# SITE SELECTION FOR AFRICA RISING
# A SUMMARY OF
# ACTIVITIES AND OUTCOMES IN
# ETHIOPIA, GHANA AND TANZANIA

**a report prepared for**
**the International Food Policy Research Institute**
**by**
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# 1) Introduction

The selection of "action Sites", communities where the Africa RISING programme will be implemented, is a critical pre-cursor to the whole programme. Equally, control sites or "counterfactuals" need to be carefully selected to permit statistically valid monitoring and evaluation of the impacts of the project. The selection process took place in a series of stages, starting early in 2012, and was effectively completed by December 2012 in time for implementation of the programme at the start of the main planting season in October 2012 in Tanzania and early 2013 in Ethiopia and Ghana. This report describes the selection criteria and processes in each of the three target countries. Selection of sites in Mali is being reported on separately by another consultant.

# 2) Principles of Site Selection for Africa RISING

## 2A. Project Areas

The first part of the selection process was the definition of "Mega Sites" or project areas. The definitions were agreed at a series of workshops in late 2011 and early 2012, and disseminated in three concept note. The definitions were a combination of geographic areas (administrative regions or districts, elevation zones) and farming systems, always including a mixture of crops and livestock. Details of the definitions of project areas, based on the concept notes, are given in Appendix 1 to this report. The "mega-sites" were selected so as to be representative of large areas of Sub-Saharan Africa, allowing extrapolation of the positive results of Africa RISING to benefit large rural populations.

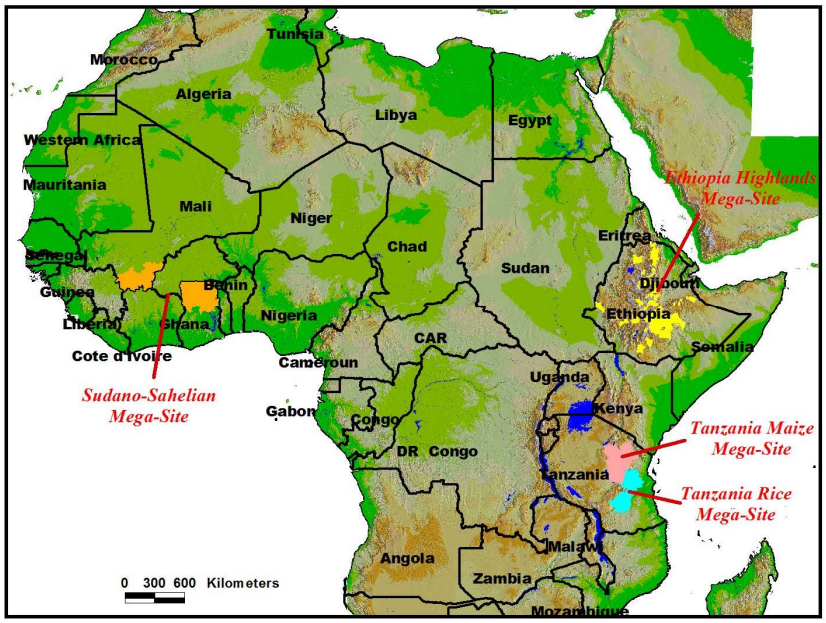



*Figure 2.1. Project Areas ("Mega-Sites") chosen for Africa RISING*

The project areas are shown in Figure 2.1 , and the potential extrapolation zones based on agro-ecological factors in more detail for each project area in Figures 2.2, 2.3 and 2.4.

Table 1. Populations in Extrapolation zones for Africa Rising Mega-Sites

| Country | Ethiopia MS | Sudano-S | EAF MS |
|---|---|---|---|
| angola | | | 1,970,000 |
| benin | | 5,600,000 | |
| botswana | | | 15,000 |
| burkina | | 3,200,000 | |
| burundi | 4,600,000 | | |
| cameroon | | 1,800,000 | |
| CAR | | 600,000 | |
| chad | | 4,500,000 | |
| cote d'ivoire | | 8,700,000 | |
| DRC | | | 360,000 |
| eritrea | 19,600,000 | | |
| ethiopia | 42,500,000 | | |
| ghana | | 11,000,000 | |
| guinea | | 640,000 | |
| kenya | 16,000,000 | | 9,000,000 |
| madagascar | | | 250,000 |
| malawi | | | 6,600,000 |
| mali | | 6,300,000 | |
| namibia | | | 330,000 |
| nigeria | | 44,700,000 | |
| rwanda | 6,200,000 | | |
| senegal | | 330,000 | |
| sudan | | 3,200,000 | 840,000 |
| tanzania | 2,700,000 | | 21,400,000 |
| togo | | 3,500,000 | |

Potentially, the livelihoods of 91 million people in the extrapolation areas of the Ethiopia Highlands mega-site, 95 million in the Sudano-Sahelian area and 66 million in the East and Southern Africa zone could be improved as a result of interventions and developments in the three mega-sites.

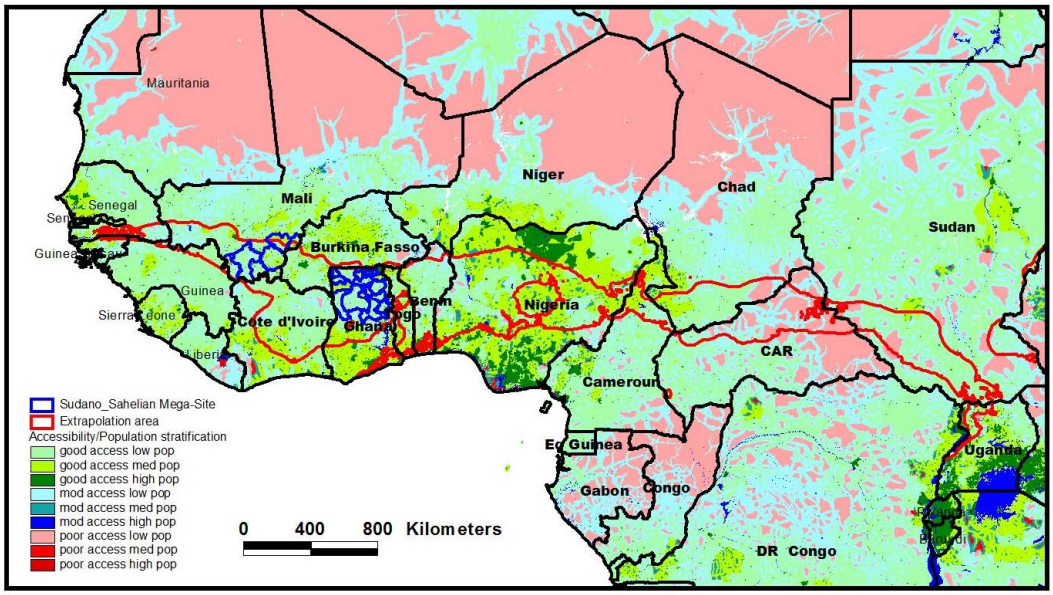



*Figure 2.2. Potential extrapolation zones with accessibility and population stratification, Sudano-Sahelian Mega-Site*

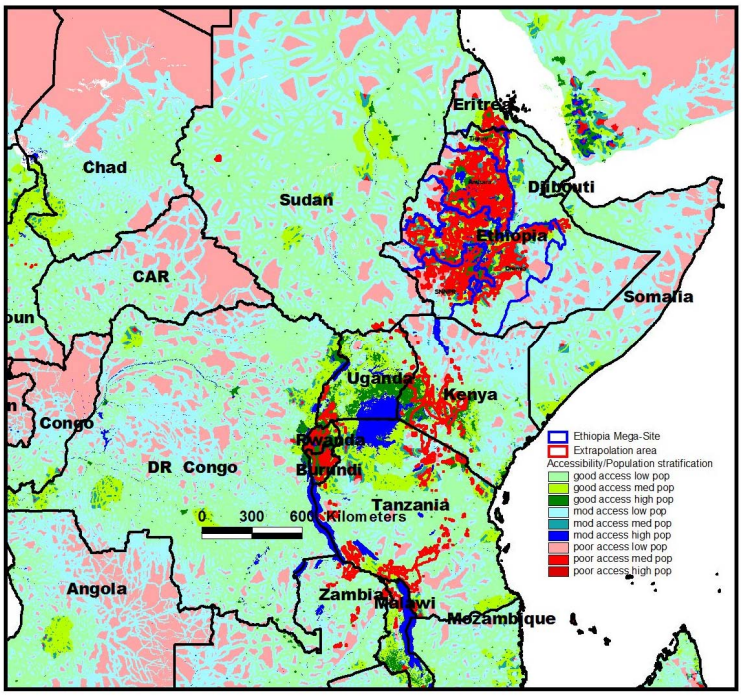



*Figure 2.3. Potential extrapolation zones with accessibility and population stratification, Ethiopian Highland Mega-Site*

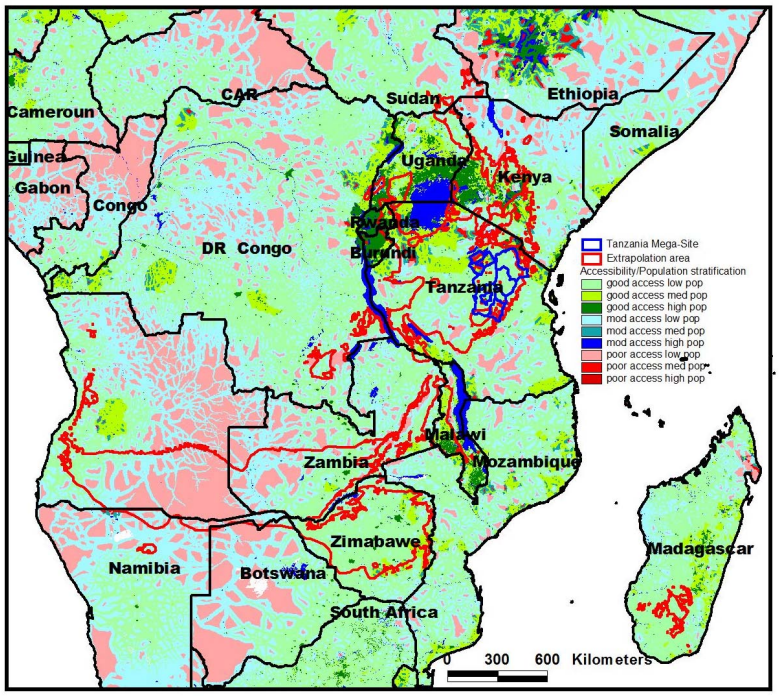



*Figure 2.4. Potential extrapolation zones with accessibility and population stratification, East and Southern Africa Mega-Site*

| Admin Unit | Average population | Average area | Number of units |
|---|---|---|---|
| Ethiopia Woreda | 129,900 | 2120 | 517 |
| Ghana district | 96,200 | 2460 | 96 |
| Tanzania District | 261,200 | 8680 | 91 |
| Tanzania Ward | 12,050 | 330 | 2690 |

*Table 2. Comparison of Rural Districts in three project countries*

**2B Project Sites**

Within each of the Project Areas, it was agreed that actual Project Sites, sometimes referred to as Action Sites, should be selected so as to cover the full spectra of variation in major biophysical and human factors within each project area. It was also agreed that project implementation would be based on communities, either single villages or clusters of villages. Concern was expressed, particularly at the Monitoring and Evaluation workshop in Addis Ababa in September 2012, that statistical validity of evaluation of impact depended on random selection of Action Sites and the counterfactual sites needed as controls. GIS stratification based on climatic, topographic, population density, market access and farm system data showed that the variation within each Project Area was considerable, and that random selection of communities within project areas would be unlikely to capture the full range of variability. Other factors were also important in selection, particularly the wishes of the donor. In Ethiopia, USAID insisted that priority should be given to areas already included in the Agricultural Growth Programme (AGP). In Tanzania, the USAID Nafaka programme is already functional in some parts of Dodoma District, and Africa RISING was requested to concentrate on Nafaka villages. In Northern Ghana, the USAID ADVANCE programme is active in many areas, and again a synergy was proposed.

Following considerable discussion, it was agreed that each project area should be stratified by GIS techniques using the major biophysical and human data sets common to all areas. This stratification should result in selection of a number of administrative units which would cumulatively cover as much as practicable of the variability within the area. Communities (villages) within each of the selected areas which met other criteria such as the presence of pre-existing USAID projects and good market access would then be chosen at random to serve as action and counterfactual sites. One complicating factor is that, ideally, action and counterfactual sites should be remote geographically from each other so as to minimise “spill-over” from action sites where Africa RISING was actively intervening to counterfactuals, where no intervention was happening.

A problem in the stratification process is the differences in size and population of administrative units within the project areas. Table 2 shows the average statistics for rural administrative units in the three main countries. Woredas (districts) in Ethiopia are broadly comparable in population and area to districts in Ghana, but Tanzanian districts are significantly larger in both population and area. For all three countries, most important statistics are available at district level, although some important indicators, such as child nutrition status and intensification index, have only been collected or calculated at regional level, and are not therefore usable in site selection. In order that communities can be selected at random within stratified units, it is important that those units be internally homogeneous. Districts in northern Ghana are relatively homogeneous in terms of climate, soils, topography and population density. In Ethiopia, woredas often show extreme topographic and thus climatic variation, as well as great differences in market access between communities (kebeles) within a single woreda. In Tanzania some districts are extremely inhomogeneous, especially in areas in and near the Rift Valleys. For this reason, stratification in Tanzania was based on Wards, not districts. Table 2 shows that Tanzanian wards are significantly smaller in population and area than districts in Ethiopia and Ghana, but most important statistics were available at Ward level, and initial studies showed that wards were orders of magnitude more internally homogeneous than districts.

The site selection process can thus be summarised as follows:-

1) Stratify Woredas (Ethiopia) districts (Ghana) and wards (Tanzania) based on a range of biophysical and human characteristics.
2) Cluster analysis of stratification to define important natural groupings
3) Elimination of districts or wards which do not meet USAID project or market access criteria
4) Random selection of target and counterfactual communities while ensuring geographic separation

In Tanzania and Ghana, targeting reports were considered by local project managers, who then requested assistance from the consultant to refine the final selection of action sites following field visits to all potential sites with Government agricultural specialists. For Ethiopia, simplified lists of potential target woredas were submitted to the local project manager, who then organised field visits with Ethiopian Government staff to select suitable communities (kebeles) as initial targets

## 3) Ethiopia Project Area

### 3A. Definition of Project Area

According to Version 3 of the Concept Note for the Ethiopian Highlands Mega-Site "The integrated research will focus on the wheat-growing area in the Ethiopian Highlands. This area exhibits large variations in existing levels of intensification, cereal-legume rotations and other crop-combinations, as well as crop-livestock integration. Furthermore, the factors driving intensification such as agricultural potential, access to available technologies, demand for livestock products, and integration with markets vary a lot within the area.

A number of study sites will be chosen from these wheat-growing areas. They will represent contrasting levels of intensification to enable the characterization of different trajectories and identification of technology combinations that lead to sustainable development pathways. The delineation of the study sites will be done on the basis of political/administrative boundaries (several woredas). The size will be large enough to encompass a range of biophysically defined areas with contrasting farming systems and a range of social institutions. A more in-depth characterization of the study sites and the entire target zone will form part of further targeting and out-scaling during the project life. This will include a variety of data at different scales and a richer interpretation of household level socio-economic data."

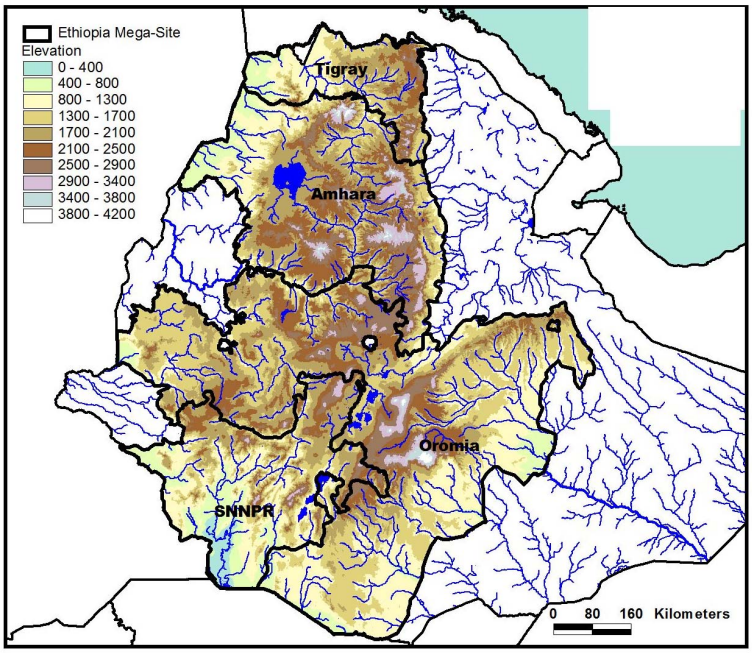



*Figure 3.1. Topography of Ethiopian Highlands*

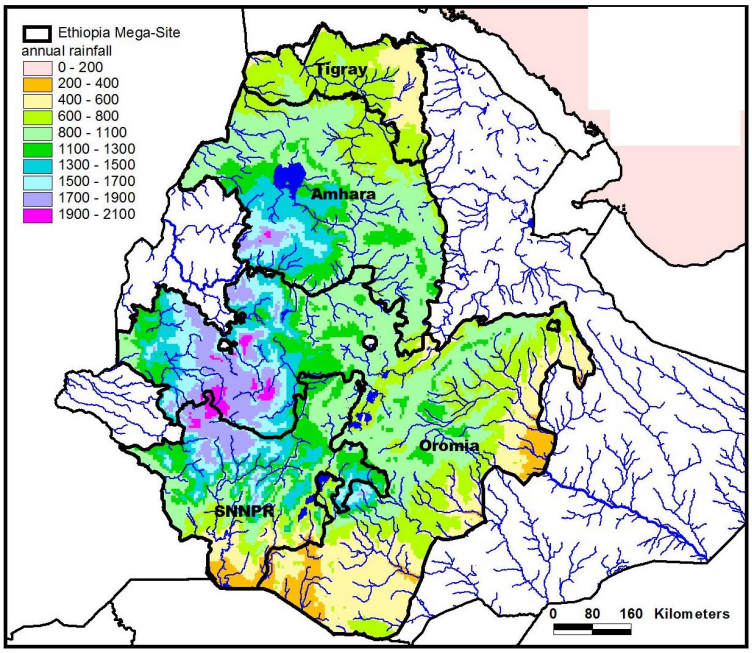



*Figure 3.2. Rainfall in Ethiopian Highlands*

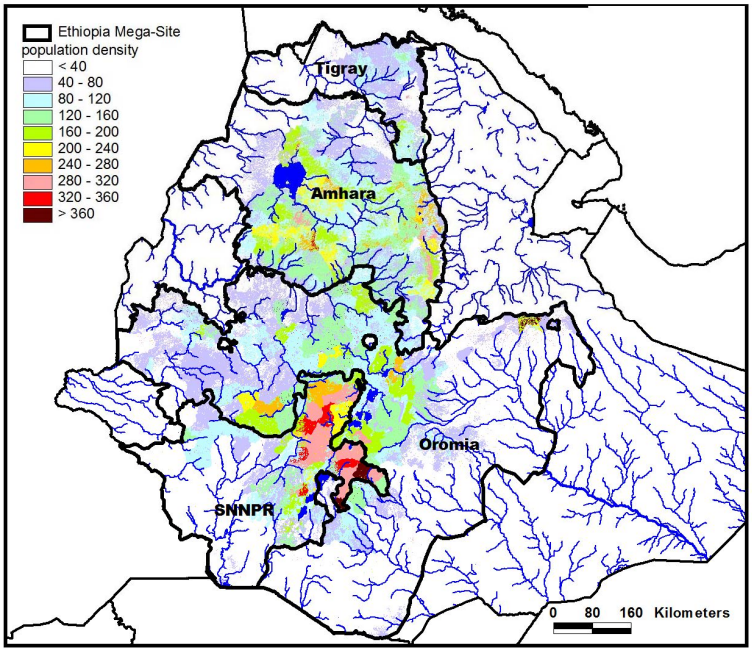



*Figure 3.3. Population distribution in Ethiopian Highlands*

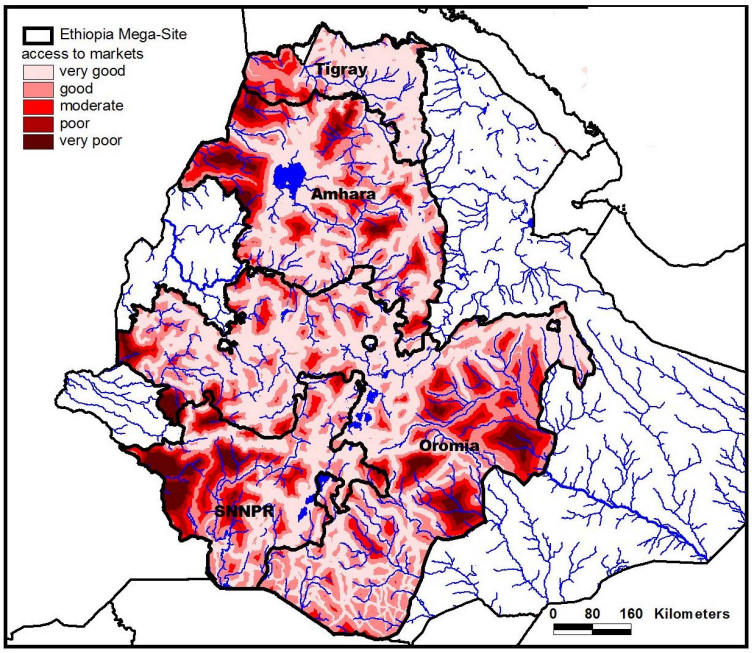



*Figure 3.4. Access to markets in Ethiopian Highlands*

**3B. Characterisation of Project Area**

As shown in Figures 3.1 to 3.5, the Ethiopian Highlands are extremely diverse topographically, climatically and in respect of population distribution and accessibility of markets. In general, wheat is produced in areas with more than 600mm annual rainfall and at elevations of greater than 1700 metres. There is a crude vertical zonation of cereal crops, from maize at lowest elevations, through teff at medium elevations, then successively wheat and barley at highest elevations.

The variation in elevation and rainfall within single woredas can be extreme. Many woredas are quite large, often more than 1500 square kilometres, and elevation ranges of more than 1500 metres in a single woreda are not uncommon. Orographic and "rain shadow" effects certainly result in great variation in annual rainfall within single woredas, although this is not captured in sufficient detail in available rainfall maps.

**3C. Phase one site selection – Woreda (District) level**

The first phase of stratification is to identify those woredas where wheat constitutes a significant proportion of the total cereal crop area. A figure of 25% of the total cereal crop area was taken as the cut-off for this targeting study. Out of a total of 656 woredas in the 2008 agricultural atlas, 113 had significant wheat production. USAID and the Ethiopian Government agree that priority should be given in Africa RISING to AGP (Agricultural Growth Plan) woredas. Out of a total of 84 AGP woredas, 19 coincided with wheat-growing woredas. After some discussion, it has been agreed that, while AGP woredas should be targeted preferentially, other non-AGP woredas could be included to fill significant gaps in targeting. The locations of woredas with significant wheat and of AGP woredas are shown in Figures 3.6 and 3.7.

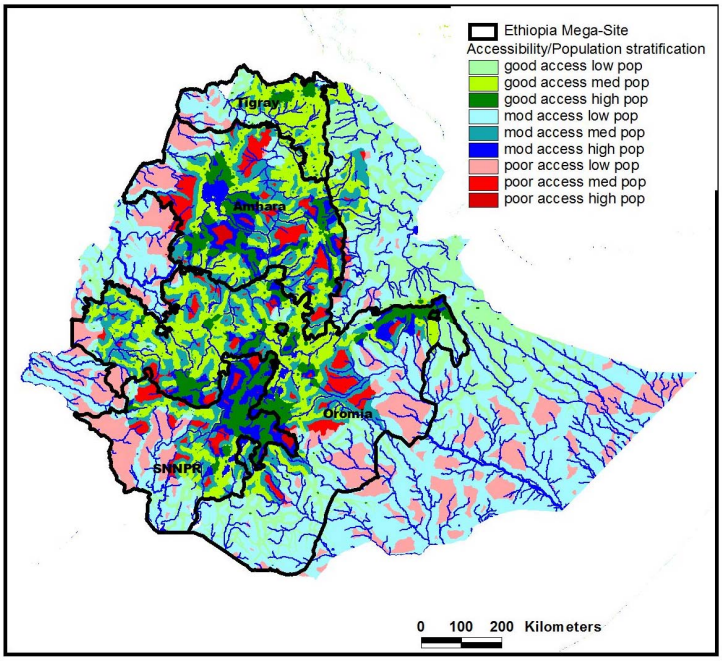



*Figure 3.5. Combination of population density and market access*

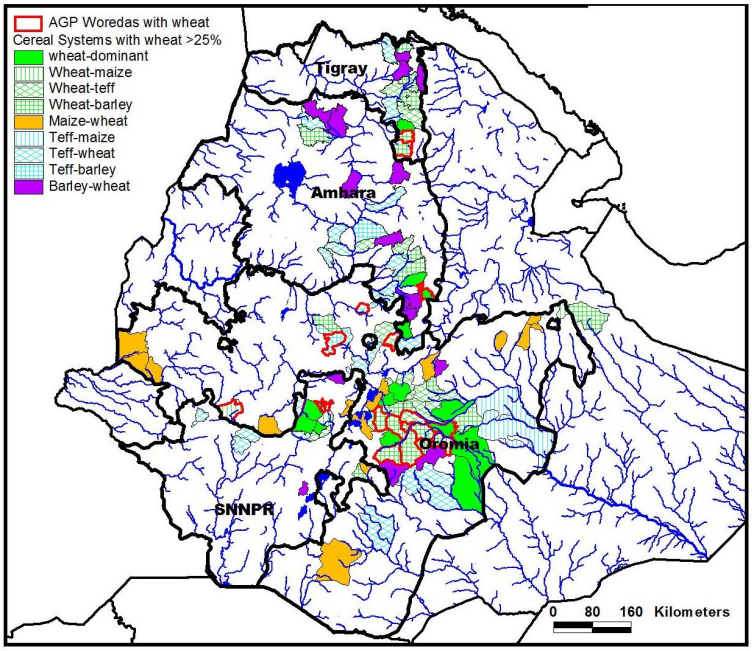



*Figure 3.6. Cereal cropping systems, Woredas with significant wheat, Ethiopian Highlands*

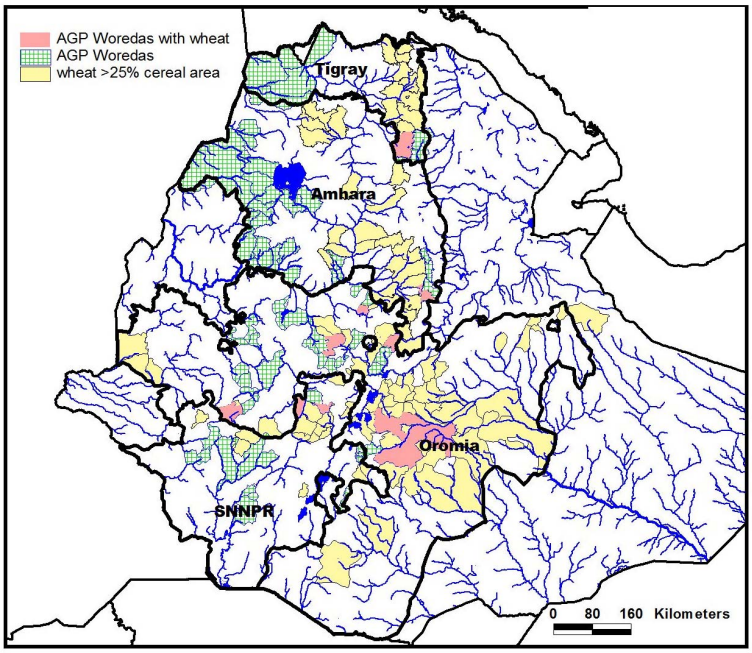



*Figure 3.7. Distribution of AGP Woredas, Ethiopian Highlands*

Table 3.1. Class limits for stratification

| Class | Elevation | Rainfall | Slope | Population | TLU/percap | Access |
|---|---|---|---|---|---|---|
| 1 | <1800 m | < 900 mm | <3 deg | < 100 /km2 | < 0.5 percap | Very good |
| 2 | 1800-2400m | 900-1100 | 3-5 deg | 100 - 200 | 0.5 – 1.0 | good |
| 3 | > 2400 m | > 1100 mm | > 5 deg | > 200 /km2 | > 1.0 percap | moderate |
| 4 | | | | | | poor |

Following the initial selection of wheat-producing woredas, further stratification was undertaken on the basis of elevation, slope, rainfall, population density, livestock density and access to markets. It was apparent that the large size and extreme topography of many woredas make the use of mean elevation and rainfall problematic, but there is little alternative for this "first-pass" stratification. The mean elevation and rainfall of a woreda may not accurately represent the main cropped areas in the woreda. In some cases the main cultivated areas may be on a plateau at the upper elevation limit of a woreda, while in other most cultivation may occur in lower valleys. Once the initial selection of target woredas is agreed, a further stratification should be undertaken at Kebelle level, where the variation within each Kebelle will be less than in the larger Woredas.

Stratification on the basis of elevation, rainfall and population density results in 14 distinct classes, as shown in Table 2 in the appendix. Nine of these classes include significant (more than 4) numbers of woredas, so these should all be targeted in order to include the full spectrum of variability in the mega-site.

Within each of the nine significant elevation-rainfall-population classes, target woredas were selected as shown in Table 3.2 and figure 3.8. Three further criteria were used to select targets. Market access had to be good to moderate, and livestock density had to be moderate to high. Where there was choice between different cereal cropping systems, those with the most significant wheat production were chosen. Where an AGP woreda existed in a class and met these additional criteria, it was automatically selected. In a few cases, AGP woredas within classes did not meet all of the additional criteria, so these are marked as possible targets depending on how strictly the AGP woreda rule is interpreted. Some elevation-rainfall-population classes are not represented by AGP woredas. This is especially true of the lower elevation classes. In these cases new non-AGP woredas need to be targeted to ensure coverage of the full spectrum of possible variation.

The target woredas suggested represent the best possible combination of all factors considered in the selection, but these are not the only possible targets to ensure coverage of the spectrum of variation. Alternative woredas can be selected based on the data presented in Appendix Table 2 if these better satisfy other criteria such as presence of research centres, existing partnerships and other socio-economic factors. The majority of the suggested target woredas are in Oromia region, but five are in Amhara, two in Tigray and two in SNNPR.

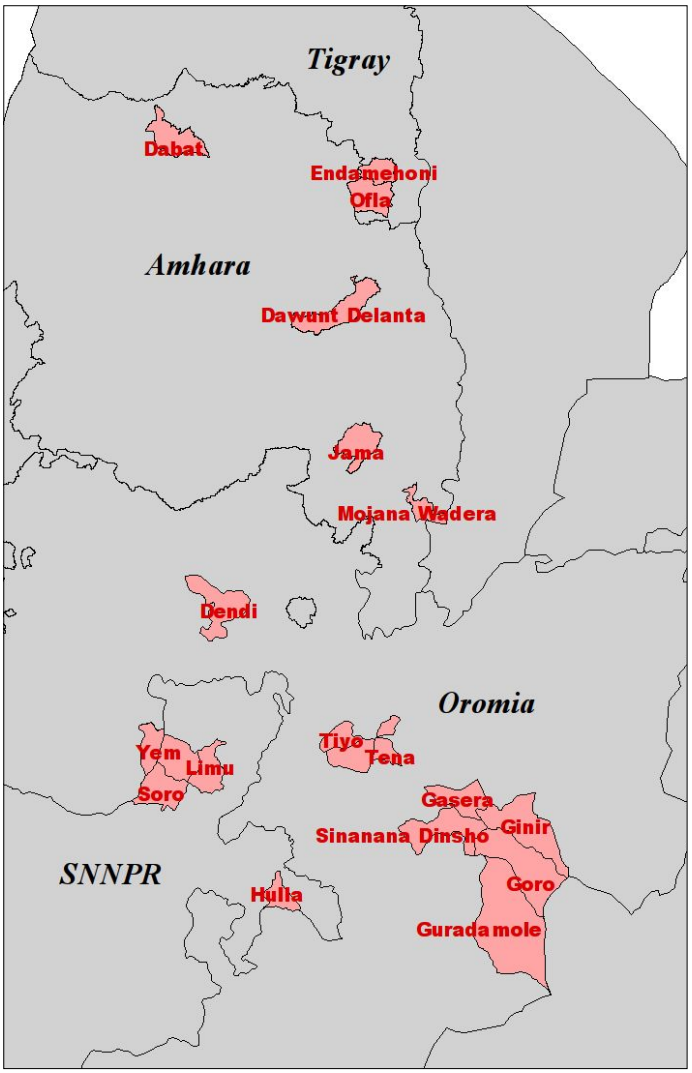



*Figure 3.8. Recommended target Woredas*

Details of all selected Woredas were given to the Ethiopia project team as maps and spreadsheets, and the final selection of woredas for the initial stages of Africa RISING, and the selection of action sites (Kebeles) within the woredas was left to the Ethiopia team, headed by Peter Thorne.

| Woreda | Region | AREA | TEFF_I | BAR_R | WHE_F | MAI_R | CERSYS | AC | MEAN | EL_RA | SLOP | RAIN | POP_TO | POP_I | TLU_F | CA | TAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dabat | Amhara | 1213 | 36.7 | 24.1 | 31.0 | 8.2 | Teff-wheat | 0 | 1918 | 1830 | 5.9 | 940 | 155403 | 128 | 0.63 | F | T |
| Dawunt Delanta | Amhara | 1560 | 40.9 | 25.2 | 33.0 | 0.9 | Teff-wheat | 0 | 2538 | 2353 | 8.1 | 1000 | 187907 | 120 | 0.77 | M | T |
| Degeluna Tijo | Oromia | 972 | 1.3 | 39.6 | 56.9 | 2.3 | Wheat-barley | 0 | 2835 | 1641 | 2.6 | 1125 | 138439 | 142 | 0.89 | N | T |
| Dendi | Oromia | 1621 | 36.3 | 30.3 | 25.1 | 8.3 | Teff-barley | 1 | 2445 | 1661 | 3.9 | 1143 | 242048 | 149 | 0.86 | N | X |
| Endamehoni | Tigray | 631 | 5.7 | 37.6 | 55.1 | 1.6 | Wheat-barley | 1 | 2607 | 1932 | 8.7 | 742 | 109773 | 174 | 0.44 | K | TX |
| Gasera | Oromia | 1149 | 0.7 | 13.4 | 56.1 | 29.8 | wheat | 1 | 2140 | 1312 | 4.7 | 1099 | 158093 | 138 | 0.54 | F | TX |
| Gera Midima Keya Gabriel | Amhara | 1678 | 22.2 | 33.0 | 44.2 | 0.6 | Wheat-barley | 0 | 2692 | 2018 | 7.5 | 1076 | 173955 | 104 | 0.76 | M | T |
| Ginir | Oromia | 2480 | 9.8 | 15.7 | 61.7 | 12.8 | wheat | 0 | 1720 | 1410 | 2.2 | 974 | 132470 | 53 | 0.97 | B | T |
| Goro | Oromia | 2880 | 14.3 | 19.6 | 64.0 | 2.1 | wheat | 0 | 1516 | 1710 | 2.8 | 837 | 94475 | 33 | 0.87 | A | T |
| Guradamole | Oromia | 5382 | 19.9 | 14.0 | 58.3 | 7.8 | wheat | 0 | 1116 | 1994 | 3.1 | 652 | 24947 | 5 | 1.21 | A | T |
| Hulla | SNNPR | 621 | 5.4 | 23.9 | 32.3 | 38.5 | Wheat-barley | 0 | 2494 | 1487 | 3.5 | 1430 | 240138 | 387 | 0.9 | N | T |
| Jama | Amhara | 1134 | 49.3 | 2.0 | 47.9 | 0.8 | Teff-wheat | 0 | 2362 | 1232 | 6.3 | 1029 | 138974 | 123 | 0.72 | F | T |
| Limu | SNNPR | 1003 | 28.8 | 8.9 | 31.9 | 30.5 | Wheat-maize | 1 | 2166 | 1200 | 2.6 | 1029 | 412615 | 411 | 0.59 | G | TX |
| Misha | SNNPR | 1205 | 21.3 | 8.8 | 53.6 | 16.2 | wheat | 0 | 2007 | 1876 | 3.2 | 1107 | 386752 | 321 | 0.54 | J | T |
| Mojana Wadera | Amhara | 557 | 21.3 | 15.9 | 62.6 | 0.2 | wheat | 1 | 1991 | 2240 | 6.9 | 1040 | 177627 | 150 | 0.34 | F | TX |
| Ofla | Tigray | 1105 | 13.8 | 32.8 | 47.6 | 5.8 | Wheat-barley | 1 | 2383 | 1964 | 7.3 | 772 | 162699 | 147 | 0.54 | C | TX |
| Sinanana Dinsho | Oromia | 1797 | 0.5 | 36.1 | 56.6 | 6.8 | Wheat-barley | 1 | 2743 | 2547 | 2.9 | 1050 | 186967 | 104 | 0.88 | M | TX |
| Soro | SNNPR | 1292 | 23.1 | 6.8 | 50.4 | 19.7 | wheat | 0 | 1858 | 1954 | 4.1 | 1227 | 387224 | 300 | 0.54 | J | T |
| Tena | Oromia | 696 | 22.8 | 25.4 | 46.0 | 5.8 | Wheat-barley | 0 | 2724 | 2294 | 4.7 | 1103 | 122175 | 176 | 0.9 | N | T |
| Tiyo | Oromia | 633 | 6.0 | 34.2 | 52.4 | 7.5 | wheat | 0 | 2541 | 2086 | 4.3 | 1035 | 169488 | 268 | 0.46 | M | T |
| Yem | SNNPR | 753 | 37.6 | 13.9 | 31.3 | 17.2 | Teff-wheat | 1 | 1902 | 1798 | 7.9 | 1246 | 86977 | 115 | 0.67 | J | X |

Table 3.2. Selected Woredas in the Ethiopia wheat zone

**3D. Phase Two Site Selection – action sites (Kebeles)**

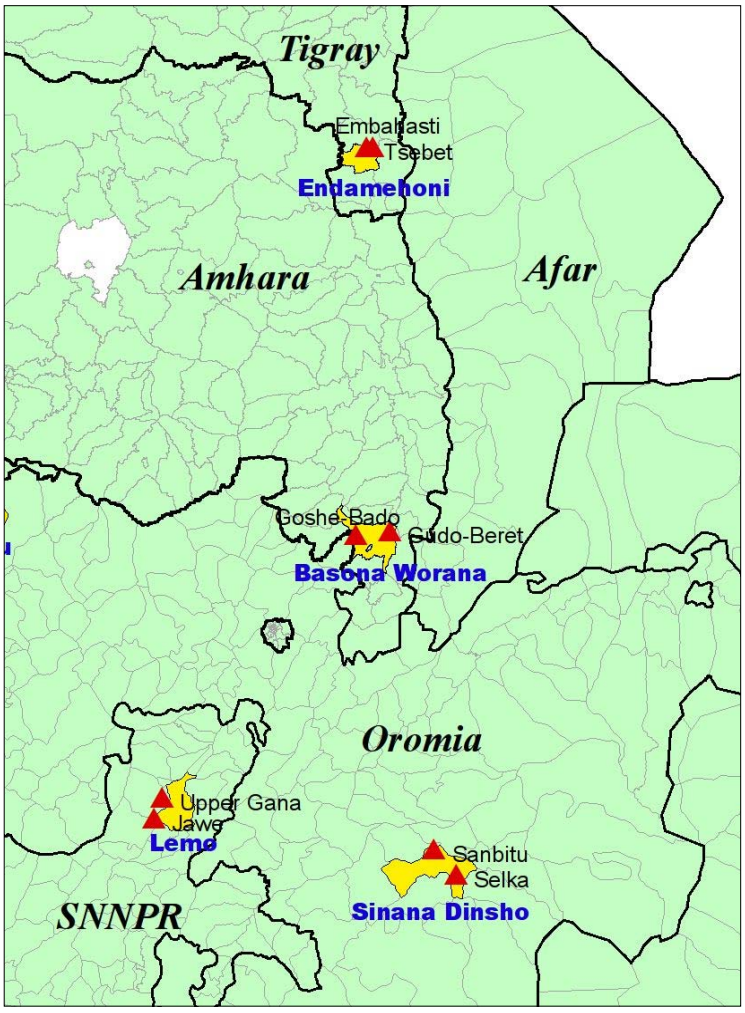



*Figure 3.9. Preliminary Action Sites selected by Ethiopia project team*

| KEBELE | WOREDA | REGION | HOUSE | MALEH | FEMHH | FARMA | MARKE |
|---|---|---|---|---|---|---|---|
| Gudo-Beret | Basona-Worana | Amhara | | | | | 32 |
| Goshe-Bado | Basoba-Worana | Amhara | | | | | 17 |
| Tsebet | Endamehoni | Tigray | 1107 | 854 | 253 | 1078 | |
| Embahasti | Endamehoni | Tigray | 823 | 514 | 209 | 836 | |
| Jawe | Lemo | SNNPR | 900 | | | | 10 |
| Upper Gana | Lemo | SNNPR | 750 | 705 | 45 | | 14 |
| Selka | Senana | Oromia | 1602 | | 185 | 7110 | 33 |
| Sanbitu | Senana | Oromia | 1254 | 1080 | 174 | 5121 | 13 |

*Table 3.3. Preliminary Ethiopia Action Sites*

The information in Table 3.2 was given to the Ethiopia Africa RISING project team, led by Dr. Peter Thorne of ILRI. Selection of initial action sites was based on discussion with agricultural research institutes and other government researchers and extension agents. In each of the four regions within the project area (Tigray, Amhara, Oromia and SNNPR), one woreda was selected from the list provided by the consultant, Two kebeles were then selected within each woreda, based on the levels of farming training, awareness of agricultural innovation, and also on market access. In each region, one kebele with very good access and a second with poorer access were selected. The ILRI/ICARDA team visited Tigray between 19th and 21st November, starting at the Tigray Agricultural Research Institute then moving to the Tigray Southern Zone, the Alamata Agri Research Centre and the Embekoni Woreda, where two villages recommended by Government researchers were visited and approved as action sites. Between 22nd and 24th November, the team visited SNNPR, starting with SARI and the Regional Bureau of Agriculture in Hawassa then moving to Areka research centre and the Hadiya Zone Bureau of Agriculture in Hosanna. Two Kebeles in Lemo Woreda, suggested by the Government officers, were visited by the team and accepted as suitable for the project. The team visited the Bale zone of Oromia region between 26th and 28th November. After calling at the Bale Zone Administrative office, they went to the Sinana Agricultural office and the Sinana Agricultural Research Centre, then to three candidate Kebeles, of which two were selected as project sites. Between 19th and 21st December, the team visited the Amhara Region, starting with the Debre Birhan Agricultural Research Centre. The team planned originally to work in Mojana Wodera woreda, as recommended by the consultant, but this proved not to have been an AGP woreda. For this, and reasons of access, Basona Worana, an adjacent woreda with similar agro-ecology, was selected. Following a visit to the North Showa Zone office of agriculture, three Kebeles recommended by the government officers were visited, and two selected as action sites. (Summarised from ILRI reports)

No control (counterfactual) communities were selected by the ILRI-led team in Ethiopia

## 4) Ghana Project Area

### 4A. Definition of Project Area

According to the December 2011 Concept Note, "The project will focus on the northern regions of Ghana, specifically in the administrative districts of Karaga, Cheroponi, and Tolon-Kumbungu (Northern Region); Kassena-Nankana and Bawku West (Upper East Region); and Wa East and Nadowli (Upper West Region) to address production constraints in rice and cereal-legume production systems. The northern Regions of Ghana are characterized by small land holdings of low input-output farming systems, which adversely impact food security in terms of availability, access and quality and result in a seasonal cycle of food insecurity of 3-5, 4-5 and 6-7 months for cereals (maize, sorghum, millet) and 5-7, 4-5 and 6-7 months (groundnut, cowpea, and soybean) in the Northern, Upper West and Upper East Regions, respectively (Quaye, 2008). These crops in the savannas are often produced in a continuous monoculture in which soil natural resources are steadily depleted and yields per unit area are falling to very low levels. The poverty profile of Ghana also depicts the three northern regions as the most poverty stricken and hunger spots in Ghana (GLSS, 2000). Gender inequalities are also apparent in these regions where women have less access to resources and capacity to generate income.

In Mali the project will focus on the Sikasso region, specifically the circles of Koutiala and Bougouni, The Sikasso region of southern Mali is ecologically similar to northern Ghana, but stretches northwards into drier zones, where maize cultivation is associated with high economic risks. Sorghum is traditionally the lead cereal and staple crop, but both maize and pearl millet are widely cultivated, to exploit specific ecological niches, and marketing opportunities.

The northern part of the Sikasso region, specifically the Koutiala district, is the most intensely farmed area in Mali. Increasing total production by expanding the area cultivated is no longer an option in this area. Maintaining soil fertility and soil health, and reducing soil erosion, while increasing overall productivity are key issues for agricultural development in this area. In contrast the Bougouni district, in the southern part of the Sikasso region is characterized by low population density, large tracts of reserve forests, and very locally diverse cropping situations, ranging from infertile lateritic rock outcrops on hilltops to large inland valley tracts that allow for double cropping, irrigated farming and vegetable production. The potential for fruit tree cultivation is high.

Integrating livestock management with crop production is a key issue for this region, as it is a zone heavily used by transhumant herders for dry-season grazing. This is resulting in serious conflicts with the local resident farming communities. A key research issues for this region is how to support growing livestock herds temporarily, while increasing crop productivity and maintaining forest cover and diversity."

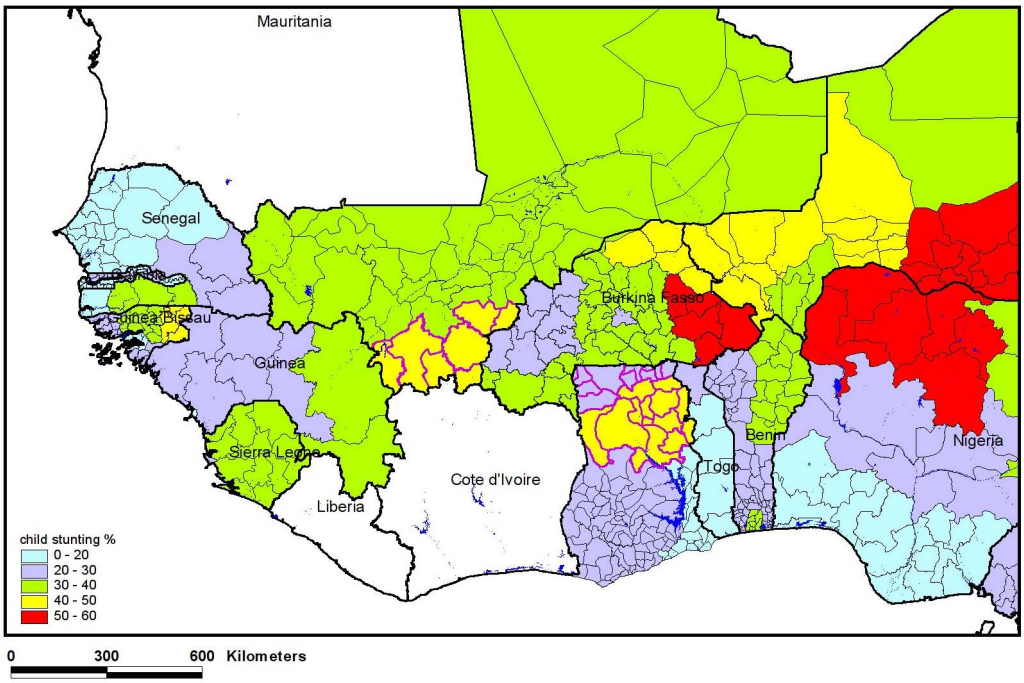



*Figure 4.1. Child stunting (height for age) in West Africa. Mega-site districts in purple*

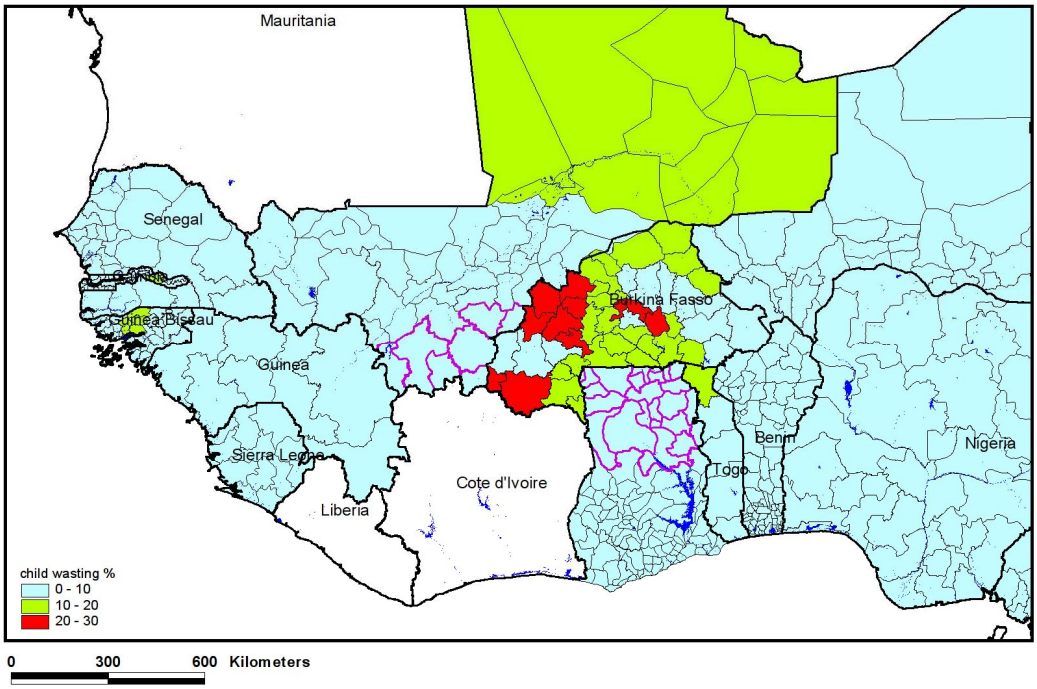



*Figure 4.2. Child Wasting (weight for height) in West Africa. Mega-site districts in purple*

**4B. Characterisation of Project Area**

As shown in Figures 4.1 and 4.2, the project regions in Mali and Ghana are areas of moderate to high child stunting, but relatively low incidence of wasting. This suggests that long-term malnutrition is common, but that there have not been extreme nutrition events recently.

The topography of the project area (Figure 4.3) is relatively subdued, with elevations between 100 metres and 400 metres and a generally undulating surface without prominent mountains. The highest land is in the Mali portion of the project area, where a plateau zone forms the watershed between major river systems. In common with most of the Sahel, rainfall increases steadily from north to south (Figure 4.4), with a sharper gradient in Mali due to the highlands. Variation is from less than 900mm to a high of over 1300 mm per year.

Population distribution is shown in Figure 4.5. Over much of the area, density is quite low, less than 20 persons per square kilometre, but large areas of the eastern portion of the Mali site have densities over 40. Apart from main towns in Ghana and Mali, there are some areas of extremely dense rural population, notably in the Upper Eastern region of Ghana, where there are significant areas with more than 100 persons per square kilometre. Access to markets is generally good to moderate, with poorest access in the western portion of the Mali project and in the south-west of the Ghana site (Figure 4.6).

The distribution of farming systems in the project area is shown in Figure 4.7. There is a rough zoning of cropping systems, from sorghum dominated in the north dryer areas, through maize dominated, to maize, yams and rice in the southern wetter districts.. Livestock is most important in the north, in both sorghum and maize systems. Legumes are grown in all districts, and are locally very important.

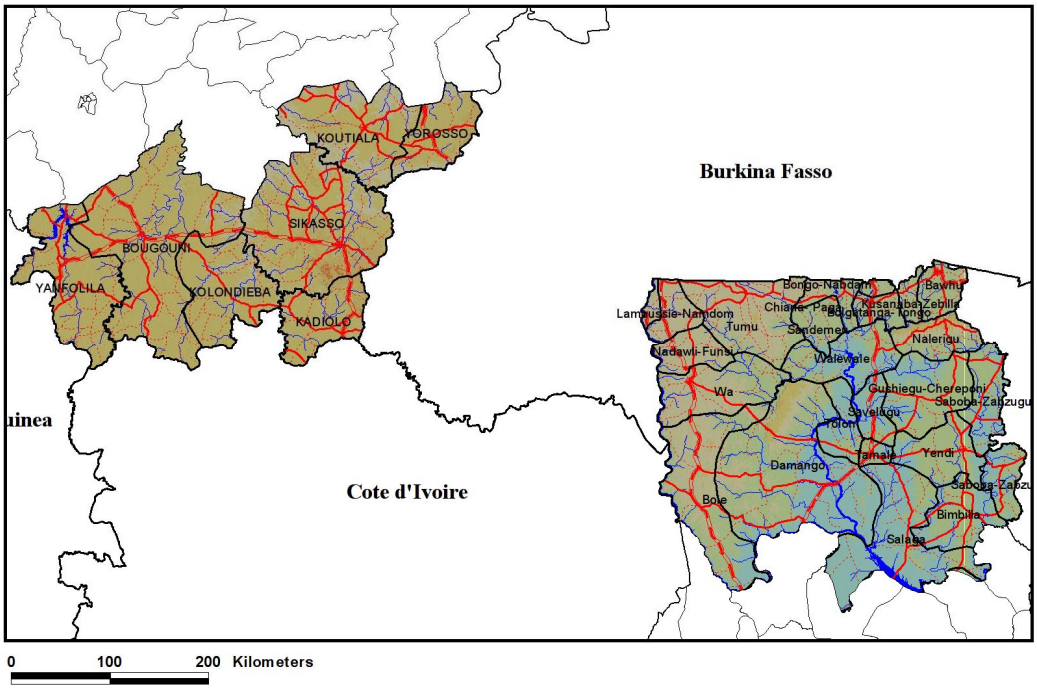



*Figure 4.3. Topography of Sudano-Sahelian project area*

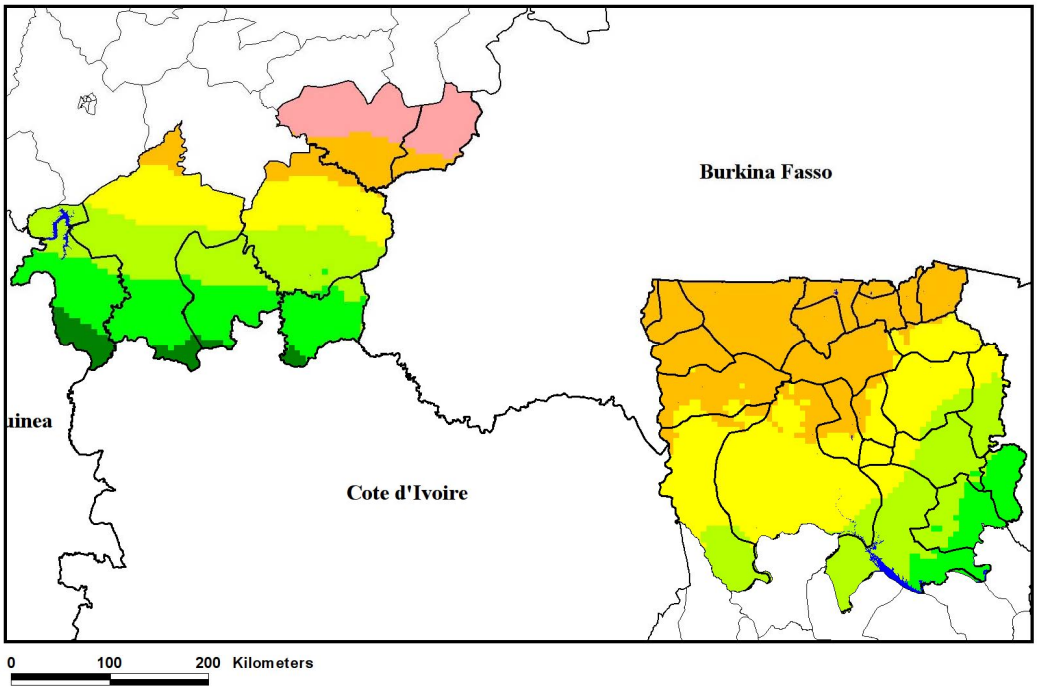



*Figure 4.4. Annual rainfall in Sudano-Sahelian project area. From 900mm (pink) to 1300mm (green)*

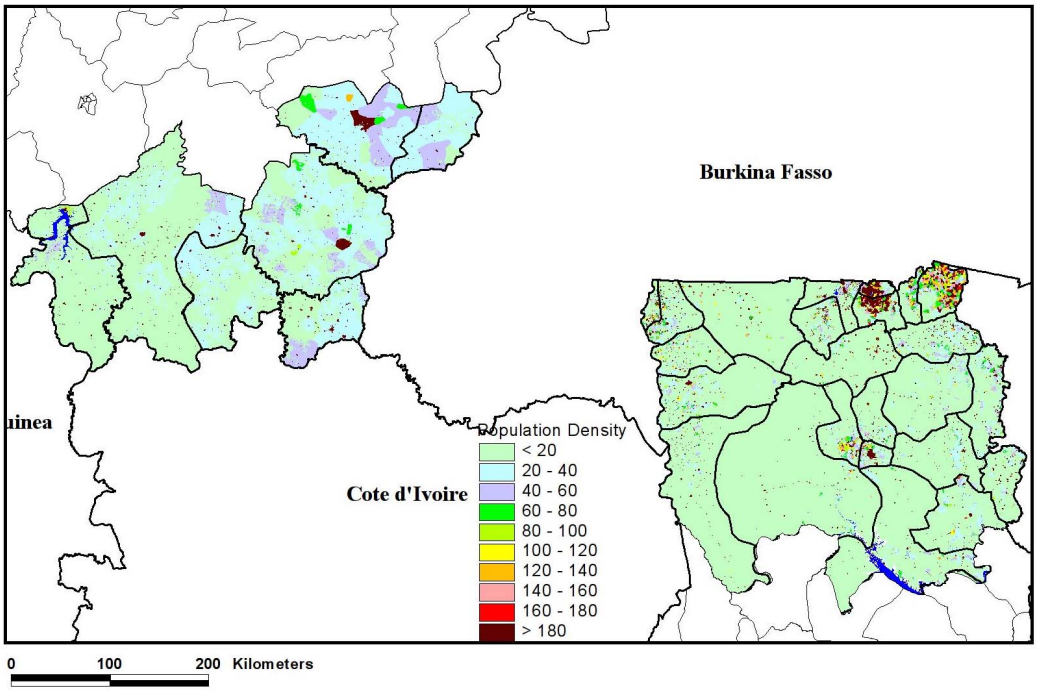



*Figure 4.5. Population density in Sudano-Sahelian project area*

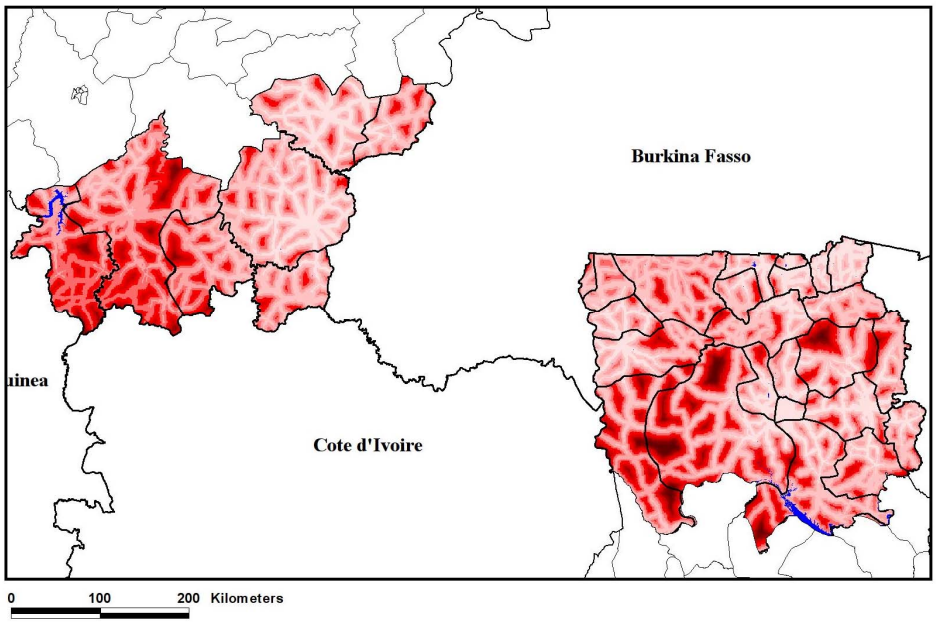



*Figure 4.6. Access to markets in Sudano-Sahelian project area. Good access (pale pink) to poor access (red)*

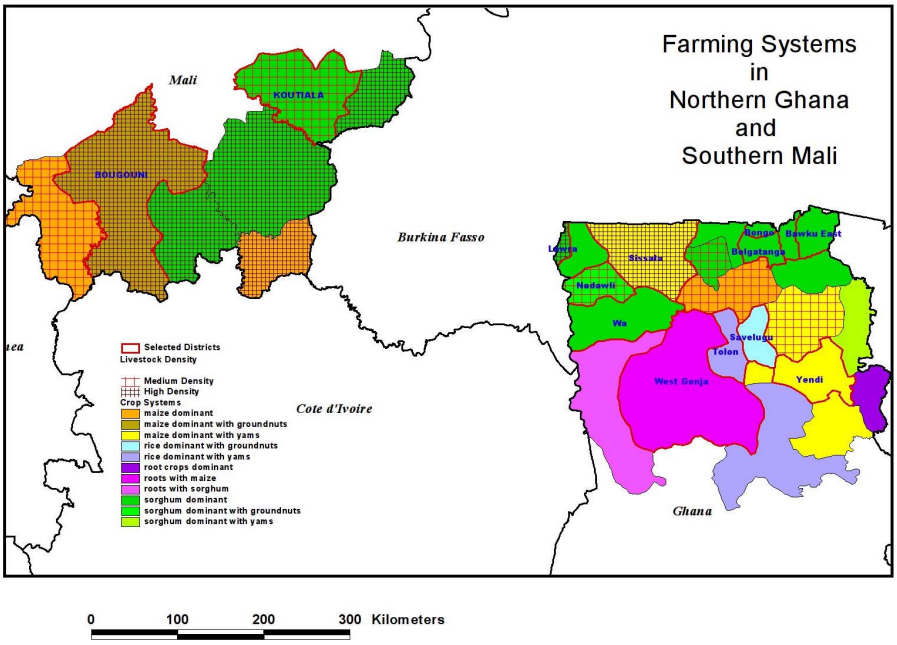



*Figure 4.7. Farming systems in Sudano-Sahelian project area*

**4C. First Phase of Site Selection – District-Level Selection**

**4C1. Stratification**

The project area was stratified initially on the basis of the four main variables; rainfall, elevation, population density and market access. These variables are classified as shown in Table 4.1.

Table 4.1. Classification of main variables

| Category | Population | Rainfall | Elevation | Market Access |
|---|---|---|---|---|
| 1 | > 100 | < 1000 | < 200 | good |
| 2 | 50 - 100 | 1000 - 1100 | 200 - 300 | moderate |
| 3 | 30 - 50 | 1100 - 1200 | > 300 | poor |
| 4 | 20 - 30 | > 1200 | | Very poor |
| 5 | < 20 | | | |

The first step in stratification, since the project emphasises intensification and wishes to reach maximum numbers of farmers, is to remove the few districts that have very low population densities and/or have extremely poor market access. The remaining districts are then grouped into a total of 22 categories based on combinations of the three variables rainfall, elevation and population density, together with dominant cropping systems. This results in the classification shown in Table 4.2. This table also highlights categories already covered by selected communities (Ghana) and districts or cercles (Mali). Some of the categories are fairly similar, and some include significant contributions from root crops, mainly yams, which are not the target of this project. It is not essential, therefore, that every category is covered by operational sites, but three important categories not covered in current planning are highlighted in yellow.

Table 4.2. Classification of districts by rainfall, elevation, population and farming system

| Class | Description |
|---|---|
| A | Low rainfall, high elevation, medium population density, sorghum-dominant |
| B | Medium rainfall, low elevation, high population density, sorghum dominant |
| C | Medium rainfall, low elevation, low population density, maize dominant |
| D | Medium rainfall, low elevation, low population density, sorghum dominant |
| E | Medium rainfall, medium elevation, high population density, sorghum dominant |
| F | Medium rainfall, medium elevation, medium population, sorghum dominant |
| G | Medium rainfall, medium elevation, medium population, sorghum dominant, livestock |

| | |
|---|---|
| H | Medium rainfall, medium elevation, medium population, rice/roots |
| I | Medium rainfall, med/high elevation, low population, sorghum dominant |
| J | Medium rainfall, med/high elevation, low population, maize/roots |
| K | High rainfall, low elevation, high population, maize/roots |
| L | High rainfall, medium elevation, medium population, rice/gnut |
| M | High rainfall, med/high elevation, low population, sorghum dominant |
| N | High rainfall, med/high elevation, low population, sorghum dominant, livestock |
| O | High rainfall, med/high elevation, low population, sorghum/roots |
| P | High rainfall, med/high elevation, low population, maize/roots |
| Q | High rainfall, low elevation, low population, maize/roots |
| R | High rainfall, low elevation, low population, sorghum/roots |
| S | High rainfall, low elevation, low population, rice/roots |
| T | High rainfall, high elevation, low population, sorghum dominant |
| U | High rainfall, high elevation, low population, maize dominant |
| V | High rainfall, high elevation, low population, maize/gnut |

The characteristics of all districts not excluded by low population density and poor access are shown in Table 4.3, together with the classes as outlined in Table 4.2. Cyan highlighting indicates all districts already selected for "quick-start" sites by the Ghana and Mali teams, while pink highlights show districts recommended for sites based on this analysis.

**4C2. Preliminary District Selection.**
A number of districts and sites have already been selected by the Ghana team, as shown in Table 3 and Figure 10. It is apparent that there are some duplications and some important omissions. Three districts in the Upper Eastern Region with Class E characteristics (medium rainfall, medium elevation, high population density and sorghum the dominant cereal have already been selected and initial work undertaken in the communities. Similarly, two selected districts in Upper Western Region have Class I characteristics ( medium rainfall, medium/high elevation, low population density and sorghum dominant). Two important classes, N and O, with high rainfall, medium/high elevation, low population density and sorghum dominant with livestock and sorghum/roots respectively, do not have any proposed sites. It is suggested that the sites in Bongo and Kusanaba be abandoned, and new sites selected in Bimbilla and Gushiegu districts.

In Mali, Bougouni and Koutiala cercles have already been selected for project implementation, although individual communities have yet to be selected. It is suggested that Kolondieba cercle be added, since this has a combination of parameters significantly different from the others.

Table 4.3. Characteristics of districts, very low population density and very poor market access excluded.

| REGION | DISTRICT | crop system | popclass | rainclass | elevclass | acclass | CLASS |
|---|---|---|---|---|---|---|---|
| Northern | Bimbilla | maize_roots | 3 | 4 | 1 | 2 | P |
| Northern | Gushiegu-Chereponi | maize_roots | 4 | 3 | 2 | 2 | O |
| Northern | Nalerigu | sorghum | 2 | 3 | 3 | 2 | M |
| Northern | Saboba-Zabzugu | sorghum_roots | 3 | 4 | 1 | 2 | Q |
| Northern | Saboba-Zabzungu | roots | 3 | 4 | 1 | 1 | R |
| Northern | Salaga | rice_roots | 3 | 4 | 1 | 2 | S |
| Northern | Savelugu | rice_gnt | 2 | 3 | 1 | 1 | L |
| Northern | Tamale | maize_roots | 1 | 3 | 1 | 1 | K |
| Northern | Tolon | rice_roots | 2 | 2 | 1 | 2 | H |
| Northern | Walewale | maize | 3 | 2 | 1 | 2 | C |
| Northern | Yendi | maize_roots | 3 | 4 | 1 | 1 | Q |
| Upper East | Bawhu | sorghum | 1 | 2 | 2 | 1 | E |
| Upper East | Bolgatanga-Tongo | sorghum | 1 | 2 | 1 | 1 | B |
| Upper East | Bongo-Nabdam | sorghum | 1 | 2 | 2 | 1 | E |
| Upper East | Chiana- Paga | sorghum | 1 | 2 | 2 | 1 | E |
| Upper East | Kusanaba-Zebilla | sorghum | 1 | 2 | 2 | 1 | E |
| Upper East | Sandemen | sorghum | 3 | 2 | 1 | 1 | D |
| Upper West | Lambussie-Namdom | sorghum | 2 | 2 | 2 | 1 | F |
| Upper West | Lambussie-Namdom | sorghum | 2 | 2 | 2 | 1 | G |
| Upper West | Nadawli-Funsi | sorghum_gnt | 3 | 2 | 2 | 2 | I |
| Upper West | Tumu | maize_roots | 4 | 2 | 3 | 2 | J |
| Upper West | Wa | sorghum | 3 | 2 | 2 | 2 | I |
| SIKASSO | BOUGOUNI | maize_gnt | 4 | 4 | 3 | 2 | V |
| SIKASSO | KADIOLO | maize | 3 | 4 | 3 | 2 | U |
| SIKASSO | KOLONDIEBA | sorghum | 3 | 4 | 3 | 2 | T |

*Cyan highlighting indicates villages already selected by project management for operational sites.*
*Pink highlighting indicates districts recommended for sites.*

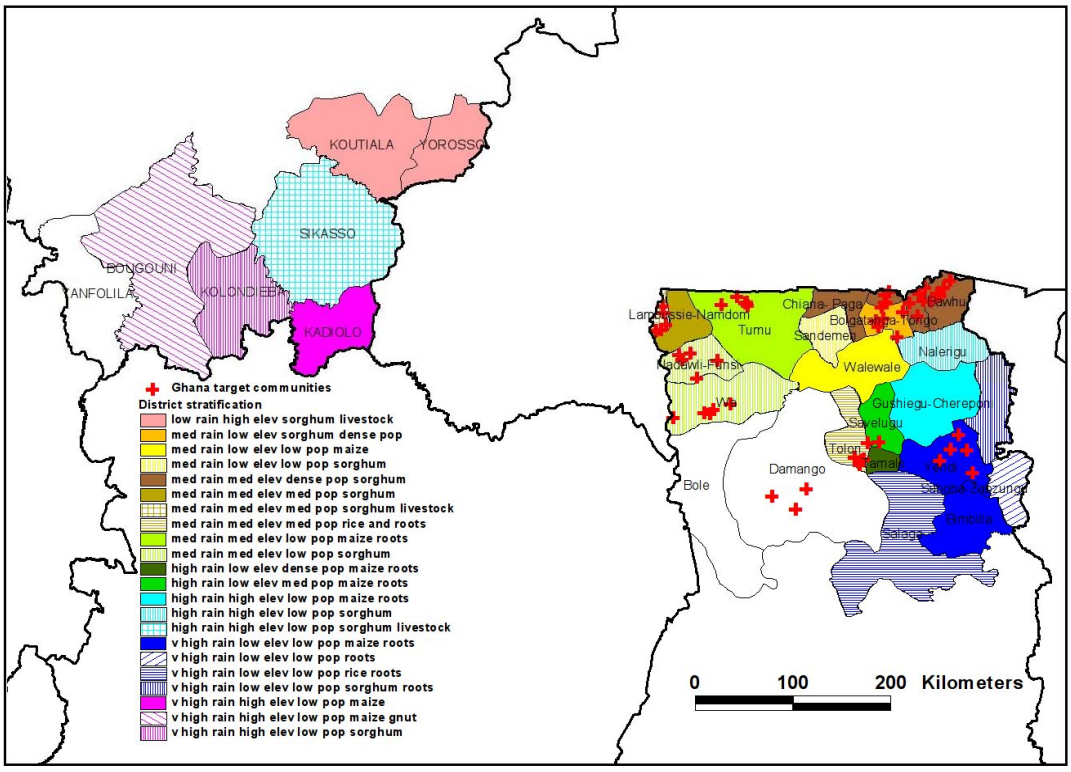



Figure 4.8. Distribution of stratified Districts. Classes as in Tables 4.2 and 4.3. Communities already selected by Ghana team for "Quick-Wins" indicated as red crosses.

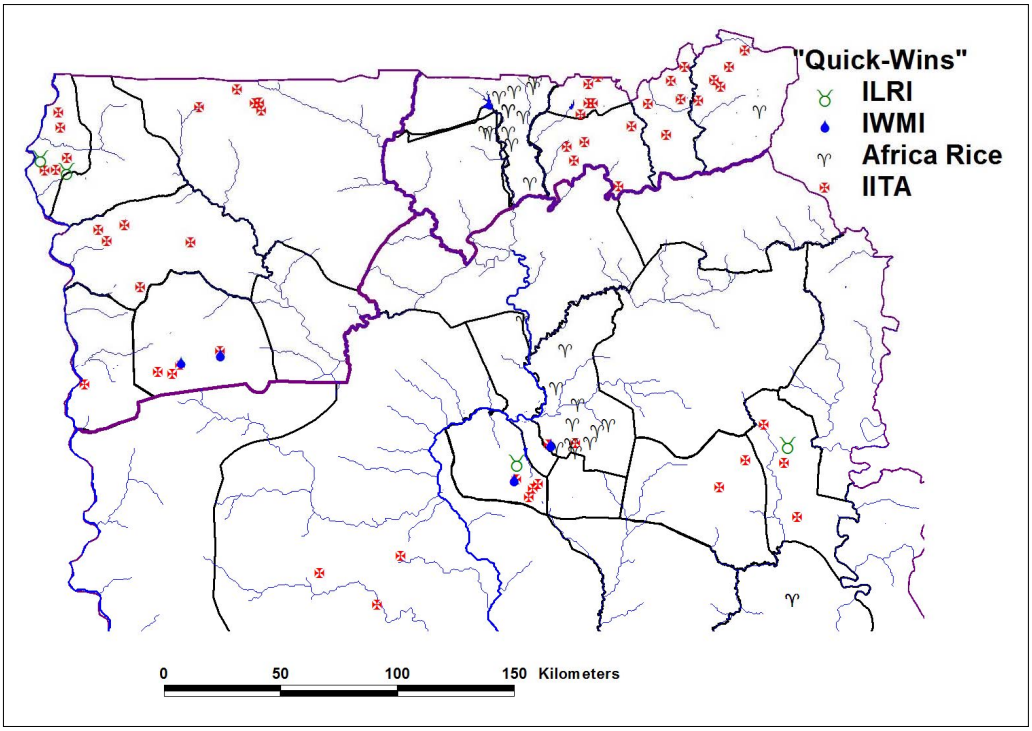



Figure 4.9. "Quick-Win" communities in Northern Ghana

**4D. Second Phase of Site Selection – Field Visits in Northern Ghana and selection of Communities**
Following stratification and detailed study of the results of the first phase of selection, and in consultation with local project management in Tamale, Northern Ghana, six districts were identified as being primary targets

**Northern Region**. Savelugu/Nanton, Tolon/Kundungu, Yendi
**Upper Western Region**. Wa, Nadowli
**Upper Eastern Region**. Kassena-Nankana

It was proposed during and subsequent to field work, to identify five action sites (communities) in each district

It was subsequently discovered, during field work, that some districts had been recently subdivided, and that areas of very dense rural population in the Upper East were not adequately sampled. This resulted in the following revised selection

**Northern Region**. Savelugu, Tolon, Mion
**Upper West**. Wa Municipal, Wa West, Nadowli
**Upper East**. Kassena-Nankana, Bongo, Bawku.

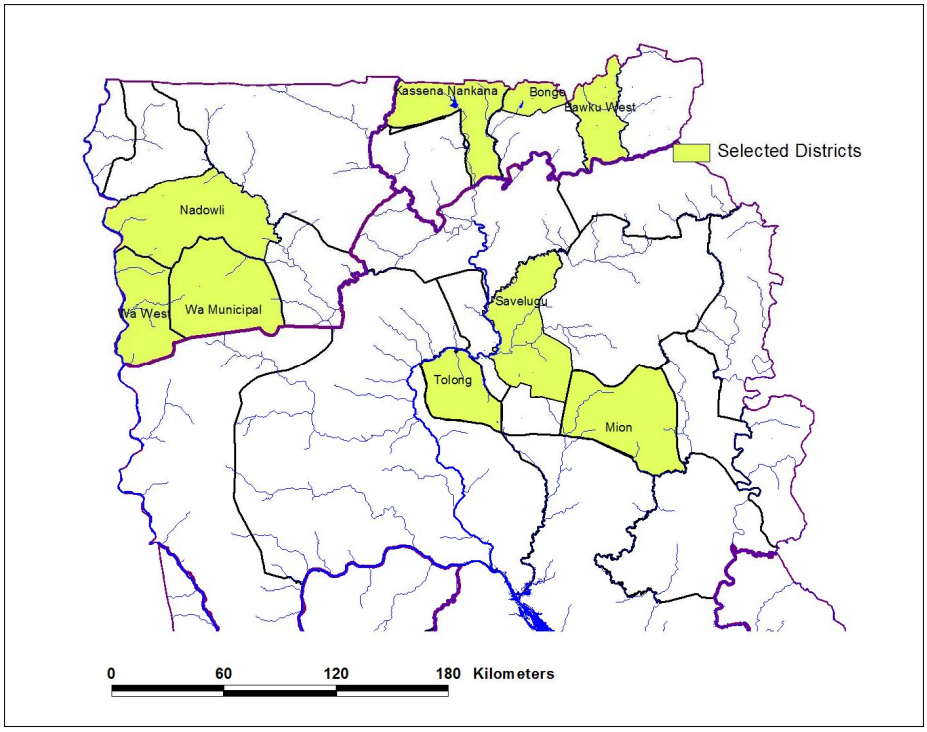



Figure 4.10. Selected Districts in Northern Ghana after field work

When target districts had been selected interactively in Tamale, based on stratification, communities within these districts were selected as Action sites and counterfactuals. Maps were prepared of all known villages within each district, based on digital locations of villages provided by Africa Rice and digitisation of locations from printed maps. New market access maps were prepared from the latest available digital maps of roads and tracks, updated daily as field work progressed, and these were used to eliminate inaccessible communities. Potential action sites and counterfactuals were selected before field work on the basis of random selection of villages within a geographic framework so as to ensure maximum separation of action sites and counterfactuals, and paper and digital maps prepared before each day's field work. All selected communities were visited to check their suitability in terms of farming systems, accessibility and size of communities. The field team consisted of the consultant, the project manager and other staff from IITA, and officers from the Ministry of Agriculture familiar with the district. Some pre-selected villages were abandoned, and other suitable sites located during field work. The locations of all suggested action and counterfactual sites were presented at a planning workshop in Tamale at the end of October 2012 (Figure 4.11).

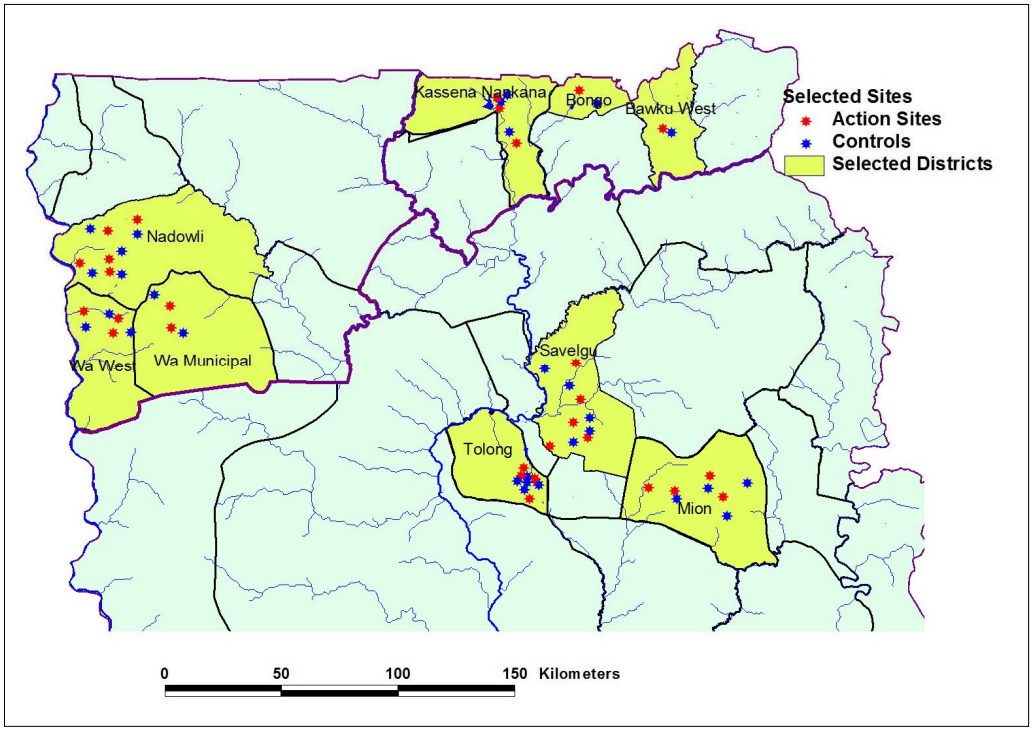


Figure 4.11. Action and Counterfactual sites in Northern Ghana as presented to the Tamale Workshop

**4E. Third Phase of Site Selection – Counterfactuals in Northern Ghana**

**4E1. Introduction**

Following the October workshop in Tamale, concern was expressed by IFPRI about the physical closeness of action and counterfactual communities in Tanzania, and it became obvious that the pattern of action and counterfactual communities in Ghana did not provide sufficient physical separation of sites. Some kind of re-selection was required.

Identification of suitable counterfactual communities is a very difficult problem. These communities are to form the basis for measuring impact within action communities. For reliable impact assessment, the counterfactuals should have identical properties – population density, cropping system, market access, etc. - as the action communities, but should be as isolated from the action communities as possible. Ideally, inhabitants of counterfactual communities should not meet inhabitants of action villages, and thus should not share markets or other public facilities. These two main conditions – similarity and isolation – can very rarely be achieved.

The best solution would be to have action and counterfactual sites in different districts. In northern Ghana this is rarely practical because of big differences in market accessibility and sometimes of cropping systems. There are no major physical barriers to movement such as very large rivers, swamps or mountain ranges. Major markets are shared by inhabitants of adjacent districts. In practice a range of approaches, as described in detail below, were adopted to suit different districts.

It is not clear yet how many counterfactual sites are needed in each area. In the initial selection of sites, one counterfactual was chosen for each action site. This may be excessive, since different interventions may be tested in different action sites, and a single counterfactual in a similar setting could be used to evaluate numerous action sites. The IFPRI-led M&E team can decide how many counterfactuals are required, and select randomly from the suggested sites.

**4E2. Revised Action and Counterfactual Site Locations**

As far as possible, action communities identified in the initial planning exercise, before the October Tamale Workshop, have been retained, although in a few cases the role of the originally selected site has been converted from action site to control or vice versa. The suggested sites for the whole of Northern Ghana are shown in Figure 4.12.

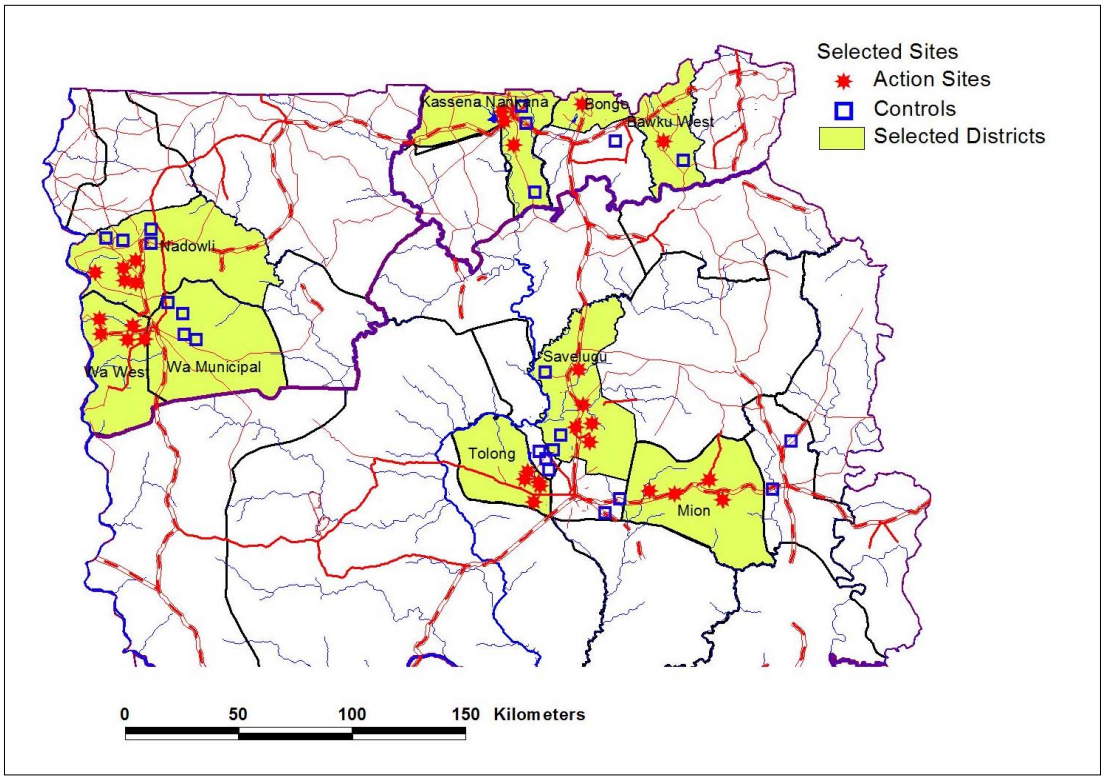



*Figure 4.12. Revised Action and Counterfactual Communities in Northern Ghana*

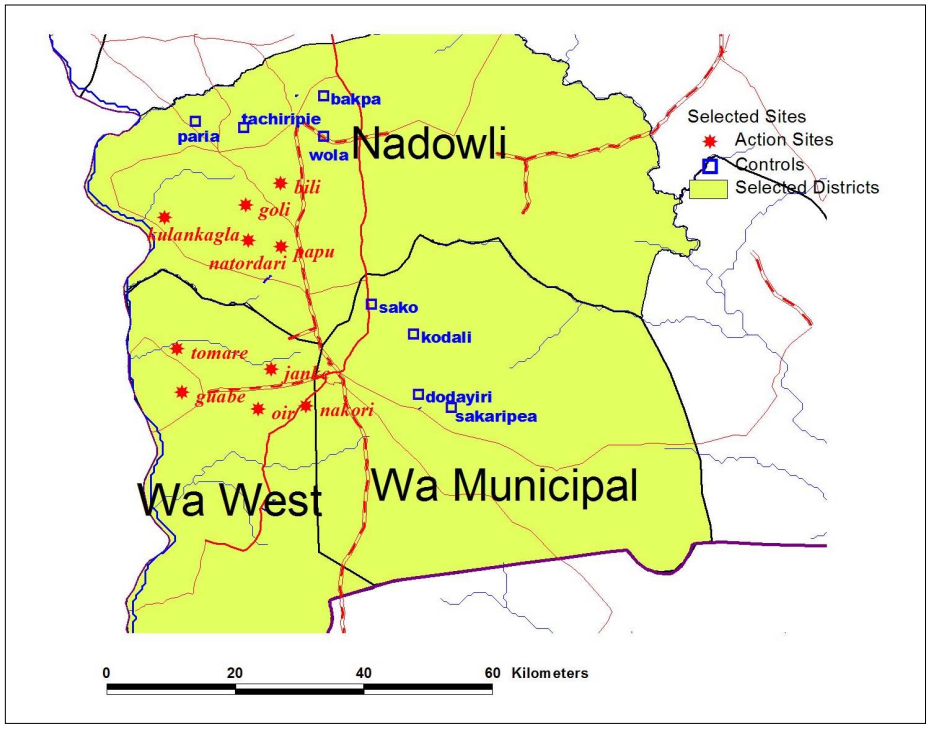


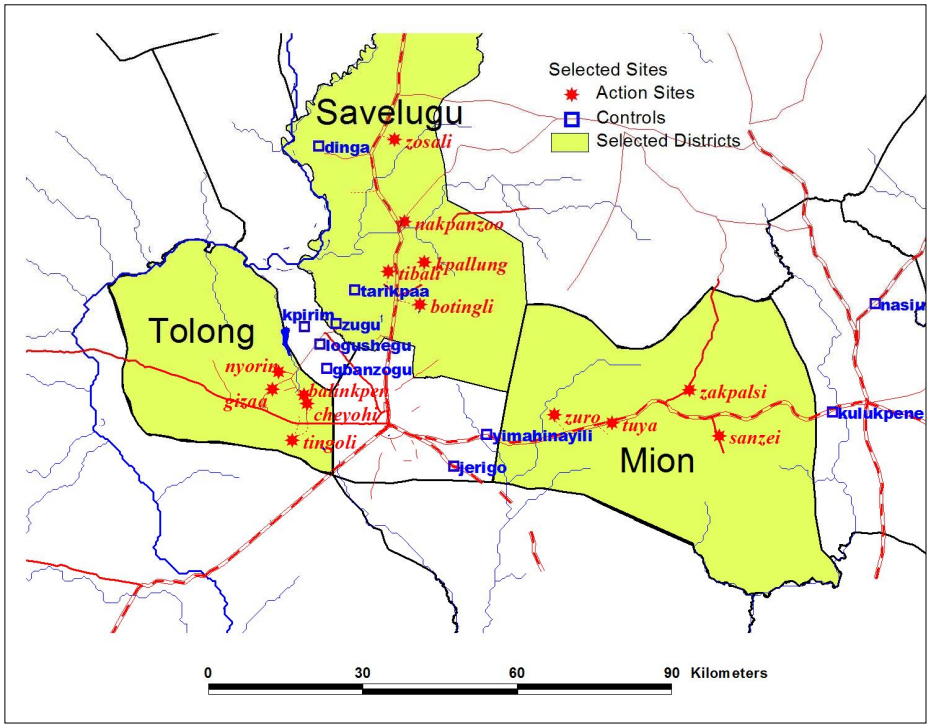

*Figure 4.13. Suggested Action and Counterfactual Communities in Upper West Region*

Suggested sites for the Upper Western region are shown in Figure 4.13. In order to achieve better spatial separation between action and counterfactual sites in this region, the originally recommended sites have been re-classified. In the two Wa districts, the proposed action communities are now all in Wa West district, while the proposed control sites are

all on the eastern side of the main road in Wa Municipal district. They will, unfortunately for the purposes of evaluation, still share the same main regional market in Wa, but regular contact between villagers is likely to be less than with the previous distribution.

In Nadowli district, there are very few villages in the sparsely populated area east of the main road, so villages in the far north of the district are suggested as counterfactuals, while a separate group further south are suggested as action sites. Both share the same main local market, and market access is similar in both groups.

All sites, action and counterfactual, in the Upper West still need to be checked in the field, since this was not done prior




to the Tamale workshop.

*Figure 4.14. Suggested Action and Counterfactual Communities in Northern Region*

Suggested sites in the Northern Region are shown in Figure 4.14. Three districts, Savelugu, Tolong and Mion, were targeted in the original selection. In the case of Savelugu district, it is not possible to select counterfactuals outside the district. Other districts with similar agro-ecologies to the north, west and east of Savelugu have much lower population densities and poorer market access. In these circumstances, counterfactual sites have to be located within the district. A crude physical separation has been achieved by locating counterfactuals west of the main road, and action sites to the east, but will not ensure isolation of the two classes.

In the case of Tolong district, proposed counterfactuals are all located in Kumbungu district, to the north-east of Tolong. This was until recently a larger single district, and distances between action communities and counterfactuals is not large. However, communities in Kumbungu use their local market in Kumbungu town, as well as Tamale, which they reach through the Kumbungu-Tamale road. Communities in Tolong use the Tolong local market, and access Tamale by the Tolong-Tamale road.

Mion district was recently created by sub-division of the old Yendi District. Possible counterfactual communities have been selected in two districts adjacent to Mion, firstly in the eastern part of Tamale Municipal district, and then in the remainder of Yendi district. None of the four proposed sites have actually been visited in the field, and should be checked before use. Within the current Yendi district, most villages have been observed to cultivate mainly sorghum without maize, but some maize-dependent communities are known to exist.

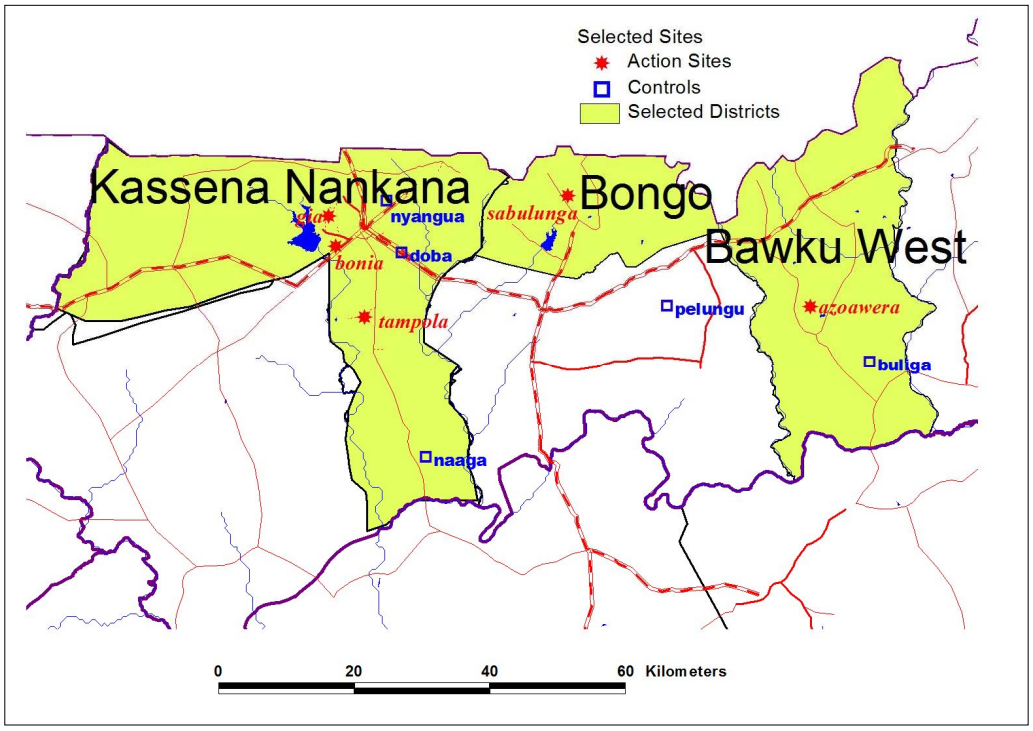



*Figure 4.15. Suggested Action and Counterfactual Communities in Upper East Region*

Figure 4.15 shows the locations of suggested sites in Upper East region. In order to cover the full agricultural and population diversity of the region, action sites had already been proposed in three districts. This seriously limits the possibility of locating counterfactual communities in different districts to action communities. Only in the case of the action community in Bongo district is it possible to find a control site in a different district, Talensi-Nabdam. In Bawku West, a counterfactual site is proposed further south-east from the action site, while in Kassena-Nankana the proposed counterfactual sites are all east and south of the action sites, but with similar market access. As suggested previously, it may not be necessary to have as many counterfactual communities as action communities, and a single site could be selected to ensure maximum isolation.

| community | DISTRICT | long | lat |
|---|---|---|---|
| nyorin | tolong | -1.03546 | 9.49404 |
| balinkpen | tolong | -0.99184 | 9.45408 |
| cheyohi | tolong | -0.98544 | 9.43944 |
| gizaa | tolong | -1.04614 | 9.46353 |
| tingoli | tolong | -1.01167 | 9.37538 |
| tampola | kassena-nankana | -1.08969 | 10.77788 |
| bonia | kassena-nankana | -1.12764 | 10.87064 |
| gia | kassena-nankana | -1.13678 | 10.91069 |
| zuro | mion | -0.55516 | 9.41941 |
| zakpalsi | mion | -0.31940 | 9.46281 |
| sanzei | mion | -0.26779 | 9.38305 |
| tuya | mion | -0.45429 | 9.40533 |
| zosali | savelugu | -0.83315 | 9.89680 |
| nakpanzoo | savelugu | -0.81673 | 9.75487 |
| kpallung | savelugu | -0.78154 | 9.68450 |
| tibali | savelugu | -0.84488 | 9.66808 |
| botingli | savelugu | -0.78975 | 9.61060 |
| janke | wa west | -2.59458 | 10.06642 |
| tomare | wa west | -2.72591 | 10.09518 |
| guabe | wa west | -2.71903 | 10.03452 |
| oir | wa west | -2.61272 | 10.01138 |
| nakori | wa west | -2.54581 | 10.01576 |
| kulankagla | nadowli | -2.74320 | 10.27752 |
| natordari | nadowli | -2.62636 | 10.24522 |
| papu | nadowli | -2.58076 | 10.23668 |
| goli | nadowli | -2.63016 | 10.29462 |

Table 4.4. Names and Locations of Action Site communities in Northern Ghana

| community | DISTRICT | long | lat |
|---|---|---|---|
| pelungu | talensi-nabdam | -0.68861 | 10.79233 |
| buliga | bawku west | -0.42078 | 10.71754 |
| naaga | kassena nankana | -1.00759 | 10.59122 |
| doba | kassena nankana | -1.04008 | 10.86181 |
| nyangua | kassena nankana | -1.05948 | 10.93018 |
| kpirim | kumbungu | -0.98988 | 9.57207 |
| logushegu | kumbungu | -0.96302 | 9.54210 |
| gbanzogu | kumbungu | -0.95095 | 9.49927 |
| yimahinayili | tamale mun | -0.67200 | 9.38491 |
| jerigo | tamale mun | -0.72985 | 9.32981 |
| kulukpene | yendi | -0.06980 | 9.42348 |
| nasiuk | yendi | 0.00457 | 9.61190 |
| dinga | savelugu | -0.96566 | 9.88546 |
| tarikpaa | savelugu | -0.90299 | 9.63615 |
| zugu | savelugu | -0.93467 | 9.57761 |
| paria | nadowli | -2.69981 | 10.41093 |
| tachiripie | nadowli | -2.63232 | 10.40198 |
| bakpa | nadowli | -2.52144 | 10.44606 |
| wola | nadowli | -2.52075 | 10.38958 |
| sako | wa municipal | -2.45463 | 10.15680 |

Table 4.5. Names and Locations of suggested counterfactual sites, northern Ghana

## 5) Tanzania Project Area

### 5A. Definition of Project Area

According to the Concept Note for East and Southern Africa, "Feed the Future (FtF) Tanzania is focusing on reducing poverty and improving nutrition through key investments to improve availability and access to staple foods by enhancing the competitiveness of smallholders. These investments are being geographically focused in areas with high agricultural potential bordering chronically food insecure districts: Morogoro (rice); Manyara and Dodoma (maize); and Arusha, Kilimanjaro, Tanga, Zanzibar, Dar es Salaam, Morogoro, Iringa and Mbeya (horticulture).

Dodoma and Manyara Regions in Tanzania are the geographic focus for this project. These areas are located in the Southern Agriculture Growth Corridor of Tanzania. Dodoma Region is a region centrally positioned in Tanzania. This Region is bordered by Manyara Region in the North, Morogoro in the East, Iringa in the South and Singida in the West. Much of the region is a plateau rising gradually from some 830 metres. There are three agro-ecological sub-zones in this region.

Zone I includes the drier areas with 300-500 mm. This agro-ecological zone covers most of the Manyara region and the Masai Steppe in Northeast part of Kondoa, Southern part of Dodoma Rural and Southwest part of Mpwapwa District. The area is dominated by dry, flat or undulating plain with low population. Rainfall is very unreliable. The soils are mostly reddish-brown loamy sands with grey clays in depressions. Major crops in these areas are sorghum, pearl millet, cassava, sweet potatoes, groundnuts, simsim, grapes, Lablab purpureus and sunflower. Potential legume crops include pigeon pea, and cowpea. Potential vegetable crops include African eggplant, Ethiopian mustard, African nightshade, amaranth and vegetable cowpea

Zone II has rainfall of 500-700 mm. It covers central and southern part of Kondoa District, Northern part of Dodoma District, the whole part of Kongwa District and part of Mpwapwa. The area has dark-brown and dark-reddish loamy sands. Major crops are maize, sorghum, groundnuts, grapes, sunflower, cassava, and simsim. Cowpea, tepary (Phaseolus actufilius) and pigeon-pea are legumes with high potential. Ethiopian mustard, African nightshade and vegetable cowpea are vegetables with high potential.

Zone III has better rainfall of 700mm-1000mm. It covers the central part of Mpwapwa District and the Bereko highlands in Kondoa District. This area has deep dark-reddish brown clay loams and black-clay soil in depressions and valleys. Major crops are maize, sunflower, grain legumes, vegetables and bananas. The region is suitable for cowpea, soybean, pigeon pea and beans. Tomato, African eggplant, Ethiopian mustard, African nightshade, amaranth, vegetable cowpea, jute mallow and spiderplant are among vegetable crops with a significant potential in this region."

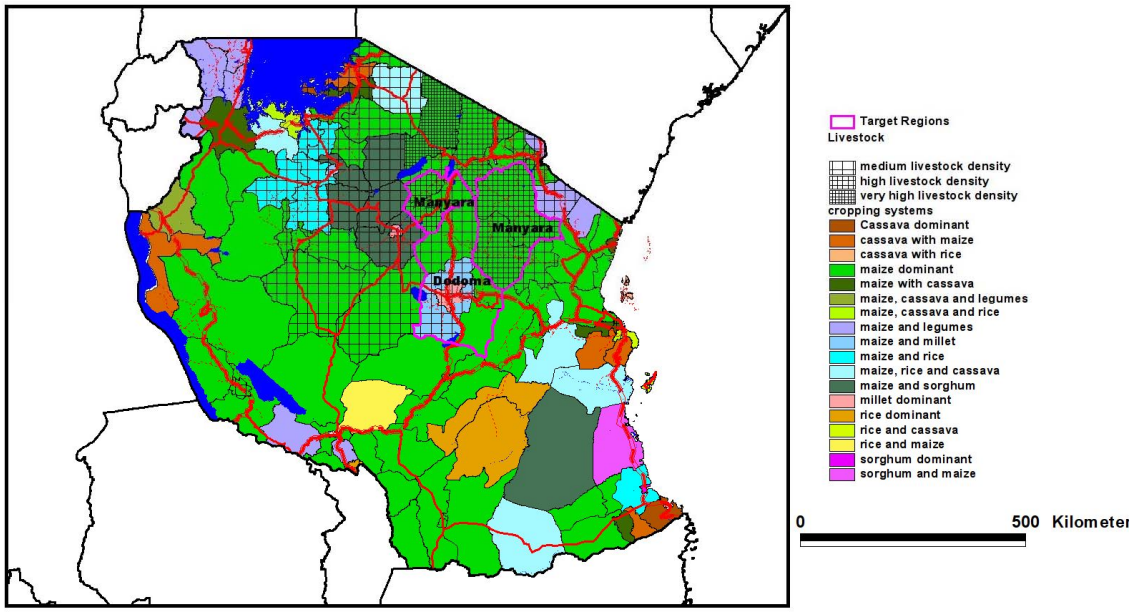



*Figure 5.1. Farming systems in Tanzania, showing project regions*

### 5B. Characterisation of Project Area

The project area, although nominally within a single agro-ecozone, includes high levels of variability in many biophysical and human parameters. Rainfall ranges form less than 500 to more than 1000 mm per year (Figure 5.3),

elevation from less than 800 to more then 2000 metres (Figure 5.2), rural population density from less than 2 persons per square kilometre to more than 20 (Figure 5.4), and while most parts of the mega-site are relatively flat, rift-faulting, volcanic activity and ancient highlands result in some zones of steep slopes (figure 5.5). Access to markets is also variable, as shown in Figure 5.6.

Cropping intensity varies dramatically across the area, as shown in Figure 5.7, with most intensive cultivation in the higher, wetter areas, and large parts of Simanjiro and Kiteto Districts having little or no cropped land. In terms of farming systems, at a national scale (Figure 5.1) most of the mega-site is either maize-dominated or maize with either sorghum or millet with moderate to high livestock densities. At a more detailed scale, and data is unfortunately not available for Dodoma Rural District, much of the mega-site is dominated by maize, with areas of maize with millet and sorghum, and some small areas dominated by either sorghum or millet. Livestock density is mostly high to very high (Figure 5.8).

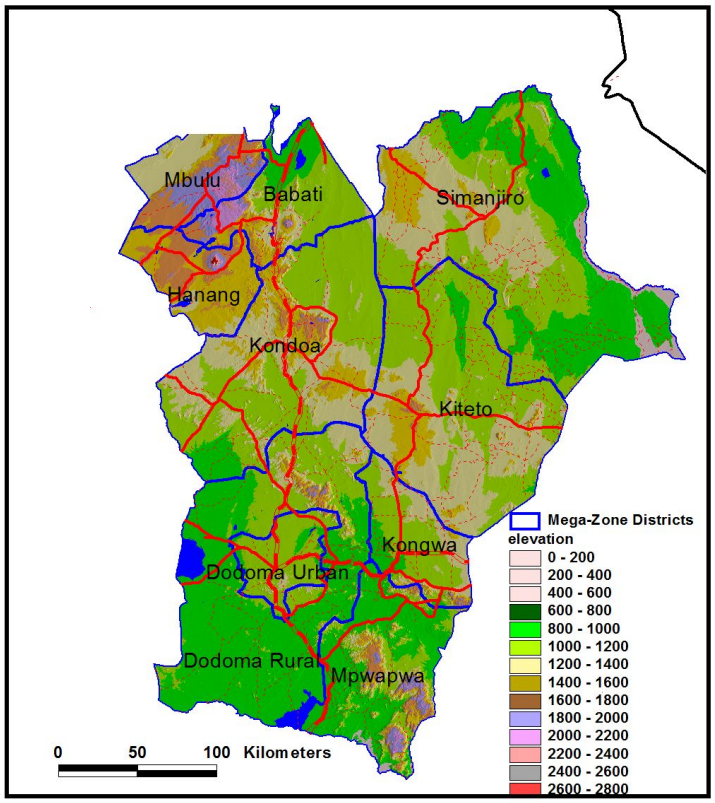



*Figure 5.2. Topography in East/Southern Africa project area*

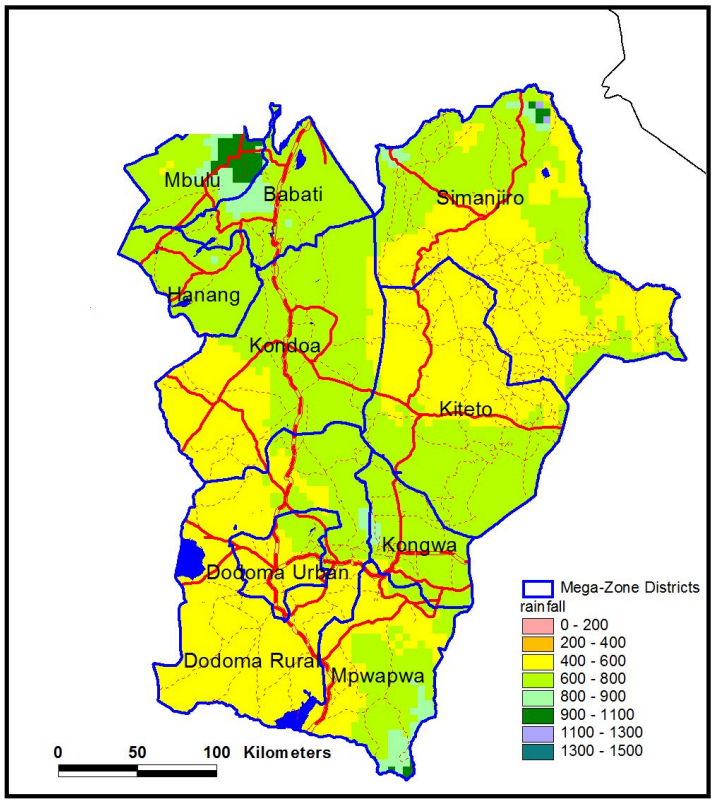



*Figure 5.3. Annual rainfall in East/Southern Africa project area*

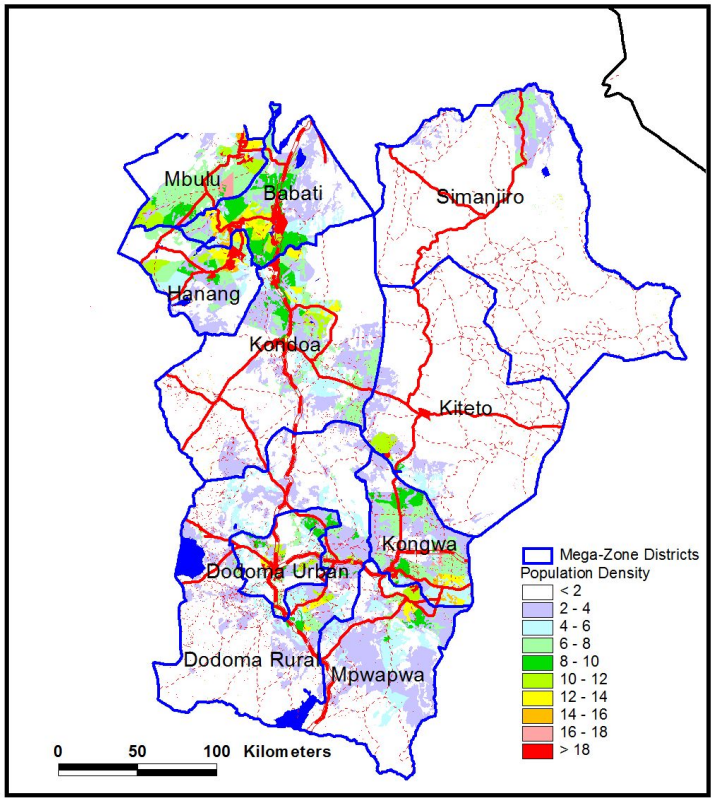



*Figure 5.4. Population density in East/Southern Africa project area*

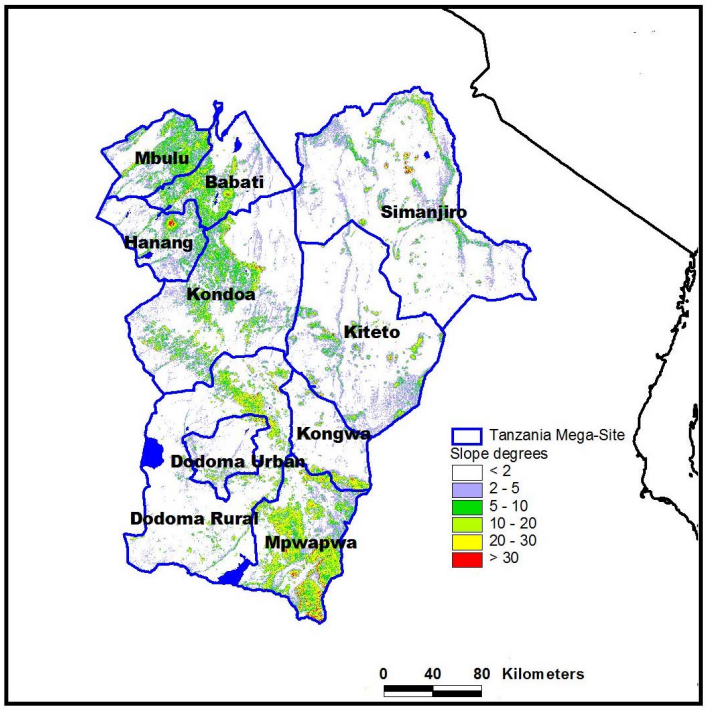



*Figure 5.5. Slopes in East/Southern Africa project area*

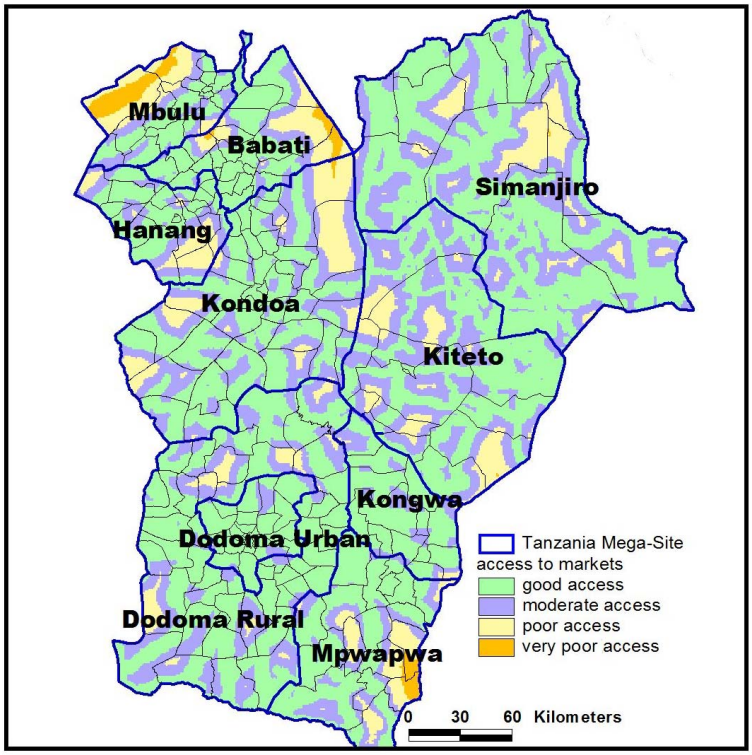



*Figure 5.6. Access to Markets*

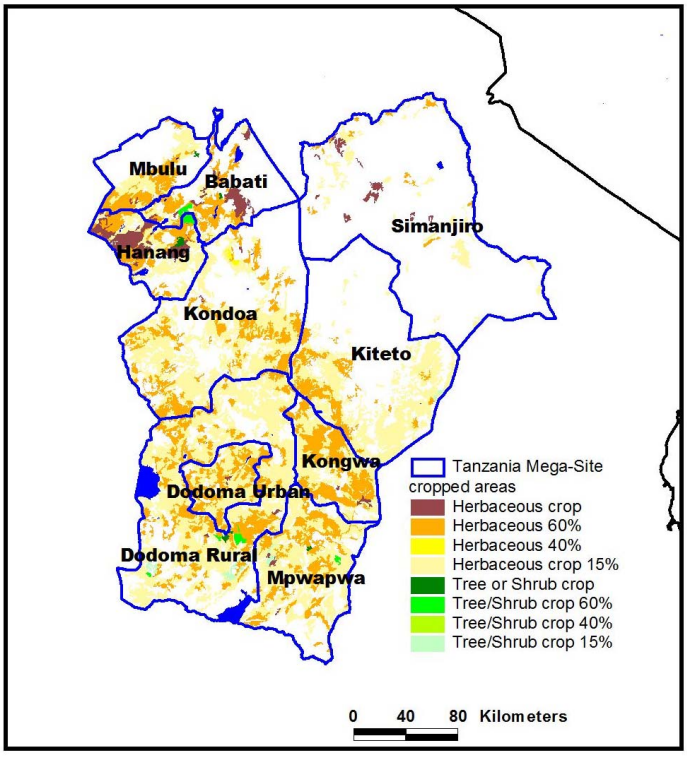



*Figure 5.7. Cropped areas (2001) from Africover in East/Southern Africa project area*

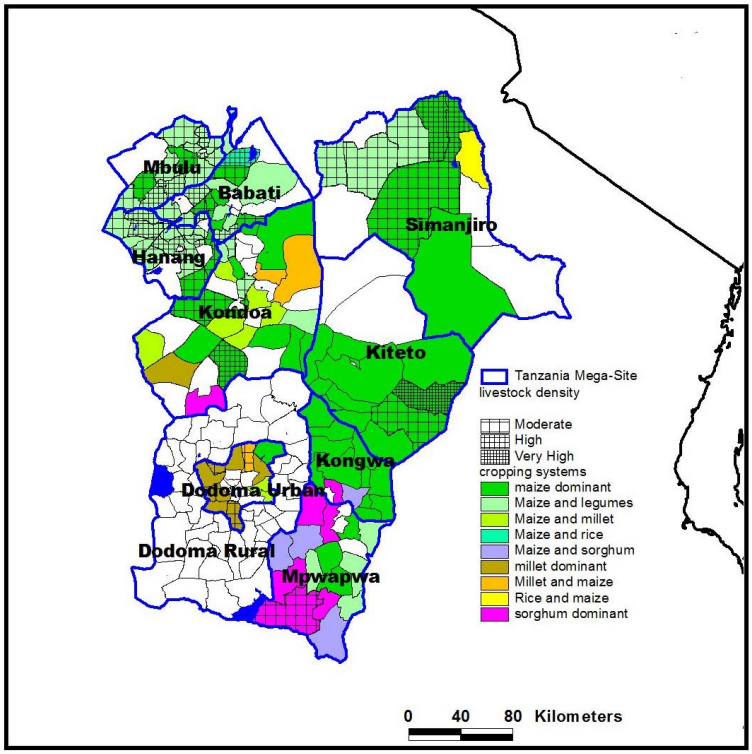



*Figure 5.8. Farming systems by Wards in East/Southern Africa project area*

**5C First Phase site selection – District Level**

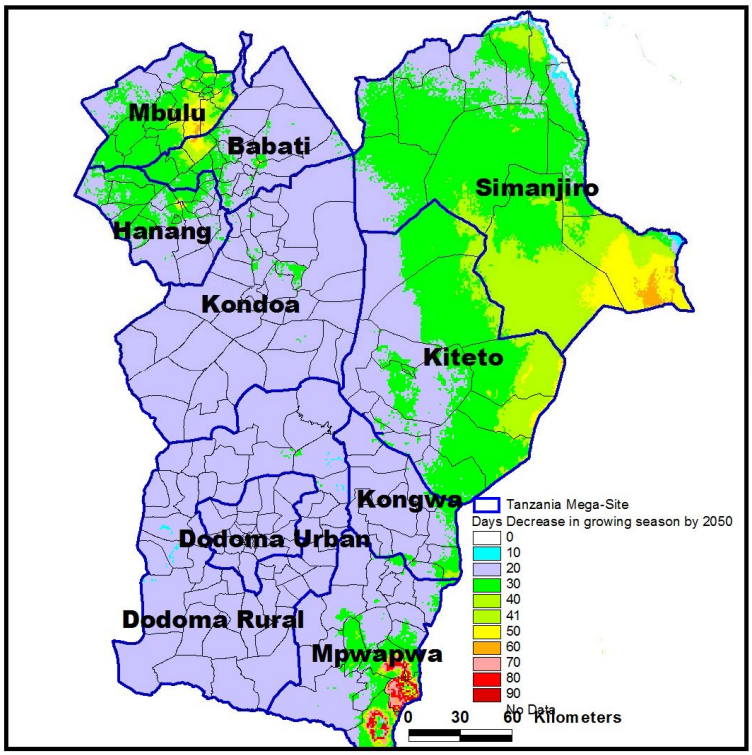
Based on discussions in the three project areas, actual project sites will be communities (villages) or groups of communities. Project sites for Africa RISING should, ideally, cover the full range of biophysical and human variability within the project area, except that, since the emphasis of the project is on sustainable intensification, areas with poor access to markets and very low population densities should be avoided. Annual rainfall (length of growing season could

alternatively be used) is the dominant factor determining what crops can be grown. Elevation is a useful proxy for temperature, both mean and maxima/minima. Slopes are an important constraint to agriculture, affecting the area of land available for simple cultivation, the farming techniques applied, and the risk of erosion. All wards in the two target regions were coded for classes of rainfall, elevation, mean slope, population density and market access (see Table 1 for class definitions), and an initial selection made on the basis of moderate to high rural population densities and good to moderate access to markets. The wards were then grouped into twelve categories of rainfall-elevation-slope classes to represent the full range of each of these variables, and two wards selected within each category for project implementation. The selected wards are always the largest wards meeting the required combination of characteristics, in order to permit greater choice of final target communities. Where possible, the two wards selected for each class are in different districts, although some combinations of rainfall, elevation and slope are found only in single districts. Suggested wards are listed in Table 5.2, and their locations shown in Figure 5.10.

**Table 5.1. Classification Criteria for Stratification Parameters**

| Class | Population | Rainfall | Elevation | Slope | Access |
|---|---|---|---|---|---|
| 1 | > 500 | 500-650 | 700 - 1000 | < 1 | < 300 |
| 2 | 200 - 500 | 650 - 800 | 1000 - 1400 | 1 to 2 | 300 - 600 |
| 3 | 100 - 200 | 800 - 950 | 1400 - 1800 | 2 to 5 | > 600 |
| 4 | 50 - 100 | 950 - 1100 | 1800 - 2200 | > 5 | |
| 5 | 10 to 50 | | | | |

The final selection of implementation sites had to be made by the project teams in the area, based on existing projects in SIMLESA, CRP 1.1 and CRP 1.2 and other linkages, as well as assessments of the importance of livestock and legumes. Climate change is predicted to affect the whole area, with a reduction of length of growing season of more than 20 days by 2050 (Figure 5.9). The reduction will be greater in the already dry eastern portions of Simanjiro and Kiteto Districts, so any project design will have to allow for this. Reductions in length of growing season in the more humid highlands of Mbulu and Babati may not have such serious consequences. If no suitable sites could be found within the suggested wards, additional wards in the same classes should be found by reference to Table 2 in the Appendix. If the number of classes proposed by this phase of targeting was too great, then similar classes could be




combined, for example medium rainfall and low elevation combined with medium rainfall and medium elevation.

*Figure 5.9. Predicted reduction in growing Season by 2050*

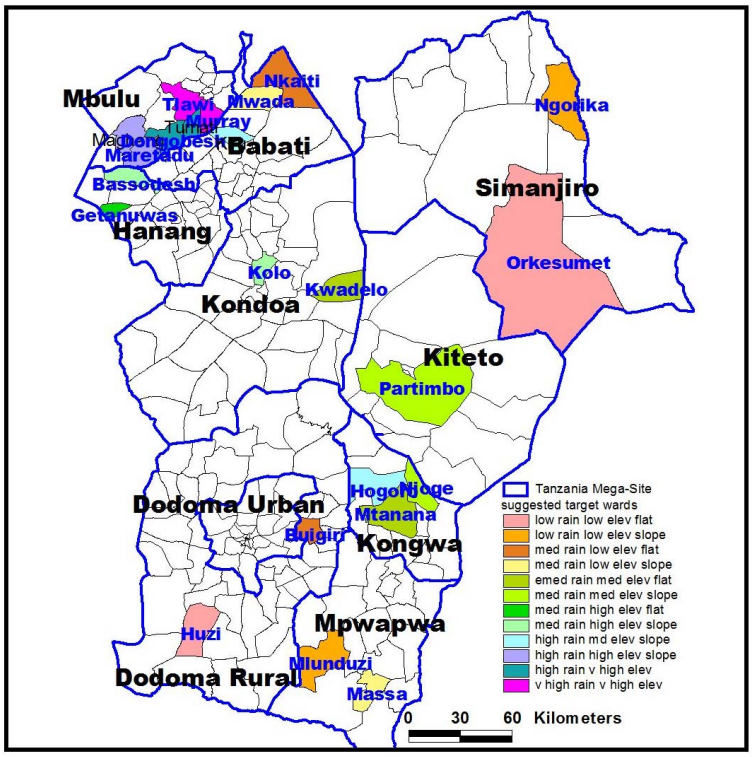



*Figure 5.10. Recommended Target Wards for Africa RISING*

Table 5.2. Recommended target wards in East/Southern Africa Maize-Legume_livestock Project Area

| Class ID | Description | CN Zone | Wards |
|---|---|---|---|
| A | Low rain low elev flat | Zone 1 | Orkesumet, Huzi |
| B | Low rain low elev slopes | Zone 1 | Mlunduzi, Ngorika |
| C | Med rain low elev flat | Zone 2 | Nkaiti, Buigiri |
| D | Med rain low elev slopes | Zone 2 | Massa, Mwada |
| E | Med rain med elev flat | Zone 2 | Kwadelo, Mtanana |
| F | Med rain med elev slopes | Zone 2 | Partimbo, Njoge |
| G | Med rain high elev flat | Zone 2 | Getanuwas |
| H | Med rain high elev slopes | Zone 2 | Bassodesh, Kolo |
| I | High rain med elev slopes | Zone 3 | Kiru, Hogoro |
| J | High rain high elev slopes | Zone 3 | Maghang, Maretadu |
| K | High rain v high elev slopes | Zone 3 | Tumati, Dongobesh |
| L | V high reain v high elev slopes | Zone 3 | Tlawi, Murray |

Within the East and Southern Africa maize-legume-livestock programme site. Kiteto and Kongwa districts were selected because of NAFAKA involvement. Babati was selected as the most diverse in terms of maize-based systems,population and livestock density, and in combination with already selected sites in Kongwa and Kiteto, provided coverage of the majority of the stratified classes identified during this phase of targeting.l

**5D. Second Phase Site Selection- Action and Counterfactual Communities based on field work**

In Babati District, wards were stratified by elevation and rainfall, then wards were selected in each ecozone based on cropping and population density. As many villages as possible in selected wards were visited by the project team, including the Consultant, the Project Manager and officials of the Ministry of Agriculture familiar with the District. Following field work, it was agreed that ward centre villages should be eliminated because they had unusually high concentrations of non-farming households. From the remaining villages, action sites chosen randomly based on the name of the village starting with the last letter of the alphabet in each ward. Potential counterfactual sites were selected randomly in wards adjacent to and with similar characteristics to the action sites

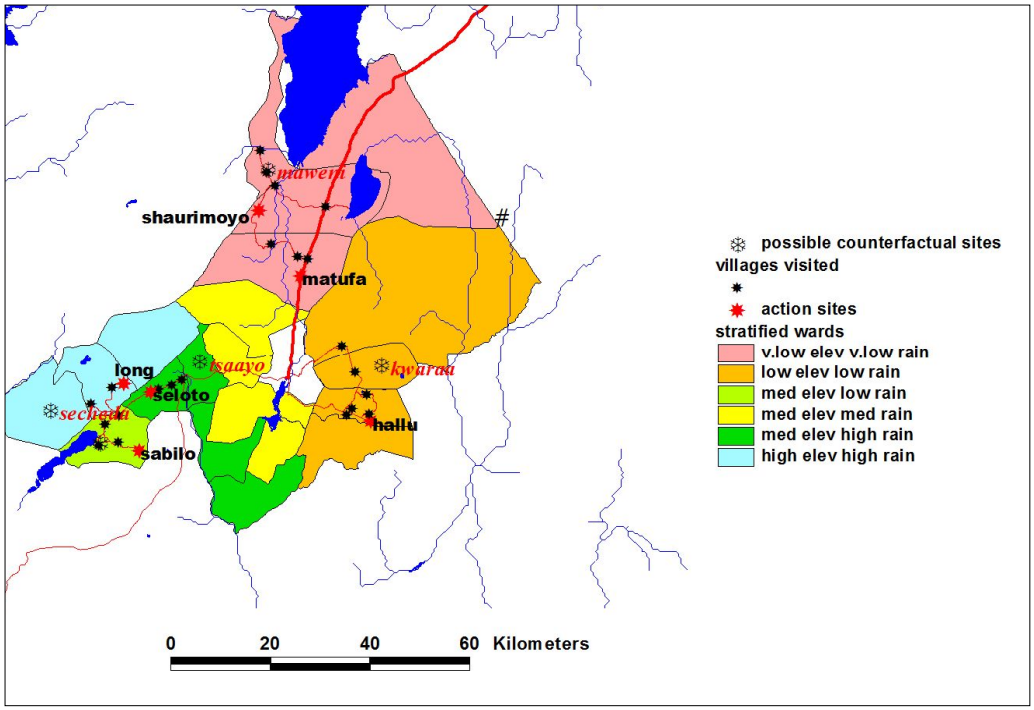



*Figure 5.11. Selected Action and Counterfactual Sites in Babati District after fieldwork*

As in Babati, wards in Kongwa and Kiteto District were stratified initially based on elevation and rainfall. At the request of USAID, action sites in these districts must correspond with villages targeted by the NAFAKA project. Villages within target wards in Kongwa District coinciding with NAFAKA sites were visited and action sites selected randomly where possible. Time did not permit visits to villages in Kieto District, which were relatively remote with poor road access. Potential counterfactual sites were identified in wards adjacent and with similar characteristics to the action sites

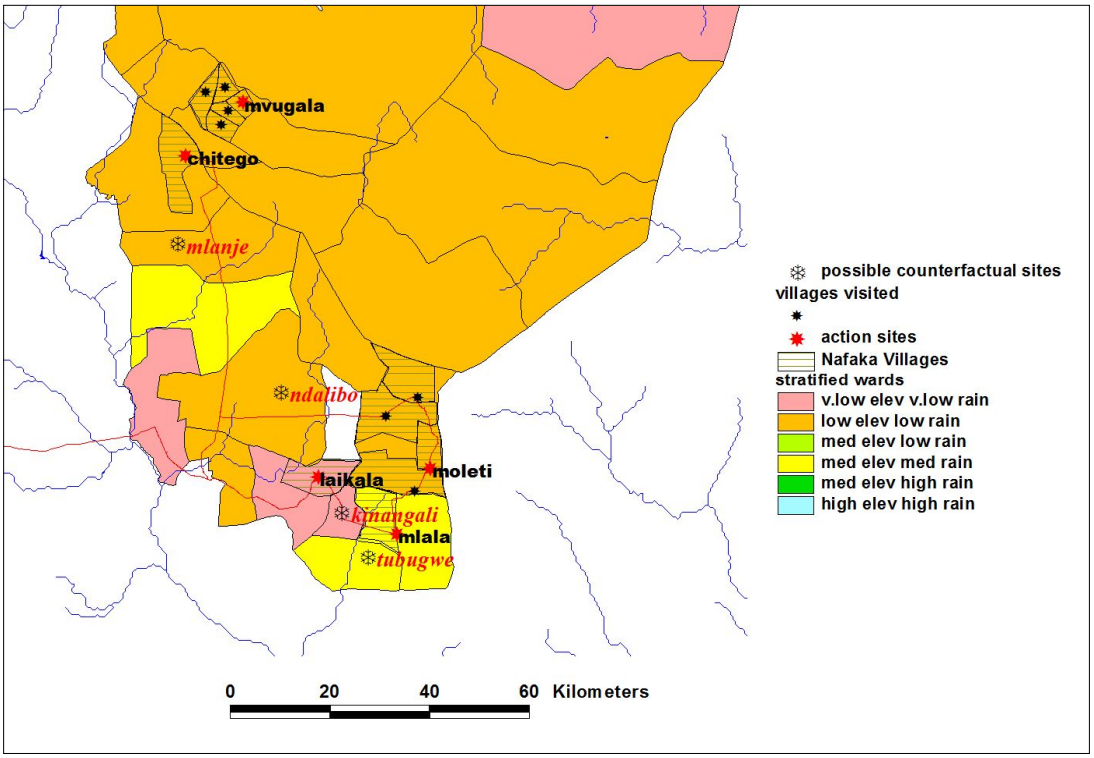



*Figure 5.12. Selected Action and Counterfactual sites in Kongwa and Kiteto Districts after fieldwork*

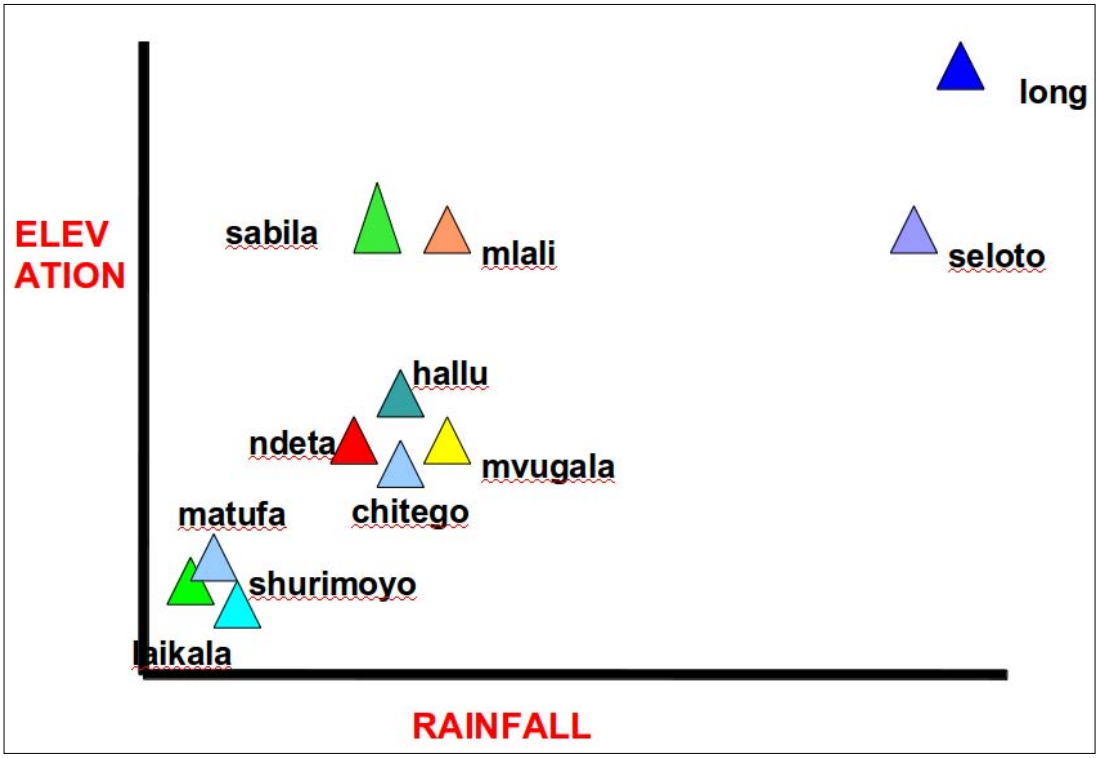



*Figure 5.13. Elevation and Rainfall distribution of selected Action Sites in East Africa Maize-Legume-Livestock project area*

| Community | Ward | Ecozone | Cropsys | Elev | Rain | HH | PopD | TLU |
|---|---|---|---|---|---|---|---|---|
| shaurimoyo | mwada | v.low elev v.low rainfall | maize-rice | 1018 | 786 | 698 | 68 | 7.11 |
| matufa | magugu | v.low elev v.low rainfall | maize | 1019 | 788 | 968 | 248 | 4.32 |
| hallu | gallapo | low elev low rainfall | maize-legumes | 1233 | 769 | 553 | 123 | 2.32 |
| long | bashnet | high elev high rainfall | maize-legumes | 2185 | 851 | 635 | 332 | 6.85 |
| seloto | dareda | med elev high rainfall | maize-legumes | 1644 | 845 | 1144 | 329 | 2.59 |
| sabilo | dabil | med elev low rainfall | maize-legumes | 1648 | 763 | 876 | 178 | 5.01 |
| chitego | zoissa | low elev low rainfall | maize | 1332 | 708 | 821 | 53 | 1.14 |
| moleti | pandambili | low elev low rainfall | maize | 1278 | 776 | 1489 | 107 | 0.42 |
| mlali | mlali | med elev med rainfall | maize | 1322 | 765 | 1624 | 283 | 1.54 |
| laikala | sagala | low elev v.low rainfall | maize-sorghum | 1176 | 722 | 984 | 97 | 0.02 |
| mvugala | engusero | low elev low rainfall | maize | 1523 | 673 | 830 | 63 | 0.06 |

*Table 5.3. Selected Action communities in Babati, Kongwa and Kiteto Districts*

**5E. Third Phase Site Selection. Revision of Counterfactuals and Action Communities**

Concern was expressed that suggested counterfactual (control) communities in the Tanzania project area, particularly in Babati District, were often too close to action communities, introducing danger of "contamination" of and "spill-over" into counterfactuals from work carried out in action sites. This problem could be partially addressed by locating control sites in wards further away from action sites, but still within Babati district, and partly by using communities in wards outside the district but with similar characteristics to the action sites.

Ideally, control sites should be as physically isolated as possible from action sites, with little interaction between the inhabitants of the two types of sites. If possible, the inhabitants should use different markets to minimise the sharing of agricultural produce, seeds and ideas. Since comparison of control and action sites forms the basis for evaluation of impact, lack of developmental progress in control sites will maximise apparent impact. In order for the M&E process to be credible, it is extremely important that insistence on physical isolation between action and control sites does not result in the selection of control sites with relatively poorer market access than action sites. This is the dilemma that we face in trying to select new and more isolated control sites in the Tanzania maize-legume-livestock project area.

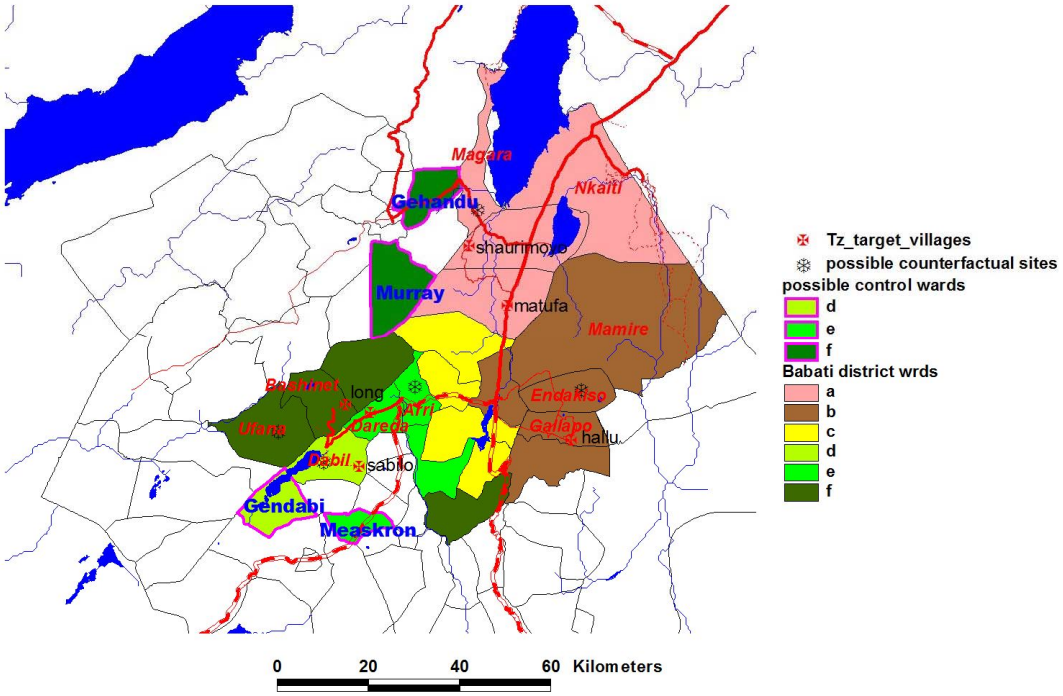



*Figure 5.14. Revised action and counterfactual sites, Babati District*

The map (Figure 5.14)shows the location of proposed action sites in Babati district, together with colour coding of the different agro-ecozones. The proposed action sites in Dabil and Derada wards represent two distinctly different zones. Both are at medium elevation, at elevated portions within the Rift Valley resulting from volcanic activity within the Rift. Rainfall is significantly higher in Dareda and some adjoining wards than in Dabil. The latter is in a "rain-shadow" created by the huge mass of Mt. Hanang, while the former has enhanced rainfall on the windward side of the mountain.

The available rainfall maps do not capture this feature. Rainfall maps are interpolations between relatively sparse long-term weather stations, and while the interpolation procedures incorporate models to allow for some orographic modification to rainfall, they do not model the very complex effects of the relationship between topography and prevailing rain-bearing wind direction. Field observations during recent visits to the area revealed these local differences, and suggest that the relatively high rainfall in Dareda continues along the main road southward from Dareda around the eastern flank of Hanang. The ward of Measkron (Hanang District), on the main road east of Mt. Hanang, is suggested as a possible analogue to Dareda, suitable for a control site. Even though this is some distance from Dareda, the main regional market will still be Babati town. It seems likely that the Ward Gendabi (Hanang District), west of Hanang and on the southern shores of Lake Balangida, has similar characteristics to Dabil, except that market access is poorer. A village in this ward could be a suitable control for the Sabilo action site in Dabil, since contact between the two wards is very restricted by the extreme topography along the Balangida lake-shore.

The proposed action community of Long in Bashinet ward, represents a very specific agro-ecology in the highland plateau west of the main Rift Valley. The wards of Murray and Gehandu in Mbulu district have similar agro-ecological characteristics as well as similar cropping systems, although the current access status is not clear. A control site could be located here, but access would have to be checked by a field visit.

Three other action sites could probably be monitored by counterfactual sites within Babati district, but more physically separated from them than the originally suggested sites. Hallu village in Gallapo ward has analogues in Mamire ward further north than the originally suggested control site. Mamire village itself is probably not suitable, but other villages further east in this ward might be better. They still use Babati town market, but otherwise physical contact between the communities is probably rare, since both use different roads to get to market. The two action communities in the northern part of Babati district, Shaurimoyo and Matufa, could probably be covered by a single control community. In place of the community suggested in Magera ward, a village close to the main road could be selected in Nkaiti ward, where access would be similar to the action sites, and climate and soils comparable.

In Kongwa and Kiteto districts, selection of counterfactual communities is not as constrained as in Babati. The topography and climate is more uniform, and large areas show very similar characteristics. It is suggested that sites should be selected randomly, constrained only by market access to ensure similar development possibilities.

## 6) East Africa Rice-Vegetable Project Area, Kilombero District, Tanzania

At the request of Carlo Azzari of IFPRI, a study of available data for Kilombero District, Morogoro Region was undertaken in order to attempt to select suitable target wards for the Africa Rising Rice-Vegetable programme area in Tanzania. Data-sets available include rainfall, elevation, population density, cropping patterns, agricultural production statistics, road networks and estimates of market accessibility.

### 6A. Overview of District

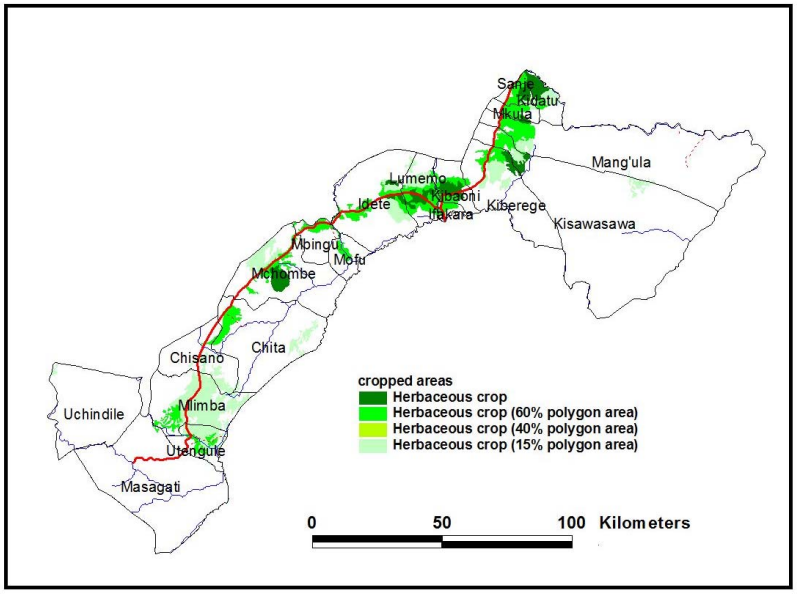



*Figure 6.1. Cropped areas according to AfriCover*

Most of the district occupies a long valley extending south-westwards from Morogoro, and agriculture is concentrated in this valley along the flat land near the main river. A road whose current quality is unknown, follows the valley. Some wards, notably Mangula and Kisawasawa, extend far from the valley, with little mapped cultivation in their eastern extents, while the most westerly ward, Uchindili, is in higher hilly country away from the river.

Annual rainfall is relatively constant along the valley, decreasing slightly from NE to SW, with higher rainfall again in the higher land to the extreme south-west, as shown in Figure 2. Elevation is also very constant along the valley until more hilly country is reached in the south-west.

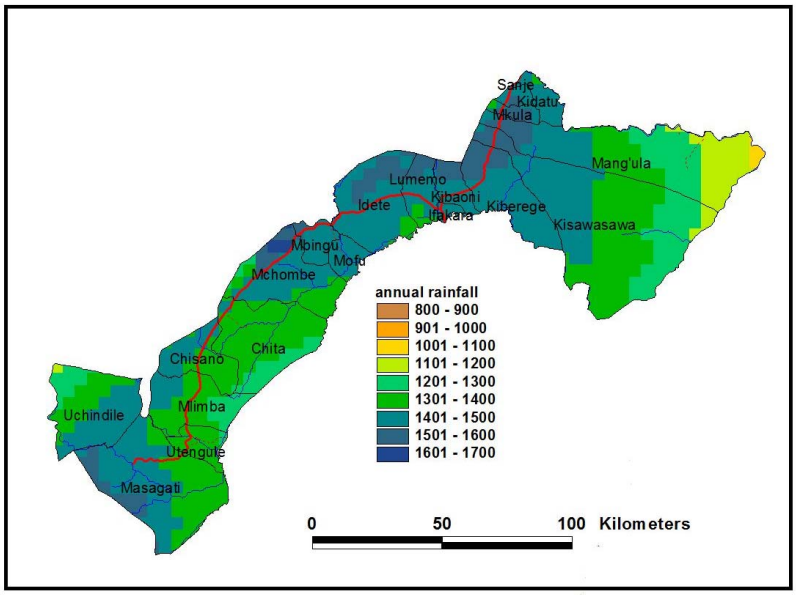



*Figure 6.2. Annual Rainfall in Kilombero District, interpolated by CRU*

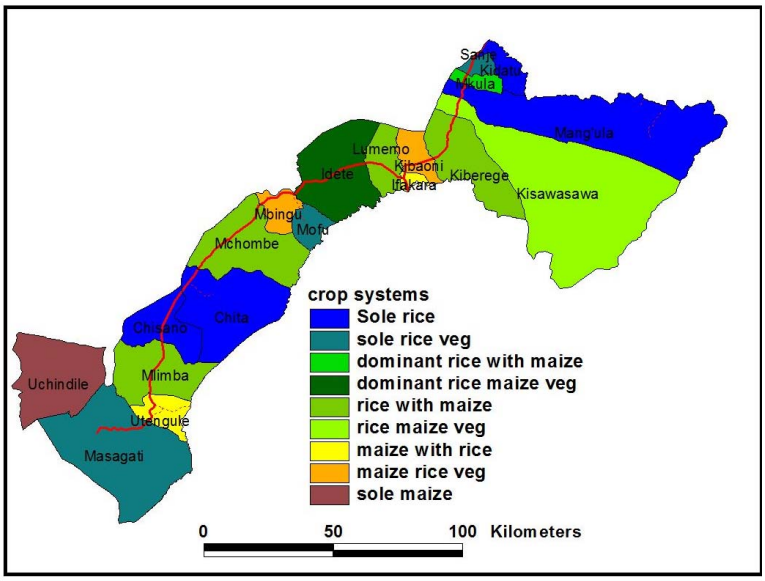



*Figure 6.3. Cropping systems in Kilombero*

According to government agricultural statistics, compiled by USAID, rice is the dominant crop in the valley, although maize is also important. Most wards appear also to grow some vegetables, although statistics are not detailed. Figure 3 maps the main crop systems according to these statistics. Sole rice indicates more than 85% of agricultural land being used for rice, dominant rice is more than 65% rice, rice with maize has more than 50% rice, maize with rice between 30

and 50% rice. Vegetables in this classification include beans, tomatoes and bananas.

**6B. Stratification and Targeting**

Available information for wards in Kilombero District is summarised in Table 1. Fields are Total Population, area in KM2, Population Density, Percentage area of maize, percentage area of rice, mean elevation of cropped areas in metres, mean annual rainfall in cropped areas, access class, population density class, crop system, class based on clustering of characteristics, and suggested targets with alternatives (X and A)

Because some wards extend far from the river and from main cropped areas, mean values of rainfall, elevation, population density and market access for the entire wards were not appropriate. Instead, values were estimated for the centres of the main cropped areas in each ward. The market access map produced by Andy Nelson shows uniformly good market access for all cropped areas in the valley, based on the existence of a good road. In reality, the condition of this road is not known to the author, but even if the quality is very good, the cost of access to market is likely to increase further to the south west, away from the main regional market in Morogoro, and this is reflected in the assigned market access class.

It is assumed that, since the target cropping system for this part of Africa RISING is rice-vegetables, target wards should be those producing rice as the dominant crop. Spatial variations in annual rainfall and elevation along the valley are relatively small, although possibly significant, and population density seems to be uniformly high in the cropped areas. Stratification is based on cropping system, rainfall, elevation and access to market. Three primary targets wards have been selected, each with an alternative if field checking suggests that the primary target is unsuitable. These are Mkula, Idete and Chisano, with Mangula, Lumemo and Chita as potential alternates, and also appropriate wards for controls A fourth target ward (Masagati) is proposed in the extreme south-west, where elevation is higher and rice less dominant. No other wards shares the characteristics of Masagati, so no alternate is proposed.

The target wards (and alternatives) are shown in table 1 and again in Figure 4. The actual target communities will have to be selected within these wards based on government lists of villages in each wards, and also on field visits.

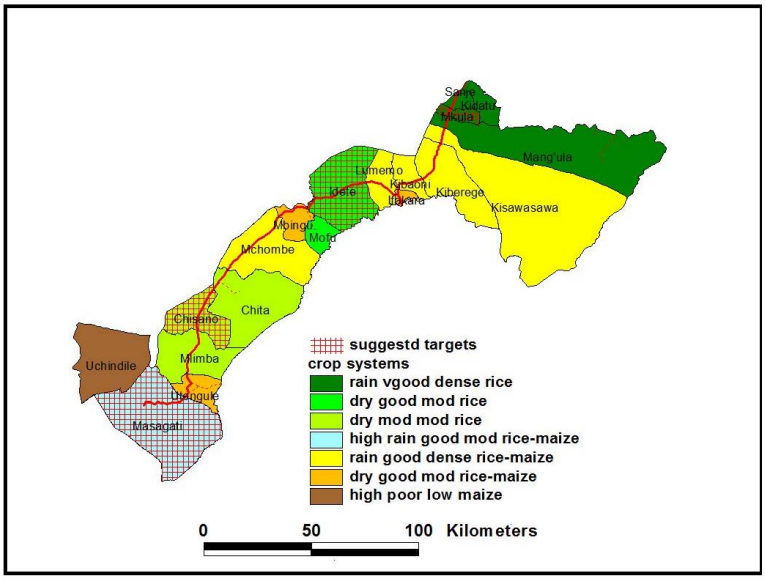



*Figure 6.4. Ward Stratification and suggested targets*

## 7. Summary and Conclusions

The site selection process for agricultural research and development projects such as Africa RISING is complex. Not only should the operational sites for the project be located so as to achieve maximum impact in a cost effective manner, but also as much of the natural variation of the target areas as possible should be covered, and the wishes of the donors regarding co-location of new interventions with pre-existing projects should be accommodated where practicable. It is also vital that the selection of sites permit statistically valid monitoring and evaluation of the effort and impact of the project. Finally, the partnerships of institutions implementing the project on the ground should understand and agree with the process and outcomes of site selection in order that the project is implemented with enthusiasm and belief that the recommended sites are really the best out of many possibilities. These demands are often conflicting, and a

combination of rigorous science, diplomacy and willingness to compromise are required to achieve a result acceptable to all parties.

The sites selected in Ethiopia, Ghana and Tanzania are by no means ideal when viewed from any one single perspective. They may not be the best outcome for precise statistical evaluation of impact, they may not cover all possible agro-ecozones, they may not involve all preferred partners, but they are probably the best compromise between all competing requirements that could be achieved within the time constraints. These are only preliminary action sites for Africa RISING, where work will start in late 2012 or early 2013. Additional sites will be chosen as work proceeds, and some of these initial sites may be abandoned if they prove unsuitable for one reason or another.

There is still considerable disquiet amongst the implementing agencies for this project about the monitoring and evaluation process, in particular the criteria for counterfactual communities. While most would agree that, from a purely scientific perspective, control or counterfactual sites should be insulated from the benefits which the project provides to action sites, the majority doubt whether this could or even should be achieved. Many people comment on the practical and moral differences between crop trials dealing with relatively simple static inanimate systems, and trials in villages where dynamic transmission of ideas and innovations is normally regarded as desirable. IFPRI still has much to do in convincing field partners of the necessity for the strict separation of action and counterfactural sites.

## 8. References


Anon. 2011. Sustainable Intensification of Cereal-Based Farming Systems in the Sudano-Sahelian Zone CONCEPT NOTE

Anon 2012B. Sustainable intensification of crop-livestock systems to improve food security and farm income diversification in the Ethiopian highlands CONCEPT NOTE

Anon 2012C CONCEPT NOTE Sustainable intensification of maize-legume-livestock integrated farming systems in Eastern and Southern Africa

ILRI 2012A. Africa RISING Ethiopian Highlands Project Site Selection for Amhara Region (19-21 December 2012)

ILRI 2012B Minute on the Visit of Africa RISING to Tigray 19-21 Nov. 2012

ILRI 2012C Africa RISING Ethiopia Transforming African agriculture through sustainable intensification LEMO TRIP REPORT

ILRI 2012D. Draft Field Report to Bale zone, Sinana Woreda

Legg, C. 2012A AFRICA RISING THE SUDANO-SAHELIAN MEGA-SITE SELECTION OF PROJECT IMPLEMENTATION SITES REPORT PREPARED FOR INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

Legg C. 2012B AFRICA RISING THE EAST AND SOUTHERN AFRICA MEGA-SITE SELECTION OF PROJECT IMPLEMENTATION SITES REPORT PREPARED FOR INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

Legg C. 2012C AFRICA RISING THE ETHIOPIAN HIGHLANDS MEGA-SITE SELECTION OF PROJECT IMPLEMENTATION SITES REPORT PREPARED FOR INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

Legg, C. 2012D Possible Alternative Counterfactual Communities for Tanzania maize-legume-livestock project area

Legg, C. 2012E SELECTION OF TARGET WARDS IN KILOMBERO DISTRICT, MOROGORO REGION, TANZANIA

Legg, C. 2012F RE-SELECTION OF COUNTERFACTUAL COMMUNITIES IN NORTHERN GHANA FOR AFRICA RISING

Legg C and Larbi, A. 2012. SITE SELECTION FOR AFRICA RISING IN NORTHERN GHANA

Legg C and Bekunda, M. 2012 ACTION SITE SELECTION IN THE EAST AND SOUTHERN AFRICA MAIZE-LEGUME-LIVESTOCK PROGRAMME SITE

**APPENDIX 1**
**Definitions of Programme Areas**

**Ethiopian Highlands Mega-Site**
According to Version 3 of the Concept Note for the Ethiopian Highlands Mega-Site (which may be superseded by a modified concept note) "The integrated research will focus on the wheat-growing area in the Ethiopian Highlands. This area exhibits large variations in existing levels of intensification, cereal-legume rotations and other crop-combinations, as well as crop-livestock integration. Furthermore, the factors driving intensification such as agricultural potential, access to available technologies, demand for livestock products, and integration with markets vary a lot within the area. A number of study sites will be chosen from these wheat-growing areas. They will represent contrasting levels of intensification to enable the characterization of different trajectories and identification of technology combinations that lead to sustainable development pathways.

**Sudano-Sahelian Mega-Site**
According to the December 2011 Concept Note, "The project will focus on the northern regions of Ghana, specifically in the administrative districts of Karaga, Cheroponi, and Tolon-Kumbungu (Northern Region); Kassena-Nankana and Bawku West (Upper East Region); and Wa East and Nadowli (Upper West Region) to address production constraints in rice and cereal-legume production systems. The northern Regions of Ghana are characterized by small land holdings of low input-output farming systems, which adversely impact food security in terms of availability, access and quality and result in a seasonal cycle of food insecurity of 3-5, 4-5 and 6-7 months for cereals (maize, sorghum, millet) and 5-7, 4-5 and 6-7 months (groundnut, cowpea, and soybean) in the Northern, Upper West and Upper East Regions, respectively. These crops in the savannas are often produced in a continuous monoculture in which soil natural resources are steadily depleted and yields per unit area are falling to very low levels. The poverty profile of Ghana also depicts the three northern regions as the most poverty stricken and hunger spots in Ghana. Gender inequalities are also apparent in these regions where women have less access to resources and capacity to generate income.

In Mali the project will focus on the Sikasso region, specifically the circles of Koutiala and Bougouni, The Sikasso region of southern Mali is ecologically similar to northern Ghana, but stretches northwards into drier zones, where maize cultivation is associated with high economic risks. Sorghum is traditionally the lead cereal and staple crop, but both maize and pearl millet are widely cultivated, to exploit specific ecological niches, and marketing opportunities.

**East and Southern Africa Mega-Site**
According to the Concept Note for East and Southern Africa, "Feed the Future (FtF) Tanzania is focusing on reducing poverty and improving nutrition through key investments to improve availability and access to staple foods by enhancing the competitiveness of smallholders. These investments are being geographically focused in areas with high agricultural potential bordering chronically food insecure districts: Morogoro (rice); Manyara and Dodoma (maize); and Arusha, Kilimanjaro, Tanga, Zanzibar, Dar es Salaam, Morogoro, Iringa and Mbeya (horticulture).

Dodoma and Manyara Regions in Tanzania are the geographic focus for this project. These areas are located in the Southern Agriculture Growth Corridor of Tanzania. Dodoma Region is a region centrally positioned in Tanzania. This Region is bordered by Manyara Region in the North, Morogoro in the East, Iringa in the South and Singida in the West. Much of the region is a plateau rising gradually from some 830 metres. There are three agro-ecological sub-zones in this region.

**Appendix 2. Cluster Analysis of administrative areas in Ethiopia and Tanzania**

Table 1. Classification of Wheat Producing Woredas and Target Identification

| Woreda | Zone | Cereals | AC | elevati | el_ran | mean rainfal | popdens | AC | TLU_l | elev_clas | rain_clas | slope_cl | pop_clas | tlu_class | category | Targets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minjarna Shenkora | North Shewa (K3) | Teff-wheat | 0 | 1567 | 1498 | 3.21 | 781 | 87 | 2 | 0.71 | 1 | 1 | 2 | 1 | 2 | A | |
| Merti | Arsi | Maize-wheat | 0 | 1743 | 2132 | 2.95 | 853 | 98 | 2 | 1.04 | 1 | 1 | 1 | 1 | 3 | A | |
| Ziway Gugda | Arsi | Maize-wheat | 0 | 1787 | 669 | 2.48 | 786 | 90 | 2 | 1.03 | 1 | 1 | 1 | 1 | 3 | A | |
| Legehida | Bale | Teff-maize | 0 | 1243 | 1124 | 2.52 | 666 | 10 | 3 | 0.90 | 1 | 1 | 1 | 1 | 2 | A | |
| Seweyna | Bale | Teff-maize | 0 | 975 | 1698 | 1.12 | 538 | 6 | 5 | 0.80 | 1 | 1 | 1 | 1 | 2 | A | |
| Arsi Negele | East Shewa | Maize-wheat | 0 | 1795 | 1493 | 1.45 | 783 | 139 | 1 | 0.86 | 1 | 1 | 1 | 2 | 2 | A | |
| Goro | Bale | wheat | 0 | 1516 | 1710 | 2.77 | 837 | 33 | 2 | 0.87 | 1 | 1 | 1 | 1 | 2 | A | potential |
| Guradamole | Bale | wheat | 0 | 1116 | 1994 | 3.10 | 652 | 5 | 4 | 1.21 | 1 | 1 | 2 | 1 | 3 | A | |
| Mennana Arena Buluk | Bale | Teff-wheat | 0 | 1370 | 3183 | 2.84 | 793 | 16 | 4 | 1.07 | 1 | 1 | 1 | 1 | 3 | A | |
| Odo Shakiso | Borena | Teff-wheat | 0 | 1530 | 1376 | 3.45 | 743 | 30 | 3 | 1.03 | 1 | 1 | 2 | 1 | 3 | A | |
| Yabelo | Borena | Maize-wheat | 0 | 1528 | 1042 | 1.91 | 552 | 14 | 2 | 1.40 | 1 | 1 | 1 | 1 | 3 | A | |
| Ginir | Bale | wheat | 0 | 1720 | 1410 | 2.16 | 974 | 53 | 3 | 0.97 | 1 | 2 | 1 | 1 | 2 | B | potential |
| Amigna | Arsi | Wheat-teff | 0 | 1713 | 1608 | 3.82 | 958 | 51 | 4 | 1.30 | 1 | 2 | 2 | 1 | 3 | B | |
| Seru | Arsi | wheat | 0 | 1648 | 1625 | 5.69 | 965 | 46 | 4 | 1.29 | 1 | 2 | 3 | 1 | 3 | B | |
| Gololcha | Bale | Wheat-barley | 0 | 1648 | 1672 | 3.78 | 965 | 75 | 3 | 0.62 | 1 | 2 | 2 | 1 | 2 | B | |
| Gidami | West Wellega | Maize-wheat | 0 | 1053 | 1843 | 3.81 | 1087 | 35 | 5 | 0.32 | 1 | 2 | 2 | 1 | 1 | B | |
| Ahferom | Central Tigray | Teff-wheat | 0 | 1925 | 1343 | 3.66 | 640 | 125 | 2 | 0.56 | 2 | 1 | 2 | 2 | 2 | C | |
| Gulomahda | Easetern Tigray | Wheat-barley | 0 | 2309 | 1053 | 4.97 | 574 | 161 | 1 | 0.46 | 2 | 1 | 2 | 2 | 1 | C | |
| Hawzen | Easetern Tigray | Barley-wheat | 0 | 2055 | 1122 | 2.88 | 625 | 135 | 1 | 0.56 | 2 | 1 | 1 | 2 | 2 | C | |
| Wukro | Easetern Tigray | Wheat-barley | 0 | 2135 | 828 | 3.22 | 607 | 114 | 1 | 0.51 | 2 | 1 | 2 | 2 | 2 | C | |
| Degua Temben | Central Tigray | Wheat-teff | 0 | 2154 | 1336 | 6.07 | 649 | 109 | 1 | 0.61 | 2 | 1 | 3 | 2 | 2 | C | |
| Enderta | Southern Tigray | Wheat-barley | 0 | 2149 | 1050 | 3.40 | 576 | 97 | 1 | 0.56 | 2 | 1 | 2 | 1 | 2 | C | |
| Samre | Southern Tigray | Teff-wheat | 0 | 1817 | 1258 | 4.21 | 639 | 71 | 2 | 0.91 | 2 | 1 | 2 | 1 | 2 | C | |
| Hintalo Wajirat | Southern Tigray | Wheat-teff | 0 | 2146 | 2018 | 5.30 | 575 | 83 | 2 | 0.68 | 2 | 1 | 3 | 1 | 2 | C | |
| Ofla | Southern Tigray | Wheat-barley | 1 | 2383 | 1964 | 7.30 | 772 | 147 | 2 | 0.54 | 2 | 1 | 3 | 2 | 2 | C | AGP targ |
| Jijiga | Jijiga | Wheat-barley | 0 | 1803 | 1027 | 2.00 | 745 | 107 | 2 | 0.46 | 2 | 1 | 1 | 2 | 1 | C | |
| Dodotana Sire | Arsi | Wheat-teff | 0 | 1880 | 1541 | 2.45 | 865 | 134 | 1 | 0.73 | 2 | 1 | 1 | 2 | 2 | C | |
| Dodotana Sire | Arsi | Wheat-teff | 0 | 1880 | 1541 | 2.45 | 865 | 134 | 2 | 0.73 | 2 | 1 | 1 | 2 | 2 | C | |
| Jarso | East Harerghe | Wheat-maize | 0 | 2006 | 1603 | 5.58 | 803 | 215 | 2 | 0.47 | 2 | 1 | 3 | 3 | 1 | D | |
| Kurfa Chele | East Harerghe | Maize-wheat | 0 | 2043 | 1739 | 5.54 | 853 | 219 | 1 | 0.37 | 2 | 1 | 3 | 3 | 1 | D | |
| Bedeno | East Harerghe | Maize-wheat | 0 | 1841 | 1998 | 7.08 | 864 | 236 | 2 | 0.51 | 2 | 1 | 3 | 3 | 2 | D | |
| Lanfero | Guraghe | Maize-wheat | 0 | 1836 | 711 | 1.42 | 888 | 220 | 2 | 0.84 | 2 | 1 | 1 | 3 | 2 | D | |
| Hagere Mariamna Kesem | North Shewa (K3) | wheat | 0 | 2367 | 2016 | 6.50 | 909 | 77 | 3 | 0.85 | 2 | 2 | 3 | 1 | 2 | E | |
| Agarfa | Bale | Wheat-barley | 1 | 2356 | 2391 | 5.24 | 1035 | 73 | 3 | 1.23 | 2 | 2 | 3 | 1 | 3 | E | |
| Nenesebo | Bale | Barley-wheat | 0 | 2330 | 1940 | 6.02 | 1061 | 37 | 3 | 1.49 | 2 | 2 | 3 | 1 | 3 | E | |
| Debark | North Gonder | Barley-wheat | 0 | 2054 | 2973 | 6.99 | 919 | 102 | 3 | 0.55 | 2 | 2 | 3 | 2 | 2 | F | |
| Dabat | North Gonder | Teff-wheat | 0 | 1918 | 1830 | 5.88 | 940 | 128 | 2 | 0.63 | 2 | 2 | 3 | 2 | 2 | F | |
| Wegera | North Gonder | Wheat-barley | 0 | 2167 | 1888 | 4.91 | 1004 | 125 | 3 | 0.58 | 2 | 2 | 2 | 2 | 2 | F | |
| Sayint | South Wollo | Teff-barley | 0 | 2303 | 2921 | 8.50 | 1085 | 112 | 4 | 0.78 | 2 | 2 | 3 | 2 | 2 | F | |
| Debresina | South Wollo | Wheat-teff | 0 | 2194 | 2316 | 7.76 | 1055 | 173 | 3 | 0.83 | 2 | 2 | 3 | 2 | 2 | F | |
| Jama | South Wollo | Teff-wheat | 0 | 2362 | 1232 | 6.25 | 1029 | 123 | 1 | 0.72 | 2 | 2 | 3 | 2 | 2 | F | |
| Moretna Jiru | North Shewa (K3) | Teff-wheat | 0 | 2092 | 1373 | 8.50 | 922 | 144 | 2 | 0.45 | 2 | 2 | 3 | 2 | 1 | F | |
| Siya Debirna Wayu & Ensarc | North Shewa (K3) | Teff-wheat | 0 | 2340 | 1425 | 4.47 | 925 | 141 | 2 | 0.50 | 2 | 2 | 2 | 2 | 2 | F | |
| Yaya Gulelena Debre Libanos | North Shewa (K4) | Teff-wheat | 1 | 2353 | 1361 | 4.96 | 1007 | 175 | 3 | 0.71 | 2 | 2 | 2 | 2 | 2 | F | |
| Jeldu | West Shewa | Wheat-barley | 0 | 2251 | 1802 | 6.06 | 1087 | 150 | 3 | 0.97 | 2 | 2 | 3 | 2 | 2 | F | |
| Gimbichu | East Shewa | Wheat-teff | 1 | 2283 | 1008 | 3.22 | 939 | 108 | 2 | 0.77 | 2 | 2 | 2 | 2 | 2 | F | |
| Akaki | East Shewa | Teff-wheat | 0 | 2073 | 1102 | 2.13 | 969 | 103 | 1 | 0.83 | 2 | 2 | 1 | 2 | 2 | F | |
| Kersana Kondaltiti | West Shewa | Teff-wheat | 0 | 2307 | 1736 | 2.67 | 1070 | 114 | 2 | 0.81 | 2 | 2 | 1 | 2 | 2 | F | |
| Aseko | Arsi | Barley-wheat | 0 | 2279 | 1778 | 8.46 | 1074 | 128 | 3 | 0.92 | 2 | 2 | 3 | 2 | 2 | F | |
| Chole | Arsi | Wheat-barley | 0 | 2385 | 2295 | 7.90 | 1070 | 142 | 3 | 0.81 | 2 | 2 | 3 | 2 | 2 | F | |
| Sude | Arsi | Wheat-teff | 0 | 2330 | 1527 | 5.84 | 1093 | 114 | 3 | 0.96 | 2 | 2 | 3 | 2 | 2 | F | |
| Robe | Arsi | Wheat-teff | 0 | 2132 | 2700 | 5.20 | 1099 | 121 | 3 | 1.02 | 2 | 2 | 3 | 2 | 3 | F | |
| Shirka | Arsi | Wheat-teff | 1 | 2233 | 2370 | 5.27 | 1039 | 142 | 2 | 1.09 | 2 | 2 | 3 | 2 | 3 | F | |
| Gasera | Bale | wheat | 1 | 2140 | 1312 | 4.71 | 1099 | 138 | 3 | 0.54 | 2 | 2 | 2 | 2 | 2 | F | AGP targ |
| Mojana Wadera | North Shewa (K3) | wheat | 1 | 1991 | 2240 | 6.93 | 1040 | 150 | 2 | 0.34 | 2 | 2 | 3 | 2 | 1 | F | |
| Kersa | East Harerghe | Maize-wheat | 0 | 2117 | 1360 | 4.35 | 903 | 357 | 1 | 0.44 | 2 | 2 | 2 | 3 | 1 | G | |
| WEREDA 19 | Zone 3 | Teff-wheat | 0 | 2224 | 275 | 2.08 | 1041 | 3439 | 1 | 0.05 | 2 | 2 | 1 | 3 | 1 | G | |
| WEREDA 26 | Zone 6 | Teff-wheat | 0 | 2173 | 214 | 1.12 | 1007 | 586 | 1 | 0.21 | 2 | 2 | 1 | 3 | 1 | G | |
| WEREDA 27 | Zone 6 | Teff-wheat | 0 | 2116 | 113 | 1.20 | 986 | 1808 | 1 | 0.11 | 2 | 2 | 1 | 3 | 1 | G | |
| Limu | Hadiya | Wheat-maize | 1 | 2166 | 1200 | 2.59 | 1029 | 411 | 2 | 0.59 | 2 | 2 | 1 | 3 | 2 | G | AGP targ |
| Menjiwo | Kaffa | Teff-wheat | 0 | 2145 | 2116 | 7.22 | 1750 | 96 | 3 | 0.81 | 2 | 3 | 3 | 1 | 2 | H | |
| Gera | Jimma | Wheat-maize | 1 | 2124 | 1588 | 3.95 | 1876 | 68 | 3 | 0.99 | 2 | 3 | 2 | 1 | 2 | H | |
| Gesha Daka | Kaffa | Teff-wheat | 0 | 2221 | 808 | 2.12 | 1929 | 45 | 4 | 0.50 | 2 | 3 | 1 | 1 | 2 | H | |
| Goncha Siso Enese | East Gojam | Teff-wheat | 0 | 2252 | 2002 | 6.15 | 1234 | 141 | 2 | 0.59 | 2 | 3 | 3 | 2 | 2 | J | |
| Enarj Enawga | East Gojam | Teff-wheat | 0 | 2316 | 2800 | 6.44 | 1193 | 173 | 2 | 0.62 | 2 | 3 | 3 | 2 | 2 | J | |
| Kedida Gamela | Kembata Alaba Teml | Wheat-teff | 0 | 2048 | 920 | 3.64 | 1107 | 614 | 2 | 0.42 | 2 | 3 | 2 | 3 | 1 | J | |

| Woreda | Zone | Cereals | AC | elevati | el_ran | mean | rainfal | popdens | AC | TLU_l | elev_clas | rain_clas | slope_cl | pop_clas | tlu_class | category | Targets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ganta Afeshum | Easetern Tigray | Barley-wheat | 0 | 2457 | 1221 | 5.73 | 583 | 319 | 1 | 0.35 | 3 | 1 | 3 | 3 | 1 | K | |
| Atsbi Wenberta | Easetern Tigray | Barley-wheat | 0 | 2478 | 1606 | 5.35 | 597 | 120 | 1 | 0.73 | 3 | 1 | 3 | 2 | 2 | K | |
| Ambalaje | Southern Tigray | wheat | 0 | 2468 | 2112 | 8.44 | 657 | 142 | 2 | 0.54 | 3 | 1 | 3 | 2 | 2 | K | |
| Endamehoni | Southern Tigray | Wheat-barley | 1 | 2607 | 1932 | 8.66 | 742 | 174 | 2 | 0.44 | 3 | 1 | 3 | 2 | 1 | K | AGP targ |
| Gidan | North Wollo | Barley-wheat | 0 | 2864 | 2126 | 8.11 | 899 | 143 | 2 | 0.65 | 3 | 1 | 3 | 2 | 2 | K | |
| Janamora | North Gonder | Barley-wheat | 0 | 2572 | 2898 | 8.34 | 918 | 90 | 4 | 0.59 | 3 | 2 | 3 | 1 | 2 | L | |
| Adaba | Bale | Wheat-barley | 1 | 2929 | 2327 | 5.20 | 1016 | 59 | 4 | 1.06 | 3 | 2 | 3 | 1 | 3 | L | |
| Endagagn | Guraghe | wheat | 1 | 2527 | 676 | 2.74 | 1013 | 0 | 2 | | 3 | 2 | 1 | 1 | 0 | L | AGP targ |
| Goba | Bale | Barley-wheat | 0 | 2938 | 2827 | 6.19 | 1059 | 52 | 4 | 0.73 | 3 | 2 | 3 | 1 | 2 | L | |
| Dawunt Delanta | North Wollo | Teff-wheat | 0 | 2538 | 2353 | 8.08 | 1000 | 120 | 3 | 0.77 | 3 | 2 | 3 | 2 | 2 | M | |
| Gera Midirna Keya Gabriel | North Shewa (K3) | Wheat-barley | 0 | 2692 | 2018 | 7.52 | 1076 | 104 | 4 | 0.76 | 3 | 2 | 3 | 2 | 2 | M | |
| Mama Midirna Lalo | North Shewa (K3) | wheat | 0 | 2666 | 1723 | 7.31 | 1049 | 132 | 2 | 0.72 | 3 | 2 | 3 | 2 | 2 | M | |
| Debre Berhan Zuria | North Shewa (K3) | Barley-wheat | 0 | 2654 | 1938 | 5.86 | 977 | 114 | 2 | 0.84 | 3 | 2 | 3 | 2 | 2 | M | |
| Berehna Aleltu | North Shewa (K4) | Wheat-teff | 0 | 2631 | 1435 | 2.71 | 1026 | 120 | 2 | 1.08 | 3 | 2 | 1 | 2 | 3 | M | |
| Gedeb | Arsi | wheat | 1 | 2604 | 1572 | 1.68 | 915 | 153 | 2 | 1.21 | 3 | 2 | 1 | 2 | 3 | M | |
| Sinanana Dinsho | Bale | Wheat-barley | 1 | 2743 | 2547 | 2.88 | 1050 | 104 | 2 | 0.88 | 3 | 2 | 1 | 2 | 2 | M | AGP targ |
| Hitosa | Arsi | wheat | 0 | 2644 | 2308 | 3.70 | 1050 | 191 | 2 | 0.71 | 3 | 2 | 2 | 2 | 2 | M | |
| Angolela Tera | North Shewa (K3) | Barley-wheat | 0 | 2763 | 1484 | 3.26 | 958 | 104 | 2 | 0.81 | 3 | 2 | 2 | 2 | 2 | M | |
| Tiyo | Arsi | wheat | 0 | 2541 | 2086 | 4.29 | 1035 | 268 | 2 | 0.46 | 3 | 2 | 2 | 3 | 1 | M | |
| Munessa | Arsi | Wheat-barley | 1 | 2429 | 2253 | 3.04 | 1001 | 129 | 3 | 1.15 | 3 | 2 | 2 | 2 | 3 | M | |
| Bekoji | Arsi | Wheat-barley | 1 | 2793 | 2547 | 3.43 | 1036 | 150 | 2 | 1.18 | 3 | 2 | 2 | 2 | 3 | M | |
| Dodola | Bale | Wheat-barley | 1 | 2776 | 1352 | 3.36 | 988 | 108 | 2 | 1.17 | 3 | 2 | 2 | 2 | 3 | M | |
| Lay Gayint | South Gonder | Barley-wheat | 0 | 2411 | 2564 | 6.90 | 1100 | 151 | 3 | 0.52 | 3 | 3 | 3 | 2 | 2 | N | |
| Legambo | South Wollo | Barley-wheat | 0 | 3060 | 1877 | 6.25 | 1192 | 182 | 2 | 0.62 | 3 | 3 | 3 | 2 | 2 | N | |
| Were Ilu | South Wollo | Wheat-teff | 0 | 2661 | 1822 | 5.65 | 1118 | 151 | 2 | 0.79 | 3 | 3 | 3 | 2 | 2 | N | |
| Gishe Rabel | North Shewa (K3) | Wheat-barley | 0 | 2682 | 1522 | 7.56 | 1118 | 95 | 4 | 0.76 | 3 | 3 | 3 | 1 | 2 | N | |
| Debay Telatgen | East Gojam | Teff-wheat | 0 | 2848 | 1581 | 4.44 | 1375 | 193 | 2 | 0.68 | 3 | 3 | 2 | 2 | 2 | N | |
| Dendi | West Shewa | Teff-barley | 1 | 2445 | 1661 | 3.89 | 1143 | 149 | 3 | 0.86 | 3 | 3 | 2 | 2 | 2 | N | AGP pos |
| Ejere (Addis Alem) | West Shewa | Teff-wheat | 0 | 2409 | 879 | 2.11 | 1116 | 160 | 2 | 0.74 | 3 | 3 | 1 | 2 | 2 | N | |
| WEREDA 28 | Zone 3 | Teff-wheat | 0 | 2473 | 793 | 2.87 | 1100 | 724 | 1 | 0.21 | 3 | 3 | 1 | 3 | 1 | N | |
| Kokir Gedbano Gutazer | Guraghe | Barley-wheat | 0 | 2658 | 1562 | 4.30 | 1181 | 152 | 4 | 0.93 | 3 | 3 | 2 | 2 | 2 | N | |
| Tena | Arsi | Wheat-barley | 0 | 2724 | 2294 | 4.69 | 1103 | 176 | 2 | 0.90 | 3 | 3 | 2 | 2 | 2 | N | potential |
| Degeluna Tijo | Arsi | Wheat-barley | 0 | 2835 | 1641 | 2.63 | 1125 | 142 | 2 | 0.89 | 3 | 3 | 1 | 2 | 2 | N | potential |
| Arbe Gona | Sidama | Maize-wheat | 0 | 2553 | 1339 | 2.64 | 1311 | 410 | 3 | 0.88 | 3 | 3 | 1 | 3 | 2 | N | |
| Hulla | Sidama | Wheat-barley | 0 | 2494 | 1487 | 3.52 | 1430 | 387 | 2 | 0.90 | 3 | 3 | 2 | 3 | 2 | N | potential |
| Chencha | Gamo Gofa | Barley-wheat | 0 | 2491 | 1872 | 7.43 | 1349 | 323 | 1 | 0.53 | 3 | 3 | 3 | 3 | 2 | N | |
| Omo Sheleko | Kembata Alaba Tem | Teff-wheat | 0 | 1614 | 1795 | 6.26 | 1266 | 391 | 2 | 0.47 | 1 | 3 | 3 | 3 | 1 | | |

Table 2. Characteristics of Wards in Dodoma and Manyara Divisions

| District | ward | Division | PP | EL | SL | RA | AC | CC | TLU | FARMSYS | target |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dodoma Rural | Babayu | Mundemu | 5 | 2 | 2 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Bahi | Bahi | 3 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Buigiri | Chilionwa | 3 | 1 | 1 | 2 | 1 | 20 | 0.00 | | C |
| Dodoma Rural | Chali | Chipanga | 3 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Chibelela | Mwitikira | 4 | 1 | 1 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Chikola | Chipanga | 3 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Chinugulu | Mwitikira | 5 | 1 | 2 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Chipanga | Chipanga | 4 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Dabalo | Itiso | 5 | 2 | 4 | 2 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Handali | Mvumi | 3 | 1 | 3 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Haneti | Itiso | 5 | 2 | 3 | 2 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Huzi | Mwitikira | 5 | 1 | 1 | 1 | 2 | 20 | 0.00 | | A |
| Dodoma Rural | Ibihwa | Bahi | 5 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Ibugule | Mwitikira | 4 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Idifu | Mvumi | 4 | 1 | 2 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Igandu | Mvumi | 4 | 1 | 3 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Ikowa | Chilionwa | 4 | 1 | 2 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Ilindi | Bahi | 4 | 1 | 2 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Iringa Mvumi | Makang'wa | 3 | 1 | 2 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Itiso | Itiso | 5 | 2 | 3 | 2 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Kigwe | Bahi | 3 | 1 | 2 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Lamaiti | Mundemu | 4 | 1 | 1 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Majeleko | Chilionwa | 3 | 1 | 3 | 2 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Makanda | Mundemu | 5 | 1 | 1 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Makang'wa | Makang'wa | 3 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Manchali | Chilionwa | 3 | 1 | 2 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Manda | Mwitikira | 5 | 1 | 2 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Manzase | Makang'wa | 5 | 1 | 2 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Membe | Itiso | 5 | 1 | 3 | 2 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Mpalanga | Chipanga | 5 | 1 | 2 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Mpamantwa | Bahi | 4 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Msamalo | Chilionwa | 4 | 1 | 3 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Msanga | Chilionwa | 3 | 1 | 3 | 2 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Mtitaa | Mwitikira | 5 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Mundemu | Mundemu | 5 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Muungano | Mvumi | 3 | 2 | 4 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Mwitikira | Mwitikira | 5 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Rural | Nghambaku | Mwitikira | 5 | 1 | 2 | 1 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Segala | Itiso | 5 | 2 | 2 | 2 | 2 | 20 | 0.00 | | |
| Dodoma Rural | Zanka | Mundemu | 5 | 2 | 4 | 2 | 2 | 20 | 0.00 | | |
| Dodoma Urban | Chihanga | Hombolo | 4 | 1 | 1 | 2 | 2 | 20 | 3.67 | Millet-maize | |
| Dodoma Urban | Hombolo | Hombolo | 3 | 2 | 3 | 2 | 2 | 20 | 0.34 | maize | |
| Dodoma Urban | Ipala | Hombolo | 4 | 1 | 1 | 2 | 1 | 20 | 1.23 | millet | |
| Dodoma Urban | Kikombo | Kikombo | 4 | 1 | 2 | 1 | 1 | 20 | 1.71 | Maize-millet | |

| District | ward | Division | PP | EL | SL | RA | AC | CC | TLU | FARMSYS | target |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dodoma Urban | Msalato | Hombolo | 3 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Urban | Nala | Zuzu | 4 | 1 | 2 | 1 | 1 | 20 | 0.69 | millet | |
| Dodoma Urban | Nzuguni | Dodoma Urbai | 3 | 1 | 1 | 1 | 1 | 20 | 0.00 | | |
| Dodoma Urban | Zuzu | Zuzu | 4 | 1 | 2 | 1 | 1 | 20 | 0.60 | millet | |
| Kondoa | Chandama | Goima | 3 | 2 | 2 | 2 | 2 | 20 | 0.44 | maize | |
| Kondoa | Changaa | Kolo | 4 | 2 | 3 | 2 | 2 | 20 | 0.00 | | |
| Kondoa | Chemba | Goima | 5 | 2 | 2 | 2 | 2 | 20 | 0.00 | | |
| Kondoa | Dalai | Mondo | 4 | 2 | 2 | 2 | 2 | 20 | 0.64 | Maize-millet | |
| Kondoa | Farkwa | Farkwa | 5 | 2 | 3 | 1 | 1 | 20 | 0.00 | | |
| Kondoa | Goima | Goima | 4 | 2 | 3 | 2 | 2 | 20 | 0.48 | maize | |
| Kondoa | Gwandi | Farkwa | 5 | 2 | 2 | 1 | 2 | 20 | 10.85 | maize | |
| Kondoa | Haubi | Pahi | 3 | 3 | 4 | 2 | 2 | 20 | 0.00 | | |
| Kondoa | Jangalo | Mondo | 3 | 2 | 2 | 2 | 2 | 20 | 0.06 | Maize-legumes | |
| Kondoa | Kalamba | Pahi | 4 | 3 | 4 | 2 | 2 | 20 | 1.75 | Maize-millet | |
| Kondoa | Kikilo | Bereko | 3 | 3 | 3 | 2 | 1 | 20 | 1.13 | Maize-legumes | |
| Kondoa | Kikore | Bereko | 3 | 2 | 3 | 2 | 2 | 20 | 0.28 | maize | |
| Kondoa | Kingale | Kondoa Urban | 4 | 2 | 3 | 2 | 2 | 20 | 0.42 | Maize-millet | |
| Kondoa | Kisese | Bereko | 4 | 2 | 3 | 2 | 2 | 20 | 0.00 | | |
| Kondoa | Kolo | Kolo | 4 | 3 | 4 | 2 | 1 | 20 | 3.35 | Maize-legume: | H |
| Kondoa | Kwadelo | Pahi | 3 | 2 | 1 | 2 | 2 | 20 | 0.00 | | E |
| Kondoa | Kwamtoro | Kwamtoro | 4 | 2 | 2 | 1 | 2 | 20 | 1.00 | maize | |
| Kondoa | Lalta | Kwamtoro | 5 | 2 | 2 | 1 | 2 | 20 | 0.00 | | |
| Kondoa | Makorongo | Farkwa | 5 | 1 | 2 | 1 | 2 | 20 | 1.57 | sorghum | |
| Kondoa | Mnenia | Bereko | 4 | 2 | 3 | 2 | 2 | 20 | 0.00 | | |
| Kondoa | Mondo | Mondo | 4 | 2 | 3 | 2 | 2 | 20 | 0.00 | | |
| Kondoa | Mpendo | Kwamtoro | 5 | 1 | 1 | 1 | 2 | 20 | 0.00 | | |
| Kondoa | Mrijo | Goima | 4 | 2 | 2 | 2 | 2 | 20 | 0.11 | maize | |
| Kondoa | Ovada | Kwamtoro | 5 | 2 | 2 | 1 | 2 | 20 | 1.47 | Maize-millet | |
| Kondoa | Pahi | Pahi | 3 | 2 | 2 | 2 | 2 | 20 | 1.13 | Millet-maize | |
| Kondoa | Paranga | Mondo | 3 | 2 | 2 | 2 | 2 | 20 | 0.32 | Maize-millet | |
| Kondoa | Sanzawa | Kwamtoro | 5 | 2 | 3 | 1 | 2 | 20 | 1.33 | millet | |
| Kondoa | Soera | Kolo | 4 | 3 | 4 | 3 | 1 | 20 | 0.93 | maize | |
| Kondoa | Suruke | Kondoa Urban | 4 | 2 | 3 | 2 | 2 | 20 | 2.51 | maize | |
| Kondoa | Thawi | Kolo | 4 | 2 | 4 | 2 | 2 | 20 | 1.55 | Maize-millet | |
| Kongwa | Chamkoroma | Mlali | 3 | 2 | 4 | 2 | 2 | 30 | 0.68 | maize | |
| Kongwa | Hogoro | Zoissa | 3 | 2 | 2 | 3 | 1 | 20 | 0.19 | maize | I |
| Kongwa | Iduo | Mlali | 3 | 2 | 2 | 2 | 1 | 20 | 0.01 | maize | |
| Kongwa | Mkoka | Zoissa | 3 | 2 | 2 | 2 | 2 | 20 | 0.03 | maize | |
| Kongwa | Mtanana | Kongwa | 4 | 2 | 1 | 2 | 1 | 20 | 0.89 | maize | E |
| Kongwa | Njoge | Mlali | 4 | 2 | 2 | 2 | 1 | 20 | 0.00 | maize | F |
| Kongwa | Pandambili | Mlali | 3 | 2 | 2 | 2 | 2 | 30 | 0.42 | maize | |
| Kongwa | Sagara | Kongwa | 4 | 2 | 3 | 2 | 1 | 20 | 0.02 | Maize-sorg | |
| Kongwa | Sejeli | Kongwa | 4 | 1 | 2 | 2 | 1 | 20 | 0.19 | maize | |
| Kongwa | Ugogoni | Kongwa | 3 | 2 | 3 | 2 | 1 | 20 | 0.84 | sorghum | |

| District | ward | Division | PP | EL | SL | RA | AC | CC | TLU | FARMSYS | target |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mpwapwa | Luhundwa | Kibakwe | 5 | 2 | 4 | 2 | 2 | 40 | 0.78 | maize | |
| Mpwapwa | Massa | Rudi | 4 | 1 | 4 | 2 | 2 | 30 | 0.78 | sorghum | D |
| Mpwapwa | Matomondo | Mpwapwa | 4 | 1 | 4 | 2 | 2 | 30 | 0.98 | Maize-legumes | |
| Mpwapwa | Mazae | Mpwapwa | 4 | 1 | 4 | 1 | 1 | 20 | 0.75 | sorghum | |
| Mpwapwa | Mima | Mpwapwa | 4 | 1 | 4 | 1 | 2 | 20 | 0.21 | Maize-sorg | |
| Mpwapwa | Mlunduzi | Rudi | 5 | 1 | 4 | 1 | 2 | 20 | 0.15 | sorghum | B |
| Mpwapwa | Rudi | Rudi | 5 | 1 | 4 | 1 | 2 | 20 | 5.48 | sorghum | |
| Babati | Bonga | Gorowa | 3 | 2 | 4 | 3 | 1 | 20 | 1.84 | Maize-legumes | |
| Babati | Dabil | Bashinet | 3 | 3 | 3 | 3 | 1 | 30 | 5.01 | Maize-legumes | |
| Babati | Duru | Gorowa | 3 | 3 | 4 | 3 | 1 | 30 | 2.49 | maize | |
| Babati | Gidas | Gorowa | 4 | 3 | 4 | 3 | 1 | 20 | 7.15 | Maize-legumes | |
| Babati | Kiru | Babati | 4 | 2 | 4 | 3 | 2 | 20 | 2.25 | Maize-legume | I |
| Babati | Magara | Mbugwe | 3 | 1 | 4 | 3 | 1 | 20 | 1.50 | Maize-legumes | |
| Babati | Mwada | Mbugwe | 4 | 1 | 2 | 2 | 1 | 20 | 7.11 | Maize-rice | D |
| Babati | Nkaiti | Mbugwe | 5 | 1 | 1 | 2 | 2 | 20 | 0.00 | | C |
| Babati | Riroda | Gorowa | 3 | 2 | 4 | 3 | 1 | 20 | 2.41 | Maize-legumes | |
| Babati | Sigino | Babati | 3 | 2 | 4 | 3 | 1 | 30 | 2.23 | maize | |
| Babati | Ufana | Bashinet | 4 | 3 | 3 | 3 | 1 | 30 | 5.90 | Maize-legumes | |
| Hanang | Bassodesh | Bassotu | 4 | 3 | 2 | 2 | 2 | 30 | 8.54 | Maize-legume | H |
| Hanang | Bassotu | Bassotu | 3 | 3 | 2 | 2 | 2 | 30 | 6.88 | Maize-legumes | |
| Hanang | Gehandu | Balangdalalu | 4 | 3 | 3 | 3 | 2 | 30 | 4.54 | Maize-legumes | |
| Hanang | Gendabi | Katesh | 4 | 3 | 3 | 2 | 2 | 30 | 4.77 | Maize-legumes | |
| Hanang | Getanuwas | Bassotu | 3 | 3 | 1 | 2 | 2 | 20 | 2.44 | Maize-legume | G |
| Hanang | Gidahababieg | Endasak | 4 | 3 | 4 | 2 | 1 | 20 | 5.63 | maize | |
| Hanang | Gisambalang | Simbay | 5 | 3 | 2 | 2 | 2 | 20 | 4.86 | maize | |
| Hanang | Gitting | Endasak | 3 | 3 | 4 | 3 | 2 | 30 | 3.29 | Maize-legumes | |
| Hanang | Hidet | Simbay | 3 | 3 | 2 | 2 | 2 | 20 | 7.28 | Maize-legumes | |
| Hanang | Laghanga | Bassotu | 3 | 3 | 2 | 2 | 2 | 30 | 4.13 | Maize-legumes | |
| Hanang | Masakta | Endasak | 3 | 3 | 3 | 3 | 1 | 30 | 7.69 | Maize-legumes | |
| Hanang | Masqaroda | Endasak | 4 | 3 | 3 | 3 | 1 | 30 | 0.00 | | |
| Hanang | Mogitu | Katesh | 4 | 3 | 2 | 2 | 2 | 30 | 6.68 | Maize-legumes | |
| Hanang | Simbay | Simbay | 4 | 3 | 2 | 2 | 2 | 20 | 0.00 | | |
| Hanang | Sirop | Simbay | 5 | 3 | 4 | 2 | 2 | 20 | 5.21 | maize | |
| Kiteto | Dongo | Sunya | 4 | 2 | 2 | 2 | 2 | 30 | 1.34 | maize | |
| Kiteto | Dosidosi | Dosidosi | 4 | 2 | 3 | 2 | 2 | 30 | 0.30 | maize | |
| Kiteto | Engusero | Matui | 4 | 2 | 2 | 2 | 2 | 20 | 0.06 | maize | |
| Kiteto | Kijungu | Kijungu | 5 | 2 | 2 | 1 | 2 | 40 | 0.65 | maize | |
| Kiteto | Lengatei | Kijungu | 5 | 2 | 2 | 2 | 2 | 40 | 58.11 | maize | |
| Kiteto | Njoro | Olbolot | 5 | 2 | 3 | 1 | 2 | 30 | 0.43 | maize | |
| Kiteto | Partimbo | Kibaya | 5 | 2 | 2 | 2 | 2 | 30 | 2.18 | maize | F |
| Kiteto | Songambele | Dosidosi | 5 | 2 | 2 | 2 | 2 | 20 | 0.13 | maize | |
| Kiteto | Sunya | Sunya | 5 | 2 | 2 | 2 | 2 | 30 | 3.99 | maize | |
| Mbulu | Bargish | Daudi | 3 | 3 | 3 | 4 | 1 | 30 | 7.25 | Maize-legumes | |
| Mbulu | Bashay | Dongobesh | 3 | 3 | 3 | 3 | 2 | 30 | 6.22 | Maize-legumes | |

| District | ward | Division | PP | EL | SL | RA | AC | CC | TLU | FARMSYS | target |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mbulu | Maretadu | Dongobesh | 4 | 3 | 2 | 3 | 2 | 30 | 6.68 | Maize-legume | J |
| Mbulu | Murray | Endagikot | 3 | 4 | 4 | 4 | 2 | 40 | 2.74 | Maize-legume | L |
| Mbulu | Tlawi | Endagikot | 4 | 4 | 4 | 4 | 2 | 40 | 3.29 | maize | L |
| Mbulu | Tumati | Dongobesh | 3 | 4 | 4 | 3 | 2 | 40 | 5.46 | Maize-legume | K |
| Simanjiro | Emboreet | Emboreet | 5 | 3 | 2 | 2 | 2 | 30 | 5.98 | Maize-legumes | |
| Simanjiro | Msitu wa Tem | Msitu wa Tem | 4 | 1 | 3 | 2 | 2 | 40 | 9.82 | maize | |
| Simanjiro | Ngorika | Msitu wa Tem | 5 | 1 | 2 | 1 | 2 | 40 | 1.24 | Rice-maize | B |
| Simanjiro | Orkesumet | Naberera | 5 | 1 | 1 | 1 | 2 | 40 | 0.65 | maize | A |
| Simanjiro | Shambarai | Moivo | 5 | 1 | 2 | 2 | 2 | 30 | 3.86 | Maize-legumes | |