Increasing Milk Availability Through Fodder Production

Photo: Mercy Corps, Kenya/Ezra Millstein 2024

LESSONS AND INSIGHTS FROM NAWIRI

Milk is a vital source of nutrients for pastoralist communities, with studies demonstrating that supplementary fodder can have a protective effect on child nutrition. However, evidence shows that increased availability of fodder alone does not immediately translate into improved nutrition. Nawiri's Milk Availability Study (2022), found that commencing fodder interventions with community dialogue, highlighting nutrition and child well-being, had greater impact on sustained uptake of improved fodder practices. This learning brief builds on the Milk Availability Study, complementing it with practical experience from implementation of the Nawiri program in Northern Kenya, and detailing emerging evidence of best practices for increasing milk availability through fodder production.

Early results from Nawiri show that fodder cultivation has the potential to be transformative for pastoralist communities. By 2025, Nawiri had supported over 8,000 households across 39 fodder production sites covering 17,378 hectares to produce over 185,554 metric tonnes of fodder. Data shows that milk yields are increasing, malnutrition rates in target areas are decreasing, and fodder production has opened up a new avenue for income generation, helping to reduce dependence on humanitarian aid. Community members are also reporting shifting behaviours and mindsets, with increased recognition of the power of a plant they historically viewed as a weed. However, the ability of fodder to improve household nutrition remains dependent on more than just production. Addressing key external factors, such as adequate storage or conservation to preserve fodder for use during dry season, and prioritising fodder as feed for the milking herd, not just for sales, will be critical to improving household nutrition.

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INTRODUCTION

Milk is a cornerstone of household and child nutrition for pastoralist communities in Northern Kenya. It is an accessible and culturally appropriate animal-source food (ASF) and a key source of protein, vitamins A and B12, and calcium, especially for children under five. However, repeated weather shocks, prolonged droughts, poor animal health and the degradation of grazing lands has reduced livestock productivity. During the dry season, pastoralists tend to migrate their herds to find pasture, often leaving women and children with no access to meat or milk. A 2012 study in pastoral communities in Ethiopia demonstrated that providing supplementary fodder and veterinary care to milking animals that stay with women and children during the dry season has a protective effect on child nutrition and provides an alternative to therapeutic feeding, however high cost and reliance on external actors limited the sustainability and replicability of this intervention[1].

Mercy Corps' Nawiri program sought to apply this learning to pastoral communities in the Samburu and Turkana counties of Northern Kenya. A Milk Availability Study conducted in 2022 identified practical approaches to extend dry season lactation in milking animals, thereby increasing the availability of milk in households with children under the age of 5 and women of childbearing age. This research revealed that communities demonstrated greater interest in adapted herd and resource management when approached through a nutrition and well-being lens – however this would require a significant mindset shift for households, communities and officials [2].

Photo: Mercy Corps, Kenya/Paul Edung 2025

Applying an evidence driven approach, Nawiri designed an intervention to utilise agroecological methods—farming approaches that build soil health, reduce dependency on costly inputs, and adapt well to changing weather patterns – for fodder production. The aim was to promote cultivation of fodder, allowing households to keep milking herds at home, improving their milk production to provide for the household, while main herds were migrated for grazing. This learning brief will share initial lessons, evidence of results, and opportunities for additional learning arising from the first full agricultural cycle implementing the fodder intervention.

THE CHALLENGE

Since 2020, consecutive years of failed and erratic rains in Northern Kenya have diminished water sources, degraded pastureland due to topography, overgrazing, weather related risks, and poor agricultural practices, and triggered increased migration and conflict over scarce resources. With limited grazing options, households are forced to migrate longer distances or split herds, leaving behind only a few lactating animals with insufficient feed to meet household nutritional

1 Sadler, et. al. *Milk Matters: The Impact of Dry Season Livestock Support on Milk Supply and Childhood Nutrition in Somali Region, Ethiopia.* Feinstein International Center (Tufts University), 2012.

2 Mercy Corps. Milk Availability Study Learning Brief: Extending Dry Season Lactation in Samburu and Turkana Counties, USAID, 2022.

needs, driving both acute and chronic food insecurity. In addition to reducing milk yield, limited pasture also increases time burdens for women, who must walk further to access feed and water, and restricts opportunities for income diversification. Historically, traditional pastoralism has relied on the availability of natural pasture as livestock feed, creating the largest mindset and cultural barrier to actively pursuing and investing in fodder cultivation.

Photo: Mercy Corps, Mabati, Kenya/Saruni Letiwa 2025

The combined effect of these challenges on pastoralist communities in Northern Kenya has led to declining livestock productivity, reduced household income, and worsening nutrition outcomes. Nawiri's 2023 Household Economic Analysis found that only 5% of very poor and 10% of poor households reported consuming livestock products as part of their minimum diet[3]. Health care workers in Samburu and Turkana reported that before Nawiri interventions, cases of child malnutrition were common, with households struggling to maintain milk supply during dry seasons. This is corroborated by national nutritional survey data showing persistently high acute malnutrition rates (Global Acute Malnutrition (GAM) was above 19% in both counties) well above the emergency nutrition threshold. Nawiri research further highlighted that dry season resource constraints severely reduced household milk supply, directly impacting child nutrition and increasing the cost of a nutritious diet for poor families[4].

NAWIRI'S APPROACH

Nawiri's fodder intervention was integrated within two key areas of the program's overall strategic framework. The first is a focus on increasing the availability of affordable, diverse, nutritious foods by supporting improved production of crops (including fodder as well as food such as kales, indigenous leafy vegetables, maize, orange flesh sweet potatoes and cowpeas) through group-based production, promotion of agro-ecological approaches and resilient design farming techniques, and strengthening of local service providers to improve access to critical farm inputs and risk information distribution channels. Second, as part of the program's natural resource management component, committees are engaged to support conflict resolution among pastoralists and to oversee the rehabilitation, effective management, use and allocation of natural resources, such as land for communal cultivation and grazing.

Within these program strategies, fodder cultivation was implemented through the following activities.

- **Group-Based Fodder Production:** building on existing communal practices such as collective leadership, shared land use, and peer-to-peer learning, and introducing significant shifts toward market-oriented, sedentary production, producer groups in 39 sites were supported to identify communal land for fodder cultivation and trained on group dynamics, resilience design, and fodder production as a business.

3 Mercy Corps Nawiri. *Household Economic Analysis*, 2023

4 Standardized Monitoring and Assessment of Relief and Transitions (SMART) Survey, 2024.

- **Agricultural Techniques and Resilient Design (RD):** Mercy Corps' Resilience Design (RD) framework guided the training of fodder production groups, integrating soil and water conservation with regenerative practices that maximize the use of local resources. Techniques such as half-moons, zai pits, and contour bunds were promoted to improve soil moisture retention and support grass growth, and a cascade model was used to scale these practices by training 431 (152 female, 279 male) agro-ecological champions. Between October 2023 and end of September 2024, 2,800 participants (1,484 female, 1,316 male) in Turkana and 1,800 participants (954 female, 846 male) in Samburu were trained on smart and sustainable agriculture practices.
- **Market Linkages and Economic Opportunities:** Nawiri strengthened both input and output markets for fodder producers, opening up last-mile markets. The program collaborated with large Agro dealers to identify and train 860 Local Service Providers (LSPs) in Samburu and Turkana who now serve as a critical bridge between input suppliers and pasture farmers. The LSPs have established trusted relationships with communities, consistently providing last-mile access to fodder seeds, equipment, and technical guidance. On the sales side, farmers were linked to buyers through business-to-business meetings, trade fairs, and partnerships with county governments, where fodder is purchased directly.
- **Natural Resource Management and Hybrid Governance Strategies:** Nawiri's fodder initiatives were integrated into larger communal land and resource management systems. Hybrid committees were facilitated to bring together traditional leadership and formal structures, and integrate land, peace and water committees to allow effective landscape-level resource management and safeguarding of natural resources. 102 committees (64 in Samburu and 38 in Turkana) were supported, with over 1,700 members including 35% women. These ward-level committees coordinated grazing plans,

Photo: Mercy Corps, Kenya/Saruni Letiwa 2025

Village Snapshot

Nawiri staff recently conducted a qualitative review of fodder activities in the village of Barsaloi. For producers there, fodder has become both a source of animal feed and a new income stream. Farmers reported that daily milk production rose from 1.5 liters to 2.5 liters per animal. Some also observed that cows fed on fodder near their homesteads produced thicker milk and more of it compared to animals grazing long distances.

The sale of just 7.5 sacks of seed earned KES 53,800, distributed among group members. By December 2024, each of the 45 members received KES 2,500 ($19.4) in dividends. Women highlighted that fodder income gave them greater financial independence and decision-making power at the household level. Youth groups also leveraged fodder proceeds to diversify into goat trading and other small businesses. Women's groups, through Village Savings and Loan Associations (VSLAs), accumulated over KES 3.3 million ($23,256) in savings and issued KES 2.5 million ($19,380) in loans to start small businesses and strengthen household resilience.

water use, and early warning systems to protect rangelands from overuse. By integrating fodder into broader natural resource management, Nawiri helped communities balance livestock needs with land regeneration, reducing conflict and building resilience on a larger scale

EMERGING EVIDENCE OF SUSTAINED RESULTS

While more robust research to capture impact is required, monitoring data and qualitative evidence show promising trends. Given that the concept of cultivating fodder is relatively new to many pastoral communities, early uptake of this practice is encouraging. By September 2025, 39 fodder production sites covering over 17,378 hectares had been established, engaging 8,472 households and producing over 185,554,000 kg of fodder – enough to meet the Kenyan average annual consumption needs of over 1,300 goats [5]. Farmers are clearly seeing the potential benefits of fodder cultivation, demonstrating the important cultural and behavioural shift required to enable prioritisation of fodder for livestock growth. Nawiri staff have further noted that replication of fodder production activities is being continued independently, such as in Barsaloi and Mabati, where communities have trained others without direct project support

> **"Fodder from our farms has helped support lactating livestock, ensuring milk for families during the dry season, while also giving us income when we sell to traders."**
>
> **KAIKOR PASTURE PRODUCERS FARM MEMBER, TURKANA**

Photo: Mercy Corps, Kenya/2025

Motivation for adoption of fodder production has varied depending on the context. In Barsaloi, households reported that their urban proximity, and therefore availability of markets, meant that they prioritized sale of fodder for income generation rather than using it for increased milk, while in Mabati, fodder seed sales were dominant. In Lowua and Mabati, more rural rangeland settings, fodder was crucial for keeping the milking herd at the household. In Kaikor, the community-led pasture production farm demonstrated how collective fodder production can enhance milk availability and household nutrition for the whole community during the dry season. Structural factors also affected how communities managed increased fodder availability. For example, a village in Lolngerded chose to let cattle graze directly on harvested plots due to a lack of storage facilities.

The first round of data collection for Nawiri's Recurrent Monitoring System[6] reflects the significance of milking animals for household nutrition in these counties. 80%

5 According to 2021 data from the African Farm Resource Center, an average 40 kg goat in Kenya needs about 1.35 kg of DM per day to meet its 3.5% daily "dry matter" requirement. This is equivalent to roughly 4 kg of fresh forage per day or 1500 kg of fresh forage per year. The exact amount depends on the goat's weight, age, and physiological stage (e.g., pregnant, lactating, or growing).

6 The Recurrent Monitoring System is a quarterly longitudinal survey which aims to assess whether higher-intensity Nawiri interventions are more effective than lower-intensity efforts at reducing GAM to below 12% in children in Turkana and Samburu. The first data collection occurred in September 2025.

of Nawiri households surveyed have at least one milking animal, and 97% of those households use the milk for domestic consumption. 42% of households reported feeding milk from animals to children aged 6-23 months. While only 16% of Nawiri households reported feeding their animals fodder in the last three months, over 60% of them obtained the fodder from household or group production (vs. via purchase or aid), and over 60% of them also reported having adequate or more than enough fodder to feed their animals. Similarly, while the uptake of fodder storage techniques is still relatively low, households receiving more intensive Nawiri support were significantly more likely to store fodder for the lean season (14.5% vs. 4.8%, $p<0.001$), stack hay (8.5% vs. 0.5%, $p<0.001$), and prepare silage (2.2% vs. 0.0%, $p<0.001$), than those receiving lighter touch support, suggesting that intensive support and promotion for these practices is worthwhile [7].

"When I saw my children having more milk, even during the dry season, I understood how pasture reduces malnutrition."

FARMER IN MABATI

A Barsaloi farmer reflected that before Nawiri, they never knew grass could be planted until they were taught.

While it is too early to give direct evidence linking Nawiri's fodder production to improved nutrition outcomes, some promising trends correlate to these nutrition-sensitive agriculture activities. Mercy Corps' Annual Survey results show that fodder and pasture land under improved management practices or technologies has increased from 89.5 hectares in 2023 to 389 hectares in 2024. Household participation in fodder production has also increased dramatically, from 1.4% at baseline in 2022 to 23.6% in 2024. The FY24 Annual Survey also reported an average milk yield of 0.71 liters per animal, up from 0.49 liters the previous year. In Samburu, acute malnutrition decreased from 21.8% in 2022 to 17.1% in 2024 and health workers reported fewer cases of child malnutrition in areas with fodder farms [8]. Meanwhile, qualitative and anecdotal evidence suggests that availability of fodder is improving not only the quantity but also the quality of milk produced.

"Fodder has improved our livestock's energy and milk production, while working together as a group makes it easier to manage farm tasks and control invasive plants."

KAIKOR PASTURE PRODUCERS FARM MEMBER, TURKANA

Income generation through fodder production provides another potential pathway to increase nutrition at the household level; increasing milk consumption by reducing the need to divert milk for sale and increasing household purchasing power to prioritise nutritious foods. Producer groups who have chosen to sell fodder or fodder seed have realized significant income for members (see box). Interest from buyers in areas where there are advanced livestock farming practices, like Laikipia and Naivasha, indicates a growing opportunity to develop

7 Mercy Corps Nawiri, Recurrent Monitoring System Analysis, 2025.

8 Mercy Corps Nawiri, Annual Agricultural Surveys, 2023-2025

a commercial fodder value chain, although these efforts are challenged by the difficulty of meeting buyer standards and achieving certification for formal seed sales, as well as by the lack of infrastructure to support safe, long-term storage of surplus fodder.

The integration of fodder interventions within Nawiri's NRM and governance strategies has also shown promise. In communities with access to cultivated fodder, they develop dry season grazing plans that allow households to plan for milking herds to remain at home, protecting rangelands from over-grazing. For example, grazing plans in Mabati ensured that milking herds had access to sufficient feed, reducing the need for migration and improving household milk supply. Also, in Lowua, committee led early warning systems have helped the hybrid committee to return animals to safety and protect the fodder sites. In Turkana, the Kaikor Pasture Production Farm shows the benefit of local authority involvement in committee leadership structures, increasing sustainable production practices whilst also promoting community ownership and accountability in natural resource management.

EARLY LESSONS AND INSIGHTS

1. Fodder Cultivation Requires a Shift in Mindset for Pastoral Communities

For many pastoralist communities, the idea of planting and protecting grass was initially unfamiliar. Grass had always been seen as a naturally occurring resource, even a weed, rather than something valuable worth cultivating for livestock feed or income. Cultivating or purchasing fodder is still a relatively new concept, and the link to milk consumption, and therefore nutrition, is not always obvious. Initially, many saw fodder primarily as an income-generating activity or a way to regenerate degraded land. Then, during periods of drought, when the cultivation of fodder allowed families to keep a few animals to graze on fodder farms, maintaining a source of household nutrition, households began to see the connection more clearly. Attitudes changed from skepticism to pride over their cultivated pasture, highlighting how shifting cultural perceptions of grass have been as crucial as technical training in ensuring the sustainability of fodder farming.

Photo: Mercy Corps, Kenya/Joyce Ang'wech 2025

2. The Pathway from Fodder Production to Milk Consumption Requires Targeted Support

Nawiri's experience highlights that while fodder has the potential to increase milk yields, the extent to which this leads to higher household milk consumption depends on local motivations, market opportunities, livestock ownership

patterns, and infrastructure. While early indications are that households are more motivated to engage when they see a direct link to healthier children and better milk supply, replication beyond Nawiri has not always maintained this nutrition focus. Communities that only received limited training often adopted fodder for other reasons, like land regeneration, drought resilience, or income from seed sales, without connecting it to milk availability. In addition, generational perspectives strongly influence how communities engage with fodder production. For many young people, the main motivation lies in income generation through sales of hay, seeds, or diversification into goat trading. By contrast, elders tend to emphasize fodder's long-term benefits for household stability, livestock health, and child nutrition. As custodians of livestock traditions, they are often more committed to sustaining fodder farms and ensuring their integration into community grazing plans. Replication has been especially strong when elders pass their knowledge to youth, ensuring that fodder production is viewed not as a break from tradition but as an extension of pastoralist identity. Understanding these dynamics, utilising elders to cascade the model, and including continued focus on nutrition as communities and households take up this new practice, is essential to any effort to strengthen nutrition through fodder cultivation.

Photo: Mercy Corps, Kenya/Saruni Letiwa 2025

3. Successful Fodder Cultivation Anchors New Practice in Traditional Methods and Structures

The success of fodder production in Samburu and Turkana depends not only on new agricultural techniques but also on integrating local wisdom and traditional pastoralist practices. Communities have long relied on rotational grazing, herd splitting, and communal management of rangelands to cope with drought and scarcity. Nawiri's Resilience Design (RD) approach builds on these foundations, aligning conservation structures like half-moons and zai pits with customary methods of land stewardship. Hybrid governance structures help ensure fodder cultivation is integrated in and supported by traditional land management and facilitated through hybrid committees who help ensure fodder is linked not only to livestock productivity, but also to peace, land regeneration and resilience.

4. More detailed research is critical to fully understand the impact of fodder on nutrition

These initial trends and anecdotes around the shift of Nawiri communities to seeing the value of fodder cultivation are promising. However, ongoing recurrent monitoring will be essential to track how uptake of fodder cultivation continues

to unfold and progress. Some key questions to consider in this continuing research and learning efforts will include:

- Which interventions and activities are most effective in maximizing the nutritional benefits of fodder cultivation via milk consumption?
- How do different fodder production models (household vs. group-based, commercial vs. subsistence) affect milk availability and nutrition outcomes?
- What enabling factors allow market-oriented fodder production to enhance, rather than displace, milk consumption for vulnerable households?
- How can alternatives to store fodder for consumption and/or sale in lean seasons be strengthened?
- How can generational perspectives be leveraged to reinforce perceptions of fodder production as a pathway to child nutrition and not only a source of income?

Conclusion

Nawiri's experience is adding to the evidence base for promoting fodder cultivation to improve milk availability in pastoral households, creating a stronger pathway for household and child nutrition, especially in dry seasons. Early trends suggest that cultivating fodder can improve community and household resilience both as a source of income and a pathway to maintaining access to nutrition through lean seasons. We are seeing how targeted engagement can lead to changing cultural perceptions from pastoral communities about how fodder production can enhance traditional practices and improve livestock productivity.

Photo: Mercy Corps, Kenya/Paul Edung 2025

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Nawiri is an eight-year (2019 – 2027) US State Department funded Resilience Food Security Activity (RFSA) implemented by a Mercy Corps-led consortium of international, national, and local implementing partners. The goal of Nawiri is to sustainably reduce persistent acute malnutrition (PAM) in Kenya's arid and semi-arid lands (ASALs), specifically across Turkana and Samburu counties. Nawiri aims to reach 598,475 participants with a set of sequenced, layered and integrated (SLI) interventions, and reduce PAM to 12% by 2027.

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