

**ECOSYSTEM COMPONENTS
AS INDICATORS TO FARMERS
TO CONSERVE, MAINTAIN AND MANAGE
LOCAL CROP DIVERSITY IN BURKINA FASO**

**BURKINA FASO COMPONENT
OF THE IPGRI GLOBAL IN SITU PROJECT**



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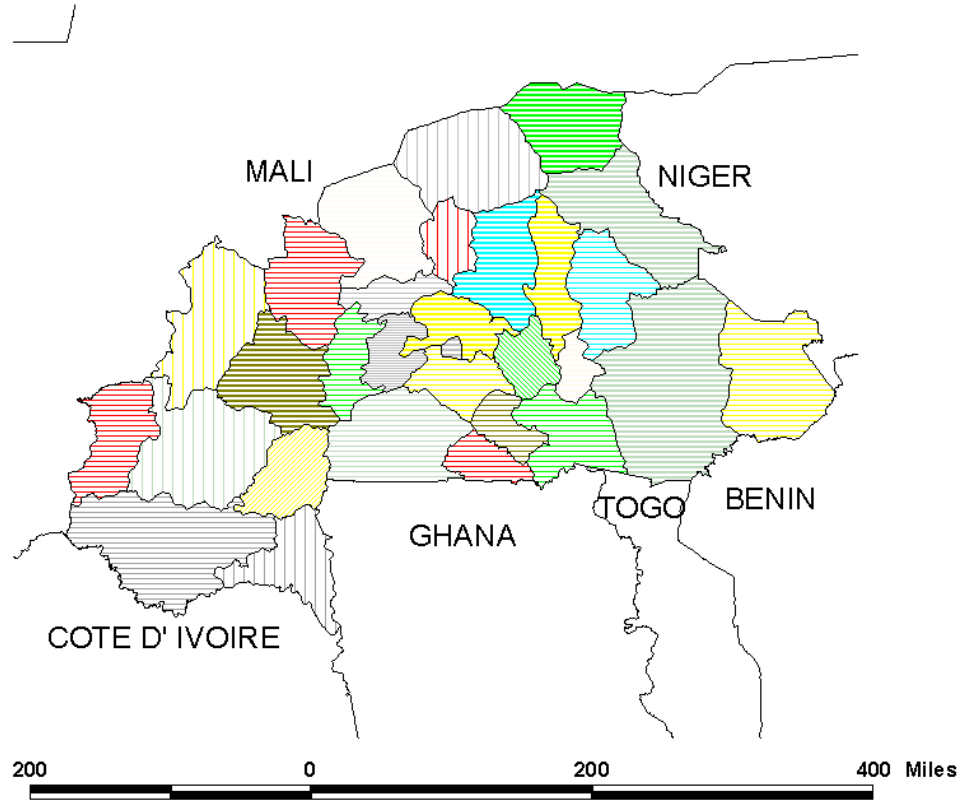
PURPOSE

In BURKINA FASO:

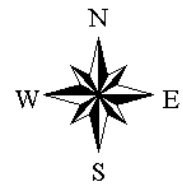
- Predict through climate maps and GIS software the probable distribution of Burkina Faso farmer's varieties across Africa
- Determine and map the actual amount and distribution of the diversity of farmer varieties, including endangered and disappeared varieties
- Describe the factors that affect this amount and distribution of diversity
- Determine and prioritise the type of interventions and actions that support farmer's management of diversity



BURKINA FASO

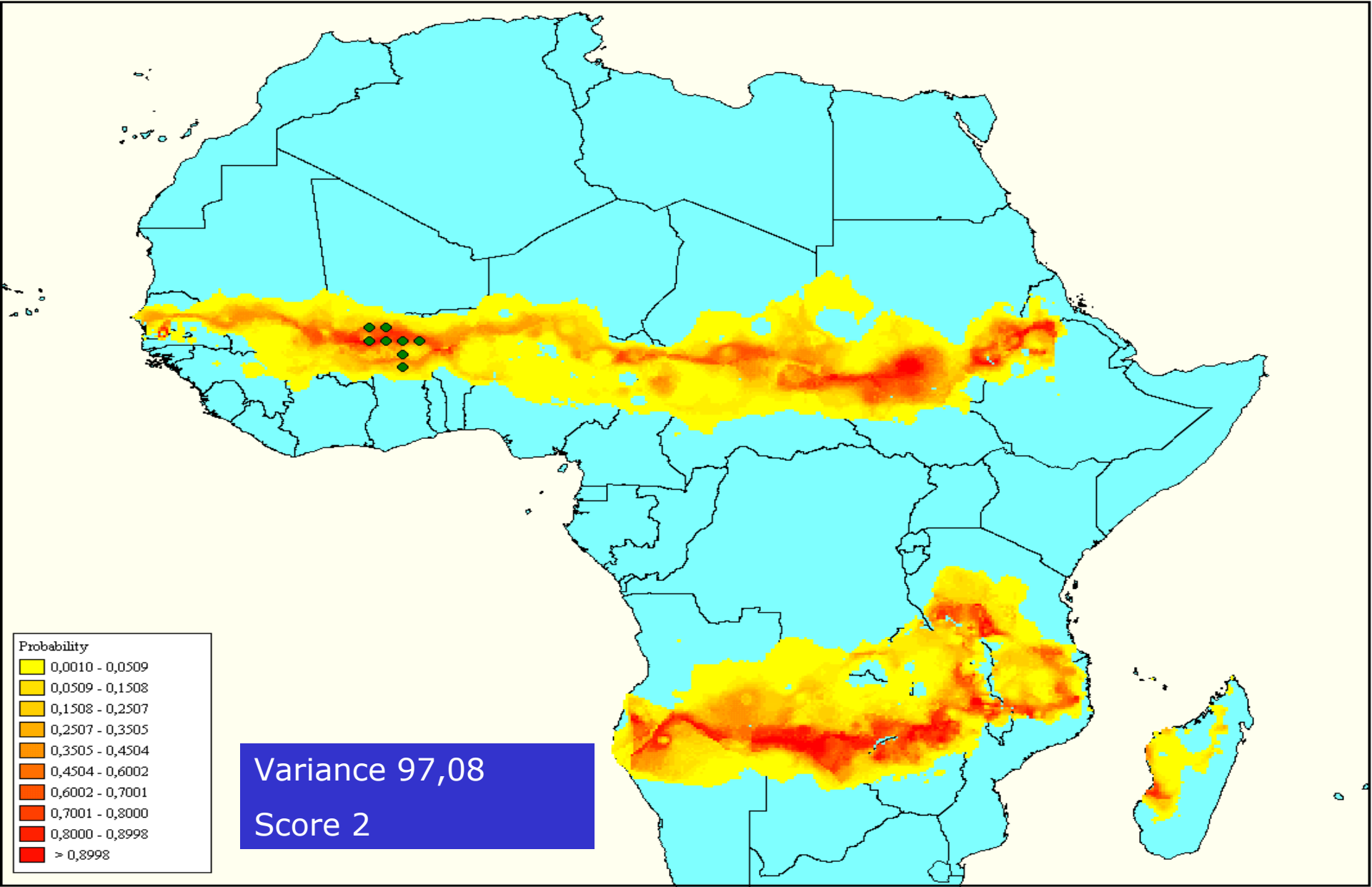


- Togo
- Niger
- Mali
- Ghana
- Cote D'Ivoire
- Benin
- Adm1.shp
- Bam
- Bazega
- Bougouriba
- Boulgou
- Boulkiemde
- Comoe
- Ganzourgou
- Gnagna
- Gourma
- Houet
- Kadiogo
- Kenedougou
- Kossi
- Kouritenga
- Mou Houn
- Nahouri
- Namentenga
- Oudritenga
- Oudalan
- Passore
- Poni
- Sanguie
- San matenga
- Seno
- Sissili
- Sourou
- Sourou
- Tapoa
- Yatenga
- Zoundweogo

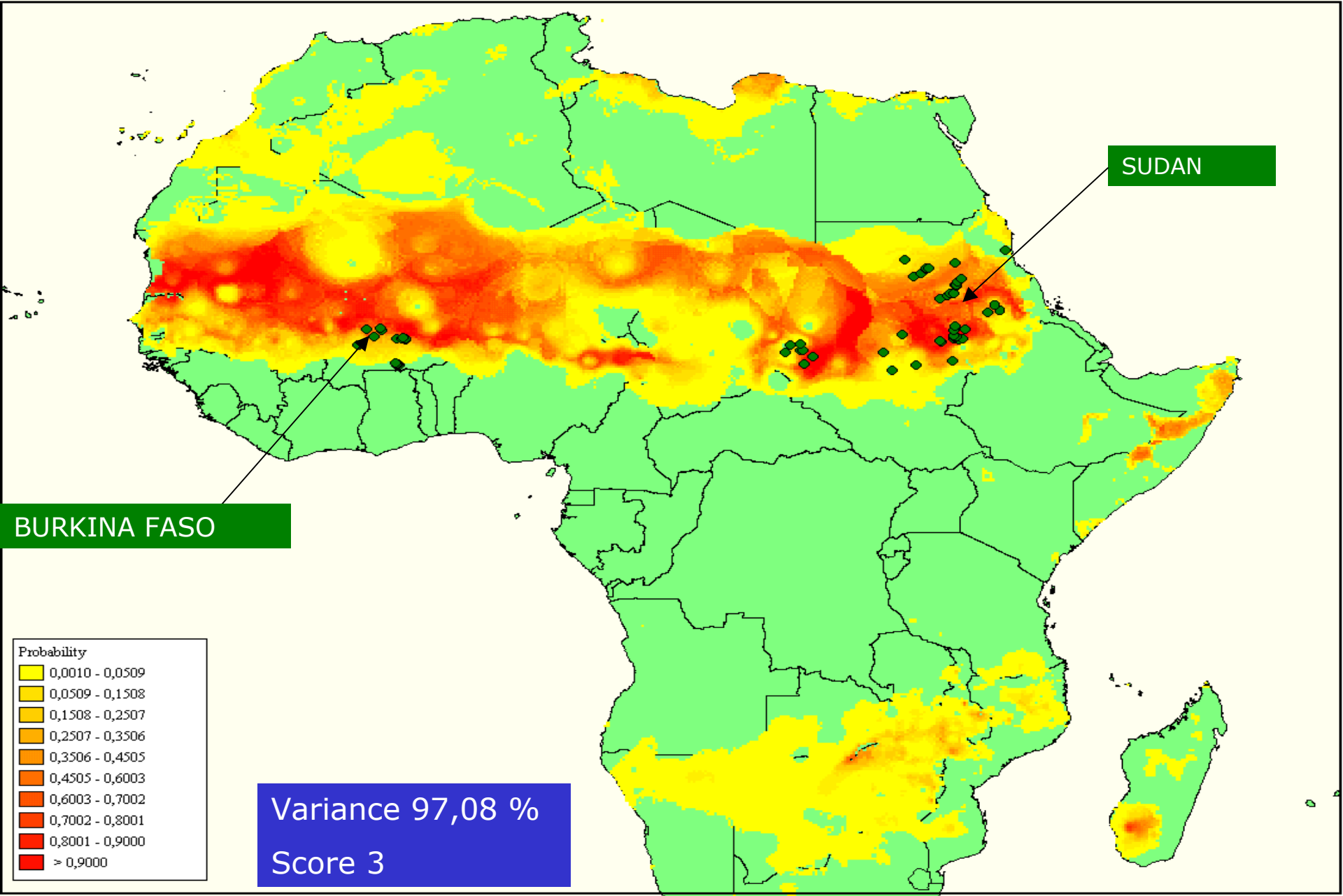


ASSESSING THE PROBABLE DISTRIBUTION OF DIVERSITY USING CLIMATIC DATA AND MAPPING TOOLS

- ArcView, Floramap, Diva, Excel



Probability of Burkina Faso Okra distribution accross Africa



Distribution of Burkina Faso and Sudan Okra accross Africa

CONCLUSION 1

Using the climate data of okra collection in Burkina Faso we can predict where similar genotypes can be found in other parts of Africa

This helps us identify new areas of possible crop diversity for conservation and use

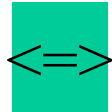
ASSESSING THE AMOUNT AND DISTRIBUTION OF DIVERSITY MANAGED BY FARMER

CRITERIA FOR SITE/ HOUSEHOLDS SELECTION

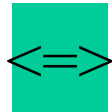
Burkina Faso



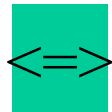
Regions



Villages



Households



- Low rainfall
- high fluctuation in rainfall
- known incidence of genetic erosion

- 5 or 6 crops - 3 or more varieties per crop
- >100 km from Ouagadougou
- Presence of NGOs and farmer organizations
- selected farmers should have been working with these groups
- Interest and commitment of farmers
- accessibility of the location throughout the year
- permanent and full-time farmer
- presence of knowledge about wild relatives
- 3 or more ethnic groups per village
- Variation of rainfall in the village

CHOICE OF CROPS

Six crops were selected:

sorghum
Pearl millet
Groundnut
Cowpea

Reason

These are the four most important crops in Burkina Faso

Okra/
Abelmoschus
esculentus

Reason

This is considered as a woman crop in Burkina Faso

Fabirama/
Solenostemon
rotundifolius

Reason

This is considered as the most endangered tuber in Burkina Faso

Project Sites and Active Household members working directly with the project

Site I (Ouahigouya)

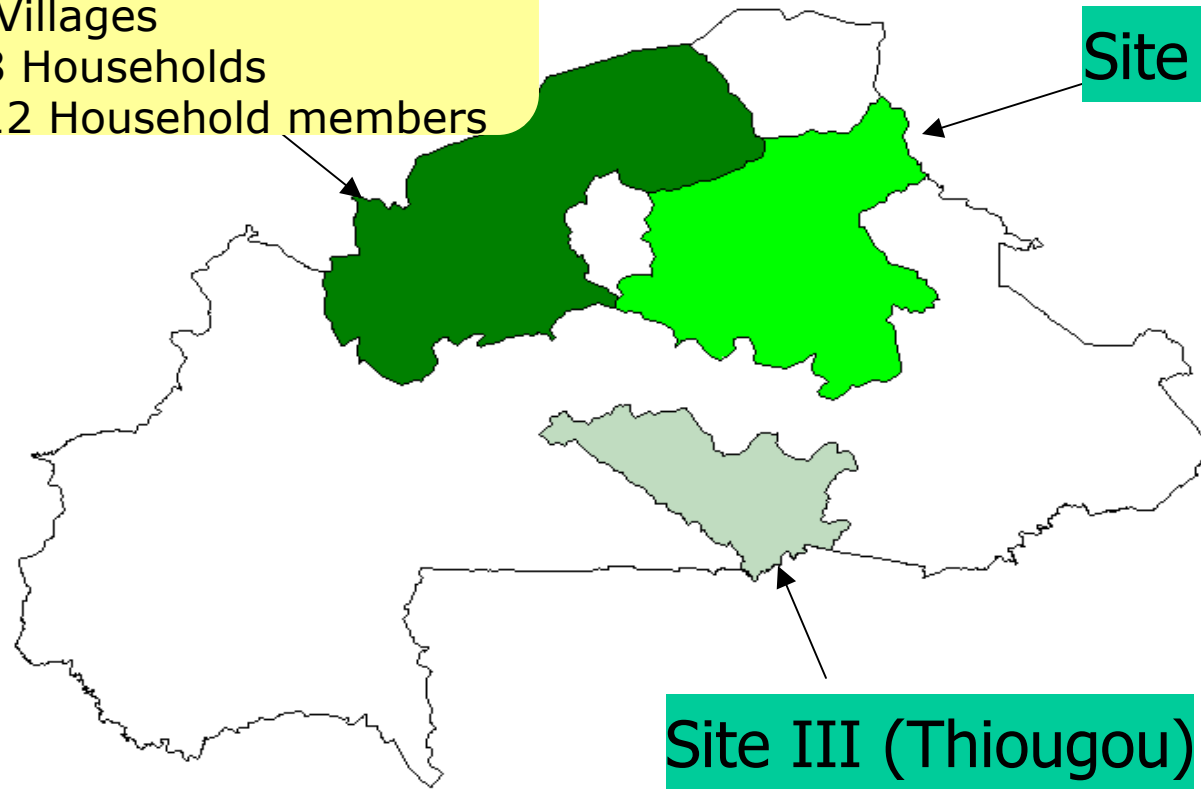
- Northern zone
- (a.r. < 500mm)
- 6 Villages
- 18 Households
- 312 Household members

Site II (Tougouri)

- Centre-North zone
- (400 < a.r. < 600 mm)
- 6 Villages
- 18 Households
- 300 Household members

Site III (Thiougou)

- South-East zone
- a.r. > 1000 mm
- 6 Villages
- 18 Households
- 295 Household members



100 0 100 200 Miles



METHOD OF SAMPLING AND DATA ANALYSIS

Data sampling (based on participatory approach)

- Group discussion
- Focus group Interview (based on semi-structured questionnaire and open questions)
- Key-informant discussion
- Interview of the Head of the household
- Transects and ranking

DATA COLLECTED

Data were collected on the following items:

Indigenous knowledge on the Cropping season to come

- Signs indicating the beginning of a season or planting time
- signs indicating the end of a rainy season
- signs indicating that the season will be good
- signs indicating that the season will be bad
- knowledge about changes in seasonal patterns

Farmers varieties and consistency of naming varieties

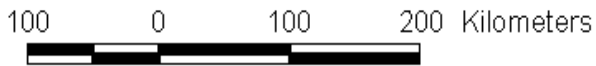
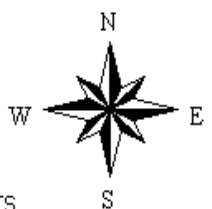
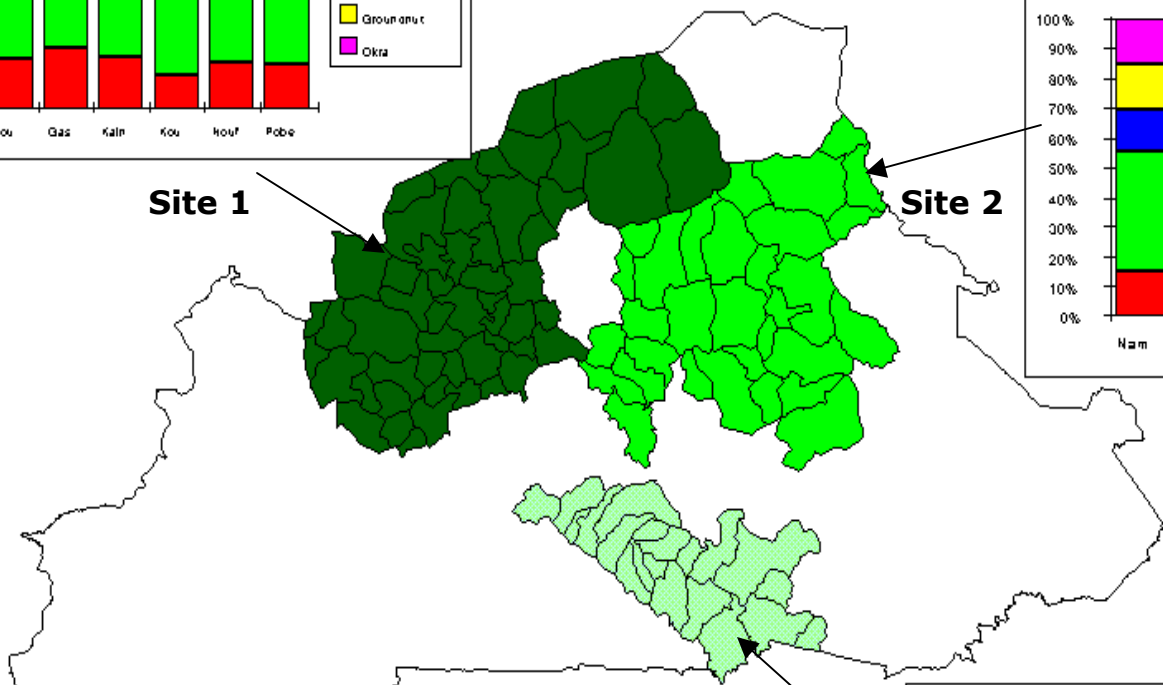
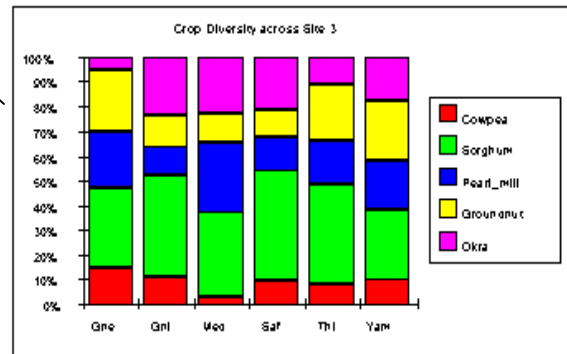
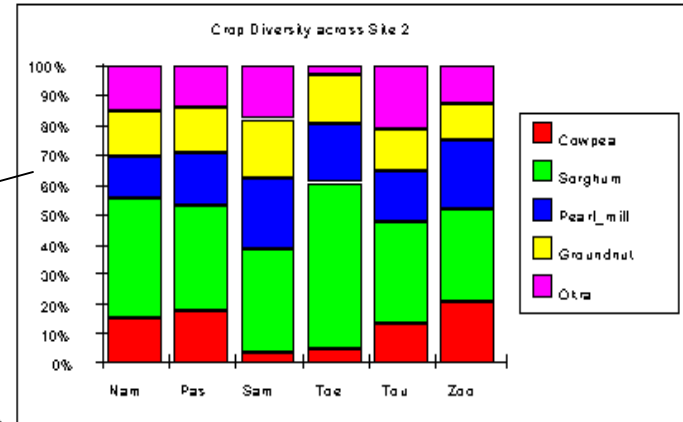
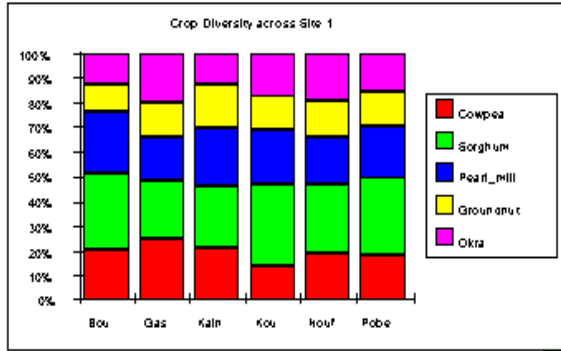
Farmer's criteria for seed selection

Farmer's criteria for:

- **Different types of soils**
- **Important plant species**
- **Important plant cultural practices**
- **Crop associations**
- **Crop rankings**
- **Objectives for the production of crops**

	CROP DIVERSITY ACROSS VILLAGES					
VILLAGE	Cow pea	Sorghum	Pearl millet	Groundnut	Okra	
Kain	1,0759	1,2558	1,1745	0,8740	0,6659	
Bougoure	1,0697	1,6254	1,2817	0,5608	0,6678	
Pobe Mengao	1,0614	1,7594	1,1726	0,8020	0,8785	
Noufondou	1,0520	1,4950	1,0398	0,7974	1,0590	
Gassan	1,8045	1,6317	1,2375	1,0244	1,4305	
Kougny	0,6899	1,6460	1,0865	0,6867	0,8566	
Tougouri	0,7111	1,8054	0,8782	0,7310	1,1365	
Sam bte mbila	0,1814	1,5086	0,9997	0,8716	0,7752	
Zoom nogo	1,0906	1,6268	1,2205	0,6302	0,6757	
Namassa	0,6916	1,8166	0,6641	0,6782	0,6931	
Paspanga	0,6899	1,2928	0,6929	0,5608	0,5303	
Toeyogdin	0,1814	1,8815	0,6723	0,5608	0,1013	
Gnetaya	0,8156	1,7565	1,2417	1,3424	0,2712	
Gnimtenga	0,5589	1,8870	0,5557	0,6066	1,0863	
Medega	0,1814	1,9536	1,6441	0,6709	1,2749	
Yam basse	0,6243	1,6712	1,1689	1,4555	1,0583	
Safoula	0,5028	2,2466	0,6905	0,5608	1,0972	
Thiougu	0,5238	2,4659	1,0669	1,3778	0,6757	
Moyenne	0,7503	1,7403	1,0271	0,8218	0,8297	
Ecart-type	0,40	0,30	0,28	0,29	0,34	
Intervalle confi.	0,184787	0,138590	0,129351	0,133971	0,157069	
Legende						
SITE 1		HIGH				
SITE 2		MEDIUM				
SITE 3		LOW				

DISTRIBUTION OF CROP DIVERSITY ACROSS PROJECT SITE



CROP DIVERSITY AND PRIORITY ACROSS THE SITES

	Diversity Managed by Farmers	Number of Farmers	Threat On diversity	Priority to be ordered
Site 1	High	Medium	High	FIRST
Site 2	Medium	Low	Low	SECOND
Site3	Low	High	Medium	THIRD



CONCLUSION 2

Crop diversity is found to be:

- ✓ **Low** in **Site 3**, where the agro-climatic conditions are very good,
- ✓ **High** in **Site 1**, which is characterized by adverse agro-climatic conditions (drought spells, poor soil, desertification).

At such risky conditions farmers seem to be using crop diversity as a strategy for survival: here diversity may be a means of life (survival).

FACTORS AFFECTING DIVERSITY MANAGEMENT

FARMERS' KNOWLEDGE ABOUT SEASONS

The Signs indicating
the Beginning of
rainy/cropping
season
or time to plant

The Signs indicating
the End of a
rainy/cropping
season

The Signs
indicating
that the cropping
season
will be good

The Signs indicating
that the cropping
season will
be bad

The Signs indicating the Beginning of a season or time to plant

PLANTS

- D_A** – Leaf fall of Tamarindus indica, Vitelaria paradoxum (Karite)
- D₁** – Beginning to have leaf of Lannea microcarpa (Sabga), Sclerocarya birrea (Nobga)
- D₂** – Flowering of Sclerocarya birrea (Nobga), Lannea microcarpa (Sabga), Pterocarpus lucens (Kumbrsaka), "Perperga"
- D₃** – Yellowing and leaf fall of Lannea acida (Samb-nutuga)
- D₄** – Appearance of Stylochiton hypogaeae (Wule) in the river beds
- D₅** – Maturity and fruiting of Lannea microcarpa (Sabga), Sclerocarya birrea (Nobga), Butyrospermum paradoxum (Taaga)
- D₆** – Ripening, drying and souring of fruits of Lannea microcarpa (Sabga), Sclerocarya birrea (Nobga)

BIRDS

- D₇** – Guinea fowls laying eggs
- D₈** – Some birds (Taaba) building their nests
- D₉** – Storks returning (migrating back) to the village
- D₁₀** – South-North migration of Silokoe and Kilimba birds
- D₁₁** – Sparrowhawk crying continuously (repeatedly)

ANIMALS

- D₁₂** – Lizards shading skin
- D₁₃** – Toads going to the bush from ponds
- D₁₄** – Toads croaking incessantly

STARS AND WEATHER

- D₁₅** – Appearance of the constellation of six stars in the west
- D₁₆** – Change in the normal trajectory of the sun
- D₁₇** – Wind blowing from the East
- D₁₈** – Temperatures are warming up
- D_x** – First clouds appearing
- D_y** – Continuous thundering

RITUALS

- D₁₉** – Predictions of rainmakers
- D₂₀** – Traditional lunar calendar

HOW MANY SIGNS/SOURCES ARE THEY USING?

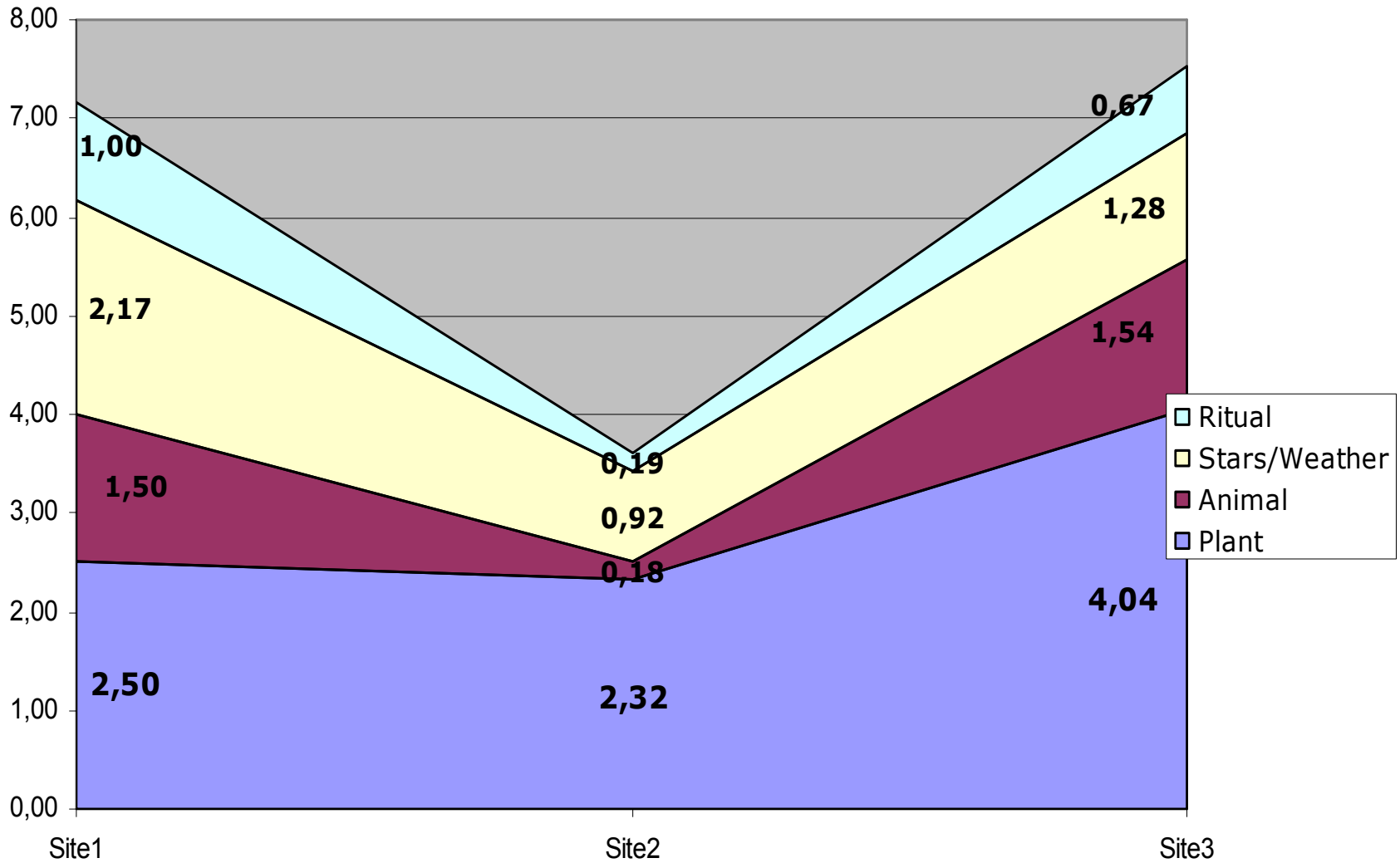


Figure : Average of signs used to predict the beginning of a season

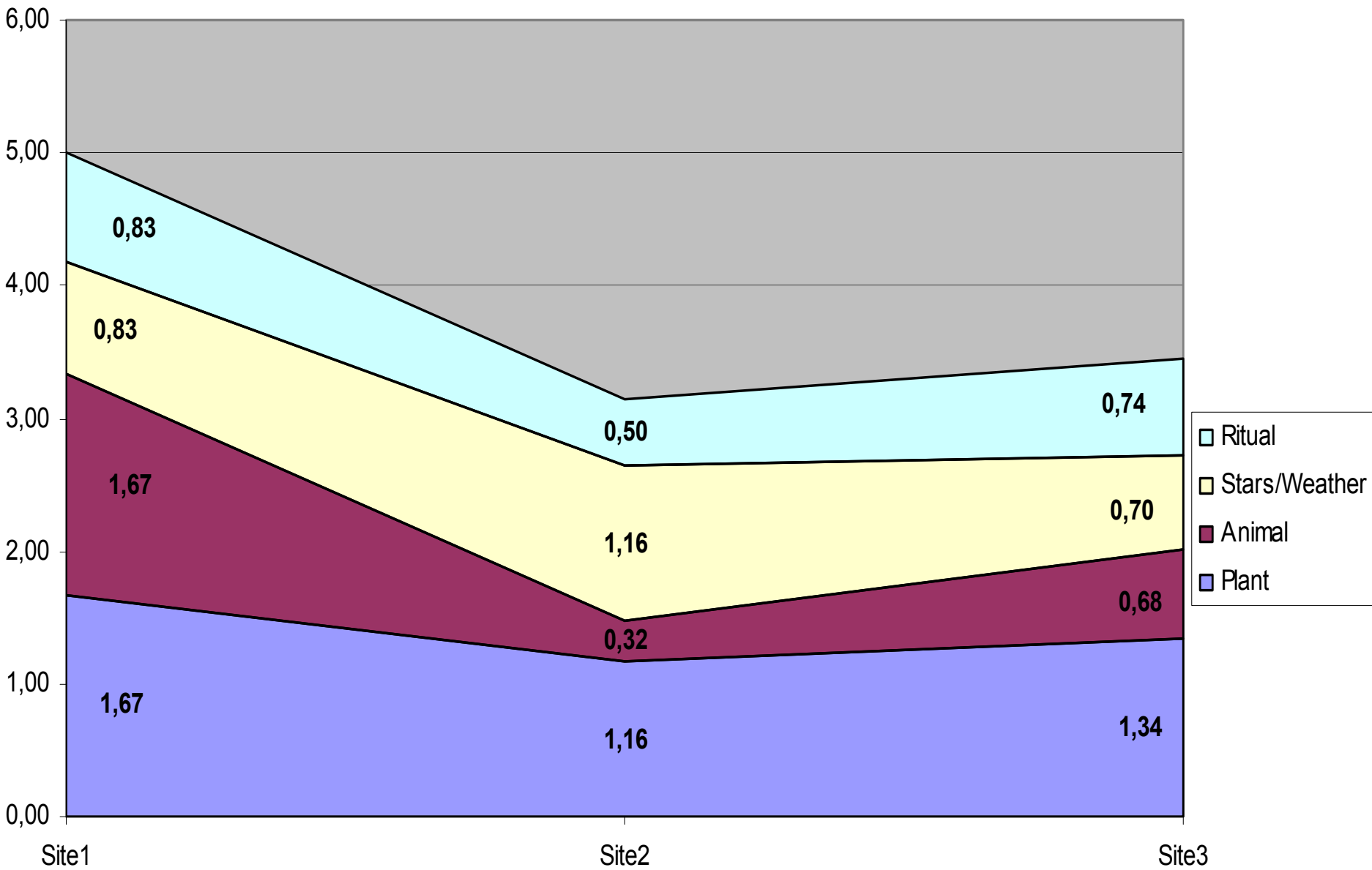


Figure : Average of signs used to predict a good season across sites

CONCLUSION 3

- **Farmers in all sites have reasonably good knowledge about the beginning of seasons, and the good seasons.**
- **This is indicated by their ability to use a combination of all signs at comparatively good levels.**
- **These signs gives farmers more sources of knowledge & different options for accurate decision-making on cropping seasons.**
- **This in turn has a very vital effect on the maintenance of the crop germplasm diversity by the farmers.**

WHICH « PLANT-BASED » SIGNS OR INDICATORS ARE MORE USED BY FARMERS TO PREDICT A SEASON ?

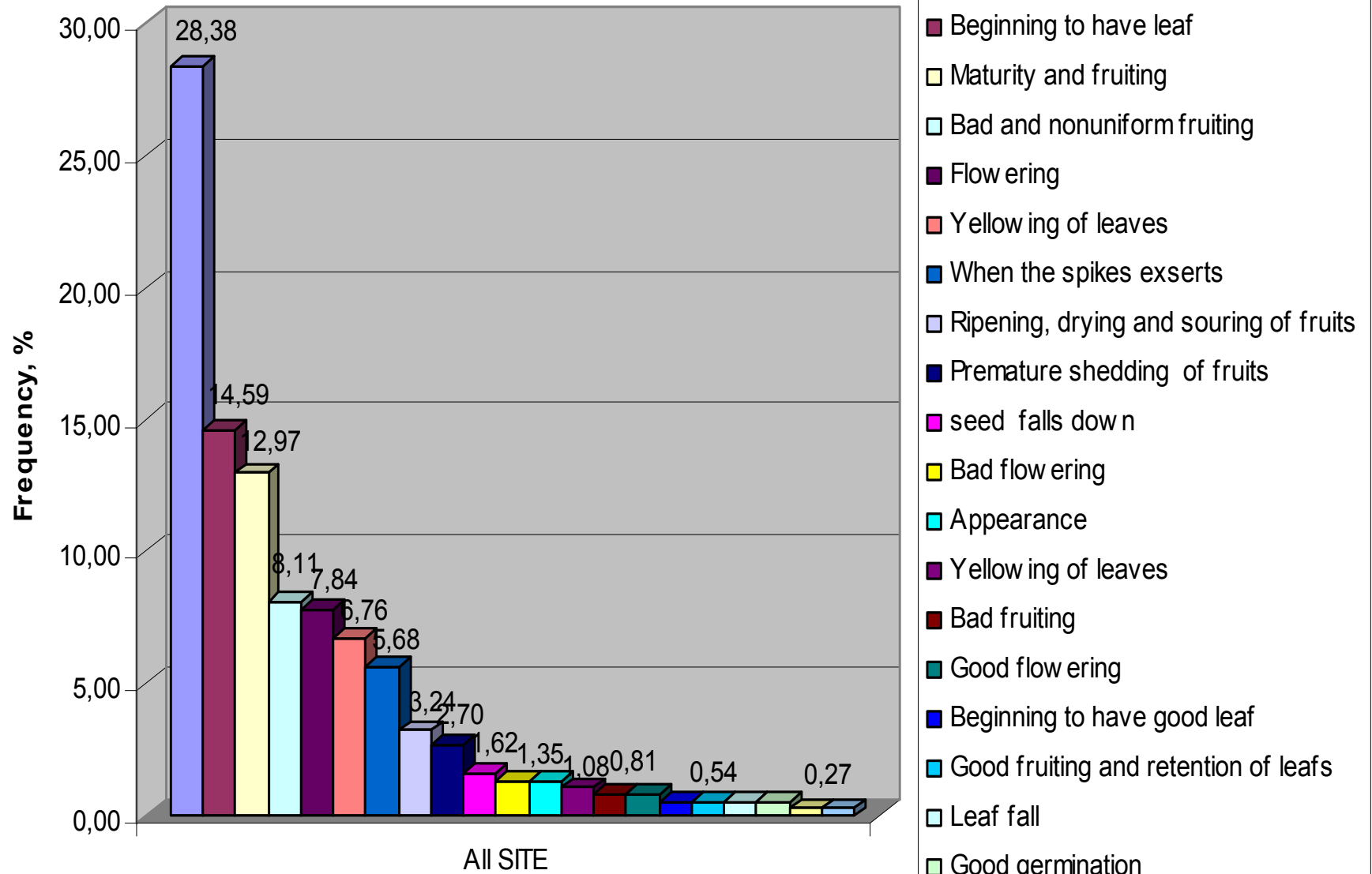


Figure : Frequency of using plant signs to predict a season

CONCLUSION 4

Uniform fruiting, leaf initiation, and maturity of certain trees are the most plant-based indicators for predicting a season.

WHICH PLANT SPECIES ARE MOST USED BY FARMERS TO PREDICT A SEASON?

Frequency of plants used to predict a season					
Plant	SITE 1	SITE 2	SITE 3	TOTAL	
1 <i>Lannea microcarpa</i> (Raisinier, *sabga)	19,18	19,05	21,85	20,00	
2 <i>Sclerocarya birrea</i> (*Nobga)	16,44	19,05	20,17	18,38	
3 <i>Vitellaria paradoxa</i> (Karite, *Taaga)	13,70	14,29	11,76	13,24	
4 <i>Ficus platyphylla</i> (*Kamsango)	6,16	4,76	5,04	5,41	
5 <i>Heeria insignis</i> (*Lebnore)	5,48	4,76	3,36	4,59	
6 <i>Acacia albida</i> (*Zaaga)	5,48	3,81	6,72	5,41	
7 <i>Ximenia americana</i> (*Lenga)	4,79	4,76	3,36	4,32	
8 <i>Diospiros mespiliformis</i> (*Ganka)	4,11	4,76	3,36	4,05	
9 <i>Boscia Senegalensis</i> (*Nabdga)	4,11	3,81	4,20	4,05	
10 <i>Loudetia togoensis</i> (*Soutou)	3,42	4,76	2,52	3,51	
11 <i>Ceiba pentandra</i> (Fromager)	2,74	0,00	3,36	2,16	
12 <i>Borassus aethiopa</i> mart. (Rhonnier, *Koaga)	2,05	0,00	0,00	0,81	
13 <i>Pennisetum americanum</i> (millet)	1,37	4,76	0,00	1,89	
14 <i>Pennisetum pedicellatum</i>	1,37	4,76	0,00	1,89	
15 <i>Adansonia digitata</i> (Baobab, *Toega)	1,37	0,95	1,68	1,35	
16 <i>Sterculia setigera</i> or <i>Setigera</i> del. (*Punpuga)	1,37	0,95	1,68	1,35	
17 <i>Tamarindus indica</i>	1,37	0,00	0,00	0,54	
18 <i>Acacia nilotica</i> (*Perperga)	0,68	1,90	2,52	1,62	
19 <i>Pterocarpus lucens</i> (*Kumbrsaka)	0,68	1,90	2,52	1,62	
20 <i>Stylochiton hypogaens</i> (*Wule)	0,68	0,95	2,52	1,35	
21 <i>Lannea acida</i> (*Samb-nutuga)	0,68	0,00	2,52	1,08	
22 Agricultural crops	0,68	0,00	0,84	0,54	
23 <i>Ficus gnaphalocarpa</i> (Figuier)	0,68	0,00	0,00	0,27	
24 Plant seedling	0,68	0,00	0,00	0,27	
Moyenne	4,14	4,17	4,17	4,16	
Ecart type	5,13	5,56	5,81	5,39	
Inter. Confi.	2,0530	2,2240	2,3260	2,1550	
*- Dénomination locale					

Conclusion 5

At present, farmers in all sites have rich alternative sources of plant-based knowledge to predict seasons. This is reflected in the large number of plant species that are used in these sites for such purpose.

However, many of these important tree species are becoming endangered in the Northern & Central region in Burkina Faso.

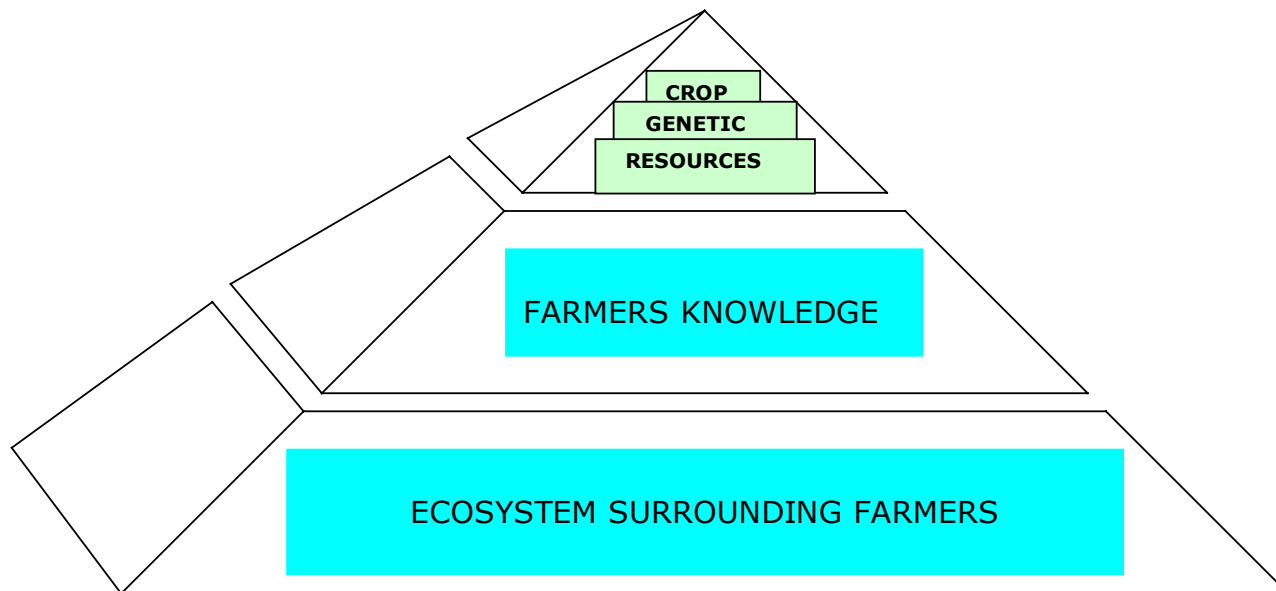
Thus, it is necessary to adopt an integrated conservation approach, where different disciplines work together towards conserving the components of the surrounding ecosystem together with crop diversity.

Lessons Learned

- In arid regions of unpredictable rainfall of Burkina Faso, diversity is a way of life.
- Managing crop diversity is only strategy available to resource poor farmers to guarantee food from one year to the next.
- Farmers rely on indicators from the surrounding ecosystem to manage their crops.
- Therefore, it is not possible to talk about conservation of crop diversity on-farm without considering the conservation and valorization of the components of the surrounding ecosystem.

Ecosystem components form the base of a pyramid at the top of which are crop genetic resources, and both are linked by the knowledge obtained from the ecosystem and applied on the crop genetic resources.

A RELATIONSHIPS PYRAMID BETWEEN CROP GENETIC RESOURCES, FARMERS KNOWLEDGE AND ECOSYSTEM



THANK YOU FOR

YOUR ATTENTION