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Positive Deviance/Hearth Plus Programme:

An integrated food-based approach to fight malnutrition
in food insecure and fragile contexts



The *Positive Deviance/Hearth Programme brief: An integrated food-based approach to fight malnutrition in food insecure and fragile contexts* was written by Diane Baik with input from Colleen Emary and Carmen Tse and editorial review by Loria Kulathungam.

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World Vision International. *Positive Deviance/Hearth Plus Programme: An integrated food-based approach to fight malnutrition in food insecure and fragile contexts*. WVI, London, 2024.

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ACRONYMS

DALY	Disability-adjusted life year
DRC	Democratic Republic of the Congo
GMP	Growth monitoring and promotion
GNI	Gross National Income
IYCF	Infant and young child feeding
MAM	Moderate acute malnutrition
MCNE	Maternal Child Nutrition Enhancement
MNP	Micronutrient Powder
MoH	Ministry of Health
MQ-LNS	Medium-quantity lipid-based nutrient supplement
MUAC	Mid-upper arm circumference
ND	Negative deviants
NPD	Non-positive deviants
PD	Positive deviants
PDH	Positive Deviance/Hearth
PDH+	Positive Deviance/Hearth Plus
RNI	Reference nutrient intake
RUSF	Ready-to-use supplementary foods
RUTF	Ready-to-use therapeutic foods
SAM	Severe acute malnutrition
SQ-LNS	Small-quantity lipid-based nutrient supplement
WASH	Water, sanitation and hygiene
WHO	World Health Organization
WV	World Vision

INTRODUCTION

In 2022, 148.1 million children under five years were stunted, 45 million wasted, and 37 million overweight.¹ Food insecurity is increasing, driven by factors including conflict, economic instability, worsening inequalities, environmental degradation and climate change. Additionally, the current coverage of services to address undernutrition is insufficient. There are gaps in capacity to deliver health and nutrition rehabilitation services, financial resource constraints, and limited availability and accessibility of specially formulated foods. Recently, the World Health Organization (WHO) made recommendations for preventing and managing moderate acute malnutrition in children under 5 years of age. The guideline recognises not all children with moderate wasting need specially formulated food to supplement their diet, but all children require access to a nutrient-dense home diet to meet their energy and nutrient needs. However, there is also a lack of guidance and research on nutrient and energy requirements for menus to rehabilitate moderately wasted children and effective food-based interventions in acute food insecure and fragile contexts.

Despite these challenges, World Vision (WV) adapted its food-based approach, also known as Positive Deviance/Hearth Plus (PDH+) since 1999 in communities across the globe and are demonstrating that locally-available foods and coping strategies can be used to effectively address malnutrition. Malnutrition can be prevented and addressed through: Nutrition education (social behaviour change), consumption of healthy diets containing diverse foods, and food fortification and supplementation when needed. **This brief will highlight PDH programmes implemented in acute food insecure and fragile contexts to show the viability of using locally available, low-cost, micronutrient-rich foods in complementary feeding to prevent and treat malnutrition.**

Positive Deviance/Hearth Plus (PDH+) is World Vision's updated version of the Positive Deviance/Hearth (PDH) approach, where PDH is integrated with additional prevention interventions, to improve the nutritional status of children from birth to age 5. PDH aims to rehabilitate malnourished, underweight and moderately wasted children without medical complications,² sustain their rehabilitation, and prevent future malnutrition in the context of their own homes and communities. The additional prevention interventions in PDH+ address nutrition screening, counselling, food security, and other community-based services such as decentralised growth monitoring and promotion (GMP),³ micronutrient powders and biofortification.

PROGRAMME EXPERIENCES

In 2024, WV is implementing PDH(+) in 23 countries (see Figure 1), including those in fragile and food insecure contexts, such as Bangladesh, Burundi, Cambodia, Chad, Democratic Republic of the Congo (DRC), Ecuador, Ethiopia, Mali, Mauritania, Niger, Somalia, and Sri Lanka. The PDH admission criteria prioritises moderately wasted and/or underweight children 6–59 months in the following order: moderately wasted⁴ children who pass an appetite test and children with disabilities without feeding difficulties, children who are severe, moderate, or 'at risk' for underweight. Severely wasted children are at times admitted if no other rehabilitation or health service is available and if they pass the appetite test.

Traditionally, PDH programme design includes formative research to understand the context and identify the existing resources, major contributing factors to malnutrition, cultural practices and beliefs, and current behaviours. A Positive Deviant Inquiry, which is conducted through an interview with caregivers of children who are *positive deviants* (PD), *negative deviants* (ND), and *non-positive deviants* (NPD),⁵ is used to identify local solutions within the PD households by observing how they address the major challenges and contributing factors to malnutrition in the community.

¹ Joint Child Malnutrition Estimates (2023). UNICEF, WHO, World Bank. Levels and trends in child malnutrition.

<https://iris.who.int/bitstream/handle/10665/368038/9789240073791-eng.pdf?sequence=1>

² severely wasted children are also admitted when CMAM services are not available and children pass the appetite test and do not have medical complications.

³ Decentralised GMP is when growth monitoring and promotion sites are further decentralised from Health centres to public spaces, schools, and markets where one post is assigned for 25–40 children under five years of age. By decentralising GMP posts, coverage, screening, and timely referrals are increased to prevent malnutrition.

⁴ Wasting is most commonly screened using MUAC tapes, but some countries may use weight-for-height if MUAC tapes are not allowed by Ministry of Health.

⁵ **Positive Deviants** are those who have limited resources, yet have healthy children; **Negative Deviants** are those who have lots of resources, yet they have malnourished children, and **Non-Positive Deviants** are those who either have lots of resources and have healthy children, or limited resources with malnourished children.

These solutions then inform six key Hearth messages. The formative research also includes a community mapping, seasonal calendar, market survey, transect walk, and 24-hour recall with PD households to identify the locally-available foods that are low in cost, easily accessible, and high in micronutrients. These foods are used to design a Hearth menu that is used as an extra meal to rehabilitate the malnourished children. The nutrient requirements of a Hearth meal are comparable or exceed the caloric, protein, and micronutrient content of Ready-to-Use Therapeutic Foods (RUTF) and Ready-to-Use Supplementary Foods (RUSF) and meet the Reference Nutrient Intake (RNI) for children 7 to 59 months of age (see Table 1).⁶ Caregivers are required to contribute the ingredients for the Hearth menu and cook the menu together during the 12-day education session, or “Hearth”, to encourage behaviour change through practice by doing.

Table 1 – Comparison of Hearth meal requirement vs. RNI, RUTF, and RUSF

Food Type	Quantity (g)	Energy (kcal) (m=male; f=female)	Protein (g) (M=Months; Y=Years)	Vitamin A (mcg RAE)	Vitamin C (mg)	Iron (mg)	Zinc (mg)
RNI: 7-12 months (mixed feeding or unknown)¹	N/A	718 (m) 646 (f)	13.7 (7-9M) 14.9 (10-12M)	350	25	7.8	5.0
RNI: 1-5 Years¹	N/A	717-1171 (1-3Y) 1291-1482 (4-5Y)	14.5 (1-3Y) 19.7 (4-5Y)	400	30	6.9 (1-3Y) 6.1 (4-5Y)	5.0 (1-3Y) 6.5 (4-5Y)
Hearth Meal Requirements (Food-based)	250-300	600-800	25-27	300	15-25	8-10	3-5
RUSF	100/sachet	510-560	11-16	1150	60	10-14	14
RUTF	100/sachet	500	10	840	49	11	13

RNI: reference nutrient intake; RUSF: ready-to-use supplementary food; RUTF: ready-to-use therapeutic food.

¹ British Nutrition Foundation. (2021). <https://www.nutrition.org.uk/media/nmmewdug/nutrition-requirements.pdf>

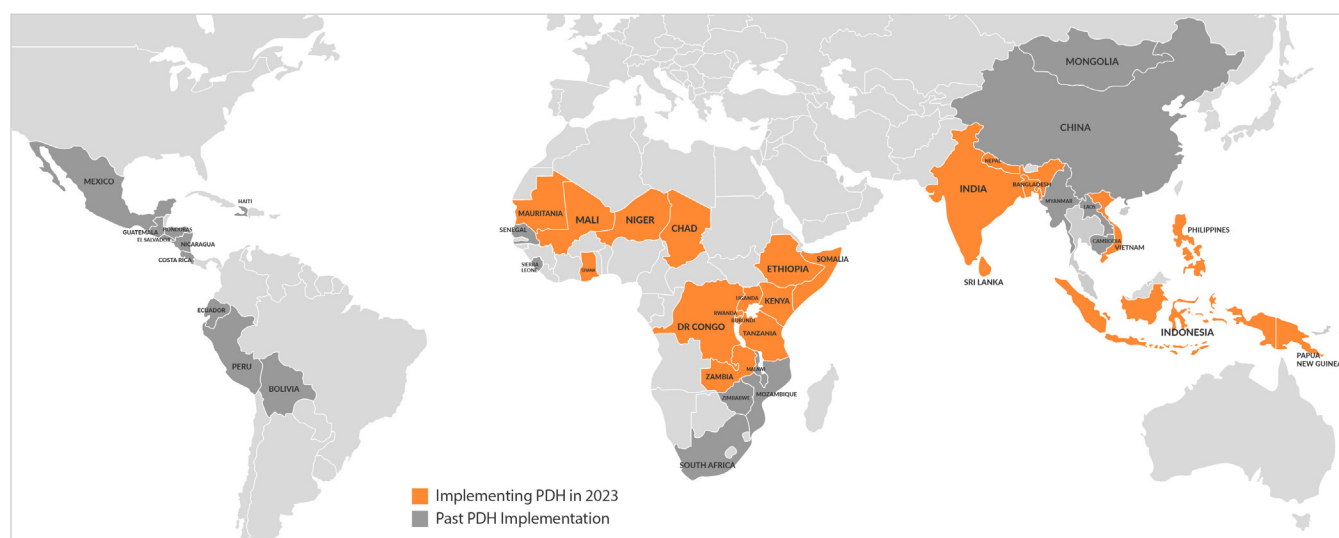


Figure 1 - Map of all World Vision’s PDH countries that implemented in the past and/or currently implementing in 2023

WV monitors PDH data using an Excel-based and online database, and a GMP-PDH mHealth application. WV also published several studies on PDH programming in fragile and food insecure contexts, including Bangladesh,⁷ Cambodia,^{8,9} Ecuador,¹⁰ Ethiopia,¹¹ with a manuscript being drafted for assessing the effectiveness of PDH in addressing acute malnutrition in Niger and DRC.

⁶ Diane Baik (2019). World Vision’s Positive Deviance/Hearth programme: multi-country experiences. Field Exchange issue 60, July 2019. p11. www.enonline.net/fex/60/worldvisionsprogramme

⁷ Kang Y, Prihartono I, Hossain MI, Min S, Kim H, Cho Y, Han S, Kim HS, Biswas JP. Impact evaluation of a community nutrition and livelihood program on child nutrition in rural Bangladesh. *Matern Child Nutr.* 2023 Apr;19(2):e13461.

⁸ Young MF, Baik D, Reinsma K, Gosdin L, Rogers HP, Oy S, Invong W, Hen H, Ouk S, Chhorvann C. Evaluation of mobile phone-based Positive Deviance/Hearth child undernutrition program in Cambodia. *Matern Child Nutr.* 2021 Oct;17(4):e13224.

⁹ Baik D, Reinsma K, Chhorvann C, Oy S, Heang H, Young MF. Program Impact Pathway of the Positive Deviance/Hearth Interactive Voice Calling Program in a Peri-Urban Context of Cambodia. *Curr Dev Nutr.* 2022 Mar 28;6(5):nzac045.

¹⁰ Roche ML, Marquis GS, Gyorkos TW, Blouin B, Sarsoza J, Kuhnlein HV. A Community-Based Positive Deviance/Hearth Infant and Young Child Nutrition Intervention in Ecuador Improved Diet and Reduced Underweight. *J Nutr Educ Behav.* 2017 Mar;49(3):196-203.e1.

¹¹ Kang Y, Kim S, Sinamo S, Christian P. Effectiveness of a community-based nutrition programme to improve child growth in rural Ethiopia: a cluster randomized trial. *Matern Child Nutr.* 2017 Jan;13(1):10.1111/mcn.12349.

CAMBODIA

A cluster randomised control study was conducted from 2017 to 2020 in the peri-urban context of Rolea Bier, Samrong Tong II and Boribour, Cambodia, which are prone to seasonal food insecurity.¹² It assessed the effectiveness of traditional PDH interventions in rehabilitating malnourished children and improving health and nutrition outcomes versus PDH mHealth interventions (where mobile phone calls were used to reduce the number of face-to-face Hearth session days and home follow-ups), versus a control group. The study targeted a total of 361 children aged 6-23 months and their caregivers. Children's nutritional status was measured at baseline, at three-month follow-up following completion of the Hearth sessions, and at one-year follow up. Findings were adjusted to account for food security, caregiver education and wealth differences among the participants.

KEY FINDINGS

- The PDH mHealth interventions were found to be just as effective as the PDH group in rapid rehabilitation of malnourished children.¹³
- PDH and PDH mHealth programmes resulted in rapid rehabilitation of underweight and wasted children in just three months and had a protective effect for weight-for-age and weight-for-height improving significantly compared to control group.
- At three-month follow up, the PDH group increased consumption of diversified diet by 43 percentage points vs. 26.6 percentage points for control group; and the PDH group improved their minimum acceptable diet by 24.5 percentage points vs. 1.4 percentage points for control group.
- At one year follow-up, the impact was sustained only in the PDH mHealth group and the prevalence of underweight declined by 12.8 percentage points, relative to the control group.
- The overall results of PDH were positive, but modest compared to other PDH programmes due to the higher levels of food insecurity in the study area and other contributing factors identified in the programme impact pathway analysis.¹⁴ The study suggested the need to combine PDH with other interventions for greater impact, such as micronutrient powders (MNP).

NIGER AND DRC

Niger is considered a fragile and food insecure context due to political instability and frequent droughts during prolonged lean seasons, with over 20% of households food insecure in any given year. PDH (also known as Foyers d'Apprentissage et de R habilitation Nutritionnelle (FARN) in Niger) has been implemented for over a decade and although MNP supplementation was integrated with PDH in the past, funding shortages make it difficult to do this regularly. MNPs help Hearth menus to easily meet the micronutrient requirements to rehabilitate malnourished children, especially since iron and zinc requirements can be difficult to achieve during food insecure time periods. WV Niger is currently implementing PDH+ by integrating PDH with market and community gardens to promote dietary diversity and increase food security. In several sites in Dosso and Tahoua, cultivation of moringa is integrated with PDH to increase access to iron-rich and vitamin-rich foods during food insecure time periods, which helps communities to run Hearth sessions throughout the year.

In some areas, World Food Program (WFP) distributes medium quantity lipid-based nutrient supplements (MQ-LNS) during the lean season as a blanket approach with all children 6 to 59 months of age receiving one sachet per day. However, due to resource shortages, WFP Niger is exploring alternative interventions for building resilience to address the increasing number of malnourished children and WV introduced the PDH+ program during a nutrition cluster meeting in Maradi. Similar information sharing is taking place in DRC, Kenya, and Mali.

¹² Young MF, Baik D, Reinsma K, Gosdin L, Rogers HP, Oy S, Invong W, Hen H, Ouk S, Chhorvann C. Evaluation of mobile phone-based Positive Deviance/Hearth child undernutrition program in Cambodia. *Matern Child Nutr.* 2021 Oct;17(4):e13224. doi: 10.1111/mcn.13224.

¹³ PDH mHealth group replaced 80% of the usual face-to-face interactions with phone calls.

¹⁴ Baik D, Reinsma K, Chhorvann C, Oy S, Heang H, Young MF. Program Impact Pathway of the Positive Deviance/Hearth Interactive Voice Calling Program in a Peri-Urban Context of Cambodia. *Curr Dev Nutr.* 2022 Mar 28;6(5):nzac045.

In DRC, WV is implementing PDH+ with donor support from UNICEF and private funding. WV DRC works in partnership with the MoH health zones to ensure sustainability of the approach. In addition, WV DRC and UNICEF are working to implement pilot nutrition projects with PDH as the fundamental approach, with the goal of eventually scaling-up across the country. Furthermore, in DRC, PDH is integrated with other interventions such as, income generating activities and savings groups for those responsible for malnourished children and for community health workers (CHWs) as an incentive in their community outreach units. GMP, infant and young child feeding (IYCF) counselling, and the promotion of home gardens are integrated with PDH as PDH+. In 2025, WV DRC plans to systematically support decentralised GMP to address prevention with rehabilitation in WV supported health and nutrition programming areas and, depending on funding, introduce the use of MNPs in PDH in fragile contexts with population movement.

An analysis of PDH monitoring data collected by WV Niger and WV DRC in 2022–2023 was conducted to assess the average weight gain per kilogram of body weight per day of children cured from wasting (using MUAC).

KEY FINDINGS

- Preliminary results show that the average weight gain per kg per day was 5.5g/kg/day ($n_{\text{Total}}=177$) in Niger and 7.0g/kg/day ($n_{\text{Total}}=255$) in DRC in 30 days for children admitted as MAM or SAM. Cure rates could be found in Table 2.

Table 2 – Cure rates for Niger and DRC at Day 12, 30, and 3 months

Follow-Up Time Period	Country Cure Rates	
	Niger ($n_{\text{Total}}=177$)	DRC ($n_{\text{Total}}=255$)
Day 12	93.8%	62.4%
Day 30	97.7%	85.5%
3 Months	96.0%	92.2%

BURUNDI

Food insecurity and malnutrition has been on the rise due to the recent political situation and economic crisis. From 2017 to 2020, a World Bank-funded multi-sectoral nutrition project, *Maternal Child Nutrition Enhancement* (MCNE), was implemented in two health districts, Rutana and Makamba. The project's main goal was to increase production and consumption of micronutrient-rich foods and utilisation of nutrition services among targeted groups by integrating nutrition and agriculture. The project integrated PDH with decentralised GMP, family groups, IYCF counselling, MNP, with kitchen gardens, biofortified crops with seed multiplication sites including orange-fleshed sweet potatoes and high-iron beans, and goat rearing with household organic fertilizer production, and village savings and loans associations.

KEY FINDINGS

Table 3 - Number of underweight children WV Burundi admitted into PDH with MAM and SAM in 2018

MUAC	MUAC Day 1		MUAC Day 12	
	# of Children	# of Children	# of Children	# of Children
MUAC ≥ 12.5 cm, but WAZ < -1.0	797	46.1	1447	83.8
MAM (MUAC ≥ 11.5 cm, < 12.5 cm)	309	17.9	143	8.3
SAM (MUAC < 11.5 cm)	14	0.8	9	0.5
MUAC not recorded	607	35.1	102	5.9
Children > 59 months of age	0		7	
Defaulted	0		19	
TOTAL	1,727		1,727	

- In 2018, WV Burundi admitted 1,727 underweight children (WAZ<-1.0) 6–59 months of age into PDH and of these admissions, 35.1% did not have mid-upper arm circumference (MUAC) measured on admission; 46.1% (n=797) had MUAC \geq 12.5cm; 17.9% (n=309) met Moderate Acute Malnutrition (MAM) criteria (yellow MUAC); and 0.8% (n=14) met Severe Acute Malnutrition (SAM) criteria (red MUAC). Following 12 consecutive days of Hearth intervention, 53.7% (n=166) of MAM children and 35.7% (n=5) of SAM children were rehabilitated to a MUAC of \geq 12.5cm (Table 3)
- Of the MAM and SAM children admitted on day one of Hearth, 53.1% (n=164) of MAM and 50% (n=7) of SAM children not only were cured (Green MUAC), they also were no longer underweight (WAZ \geq -2.0) in three months
- WV Burundi's monitoring data showed that MAM and SAM children recovered in terms of MUAC and weight gain through the rehabilitation process. Programme observations suggest that recovery of MAM children takes longer (an additional one to two Hearth sessions) than for children who are only underweight.
- For overall population in the target area, child wasting in children under five years of age decreased from 12.9% (n_{Total}=7,300) (April 2019) pre-intervention to 4.3% (n_{Total}=19,088) (April 2020) post-intervention even during the COVID-19 pandemic.¹⁵

COST-EFFECTIVENESS AND BENEFIT-COST RATIO OF PDH+

In an analysis of 38 WV PDH projects from two countries (Bangladesh and DRC) from 2019 to 2023, PDH alone was very cost-effective in all 38 projects, as defined by WHO where the cost of one disability-adjusted life year (DALY) averted was \$111 in DRC and \$325 in Bangladesh, which is 0.17 and 0.13 of the GDP per capita, respectively. From a cost-benefit analysis, the benefit-cost ratio was 11.94, meaning for every dollar invested there was a return in social benefit of \$11.94. WV's investments in this portfolio saved an estimated 688 lives among children under two (U2) and averted 8,169 DALYs, also among U2.

It should be noted that these both are conservative estimates of the values, as the benefits of PDH were limited to the reduction of underweight, wasting and stunting for children 6 to 23 months in PDH programmes, and so does not include any benefits experienced by older children in the programme as well as other effects on the prevention of malnutrition in the communities. Further, the estimates of the effect size of PDH on reductions in malnutrition were conservative, and not reflective of results from high-quality PDH programmes within WV.

WV programmes targeting 150,000-250,000 people spent approximately \$0.25 per beneficiary per year. Costs for PDH integrated with food security include significant investment initially in training and start-up costs, but as scale-up increases, cost per beneficiary decreases. Cost analysis from Bangladesh, Honduras, India, and Mali show a per capita cost ranging from \$0.73 in Mali to \$4.86 in India and \$9.00 in Bangladesh. Up to 80% of the overall programme cost in India and Bangladesh was for food production activities (animal and garden inputs).¹⁶

ADVOCACY AND INTEGRATION OF PDH INTO NATIONAL HEALTH AND NUTRITION STRATEGIES

In both Burundi and DRC, World Vision and local partners have been successful in working with government to scale up PDH to treat and prevent child malnutrition. In Burundi, the MoH recognised World Vision's success with PDH+ programming, which focuses on integrating PDH with supporting prevention interventions such as IYCF together with integration of water, sanitation and hygiene (WASH) programming. The programme rehabilitates moderately wasted children by scaling up positive nutritional practices within communities. It also reaches rural areas supported by a digital health application and educates households on improved practices for caregiving, child feeding, nutrition, hygiene, and malaria prevention. The MoH recognised the success of these programmes based on clear data and positive trends in

¹⁵ Basenya, O.B., Sonne, S.E.W. (2021). Implementation completion and results report for the Burundi Maternal Child Nutrition Enhancement Project. World Bank. <https://documents1.worldbank.org/curated/en/391051614374435562/pdf/Implementation-Completion-and-Results-Report-ICR-Document-Burundi-Maternal-Child-Nutrition-Enhancement-Project-P157993.pdf>

¹⁶ World Vision International (2015). Nutrition Marketplace: Profiling World Vision's Best Practices in Nutrition. WV. https://www.wvi.org/sites/default/files/Nutrition_MarketplaceV3.pdf

reducing rates of malnutrition. In 2019, the Government of Burundi adopted the PDH programme model as a national directive to be provided across all departments of the country, with PDH curriculum forming part of the national health and nutrition strategy.

The success of PDH in DRC built upon the previous success in neighbouring Burundi. The main success of WV DRC is the uptake, still in progress, by the government of the PDH programme with integrated decentralised GMP as a part of the MoH's Community-Based Nutrition programme to address prevention and treatment of undernutrition. This action by the MoH resulted in a reduction in the rate of underweight children in supported communities and a decrease in cases of severe wasting in many of the communities where the project model was successful. Further, many lives were saved when health facilities ran out of RUSF to treat cases of moderate acute malnutrition, and PDH menus, using locally-available nutritious foods, were used instead for children's rehabilitation.

KEY CONSIDERATIONS FOR IMPLEMENTING PDH+ IN FOOD INSECURE CONTEXT

- Where necessary, subsidise the purchase of some local ingredients. For example, in Sri Lanka, the project covered the costs of purchasing oil and eggs, approximately 25–30% of total menu costs, while caregivers provided 70–75% of ingredients as in-kind contributions.
- Provide supplementary feeding during the three-month follow-up period after the Hearth session.
- Adapt Hearth menus to seasonality. Identify which local and/or indigenous foods are available during food insecure periods and design Hearth menus for different seasons.
- Supplement and integrate PDH with supplements and specially formulated foods (e.g. MNPs, small-quantity lipid-based nutrient supplements (SQ-LNS), RUTF) during lean seasons if food insecurity is extremely high or in fragile contexts when budget allows
- Integrate PDH with livelihood interventions such as savings groups and income generating activities alongside PDH to bolster household income and increase food security by purchasing foods during lean seasons
- Integrate PDH with biofortification. Promote consumption and production of biofortified crops and incorporate biofortified foods into PDH menus.
- Promote use of ingredients provided by food aid programmes in Hearth menus if there are blanket food aid programmes implemented in the PDH target areas.
- Ensure a capacity building strategy is put in place to ensure quality formative research and designing of key messages and menus are developed and on-going implementation, monitoring, and supervision remains strong to see results even with scale-up of PDH nationally
- Implement PDH during the transition and recovery phase of a disaster, or during the phase-out of the CMAM program.

