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Estimating Averted Humanitarian Assistance Needs through WFP's Integrated Resilience Programme (IRP) in the Sahel

October 2024

Index

Abstract

Since 2018, the World Food Programme (WFP) has been implementing an Integrated Resilience Programme (IRP) in the Sahel focusing on land restoration, community infrastructure, education, nutrition, healthcare, and employment opportunities. This analysis evaluates the IRP's contribution to reducing humanitarian assistance needs, triangulating data from outcome monitoring surveys with external sources, including the Cadre Harmonisé (CH) results. A 4-step approach was used:

Step 1: Translate outcome monitoring data into averted humanitarian needs

The analysis utilises outcome monitoring data from WFP's IRP to translate food security improvements into averted humanitarian needs. Drawing from over 37,000 observations across 41 surveys conducted in the five Sahel countries between October 2018 and August 2023, the study assumes that households facing IPC/CH Phase 3+ food insecurity require assistance. A matrix analysis was applied, converting WFP's food security indicators (FCS, rCSI, LCS) into humanitarian needs using CH thresholds, enabling a comparative assessment of food security trends over time against the general population.

Step 2: Estimate reduction in humanitarian needs amongst WFP beneficiaries over time

Between 2018 and 2023, the prevalence of food insecurity among IRP beneficiaries significantly decreased. Among targeted households, food insecurity (CH Phase 3+) dropped from 29.5% in 2018/19 to 23.5% in 2022/23. The improvements were even more pronounced during the lean season, with a reduction from 40.5% to 30.6%, indicating increased resilience to seasonal fluctuations. Chad and Niger showed the most significant progress, while conflict-affected areas like Burkina Faso and Mali faced greater challenges.

Step 3: Comparative analysis with CH results for IRP intervention areas

A comparison with CH data shows that while food insecurity worsened substantially for the general population (from 2% to 8.3% post-harvest and from 5.3% to 15.4% during the lean season), food insecurity among WFP-supported households improved, even during the lean season. This suggests that WFP's interventions contributed to mitigating the negative impacts of various shocks in targeted areas.

Step 4: Estimate averted humanitarian needs using the CH as reference

To estimate averted humanitarian needs, the model compared the potential trajectory of food insecurity among IRP beneficiaries with CH trends. The analysis estimates that up to 400,000 people were prevented from falling into food insecurity during the post-harvest period and nearly 1 million during the lean season in 2022/23.

Conclusions & takeaways

The IRP successfully mitigated food insecurity among targeted households, even as food insecurity worsened among the general population in the Sahel. This underscores the importance of integrated resilience interventions in building long-term resilience to shocks like conflict and climate variability. While Chad and Niger showed the most significant improvements, areas heavily affected by conflict (Burkina Faso and Mali) saw less progress, highlighting the need for conflict-sensitive approaches and tailored strategies for different contexts. Overall, the IRP's success in reducing food insecurity demonstrates its critical role in decreasing future humanitarian needs in a challenging and volatile environment.

Background

Since 2018, the World Food Programme (WFP) has been implementing its Integrated Resilience Programme (IRP) in the Sahel region, specifically in Burkina Faso, Chad, Mali, Mauritania, and Niger. The IRP, with its focus on land restoration, community infrastructure, education, nutrition, healthcare, and employment opportunities, has positively impacted over 4 million individuals across nearly 3,400 villages in 2023. Since the beginning of the IRP in 2018, the programme rehabilitated nearly 300,00 hectares of land. The implementation of the IRP is complemented by the Resilience Monitoring and Measurement (RMM) framework, which integrates data from various sources to evaluate the program's influence on resilience outcomes, particularly its effect on reducing humanitarian assistance needs. This analysis utilizes data from WFP's outcome monitoring systems and a methodology originally developed by FEWS NET, adapted for resilience programmes by TANGO. Notably, the analysis builds upon an earlier version presented in the March 2023 publication "Evidence from WFP's Integrated Resilience Programme in the Sahel"[1], with subsequent refinements.

Methodology

Data collection

This analysis is based on outcome monitoring data collected by WFP Country Offices (COs) twice yearly between 2018 and 2023. Harmonised monitoring surveys that include a set of key indicators on food security, livelihoods, and resilience are conducted during the post-harvest period – to track longer-term progress on key resilience outcomes – as well as during the lean season, to capture how targeted households respond to shocks. Surveys used a two-stage cluster sampling approach, focusing on beneficiaries of direct household transfers (Food Assistance for Assets, FFA, and Lean Season Support, LSS). The data from individual surveys was aggregated for key indicators at the regional level, resulting in a combined dataset with over 57,000 observations from 42 surveys. For this longitudinal analysis, a sub-set of this dataset was used focusing on administrative areas with consistent data collection from 2018 to 2023. The table below shows the number of observations by country and survey round:

1 In Niger, this approach was used for the initial data collection in late 2018, followed by panel surveys amongst the same households in consequent years.
2 Note that due to the Covid-19 pandemic, data collection for the 2020 lean season was limited due to movement restrictions. In some countries, remote data collection was used instead of face-to-face surveys, explaining the low number of observations for this survey round.

TABLE 1: NUMBER OF SURVEYED HOUSEHOLDS PER COUNTRY AND DATA COLLECTION ROUND

Country	2018/19		2019/20		2020/21		2021/22		2022/23	
	PH	LS	PH	LS[2]	PH	LS	PH	LS	PH	LS
BURKINA FASO	1,037	0	1,002	0	502	577	503	0	603	789
CHAD	2,522	0	448	0	588	664	1,314	1,374	1,538	1,380
MALI	1,145	0	976	0	2,290	0	3,435	1,407	1,368	1,573
MAURITANIA	144	840	234	219	258	826	825	0	537	524
NIGER	1,450	371	1,223	323	538	187	525	510	532	541
SAHEL	6,298	1,211	3,883	542	4,176	2,254	6,602	3,291	4,578	4,807

Analytical approach

Humanitarian assistance needs were defined as acute food insecurity using the IPC/CH definition[3] and scale (IPC/CH Phase 3 or worse). A matrix analysis approach[4] developed by FEWS NET and adapted by TANGO for resilience programmes[5] was applied to WFP's outcome monitoring data. To better understand how food security trends observed amongst households participating in the IRP compare to the overall context in the Sahel, the modelled results were triangulated with the results of the CH analyses conducted over the same timeframe (2018 to 2023) for the same areas[6]. For each year and country, two datapoints were used – the October-December CH estimate as a reference point for the post-harvest period and the June-August CH projection for the lean season. These reference periods are aligned with the timing of the outcome monitoring surveys, which allows us to compare the level of humanitarian needs amongst targeted households (derived from outcome monitoring data) with that of the general population (derived from the CH). Finally, the analysis was complemented with data from studies and evaluations conducted as part of the regional RMM approach, to triangulate findings and fill knowledge gaps. For a more detailed description of the methodology, please refer to Annex 1.

Context analysis

The Sahel region has experienced increased exposure to key shocks and stressors since 2018. Underlying development indicators such as the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI) have not evolved significantly and combined with recurrent natural shocks and a significantly deteriorating security context, have contributed to a significant increase in food insecurity, particularly from 2020 onwards.

3. CILSS. 2019. Cadre Harmonisé: Manual Version 2.0. – Identification and analysis of areas at risk and populations affected by food and nutrition insecurity. Ouagadougou: CILSS. Available online at: https://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/ch/CH_Manual_2.0_English.pdf.
4. FEWS NET. 2021. Matrix Analysis: Integrated analysis of survey-based indicators for classification of acute food insecurity. Washington, DC: FEWS NET. Available online at: https://fews.net/sites/default/files/documents/reports/fews-net-matrix-guidance-document.pdf.
5. REAL. 2022. Classifying Food Insecurity Using FEWS NET Matrix Analysis: Assessing The Need For Humanitarian Food Assistance.Humanitarian Food Assistance Averted Technical Paper No. 1. Washington, DC: Resilience, Evaluation, Analysis and Learning (REAL) Associate Award. Available online at: https://www.fsnnetwork.org/sites/default/files/2022-08/HFAA%20Technical%20Paper%201.pdf.
6. To ensure comparability of the data, the results of the CH analyses were extracted for the same administrative areas in whichthe outcome monitoring data was collected between 2018 and 2023.

Significantly deteriorated security situation

The HDI highlights stagnation or deterioration in human development across the Sahel countries since 2018. After considerable progress in terms of human development between 2010 and 2019 in all five Sahel countries, a stagnation or deterioration of the HDI can be noted since then, in line with global trends[7]. The MPI further underscores the multiple deprivations faced by Sahelian populations.

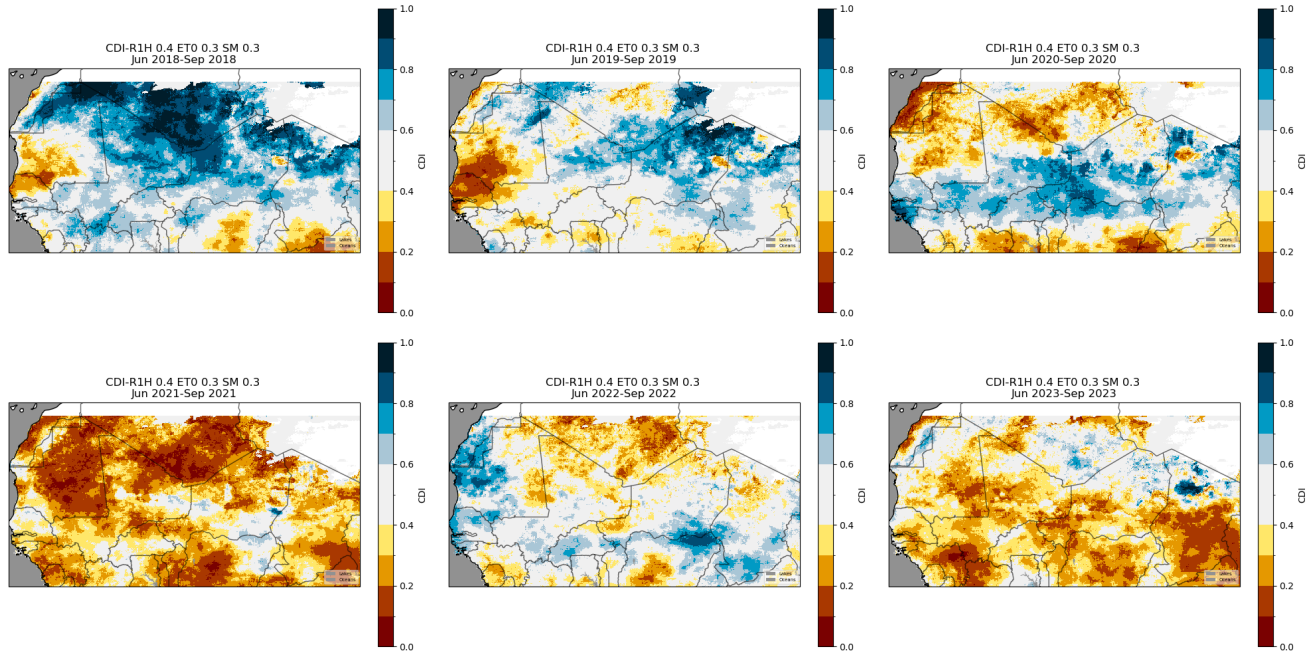
Niger and Chad are the two countries with the highest levels of multi-dimensional poverty in the world, driven in large parts by limited access to health and education. Mali and Mauritania, while exposed to slightly lower levels of multi-dimensional poverty, experienced a similar exposure to multiple deprivation in 2023[8].

7. UNDP. 2022. Human Development Report 2021-22: Uncertain Times, Unsettled Lives: Shaping our Future in a Transforming World. New York. Accessed online: https://hdr.undp.org/.
8. UNDP. 2023. 2023 Global Multidimensional Poverty Index (MPI): Unstacking global poverty: Data for high impact action. New York. Accessed online: https://hdr.undp.org/content/2023-global-multidimensional-poverty-index-mpi#/indicies/MPI. Note that no data was available for Burkina Faso, which has consistently ranked amongst the world's most affected countries in previous analyses.

Recurrent natural shocks

Despite a general wetting trend since the 1980s, the variability of seasonal rainfall in the Sahel has increased in recent decades, leading to more frequent instances of erratic rainfall. WFP's Combined Drought Index (CDI), which combines rainfall, soil moisture, and evapotranspiration data, indicates that the region experienced significant drought events in 2021 and 2023, with Mauritania experiencing a drought in 2019 and western Niger in 2022:

FIGURE 1: COMBINED DROUGHT INDEX (CDI) IN THE SAHEL, 2018 TO 2023

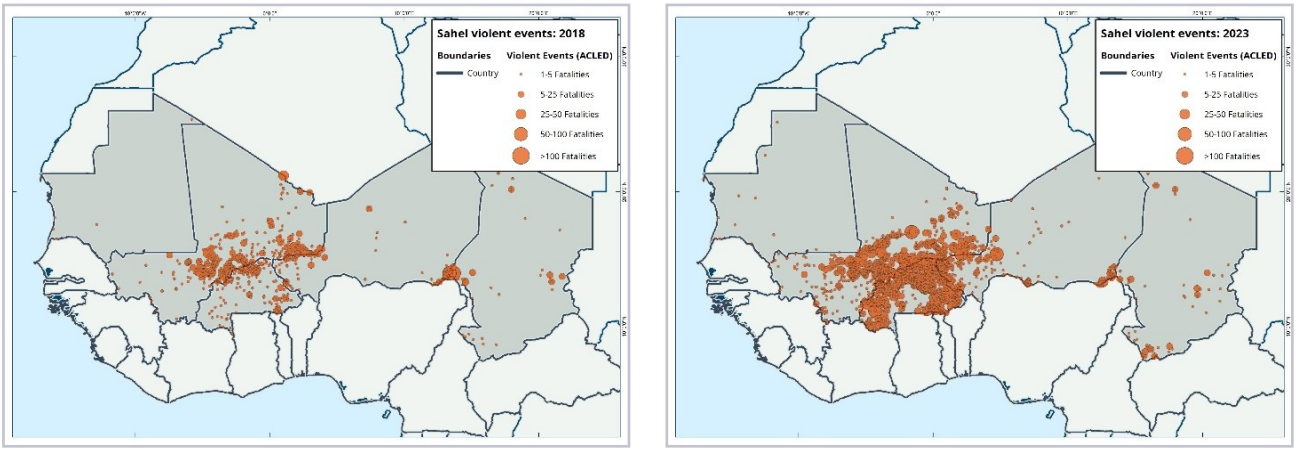


In WFP's resilience intervention areas, instances of intense (CDI between 0.2 and 0.3) or severe drought (CDI below 0.2) occurred across the five countries in 2021 and 2023, as well as in Mauritania in 2019. Moderate drought (CDI between 0.3 and 0.4) was observed in most intervention areas in 2021 and 2023 (see annex 2 for a detailed analysis).

Significantly deteriorated security situation

The most significant contextual factor that deteriorated over the past five years in the Sahel is linked to the security situation. Between January 2019 and December 2023, nearly 15,000 violent events and 44,000 associated fatalities were recorded in the five countries, compared to less than 2,500 events and 7,600 fatalities between January 2014 and December 2018 respectively. The geographic scope of conflict also expanded significantly, as highlighted by the following maps:

FIGURE 2: VIOLENT EVENTS AND ASSOCIATED FATALITIES IN THE SAHEL, 2018 (LEFT) AND 2023 (RIGHT) (SOURCE: ACLED)



A recent analysis by IFPRI[9] conducted as part of the research collaboration between WFP and CGIAR provides further insights into the conflict trends and dynamics in the Sahel region. The analysis, which applies ACLED's Conflict Index methodology to the Sahel context indicates that political violence has intensified between 2018 and 2023, with most conflict events concentrated in the border areas between Mali, Burkina Faso, and Niger. The analysis also highlights how political violence in the region is significantly different when it comes to the underlying dimensions of conflict (considering the dimensions of deadliness, danger, diffusion, and fragmentation). An extraction of the IFPRI conflict index for IRP intervention areas suggests that Mali (particularly Gao, Mopti, and Tomboctou regions) and Burkina Faso (Centre-Nord and Sahel) are the countries most impacted by insecurity, followed by Chad (Lac region) and to a lesser extent Niger (with some instances of insecurity in Maradi region).

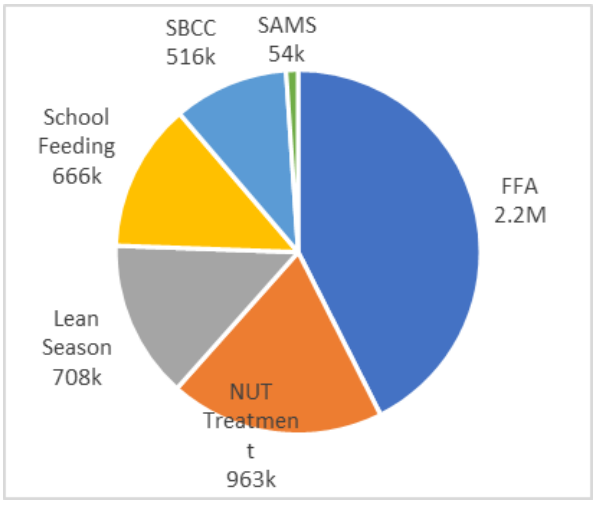
9. Marivoet, W., Hema, A., Nsaibia, H. 2024. Political Violence in the G5 Sahel Countries (2018-2023): An Application of ACLED's Conflict Index Methodology. Washington, DC: IFPRI. Accessed online: https://cgspace.cgiar.org/items/1d0dd9f6-e3b6-4be2-bc08-bd9a7171ee69.

Programme implementation

Beneficiary reach and activities

By June 2023, the IRP had supported around 3.2 million people[10] across the Sahel, with women making up 53% of beneficiaries. Figure 3 provides a breakdown by activity type (note that the figures include overlaps across activities). The IRP relies on an integrated package of activities which aims to improve and change lives by strengthening resilience at the three levels: individual and household, community, and ecosystem, as well as national and systems level.

FIGURE 3: BENEFICIARIES BY ACTIVITY TYPE



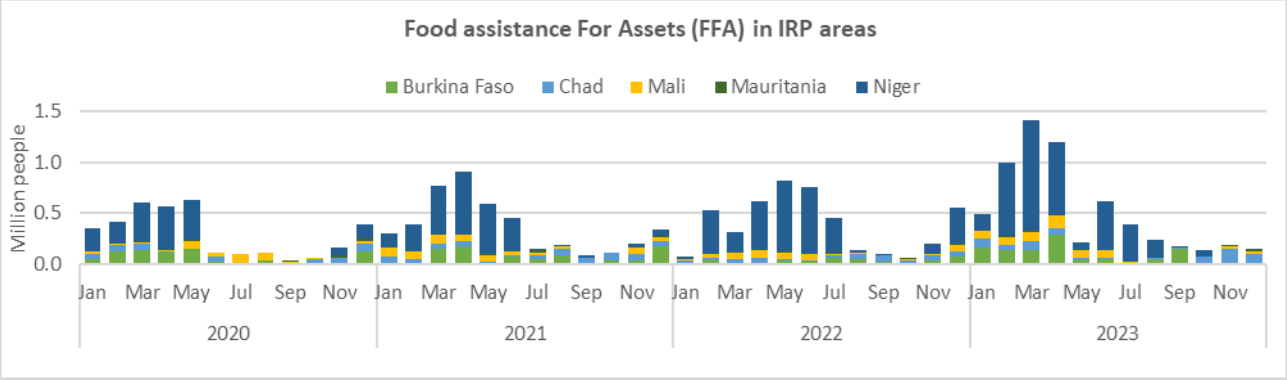
The programme focuses on the creation of productive assets in the affected communities and the integration with other WFP investments such as school feeding, malnutrition prevention, and treatment, social protection as well as smallholder agriculture and market support:

- **Asset creation and land restoration:** the IRP has created and supported nearly 1,000 sites encompassing over 3,400 villages. Since its inception in 2018, the programme has restored nearly 300,000 hectares of degraded agropastoral land using physical and biological soil and water conservation techniques. These efforts have significantly improved the availability of croplands and livestock pastures. Additionally, the IRP has facilitated the creation and rehabilitation of 1,100 water points, enhancing access to both drinkable and productive water. This has enabled the establishment of nearly 3,000 hectares of community gardens.
- **Household and community support:** as of June 2023, nearly 165,000 households benefited from various homestead activities, including organic gardening, improved and energy-efficient stoves, and Water, Sanitation, and Hygiene (WASH) facilities.

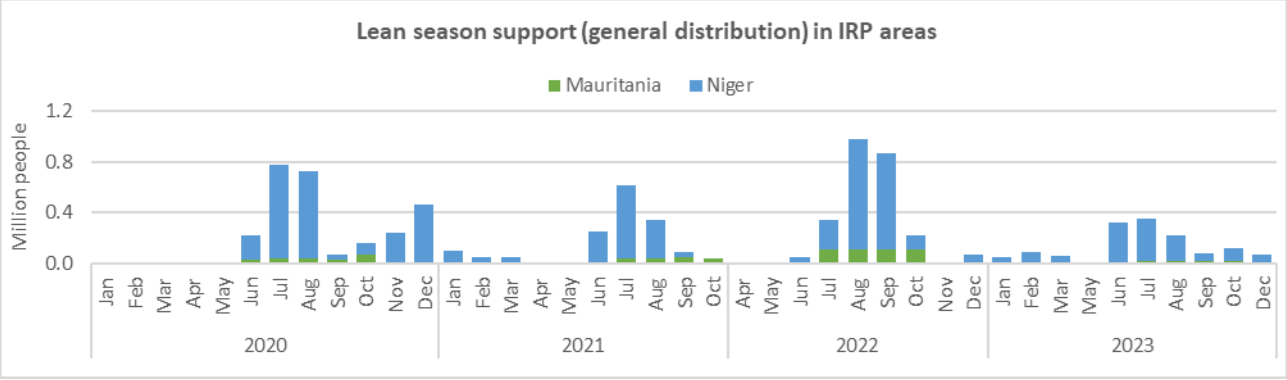
10. Note that as of December 2023, over 4 million people had received support through the IRP across the Sahel.

Seasonal implementation patterns

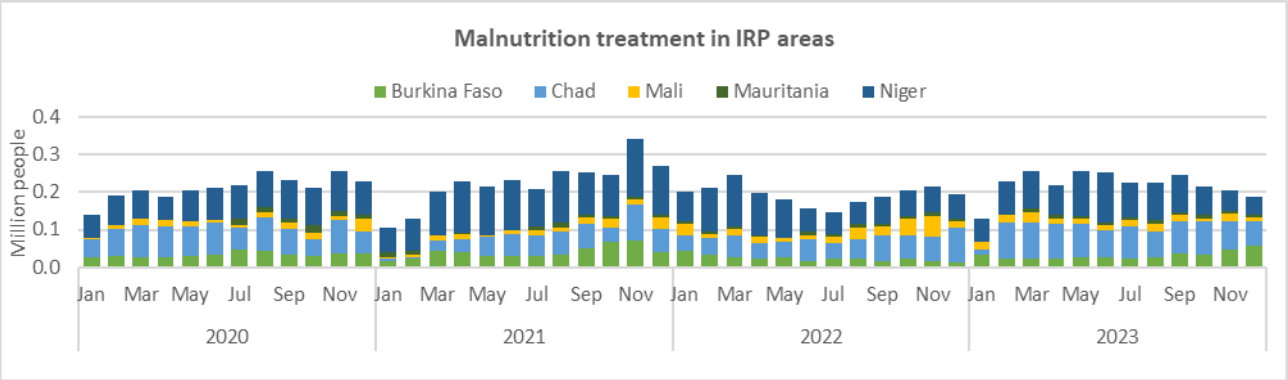
The activities within the IRP are tailored to the seasonal patterns and needs in the Sahel. By integrating these activities and ensuring a logical sequence of implementation, the Sahel IRP aims to build resilience across the five Sahel countries and contribute to tackling the region's complex challenges. The graphs and tables below illustrate the number of people reached between 2020 and 2023 through the major components of the IRP, including FFA, lean season support, malnutrition treatment and school feeding:



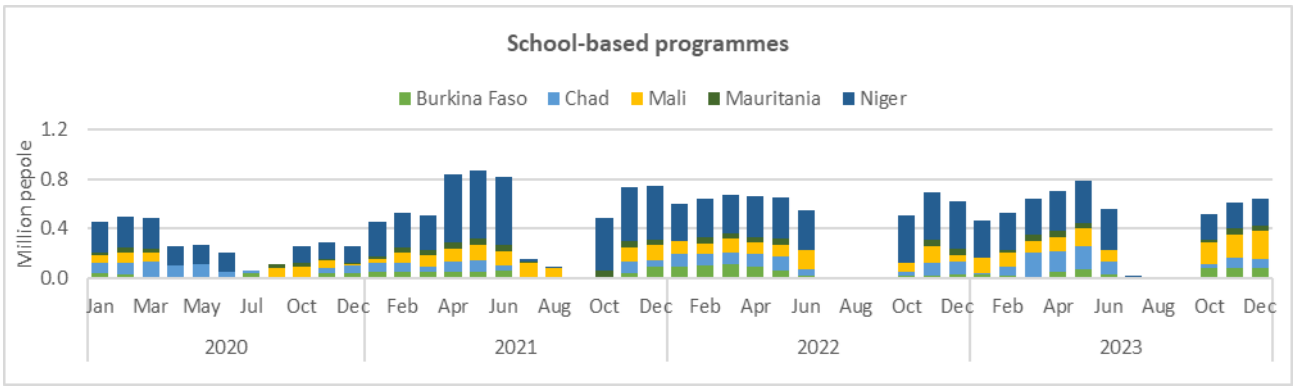
Food Assistance for Assets (FFA): FFA activities are primarily conducted during the dry season, from November to June, when fewer agricultural activities are performed by the communities. These activities involve land rehabilitation, reforestation, water management, and homestead improvements, benefiting over 2.1 million people by June 2023.



Lean Season Support: During the lean season (June to October), the programme provides general food or cash distributions to participants. In 2023, over 700,000 people received this support. Lean season support caseloads are limited to Mauritania and Niger, given that in other countries this programme component was not implemented systematically as part of the IRP.



Malnutrition Treatment: Malnutrition treatment is an ongoing activity, peaking during the lean season due to increased cases of water-borne diseases and malaria among children under five. The nutrition component of the IRP, which covers over 3,000 health centres, reached more than 1.2 million people.



School-based programmes: School feeding programs operate during the school year (October to June/July). By June 2023, over 665,000 children in nearly 2,600 schools received school meals. The programme also supported the creation of more than 1,800 school gardens to supply canteens and promote home-grown school feeding.

Analysis: the graphs above show the seasonal implementation patterns of the key components of the IRP. Between 2020 and 2023, the total number of FFA beneficiaries has increased significantly, with the bulk of FFA activities being implemented in the dry season between March and May. However, over time, the implementation of FFA activities appears to have extended further into June and July, i.e. the early months of the rainy season, suggesting either a slight shift in implementation patterns, or delayed reporting or transfers. Unconditional assistance is more consistently provided during the main lean season, between June and August, with the highest caseloads recorded in 2020 and 2022. Out-of-season transfers can also be observed in late 2020, likely linked to WFP's Covid-19 response that was partly channelled through the IRP in some countries. Caseloads for malnutrition treatment and school-based programmes are more stable over time, due to the nature of these institutional support activities. It is important to note the increase in the caseloads of school-based programmes from 2020 to subsequent years.

Outcome analysis

The following section explores the overall trends observed when analysing the outcome monitoring data. The food security analysis among IRP beneficiaries is based on a classification of households into four categories, as outlined in the methodology above. Survey data collected during the lean season and post-harvest period in the five Sahel countries between 2018 and 2023 has been aggregated at the regional level to enable long-term analyses of food security.

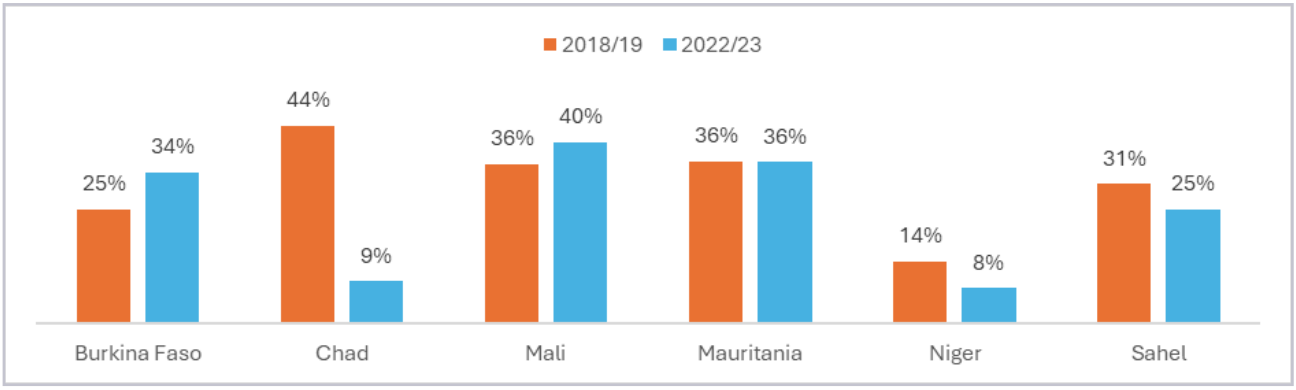
Overall food security trends

Figure 4 illustrates the evolution of food security classification at the regional level. The data highlights the yearly and seasonal fluctuations in food insecurity – including the significant deterioration during the Covid-19 pandemic in 2020 and 2021 – and indicates significant progress in reducing food insecurity among IRP beneficiaries. Since the 2018 post-harvest baseline, the proportion of food-insecure households (categories 3 and 4, equivalent to IPC/CH phase 3+) decreased from 31% to 25.4%, a 18% reduction in the prevalence of food insecurity. Improvements were most notable during the lean season, with a 23.5% improvement in food security (from 43% in 2018/19 to 32.9% in 2022/23), indicating enhanced resilience to seasonal changes.

FIGURE 4: EVOLUTION OF FOOD SECURITY AMONGST IRP BENEFICIARIES IN THE SAHEL, 2018/19-2022/23

However, there are significant differences in the evolution of food security across the different countries. As illustrated by Figure 5 above, some countries recorded notable improvements in their food security situation between 2018/19 and 2022/23, including Chad and Niger, while others experienced stable or deteriorating conditions (Burkina Faso and Mali). It is important to highlight that these two countries were the most affected by conflict and insecurity over the past five years, with repercussions on the implementation of the integrated resilience programme, which might explain some of these trends.

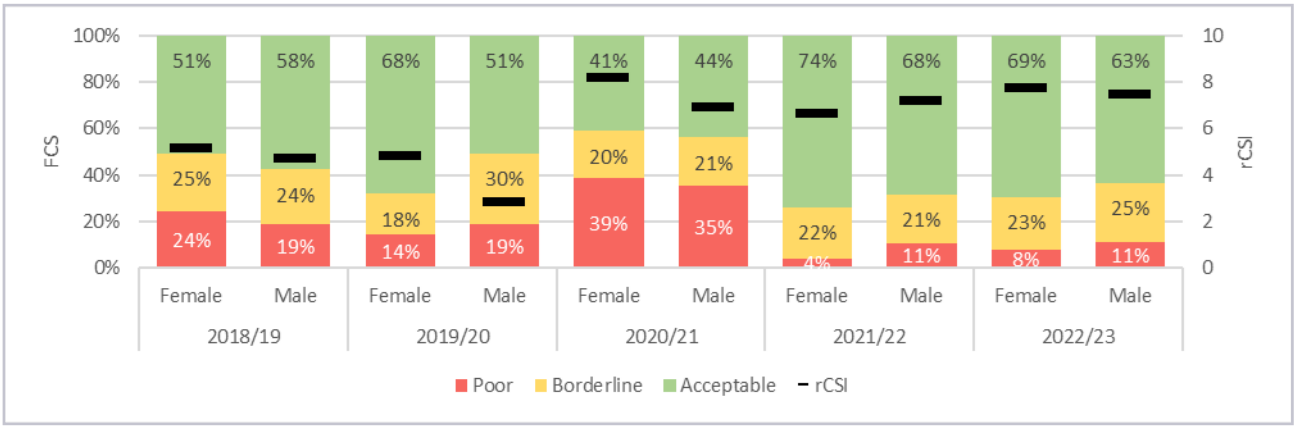
FIGURE 5: PERCENTAGE OF FOOD INSECURE HOUSEHOLDS PER COUNTRY AT BASELINE (2018/19) AND ENDLINE (2022/23)



Gender-specific trends

Female-headed households demonstrated better performance in improving their food security status over time compared to male-headed households. The prevalence of food insecurity decreased by over 13% among female-headed households, compared to a relative stability among male-headed households between 2018/19 and 2022/23. However, in some cases, the prevalence remained severe, particularly in Mali, where over two-thirds of female-headed households were food insecure in 2022/23.

FIGURE 6: EVOLUTION OF KEY FOOD SECURITY INDICATORS (FCS & RCSI) BY YEAR AND GENDER OF HEAD OF HOUSEHOLD



Female-headed households showed greater improvement in food consumption over time. The proportion of female-headed households with acceptable food consumption improved by over 35% during the post-harvest period between 2018 and 2022, while the improvement was only 10% among male-headed households. However, female-headed households also reported higher adoption of consumption-based coping mechanisms, indicating ongoing challenges (see figure 6).

An analysis of the coping strategies adopted to access food in the short-term suggests that female-headed households mostly relied on consuming less preferred and less expensive foods, then borrowing food or seeking assistance from relatives. This trend persisted since 2020 across the Sahel, highlighting the persistent challenge of food access.

Analysis of contributing factors

To better understand which factors contribute most to the food security outcomes and trends discussed above, a correlation analysis was conducted. In a first step, the relation between the overall food security classification (i.e. the modelled CH/IPC phase) and its individual components (food consumption, consumption-based coping strategies and livelihood-based coping strategies) was carried out. The results, summarised in the table below, suggest that all three indicators have a significant correlation with the final food security classification:

FIGURE 4: EVOLUTION OF FOOD SECURITY AMONGST IRP BENEFICIARIES IN THE SAHEL, 2018/19-2022/23

Correlations						
			Food Security Classification	FCS	rCSi	LCS
Spearman's rho	Food Security Classification	Correlation Coefficient	1.000	-.209**	.635**	.736**
		Sig. (2-tailed)		0.000	0.000	0.000
	FCS	Correlation Coefficient	-.209**	1.000	.015**	.014**
		Sig. (2-tailed)	0.000		0.000	0.000
	rCSI	Correlation Coefficient	.635**	.015**	1.000	.346**
		Sig. (2-tailed)	0.000	0.000		0.000
	LCS	Correlation Coefficient	.736**	.014**	.346**	1.000
		Sig. (2-tailed)	0.000	0.000	0.000	
**. Correlation is significant at the 0.01 level (2-tailed).						

The strong positive correlation between the consumption-based coping strategies (rCSI) and the livelihood-based coping strategies (LCS) suggests that these two dimensions are the strongest determinants of food security. In other words, when households adopt less severe of frequent coping strategies, they are more food secure. The negative correlation between the food consumption score (FCS) and the overall food security classification indicates that households with improved food consumption are more food secure – albeit with a weaker relation to the final outcome than the rCSI and LCS. The three indicators are only weakly correlated between themselves, highlighting the importance of a combined classification to better capture overall food security outcomes.

A correlation analysis between the final food security classification and other selected variables[11] suggests the following (see annex 4 for detailed results):

- Migration trends appear to be linked to food security, with households reporting a decrease in seasonal outmigration being more food secure. This is substantiated by an independent evaluation conducted in Chad in 2023[12] that found that the assets creation activities contributed to decreasing' youth outmigration by offering local income generating opportunities.

11. Note that only variables with a correlation of over 0.09 (positive or negative) are presented here.
12. See: https://www.wfp.org/publications/chad-resilience-building-activities-evaluation.

- The number and severity of shocks, as measured through the Shock Exposure Index, also appear to be correlated with food security, suggesting that households that have experienced more frequent or severe shocks are more food insecure.
- WFP's Asset Benefit and Environmental Benefit Indicators (ABI and EBI) also have a modest correlation with food security, suggesting that households that report increased benefits from WFP's asset creation activities tend to be more food secure.
- An exploratory analysis of food security and drought (as measured through the CDI presented above) appears to suggest that the strength of the correlation between food insecurity and drought reduced over time. The independent evaluation in Chad also pointed to the fact that households' capacities to withstand drought related shocks increased as a result of asset creation activities (e.g. construction of water irrigation points and market gardening sites). In other words, evidence seems to suggest that, with time, drought has less of an impact on the food security of households participating in the IRP (see annex 5 for further details).

Summary

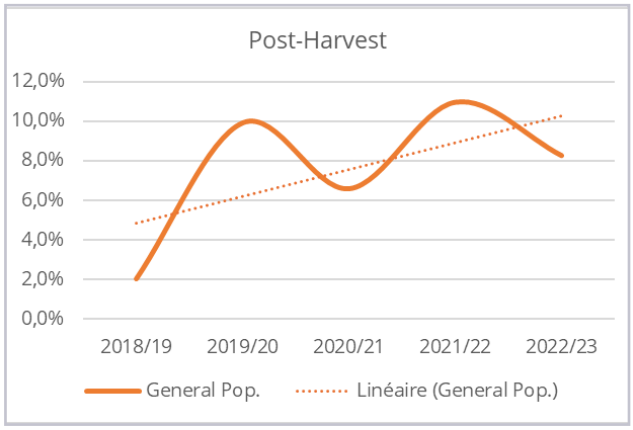
The analysis of food security outcomes among the households supported by the IRP between 2018/19 and 2022/23 reveals that there is a notable reduction in food insecurity, particularly during the lean season. This suggests improved resilience to seasonal fluctuations. However, the trends are not uniform across countries. While Chad and Niger have shown marked improvements in food security over time, the situation has remained stable or worsened in Burkina Faso and Mali, likely due to ongoing conflicts and insecurity that impacted programme implementation in the areas in which the data used for this analysis was collected (although less than the general population trend, meaning that IRP reduced the impact of the worsening situation on Food security). Gender-specific analysis suggests that female-headed households have made greater progress in terms of food security than male-headed households, suggesting that the food security gap between the two groups has reduced. Despite this progress, female-headed households continue to face important challenges, particularly in Mali, and appear to be more likely to adopt negative consumption coping strategies.

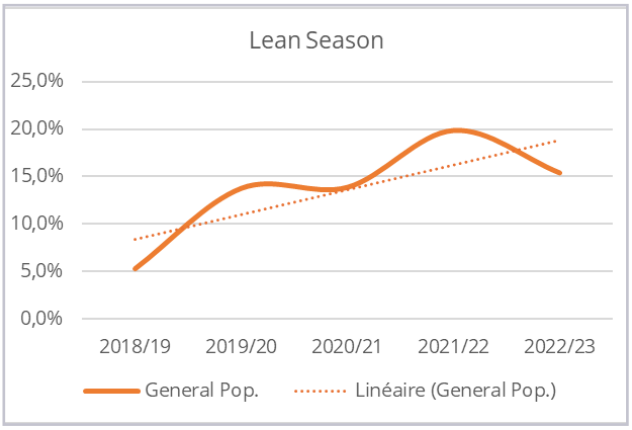
The correlation analysis highlights the significant role of these coping strategies as a determinant of overall food security. In addition, other factors such as seasonal outmigration, shock exposure, and benefits from asset creation activities appear to be linked to food security outcomes – albeit less strongly. These findings confirm the generally positive effect of WFP's resilience interventions, while at the same time suggest that there is an opportunity to further tailor programmes to their specific context and considering the broad HDP Nexus spectrum (e.g. taking into account the complex operating environments in Burkina Faso or Mali).

Comparative analysis with Cadre Harmonise (CH)

The national CH analyses, which are conducted twice yearly in each of the five countries and provide a classification of the severity of food insecurity for three key periods[13] of the year, are a useful benchmark to compare the trends measured amongst targeted households against the general population. This allows on the one hand to better understand the context in which WFP's resilience programme has been implemented. On the other hand, it also allows to assess to what extent the IRP contributed to strengthening the food security and resilience of targeted populations. In a first step, the CH results for the period 2018-2023 were aggregated specifically for WFP's intervention areas[14] in the Sahel. To ensure comparability with the monitoring data presented above, this extraction was done for the two periods that match the timing of WFP's outcome monitoring surveys, namely the post-harvest period (October-December) and the lean season (June-August). The graphs below show the prevalence of food insecurity amongst the general population (i.e. the population of interest analysed in the CH, regardless of whether or not households participated in the IRP or other assistance programmes) over time for these two periods:

FIGURE 7: PREVALENCE OF FOOD INSECURITY AMONGST GENERAL POPULATION, POST-HARVEST PERIOD (LEFT) AND LEAN SEASON (RIGHT), 2018/19-2022/23 (SOURCE: CADRE HARMONISÉ)





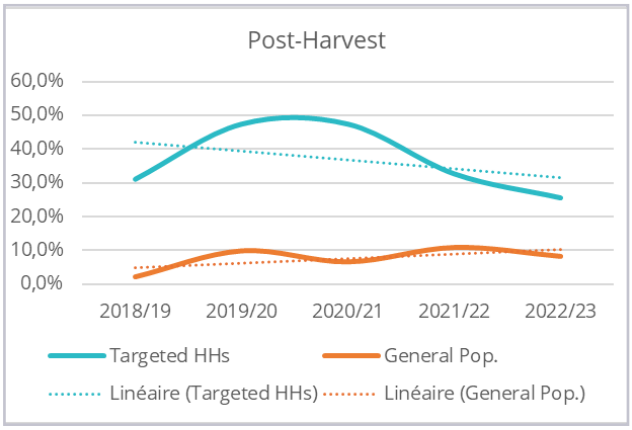
The graphs clearly showcase the deterioration of the food security situation in the Sahel mentioned in the context analysis above, which can also be observed in WFP's resilience intervention areas. Between 2018 and 2022, the prevalence of food insecurity (CH Ph3+) during the post-harvest period (October-December) increased from 2% to 8%. Over the same period, food insecurity during the lean season increased from 5% to 15%. These trends for WFP IRP intervention areas mirror the overall evolution of CH

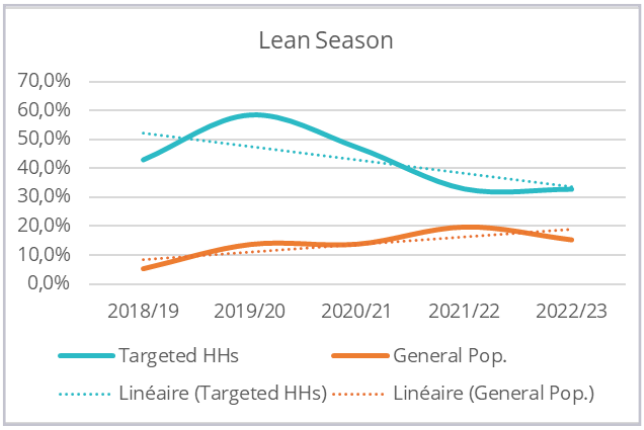
13. Post-harvest: October-December; Pre-lean season: March-May; Lean season: June-August. For the purposes of this analysis, the October-December and June-August CH estimates were used.
14. Based on the latest mapping exercise of resilience intervention areas, the CH results were extracted for admin 2 areas targeted by WFP.

figures across the Sahel, and reflect the impact of various shocks and stressors, including the deterioration of the securitycontext in the region. Despite some fluctuations – for instance, a slight improvement of the food security situation during the 2020/21 season as well as in 2022/23 – the overall trend points towards a significant deterioration of food security outcomes over time.

The comparison of these overall trends with the evolution of the food security situation of WFP-targeted households in the same areas[15] reveals how this pattern of deteriorating food insecurity is reversed amongst the communities participating in the IRP. While the prevalence of food insecurity amongst the general population increased fourfold from 2% to 8.3% during the post-harvest period between 2019 and 2022, and from threefold from 5.3% to 15.4% during the lean season, it decreased during both the post-harvest period (from 31% to 25.4%, i.e. an 18% reduction) and during the lean season (from 43% to 32.9%, i.e. a 23.5% reduction) amongst WFP-targeted households:

FIGURE 8: PREVALENCE OF FOOD INSECURITY AMONGST GENERAL POPULATION AND WFP-TARGETED HOUSEHOLDS, POST-HARVEST PERIOD (LEFT) AND LEAN SEASON (RIGHT), 2018/19-2022/23 (SOURCE: CADRE HARMONISÉ & WFP OUTCOME MONITORING DATA)



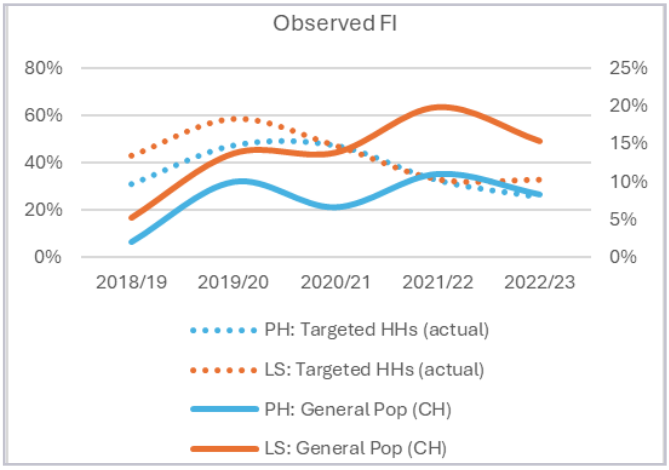


These findings are encouraging given that they suggest that the households assisted by WFP not only saw their food security situation improve over time, but this improvement occurred in a context of increasing humanitarian needs in the Sahel. This suggests that WFP-assisted communities are better equipped to withstand the shocks and stressors they face.

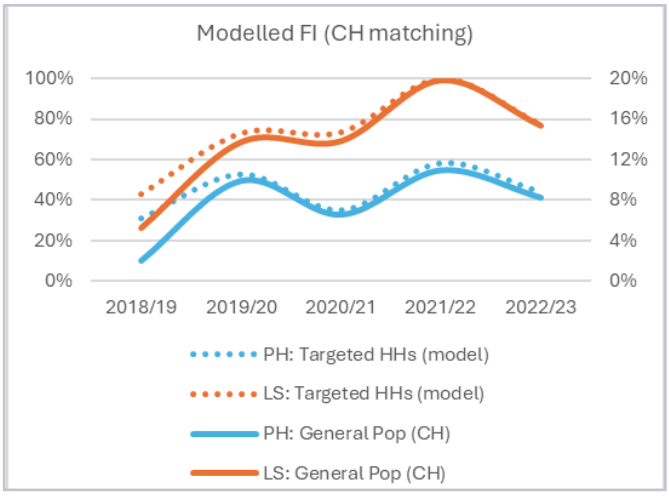
15. Note: the prevalence of food insecurity amongst WFP-targeted households was calculated using the matrix analysis presented above. While the two approaches are not the same, the use of the CH/IPC thresholds in the matrix analysis ensures some degree of comparability between the two. For a more in-depth discussion of the limitations of the approach, refer to Annex 1.

Estimation of averted humanitarian needs

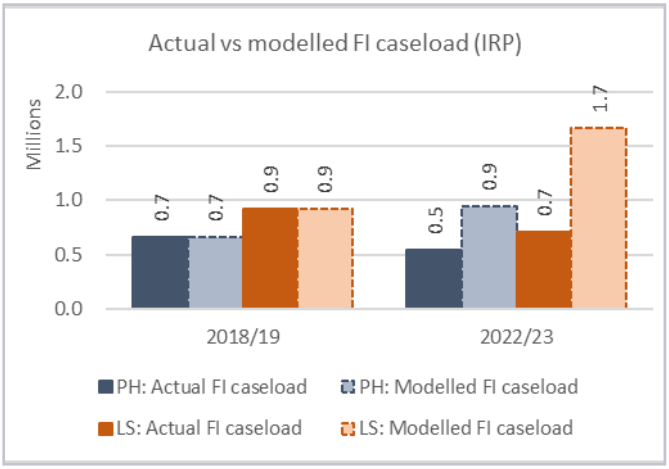
To quantify the potential averted caseload of people in need of humanitarian assistance, the observed food insecurity caseloads among WFP-targeted households (HHs) were matched with the evolution of the Cadre Harmonisé (CH) figures, to estimate the possible food insecurity trajectory of the communities targeted by the IRP. The modelled estimates were then applied to the WFP beneficiary caseload for 2022/23, to translate them into numbers of food insecure people. The approach used is described in detail below:



Step 1: in a first step, the observed prevalence of food insecurity among the general population and among WFP-targeted households were consolidated for both the post-harvest (PH) period and the lean season (LS). The graph to the right shows the trends for targeted households for the PH period and the LS in a dotted line, with the corresponding prevalence of food insecurity visualised on the primary y-axis. The prevalence of food insecurity among the general population is visualised by the solid lines (secondary axis).



Step 2: to estimate the potential food insecurity trajectory of WFP-targeted households over time, the food insecurity prevalence trend was matched with the evolution of CH figures. To avoid unrealistic values, a bounded scale was used. In practice, for the first year (2018/19 to 2019/20), it was assumed that the number of food insecure populations would have potentially increased by a factor of 1.7, rather than the actual observed increase (over 350%). For subsequent years, the observed evolution of food insecurity amongst the general population was applied to the modelled estimates, capping the maximum food insecurity prevalence at 100% of the population.



Step 3: the final step consisted of translating the observed and modelled evolution of food insecurity prevalence into population figures. To do this, the FFA beneficiary caseload for the 2022/23 project year was used (i.e. 2.15m). The graph to the right shows the 'actual' and modelled caseload of food insecure people amongst

Conclusion

Key findings

The analysis of outcome monitoring data and triangulation with other data sources such as evidence from evaluations and studies, drought indicators, and the Cadre Harmonisé (CH) data, suggests significant progress in reducing food insecurity among households supported by the IRP, particularly during the lean season. This indicates enhanced resilience to seasonal fluctuations, as well as to the complex interplay of different shocks and stressors (such as underlying vulnerabilities, natural shocks, or conflict), which have led to an important increase in food insecurity across the Sahel since 2020. Specifically, the analysis highlights the following:

WFP's Integrated Resilience Programme (IRP) has contributed to reducing food insecurity among targeted households over time. The proportion of food insecure households (equivalent to CH/IPC Phase 3 or worse) has decreased by 18% between the 2018/19 and the 2022/23 season, from 31% to 25.4%.

The improvement in food insecurity was even more pronounced during the lean season, with a 23.5% decrease in the proportion of food insecure households (from 43% in 2018/19 to 32.9% in 2022/23).

Significant improvements were observed in Chad and Niger. However, Burkina Faso and Mali experienced stable or worsening food security outcomes, likely due to conflict and insecurity, although mitigating the general population worsening trend in food security.

Female-headed households showed better performance in improving their food security, closing the gap with male-headed households over time. Despite these improvements, female-headed households still face challenges that translate to a reliance on negative coping strategies – a key determinant of food insecurity.

Consumption-based copings strategies (as measured through the rCSI) and livelihood-based coping strategies (LCS) are the key determinants of food security, followed by the Food Consumption Score (FCS). Other contributing factors include seasonal outmigration, shock exposure and benefits from asset creation activities. A decrease in migration trends was linked to better food security outcomes.

Households experiencing more frequent or severe shocks were more likely to be food insecure. The analysis also suggests that the impact of drought on food insecurity might have reduced over time, potentially suggesting stronger resilience to natural shocks – however, this preliminary finding needs to be investigated further- as a consequence of the creation of assets aiming at climate adaptation and drought response.

The analysis demonstrates that IRP contributed to reducing humanitarian needs in the Sahel. An approach was developed to translate this contribution into actual caseloads. Based on this calculation, it can be estimated that the IRP contributed to reducing humanitarian needs for a caseload of up to 400,000 during the post-harvest period and up to nearly 1 million people during lean season (corresponding to around 42% of the caseload during the PH period and 58% of the caseload during the LS).

Recommendations

TECHNICAL RECOMMENDATIONS:

- Further investigate trends and patterns of food insecurity among IRP beneficiaries, including through country -specific analyses that use a mix of quantitative and qualitative approaches. These analyses should include a more in-depth investigation of the different factors (programmatic and contextual) that contribute to (or hamper) improving the food security and resilience of WFP-assisted populations.
- Continue harmonising outcome monitoring systems across the Sahel, including through the alignment of the timing and type of monitoring surveys, the standardisation of key indicators on food security, nutrition, resilience, well-being, and demographics, as well as the roll-out of the new RAM IM Ecosystem, to ensure comparability of data across the region, and facilitate the aggregation of data over time and space.
- Conduct additional in-depth research on the determinants of sustainable food security outcomes in the Sahel region, as well as WFP's contribution to building resilience, through quantitative and qualitative analyses, to inform programme design and implementation, with a particular emphasis on women-led household, drivers of change, and adaptation strategies.

PROGRAMMATIC RECOMMENDATIONS:

- Continue to roll-out and strengthen conflict-sensitive approaches, particularly in conflict-affected areas, to ensure that programmes take into consideration the specific needs of conflict-affected populations, and to ensure the continuity of programme implementation.
- Consider shifting to alternative strategies in conflict-affected or inaccessible areas like northern Mali and Burkina Faso, with solutions oriented at HDP nexus, emergency, and safety nets, where long term resilience programming is more difficult to implement.
- Identify and tailor strategies to women-led households, to strengthen long term food security improvements and transformational approaches.
- Identify, document, and replicate good practices from countries like Chad and Niger in other countries, where appropriate.
- Scale up integrated resilience programmes as a mechanism for reducing and preventing humanitarian needs in the Sahel and other vulnerable regions.
- Implement adaptive programme management to regularly review and adjust programme implementation based on emerging evidence and changing contexts.

Annexes

Annex 1: Detailed methodology

PREMISE

The underlying assumption this analysis is trying to assess is that the IRP contributes to reducing humanitarian assistance needs over time by strengthening households' and communities' resilience to shocks. For the purposes of this analysis, humanitarian assistance needs are defined as acute food insecurity as per the IPC/CH definition (i.e. IPC/CH Phase 3 or worse). To estimate the prevalence of IPC/CH Ph3+ levels of food insecurity amongst households participating in the IRP, a matrix analysis approach developed by FEWS NET will be applied to outcome monitoring data collected twice yearly between 2018 and 2023. Similar analyses have been proposed by TANGO using datasets from USAID-funded resilience programmes in Ethiopia, Kenya and the Sahel.

ESTIMATING FOOD SECURITY PHASE CLASSIFICATION

FEWS NET's matrix analysis approach outlines how to combine commonly used food security indicators to estimate the prevalence of food insecurity using the IPC/CH classification scale and reference table. For the purposes of this analysis, the Food Consumption Score (FCS), the reduced Coping Strategies Index (rCSI) and the Livelihood Coping Strategies index for Food Security (LCS-FS) will be used based on the following approach:

- **Step 1:** the first step combines the two consumption-related indicators, the FCS and the rCSI extracted from outcome monitoring data, to estimate the IPC/CH classification of the food consumption outcome based on the reference table below (note that the numbers refer to the combination of indicators, while the colours are associated to the different IPC/CH phase classifications – e.g. green for Phase 1, yellow for Phase 2 etc.):

FIGURE 9: MATRIX CLASSIFICATION USING FCS & RCSI (ADAPTED FROM FEWS NET MATRIX ANALYSIS)

	Acceptable FCS	Borderline FCS	Poor FCS
rCSI <4	1	4	7
rCSI 4-19	2	5	8
rCSI ≥19	3	6	9

- **Step 2:** in a second step, the food consumption phase classification calculated in Step 1 is combined with the phase classification of the livelihood coping dimensions.
- **Step 3:** based on the analysis conducted in Step 2, an overall IPC/CH phase classification is attributed to each combination of indicators as per the guidance below (with the colours indicating the corresponding IPC/CH phase classification):

FIGURE 10: PHASE CLASSIFICATION USING FOOD CONSUMPTION & LIVELIHOODS INDICATORS (ADAPTED FROM FEWS NET MATRIX ANALYSIS)

	Livelihood Coping Phase 1	Livelihood Coping Phase 2	Livelihood Coping Phase 3	Livelihood Coping Phase 4
Food Consumption Phase 1	1	5	9	13
Food Consumption Phase 2	2	6	10	14
Food Consumption Phase 3	3	7	11	15
Food Consumption Phase 4	4	8	12	16

Note: Households in Phases 3 (orange) and 4 (red) are considered to be food insecure, while phases 1 (green) and 2 (yellow) are considered to be food secure.

CONTEXT ANALYSIS USING THE CADRE HARMONISÉ

To better understand how food security trends observed amongst households participating in the IRP compare to the overall context in the Sahel, the modelled results were triangulated with the results of the CH analyses conducted over the same timeframe (2018 to 2023). The following datapoints were used:

- Post-harvest: outcome monitoring results from WFP's annual resilience follow-up surveys conducted in November/December were compared to the results of the CH analyses for the October-December period. For instance, the food security situation of WFP beneficiaries from the 2018 post-harvest baseline was compared to the CH results from October-December 2018.
- Lean season: data from WFP's lean season post-distribution monitoring (PDM) exercises was compared with the CH lean season projections for June-August, using the same principle described above.

Given that the CH analysis is not specifically conducted for WFP-assisted populations, and to account for the fact that WFP's IRP does not cover the entirety of the five countries, the CH results for WFP intervention areas were extracted from the overall database of CH results. It is important to note that this matching could only be done at the Adm216 level given the level of representativity of CH results – this means that there is some degree of mismatch between the outcome monitoring datasets and the CH results (see limitations below).

To identify and extract CH data for WFP's intervention areas only, list of Adm2 areas in which monitoring surveys were conducted was used.

ASSESSING REDUCTIONS IN HUMANITARIAN ASSISTANCE NEEDS

Using the approach described above as a proxy for humanitarian assistance needs – with the assumption that populations in IPC/CH Ph3+ are in need of assistance – two types of analyses were conducted to assess observed reductions in needs amongst households participating in the IRP:

1. **First**, the long-term changes in humanitarian assistance needs were assessed using the baseline (2018 post-harvest) and the annual follow-up surveys conducted towards the end of each year. Long-term changes in food insecurity were then be compared against the general food security situation and trends in WFP IRP intervention areas using the CH results, to understand how the situation of WFP -assisted households evolved in relation to the overall population.
2. **Second**, the evolution of changes between the post-harvest period and the lean season over time was analysed. In theory, it was expected that over time, WFP-assisted populations will be less impacted by seasonal food insecurity and would be more resilient to the impact of shocks and stressors. To assess this, outcome monitoring results were grouped by project cycle (2018-19, 2019-20, 2020-21, 2021-22 and 2022-23).

DATA SOURCES

The following data was used for this analysis:

- **Outcome monitoring data from WFP's IRP:** since 2018, all 5 COs systematically conduct outcome monitoring exercises specific to IRP beneficiaries, with at least two data collection exercises per year. The timing of these exercises is generally harmonised across the 5 countries, with a more in-depth assessment conducted during the post-harvest period (usually in November or December) and one lighter post-distribution monitoring exercise conducted during the lean season (between May and July/August). These outcome monitoring exercises are statistically representative for IRP beneficiaries in each country (with additional levels of representativity for some countries and projects). RBD RAM maintains a consolidated database covering the 5 countries that includes selected indicators incl. on household demographics, socio-economic indicators, food security and resilience capacities. As of January 2024, this database includes over 57,000 observations from several data collection exercises conducted between October 2018 and September 2023 (baseline, PDM, and annual follow-up surveys). A subset of this data was used for this analysis, focusing on areas with consistent data collection between 2018 and 2023.
- **Output monitoring data** from WFP. Outputs are collected across the 5 countries to inform semi-annual and annual reports of the IRP. A consolidation was done at regional level to aggregate output data since 2018 to allow WFP to emphasise achievements across countries and overtime. The figures were integrated to the narrative to better tell the story from the matrix analysis, by showing the different inputs and deliveries that communities have received through the resilience interventions.

- **Cadre Harmonisé data** collated by the WFP RAM Unit was used to compare the outcome monitoring results and understand how the context in IRP intervention areas evolved over time. WFP consolidates CH results after each CH exercise. A comprehensive database of CH data can be found on HDX. The CH data was used instead of household food security assessments due to its availability for the reference periods of this analysis (i.e. one data point for the post-harvest period and one for the lean season for each year and country), and because it takes into account the impact of shocks and stressors such as droughts, floods, market prices, conflict etc.

LIMITATIONS

The following limitations need to be noted and will be taken into account in the analysis:

- **Comparability of data:** While FEWS NET's Matrix Analysis estimates IPC/CH-equivalent food insecurity prevalence using outcome monitoring data, it's essential to recognise that these estimates aren't directly comparable to CH analyses. The CH involves a variety of data and multiple partners to reach a technical consensus. Another disparity lies in the sampling approach: WFP's outcome monitoring uses IRP participant lists, while CH typically covers the entire population at the Adm1 or Adm2 level. We extracted CH results for IRP areas, though they still represent a broader population. Despite these limitations, our comparative analysis assessed trends and patterns in food insecurity, a foundation for more specific in-depth analyses.
- **Causal attribution:** This analysis does not claim exclusive causal attribution of changes to WFP's interventions. Instead, it scrutinised trends within IRP participant households and compared them to the overall population to understand evolving food security patterns in the challenging Sahel context. This allowed us to reasonably claim contribution to changes observed over time.
- **Consistency and quality of data:** Data collected via WFP's outcome monitoring systems adheres to WFP's data quality guidelines, yet disparities exist across countries and years. To ensure consistency and quality, RBD is harmonising data collection processes and tools across the Sahel, standardising indicators and providing technical support and oversight to COs. However, challenges, including financial or administrative issues causing data collection delays, persist. Regarding CH data, quality depends on various factors, including data availability and the analysis process.
- **Scope of the analysis:** This analysis focuses solely on changes in select food security indicators over time within WFP's IRP. It's important to emphasise that the IRP aims to produce outcomes across diverse levels, from individuals to systems. These outcomes are assessed through a blend of outcome monitoring, specialised analyses, evaluations, and research. The combination of these tools and approaches is vital for accurately tracking the changes and transformations influenced by the IRP.

Annex 2: CDI for IRP intervention areas, 2018 to 2023

The following table shows the mean seasonal CDI value for all WFP IRP areas included in this analysis for the period 2018 to 2023. Instances of severe drought (CDI below 0.2) are highlighted in brown, intense droughts (CDI between 0.2 and 0.3) are highlighted in orange, and moderate droughts (CDI between 0.3 and 0.4) are marked in yellow:

Country	Region	District	2019	2020	2021	2022	2023
Burkina Faso	Centre-Nord	Sanmatenga	0.480	0.679	0.269	0.560	0.328
	Sahel	Seno	0.466	0.744	0.262	0.352	0.249
Chad	Barh-El-Gazel	Barh-El-Gazel Sud	0.620	0.646	0.397	0.640	0.241
	Batha	Batha Est	0.520	0.597	0.316	0.475	0.157
		Batha Ouest	0.582	0.592	0.337	0.467	0.166
	Guera	Guera	0.558	0.507	0.208	0.570	0.177
	Kanem	Kanem	0.573	0.631	0.491	0.700	0.265
		Nord Kanem	0.558	0.519	0.439	0.499	0.211
	Lac	Kaya	0.511	0.692	0.541	0.736	0.320
		Mamdi	0.502	0.702	0.557	0.747	0.324
	Ouaddai	Ouara	0.472	0.559	0.254	0.622	0.154
Mali	Gao	Gao	0.618	0.711	0.376	0.502	0.361
		Menaka	0.572	0.787	0.456	0.402	0.301
	Mopti	Bandiagara	0.408	0.624	0.292	0.463	0.298
		Mopti	0.457	0.614	0.316	0.487	0.293
	Tombouctou	Gourma-Rharous	0.566	0.635	0.249	0.537	0.305
		Niafunke	0.607	0.679	0.317	0.547	0.246
		Tombouctou	0.554	0.410	0.242	0.387	0.353
Mauritania	Assaba	Barkeol	0.140	0.451	0.297	0.523	0.322
		Kiffa	0.169	0.550	0.226	0.622	0.392
	Guidimakha	Ould Yenge	0.231	0.578	0.291	0.778	0.391
	Hodh Ech Chargi	Djigueni	0.376	0.641	0.216	0.603	0.329
Niger	Maradi	Dakoro	0.505	0.793	0.404	0.558	0.341
		Guidan Roumdji	0.496	0.806	0.325	0.621	0.328
		Madarounfa	0.523	0.795	0.357	0.658	0.359
		Mayahi	0.549	0.751	0.396	0.581	0.388
		Tessaoua	0.588	0.714	0.394	0.607	0.433
	Tahoua	Abalak	0.499	0.729	0.410	0.420	0.277
		Bouza	0.463	0.819	0.277	0.508	0.342
	Zinder	Belbedji	0.547	0.632	0.382	0.520	0.300
		Kantché	0.569	0.682	0.388	0.650	0.383
		Magaria	0.601	0.693	0.463	0.678	0.392
		Mirriah	0.594	0.668	0.466	0.706	0.427

Annex 3: Conflict index by year for IRP intervention areas

The table below shows the severity of conflict using the ACLED conflict index adapted by IFPRI17. Based on an analysis of four dimensions of conflict (deadliness, danger, diffusion and fragmentation), all administrative areas of the Sahel were ranked and classified into one of four categories, ranging from Low/Inactive to Extreme. The data below is an extract of the

Country	Region	District	2018	2019	2020	2021	2022	2023
Burkina Faso	Centre-Nord	Sanmatenga	High	Extreme	Extreme	Extreme	Extreme	Extreme
	Sahel	Seno	Turbulent	High	High	Extreme	Extreme	Extreme
Chad	Barh-El-Gazel	Barh-El-Gazel Sud	Low	Low	Low	Low	Low	Low
	Batha	Batha Est	Turbulent	Low	Low	Low	Low	Low
		Batha Ouest	Low	Low	Turbulent	Low	Low	Low
	Guera	Guera	Low	Low	Low	Low	Low	Low
	Kanem	Kanem	Turbulent	Low	Low	High	Low	Low
		Nord Kanem	Low	Low	Low	Turbulent	Low	Low
	Lac	Kaya	Turbulent	Extreme	High	High	High	Turbulent
		Mamdi	High	High	High	High	High	Turbulent
	Ouaddai	Ouara	High	High	High	Turbulent	Turbulent	Low
Mali	Gao	Gao	Extreme	High	Extreme	Extreme	Extreme	Extreme
		Menaka	Extreme	Extreme	Extreme	High	Extreme	Extreme
	Mopti	Bandiagara	High	Extreme	Extreme	Extreme	Extreme	Extreme
		Mopti	Extreme	Extreme	Extreme	Extreme	Extreme	Extreme
	Tombouctou	Gourma-Rharous	Extreme	High	High	High	High	High
		Niafunke	High	Turbulent	High	High	High	Extreme
		Tombouctou	Extreme	High	High	High	High	High
Mauritania	Assaba	Barkeol	Low	Low	Low	Low	Low	Low
		Kiffa	Low	Low	Low	Low	Low	Low
	Guidimakha	Ould Yenge	Low	Low	Low	Low	Low	Low
	Hodh Ech Chargi	Djigueni	Low	Low	Low	Low	Low	Low
Niger	Maradi	Dakoro	Low	Low	Low	Low	Low	Low
		Guidan Roumdji	Low	Turbulent	Turbulent	Turbulent	High	Low
		Madarounfa	Low	High	High	High	High	Turbulent
		Mayahi	Low	Low	Low	Low	Low	Low
		Tessaoua	Low	Low	Low	Low	Low	Low
	Tahoua	Abalak	Low	Low	Low	Low	Low	Low
		Bouza	Low	Low	Low	Low	Low	Low
	Zinder	Belbedji	Low	Low	Low	Low	Low	Low
		Kantché	Low	Low	Low	Low	Low	Low
		Magaria	Low	Low	Low	Low	Low	Low
		Mirriah	Low	Low	Low	Low	Low	Low

Annex 4: Correlations between selected variables and food security classification

The table below shows the correlations between the final food security classification and selected variables collected through outcome monitoring surveys. Only variables with a correlation of at least 0.090 (positive or negative) were included:

Correlations			
			Food Security Classification
Spearman's rho	Food Security Classification	Correlation Coefficient	1.000
		Sig. (2-tailed)	
	Migration trend	Correlation Coefficient	-.171**
		Sig. (2-tailed)	0.000
	Number of shocks over past 12 months	Correlation Coefficient	.178**
		Sig. (2-tailed)	0.000
	Shock Exposure Index	Correlation Coefficient	.132**
		Sig. (2-tailed)	0.000
	Level of shock exposure	Correlation Coefficient	.114**
		Sig. (2-tailed)	0.000
	Ability to Recover Index	Correlation Coefficient	-.098**
		Sig. (2-tailed)	0.000
	ABI	Correlation Coefficient	-.099**
		Sig. (2-tailed)	0.000
	EBI	Correlation Coefficient	-.082**
		Sig. (2-tailed)	0.000
**. Correlation is significant at the 0.01 level (2-tailed).			

Annex 5: Correlation between food security, shock exposure and drought index (CDI)

The table below shows the correlation between the CDI and the overall food security classification, as well as shock exposure variables. The data appears to suggest that between 2019 and 2022, the impact of drought on food security might have decreased. A more in-depth analysis of these trends will be conducted to better understand the relationship between the CDI and food insecurity.

Correlations							
Year			Food Security Classification	CDI	Shock Exposure Index	Level of shock exposure	No. of shocks over past 12 months
2019	Food security status	Pearson Correlation	1	.344**	.[a]	.[a]	.[a]
		Sig. (2-tailed)		0.000			
	CDI	Pearson Correlation	.344**	1	.[a]	.[a]	.[a]
		Sig. (2-tailed)	0.000				
	Shock Exposure Index	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]
		Sig. (2-tailed)					
	Level of shock exposure	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]
		Sig. (2-tailed)					
	No. of shocks over past 12 months	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]
		Sig. (2-tailed)					
2020	Food security status	Pearson Correlation	1	.183**	.[a]	.[a]	.[a]
		Sig. (2-tailed)		0.000			
	CDI	Pearson Correlation	.183**	1	.[a]	.[a]	.[a]
		Sig. (2-tailed)	0.000				
	Shock Exposure Index	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]
		Sig. (2-tailed)					
	Level of shock exposure	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]
		Sig. (2-tailed)					
	No. of shocks over past 12 months	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]
		Sig. (2-tailed)					
2021	Food security status	Pearson Correlation	1	-.104**	.047**	0.006	-.059**
		Sig. (2-tailed)		0.000	0.000	0.524	0.000
	CDI	Pearson Correlation	-.104**	1	.062**	.192**	.049**
		Sig. (2-tailed)	0.000		0.000	0.000	0.000
	Shock Exposure Index	Pearson Correlation	.047**	.062**	1	.824**	.542**
		Sig. (2-tailed)	0.000	0.000		0.000	0.000

Correlations							
Year			Food Security Classification	CDI	Shock Exposure Index	Level of shock exposure	No. of shocks over past 12 months
2021	Level of shock exposure	Pearson Correlation	0.006	.192**	.824**	1	.562**
		Sig. (2-tailed)	0.524	0.000	0.000		0.000
	No. of shocks over past 12 months	Pearson Correlation	-.059**	.049**	.542**	.562**	1
		Sig. (2-tailed)	0.000	0.000	0.000	0.000	
2022	Food security status	Pearson Correlation	1	.046**	-.317**	-.139**	-.142**
		Sig. (2-tailed)		0.000	0.000	0.000	0.000
	CDI	Pearson Correlation	.046**	1	-.104**	-.258**	.120**
		Sig. (2-tailed)	0.000		0.000	0.000	0.000
	Shock Exposure Index	Pearson Correlation	-.317**	-.104**	1	.649**	.050**
		Sig. (2-tailed)	0.000	0.000		0.000	0.000
	Level of shock exposure	Pearson Correlation	-.139**	-.258**	.649**	1	0.017
		Sig. (2-tailed)	0.000	0.000	0.000		0.168
	No. of shocks over past 12 months	Pearson Correlation	-.142**	.120**	.050**	0.017	1
		Sig. (2-tailed)	0.000	0.000	0.000	0.168	

**. Correlation is significant at the 0.01 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

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