FANTA III
FOOD AND NUTRITION TECHNICAL ASSISTANCE

USAID
FROM THE AMERICAN PEOPLE

Expanding Early Warning Capacities in Haiti: Field Work and Recommended Approaches to Adapt a Project-Level Food Security Early Warning System Model to Other Food for Peace Development Projects

A Summary of Field Work Conducted by Howard Standen in 2003

FANTA
FHI 360
1825 Connecticut Ave., NW
Washington, DC 20009-5721
Tel: 202-884-8000 Fax: 202-884-8432
fantamail@fhi360.org www.fantaproject.org

fhi 360
THE SCIENCE OF IMPROVING LIVES

This report is made possible by the generous support of the American people through the support of the Office of Health, Infectious Diseases, and Nutrition, Bureau for Global Health, U.S. Agency for International Development (USAID) and USAID/Haiti, under terms of Cooperative Agreements HRN-A-00-98-00046-00 and AID-OAA-A-12-00005, through the Food and Nutrition Technical Assistance Project (FANTA), managed by FHI 360.

The contents are the responsibility of FHI 360 and do not necessarily reflect the views of USAID or the United States Government.

July 2016

Recommended Citation

FANTA. 2016. *Expanding Early Warning Capacities in Haiti: Field Work and Recommended Approaches to Adapt a Project-Level Food Security Early Warning System Model to Other Food for Peace Development Projects*. *A Summary of Field Work Conducted by Howard Standen in 2003*. Washington, DC: FHI 360/FANTA.

Contact Information

Food and Nutrition Technical Assistance III Project (FANTA)
FHI 360
1825 Connecticut Avenue, NW
Washington, DC 20009-5721
T 202-884-8000
F 202-884-8432
fantamail@fhi360.org
www.fantaproject.org

About This Report

In 2003, the Food and Nutrition Technical Assistance I Project provided technical support to three U.S. Agency for International Development (USAID) Office of Food for Peace (FFP) development food assistance projects in Haiti to begin adapting a food security early warning system that had been developed by CARE (another FFP development project partner). This report synthesizes the findings of the field work and associated recommendations from that effort. While this work was undertaken several years ago, many of the approaches, findings, and lessons of the activity remain relevant today. As such, the Food and Nutrition Technical Assistance III Project has produced this summary of the work to share insights and experiences from the effort with stakeholders looking to undertake similar work in Haiti or elsewhere.

Acknowledgments

The Food and Nutrition Technical Assistance III Project (FANTA) thanks Howard Standen for undertaking the work in Haiti in 2003 that led to this summary report. In addition, FANTA thanks all of the then-project staff, project beneficiaries, other community members, and local- and national-level stakeholders associated with the U.S. Agency for International Development's (USAID's) Office of Food for Peace development projects in Haiti who gave their time and perspectives to assist with this effort. FANTA also extends its gratitude to colleagues at the USAID Mission in Haiti who saw the utility of the approaches, recommendations, and lessons from this work for similar initiatives in Haiti and other countries and supported the compilation of this report.

Contents

About This Report ..... **i**

Acknowledgments ..... **ii**

Abbreviations and Acronyms ..... **iv**

Executive Summary ..... **v**

1 Introduction and Methods **1**

1.1 Technical Assistance Methods 1

2 Background **3**

2.1 Overview of Common Natural Hazards in Haiti 3

2.2 Overview of CARE's NEWS 4

2.3 Risk Information Collected During the Rapid Assessments 7

3 NEWS Approach and Recommendations for Adapted System Design **9**

3.1 NEWS Data Collection Approaches and Adaptation Recommendations 9

3.1.1 Crop Production Monitoring and Harvest Forecasting 9

3.1.2 Rainfall Data 12

3.1.3 Livestock Conditions 12

3.1.4 Market Price Data 13

3.1.5 Coping Strategies 15

3.2 Nutrition and Health Data Collection Considerations and Recommendations for Application 17

3.2.1 Nutrition Surveillance and Early Warning 17

3.2.2 Health and Epidemiological Surveillance 19

3.3 Site Selection and System Design Recommendations 20

3.3.1 Summary of the NEWS Site Selection and Design Approaches 20

3.3.2 Recommendations for Site Selection and Associated Data Collection 20

3.4 Organizational Structure and System Development 27

3.4.1 NEWS Administration 27

3.4.2 Recommendations for Administration of the Haiti FFP Development Projects' Adapted Early Warning Systems 29

Annex 1. Agro-Ecological Zone Definitions and Map **30**

Annex 2. Publications Reviewed for Activity Literature Review and Field Assessments **32**

Abbreviations and Acronyms

CNSA	National Food Security Coordinating Unit (Coordination Nationale de la Sécurité Alimentaire)
CRS	Catholic Relief Services
FANTA	Food and Nutrition Technical Assistance Project
FFP	Office of Food for Peace
M&E	monitoring and evaluation
MSPP	Ministry of Public Health and Population (Ministère de la Santé Publique et de la Population)
MARNDR	Ministry of Agriculture, Natural Resources, and Rural Development (Ministère de l'Agriculture des Ressources Naturelle et du Développement Rural)
NEWS	Northwest Early Warning System
SC	Save the Children
USAID	U.S. Agency for International Development
WV	World Vision

Executive Summary

This report summarizes the findings and recommendations of technical assistance the Food and Nutrition Technical Assistance Project provided in 2003 to several partners implementing U.S. Agency for International Development (USAID) Office of Food for Peace (FFP) development projects in Haiti. The purpose of this technical assistance was: (1) to review the efforts of one FFP development project in Haiti to design and implement a food security early warning system in the project's area of implementation (the Northwest Early Warning System [NEWS]) and (2) to apply the findings of that review, as well as information obtained through an analysis of relevant literature and qualitative rapid field assessments, to recommend key technical and administrative considerations the other FFP development project partners should keep in mind as they worked to develop similar early warning systems in their respective areas of implementation. While this technical assistance was undertaken several years ago, many of the activity's approaches, findings, and lessons remain relevant in Haiti and other shock-prone areas today. As such, the Food and Nutrition Technical Assistance III Project (FANTA) has produced this summary to share insights and experiences from the effort with stakeholders looking to undertake similar work in Haiti and elsewhere.

The NEWS was developed in 1997 through a collaboration among entities including the monitoring and evaluation units of two nongovernmental organizations (CARE and Catholic Relief Services), the USAID-supported Food Security Policy and Information System, and the Government of Haiti's National Food Security Coordinating Unit. The goal of the NEWS was to prevent the loss of community assets and promote household livelihood systems and overall food security. The system focused primarily on drought monitoring, given the major risk to livelihoods and food security this hazard posed for Haiti's Northwest Department, though the system did collect information associated with other hazards likely to affect agricultural production, a major contributor to the department's overall food security.

The NEWS monitored food availability and access in the agricultural intervention areas of CARE's FFP development project in Haiti through the analysis of a range of meteorological, agricultural, and market data, while concurrently monitoring trends in the use of a/typical livelihood and coping strategies, particularly during key periods in the agricultural cycle. This information was complemented by other data (e.g., incidence/prevalence of pests and/or crop diseases, incidence of hail, livestock body conditions, pasture availability), all of which supported analysis and efforts to forecast when a drought or other production shock could lead to an increase in food insecurity. In the early 2000s, the NEWS also began collecting and analyzing health and nutrition outcome indicators. As the description of this approach implies, NEWS data analysis and forecasting were done using a convergence-of-evidence approach (applying quantitative and qualitative information from multiple sources to assess an area's food security); limited confidence was placed in any individual piece of information. Whenever some data indicated a normal situation while others indicated a problem, further verification of the situation was conducted.

Overall, the NEWS was managed and supervised by a system coordinator based in Port-au-Prince who reported to the overall FFP development project's agricultural program manager. The coordinator was responsible for data processing, analysis, and reporting through the NEWS monthly bulletin. The CARE FFP development project's agricultural staff typically collected and undertook preliminary analysis of NEWS agricultural and coping strategies data, while the project's health staff collected and analyzed health and nutrition data in collaboration with the NEWS coordinator. Data collection and reporting activities for the NEWS were included in the terms of reference for the project's regional managers and other extension agents and, when possible, rainfall, crop monitoring, market, and health data were collected on standardized reporting forms.

In particular, the NEWS collected and analyzed information including:

- Quantitative data on decadal (10-day) rainfall levels and biweekly market prices for select commodities. Trends associated with these indicators that signaled a potential food security issue in the NEWS included inadequate rainfall for two or more consecutive 10-day periods or an aseasonal or otherwise atypical price change in the same direction for more than two data collection periods.
- Qualitative data on the status of agricultural production. Production factors that signaled a potential food security issue in the NEWS included delayed planting of crops, late crop flowering, and estimated below-normal crop yields.
- Quantitative and qualitative data on the application of household coping strategies. In particular, the NEWS regularly monitored coping strategies once it had confirmed that prices were rising abnormally and/or rainfall and/or agricultural production levels were below normal.

All of this information was then amalgamated with interpretations of historical trends, local knowledge, and signals from various indirect indicators (e.g., volume of animal sales and rainfall impact on crop production) to make food security forecasts. As noted, the NEWS shared its analyses with stakeholders via published monthly bulletins.

With an understanding of the various technical and administrative facets of the NEWS model's approach, a series of design considerations were recommended to FFP's other development project partners as they worked to adapt a similar system to their project areas in Haiti. Recommendations for data collection and analysis in these other areas included the following:

- Begin collecting crop monitoring and harvest forecasting data using the NEWS formats and procedures (e.g., collection and analysis of quantitative and qualitative information on crop development and cropping conditions by project agricultural agents and other project staff), with the understanding that these could be adjusted over time as necessary to account for issues specific to each implementation context and to further overall analysis (e.g., improve crop production estimation capacities and expand into non-agricultural intervention areas).
- Ensure that analyses of and reporting on rainfall data reflect information on any delays in the start of a season, rainfall levels in relation to requirements for key crop growth stages, rainfall intensity and frequency, and when (onset and duration) and where during the production season poor rains occurred.
- Collect livestock data similar to that collected by the NEWS (e.g., body conditions, diseases, and pasture availability), given livestock's importance for understanding household vulnerability in the country and report on that information during critical periods (e.g., at the end of the rainy season, during extended droughts, and in the midst of reported epidemics) and/or in locations where livestock play a particularly dominant role in household livelihoods and food security.
- Adopt the NEWS's market price data collection methods (e.g., monitoring of data for key commodities in selected markets every 2 weeks throughout the year), while working to establish and apply standardized weights and measures (or associated conversions) so that all projects base prices on uniform weight equivalents.
- Consider analyzing the terms of trade for exchanging livestock (if animals are commonly held by households in a given project area, even in small numbers) and/or charcoal for another key commodity, such as maize or beans, and develop standard protocols for collecting complementary qualitative information on livestock sale volumes, gender, and age at sale.
- Continue anthropometric data collection at least monthly and analyze and report the data at the commune level (and below the commune level, as appropriate, during emergencies).

- Participate fully in any Government of Haiti initiative to collect health and epidemiological data from sentinel sites at health posts in their implementation areas.

Recommendations for the selection of sites where the other FFP development project partners could collect food security early warning data in Haiti included the following:

- At least initially, follow the NEWS approach of focusing on drought monitoring and early warning and on collecting data from agricultural implementation areas, with an eye toward future expansion of the systems into data collection for other shocks and for non-agricultural intervention areas.
- Identify at least two to three sites per agro-ecological zone within each project implementation area for crop monitoring and rainfall data collection and, to the extent possible, collect market price data from a combination of markets in project catchment areas, including major consumption markets, markets in drought-prone areas and, in some instances, smaller local markets.
- Continue to collect health data from health posts as noted above.

Recommendations for the structure of each project's adapted food security early warning systems in Haiti included the following:

- Divide management responsibilities for the adapted early warning systems among an early warning coordinator and associated sector staff, with final early warning-related data analysis and reporting responsibilities resting with the early warning coordinator (after consulting, as appropriate, with each project's overall monitoring and evaluation teams).
- Differentiate data collection, supervision, and analytical roles and responsibilities between the early warning system coordinator and sector managers, as well as between sector managers and their staff. Ensure that job descriptions reflect early warning system data collection, analysis, and overall management responsibilities, where relevant, and develop clear memoranda of understanding between each FFP development project implementer and any other partner agencies participating in the early warning system.
- Develop short updates for regular monthly reporting that can be circulated internally and forwarded to interested stakeholders and produce more extensive reports only during critical periods in the production cycle and/or when the systems indicate a deterioration in food security conditions.

1 Introduction and Methods

At the turn of the 21st century, Haiti was the poorest country in the Western Hemisphere, with about 80 percent of its rural population living in poverty. Chronic food insecurity affected a large portion of the population due to factors including political instability, economic decline, and a population that grew from about 3 million people in 1950 to 8 million people in 2000. The country's agricultural areas could not adequately support the sector, which provided a key livelihood for the majority of Haitians. Constraints to food production included limited access to agricultural land and inputs, a poorly developed market system, and political and fiscal policies that were not farmer-friendly. Many of these demographic and economic trends persist today.

In addition, natural disasters posed (and continue to pose) another major challenge to the country's food security. Haiti is located in a region highly affected by frequent meteorological hazards (e.g., tropical storms/hurricanes, floods, and droughts) and occasional geological hazards (e.g., earthquakes). Given the country's vulnerability to natural disasters and the negative impacts these disasters tend to have on food security, several efforts have been made to develop food security-focused early warning systems for Haiti.

In 2003, one food security early warning system model that was operating in Haiti was the Northwest Early Warning System (NEWS). The NEWS covered portions of the country's Northwest Department and was managed by CARE as part of its U.S. Agency for International Development (USAID) Office of Food for Peace (FFP)-funded development project. The CARE NEWS's objective was to simply, economically, and effectively monitor food security conditions and forecast drought in areas where CARE was implementing agricultural activities. The utility of this model led the Government of Haiti to consider CARE's NEWS as a possible model on which to base a national food security early warning system. As such, the USAID Mission in Haiti asked the other organizations that were implementing FFP development projects in the country—Catholic Relief Services (CRS), Save the Children (SC), and World Vision (WV)—to, where practicable, adapt the CARE NEWS's activities to their respective intervention areas. Because the FFP development projects in Haiti together covered a broad geographic swath of the country, adapting the NEWS to these additional areas was seen as an initial step toward national-level early warning system coverage in Haiti.

1.1 Technical Assistance Methods

Hazard and vulnerability information for the other FFP development projects' areas of implementation in Haiti was relatively limited when FANTA provided this technical assistance in 2003, and the information that was available tended to generalize conditions across wide geographic areas. Given this, FANTA's technical support centered around reviewing available literature and conducting sub-department-level rapid assessments in the CRS, SC, and WV project areas to collect localized vulnerability and hazard information that would facilitate the design of project area-appropriate food security early warning systems. Information collected during the rapid field assessments was primarily qualitative in nature—stemming from key informant interviews and focus group discussions—and included:

- Department-level and sub-department-level (e.g., commune) historical hazard profiles and information on the impacts of profiled hazards on associated communes and departments
- Local factors that influenced vulnerability (e.g., heterogeneity of livelihood and agricultural production systems, location of agro-ecological zones [see Annex 1], and characteristics of the local market system)
- Information that could be relatively easily monitored to assist in interpreting hazard impacts (e.g., harvest calendars and timing and implementation of coping strategies)

As noted, this information was complemented by a review of available published and grey literature related to the hazards that populations in Haiti face, the specifics of the FFP development projects being implemented, and the characteristics of the projects' implementation areas (e.g., livelihood zones and market systems). The specific resources that informed this technical assistance are noted in Annex 2.

Tools used during the rapid field assessments associated with this technical assistance are listed in Table 1. These tools were designed for sequential use, from the initial analysis of risk at the department level to similar analyses at the community level. In terms of limitations, it is important to note that the project areas visited during the rapid field assessments were purposively selected to coincide with the time available for the field work. It is also important to note that although focus group discussions and/or key informant interviews were held with community representatives in all project areas visited during the rapid field assessments, logistical and time constraints made planned household-level meetings to triangulate information provided at the community level infeasible.

Table 1. Qualitative Tools Used and Information Collected During Rapid Field Assessments

Type of Information Collected	Rapid Assessment Tools				
	Maps	Historical Profile	Calendars (Agriculture/ Food Security)	Disaster Timeline	Food Security Timeline
Hazard Threats	X	X		X	
Geographic Risk and Hazard Frequency	X	X		X	
Production and Livelihood Strategies	X		X		X
Typical Household Consumption Patterns			X		X
Typical Household Coping Strategies			X		X

To contextualize this technical assistance effort, Section 2 of this summary report provides background information on common food security hazards in Haiti and the broad risk profiles developed during the rapid field assessments undertaken in project-specific intervention areas. Section 3 describes key technical and administrative facets of the NEWS and associated recommendations for each of the other FFP development projects to consider in adapting these facets to their respective implementation areas.

2 Background

In general, early warning systems aim to provide timely and accurate information on the "who," "what," "when," "where," "how," and "why" of potential or ongoing hazard impact by (1) assessing risks related to a given hazard (e.g., losses the hazard can cause, or groups most likely to be affected by the hazard and their capacity to cope with and recover from its impacts), (2) forecasting and monitoring the development of hazards, and (3) issuing alerts on potential and/or actual hazard impacts. The rapid assessment undertaken as part of this technical assistance focused on several factors associated with the early warning of natural hazards that can significantly impact the livelihoods and food security of populations in the FFP-funded development projects' areas of implementation in Haiti. In particular, it looked at slow-onset events, such as drought.[1] This section opens with an overview of typical natural hazards in Haiti and the design of the CARE NEWS. It then discusses the specific hazards that the rapid field assessments associated with this technical assistance indicated were most common in the areas where CRS's, SC's, and WV's FFP-funded development projects were operating.

2.1 Overview of Common Natural Hazards in Haiti

Vulnerability and hazard assessment data for Haiti at the time of FANTA's technical assistance in 2003 were limited, and much of the information that was accessible was not sufficiently detailed to support localized early warning activities. Available information on hazard frequency and impact in the country indicated that the major natural hazards affecting Haiti were tropical storms and hurricanes, floods, droughts, landslides, and earthquakes. A broad outline of the attributes of each of these hazards in Haiti follows.

Geological Hazards

Geological hazards (e.g., earthquakes and landslides) pose a considerable threat in Haiti. However, risk from these hazards was not considered in this assessment because, although capabilities exist for identifying areas where these hazards are likely to occur, capacities for forecasting them are limited. Currently, there is no reliable capability for providing early warnings of earthquakes. Landslides can be predicted with some success because they often result from an underlying condition (e.g., soil composition) exacerbated by a triggering event (e.g., extended heavy rainfall). Several factors in Haiti increase the risk of landslides, including deforestation, population growth, and increased development in landslide-prone areas.

Tropical Storms and Hurricanes

Tropical storms and hurricanes are among the most severe weather conditions affecting Haiti. The combination of high winds, heavy rainfall, and resultant rising sea levels that these events bring leads to floods, landslides, coastal erosion, livestock and crop losses, infrastructure damage, and often increased prevalence of endemic and waterborne diseases. These events are seasonal (June to December), and most occur between August and October, with the total number of such events varying annually. While the impacts of tropical storms and hurricanes are felt across much of Haiti, given that most originate off the western coast of Africa and cross the Atlantic to enter the southern Caribbean Sea, they tend to have a greater impact on the southern portion of the country.

[1] Each hazard possesses unique characteristics that affect the ability to issue associated timely warnings. For example, early warning for flash floods typically allows less than 1 hour of lead time, whereas early warning for tropical storms and hurricanes allows a lead time of several hours to several days. Because droughts build over time, several days to several weeks of lead time are possible before their impacts are felt.

Floods

Flooding in Haiti generally follows heavy rainfall and occurs more frequently during the rainy seasons (April–June and August–November). This flooding falls into two major categories:

- River floods, which tend to be seasonal, occurring in larger rivers or as flash floods in smaller catchments[2]
- Coastal floods, which tend to accompany tropical storms/hurricanes or abnormally high tides

Several contextual factors exacerbate flooding in Haiti, including increased hillside runoff due to deforestation (which increases erosion), construction in flood-prone areas (e.g., on the sides of ravines or hills) that is not adequately adapted to this hazard, and poor and poorly maintained drainage infrastructure, particularly in urban areas. Generally, the areas affected by flooding in Haiti are close to shallower rivers or in alluvial flood plains (such as Les Cayes and Port-de-Paix) or in enclosed valleys (such as Port-à-Piment and Les Anglais).

Drought

Defined in general terms, a drought is an extended period of insufficient rainfall. However, drought conditions are not purely meteorological. Rather, they result from a complex interaction of rainfall- and non-rainfall-related factors, the latter of which include economic conditions and soil quality. In Haiti, the term "drought" is associated with both large-scale events (e.g., a department-wide and/or nationwide lack of rainfall) and more localized periods of poor rainfall due to delays in the start of the rainy season and/or poorly spaced/infrequent rains during the season. Several factors make Haiti susceptible to droughts, including the aforementioned widespread environmental degradation (such as deforestation) and subsequent desertification. In addition to impoverishing the natural potential of ecosystems, desertification reduces the amount of nutrients in the soil—and thereby reduces agricultural yields—which affects the food security of populations in affected areas. Unfortunately, many households in Haiti have adopted livelihood strategies that worsen desertification by overexploiting natural resources (e.g., cutting trees for fuel).

2.2 Overview of CARE's NEWS

CARE's NEWS focused primarily on drought monitoring, given the major risk to livelihoods and food security this hazard posed for Haiti's Northwest Department, though the system did collect information associated with other hazards likely to affect agricultural production—a major contributor to the department's overall food security. The NEWS was developed in 1997 through a collaboration among entities including the CARE and CRS monitoring, training, information, and evaluation units; the USAID-supported Food Security Policy and Information System; and the Government of Haiti's National Food Security Coordinating Unit (CNSA). Its creation was spurred by a drought assessment in the Northwest Department, during which it became clear that there were little historical or current primary data to support drought analyses in the area, despite the risks this hazard posed.

At the time of FANTA's technical assistance, the NEWS was the only functional food security-focused early warning system operating in Haiti. The NEWS collected and analyzed a range of data (including meteorological, agricultural, and market information) in the agricultural intervention areas of CARE's FFP project, with the goal of supplying decision-makers with information on the geographic extent, degree (severity), and impact of a lack of rainfall and/or other agricultural hazards on crop and livestock

[2] Flash floods generally occur when heavy rainfall rapidly fills streams, gullies, creeks, and ravines, causing these courses to overflow. Such floods usually occur during and/or within hours of heavy rainfall events.

production, household coping strategies, and ultimately, food security in parts of the Northwest Department. The goal of the system was to prevent the loss of community assets and promote household livelihood systems and overall food security. In particular, the NEWS aimed to:

- Warn when and where a drought (or other production-focused shock) was likely to occur
- Assess the severity of the shock if/as it unfolded
- Determine what interventions were needed in response to the shock

The NEWS monitored food availability and access through the analysis of key indicators, including rainfall and crop production levels, market prices, and trends in the use of a/typical livelihood and coping strategies (e.g., livestock sales), particularly during key periods in the agricultural cycle. This information was complemented by other data (e.g., incidence/prevalence of pests and/or crop diseases, incidence of hail, livestock body conditions, pasture availability), all of which supported analysis and efforts to forecast when a drought or other production shock could lead to an increase in food insecurity. As the description of this approach implies, NEWS data analysis and forecasting were done using a convergence-of-evidence approach (applying quantitative and qualitative information from multiple sources to assess an area's food security); limited confidence was placed in any individual piece of information. Whenever some data indicated a normal situation while others indicated a problem, further verification of the situation was conducted.

More specifically, the NEWS collected and analyzed information including:

- Quantitative data on decadal (10-day) rainfall levels and biweekly market prices (retail market price information was collected on rice, beans, millet/sorghum, bananas, goats, oil, and charcoal). Trends associated with these indicators that signaled a potential food security issue in the NEWS included inadequate rainfall for two or more consecutive 10-day periods or an aseasonal or otherwise atypical price change in the same direction for more than two data collection periods.
- Qualitative data on the status of agricultural production. Production factors that signaled a potential food security issue in the NEWS included delayed planting of crops, late crop flowering, and estimated below-normal crop yields.
- Quantitative and qualitative data on the application of household coping strategies. In particular, the NEWS regularly monitored coping strategies once it had confirmed that prices were rising abnormally and/or rainfall and/or agricultural production levels were below normal.

As Table 2 shows, the NEWS also considered risks that affected crop and livestock production outside of those directly related to rainfall variability (e.g., pests and diseases). In addition, in the early 2000s, the NEWS began collecting and analyzing health and nutrition outcome indicators. All of this information was then converged to make food security forecasts based on interpretations of:

- Historical trend analysis
- Local knowledge
- Indirect indicators (e.g., volume of animal sales or rainfall impact on crop production)

Table 2. NEWS Indicators and Collection and Analysis Protocols

Indicator	Quantitative and Qualitative Indicator Analysis	Mode of Indicator Measurement	Indicator Collection Timing	Indicator Collector Responsibility	Indicator Analysis Responsibility
Rainfall data	• Rainfall volume per 10-day period • Number of days of rainfall per 10-day period • Inter-annual comparisons of decadal rainfall totals (where available)	• Rainfall gauges • Historical rainfall totals (where available)	• Daily collection • Decadal/ monthly reporting	• CARE's FFP project volunteers • CARE's FFP project agricultural field staff • Schools	• Senior CARE FFP project staff • CARE FFP project monitoring and evaluation (M&E) staff • CARE NEWS staff
Crop/livestock production data	**Crop calendar monitoring** • Timing of planting • Percentage of seed germination • Crop growth stage • Crop damage due to pests, disease, and/or weather • Harvest estimates **Livestock** • Grazing availability • Water availability • Diseases/epidemic incidence/prevalence	• Interviews with farmers • Direct observation	• Monthly	• CARE's FFP project volunteers • CARE's FFP project agricultural field staff	• Senior CARE FFP project field staff • CARE FFP project M&E staff • CARE NEWS staff
Market data	**Market prices for:** • Key staples • Selected non-food commodities • Livestock **Trading patterns** • Volume of exchange • Production or other goods sold via petty commerce	• Market visits • Interviews with market women	• Biweekly	• CARE FFP project field staff • CARE FFP project partner staff*	• CARE FFP project M&E staff • CARE NEWS staff • CARE FFP project partner staff*
Household coping strategies	• Changes in consumption patterns (e.g., number of meals eaten per day; food types eaten, including wild foods) • Asset liquidation	• Interviews with community members	• Monthly collection following confirmation of an anomaly among any of the preceding indicators	• CARE FFP project staff (e.g., health promoters) • Local health care providers	• Senior CARE FFP project staff • CARE FFP project health promoters • CARE FFP project M&E staff • NEWS staff

*CARE implemented its FFP development project in the Northwest Department with the support of a partner project, Actions dans le Nord-Ouest pour le Sécurité Alimentaire.

2.3 Risk Information Collected During the Rapid Assessments

As noted, in addition to the indicators it monitored regularly, the NEWS drew on other information, such as historical trends, local knowledge, and supporting (indirect) information. To begin to accumulate some of this information in the CRS, SC, and WV FFP project areas, FANTA's technical assistance included rapid qualitative field assessments to a subset of these locations to begin to develop basic historical food security timelines and risk profiles for each area visited. Information from these assessments is summarized below.

Côte Sud (South Department) (CRS)

Haiti's Côte Sud lies mostly within a semi-arid agro-ecological zone (see Annex 1). The historical profile for the area compiled during the rapid field assessments indicated that hurricanes and floods regularly affected Côte Sud. Qualitative discussions in the field noted that the last major floods in the area had occurred in October 2001, and the last major hurricane in 1998.

The rapid field assessments also included the development of area-specific food security timelines with community leaders. The timeline for Côte Sud indicated a perception of generally poor food security conditions during the previous 10 years due to poor rainfall during both the first (main, April–June) and second (August–November) production seasons over much of that period. The communities assessed also reported perceiving a shift in rainfall patterns in the area during the preceding 5–10 years, with later starts to the seasons, often followed by periods without rainfall and then periods of intense rainfall, all of which ultimately contributed to reduced crop production. As a result, community members reported that households increasingly relied on a range of coping strategies to generate income to buy food and essential non-food items.

Although the communities assessed mentioned production problems associated with pest infestations and heavy rainfall, they felt drought was the main hazard affecting their livelihoods. They associated drought with increased rates of morbidity and mortality among larger livestock, increased prevalence of endemic diseases among humans (e.g., scabies, diarrhea, and conjunctivitis), and lower food security.

Maïssade (Central Department) (SC)

The main factors community members and other key informants reported as affecting food security in Maïssade during the rapid field assessments were a combination of late and infrequent rainfall (and intense rainfall episodes when rains did occur), high winds, hail, and pest infestations. An increase in endemic diseases among humans, particularly diarrhea, was also reported during the rainy season. Anthrax, which is endemic in the area, was the only major problem community members noted that affected livestock.

Dessalines (Artibonite Department) (SC)

According to the historical profile the communities in this commune developed during the rapid field assessments, flooding was a primary food security hazard for this area. Informants associated flooding with crop losses; infrastructure damage; and an increased prevalence of waterborne diseases, particularly typhoid and diarrhea, among humans. Drought events in the form of irregular seasonal rainfall and/or a longer dry season (late start of season) were also noted in the hazard profile, with these events reportedly particularly impacting production in the dry plain agro-ecological zone. Community members further noted that a range of pest infestations regularly negatively impacted crop production. As with Maïssade, anthrax was reported as endemic in the area, which stakeholders noted negatively affected livestock production.

Haut Plateau (Central Department) (WV)

The last severe drought in WV's project area was reportedly in 1990. However, a food security timeline for the previous 10 years developed during the rapid field assessments showed a perception that food security had deteriorated across this period mainly due to insufficient and irregular rainfall during both the first and second production seasons, which reduced crop production. As in Côte Sud, the communities visited in Haut Plateau reported a perception that rainfall patterns in the area had shifted during the previous 5–10 years, with late starts to the seasons, often followed by a period without rainfall and then a period of intense rainfall, the timing of which ultimately reduced crop production. Hail and pest damage also reportedly hurt crop production in this area.

Community leaders in Haut Plateau reported that drought events were marked by a substantial increase in endemic and waterborne diseases among humans (e.g., diarrhea, dysentery, typhoid, acute respiratory tract infections, conjunctivitis, and scabies). Mortality rates also reportedly increased for both large and small livestock during drought events, as forage for animals decreased during these dry periods.

Table 3 provides a department-level risk assessment matrix, which was adapted for CRS's, SC's, and WV's project areas to reflect information collected during the rapid field assessments.

Table 3. Principal Hazards and Risk Levels in the FFP Development Projects' Implementation Areas

Overall Level of Risk*	Department and Key Characteristics	Principal Hazards	Localities Most Affected
Very high	South (high level of general hazard impacts and relatively high population density)	Hurricanes	Chardonnières, Côteaux, Port-Salut, Arniquet, Chantal, Camp-Perrin, Cavaellon, Aquin, Les Cayes
		Floods	Les Cayes, Torbeck, Plaine des Cayes
		Drought	Aquin, Tiburon
High	Artibonite (high population density and high conflict risk)	Floods	Vallée de l'Artibonite, Estère, Petite Rivière, Dessalines
		Erosion	Montagnes de Dessalines, Gros Morne de Gonaïves
Average	Northwest (highly drought-affected)	Drought	Môle-Saint-Nicolas, Bombardopolis, Baie-de-Henne
		Floods	Saint-Louis-du-Nord, Jean-Rabel, Port-de-Paix
	Grand'Anse (low population density)	Hurricanes	Beaumont, Jérémie, Abricots
		Floods	Massif de la Hotte (southwestern portion)
Very low	Central (low hazard impact frequency)	Drought	Haut Plateau—(northern portion), Thomassique, Cerca-la-Source, Cerca-Caravajal, Maïssade (northern portion)
		Floods	Bas Plateau—Mirebalais, Lascahobas, Savanette

* Overall departmental risk levels were assigned after weighing factors such as hazard frequency, impact, and population density.

3 NEWS Approach and Recommendations for Adapted System Design

This section presents various technical and administrative facets of the NEWS model's approach—including data collection and analysis, site selection, and system structure and organization—and provides related design considerations that were recommended to CRS, SC, and WV for adapting a similar system to their project areas. The recommendations assumed that the other FFP development projects' early warning systems in Haiti would (1) be implemented primarily through each project's agricultural interventions, (2) primarily monitor and assess drought, and (3) draw on existing project resources (i.e., integrate early warning activities into ongoing project interventions using available financial, physical, and human resources).

3.1 NEWS Data Collection Approaches and Adaptation Recommendations

3.1.1 Crop Production Monitoring and Harvest Forecasting

Summary of the NEWS Approach

NEWS analyses were based on *ex ante* crop production forecasts; the NEWS did not conduct *ex post* crop assessments. NEWS production forecasts were updated throughout the production cycle and were based largely on an analysis of quantitative and qualitative information on crop development and cropping conditions. Forecasts provide a useful first view of how harvests are likely to develop based on current conditions and of the possible implications for food security should these conditions persist. NEWS forecasts were generally expressed as "good" or "poor" production scenarios or as an estimated percentage of normal yield based on analysis of a specific locality.

In the NEWS, crop development data were collected from farmer group leaders (agricultural agents) and agricultural zone technicians at CARE project sites through semi-structured interviews. The results were then summarized into a two-page report produced by CARE's agricultural zone supervisor (Box 1). The interview format also facilitated the collection of information on other factors affecting crop production, such as the impacts of pests, high winds, excessive rainfall, and the availability of seeds and other inputs.

Box 1. NEWS Agricultural Data Collection and Reporting Topics

Items covered in agricultural zone supervisor's report:

- Agricultural situation summary
- Rainfall data and impact interpretation
- Market data and impact interpretation

Items in agricultural production data collection checklist (compared to "normal" conditions):

- Availability of seeds and other inputs (lower, similar, higher—with types of inputs used)
- Price of agricultural inputs (increased, similar, decreased)
- Level of purchases of seeds or other agricultural inputs (lower, similar, higher)
- Planting period (late, normal, early—with reasons for any atypical planting)
- Estimation of area planted (lower, average, higher—with rationale for lower or higher area planted)
- Estimation of seed germination rates (lower, average, higher—with reasons for atypical germination)
- Crop growth problems (higher, average, lower—with problem and causes identified and actions taken)
- Plant disease/pest infestation impacts (higher, average, lower—with diseases/pests and causes identified and actions taken)
- Estimation of production (poor, average, high—with reasons for atypical estimates)
- Any changes in crops planted and their performance (with reason for change)

Recommendations for Adaptation

To minimize delays in implementing adaptations of the NEWS, it was suggested that CRS, SC, and WV begin collecting data using the NEWS formats and procedures for crop monitoring and harvest forecasting in their FFP development projects' agricultural intervention areas. Over time, it was expected that these formats and procedures would be adjusted as necessary to better address context-specific characteristics. Illustrative examples of such adjustments follow.

Monitoring of Crop Conditions and Development

While the NEWS's semi-structured interview method appeared to function well overall, it was noted that it may be beneficial, particularly when the other FFP development projects train new staff to carry out the tasks of their adapted systems, to explicitly disaggregate the topics covered in the data collection formats to more clearly reflect the monitoring associated with each key stage of the agricultural cycle. This more explicitly staged approach would divide monitoring activities into five main phases: pre-rainfall, start of season, seasonal progress, end of season, and post-harvest, highlighting key early warning issues, monitoring activities, and associated questions to be addressed at each stage. Examples of more explicitly staged monitoring and analysis (compared to normal) activities associated with these issues are outlined below.

- Pre-season monitoring:
  - Extent of land preparation (lower, average, above average—with reasons for atypical preparations)
  - Availability of inputs in markets (lower, similar, higher—with types of inputs used)
  - Price of inputs in markets (increased, similar, decreased)

  - Reports of inputs purchased by farmers (lower, similar, higher—with types of inputs acquired)

- Start-of-season monitoring:
  - Timing of season start (late, normal, early)
  - Area planted (lower, average, above average—with rationale for lower or higher area planted)
  - Stage and condition of crops (with causes of any observed problems)
  - Availability of inputs in markets (lower, similar, higher—with types of inputs used)
  - Price of inputs in markets (increased, similar, decreased)
  - Reports of inputs purchased by farmers (lower, similar, higher—with types of inputs acquired)

- Seasonal progress monitoring:
  - Rainfall levels—amount and distribution (poor, normal, above normal)
  - Timing of current agricultural activities (late, normal, early—with reasons for atypical timing)
  - Stage and condition of crops (with causes of any observed difficulties)
  - Availability of inputs in markets (lower, similar, higher—with types of inputs used)
  - Price of inputs in markets (increased, similar, decreased)
  - Reports of inputs purchased by farmers (lower, similar, higher—with types of inputs acquired)

- End-of-season monitoring:
  - Cumulative rainfall levels—amount and distribution (poor, normal, above normal)
  - Timing of current agricultural activities (late, normal, early—with reasons for atypical timing)
  - Stage and condition of crops (with causes of any observed problems)
  - Early estimation of production (poor, average, above average—with reasons for atypical estimates)

- Post-harvest monitoring:
  - Harvest outcomes following crop assessments (poor, average, high—by crop and agro-ecological zone)
  - Analysis of harvest based on total output and productivity aspects, such as rainfall (comparing this season's harvest with past trends and explaining differences)

Crop Production Estimates

Crop production estimates are generally based on multiplying area sown by estimated yield.[3] However, in Haiti, a number of challenges complicate yield estimations—and therefore overall crop production estimates—including high variability in agro-ecological conditions (including climatic and phyto-geographic factors) and widespread use of "multiple cropping" approaches (the combination of seasonal and perennial crop production in the same area and the crops' varying harvest times within a year). That

[3] The reliability of yield estimate data depends on a number of factors, including the number of farms sampled and the level of training and supervision provided to assessors.

said, developing project-level crop assessment and yield estimating capacities is recommended in the medium term, though this would require a considerable investment in training and other project resources.

3.1.2 Rainfall Data

Summary of the NEWS Approach

In 1997, the Food Security Policy and Information System and CNSA, with support from other organizations (including CARE), began collecting daily rainfall data from about 40 rainfall stations in Haiti to establish time series data that, eventually, would provide a long-term historical rainfall average to compare with seasonal rainfall levels in the station areas. Participating organizations received training in rainfall data management and analysis as part of this effort, and, in 1998, all of the data management and analytical responsibilities for these stations were transferred to CARE. The NEWS therefore had access to a limited time series of decadal rainfall data that, when combined with qualitative crop development and agricultural performance information and an understanding of critical periods in crop production, facilitates forecasting of the likely impact of rainfall patterns on agricultural production. This information helped the NEWS classify communes or departments experiencing dry periods into warning categories based on the duration of anomalous rainfall periods.[4]

Recommendations for Adaptation

One challenge the FFP development projects faced in analyzing rainfall data was the overall lack of long- and short-term rainfall data averages for comparisons. As such, in many CRS, SC, and WV implementation areas, the projects' rainfall station data served to establish this needed historical reference. Even where longer-term historical data were available (e.g., Les Anglais in CRS's implementation area), caution was needed when using this information for comparison, as quantitative data provide only part of the picture. The continued use of complementary qualitative information for production forecasting was emphasized, as this allowed a greater degree of triangulation should quantitative data signal anomalies in rainfall frequency and/or distribution. Ideally, analysis of rainfall data includes information on any delays in the start of a season, rainfall levels in relation to requirements for key crop growth stages, rainfall intensity and frequency, and when (onset and duration) and where during the production season poor rains occur. Information and recommendations on where and how other FFP development projects could install rainfall stations are available in Section 3.3.

3.1.3 Livestock Conditions

Summary of the NEWS Approach

Understanding the role of livestock in household food security helps contextualize reports of animal diseases and/or pasture problems. While most households in Haiti have only a few smaller ruminants, these livestock typically serve as an important signal of household vulnerability. As such, the NEWS regularly collected information on livestock body conditions and diseases, as well as on pasture conditions.

Recommendations for Adaptation

It was recommended that CRS, SC, and WV collect similar livestock data as that of the NEWS, given livestock's importance to household vulnerability in Haiti and considering that information on livestock

[4] The NEWS issued low-level alerts when 50 percent of rainfall stations reported no rainfall for two 10-day periods during the rainy seasons and high-level warnings when 50 percent of stations reported no rainfall for three 10-day periods during the rainy seasons.

numbers and diseases are not always readily available from the Ministry of Agriculture, Natural Resources, and Rural Development (MARNDR). In addition, collecting these data does not require significant additional staff time. However, because of the endemic nature of many livestock diseases in Haiti, it was recommended that the other FFP development projects consider reporting livestock data only during critical periods (e.g., at the end of the rainfall season, during extended droughts, and during reported epidemics) and/or in locations where livestock play a particularly dominant role in household livelihoods and food security.

3.1.4 Market Price Data

Summary of the NEWS Approach

Market prices can provide important information on the supply of commodities in the market. One assumption underlying market price analysis is that as the supply of a commodity decreases, its price tends to rise (i.e., large price increases often indicate a decline in the amount of food for sale). Prices can also reflect how market traders perceive future supply and demand: prices typically rise if a shortfall in supply is expected and decline if a surplus is expected. In addition, prices can act as an incentive or disincentive to agricultural production, with producers sometimes opting to grow less of a commodity when its farmgate or retail prices are or are expected to be low. Given these factors, and the fact that most households in Haiti rely on markets to access at least some of the foods they consume, it is important that prices are monitored throughout the year and that particular attention is paid to price dynamics at key moments, such as at the start of the production season and throughout the post-harvest period. The NEWS followed the prices of essential food products in selected markets throughout the year, not only to monitor price fluctuations and their impacts on local populations' access to food but also to monitor for any potential market price impacts from project-distributed commodities.[5]

Specifically, the NEWS collected data from four markets in Haiti's Northwest Department, while its partner, Actions dans le Nord-Ouest pour la Sécurité Alimentaire, collected information from six other markets in the area. Markets included in the NEWS were selected based on their location, transaction volume, and accessibility to the local population. CARE's agricultural zone supervisors visited selected markets twice per month between 10:00 a.m. and noon on predetermined days. Prices for selected commodities were obtained from at least three vendors, and the zone supervisors worked to obtain prices from different vendors during each visit. Prices were collected as per the average unit of sale, though products were not weighed during data collection.[6] Prices were ultimately reported in Haitian gourdes per pound using area-specific conversion tables for each unit of sale. The NEWS collected retail prices for rice (local and imported), cereals (maize and sorghum), beans (white, black, and red), bananas, charcoal, cooking oil, and livestock (mainly goats and sheep). The NEWS also monitored seed prices and availability at key periods in the production cycle (e.g., pre-season and start of season).

Recommendations for Adaptation

General Methodology

It was recommended that CRS, SC, and WV adopt the NEWS' market price data collection method, monitoring the retail prices of identified key commodities in each project's intervention area. One challenge in applying this method is the standardization of weights and measures, as there is considerable

[5] Part of each FFP-funded development project's package of interventions in Haiti included the targeted distribution of food aid commodities.

[6] Units of sale vary by commodity and include *marmite* (a measure equivalent to about 6 pounds, depending on the measuring tin used) for cereals, rice, and peas; gallon for oil; and sack for charcoal.

variation in how weights of fresh and dry produce are measured within and between markets. Although it is preferable to equip each market monitor with scales to enable weight-based analysis, it was understood that this may be difficult to implement due to market traders' perceived resistance to the use of scales. It was therefore suggested that the projects pilot the use of balance scales and/or other measuring devices in their areas in an effort to develop a suitable method for introducing their broader use. In the interim, it was recommended that each FFP development project create weight conversion tables for *marmites* and other local measures so that all projects based prices on uniform weight equivalents.

Commodity Selection

The selection of commodities each FFP development project monitors should reflect the agricultural production and consumption patterns in their intervention area. It was recommended that all FFP development projects in Haiti monitor retail prices for at least the following commodities:

- Imported rice (Miami and/or Dominican)
- Cereals—maize (processed and unprocessed) and sorghum
- Beans—white and black
- Groundnuts
- Bananas
- Cooking oil
- Charcoal and/or wood
- Livestock (average price for goat/sheep)

These recommendations were based on observations and information collected during the rapid field assessments and on available project data, with attention to which commodities should be considered for data collection across all projects (thereby enabling broader geographic comparisons) and taking into account the number of overall products in the market, available project resources, and the list of commodities monitored by the NEWS, MARNDR, and the Haitian Institute of Statistics.

Depending on their location and resource availability, it was recommended that individual projects also consider collecting prices for local rice, red and lima beans, and pigeon peas. Experience from other countries suggests that it is initially better to collect prices for a relatively limited number of commodities and to add more commodities over time, as necessary. This reduces the initial workload for data collectors and analysts and facilitates more in-depth analysis of the marketing and consumption patterns of the selected commodities.

Terms of Trade

Because food insecure households typically have limited savings, the terms of trade of their liquid assets (e.g., agricultural production and charcoal) are an important indicator of their ability to acquire essential items. (Terms-of-trade analysis indicates the amount of a given commodity a household can acquire from selling agricultural production, charcoal, or another asset [and vice versa]). As such, it was recommended that CRS, SC, and WV consider analyzing the terms of trade of key commodities (e.g., for livestock if animals are commonly held by households in a given project area, even in small numbers, and/or charcoal and maize or beans).

Piloting More Comprehensive Livestock Price Collection Methods

As noted, while households in Haiti typically hold only a few small ruminants, livestock sales can be an important indicator of household food insecurity. As such, it was recommended that market data collectors be trained in collecting more comprehensive livestock price data, particularly in areas where

livestock play a more dominant role in local livelihoods and food security. Applying a more comprehensive approach to this data collection could involve continuing to survey retail livestock prices every 2 weeks at major markets, with price data collected directly from sellers and weight estimates obtained based on standard MARNDR tables, and complementing the data with qualitative information on livestock sale volumes, gender, and age at sale collected from market traders/sellers as the system grows and especially during periods of stress.

Strengthening Market-Related Qualitative Data Collection[7]

Finally, it is recommended that project data collectors receive training and guidance on how to conduct focus group discussions and key informant interviews with market actors, as well as observational techniques to facilitate the collection of information on changes in trading volumes in the overall market and for specific commodities. This qualitative data should be collected regularly and more frequently when available information signals a potential food security problem.

3.1.5 Coping Strategies

Summary of the NEWS Approach

Coping strategies are actions households take to adjust how they meet their needs when faced with shocks such as price increases, reduced agricultural production, or loss of employment. The coping strategies a given household employs depend on the household's primary livelihood strategies and the strategies' associated underlying factors (e.g., if a household's primary livelihood is agricultural production, the household's coping strategies will partly depend on local agro-ecological conditions such as soil type, rainfall levels, and availability of natural resources), household assets (e.g., human and financial capital), and the nature and duration of the shock. In general, households adopt progressively more severe coping strategies as food security worsens. These strategies can be generalized along the following broad continuum:

- **Adaptation strategies** are actions that aim to "make ends meet." They often involve changing consumption patterns (e.g., eating less expensive foods) and/or reallocating available resources (e.g., producing charcoal or increasing labor migration).
- **Divestment of liquid assets** involves tapping into resources that can be easily sold (e.g., small animals) or accessing social assets (e.g., informal loans). These actions are generally taken after adaptation strategies have been exhausted.
- **Divestment of productive assets** may involve consuming seed and/or selling capital items required for production (e.g., plows and rakes). This strategy is among the most severe forms of coping, as households with fewer productive assets to leverage are typically less able to cope with future shocks.

In the NEWS, information on coping strategies was initially collected and analyzed during vulnerability or other qualitative baseline assessments and was collected and analyzed again after a deteriorating situation was identified. Such comparisons provided an additional means of triangulating hazard impact and its effect on local food security. During deteriorating food security conditions, NEWS agricultural extension staff collected coping strategies data from purposively selected households in affected areas

[7] It should be noted that strengthening capacities in qualitative data collection assists in the collection and analysis of all aspects of a food security early warning system, not just market-related aspects.

using standardized interview/data collection formats. Coping information collected when food security deteriorated included:

- Number of meals and/or types of food consumed and/or portion sizes consumed over a given period (e.g., the last 7 days), and timing and duration of any reduction in food intake
- Seed consumption (amount of seed consumed, seed type)
- Sale of household assets and types of assets sold (including livestock)
- Number and size of any formal or informal loans taken
- Migration patterns

Recommendations for Adaptation

Basic information on coping strategies was gathered during the rapid qualitative field assessments associated with this technical assistance in CRS's, SC's, and WV's implementation areas to provide a first-level analysis of the typical timing and evolution of local coping strategies. Where time allowed, this information was further refined using a pair-wise ranking technique.[8] Table 4 shows common coping strategies noted in community focus group discussions and by key informants across CRS's, SC's, and WV's FFP development project areas.

Table 4. Coping Strategies in the Assessed FFP Development Projects' Implementation Areas

Ranked Strategies in Haut Plateau* (WV)	General Strategies in Côte Sud (CRS)	General Strategies in Maïssade (SC)
1. Charcoal production/change in consumption patterns 2. Livestock sales and small-scale commerce 3. Commercial loans 4. Migration to the Dominican Republic in search of employment	• Family and agency loans/credit • Small-scale commerce • Migration in search of local employment (normally to Les Cayes) • Sale of livestock (large-scale sales serve as a final strategy; livestock sales were reported as normal livelihood strategies in Tiburon commune) • Charcoal production**	• Low-level livestock sales • Small-scale commercial activities • Commercial loans • Planting of more resistant crops (cassava and groundnuts)

* The pair-wise ranking conducted in WV's implementation area (described in footnote 8) allowed for the ranking of coping strategies from those applied earlier (more common strategies) to those applied later (less common strategies).
** Although not mentioned in community focus group discussions in Côte Sud, key informants interviewed at the department level considered charcoal production an important coping strategy.

While the rapid field assessments provided general background on coping strategies common in each project area, more localized (and triangulated) information is needed. It was recommended that CRS, SC, and WV conduct more in-depth vulnerability assessments to better understand the livelihood and coping strategies used by the populations in their respective areas of intervention given the extent to which local factors influenced when and how different strategies were adopted (e.g., seeking additional employment opportunities was reportedly an early coping strategy in Artibonite Department, due in part to the area's proximity to rice production zones, however, this strategy was reportedly adopted later in Côte Sud and Haut Plateau because it often required migrating). Additional information gathered during the rapid field

[8] The pair-wise ranking technique was used in WV's implementation area. The technique aims to overcome difficulties in ordering/ranking more than two items by breaking down the ranking process so that only two items are compared at any one time. This is achieved through designing an ordered matrix of the items to be compared, comparing the items against each other, and adding up the comparative scores for each item.

assessments underlined the importance of considering the following when interpreting information on coping strategies:

- Many coping activities are used routinely in non-emergency situations (e.g., poorer households often apply some form of coping during normal lean seasons).
- Coping activities might not occur sequentially; households might pursue several strategies at the same time.
- The sequence and nature of coping may differ according to wealth and livelihood systems. This underscores the need to frame coping information within the local livelihood context and, for the purposes of FFP development projects, to focus on collecting this information from the most vulnerable populations, in particular.

3.2 Nutrition and Health Data Collection Considerations and Recommendations for Application

3.2.1 Nutrition Surveillance and Early Warning

Although the collection and analysis of anthropometric data were not considered in the original NEWS model, at the time this technical assistance was provided, all of the FFP development projects in Haiti (including CARE) had recently added collection and analysis of some of these data to their projects. This sub-section clarifies several issues regarding the use of anthropometric data for early warning purposes.

All FFP development projects in Haiti conducted growth monitoring activities as part of the health and nutrition component of their projects, regularly collecting and analyzing weight-for-age data[9] from participating hospitals, health centers, and rally posts[10] in collaboration with the Ministry of Public Health and Population (MSPP). Nutrition information gathered from these activities was generally reported at the commune level using a nutritional status classification based on weight-for-age z-score (see Table 5). The number of cases of nutritional edema (kwashiorkor) was also reported.

[9] "Weight-for-age reflects body mass relative to chronological age. It is influenced by both the height of the child (height-for-age) and his or her weight (weight-for-height), and its composite nature makes interpretation complex. … However, in the absence of significant wasting in a community, similar information is provided by weight-for-age and height-for-age, in that both reflect the long-term health and nutritional experience of the individual or population. Short-term change, especially reduction in weight-for-age, reveals change in weight-for-height" (WHO. *Global Database on Child Growth and Malnutrition*. http://www.who.int/nutgrowthdb/about/introduction/en/index2.html).

[10] Rally posts are locations within FFP project areas where beneficiaries gather at specified intervals (e.g., once per month or once per quarter) to receive specific project services (e.g., growth monitoring, immunizations, and food aid distributions). Because projects typically place rally posts in centralized locations, the posts tend to pull participants from several surrounding administrative areas (communes).

Table 5. Nutritional Status Classifications Based on Weight-for-Age Z-Score

Nutritional Status	Weight-for-Age Z-Score
Normal	> -1 z-score
Mild malnutrition	-1 to -2 z-score
Moderate malnutrition	-2 to -3 z-score
Severe malnutrition	<-3 z-score

At the time of this technical assistance, there was a considerable delay (10–12 weeks) in the reporting and analysis of anthropometric information through normal MSPP data reporting channels. By contrast, the monitoring and evaluation (M&E) units of the FFP development projects, which had considerably more data collection and processing support than the MSPP and which used the same data collection forms (so that this information could be more easily used by the MSPP), could share nutrition surveillance information within 1–2 weeks of collecting the data.

Early warning systems depend on the collection and analysis of leading (predictive) indicators. Anthropometric data are generally considered lagging (outcome) indicators and typically are not used for predictive purposes. However, anthropometric data may be used as a concurrent indicator of nutritional stress to triangulate other predictive indicators and/or to provide a context for reporting improvement or deterioration in a population's situation compared with a pre-established baseline.

Early warning systems typically collect nutrition data when there is (or soon will be) a surveillance system that regularly reports this information in a timely manner, facilitating the monitoring of nutritional status over time. During emergencies, early warning systems are typically concerned with collecting weight-for-height data[11] to determine the prevalence of wasting, an effective indicator of short-term mortality risk.[12] Changes in malnutrition rates during an emergency can be assessed through growth monitoring activities, nutrition screening data, or random sample surveys. The most effective—albeit costly—means of monitoring the nutrition situation is repeat surveys. In an ideal situation, surveys based on weight-for-height would be implemented before an emergency, after the initial response (once the situation is believed to be stabilizing), and before the response ends.

Anthropometric data are normally analyzed as trends in prevalence against a predefined cutoff. However, deciding whether malnutrition levels are acceptable requires both assessing the prevalence of malnutrition defined by these cutoffs and analyzing how the current situation compares to available baseline data. This can be achieved by comparing the results of one-time assessments with data from previous surveys, taking into account seasonal effects and assuming the comparability of samples. An overview of appropriate definitions of malnutrition, issues concerning the use of nutrition data, and the development of nutrition surveillance systems during emergencies is outlined in the SPHERE standards for disaster response.[13]

[11] Weight-for-height reflects body mass relative to height. Low weight-for-height often indicates recent and severe weight loss (wasting), which is typically associated with acute disease and/or starvation (WHO. *Global Database on Child Growth and Malnutrition*. http://www.who.int/nutgrowthdb/about/introduction/en/index2.html).
[12] If weight-for-height data are not available, changes in mid-upper arm circumference are considered an acceptable alternative. Weight-for-age data can also be used to monitor the nutrition situation because rapid changes in this index may reflect an increase in wasting (see footnote 9).
[13] The SPHERE standards handbook is available at: http://www.sphereproject.org/handbook/.

Recommendations for Application

The rapid field assessments undertaken as part of this technical assistance did not include a detailed review of the FFP development projects' health and nutrition data collection and analysis procedures, as it was assumed that these activities were standardized across the projects when they were introduced. However, the level at which the indicators were sometimes analyzed/reported and the timeliness of their official reporting could pose challenges to including such data in the FFP development projects' early warning systems. It was recommended that these data continue to be reported and analyzed at the commune level and that analysis below the commune level be considered, as appropriate, during emergencies. The timeliness of reporting is especially relevant when the early warning system indicates a developing problem and during an emergency. In both cases, nutritional status data should be reported and analyzed at least monthly.

Finally, it was recommended that two points be considered regarding the use of weight-for-age and/or weight-for-height data to monitor nutritional status during emergencies. First, weight-for-age and weight-for-height incidence data collected from rally posts must be carefully examined to determine whether large increases in caseload mean that more malnourished children are arriving at the data collection points or that malnutrition rates among the population are actually increasing. Second, due consideration should be given to both the implementation of random sample surveys that collect weight-for-age and/or weight-for-height data and the use of additional, complementary indicators from growth monitoring activities (e.g., percentage of children losing weight each month) for triangulation during emergencies.

3.2.2 Health and Epidemiological Surveillance

Another aim of many early warning systems is to mitigate the public health impact of diseases by enabling health officials to obtain timely disease outbreak surveillance information so they can coordinate appropriate resources and responses when necessary. During the rapid field assessments undertaken as part of this technical assistance, information was obtained on the main diseases affecting communities during past disasters using historical timelines, risk profiles, and interviews with project health staff and other key informants. In all cases, an increase in endemic diseases was reported during disasters, with the risk from these diseases being exacerbated by poor health care coverage and a lack of sanitation and clean water.[14] Baseline epidemiological surveillance information was not available at the time of the rapid field assessments to support a more specific disease vulnerability assessment. However, information gathered during field interviews indicated that the main human health threats communities perceived during floods, hurricanes, and drought were diarrhea, gastrointestinal and respiratory tract infections, amoebiasis, typhoid, conjunctivitis, and malaria.

Recommendations for Application

MSPP reports incidence rates for the diseases outlined above at health centers and hospitals in Haiti. However, as noted, this information generally is not available in a timely manner. As such, the main challenges to integrating this component into the FFP development projects' early warning systems in Haiti were ensuring that morbidity data were collected and analyzed in a timely fashion and that collection and analysis of the data could be scaled up during disasters. MSPP had proposed to initiate a sentinel site surveillance system for health and epidemiological data based on reporting from 34 health posts in five departments and to develop a coordination forum between the MSPP, nongovernmental organizations, and other public health stakeholders to standardize data collection and reporting formats. It was recommended that the FFP development projects in Haiti participate fully in this or a similar process.

[14] A number of endemic diseases, such as diarrhea and malaria, also experience peaks during Haiti's rainy seasons.

3.3 Site Selection and System Design Recommendations

When deciding on design options and data collection sites for food security early warning systems, it is not necessary that each project collect all of the aforementioned information from all localities in its agricultural intervention area or that each project develop a system exactly the same way as the others. Rather, decisions about system structure and what information is collected from which areas should be informed by factors including the area's hazard profile, the heterogeneity of the area's agro-ecological zones and its inhabitants' livelihoods, and the project's geographic coverage and available resources.

3.3.1 Summary of the NEWS Site Selection and Design Approaches

The NEWS used a high-density data collection network that covered one of Haiti's most drought-prone areas. The system leveraged agricultural agents to collect data at 70 to 80 project intervention sites throughout the communes of Bombardopolis, Jean-Rabel, Port-de-Paix, and Bassin Bleu. Collected data were analyzed and reported at the local administrative level (commune and department). That said, the system was not designed to provide representative data for the Northwest Department or for communes outside of CARE's agricultural intervention areas; essentially, the system provided information sufficient for early warning purposes in CARE's project areas.[15] While these project areas covered a large part of the department, for department-level reporting, information on areas not directly covered by the system would also have been required.

3.3.2 Recommendations for Site Selection and Associated Data Collection

Data Considerations for Site Selection

A key challenge to designing food security early warning systems in the FFP development projects' implementation areas in Haiti was the lack of a framework for a national food security monitoring system. This put the projects in the unusual situation of developing food security monitoring systems in both high- and low-risk areas, with a view to contributing this information to a fledging national monitoring endeavor. In general, high-risk areas should collect data at a higher resolution (which requires more detailed vulnerability and risk information and a more extensive, higher density monitoring network) than that required for low-risk areas. Because the FFP development project areas faced various risk levels for shocks such as drought, the systems in each area would need, to some extent, to be set up differently. That said, given that NEWS data collection was done by the agricultural component of CARE's project, it was recommended that the other FFP development projects' systems initially target areas where they were implementing agriculture activities, with the idea that the systems could later expand into areas where other sector interventions were being implemented. In addition, given that the NEWS model focused on drought monitoring and early warning, it was similarly recommended that, at least initially, the other FFP development projects' adapted data collection systems place less emphasis on areas less vulnerable to drought in Haiti. Table 6 notes the risk of drought in CRS's, SC's, and WV's areas of intervention, based on information collected during the rapid field assessments and other data made available during this technical assistance.

[15] There was some confusion over NEWS coverage in Haiti. A number of people interviewed during the rapid field assessments thought that the NEWS reported average rainfall data for the entire Northwest Department, when only CARE's areas of operation were included in reported analyses. It may be useful for all FFP development projects to clarify which areas are covered by their systems in any published bulletins.

Table 6. Sub-Department-Level Drought Hazard Profiles for Assessed FFP Development Project Implementation Areas

Department	Communes/Localities with High Drought Risk	Communes/Localities with Low Drought Risk
South (CRS)	Côte Sud, Aquin, Tiburon	
Central (WV)	Northern Hinche, Thomassique, Cerca la Source, Cerca Caravajal, northern Maïssade	Communes in the Bas (Low) Plateau
Artibonite (SC)		All communes

As Table 6 indicates, given the high level of drought risk in the CRS project areas included in the rapid field assessment, it was recommended that a higher-density data network be developed in the South Department, as is described further below.

Although the Central Department was classified as having a low drought risk overall, information gathered during the rapid field assessments indicated that drought frequency and impact differed across the department. In particular, drought reportedly affected the northeast portion of the department more frequently, while communes in the Bas Plateau and the humid areas of Maïssade Commune reportedly faced lower incidence of the hazard. This variability suggests the need to develop a system that could account for differences across the department. As such, it was recommended that WV's data collection network be higher-density only in areas with a higher risk of drought.

Information collected from the selected communes in Artibonite Department appeared to confirm its classification as being at lower risk of drought. Other than the reported higher incidence of drought events in the department's more arid agro-ecological zones, drought frequency was reported to be generally low across the selected communes. It was therefore recommended that SC collect early warning data in only a few sites in the department.

Crop Monitoring and Rainfall Data Site Selection

Potential locations of rainfall data collection and crop monitoring activities were discussed with staff from CRS, SC, and WV as part of the provided technical assistance. While it was anticipated that each selected site would collect both crop monitoring and rainfall data, final decisions on the precise number and location of such sites were left to the individual FFP development projects. That said, it was recommended that each project identify at least two to three crop monitoring/rainfall data collection sites from each agro-ecological zone within their project area, where possible, to increase the likelihood that the data collected represent the area's general conditions (with more collection sites recommended for areas with higher risk of drought). It was also recommended that the projects consider the following when selecting crop monitoring and rainfall data collection sites:

- Choose a limited number of sites based on available sub-department/commune-level hazard history and vulnerability information, the number of agro-ecological zones in the area, and overall geographic coverage to facilitate reliable, representative analysis of the specific project area.
- Continue regular observation of all project areas. Although early warning system monitoring/rainfall data need not be collected from all agricultural intervention areas, observations from regular project monitoring of all sites will likely facilitate triangulation with the early warning data that are collected.

Market Data Site Selection

The structure of the market network in Haiti reflects longstanding inequalities between rural areas and economic and political centers. Most rural markets are small and cater to local clients due to the difficult terrain, poor roads, and the tendency for production to move out of rural areas toward larger regional and/or urban markets. The Dominican Republic also has a major influence on trade flows, particularly for markets near the border with that country.

Given limited available data on the structure, conduct, and performance of Haiti's market networks at the time of the rapid field assessments, recommended market site selection criteria for CRS's, SC's, and WV's adapted early warning systems were based on market catchments (geographic areas from which commodities or labor is sourced) near the projects' implementation areas. Within these catchments, it was recommended that the following combinations of categories of markets be selected, where possible:

- Major consumption markets, generally in larger towns and urban areas
- Larger cereal markets, also generally in larger towns
- Markets in areas reported to be more vulnerable to drought conditions

The selection of recommended market sites in the following maps reflects an understanding that data initially should be collected in a limited number of markets in larger communes, with the possibility of future expansion to other areas, depending on need and resource availability. In some project areas, it was also recommended that market data be collected from smaller local markets to better understand price behavior within a given catchment.

Site Selection Maps and Rationale

The maps in the following sub-sections collate the information provided above, recommending a minimum number of data collection sites based on the aforementioned criteria for each FFP development project's implementation area. In some cases, the maps show where additional sites would be useful, pending resource availability (these potential additional sites are depicted with a "2," as seen in Figures 1, 3, and 4); however, the final decision on the number of collection sites ultimately rests with each project.

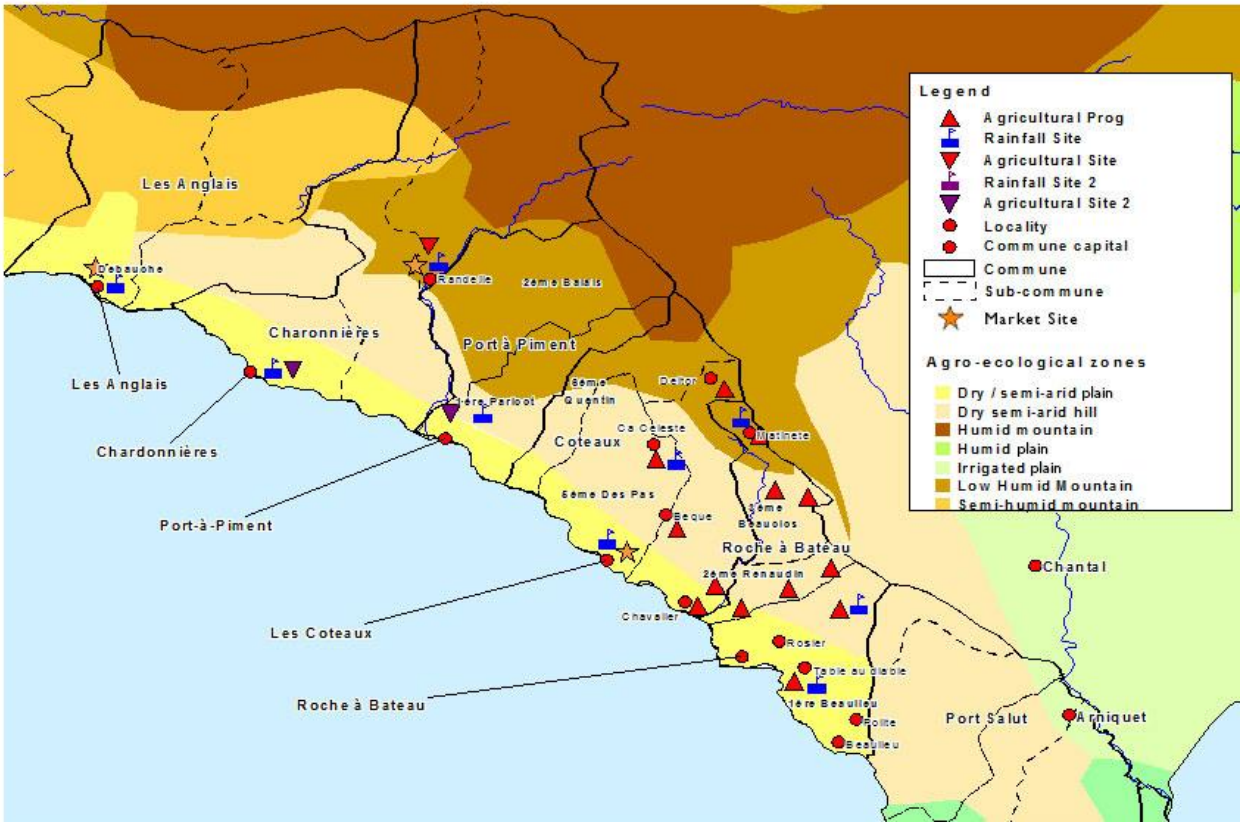
Recommended Sites in South Department (CRS)

The rapid field assessments undertaken as part of this technical assistance indicated that drought risk is high in the South Department's dry/semi-arid zones. Although drought could be considered a "normal" characteristic of such zones, community discussions during the assessments indicated a perception that rains have become increasingly unpredictable in these areas during the previous 5–10 years. While the assessed area's livelihood systems appeared relatively adapted to such a local environment, vulnerability levels were reportedly rising after a series of poor first-season harvests. This area is also at high risk for hurricanes and floods.

Each commune in the dry plain/hill areas already had at least one rainfall data collection site (e.g., the clinic in Chardonnières and sites in Port-à-Piment). It was recommended that two additional sites be placed in the low and semi-humid mountain areas (e.g., northern Les Anglais Commune, which also had a historical rainfall dataset) for comparison and general monitoring purposes (see Figure 1).

Little difference was reported in market prices or general price trends between small local markets in CRS' FFP development project areas and larger markets in other parts of the department. The larger markets (e.g., those at Les Anglais and Les Cayes, the latter of which is not shown in Figure 1 but is due east of Chantal) exerted considerable influence on local prices, likely due at least in part to the relatively short distances between the larger markets and the commune capitals and the fairly good coastal road network between them. It was therefore recommended that market prices be collected from Les Anglais and one local market in each of the dry plain/hill and humid zones to be selected by CRS (not shown in Figure 1). Expansion of market data collection to Les Cayes was also recommended as resources allowed.

Figure 1. Map of Recommended Sites in South Department (CRS)

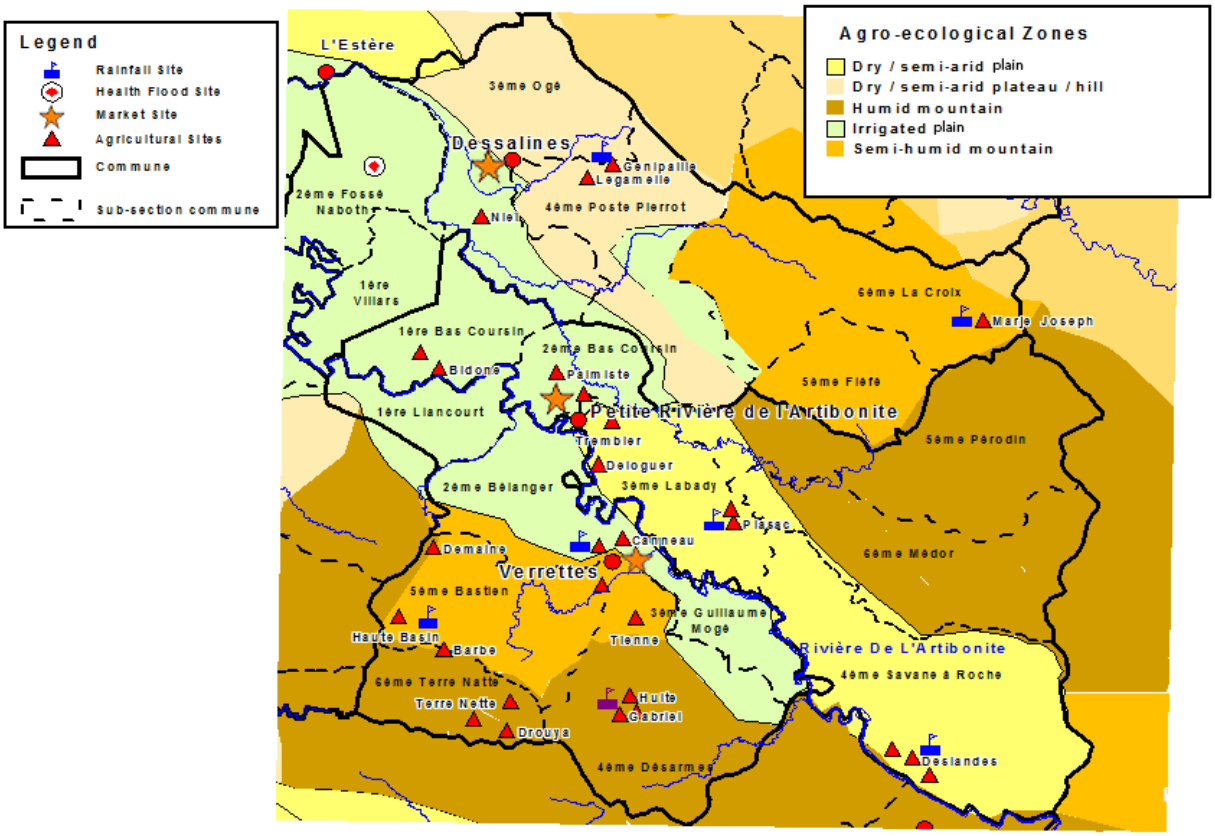


Recommended Sites in Artibonite Department (SC)

Because Artibonite Department was assessed as having a relatively low drought risk, lower-density food security monitoring was recommended in SC's intervention areas. It was recommended that this monitoring include two rainfall data collection sites per commune within the arid/semi-arid agro-ecological zones that are likely to experience relatively more frequent seasonal droughts (see Figure 2).

Market catchment analysis for SC's implementation area in this department indicated that, at the least, markets in commune capitals should be monitored. The shorter distances between markets and the area's relatively good road network appeared to mitigate price differences between these capital markets and smaller local markets in the area. It was recommended that SC also consider collecting market data from L'Estère, given its role as a major wholesale market in SC's intervention area.

Figure 2. Map of Recommended Sites in Artibonite Department (SC)



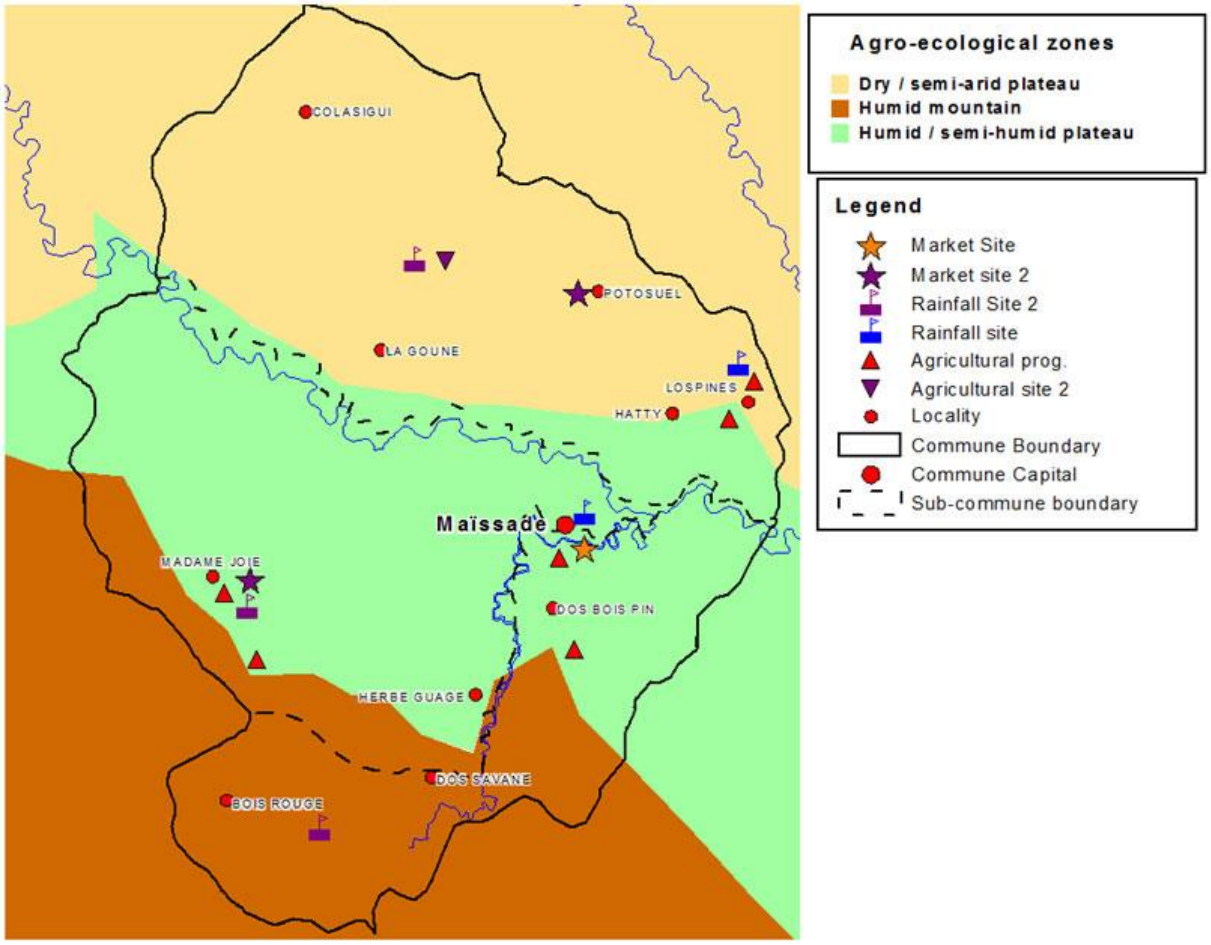
Note: A "health flood site" is a clinic in a flood risk zone that is typically accessible during flooding and could serve as a data source when this hazard occurs in surrounding areas.

Recommended Sites in Central Department/Maïssade (SC)

The Central Department's Maïssade Commune (another SC project area) also had a relatively low drought risk (though seasonal droughts were reported to be more frequent in northern portions of the project area) but faced frequent hail/pest impacts on crops. Given this, at least one rainfall data collection site was recommended in the humid and dry plateau agro-ecological zones. In keeping with the notion of including a higher number of data collection sites in areas at higher risk of drought, it was recommended that SC consider adding another collection site in the dry plateau zone portion of the project area, given the reported higher frequency of drought in this locale. While Figure 3 shows a possible additional rainfall data collection site in the humid mountain zone (pending resource availability), such data collection may not be necessary due to the area's relatively lower drought risk and the logistical constraints of data collection in this locale.

It was recommended that SC continue collecting market data from the commune capital (Maïssade) and consider expanding these data collection activities to other areas of the commune (such as Madame Joie and Potosuel) to better understand any price differences among these locales.

Figure 3. Map of Recommended Sites in Central Department/Maïssade (SC)

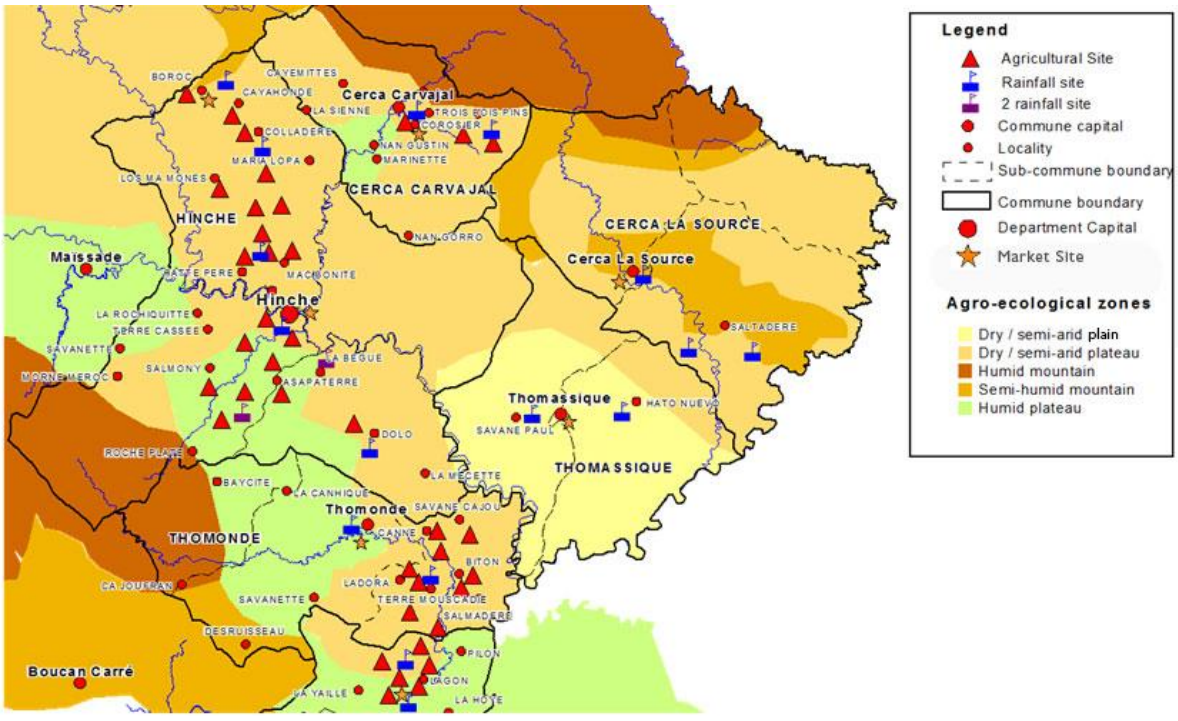


Recommended Sites in Central Department/Haut Plateau (WV)

As noted, Central Department was considered a low drought risk area overall, with communes in the northern areas of Hinche, Cerca-Carvajal, and Cerca-la-Source, as well as Thomassique reportedly being more vulnerable to seasonal droughts, particularly in the dry plateau zone. Given this variation, it was recommended that the early warning system for this area be set up by commune. It was recommended that in Hinche Commune, the rainfall data collection network be designed to ensure adequate coverage of the commune's northern (reportedly higher risk) and southern areas. It was also recommended that WV consider placing a site in the humid plateau zone to facilitate comparative analysis among the predominant agro-ecological zones in its implementation area. In Thomonde Commune, given the concentration of programming and the reported lower vulnerability, two rainfall data collection sites in the dry plateau zone were thought to be able to provide adequate minimal coverage. For similar reasons, two such sites in Cerca-Carvajal Commune were recommended. It was also recommended that WV consider eventually expanding sites to Cerca-Carvajal's dry plateau, followed by sites in Cerca-la-Source and Thomassique communes. The two sites shown in Lascahobas commune in the Bas Plateau (the southernmost commune shown in Figure 4) were thought to be adequate given WV's agriculture intervention coverage and the area's reported lower relative drought risk.

Initial selection of market data sites (not shown in Figure 4) was based on commune capitals. The market at Boroc was recommended because it is a major assembly market in the north of Hinche and was in an area with a higher reported vulnerability to drought. Given Central Department's strong market linkages with the Dominican Republic, price variation is likely between the markets in the central plateau and those in the rest of the country, as well as between the commune capital markets and local markets closer to the border. It was therefore recommended that WV consider collecting more information on market trading networks to confirm whether prices in the larger commune markets adequately represent local price movements or whether additional local price monitoring would be needed.

Figure 4. Map of Recommended Sites in Central Department/Haut Plateau (WV)



3.4 Organizational Structure and System Development

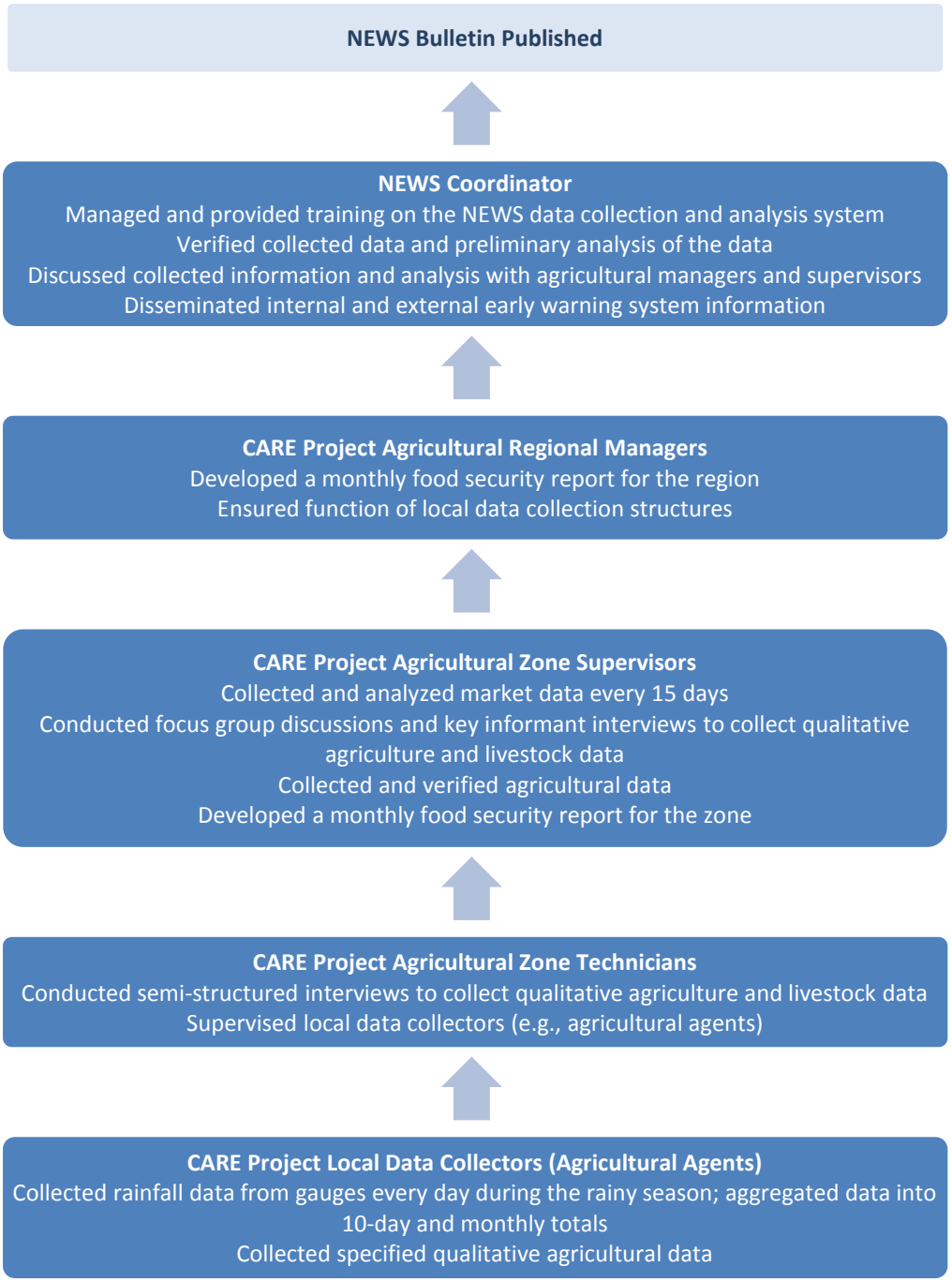
In addition to the aforementioned technical aspects of setting up an early warning system, due consideration of its administrative features is also essential to its effectiveness. This section provides an overview of the NEWS management and data collection system and recommendations for how to apply these to the proposed adapted systems in the other FFP development projects' implementation areas in Haiti.

3.4.1 NEWS Administration

Overall, the NEWS was managed and supervised by a system coordinator based in Port-au-Prince who reported to the CARE FFP project's agricultural program manager. The coordinator was responsible for data processing, analysis, and reporting through the NEWS monthly bulletin. The coordinator generally spent the first 2 weeks of each month in the field visiting sites and overseeing data collection and the following 2 weeks in Port-au-Prince analyzing and compiling a report on the data for the bulletin.

Figure 5 provides a diagram of the NEWS data collection, analysis, and dissemination process. As noted, the CARE FFP project's agricultural staff typically collected and undertook preliminary analyses of NEWS data. In addition, the project's health staff collected and analyzed health and nutrition data in collaboration with the NEWS coordinator. Data collection and reporting activities for the NEWS were included in the terms of reference for the project's agricultural regional managers and other extension agents (e.g., agricultural zone supervisors and technicians). Agricultural program regional and zonal managers supervised overall data collection. Rainfall data and qualitative crop monitoring information from selected sites were transmitted from the project's agricultural zone technicians and other data collectors to these managers at the end of each month. Market data were similarly collected and transmitted every 2 weeks. Rainfall, crop monitoring, and market data were all collected on standardized reporting forms. Where applicable, health data also were collected on standard forms developed with the MSPP. Each month, the NEWS coordinator visited regional managers and supervisors and selected field sites to discuss the current situation; verify reported information through field observation and discussion with field staff, partner agencies, and Government of Haiti ministries; and ensure data were collected effectively and reported in a timely manner.

Figure 5. NEWS Data Collection, Analysis, and Dissemination Process



3.4.2 Recommendations for Administration of the Haiti FFP Development Projects' Adapted Early Warning Systems

Organizational Structure

As it was with the NEWS, it was recommended that each of the other FFP development project's early warning coordinators and participating sector staff share management responsibilities for the adapted early warning systems in Haiti. However, it was suggested that responsibility for final early warning-related data analysis rest with each FFP development project's early warning coordinator. At the time of this technical assistance, the FFP development projects in Haiti generally had structured the system coordinator role so that it interfaced with their M&E units.[16] It is important that data collection, supervision, and analytical roles are clearly differentiated between the system coordinator and sector managers, as well as between sector managers and their staff. It was recommended that job descriptions/terms of reference reflect early warning system data collection, analysis, and overall management responsibilities, where necessary. It was also recommended that clear memoranda of understanding be developed between the FFP development projects and any partner agencies participating in the system's development.

Information System Management

Information system management tasks aim to ensure that data are collected effectively and that information from the field flows to the project managers and the system coordinator in a timely manner. After data collection sites were selected, it was recommended that the coordinator and sector managers develop and adhere to clear timetables that specified when and how data would be collected and transmitted. In addition, it was recommended that the system coordinator delegate information system management and supervision responsibilities to field-level system managers to reduce the amount of time that the coordinator had to spend in the field. In particular, it was recommended that the coordinator visit the field regularly during system startup to help develop key system components but then limit field visits to critical periods (e.g., key moments in the production cycle, when data indicate deteriorating food security conditions, and to facilitate data analysis) to allow more time for other system management functions.

Data Analysis and Reporting

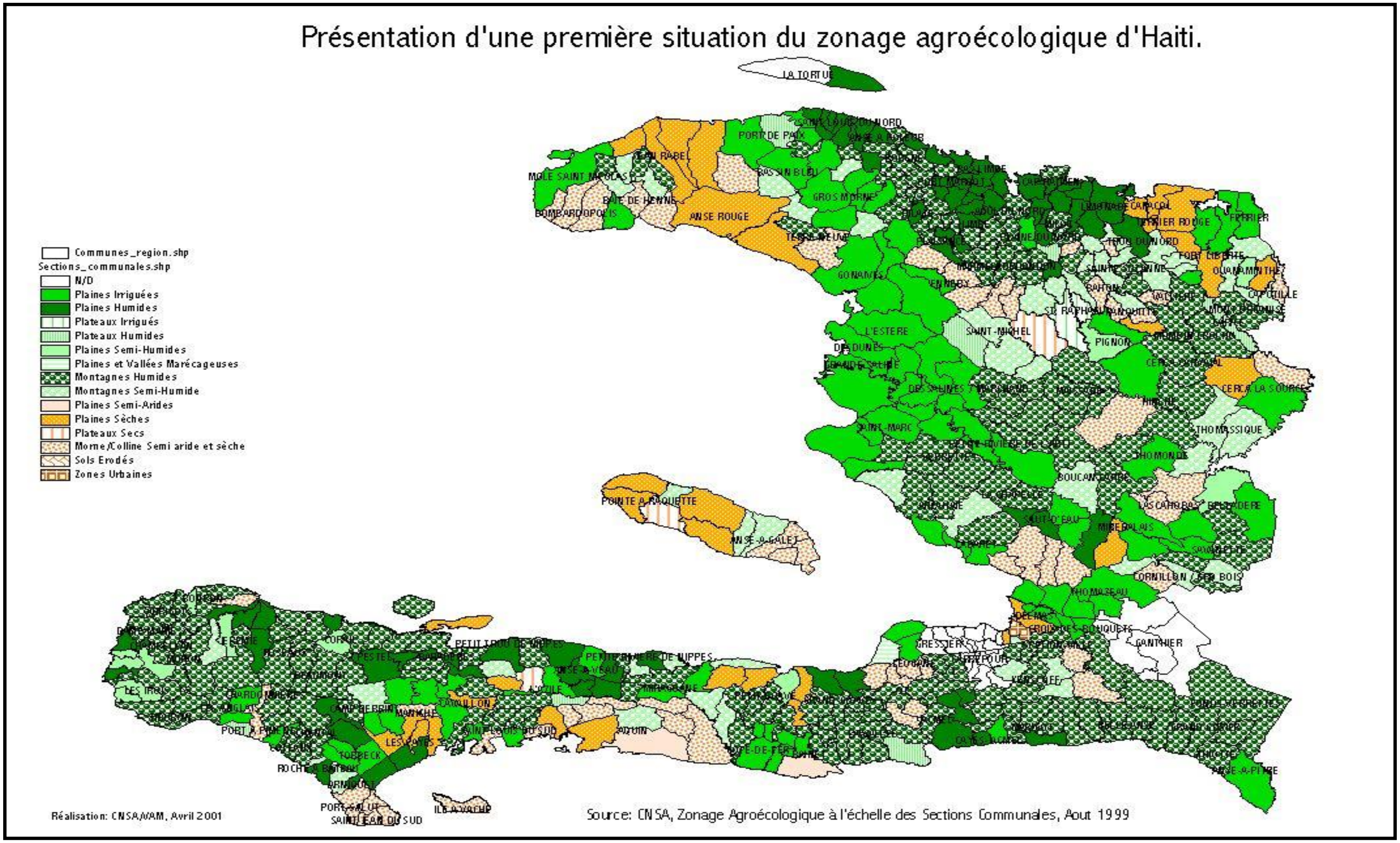
Although system coordinators should review early warning system data analysis monthly, it was not necessarily recommended that each of the other FFP development projects produce an extensive report similar to the NEWS bulletin every month, particularly while the systems were being established. Instead, it was recommended that the other FFP development projects in Haiti consider creating a short update for monthly reporting that could be circulated internally and forwarded to interested stakeholders. It was recommended that more extensive reports be produced during critical periods in the production cycle and/or when the systems indicated a deterioration in food security conditions.

[16] Given their slightly different organizational structures, the early warning system coordinator's location and responsibilities within each FFP development project in Haiti were as follows. At CRS, the agricultural manager for Haiti managed the project's early warning system. The FFP project's agricultural manager conducted data analysis in close association with the overall agricultural manager. At SC, the M&E and deputy FFP project managers shared responsibility for managing the project's early warning system. The head of the project's M&E unit conducted data analysis. At WV, the head of the project's M&E unit and the agriculture manager shared responsibility for managing the project's early warning system. M&E managers for each operational department shared responsibility for final data analysis.

Annex 1. Agro-Ecological Zone Definitions and Map

Zone	Altitude (meters)	Rainfall (millimeters per year)	Dominant Agriculture Crops
Very humid mountains	> 800	> 2,000	Tubers (yams, potatoes)
Humid mountains	600–800	1,000–2,000	Beans, coffee
Semi-humid hills/hillsides	300–600	800–1,000	Maize, potatoes, cassava
Dry hills/hillsides	300–600	400–800	Groundnuts, cassava, pigeon peas
Semi-arid hills/hillsides	300–600	< 400	Limited agriculture/charcoal
Humid plateau	Variable	1,000–2,000	Bananas, maize, sugar cane
Dry plateau	Variable	< 800	Sorghum, groundnuts, pigeon peas
Irrigated plain	< 200	Not applicable	Bananas, rice, beans
Humid plain	< 200	> 1,000	Bananas, beans, maize, vegetables
Semi-humid plain	< 200	800–1,000	Beans, maize, pigeon peas, sugar cane
Dry plain	< 200	400–800	Sorghum, maize, pigeon peas, cassava
Semi-arid plain	< 200	< 400	Sorghum, pigeon peas

Source: CNSA


Présentation d'une première situation du zonage agroécologique d'Haiti.
Communes_region.shp
Sections_communales.shp
N/D
Plaines Irriguées
Plaines Humides
Plateaux Irrigués
Plateaux Humides
Plaines Semi-Humides
Plaines et Vallées Marécageuses
Montagnes Humides
Montagnes Semi-Humide
Plaines Semi-Arides
Plaines Sèches
Plateaux Secs
Morne/Colline Semi aride et sèche
Sols Erodés
Zones Urbaines
Réalisation: CNSA/VAM, Avril 2001
Source: CNSA, Zonage Agroécologique à l'échelle des Sections Communales, Aout 1999

Annex 2. Publications Reviewed for Activity Literature Review and Field Assessments

Bureau of Applied Research in Anthropology (BARA), University of Arizona/ADRA. 1997. *A Baseline Study of Livelihood Security in the Departments of the Artibonite, Central, North, Northeast, and West, Republic of Haiti.* Tucson, AZ.

BARA/CARE. 1996. *A Baseline Study of Livelihood Security in the Northwest Haiti*. Tucson, AZ.

CARE/Haiti. 1997–2001. *NEWS Bulletin*. Port-au-Prince: CARE.

CARE/Haiti. 2001. Productive Land Use Systems Project (PLUS) Annual Report. Port-au-Prince: CARE.

Catholic Relief Services (CRS). 1997. *Design for an Early Warning System* (memorandum). Port-au-Prince: CRS.

CRS. 2001. *Development Activity Program Summary*. Port-au-Prince: CRS.

CRS. 2002. *SAP—Proposition de Cadre Conceptual*. Port-au-Prince: CRS.

CRS. 2003. *Systeme d'Alerte Precoce (SAP) Bulletin Trimestriel. October–December 2002*. Port-au-Prince: CRS.

Chemonics International Inc. 1999. *Haiti Enhancing Food Security 11 Project* (CD-ROM). Washington, DC: U.S. Agency for International Development (USAID).

CNSA. 1999. *Compte Rendu De L'Atelier Sur Le Suivi Des Prix Des Produits Agricoles Sur Les Marches Ruraux D'Haiti.* Port-au-Prince: CNSA.

CNSA. 1999. *Systeme de Suivi la Situation de Securite Alimentaire en Haiti*. Port-au-Prince: CNSA.

CNSA. 1999. *Zonage Agro-Ecologique A L'Echelle Des Sections Communales*. Port-au-Prince: CNSA.

CNSA/Food and Agriculture Organization of the United Nations (FAO) and Standen, H. 2002. *Review of the Northwest Early Warning System (NEWS)—Strategic Implications for the Development of a National Early Warning System in Haiti*. Port-au-Prince: CNSA.

CNSA/Le Groupe CJ—Consultants. 1998. *Etude Des Marches Ruraux D'Haiti*. CNSA: Port-au-Prince.

CNSA (National Food Security Coordinating Unit)/World Food Programme (WFP) and Jean-Pierre, D. 2002. *Revue Bibliographique Sur La Vulnerabilite Alimentaire en Haiti*. Port-au-Prince: CNSA.

Economist Intelligence Unit. 2002. *Country Report: Dominican Republic, Haiti, Puerto Rico*.

Famine Early Warning Systems Network (FEWS NET). 2000. *Mini-Manual for Understanding and Assessing Households' Risk and Food Shortages* (draft).

Interim Food Security Information System (iFSIS). 1996. *SISA Document de Travail*. Port-au-Prince.

John Snow, Incorporated. 2001. *Evaluation Report of the Enhanced Food Security Program*. USAID Haiti Mission.

Ministry of Agriculture, Natural Resources, and Rural Development (MARNDR). *Projet de Renforcement du Systeme de Statistiques Agricoles*. Port-au-Prince: MARNDR.

Ministere de la Sante Publique et de la Population (MSPP) and OPS. 2002. *Support a l'Operationalisation des Unites Communales de Santes (UCS)*. Port-au-Prince.

MSPP and OPS. 2002. *Manuel pour la Surveillance Epidemiologique en Haiti—Normes et Procedures*. Port-au-Prince.

MSPP and OPS. 2002. *Plan Strategique pour le Developpement de l'Epidemiologie en Haiti*. Port-au-Prince.

Oxfam. 2003. *Cartes et Etude de Risques de la Vulnerabilite et des Capacites de Response en Haiti*.

Pan American Development Foundation (PADF). 2002. *Hurricane George Recovery Programme*. Port-au-Prince: PADF.

PADF. 2001. *Plan d'Action Pour la Protection Civile—Ville de Jacamel*. Port-au-Prince: PADF.

Republic of Haiti. 2001. *Plan National De Response—Avant-Project*. Port-au-Prince: Republic of Haiti.

Republic of Haiti. 2001. *Plan National d'intervention de la Republique d'Haiti*. Port-au-Prince: Republic of Haiti.

Republic of Haiti Ministere de la Planification et de la Cooperation Externe/U.N. Development Programme. 1997. *Project d'appui Institionnel en Amenagement du Territoire – Elements de la Problematique Departementale*. Port-au-Prince.

RESAL. 1999. *Mise En Place D'Un Instrument De Suivi De L'Integration Des Marches Des Cereales*. Port-au-Prince: RESAL.

Riely, F. et al. 1999. *Food Security Indicators and Framework for Use in the Monitoring and Evaluation of Food Aid Programs*. Arlington, VA: Food Security and Nutrition Monitoring Project (IMPACT), ISTI, Inc., for USAID.

SADC Regional Early Warning System for Food Security; Chopak, C. 2000. *Early Warning, Monitoring, and Reporting: Toward a Broader Approach*. Harare, Zimbabwe.

Save the Children/United States (SC/US). 2002. *DAP Annual Operating Plan*. Port-au-Prince: SC/US.

SC/US. 2001. *Revised DAP Proposal*. Port-au-Prince: SC/US.

United Nations. 1997. *International Decade for Natural Disaster Reduction (IDNDR) Early Warning Programme—Guiding Principles for Effective Early Warning*. Geneva: IDNDR Secretariat.

United Nations Development Programme (UNDP). 2002. *Economic and Social Situation in Haiti*. Port-au-Prince: UNDP.

U.N. System in Haiti. 2001. *U.N. Development Assistance Framework*.

U.N. System in Haiti. 2003. *Integrated Emergency Response Programme Targeting Vulnerable Groups and Communities in Haiti*. Port-au-Prince.

World Vision (WV)/Haiti. 2001. *Development Activity Program Proposal—Resource Request Summary*. Port-au-Prince: WV/Haiti.

WV/Haiti. 2002. *Central Plateau Rapid Food Security Assessment Report*. Port-au-Prince: WV/Haiti.

WV/Haiti. 2002. *Early Warning System—Etat D'Avancement*. Port-au-Prince: WV/Haiti.

WV/Haiti. 2002. *Early Warning System—Implementation du Systeme Cadre de Reference.* Port-au-Prince: WV/Haiti.

WV/Haiti. 2003. SAP Vol.1, No.1. Port-au-Prince: WV/Haiti.