



## CHAPTER 13

# Reaching New Heights

## 20 Years of Nutrition Progress in Nepal

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DESPITE SIGNIFICANT ECONOMIC growth, South Asia remains notorious for its alarmingly high rates of undernutrition. This “Asian enigma” has long puzzled both researchers and policy makers. However, Nepal’s recent experience presents yet another enigma: a rapid reduction in maternal and child undernutrition during a period of civil war and prolonged political and economic instability. From 1996 to 2011, the prevalence of stunting among children under two years of age fell from 48 to 27 percent, and the prevalence of maternal underweight decreased from 28 to 20 percent.<sup>1</sup>

How did such remarkable improvements take place and how can Nepal sustain this impressive progress? Answering these questions is challenging because many factors influence nutritional well-being and these various determinants interact in complex ways.<sup>2</sup> Globally, multistakeholder, multisectoral platforms are being recommended to address nutritional challenges, precisely because the underlying determinants relate to a wide range of social and economic sectors.<sup>3</sup> Nepal’s success in reducing undernutrition may shed light on which

sectors require prioritization and coordination and on how to address undernutrition in remote and poor rural settings.

### Trends in Nutrition Outcomes, Feeding Practices, and Underlying Determinants

Nepal’s progress in reducing child stunting<sup>4</sup> and maternal undernutrition<sup>5</sup> is remarkable. Indeed, the rate of reduction of child stunting in Nepal from 1996 to 2011 has been one of the fastest in the world ([Table 13.1](#)). However, despite rapid progress, millions of Nepalese remain undernourished: more than one out of four children under two years of age are stunted and one out of five mothers are underweight.

Understanding Nepal’s progress in reducing maternal and child undernutrition requires close examination of both nutrition-specific factors (such as infant and young child feeding practices) and nutrition-sensitive factors (including wealth and education; access to healthcare; and water,

**TABLE 13.1** Maternal and child undernutrition in Nepal, 1996–2011 (%)

Year	Maternal underweight <sup>a</sup>	Child stunting <sup>b</sup> (ages 0–60 months)	Child wasting <sup>c</sup> (ages 0–24 months)
1996	27.6	47.8	15.5
2001	26.0	41.1	11.7
2006	25.9	34.0	12.9
2011	20.3	27.0	11.3
Annual % change	–1.8	–2.9	–1.8

**Source:** Authors' estimates from the 1996 and 2011 rounds of the *Nepal Demographic and Health Survey* (DHS).

**Notes:** <sup>a</sup> Maternal underweight is defined as a body mass index (BMI) < 18.5; <sup>b</sup> Stunting is defined as a height-for-age Z-score (HAZ) < –2.0 SD from the median of the reference population, based on the 2006 World Health Organization growth standards; <sup>c</sup> Wasting is defined as a weight-for-height Z-score (WHZ) < –2.0 SD from the median of the reference population, based on the 2006 World Health Organization growth standards.

sanitation, and hygiene facilities), as well as the broader political-economic context.

Infant and young child feeding (IYCF) practices are very poor in Nepal and have remained largely unchanged over time. Between 2001 and 2011, Nepal saw no improvement in rates of exclusive breastfeeding—about 80 percent—among children 0 to 6 months of age. Complementary feeding should occur from about age 6 months to 24 months, as children transition from breastfeeding to family foods, but in Nepal only about 60 percent of children 6 to 8 months of age eat solid or semisolid foods. Less than 20 percent of children 6 to 24 months of age consume foods from at least four of seven globally recommended food groups. The only IYCF indicator to improve was minimum meal frequency, defined as the appropriate number of feedings given the child's age and whether he or she is breastfeeding.<sup>6</sup> Progress in minimum meal frequency likely reflects increased household socioeconomic status and food security.

For nutrition-sensitive determinants, a range of indicators are relevant ([Table 13.2](#)), but health care, demographic factors, household asset ownership, parental education, and water, sanitation, and hygiene (WASH) may be particularly important for nutrition. Between 1996 and 2011, the Nepalese experienced large improvements in access to and

use of health and sanitation services. For example, hospital deliveries increased from 9 to 41 percent, and toilet use increased from 18 to 52 percent. There were also sizable reductions in fertility rates (as proxied by average birth order) and increases in birth spacing, which could be a result of family planning programs, increased wealth and education, or increased overseas emigration—usually of male members of the household—which generates remittances and tends to increase households' access to cash. Asset ownership and parental education, particularly among women, also rose rapidly ([Table 13.2](#)). These two factors could influence nutrition through multiple channels, such as by raising food and nonfood expenditures relevant to nutrition and empowering women, which can improve the nutritional well-being of both mothers and their children.

## A Statistical Exploration of the Drivers of Nutritional Change over Time

Many factors that underlie good nutrition have improved in Nepal in recent decades, but it is not immediately clear which ones actually made significant contributions to improving the country's maternal and child nutrition indicators. To help shed light on this question, we analyzed statistics

**TABLE 13.2** Trends in underlying drivers of nutritional change in Nepal, 1996–2011

Driver	1996	2011	Annual change (%)
Toilet use (%)	18.2	51.6	12.2
Four or more antenatal care visits (%)	6.3	29.6	24.7
Maternal empowerment (%)	9.6	19.9	7.2
Maternal education (years)	1.2	3.9	15.0
Iron supplements during pregnancy (%)	11.6	82.3	40.6
Paternal education (years)	4.0	5.7	2.8
Household asset ownership (1–10)	1.5	4.9	15.1
Child born in health institution (%)	8.6	41.1	25.2
Child fully vaccinated (%)	25.9	51.2	6.5
Water source: piped (%)	30.0	37.1	1.6
Water source: tubewell (%)	32.7	43.7	2.2
Maternal height (centimeters)	150.5	151.1	0.0
Birth order of child	3.3	2.5	–1.6
Birth interval (years)	3.9	4.6	1.2

**Source:** Authors' estimates from the 1996 and 2011 rounds of the *Nepal Demographic and Health Survey* (DHS).

**Note:** Asset ownership: 10-component index including electricity access and ownership of radios, TVs, and bicycles; maternal education: years of formal schooling; paternal education: years of formal schooling; antenatal care visits: dummy if mother had four or more check-ups during pregnancy; iron supplements: dummy if mother received iron supplements during pregnancy; health institution: hospital, medical clinic, or health post; birth order: ranking of child's birth order, with a first-born child equal to one; birth interval: time between birth of present child and last-born child; tubewell water: dummy if household drinking water sourced from tubewell; piped water: dummy if household drinking water from a piped source; maternal empowerment: equal weighted index of mother's involvement in three decisions (on her own health, on major household purchases, and on visiting relatives).

from the *Nepal Demographic and Health Survey* (DHS) datasets to see which changes in underlying factors were associated with which improvements in nutritional indicators ([Figure 13.1](#)). An underlying factor could possibly explain nutritional change if it has significant and large associations with nutrition outcomes and if it has changed rapidly over time ([Table 13.2](#)).<sup>7</sup> The results in [Figure 13.1](#) should not be interpreted in a strictly causal sense, however; rather, they are estimated contributions based on how well different factors statistically correspond with changes in nutrition over time.

The most important factor associated with improvements in child growth was increased access to health services (antenatal and neonatal care), but household asset accumulation and parental education—mostly maternal education—were also important correlates of child growth.

Unsurprisingly, maternal height—a slow-moving intergenerational driver—seems to have played only a modest role in improving child height-for-age Z-score (HAZ). Interestingly, though, a large share of the improvement in HAZ between 1996 to 2011 was not explained by the statistical model, possibly because the model did not include certain factors, such as climate shocks, agricultural production, and food security, and access to nutrition-specific programs.

For improvements in child and maternal weight gain, better sanitation appears to have been the most important factor, suggesting that increased toilet access may have led to large declines in maternal and child infections. Increased access to health services (antenatal and neonatal care) was also significantly associated with the improvements in maternal BMI and child weight-for-height Z-score

(WHZ), and household asset accumulation and education played roles as well. In contrast, increased access to piped water seems to have played only a small role. It is important to note that the WHZ model overpredicts nutritional change (that is, estimated changes in WHZ were larger than actual changes between 1996 and 2011), though the model of maternal BMI explains total BMI change quite accurately.

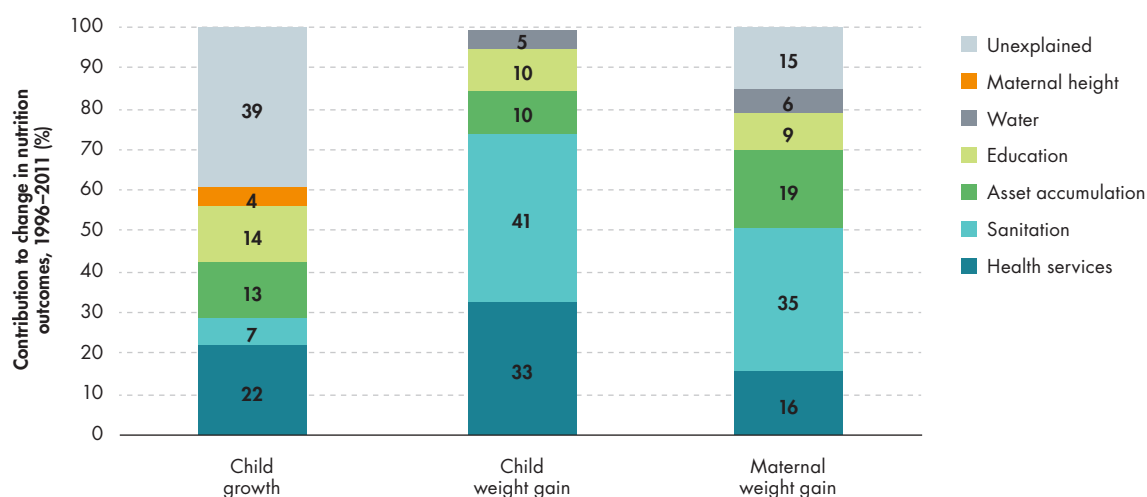
### Community Perspectives on Changes in Nutrition and Underlying Determinants over Time

Qualitative interviews of 20 mothers complemented the quantitative findings, giving mothers' perspectives on both nutrition-specific and nutrition-sensitive changes in their communities during roughly the same time period. The women

interviewed were selected from two *terai* districts—Rupandehi and Chitwan—and were known to have given birth in one of five five-year periods: 1990–1995, 1995–2000, 2000–2005, 2005–2010, and 2010–2015.<sup>8</sup>

All mothers reported that they had breastfed their babies; their perceptions of their own milk supply determined how long they engaged in both exclusive and predominant breastfeeding. Most mothers reported that they had not introduced most complementary foods to their children at age six months, indicating a general late introduction. Many mothers reported having received antenatal care checkups at a health facility, though this was much more common among mothers who had given birth recently. Similarly, mothers who had given birth more recently reported taking iron supplements during pregnancy and delivering at a health facility. Even some mothers who

**FIGURE 13.1** Underlying factors' estimated contributions to improvements in child growth, child weight gain, and maternal weight gain in Nepal



**Source:** Authors' estimates from the 1996 and 2011 rounds of the *Nepal Demographic and Health Survey* (DHS).

**Note:** Child growth is based on height-for-age Z-scores (HAZ) for children 0 to 2 years; child weight gain is based on weight-for-height Z-scores (WHZ) for children 0 to 2 years; maternal weight gain is based on body mass index (BMI). The statistics in the figure report the share of total nutritional change estimated by the decomposition model for 1996–2011. The decomposition model is a simple decomposition at means, where the change in each nutrition outcome due to an explanatory variable is the change in means of that variable over the period 1996–2011, multiplied by its regression model coefficient for a pooled model covering all four *Nepal Demographic and Health Survey* (DHS) rounds over 1996–2011.

had previously delivered at home gave birth to their youngest child at a health facility.

In terms of wider community development changes in areas known to have potential contributions to nutrition, mothers noted improvements in housing, income, education, and availability of improved water sources, toilets, and contraception. Mothers noted that houses now tend to be larger and constructed with more permanent roof and wall materials. Most mothers stated that their husbands or sons had left Nepal to work in India, Malaysia, and the Middle East and reported migration-related household income growth, though the positive economic benefits of migration were not universal. Younger mothers were more educated than older ones, and all mothers spoke about sending their children, including daughters, to school. Many mothers stated that they now had a toilet at home and mentioned improvements in access to clean drinking water. Mothers who gave birth recently had one or two children, whereas those who gave birth before 2010 had up to five children. Some mothers talked about the increasing availability and use of permanent contraception over time.

The qualitative interviews thus tended to confirm quantitative findings and shed light on mothers' perspectives, including how and why there had been progress, or a lack thereof, in certain areas. For example, mothers noted limited improvement in infant and young child feeding practices despite many other positive changes, including improvements in access to and use of health services and overall community development.

## The Role of Policies, Programs, and Socioeconomic Changes

Nutritional improvements have been driven by economic and social changes, and many of these changes are likely associated with increased public



K. Das Shrestha

*Better sanitation, including access to latrines like this one, may have led to large declines in infections in mothers and children in Nepal.*

investments, better provision of public services, and an increasing role for NGOs in public service delivery.

Greater access to and use of health services, including antenatal care and hospital delivery, are leading factors associated with reductions in undernutrition, and consistent with the results of other child nutrition studies in Nepal.<sup>9</sup> This progress stems from several factors. First, public spending on health, as a percentage of total public spending in Nepal, rose from about 4 percent in 1988–1992 to 7 percent in 2001–2006.<sup>10</sup> Second, Nepal increasingly decentralized its health services and made a sustained effort to improve people's access to basic health services across the country. Instrumental in this effort was Nepal's expansion of healthcare institutions, including primary healthcare centers and female community health volunteers (FCHVs) working at the sub-village, or ward, level. Since the 1990s, Nepal has increased the number of FCHVs working in rural villages



and extended the range of goods and services they provide. These volunteers not only distribute vitamin A but also treat child illness, offer family planning, care for pregnant women and newborns, and serve as the first point of referral to health facilities in cases of severe health complications.<sup>11</sup> In 2005 Nepal introduced the Safe Delivery Incentive Program, which provides cash to women giving birth in a health clinic and provides incentives to health workers to attend deliveries.<sup>12</sup> An evaluation showed that this program increased delivery with a skilled attendant by 17 percent if mothers were aware of the program before childbirth.<sup>13</sup> These health initiatives were specifically designed to overcome the widespread problem of physical isolation in Nepal, as well as the cultural barriers that women face in gaining access to health services, especially during pregnancy.

Micronutrient deficiencies in the Nepalese population have long been a major concern. Although the Ministry of Health and Population has included iron and folic acid supplementation for pregnant and lactating women as part of antenatal care since 1998, coverage has been limited. In 2003 the Intensification of the Maternal and Neonatal Micronutrient Program improved coverage by using health workers and FCHVs to distribute iron and folic acid in communities.<sup>14</sup> As a result, coverage of iron and folic acid supplementation rose from 12 percent in 1996 to 82 percent in 2011. This maternal iron supplementation has been found to be important for child nutrition: in Nepal, iron and folic acid supplements and antenatal care contribute to preventing low birth weight.<sup>15</sup>

Although Nepal has made only limited improvements in supplying households with improved



K. Das Shrestha

*Nepal has significantly raised its investment in girls' education, which is correlated with the growth of girls' future children.*

sources of clean water, which is an important issue for densely populated areas,<sup>16</sup> it has made significant advances in toilet coverage, which have been strongly associated with reductions in under-nutrition for both mothers and children. Nepal has had water and sanitation policies in place for decades, but toilet construction and use had made slow progress. In the 2000s, however, there were renewed public and NGO efforts to expand toilet use, and hygienic behaviors (which are difficult to observe) more generally. In 2003, inspired in part by Bangladesh's success, Nepal piloted community-led total sanitation (CLTS) as a sustainable way to use mass sensitization activities to trigger communities to construct and use basic toilets, as opposed to the traditional approach of providing costly hardware support.<sup>17</sup> A wide range of NGO and development partners then rapidly scaled up CLTS. The recognition that an analogous approach was needed for schools, particularly to improve attendance by girls, led to adoption of the school-led total sanitation (SLTS) approach in 2006, which mobilized school-based clubs. By the end of 2015, 27 of Nepal's 75 districts had been declared free of open defecation.<sup>18</sup>

Other important factors associated with reductions in maternal and child undernutrition include improved socioeconomic status and parental education, especially maternal. In Nepal, between 1995 and 2010, the share of people living below the \$1.25-a-day poverty line fell from 42 to 25 percent.<sup>19</sup> While this may not be closely linked to any particular policy, overseas emigration and resulting remittance flows are widely thought to be a major driver of income growth and poverty reduction in Nepal.<sup>20</sup> In particular, the 2000s saw a shift in emigration destinations, with growing numbers of men and some women emigrating to more lucrative employment positions in the Persian Gulf countries rather than to neighboring India. Growth in agriculture—the largest domestic employer—has struggled to

keep pace with population growth. Nepal has been in a food deficit since 2006, meaning it is a net food importer; at the same time, public investments in agriculture have been declining.<sup>21</sup> However, the current Agriculture Development Strategy 2015–2035 aims to boost this sector.<sup>22</sup> Tourism—another important sector—was hit hard by the civil war starting in the mid-1990s but recovered strongly after the war ended in 2006.<sup>23</sup>

In education, the government has played a more direct role, committing increasing financial resources to this sector. In 1990 education only received about 10 percent of the overall budget, but by 2011 it received nearly 20 percent.<sup>24</sup> Following the World Conference on Education for All in 1990, Nepal adopted a National Plan of Action, which included gender parity as one of six goals.<sup>25</sup> Since then, improvements in women's educational attainment have been rapid and sustained.

Finally, the government of Nepal has—in more recent times—made a concerted effort to adopt a more explicit multisectoral approach to addressing malnutrition. In 2009, the World Bank and other development partners commissioned a Nutrition Assessment Gap Analysis (NAGA), and in 2011, following its evidence-based recommendations, Nepal adopted the Multi-Sectoral Nutrition Plan (MSNP).<sup>26</sup> The MSNP serves as a national roadmap for addressing undernutrition by engaging various ministries, including health, education, urban development, agriculture, and local development. This roadmap is used to mobilize resources and align projects and programs for nutrition.

## Lessons Learned and Future Challenges

Nepal has made huge strides in reducing maternal and child undernutrition in the past 20 years, despite a period of civil conflict and political instability, and without the stellar economic growth

of China, India, or Vietnam. In this investigation into Nepal's success in reducing maternal and child undernutrition, four main factors stand out: (1) improvements in access to and use of health services, (2) increased toilet coverage, (3) wealth accumulation, and (4) parental education, especially maternal. Underlying these advances were important policy and programmatic changes, particularly in health, education, and WASH. Across these policies and programs, better delivery of services was vital, given that many households are extremely isolated geographically and socially, and many women and girls as well as individuals belonging to specific castes are marginalized. Also striking is the involvement of multiple actors, including different levels of government, multilateral and bilateral development agencies, a wide range of NGOs, and communities themselves, often through volunteer organizations.

Despite these remarkable improvements, the present situation remains unsatisfactory; there still exist many challenges to achieving further reductions in undernutrition. Nepal will need to scale up nutrition-related policies and programs and perhaps find new creative ways to operationalize plans and policies to help those who have thus far remained beyond their reach. As of 2011, only about 30 percent of births were preceded by adequate antenatal care, just over 40 percent took place in a medical facility, and just over 50 percent of children were fully vaccinated.<sup>27</sup> Despite rapid expansion of WASH facilities, as of 2011 at least half of Nepali households still practiced open defecation and almost two-thirds continued to be without access to piped water.<sup>28</sup> During interviews, mothers also noted the continued lack of adequate road networks, health facilities, education, and job opportunities in rural areas, as well as the long road ahead to creating equal opportunities for all people, regardless of gender or caste. Poverty and food insecurity are also still widespread, especially in the

wake of the earthquakes, floods, and the fuel crisis of 2015.

In Nepal, some traditional beliefs and practices are harmful for nutrition and may curb further reductions in undernutrition unless they are addressed. Our quantitative results showed that infant and young child feeding practices have not improved over time, and interviews with mothers revealed that knowledge gaps and cultural beliefs contribute to poor household diets and child feeding practices. Mothers said they had given meat, fish, and eggs to their children only after 12 months of age because they believed that a baby could not digest these foods earlier. Several mothers reported missing antenatal visits because services were not available, but many also noted being bashful about pregnancy or remaining unconvinced that healthcare visits were really necessary.

Cultural norms and practices are often embedded in longstanding gender norms that influence household-level nutrition in many ways. In Nepal, women's empowerment is particularly low even in comparison with other South Asian countries and has only improved modestly in the past 25 years.<sup>29</sup> Results from the 2011 Demographic and Health Survey suggest that mothers play only a small role in household decision making, with 42 percent of mothers reporting that other people made their healthcare decisions. But women's lack of autonomy and decision-making power also affects food allocation and utilization in the household, access to and control of income, freedom of movement, and division of time on a daily basis between work and household chores including cooking, feeding, and caring for young children. All of these can influence women's own nutritional well-being and that of their children.<sup>30</sup> Patriarchal structures present deep-rooted challenges but also open opportunities for policies and programs across a range of development domains—such as agriculture, health,



microfinance, education, and WASH—to catalyze women’s empowerment.

In addition to the need to tackle deeply ingrained cultural norms, policymakers face significant institutional challenges. The MSNP is a national roadmap for coordinating—or at a minimum, aligning—the many diverse programs and activities across sectors, agencies, and actors, operational at different administrative units, that can contribute to eradicating undernutrition. Working across sectors, however, will require carefully coordinating and managing many ministries and development partners in order to plan, implement, and monitor large-scale packages of interventions operating at the district and subdistrict levels. Nepal also faces many gaps in human resources and institutional capacity, including staff shortages, frequent turnover of frontline workers, and technical and managerial gaps at all levels. An additional challenge—and opportunity—has recently emerged: to align the multisectoral coordination of nutrition efforts with Nepal’s newly adopted federalist constitution and its emerging decentralized governance structures. The new subnational government structures will be tasked with public service delivery and broader economic development, which are essential for solving the persistent problem of undernutrition.

Finally, other important nutrition-related topics have yet to be addressed in Nepal. For example, anemia among women and children is an even

more pervasive problem nationally than stunting or underweight. Also, the prevalence of overweight among children and women of reproductive age is rising and will likely continue to do so as urbanization and incomes rise; many programs that currently target undernutrition could also be leveraged to prevent overnutrition and noncommunicable diseases. Feeding and care of children during illness remains poor despite its crucial importance for reducing child mortality and morbidity. Food hygiene and safety are also neglected, as is the role of migration in the health and nutritional well-being of both the migrants and the family members left behind.

Despite these challenges, Nepal has an excellent opportunity to sustain and even accelerate its nutritional improvements. In the MSNP the country has not only a roadmap for pursuing a more comprehensive and coordinated multisectoral nutrition strategy, but also substantial political momentum for sustaining its progress and continuing the important process of decentralizing public service delivery. In addition to solidifying its political and financial commitments, the challenge for Nepal will be to effectively operationalize the MSNP and other plans and policies supporting the nutrition agenda and improve their implementation, with specific attention to targeting and scale-up to further address the persistent public health and development burden of maternal and child undernutrition.

