infants, children of all ages and adolescents."¹³⁵

In 1935, shortly before Aykroyd took up his work as the director of the Coonoor Research Laboratories in India, the LNHO had tasked him and Etienne Burnet to oversee an inquiry of the nutritional health of people in the UK, France, the US, Denmark, Sweden, Norway, and the USSR. The results of the study informed the new dietary standards that the League of Nations and the International Labour Office published in 1935 and 1936.¹³⁶ The study also shaped dietary recommendations in India. In 1937, Aykroyd distributed the findings through the *Health Bulletin* of the Indian Nutrition Advisory Committee (NAC). *The Nutritive Value of Indian Foods and the Planning of Satisfactory Diets* was reprinted several times in the following two decades, with a fifth edition published in 1956.¹³⁷ When the Department of Nutrition of Bombay Government in 1959 published a diet manual for institutional feeding in hospitals, schools, prisons and factories, it still relied on Aykroyd's findings.¹³⁸

In the context of new nutritional standards emerging in the interwar period, even more important than assessing milk consumption was the caloric measurement of diets. Informed by Wilbur O. Atwater's thermodynamic model that introduced the calorie to nutritional parlance, the LNHO defined a caloric minimum that in principle was applicable on a global level and allowed for the comparison of national diets in terms of their energy content.¹³⁹ Yet, it similarly introduced several qualifications that translated into a differential standard for "oriental" populations.¹⁴⁰ Reasons given for this deviation included the current low caloric intake of populations in the East as well as the agricultural basis of the countries' economies; peasants ostensibly burned less energy on the field than workers in factories.¹⁴¹ The claim that Indians needed less calories than Europeans also found supporters among Indian researchers. In his monograph *Food Planning for Four Hundred Millions* (1938), Radhakamal Mukerjee (1898–1968), professor of economics and sociology at Lucknow University, argued that the small body height of Indians, coupled with their climate-induced low metabolism, translated in less calories being burnt by Indians than by people living in Europe and the United States.¹⁴² Despite his embrace of differential caloric requirements, Mukerjee nevertheless acknowledged the general poor level of food consumption in India and recommended the improvement of diets.¹⁴³ The professor moreover stressed the impact of nutritional health on labour productivity and explained that Indian industrial workers compensated their lack of nutrient-intake with idleness and absenteeism.¹⁴⁴ In the aftermath of the Indian Industrial Commission (1916–18), the purportedly low productivity of the Indian industrial labour force moved into the focus of Indian social reformers, who emphasised the need for welfare measures to improve national efficiency.¹⁴⁵ Mukerjee noted that industrial work warrants a higher calorie-intake than agricultural work—a proposition that found wide support. Diwan Chaman Lall (1892–1973), a founding member of the All India Trade Union Congress, similarly demanded the increase of workers' food intake by

remarking with resentment that industrial workers in India were forced to live on a “famine ration”.¹⁴⁶ In *Coolie: The Story of Labour and Capital in India* (1932), Lall compared the famine codes’ regulation of food consumption to prison diets and to the food intake of factory labourers in order to reveal the poor nutritional health of India’s industrial classes.

Thus, the nutritional health of sections of Indian society who failed to fill their stomachs despite the absence of famine received greater attention during the inter-war period. Yet, while the focus on mal- and undernutrition outside the context of famines partly replaced the earlier focus on the colonial administrative responses to famines, famine continued to be an important point of reference in debates on Indian public health.

1.4 Conclusion

The assumption that it was too costly and generally in conflict with economic principles to provide famine relief on a scale that met nutritional standards and medical opinions on healthy eating undergirded the Indian famine codes—the rules and guidelines that were meant to govern the colonial famine response. The famine codes, despite their reform and revision, consistently fixed food rations and wages below standard. This was to limit expenditure and prevent people from abandoning their regular occupations in favour of state assistance. In other words, people affected by famine had to eat worse than they normally did, because a higher level of relief would ostensibly entice people to seek state assistance who could do well without.

Medical officials such as William Robert Cornish pointed out in the nineteenth century a weakness of the economic argument against the use of dietetic standards in famine relief. He argued that improving the nutrition of people in state care made economic sense, because compromised health was a major obstacle to labour productivity. Members of the SIS, themselves involved in mitigating famine, similarly tapped into nutritional studies to advocate for improved famine relief. R. Suryanarayana Rao cited studies to reveal discrepancies in the administration of food in different colonial institutions, comparing prison diets and famine rations to demonstrate the poverty of diets administered during famines. Medical and nutritional research on dietary standards had no immediate impact on the famine codes, but it gradually shaped aid practice. As John Hewett’s administration of relief in the United Provinces in 1907/8 revealed, colonial administrators, alerted by nutritionists to the inadequacy of aid, at times deviated from the famine codes and issued larger rations and higher wages than recommended. At other times, colonial famine relief remained inadequate from a nutritional perspective. Against

the background of heightened interest in the health of mothers and children, nutritional studies carried out in Madras in the 1930s investigated the impact of colonial famine relief on children. Scientists associated with the Nutrition Research Laboratories in Coonoor revealed the detrimental effect of the relief rations on the development of children in the Bellary district of Madras. Food aid was fixed at a level that did not prevent stunted growth and life-long impairment. The low standard of famine relief in Bellary was once again explained with the economic principle of famine relief, which set children's food consumption below that in normal times. Surveys noting the generally poor nutritional health of children in Bellary thus legitimised the low standard of famine relief and conveniently absolved the state of its responsibility to maintain the health of children during famines. Advocates of this "economic approach" to famine relief, including the author the nutritionist Reginald Passmore, argued that trying to significantly improve the health of children risked throwing Madras into economic jeopardy. To many Indians, on the other hand, the insufficiency of famine relief measured against nutritional standards demonstrated the failure of the colonial state to protect the most vulnerable sections of the population. For famine-stricken populations in colonial India, especially for women and children, seeking government assistance continued to be a risky survival strategy in the twentieth century. The famine codes, working with a series of simplifications and shortcuts to facilitate the administration of food, made the average working man the basis of estimated productivity and food needs. This was at the expense of the needs of women and children whose rations often remained inadequate.

Colonial administrators were still celebrating the success of the colonial system of famine management when critics of colonial rule in India reframed the debate, drawing attention to the hunger that prevailed in the country outside the context of famine. Indian social reformers identified the nutritional needs of the population at large as a pressing concern in the interwar period and broadened their own activities to address them. Indian discourses on nutritional reform and education predated the interwar period. However, nutritional studies that generated public awareness of the prevalence of maternal and infant malnutrition in India in the 1920s and 1930s accelerated the involvement of Indian organisations in nutritional reform and education. Indian nutritionists and politicians advocated a change of food habits and diets to improve the nutritional health of Indians, as well as to strengthen them physically in their political fight against colonial rule. Mirroring this shift of the debate on hunger in India that had occurred in the interwar period, famine would again take a backseat in the public debate on nutrition in the 1940s and 1950s, which was more concerned with improving the nutritional health of the population in general. The prospect and realisation of political independence at this time discouraged efforts to improve famine relief in India, since independence

supposedly removed political resistance against effective famine prevention. When India became independent in 1947, the state governments inherited the famine codes that were converted into scarcity manuals from the 1950s onwards.¹⁴⁷ Continuity outweighed the changes made to famine relief in the process. In Bombay, where the new scarcity manual replaced the state's famine code in 1954, the main difference was the abolishment of the differentiation of scarcity and famine. Whereas previously, the full mobilisation of counter-measures followed only after the declaration of famine, now scarcity sufficed to set them in motion. This change was not insignificant, but it was overshadowed by the perpetuation of the earlier focus on labour and by the retention of the wage system, which emerged as continuities from the colonial period.¹⁴⁸

The famine codes (and now scarcity manuals) received less commentary after independence, but they were not removed from the public debate. Some of the later discussions bore a strong resemblance of earlier debates, which illustrate unresolved contradictions of state-sponsored famine relief. In 1975, the economic historian Morris David Morris (1921–2011) lamented somewhat surprisingly that “up to now famine policy has been a subject which scandalously little serious attention has been paid.”¹⁴⁹ Morris penned his analysis in the aftermath of a severe drought in Maharashtra. For three consecutive years, beginning in 1970, fifty million people in Maharashtra were at risk from dwindling access to food. Through a combination of anti-famine policies, including the Public Distribution System, food-for-work programmes, and the ban of food exports from the state, the government contained the famine.¹⁵⁰ Despite the success, Morris deplored the excessive government investment in famine relief. He recommended scaling back early investments in famine protection to free up resources for development and strengthen the population's resilience to drought in the long run. Criticising hasty interventions, Morris suggested setting the administrative machinery in motion only when consumption fell “below some established level of daily calorie intake.”¹⁵¹ Minimum food requirements had been widely discussed in India for over a century by this time. Morris recommended reconsidering the application of international nutrition standards. Reminiscent of debates on differential nutritional standards in the 1930s which claimed that “oriental” people needed less food than Europeans and North Americans, Morris opined that India's historical record of starvation and chronic poverty proves that international standards were excessive for Indians. Their bodies had supposedly adapted to poor food intake.¹⁵² Echoing the economic liberalism that undergirded colonial famine relief, Morris called for a “hard calculus” to achieve a balance between humanitarian concern and economic feasibility.¹⁵³ Applying international nutrition standards during famine “would result in more being allocated to people in a scarcity area than probably is available to them when there is no drought.”¹⁵⁴ Not long after Morris's publication, the economist

David Seckler provided further support for the application of differential caloric standards. Relying solely on his own observations, he defined a subsistence wage for Indian workers that was lower than the minimum requirements stipulated by the majority of his contemporaries. He proposed the “small but healthy hypothesis” in 1980 which claimed the ability of the human body to adapt to poor food intake. In other words, Indians could live on a nutritional level below recommended international standards, because of their reduced body-height and their slow metabolism. The “small but healthy hypothesis” built on earlier demands for national rather than international nutrition standards which had emerged in the interwar period. As a hypothesis, Seckler’s claim provoked debate within the scientific community. It however lost its innocence when translated into political advice. If Indians could live on poor diets, India’s nutritional crisis was less severe than assumed and no longer needed to be a political priority.¹⁵⁵ Historicising the mobilisation of science to define needs and manage food, as attempted in this chapter, sheds light on the wide-reaching consequences of the scientific underpinnings of food aid and anti-famine policies.¹⁵⁶ Scientific arguments are easily instrumentalised by political actors to shake off responsibility, or when translated into policies, hypotheses become indisputable truth.

CHAPTER 2

Food Technology, Nutritional Science, and Indo-US Entanglements in the 1940s and 1950s

Abstract

The chapter traces the growing collaboration between Indian and American scientists, social reformers and philanthropists in the effort to meet India's food needs against the backdrop of famine in Bengal, World War II and Indian post-independence food policy. It examines South Asia as a site of knowledge production in nutrition and anchors South Asia in the global history of food aid. The chapter shows how the use of supplements, fortified and blended foods grew in importance in the 1940s and 1950s.

Keywords: Bengal Famine, food supplements, independence, US food aid

2.1 Nutritional Science and Famine in the 1940s

Food Supplements and Substitutes

Famine had not been absent in India in the early twentieth century, but the scale of starvation that shook the population of the subcontinent in the 1940s marked a return of the horror of bygone centuries (see Chapter 6 for a discussion of the Bengal famine). Marginal aid for Bengal was coming forward from Delhi and Whitehall in August 1943, when the Bengal government started to dole out cooked food in Calcutta (today's Kolkata) and to support the relief efforts of non-state agencies by allowing them to procure food supplies at a subsidised price. The general unavailability of food coupled with the illegal diversion of stocks and the adulteration of food doles in official kitchens resulted in the poor quantity and quality of the relief provided. Not only did relief start too late, it was also by no means sufficient. Indian organisations trying to aid the affected population took creative measures to compensate the shortage. In October 1943, the district branches of the AIWC in Bengal, which were amongst the first to respond to the famine and primarily aided women and children, reported on the unavailability of milk. It started using a texture that was made of soybean, barley, and shark oil to offer some nourishment.¹

In early November 1943, the *Hindustan Times*, an Indian English-language daily from Delhi with ties to the INC and a readership in the millions, published a cartoon



Fig. 1. British Food Supplements for Bengal. *The Hindustan Times* November 7, 1943.

that mocked British food aid for Bengal (figure 1).² The cartoon captured the cynicism of the British gesture of supplying multi-vitamin pills, cod liver oil and halibut capsules after turning a blind eye to the suffering in Bengal for nearly a year.³ With the British government prioritising the war effort, the Bengalis who had suffered and survived starvation had now reached a level of physical deterioration that required therapeutic feeding. Their digestive systems could no longer cope with regular food intake. The arrival of food supplements to Bengal however owed more to the preferences of governments and humanitarian organisations than to the needs of the affected population. Pills, capsules and milk powder were easy to store and transport and less bulky than other food items. This was important at a time when governments prioritised the transport of war supplies. In addition, the sending of food supplements allowed the government to appease the public in Britain, where calls for government intervention to mitigate the Bengal famine had become louder.⁴ At the time of the cartoon's publication in the *Hindustan Times*, Britain had eventually started to send substantial relief to Bengal. The newly appointed Viceroy Lord Wavell rushed food into the province in November 1943. However, the aid came too late to prevent the deaths of an estimated three to five million people.⁵

The use of food supplements to alleviate starvation during World War II built on developments of the interwar period. Nutritionists had started to emphasise the nutritional and economic advantages of milk powder in the 1920s and 1930s before it turned into a central element of famine relief efforts in India and beyond. Powdered milk was a surplus product in the dairy industries and one of the world's leading producers was the United States. The growth of the US dairy industry coincided with the revised estimate of the nutritional value of milk powder in the US. In

the interwar period, Americans regarded milk powder as a vital source of protein, calcium, phosphorous, and vitamin G.⁶ The white powder also turned into a relief item after World War I, when the American Relief Administration (ARA) used it to alleviate famine in Soviet Russia in 1921. Canned dried milk brought its nutritional benefits to distant populations and also had a strong emotional appeal. As Bertrand M. Patenaude notes in his exploration of the ARA's relief work in Russia, "of all symbols of American beneficence—corn, kasha, white bread, cocoa—it was milk and its associations with maternal nurturing that seemed to strike the deepest emotional chord."⁷ World War II intensified the use of milk powder which turned into the main ingredient in US American food aid, supplementing the diets of American troops and British citizens.⁸ In Bengal, American powdered milk was applied to counter malnutrition in late 1943 and early 1944. Donations to US American missionary societies and the Quaker American Friends Service Committee (AFSC) advanced the distribution of milk in India. The American aid organisations forwarded the white powder to the AIWC, the SIS and the Indian Red Cross Society who used the milk in their relief campaigns.⁹

The experiences of relief agencies in Bengal substantiated the suitability of milk as food aid. In India, relief workers "were struck by the improvement in under-nourished destitute children which took place when they were given milk for a few weeks."¹⁰ Further support for the food supplement was coming from the United States. A group of advocates of food aid for India assembled the India Famine Emergency Committee (IFEC) in 1946 to mobilise against the discriminatory nature of the US-led international food aid regime (see Chapter 7 for details). Apart from its political work, the IFEC contemplated the feasibility of providing material aid to India. Weighing the advantages and disadvantages of different forms of food aid against each other, it found inspiration in the work of the Cooperative for American Remittances to Europe (CARE) that was currently sending food packages to Europe.¹¹ The IFEC explored ways to launch a similar food package programme for India. While it deliberated over the content of the food parcels and debated which products to send, it sought advice from Wallace R. Aykroyd, who had then become the first nutritional expert of the FAO.¹² Aykroyd strongly recommended abandoning the idea of the food package programme altogether to concentrate instead on milk powder—a recommendation the committee eventually agreed to.¹³ The IFEC, however, did not base its final decision only on Aykroyd's insights. The purchasing agent of the AFSC, H.H. Thompson, had similarly advised the IFEC to opt for milk powder. Drawing from the AFSC's experience in Europe, Russia, China and India, he considered individual food packages inefficient in terms of costs and instead recommended appealing to Americans to donate one dollar each for ten cans of evaporated milk sent to India.¹⁴

The AFSC was not the only American aid provider sending milk powder to India. Church World Service alone shipped 80,000 pounds to India in 1946.

Indeed, milk continued to occupy a central place in the relief efforts of missionary organisations in India well into the 1950s. By 1955, the National Christian Council in India would call milk powder “one of the most effective weapons in the war against undernourishment.”¹⁵ The organisation most strongly associated with milk powder, however, was the United Nation Children’s Fund (UNICEF), which became the main purchaser of US surplus milk after 1946. UNICEF also began to engage in a milk conservation programme that sponsored the establishment of milk processing plants in various countries to boost local milk production. In 1955, UNICEF co-sponsored the establishment of a dairy plant in cooperation with a milk cooperative in Kaira (today Kheda, Gujarat), which would later become the famous Indian Amul brand.¹⁶

Starvation Science and the Medicalisation of Famine Relief

The now intensive use of milk powder to alleviate famine in and outside South Asia was only one of the changes that famine relief underwent in the 1940s. The use of food supplements and substitutes indicated a medicalisation of famine relief that favoured techno-medical solutions to starvation. In October 1943, the Nutrition Advisory Committee (NAC) of the Indian Research Fund Association (IRFA) began to criticise the insufficiency of relief rations in Bengal, pointing out that rations currently amounted to no more than 800 calories per person per day.¹⁷ This was a third of the amount the Bengal Famine Code prescribed.¹⁸ The NAC formed in 1936 to advise the Indian government on matters of nutritional reform and food supply. It was the result of growing international pressures on the British government that heightened in the aftermath of the findings of the LNHO. The NAC comprised of the Public Health Commissioner with the Government of India, the director of the Coonoor Nutrition Research Laboratories who at the time was Wallace Aykroyd, and a group of British and Indian nutritional, agricultural and economic advisors.¹⁹ The evaluation of famine relief was not part of NAC’s mandate, but in the last quarter of 1943 it began to deplore the insufficient caloric value and nutritional composition of the gruel doled out at government relief sites in Calcutta. It suggested that famine relief was to be based on “expert nutritional advice.”²⁰ Apart from deploring the size of famine relief rations, the NAC wished to learn about possible avenues of treating the most famished sufferers of famine who were at that time collected in the streets of Calcutta and admitted to hospitals. To this end, the IRFA allotted a grant of 12,000 rupees to the All-India Institute of Hygiene and Public Health in Calcutta (AIHH&PH) to finance a clinical study of the best “scientific methods of treating famished people.”²¹ The results of the clinical study were summarised in a leaflet titled *Treatment and Management of Starving Sick Destitutes*.²² It contained concrete instructions on how to treat starvation in Bengal and recommended that doctors classify famine

patients into one of four categories, and specified treatment accordingly. For patients able to consume and digest food (group one), the leaflet recommended the intake of a gruel diet. The gruel was to consist of one and a half pounds of *dal*, six pounds of cereal mixture, and two and a half pounds of vegetables, to be cooked in water and seasoned with condiments and salt. The second group included patients who were unable to digest the gruel and hence needed nourishing fluid diets. The fluids provided were fruit juices, if available, but more often consisted of flour soaked and boiled in water, and enriched with sugar, salt, yeast, and shark liver oil (this would later become known as the Bengal Famine Mixture). For patients able to digest milk (group three), nutritional advisors recommended a supply of various milk preparations such as *ghol* (a yoghurt drink), *conji* or sweetened milk diluted with water. The size of rations was to be determined by the medical staff, who wrote the sort of diet and the number of calories to be consumed on the patients' cards, which were then placed around their necks. While medical officers needed to adjust the quantity of nourishment to the patient's condition, the leaflet nevertheless provided a general estimation. Thus, a fluid diet was supposed to contain 800 calories, a milk diet 1,200 calories and a gruel diet 1,900 calories.²³ Finally, the AIIH&PH advised treating patients found in a state of collapse (group four) through nasal feeding or intravenous injections of protein hydrolysates.²⁴ Whereas the administration of special diets to patients was grounded in earlier relief practices in India, the use of intravenous injections to insert nutrients into famished bodies was altogether new. To manufacture protein hydrolysates, the AIIH&PH used an enzyme to pre-digest meat and extract protein. The Indian researchers dissolved the extracted protein in a glucose solution, so that it might be used on patients.

Indian researchers tested the use of protein injections on patients in Calcutta's emergency hospitals in November 1943.²⁵ It was the first time that researchers in India had tried protein hydrolysates in humans. Only a few months earlier, physicians in the United States had announced some success in using protein injections on patients who were otherwise unable to consume or absorb protein.²⁶ In Bengal, researchers tried the protein injections on people in a state described as inanition collapse, which referred to a loss of eighty percent of their normal weight. These patients were unconscious and unable to take even small quantities of liquid food.²⁷ The fact that a quarter of the people brought to emergency hospitals in Calcutta were in a state of inanition was proof of the severe delay and insufficiency of relief measures.²⁸ Science had become a last resort, relied upon to prevent the death of people in an apparently hopeless physical condition. The fact that these people were believed to be beyond saving also seemed to justify the use of experimental drugs. By the end of 1943, the outcome of the use of protein hydrolysates in hospitals in Calcutta looked favourable: "I think it [protein hydrolysates] pulled round some of the patients who were, according to previous experiences, considered hopeless"

reported B.N. Bhandari of the Indian Medical Corps.²⁹ After such positive evaluation, AIHH&PH recommended the use of protein injections for cases of inanition collapse throughout Bengal. It supplied medical staff in Bengal with protein hydrolysates and instructed them to document their use. In the following weeks, protein injections that were meant as a last remedy were applied far beyond their intended use. M.V. Chari served in the medical battalion of the Army in the Burma Reserve of Officers (A.B.R.O) and was delegated to work in Barisal in Bengal (today in Bangladesh) from November 1943 to January in 1944. Chari documented his use of hydrolysates on patients who were able to consume food.³⁰ One of his patients, a young girl of nine years, had been recovering on a salt free diet of rice and *dal*. Chari, however, sought to speed up her recovery by administering protein hydrolysates. The solution given to the girl however was contaminated, causing cyanosis and the quick death of the child.³¹ As Chari pointed out in hindsight, maintaining sterile conditions and storing the protein hydrolysates safely remained challenges given the poor standards of the medical facilities at hand. Injecting hydrolysates therefore meant a much greater risk than conventional methods.

Chari's clinical study furthermore illustrates the wish of medical practitioners to contribute to the scientific discourse on nutrition. The impetus on the part of medical staff and nutrition scientists to advance their knowledge on starvation during the Bengal famine can be traced in leading Indian and British medical journals, which presented a variety of nutritional experiments and clinical studies in the aftermath of the famine.³² The desire to advance the understanding of starvation is also visible in the letter of a nutritionist and physician named R.C. Bhattacharjee to Syamaprasad Mukherjee, the leader of the Hindu Mahasabha. In September 1943, the overtly ambitious graduate of the Universities of Calcutta, Leipzig and Paris approached Mukherjee for gaining access to the relief sites administered by the Hindu Mahasabha.³³ In an effort to convince Mukherjee of his plans to conduct research during the famine, he explained:

From scientific as well as from social point of view this is a unique opportunity of making such a research. Such abnormal conditions will never prevail again and such a mass of experimental human objects in such abnormal malnutrition condition will scarcely be available to a scientist.³⁴

Echoing the current trends in scientific discourse, Bhattacharjee was primarily concerned with exposing the insufficient protein intake and studying the effects of such a deficiency on the bodies of those affected by famine. He proposed to apply what were, by then, common scientific methods. These included closely monitoring people's pathology as well as chemically analysing foodstuffs before feeding and after consumption, the last through the careful collection and analysis of

excretions. The designs of the proposed experiments illustrate an important point. Nutritional studies depended on the ability of scientists to exert tight control to fulfil the demands of modern science. Such control was facilitated by the involvement of the army in famine relief in Bengal. The Indian Army Medical Corps had been deployed to attend to the crisis in mid-November after the government recognised that Bengal's medical needs outstripped the capacity of the Indian Medical Service. With the arrival of the army, military hospitals, termed Relief Emergency Hospitals, were set up in Calcutta and in rural Bengal.³⁵ Poorhouses and relief camps had already given way to experiments in the reduction of food rations and the study of diets since the mid-nineteenth century. Military hospitals further facilitated nutritional and medical studies in 1943 by enabling control.³⁶

The desire to advance knowledge on the appropriate treatment of starvation, which drove nutritionists in India to conduct research during the Bengal famine, also manifested in the United States.³⁷ Unlike in Bengal, where the clinical work of the AIIH&PH resulted from immediate and proximate needs, nutritional scientists in the United States were motivated by the needs of post-war Europe. In November 1944, the US American physiologist Ancel Keys (1904–2004) conducted a controlled human experiment at the University of Minnesota that came to be known as the Minnesota Starvation Project. The aim of the project was to refine the methods of humanitarian organisations that were about to assist in rehabilitating war-torn societies. The experiment involved thirty-six conscientious objectors, mostly Quakers, who volunteered to live on a diet of 1,800 calories while walking twenty-two miles daily over a period of six months. Keys and his colleagues monitored the men closely throughout this period to study the effects of starvation on their minds and bodies.³⁸ The men were offered psychological assistance and some of them used the initial weeks of the experiment to complete their university degrees. Though the experiment left a lasting impression on the participants, none of them suffered any permanent physical impairment. The voluntary framework chosen by Keys had been truly unique, and his ability to limit the effect of the study on participants owed much to the socio-political context in which it was conducted. The United States had been the best-fed nation during the entire war and was in a position to carefully select volunteers to starve for science and to treat them with extreme care.³⁹

Research in the US and India contributed to a body of knowledge on the treatment of starvation that shaped the aid to post-war Europe. The findings of Keys resulted in a manual for US relief personnel working in Europe. The tests carried out by the AIIH&PH led to the decision of the British Medical Research Council (MRC) to produce protein hydrolysates in Britain and their use in Europe after the war by British aid workers. Following a Dutch request, protein hydrolysates became a means to alleviate starvation in the northwest Netherlands too. It was not long after that further studies in Europe revealed the weakness of the new remedy.

A delegation of British medical officers under the lead of Janet Vaughan (1899–1993) was sent to Europe to conduct a study of protein hydrolysates as a treatment of extreme cases of inanition in early 1945. The delegation's journey coincided with the liberation of the concentration camp of Bergen-Belsen in April 1945, resulting in the diversion of the British research team which began to provide medical relief for the former inmates of the concentration camp.⁴⁰ At the outset, British nutritionists observed the use of protein hydrolysates with great elation. The euphoria was misplaced. Vaughan reported that the use of protein hydrolysates in the former concentration camp proved disastrous. The tubes and needles required to puncture veins and administer the protein infusion reminded patients of instruments of torture and murder. British medical staff approaching patients with protein injections in their hands found that their patients panicked and collapsed.⁴¹ Even patients who eventually received protein hydrolysates either recovered slowly or did not recover at all. Vaughan concluded that milk flavoured with tea or coffee was decidedly more successful in treating patients than the injections.⁴² Protein hydrolysates were not the only treatment that had travelled from Bengal to Belsen. The recipe for the fluid gruel prepared in Bengal, which came to be known as the Bengal Famine Mixture, was turned into a canned, ready-to-supply product used in Belsen.⁴³ This transfer proved to be a failure too. Unaccustomed to the taste and texture of the Bengal Famine Mixture, inmates rejected the gruel, which also caused them stomach pain and diarrhoea.⁴⁴ The problems inherent in applying an overtly technocratic approach to remedy starvation, which entailed a shift from feeding to treating patients, became apparent in Bengal and Belsen in 1944 and 1945.

2.2 Indo-US Cooperation in Food Science: The Rise and Demise of Indian Multi-Purpose Food

The Age of Food Technology

In November 1943, the *Amrita Bazar Patrika*, a leading Indian newspaper that published from Calcutta in English and Bengali and had a readership all over the country, offered its view on the interplay of food and science in India. With scathing irony, it commented on the prospect of modern science trumping people's cultural and emotional attachments to food in India and ending all sensual pleasures of eating.

The trend of modern scientific research and innovations in the common man's dietary will fill all gourmets and connoisseurs of dainty dishes with dismay. No more may he be called upon to preside over the table where heaps of caviar or *pilau* vie in attractive power with

the fragrant curry that brings water to one's mouth and fills one with an anticipatory exhilaration of spirit. No more those lovely balls of nectar called *sandesh* or that miracle of the confectioner's art, *rasgolla* (of Bagh-bazar, for preference), the soothing *dahi*, the cooling ice cream of the tonic *sherbet*. Science will have none of these, at least for usefulness in the way of nutrition.⁴⁵

Given the still disastrous food situation in Bengal at the time, the description of culinary delights seems misplaced. But the focus of the *Amrita Bazar Patrika*'s editorial was not on the current famine conditions in Bengal, but on the nutritional health of the Indian society at large. At the heart of it was an assertion that was gaining support of Indian political and social elites. "Our national diet is basically wrong", stated the author of the above lines, urging the future independent government of India to draw from science to improve Indians' "physical stamina" and "resistance to diseases."⁴⁶ Criticism of Indian diets had a longer gestation, yet they were fanned in the 1940s when the prospect of gaining independence from colonial rule increased the importance of nourishing Indian bodies to enable India to stand as a nation. In the early years of independence, food planning took precedence. Indian state planners invested in agricultural reform and encouraged a change of food habits that was aimed to scale down the consumption of scarce commodities. The Indian government strove to increase agricultural production and to balance out scarcities through the import of grain.⁴⁷ Meanwhile food science offered the prospect of changing food consumption in India and improve Indians' nutritional health through altering their food habits.

In late 1950, two months before famine conditions in Bihar and Madras forced the Prime Minister Jawaharlal Nehru to request US food aid, Nehru welcomed the official inauguration of the Central Food Technological Research Institute (CFTRI) in Mysore. Preceding this appointment, unfavourable weather conditions had led to floods in the east and droughts in the south of India. Widespread crop failure affected people in Hyderabad, Kashmir, and Uttar Pradesh, but the poor harvests hit Bihar and Madras the hardest. It was the worst food crisis since India had attained independence in 1947 and it caused political turmoil in the country as Nehru and his cabinet strove to understate the famine (see chapter 7 for details). In late 1950, India officially requested a loan from the US to purchase its food grain.⁴⁸ With the inauguration of the CFTRI, Nehru, in the meantime, had tasked India's leading researchers to provide another solution to India's pressing food problem.⁴⁹

The formation of the CFTRI, housed in the former residency of a member of the Mysore royal family on a 130-acre property, points to the role that food science and technology was expected to assume in national food planning. While in the first decade of independence agricultural experts laid out plans to raise harvest yields and politicians strove to increase food imports, Indian biochemists and food

technologists were asked to improve the shelf-life of food products, identify new and unfamiliar food materials, and invent food supplements and food substitutes that balanced out dietary deficiencies.⁵⁰ The first director of the CFTRI, Vaidyanatha Subrahmanyam (1902–79), had received his training in biochemistry in India and Britain. He had set up a food technology section in the Department of Biochemistry at the Indian Institute of Science (IISc) in Bangalore in 1942.⁵¹ The small group of scientists of the food technology section initially catered for military needs. This paralleled similar processes in the US, where concerns over the nutritional content and appeal of army rations drove innovations in food technology. Towards the end of the war, however, a grant from the Indian Council of Medical Research allowed Subrahmanyam to tailor his research to the needs of the civilian population. He became invested in the development of soy-milk that was modelled after a Chinese prototype and intended to remedy protein-malnutrition in children and mothers. Since soy was not grown in India, his experiments soon concentrated on replacing the former with other ingredients such as coconut, sesame, cottonseed, and groundnut.⁵² His research was clearly in consonance with international nutritional research which gave priority to protein in those years. Adding protein to Indian meals became part of dietary reform plans that in particular targeted Indian “rice eaters”. Whether Indians in general, and “rice eaters” in particular, were capable of adjusting diets was heatedly debated. In the colonial period, the assumption that Indians were unwilling to alter their diets contributed to the reproduction of stereotypes that depicted Indian culture and society as static. In the early years of independence, the deep-seated belief that “rice eaters” could hardly be accustomed to alternative foods undergirded experiments of Indian researchers with artificial rice products. Researchers were convinced that products that resembled rice would gain easier acceptance among “rice eaters” than other grains.⁵³ As part of this broader research agenda, India’s food technologists tested a formula, called Multi-Purpose Food (MPF) which was advocated in India by a US non-profit called Meals for Millions (MFM).

Meals for Millions and the Development of Multi-Purpose Food in the United States

In mid-1946, Indian nationalist and New York-based entrepreneur JJ Singh (1897–1976) received a letter from “an American young man” who offered to share “American knowledge” on fortified and blended food with the Indian people.⁵⁴ The letter was accompanied by wrapping papers to show the wide selection of products available, and the advice that the IFEC, currently at work to mobilise political opinion in favour of America food aid for India, “send many tons of the powdered food and candy bars to the starving people of India.”⁵⁵ Boosted by the need to improve army rations, research on effective meals converged with an increasing confidence

in science and technology to try to solve what was understood to be a world-wide nutritional crisis. After the war, fortified and blended foods started to alter food consumption habits in the United States and beyond, also influencing the choice of food aid products.⁵⁶ This was at a time when the new confidence in science and technology drove the invention of new tools and technologies used in later development work.⁵⁷ It is therefore not surprising that, as the IFEC contemplated sending food aid to India, the organisation received offers and product samples from food companies that sought to advertise their solutions to India's nutritional crisis. The "American young man" who had written to Singh, however, was unaware that Indian institutes already conducted research on food supplements and substitutes and applied them across India. Meanwhile, Henry Borsook (1897–1984), Professor of Biochemistry at Caltech, was convinced that food science and technology could assist in feeding the world's hungry through transforming conventional food in new and more effective products.⁵⁸ Borsook invented the soy-based high protein food supplement that came to be known as MPF in 1945. The idea that undergirded the invention of MPF, however, had a longer gestation. Research on MPF was instigated by the restaurateur and do-gooder Clifford Clinton (1900–69) who had approached Borsook in 1944 with the proposal to develop a protein food supplement that was cheap, easy to transport and to store and with ingredients readily in supply in the US.⁵⁹ Clinton had been interested in the design of effective meals since the 1930s. His experience of the social consequences of the Great Depression had led him to open his first canteen in downtown LA which served meals at low cost but high in nutrition value and offered its customers to pay as much as they wanted or could. Clinton's experiments in composing efficient meals continued as he opened further restaurants over the next decade. His understanding of the demand for protein considerably deepened during the last years of World War II when meat was increasingly unavailable for private consumption in the US, and Clinton searched for protein alternatives that would guarantee his customers a steady supply of the vital nutrient. He also joined a group of restaurateurs who consulted with the government regarding the nutritional content and taste of army rations. This brought him in touch with Borsook.⁶⁰

Clinton began advertising MPF in 1945. He adopted the slogan "3 cents buys a meal" arguing that two ounces of MPF (56 grams) compared to "a quarter pound of beef, a baked potato, a side dish of peas and a glass of milk."⁶¹ MPF was sporadically distributed in the US in the following years and was, amidst others, used to improve the diets of Native American Navajo.⁶² Clinton nevertheless envisioned MPF to create the greatest impact outside the US. Borsook and Clinton made the MPF formula available to researchers in other countries, hoping they would encourage the development of similar food products. In the meantime, they promoted MPF as a food relief item to be applied in Europe and beyond. Although MPF spoke to the

nutritional and logistical demands of North American relief agencies, they showed little interest in the product. Humanitarian organisations could buy milk powder at subsidised rates or even receive it free of charge from the US government. Hence, they had little incentive to purchase the still unknown and untested MPF. Not even Borsook's claim that MPF contained a higher dose of vitamins and proteins than powdered milk convinced relief agencies to buy the supplement.⁶³ The reluctance of the American aid sector threatened to end Clinton's bold initiative abruptly. At this time, a meeting with Pearl S. Buck (1892–1973) and her assistant Florence Rose (1903–69) opened up new opportunities. Convinced that MPF could assist in relieving hunger and malnutrition in what came to be understood as the “Third World” in the post-war era, the two women assisted Clinton and assumed a pivotal role in attracting relief providers and sponsors.⁶⁴

Multi-Purpose Food for India

Pearl S. Buck is well-known for her work as a women's rights activist, her support of Indian nationalism and of the American civil rights movement.⁶⁵ She also became an advocate of US American food aid for Asia during World War II, organising private relief for civilians in China and India. Buck publicly embraced Clinton's plan to apply MPF to combat global hunger against the background of her philanthropic work. But it was Florence Rose who worked full-time to put Clinton's plan into practice. Clinton founded the non-profit MFM in 1946 in order to promote the food supplement in the face of the lack of interest from North American relief agencies and Rose joined him as the organisation's secretary. Drawing from Clinton's church and missionary contacts, MFM swiftly began sending the product directly to relief workers in Europe, the Middle East, and Asia.⁶⁶ While American missionaries applied MPF sporadically in India, MFM won further supporters of the food product in the United States. The personal channels available for the dissemination of MPF in India were thus constantly expanded. John Haynes Holmes (1879–1964), a well-known pacifist and Gandhi disciple (and member of MFM) personally introduced MPF to the Mahatma in early 1948, who acknowledged the potential of the product. After Gandhi's murder, his son, Devdas Gandhi distributed MPF in accordance with his father's wishes to Indian research institutions.⁶⁷ Two years later, the physician, educator, and then Chief Minister of Bengal, B.C. Roy (1882–1962), visited MFM in LA, expressing a wish to use the food supplement in India. Following his visit, MPF became part of feeding programmes in Bengal.⁶⁸

While Indian politicians and social reformers had already shown sporadic interest in MPF in the early years of independence, it was the famine in Bihar and Madras in 1950 that gave a considerable boost to the food supplement in India. Seizing the opportunity that famine provided to advertise MPF in India,

MFM assembled the United Emergency Committee on Famine Relief for India (henceforth United Emergency Committee) in January 1951. The United Emergency Committee collected donations in North America to send MPF and CARE packages to relief agencies in the subcontinent. From June onwards, its work was facilitated by the India Emergency Food Aid Act which granted India a loan to purchase North American grains after lengthy negotiations over the conditions of this aid. It also eased the work of American relief agencies in India.⁶⁹ While India guaranteed a duty free entry of relief goods and paid the cost of inland transportation, the US government granted free ocean transportation to organisations registered with the Advisory Committee on Voluntary Foreign Aid. The American Red Cross (ARC) and CARE had already started to use monetary donations to buy “direly needed high protein content foods” like dried eggs, powdered milk, and dried beans from the government owned Commodity Credit Corporation and, under the agreement, now received milk powder free of charge from the US Department of Agriculture.⁷⁰ Therefore, in 1951, American voluntary organisations including the AFSC, CARE, Church World Service, and ARC shipped tons of wheat, milk powder, multi-vitamin tablets to India. In addition, aid shipments entailed a remarkable quantity of MPF: 4.6 tons of the food supplement reached India through registered voluntary agencies in 1951—an amount doubled by direct shipments of the United Emergency Committee.⁷¹ Apart from promoting the use of its own in-house product, the United Emergency Committee worked closely with CARE. It offered Americans the option to earmark their donations for CARE food packages, plough packages, cotton packages, or hand tool packages (which comprised of pitchforks, mattocks, weeding hoes and spades). This was the first time that CARE offered non-food aid to equip farmers with the adequate means to increase their harvests. The sending of the first “CARE plow” to India in 1951 had important historical precursors in the use of tools and technologies by American missionaries in the early twentieth century. However, CARE’s response to the famine in Bihar and Madras marked the beginning of the organisation’s experiments with manufacturing and providing ploughs. Based on the experience gathered in India, it began to provide ploughs in Latin America, Korea, and Greece.⁷²

By the end of the famine of 1951, the United Emergency Committee listed twenty-six institutions in India that applied tons of MPF in their emergency feeding programmes.⁷³ Moreover, it had aroused the interest of the Indian Ministry of Agriculture and Food which distributed MPF in famine-afflicted areas of Madras and Bihar.⁷⁴ Once the famine had ended and the United Emergency Committee disassembled, its members continued to promote MPF, now envisioning the wider application of the food supplement in India. In compliance with the mission of MFM, they promoted research on MPF, hoping that a locally produced protein-food supplement would soon help improve the diets of children and mothers from

India's low-income classes. As a leading member of the National Council for Child Welfare and the AIWC, Dhanvanthi Rama Rau (1893–1987) was pivotal in the process.⁷⁵ She visited MFM in Los Angeles in 1953 to acknowledge the donation of 10,000 pounds of MPF to the AIWC that benefited the rural health and nutrition programme of the women's organisation.⁷⁶ In early June 1955, Rama Rau convened a meeting between Rose and representatives of the Indian government, the Indian Red Cross Society, the Rockefeller Foundation, the relief committee of the National Christian Council, CARE and delegates of the regional offices of the FAO in New Delhi. The creation of the non-profit Meals for Millions India (MFM India) was announced during the meeting and, given that research on Indian MPF had significantly advanced in the meantime, the organisation began advertising the food supplement in the country.

Making Multi-Purpose Food Indian

The first laboratory experiments carried out to invent Indian MPF followed current general trends of food science in India and hence initially envisioned Indian MPF to become an artificial rice product. In 1952–53, the biochemist R. Rajagopalan at the IISc experimented with a blend of peanut, sesame, wheat, and tapioca flour that was partially gelatinised, pressed into vermicelli, and finally broken to resemble rice. His experiments showed that the Indian version compared unfavourably to the “American” MPF formula, and further experiments needed to be conducted.⁷⁷ The formula that eventually came to be known as Indian MPF was developed three years later at the CFTRI. It was a blend of peanut (groundnut) and chickpea flour that was fortified with minerals and vitamins. Researchers of the CFTRI had adopted the idea of using MPF as a dietary supplement that could be added to meals and therefore did not require a change of food habits. Whereas chemical analysis of Indian MPF showed that the new formula was identical to the American counterpart in terms of its nutritional value, its ability to treat protein-malnutrition still had to be scientifically validated. A series of feeding trials and experiments were carried out in the following years and the results were published in Indian and international scientific journals.⁷⁸ According to Subrahmanyam and his colleagues at the CFTRI, the tests were successful. The experiments proved that Indian MPF benefited the health of children, who recovered faster from diseases, grew steadily and gained weight.⁷⁹ Later trials carried out in paediatric wards of hospitals and in schools further fed into the process of establishing MPF as a suitable remedy against infant protein-malnutrition in India.⁸⁰

While researchers were still studying the health benefit of the food supplement, MFM India strove to popularise MPF by identifying suitable channels of distribution and by educating consumers on how to apply the product. The daily ration of

approximately ten teaspoons of the MPF powder could be simply stirred in water and eaten straight to derive the intended health benefits. However, researchers believed that promoting MPF as an ingredient for daily use in Indian cooking routines would enhance its acceptance. The CFTRI consulted housewives to learn whether the product met their demands and the findings proved encouraging. Tests revealed that MPF could be added to *dal*, curries, vegetables, porridge and chutneys without affecting the taste. MPF also raised the nutritious content of Indian sweet dishes, such as *chikki*, *kal kal*, *seviya* and *barfi* and when ten to fifteen percent of the food supplement was added to the dough of *chapatis* while kneading, the food supplement even improved the consistency of the bread.⁸¹ To promote such usage of MPF, the CFTRI published a series of recipes and organised public cooking demonstrations. The first exhibition of MPF took place at the Lady Irwin College in 1956, a well-known institution of women's education and home economics, which had been running education programmes in nutrition and diets for over a decade.⁸² The choice of the institution suggests that MFM India advertised MPF among the middle-class—a strategy that might be explained through the institution's trust in the “trickle-down effect.” Protein food supplements in and outside of India were often stigmatised as “poor people's food” (or in the case of MPF “cattle feed”).⁸³ To counter such stigmatisation, members of the middle-classes were encouraged to consume the food product, thereby contributing to the acceptance of the food among low-income classes. This, however, rarely worked out as intended.⁸⁴ Thus, MFM India used other distribution channels as well. With the support of the central and state governments, public medical and health departments distributed MPF to hospitals, maternity and child welfare centres, community development projects and school lunch programmes where it benefitted small children as well as expectant and breast-feeding mothers directly.⁸⁵ MFM India considered government support as crucial. The Indian Minister of Agriculture Panjabrao Deshmukh (1952–1962) was president of MFM India and lobbied within the government to make MPF a part of India's national food plans.⁸⁶ To win the additional support of high-ranking politicians, MFM India also sent out MPF to Indian members of parliament followed by a demonstration of the food supplement at Rashtrapati Bhavan, the presidential residence, in 1956. The demonstration aroused the interest of Nehru who also agreed to sponsor the production of Nutro Biscuits (another MPF-related invention of the CFTRI) for their application in flood and famine-affected areas.⁸⁷ MFM in Los Angeles also gave crucial support for the production of Indian MPF through purchasing the food supplement and encouraging US relief agencies to do the same.⁸⁸ The presidents of both MFM foundations, Clinton and Deshmukh, approached Nehru again jointly in 1957, in the hope of obtaining permanent government support for the expansion of MPF production in India which until then had been limited to the capacity of a pilot plant.⁸⁹ Nehru allegedly testified his interest in MPF during the meeting. His

statement “This is what India needs, this is what India wants; but we must do it in our own way” even made it into a promotional film that MFM showed to international audiences in 1962.⁹⁰ From 1958 onwards annual government grants allowed MFM India to distribute MPF to charitable organisations concerned with the health of mothers and children. In addition, charitable institutions now purchased the food supplement directly and regularly from the CFTRI. Beginning with the second grant of 1959–60, the distribution of MPF was further expanded. Apart from family planning clinics and pre-schools, the food supplement was now also applied in industrial canteens, collieries, labour colonies and the defence services to enhance labour productivity. Previously, tests of the generic MPF formula in Latin America had shown that the food supplement increased the productivity of labourers by ten percent, which seemingly fuelled the imagination of Indian national planners and industrialists in making the ideal productive citizen.⁹¹

While the demand for MPF in India was growing, increasing its production was a lengthy undertaking which suffered from frequent setbacks. The need for keeping the prize of Indian MPF low was a major difficulty. Moreover, negotiations with state governments were time consuming. When Subrahmanyam retired as the director of the CFTRI in 1963, the future of Indian MPF was still uncertain. Subrahmanyam hoped that Indian companies would start producing, distributing, and marketing MPF to save the food supplement from falling into oblivion. Such a private partnership had proven successful in the case of Nutro Biscuits. After the private biscuit company Britannia took over its production and marketing, the food product became increasingly popular.⁹² However, before MPF could follow a similar path, the decision of the US government to make US produced Corn-Soy-Milk (CSM) a part of its food aid agreement with India in 1966 discouraged any future investments in MPF. Against the backdrop of emerging famine conditions in Bihar in 1966–67, the US government donated large amounts of CSM to relief agencies in India, thereby discouraging the latter from purchasing Indian MPF. In addition, the US Agency for International Development (USAID) sent two of its nutritional experts, Nevin S. Scrimshaw and Alan Berg, to India to oversee the development of a “local” formula of CSM. The outcome of what indeed were collaborative efforts of Scrimshaw, Berg and Indian researchers of the CFTRI was a mixture that came to be known as Balahar. Whereas MPF was made out of Indian staple foods, seventy percent of Balahar consisted of US cereals, whose import was covered by the Indo-US food aid agreement.⁹³ In light of such investments, the still unstable financial support of MPF dried up completely. While it was still applied alongside Balahar and CSM in Bihar in 1966–67, its production ceased in the famine’s aftermath.⁹⁴

Although interest in Indian MPF dropped sharply in the late 1960s, MFM in Los Angeles still advertised the MPF formula as a solution to the world’s “protein crisis”.

Indian researchers had been the first to mould the generic MPF formula into a local product which rendered Indian MPF an important test case for proponents of the formula. The “Indian pattern”, a summary of all major steps in the production and popularisation process in India, was used as a blueprint to introduce MPF in other countries.⁹⁵ Even more important than the development of an altered formula were the comprehensive scientific studies that had been carried out in India to scrutinise the claims made by the inventors.⁹⁶ The publication of findings assured that Indian research on MPF contributed to a global body of knowledge on protein food supplements that undergirded the invention of later products in India and beyond. In addition, alongside the promotion of Indian MPF in India itself, Indian researchers and politicians had begun to promote the food supplement as a means against protein-malnutrition in the global south and assist other countries in developing similar products.⁹⁷ Deshmukh used the occasion of the World Agricultural Fair in Delhi in 1959 to introduce Indian MPF to an international audience and subsequently small portions of the food supplement were sent to Asian and African countries.⁹⁸

2.3 Conclusion

In 1961, two years prior to his retirement as director of the CFTRI, Subrahmanyam wrote a letter to MFM in LA in which he strongly opposed the description of Indian MPF as “a copy” of the American formula.⁹⁹ MFM was quick to apologise for its rhetorical lapse and promised to stop referring to “original” and “copied” MPF formulas. The carelessness that undergirded the use of such labels in 1961, however, reverberates in the literature on post-war development in South Asia. Whereas the former brushes away decades of research on soy and groundnut that had predated the arrival of the generic MPF formula in India and the work of Indian researchers in inventing, testing and applying Indian MPF, the latter readily assumes US dominance over the production of knowledge and the means applied in development planning in India. Both characterisations miss the complexity of the processes that undergirded the production of development knowledge and the multi-directional entanglements it entailed. In the 1940s and 1950s, the desire to improve Indian nutrition within and outside the context of famine intensified the collaboration between Indian and US scientists, philanthropists, politicians and social reformers. Previous collaboration between Indian anticolonial activists and American anti-imperialists in the United States (detailed in chapter 5 of the book) provided the organisational structures for this collaborative endeavour that now stressed the importance of US food aid and scientific cooperation to boost India’s national development. After the rise and demise of Indian MPF in India itself, the food supplement continued to inspire nutritional remedies outside South Asia. In

1963, Subrahmanyam proudly referred to the assistance the CFTRI had rendered to other countries “in the Eastern region, but also in Africa and in the Caribbean in their production programmes”, further claiming that Indian research on MPF “became a model for other countries to follow.”¹⁰⁰ In the same year, Subrahmanyam assumed his new post in Manila, where he assisted in the establishment of the food technology laboratory at the National Institute of Science and Technology as advisor to the FAO.¹⁰¹ The history of Indian MPF thus continued outside the subcontinent and illustrates the role of India as a site in the production of knowledge of food and nutrition and concrete technologies that continued to shape development practice in the decades that followed. Yet, the rise of protein food products of which MPF was an early and important example, had a doubtful effect on the reduction of mal- and undernutrition worldwide. Doubts about the usefulness of protein food supplements in mitigating malnutrition accumulated in the 1970s. Studies revealed that protein products remained unpopular among those they intended to nourish.¹⁰² They also seldom produced significant health benefits if consumed outside of institutional feeding programmes. Diets that lacked protein were commonly also deficient in calories and the insufficient intake of energy impeded the absorption of added protein. In other words, when people failed to fill their stomachs, the consumption of ready-made packaged protein bars, biscuits and powders seldom saved them from starvation.¹⁰³ Lastly, the focus on food supplements diverted resources and attention away from the structural causes of malnutrition—above all people’s poverty.

Considering the longer history of famine relief and its relationship with nutrition science, the use of food supplements and substitutes to alleviate famine in India in the 1940s and 1950s might suggest a reassessment of this relationship. But famine relief continued to be out of sync with the nutritional needs of the population as political and economic pressures determined the timeliness and scope of relief. The logistical demands of warring nations and humanitarian organisations rendered milk powder, protein supplements, vitamin pills and halibut oil capsules preferred aid items during World War II. They consumed considerably less shipping space than bulky food items, such as grain. The popularity of food supplements and substitutes was also conditioned by a new trust in scientific and increasingly technocratic solutions to hunger. The aid that reached the starving population of Bengal belatedly in 1943 and 1944 illustrate this development. When the scope of suffering inflicted on Bengal became visible to a larger public outside the province only in August and September, demands for the use of all scientific means available to mitigate starvation emerged in India. Whereas substantial relief reached the province only slowly, the intravenous application of protein-hydrolysates was tested on those believed to be already lost. The new technique might have helped some patients in the hospitals of Calcutta where the procedure was

used to rescue those suffering extreme body wastage. But as it was applied without sufficient supervision throughout Bengal, and later misappropriated to assist the recovery of Holocaust survivors in Bergen-Belsen, it produced harrowing results. This is another example of the malleability of scientific arguments, able to be geared conveniently to match political and economic demands.

