

DESIGN & CONSTRUCTION

of the
PILOT PLANTATION <TSO- MIA -WO DEKA>¹
FOR THE CULTIVATION OF JATROPHA CURCAS & FOOD CROPS
by
GuKam S.I.
in Cooperation with 'TOMOKA en formation' & the Community of the Canton of Dawlotu Tutu

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¹ TSO-MIA-WO- DEKA means in Ewé: < let's join hands - cooperation> . This name underlines the cooperation between the Rural Target Area of Dawlotu Tutu and our company GuKam S.I.

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INTRODUCTION

The Pilot Plantation (PP) will be located on a plot of 50 hectares in Avégamé, close to the village of Kpékpéta in the Canton of Dawlotu-Tutu; see Attachment 1. The Surveyor has designated the land concerned in January 2010. This Plot of land is privately owned by one of GuKam's Directors, mr Amegadze. GuKam has obtained the **Exploitation Rights of the total property of 50 hectares** by a simple written statement which specifies that the duration, compensation to be paid to the owner and other arrangements will be similar to those which will be part of the Agreement between GuKam and the Chieftaincy of Dawlotu-Tutu with regards to the one thousand hectares which have been attributed to the Food&Jatropha Project and GuKam's plans to start up a non-profit organisation for sustainable rural development -- probably under the name Tomoka.

This document **integrates ALL previous plans and preparations** for the *construction* of the Pilot Plantation (PP). As such it is "only" one part of the of GuKam's total Food&Jatropha Project. Sometimes we refer to documents which describe other elements of this Project in order to understand better why the PP is going to be built in the way which is explained in this document. But it is stressed again here: many <old details> have changed² while we have been working out the Project as a whole. An important change is the fact that we have decided to **start with Scenario 4** for the Introduction of the Jatropha System in the Target Area of Dawlotu-Tutu. This Scenario is based on the directive that 60% of the new uncultivated land is going to be used for Jatropha cultivation and 40% for staple food production. This allocation of land is more appropriate for our poor Target Population in Dawlotu-Tutu. They simply cannot afford to wait a long time for income from Jatropha. A stable income from Jatropha is only possible after year 5: when this perennial plant has reached maturity. The relatively little work and cost of raising Jatropha to its point of maturity enables local farmers and GuKam to earn attractive incomes with cash crops -- like maize and beans -- which are more labour intensive.

It is important to keep in mind that this document **focuses on the construction of the starting-up elements** of the Pilot Plantation (PP). In other words: this document does *not* provide details of the Future Field Office, Jatropha Store, and Maize & Beans Silos. It does not deal with instructions and details for the daily plantation routines either. That is why there are no attachments which explain our Agric Work Calendar, Monitoring System, Demonstrations, etcetera. Having said this, it will be clear that the Pilot Plantation (PP) will be characterized as a Sub-Division which will continue to be <in progress>.

The MAPS in Attachment 4 are essential for a good start of the Pilot Plantation (PP). They specify the dimensions, position and layout of the Experimental Fields and the Service Area of the PP. They also provide all details of the planting process.

² EXAMPLE OF CHANGED DETAILS: GuKam's <Manuel 2: Plantation Pilote – Phase 1> from 27 October 2009 explains how the 5 Trial Fields should be laid out. These plans are not valid anymore, because we have concluded meanwhile that more spacing methods should be tested out than the one dr Henning is promoting (a scheme of 2,5m x 3m). We arrived at that conclusion when we got to know that Senegalese Jatropha Farmers use a much more dense planting method – and get much more fruits and seeds that way. But we do not know whether the Senegalese climate, soil quality, altitude and other factors (like labour intensity and transport facilities) are comparable with ours in Dawlotu-Tutu where we hope to obtain two Jatropha harvests per year. So, we have to try out different spacing methods on our Pilot Plantation in order to identify the most *appropriate* one!

1 PLANNING -- WORK CALENDAR

1.1 Details of the Work Calendar

The Table on next page summarizes what has to be done.

The Pilot Plantation (PP) gets literally shape during the first three months of 2010: the <hardware> is being built then. A critical reader will observe that the Work Calendar does not pay much attention to the building of the <software> : the organisation and its implied administrative tools. The reason for this pseudo omission is the fact that **all organisation elements *depend* on the choices which are made for the Experimental Fields, Service Area and other hardware elements of the PP.** The following two examples of software development will clarify this:

1)- The Tasks of the PP-Manager (Fr: Maitre de Champ / MC) depend on the kind of Tests and Trials which have to be carried out on the Fields. Consequently, we can only draw up a Required Competency Profile when we know those tests. And only then the recruitment of a competent person can start. In other words: the organisation building (software development) comes more or less *after* the hardware construction.

2)- The Test & Trials (Experiments) on the Experimental Fields determine the specifics of the Monitoring Tasks which the PP-Manager has to carry out regularly. Simple forms have to be developed for the registration of observable facts on the Fields. In particular, GuKam wants to investigate and test the effects of certain propagation materials and certain agronomic practices ³ on Jatropha's growth & yield, and on the quantity of inputs (labour, fertilizer, etc) and their cost. The same is true for the intercrops (maize, millet, groundnuts, beans).

We are only able to design registration forms and observation methods when we know the concrete test tasks, planting system on the fields, and other concrete aspects of the Pilot Plantation. In other words: the Administrative tools (software developments) come more or less *after* the hardware.

The WORK CALENDAR on next the page speaks for itself.

We only point out that the construction phase of our Pilot Plantation is spreading over the year. However, the bulk of the construction work takes place during the first three months of 2010.

1.2 Constraints to overcome

The success of the construction phase depends largely on the ways by which GuKam is able to deal with 3 Major Constraints. They are:

1 LONG DISTANCE

The Project Site in Avégamé (in the Canton of Dawlotu-Tutu) is located far away from GuKam's Office in Lomé: more than 180 km separates them. The Project Description explains that there are valid reasons for this awkward and cost raising situation. Nevertheless, the fact stays that GuKam Directors will have to invest much time and money in travelling up and down to the Project Site, and in other ways of communicating with the Project Staff in Avégamé

This situation requires at least a competent staff on site, efficient administrative tools which help GuKam to direct and evaluate the work being carried out far away, and a smooth way of delegating tasks to others.

2 BAD ACCESSIBILITY OF THE PROJECT SITE

The Project Site in Avégamé belongs to the <extremely poor> areas of our country. A large stretch of the journey to the Project Site has to go over dirt roads (Fr pistes) which are not, or almost not, 'navigable' during the rainy season. The only vehicles which are able to get there then are 4-wheel drives, trucks and mototaxis.

In the absence of sufficient financial means to buy a 4-wheel drive or truck at this stage, GuKam is aware of the fact that the solutions which are mentioned under point 1, are even more important than ever!

3 AVAILABILITY OF CAPITAL

GuKam is the first company which introduces the Jatropha System in Togo. Nobody ever heard about it. In other words: a lot of promotion work has to be undertaken before enough Capital and Cooperation will be acquired. Meanwhile – already from February 2009 onwards -- GuKam has to finance all preparations from its own scarce means. Consequently, Gukam will devote much time and effort to Income generation, Promotion, and Fund Raising during the starting up phase of the Jatropha Project.

Paragraph 2.3 explains that we intend to get some income with the help of <Temporary Production of Cash Crops (TPC)> on 10 adjacent hectares. But this won't be enough. GuKam is also working out other possibilities.

³TEST & TRIAL VARIABLES are mentioned in paragraph 3.4.1

CONSTRUCTION & MANAGEMENT OF THE PILOT PLANTATION – WORK CALENDAR 2010

Update 9 February 2010 -- draft version with many problems to solve and details to work out

ACTIVITY	2009	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
nr	Description & details			Rain?							Rain			
A	PLANNING & PREPARATIONS													
1	RECRUIT LABOURERS & CONTRACTORS													Incl surveyor, agric offic
2	MAKE <i>DRAFT LAYOUT</i> of the Pilot Plantation													Map
3	MAKE <i>FINAL VERSION LAYOUT</i> of Pilot Plantation													Based on available Seed ...
4	DEMARCATÉ DETAILS ON SERVICE AREA													See above Map
5	DEMARCATÉ 5 TRIAL FIELDS													See Layout Model Nr...?
6	CLEARING OF 5 TRIAL FIELDS													Boundaries
7	SPACING ON 5 TRIAL FIELDS: locate the pits & paths													See Field Overviews 1-5
B	CONSTRUCTION													
1	CONTRACT BUILDERS (water well, storage, office													
2	CONSTRUCTION SERVICE AREA – well, lane, etc													
3	PLANTING DEMARCATIONS Service Area- Type A													Dense hedges = Type A
4	PLANTING BOUNDARIES: hedges of type B													Around total Area
C	JATROPHA CULTIVATION													
1	COLLECT & TEST SEEDS & CUTTINGS (semence) – This crucial factor determines all Trials													Manuel 1 + Germination Test results
2	COLLECT CUTTINGS & SEED FOR BOUNDARIES													
3	BUILD NURSERY – at least 6 Beds. Pits: 45cm deep with compost? Manure? Fertilizer?													See Doc.....
4	TENDING THE GROWTH OF SEEDLINGS- 2' rounds													PROBLEM 1
5	PLANTING OF SEEDLINGS ON RESERVED FIELDS Seedlings are ± 2-3 months old will be planted on the fields (during the rainy season only?)													PROBLEMS 1 + 2
6	REPLACING dead plants with seedlings & taking care of them													During growth season?
7	PITS: digging – 45cX45cmX45cm													
8	PITS: preparing = filling (Compost? Fertilizer? Manure?)													Before rain starts
9	DIRECT SOWING ON TRIAL FIELDS													Immediately after first good rainfall
10	SINGLING (leaving one good plant in its pit)													
11	PRUNING – first round (cut back to 30-45 cm)													See Manuel 514 - THD
12	PRUNING – second round (at end of dry season)													
13	PRUNING -- for fast growers only													Plantes en forte croissance
14	MAINTENANCE (a.o.'weeding')													Weeding etc
D	INTERCROP (MAIZE) CULTIVATION													
1	Planting													Intercrop & outside Pilot
2	Maintenance													Idem
3	Harvesting (and storage)													Idem

nr	ACTIVITY -- details	2009	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
E	ESSENTIAL CULTIVATION PHENOMENA OF JATROPHA														
1	Flowering (minimal during first year)														Continuously??
2	Fruiting (minimal or nothing during first year)														Starts 90 days after flower
3	Harvesting (minimal or nothing during first year)									??	???				
4	Storage of harvested seeds (max 15 months)														
nr	ACTIVITY -- details	2009	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
F	MONITORING – growth – yield – labour – cost & other inputs														Standard forms & standard procedures
1	Forms & Instructions: design & try outs														
2	Routine Monitoring														
3	Analysis & Adjustments of Activities – each month				x	x	x	x	x	x	x	x	x	x	
4	Comparative Monitoring on Mini Pilot in Danyi			x	x	x	x	x	x	x	x	x	x	x	
G	PROMOTION & DEMONSTRATIONS														
1	Local Target Groups of Dawlotu-Tutu														
2	Potential Investors, Banks,														
3	Development Agencies & Millennium Goals														Incl Ministries
4	Jatropha Experts & Networks Abroad														Incl networking
H	TEMPORARY PRODUCTION OF CASH CROPS (TPC) on 10 adjacent hectares														
1	Maize														Duration to be verified
2	Beans														Duration to be verified

AD B3: HEDGE TYPE A:

The hedges *on and around* the Service Area should be planted densely, for example 25cm x 25cm. or 40cm x 40cm. Exclusive use of cuttings (Fr: boutures) give the fastest results . This way our Service Area will get shape fast.

AD B4: HEDGE TYPE B:

The hedges facing the street (=Piste leading to Notse) should be planted with a double row of Jatropha Plants (seeds from Kpéképéta or other origins) with a small spacing of 1,5m x 1,5m. This also creates the impression of a living Closed Fence (Fr: cloture) around the Property of 50 hectares.

2 POSITION & CHARACTER OF THE PILOT PLANTATION WITHIN THE JATROPHA SYSTEM

2.1 Position: the Pilot Plantation prepares the Implementation of the Jatropha System in Dawlotu-Tutu

This document assumes that the reader has understood Chapter 5 of the *Project Description*⁴. The whole Jatropha System depends on the performance of the Agriculture Department of which the Pilot Plantation is the start. Agro-Industry and Involvement of the local Community – the other two major departments of the Jatropha System -- are determined by the output (crops) of the Agric Department.

2.2 Character: the Pilot Plantation is a Testing & Learning Place with a Promotion Function

The Pilot Plantation's overall form – its layout -- has been determined by the major activities which will enable the introduction and implementation of the <Jatropha System> in the Canton of Dawlotu-Tutu. Such an introduction is only possible when we have accumulated sufficient knowledge, experience and finance. In other words: we prepare ourselves and we meanwhile *show* our concrete results and prognoses to future Partners, Bankers, Donors and others whom we want to get involved.

We urge the adoption of our Project in the best possible way when we have a *concrete, professional looking Pilot Plantation* (and pilot agro-industry) at hand!! In other words: if we want to promote our achievements and insights, then this can only be done with professionally looking materials!

Another Jatropha Production Program will be started up without having been tested on the Pilot Plantation. Existing farmers will be encouraged to plant HEDGES around their property with the propagation material which is available in the wild. The future crop results will be compared with those of the Pilot Plantation.

2.3 The Layout of Experimental Fields enables and reflects the Testing & Learning functions of the Pilot Plantation

In general, it is true what an old proverb says: <The shape of things gives us a clue of their function>. This is certainly true for the layout (=shape) of our five Experimental Fields. They got their size (1 hectare each), and shape (100m x 100m) with their functions in mind. Those **major functions** of the Pilot Plantation (PP) are:

1 Testing the validity of the Assumptions underlying:

- 1.1 the Selection of Jatropha Propagation material (Seeds & Cuttings) in order to get the best yields (crops)
- 1.2 the Application of so called Best Practices: Agric Techniques which are supposed to deliver the best growth, health and yields of the Jatropha plants – we will concentrate on spacing, use of fertilizer, and intercropping
- 1.3 positive Intercrop effects on the growth and yield of both Jatropha and staple foods like maize and beans

2 Production of sufficient quantities of High Yielding Jatropha Seeding Material (propagation material) – large enough to provide seeds for Gukam's Land Extension Program and its two related cultivation Programs:

- 2.1 <Insertion des Petits Cultivateurs> -- ultimately 100 new Jatropha growers will join the Jatropha System on plots of 5 hectares for the "culture de Jatropha & vivriers">
- 2.2 <Culture de Jatropha & vivriers par GuKam> -- ultimately 550 hectares of land will be cultivated by GuKam

3 Production of sufficient quantities of Jatropha Seeds (raw material / produce) – large enough to provide inputs (seeds) for the *starting up* of the agro-industrial department of the Jatropha System. In particular for:

- 3.1 small scale oil pressing – start of the Jatropha Oil Mill
- 3.2 demonstrations and promotion activities -- with a view to inserting local farmers into the Jatropha System & obtaining External Financing by commercial banks (loans), investors, and donors

4 Enabling the production of convincing Promotion Material: images (photos) and data

FURTHERMORE, there will be a Parallel Scheme <Temporary Production of Cash Crops (TPC)> on 10 adjacent hectares. They will be managed by the Staff of the Pilot Project. Monitoring growth and crops on this plot will deliver relevant comparative information. But its major function and objective is:

5 Income generation via food production (maize and beans) as cocrops -- *not* as intercrops, large enough to cover a part of the starting up cost of the Pilot Plantation – This is needed until enough external financial means have been acquired to go ahead 'full speed' – probably in 2012

⁴ PROJECT DESCRIPTION: See GuKam's internal document <Pilot Project Tso-Mia-Wo-Deka: integrated rural development by Cultivating & Agro-Industrial Processing of Jatropha Curcas & Staple Crops>, Chapter 5: Objectives & Major Activities per key Function / Department. > -- document 30.20.200, updated version of 30 January 2010).

3 BUILDING THE HARDWARE: SURFACE – SECTIONS – FIELDS – LAYOUT

3.1 Arrange Surface & Juridical Rights

3.1.1 Mark the boundaries around and within the Private Plot of land in Avégamé

PRIVATE PLOT

A surveyor has established the boundaries of the Private Plot of 50 hectares of land in Avégamé on which the Pilot Plantation will be established.

PILOT PLANTATION (PP)

The boundaries of the Pilot Plantation -- 6 hectares in the lower Left Corner of the above Property – have been established and marked with markers in January 2010.

SERVICE AREA & EXPERIMENTAL FIELDS

The division of the surface for the Pilot Plantation has taken place in January 2010.

There are 6 plots of 1 hectare, each of them measuring one hectare.

High Markers (Fr: piquets) indicate the boundaries of each plot, and indicate their Field Number.

ADJACENT PLOT FOR THE TEMPORARY FOOD PRODUCTION SCHEME

With a view to generating immediate income, GuKam will produce staple food crops on land adjacent to the Pilot Plantation (PP). This <Temporary Food Production Scheme (FPS)> occupies 10 hectares.

If we restrict ourselves to rotating maize and beans in 2010 (and no use of fertilizers), then GuKam may expect a gross income⁵ of 11.000 kilos of maize and 24.000 kilos of beans. The expected gross income from these two staple crops is F CFA 1.980.000 + F CFA 8.640.000 = F CFA 10.620.000

The Map in Attachment 1 shows the location of all divisions on the 50 hectares Private Property in Avégamé.

3.1.2 Assure Property & Usage Rights

Investors --- and GuKam -- are keen on securing their investments.

Future Investors, Banks and Donors will certainly demand <proof of property & usage rights> of the 50 hectare Plot which will contain the Pilot Plantation. That is why certified copies of essential documents are on file in GuKam's Office:

- 1 The Deed and Surveyor Map which proves that GuKam's director, Mr Amegadze, is the owner of the said Property
- 2 A simple (unilateral) Declaration of the Owner, dated 27-10-2009 declaring that he:
 - 2.1 gives the <usufruit> of the said Property at Avégamé to <GuKam s.i. en formation>
 - 2.2 will be satisfied with a rental fee or other compensation -- to be paid by GuKam for the use of the land – which will be similar to the local arrangements which GuKam is going to obtain from the local Authorities concerning the 1000 hectares which have been allocated to this Food&Jatropha Project by Acte D'Engagement, signed on 25 October 2009

3.2 Design and Mark the Sections & Layout of the Pilot Plantation (PP)

From the rural dirt road (piste) next to the Plantation Site, people should see immediately that the Pilot Plantation and parts of the Large Plantation are located where they are. That is why the boundaries are planted with different kinds of Jatropha Hedges.

HEDGE TYPE A are the hedges *on and around* the Service Area. They will be planted densely, for example 40cm x 40cm. Only cuttings (Fr: boutures) will be used. This way our Service Area will get shape fast.

HEDGE TYPE B are the hedges facing the street (=Piste leading to Notse) and around the total property of 50 hectares. These will be planted with a zigzag double row of Jatropha Plants. The propagation material will be seeds from Kpékpéta or other origins. If available, cuttings will be used. The spacing will be zig-zag with 1.5m x 1.5m. This will create the impression of a living Closed Fence (Fr: cloture) around the Property of 50 hectares.

THERE ARE TWO SECTIONS *WITHIN* THE PILOT PLANTATION

- A Service Area – 1 hectare
This section will contain buildings, nursery and other provisions needed for the agricultural activities
- B Experimental Fields: 5 x one hectare (including narrow paths)
This section allows the experimental planting scheme to test our assumptions about Propagation Material and Best Agronomic Practices. The results will eventually lead to our fixed ways of soil management and crop raising.

⁵ CROPS AND REVENUE PER HECTARE : See Tableaux 7-A & 8-A of Scénario 4.

Figure 1: Model of the Pilot Plantation (PP)– overall layout

FIELD 1 ORIGINE	FIELD 2 INTERCROP	FIELD 3 TRAITEMENT
x	x	x
SERVICE AREA	FIELD 4 GROSSEUR	FIELD 5 ESPACEMENT
	x	x

The rural dirt road leading to Notse is located on this side -- The adjacent TPC PLOT is located on the right of the PP
X = the left side of a field

AD SECTION A: SERVICE AREA : 1 hectare – see Attachment 3 for details

This Area provides the facilities for the Agricultural Department of the Project.
Several (but not all) buildings for the Agro-Industrial Department will be built here in future.

GuKam will first concentrate on the essentials for the Agriculture Department.

The internal boundaries are planted with *dense jatropha hedges* (small interspaces, Type A) in order to establish the feeling that there are different subdivisions. The place looks more orderly this way, and will create a more **professional image** – an image GuKam needs desperately when we want to convince banks, investors and others to join the Jatropha System in far-away Dawlotu-tutu. Attachment 2 provides a short narrative which explains how the Layout could and should project this desired image.

AD SECTION B: EXPERIMENTAL FIELDS: 5 x 1 hectare – see the figure above

The Major Testing Functions have been divided over 5 Experimental Fields.

GuKam is going to test five major variables: ONE variable per field.

The Basic Testing Question is simple:

<What are the effects of this variable on growth, yield (crop), labour and cost?>

A Monitoring Manual is in the making to facilitate systematic observations at regular intervals. The data will be collected by the Maitre de Champ (MC) who is in charge of Daily Routines. He reports –with his monitoring sheets – to the Directors of GuKam who will take care of regular analysis and instructions.

There are five testing fields with (French) names which express their major test variable:

- 1 Field 1: ORIGINE : planted with propagation material from 4 different locations (origins):
The propagation Material (seeds and cuttings) has been collected and tested and stems from High Yielding Mother Plants growing in 4 different locations
- 2 Field 2: INTERCROP: Jatropha interspersed with maize (first season) and beans (second season)
The propagation material used here has been collected at random: in the Kpékpéta Zone. Their germination vigour has not been tested.
- 3 Field 3: TRAITEMENT: use of fertilizer and pesticides
The propagation material (seeds and seedlings) has the same origin as on Field 2.
- 4 Field 4: GROSSEUR: The propagation material (small and big seeds) has the same origin as on Field 1
- 5 Field 5: ESPACEMENT: effects of different spacing methods

The Field Maps in Attachment 4 present the lay-out and the PLANTING DETAILS of each Experimental Field.

Paragraph 3..4.2 presents a summary of all these characteristics.

AD ADJACENT PLOT <TEMPORARY PRODUCTION OF CASH CROPS (TPC)>

The Map in Attachment 1 shows the location of the 10 adjacent hectares which have been reserved for income generation. This <Temporary Production of Cash Crops (TPC)> scheme delivers some of the capital which GuKam needs during the years that external funding has not yet been acquired.

There will be no <modern agronomic practices> here, because GuKam needs all of its time for the Implementation of the foreseen hybrid form of the Jatropha System and the involvement of the local population. That is why <Traditional Planting Methods> will be maintained. This includes the rather generous spacing of the cash crops. Local farmers appear to use for maize: 100cm x 10cm , or 50cm x 80cm, or 60 x 80 cm. And for beans: 40cm x 50cm 9for ‘haricot érigé) or 60cm x 100cm (haricot rampante). GuKam does not know yet whether our prudent crop estimates in Scenario 4 will be similar, lower, or higher than the ones obtained from traditional farming practices.

3.3 Prepare Plant Identity registration with the help of <Colour & Letter Coding> + <Position Numbering>

The identity and location of each plant on the Fields and in the Nursery can be established with a simple coding system which indicates a plant's origin and its place in a row.

3.3.1 Indicate Identity/Origin of propagation material with Colours & Letters

Six different colours are used to refer to the origin of the propagation material (seeds & cuttings) of each plant (Fr: provenance):

- | | | | | |
|---|---------------|----------|-------|---|
| 1 | AGOU | : Red | & A | (from High Yielding mother plants & Tested for Germination Vigour) |
| 2 | AKATA | : Green | & B | (from High Yielding mother plants & Tested for Germination Vigour) |
| 3 | KPELE GOVIE | : Blue | & C | (from High Yielding mother plants & Tested for Germination Vigour) |
| 4 | TOVE AGBESIA | : Yellow | & D | (from High Yielding mother plants & Tested for Germination Vigour) |
| 5 | ASSORTIE ABCD | : White | & M | (small size seeds from locations A,B,C,D – all origins mixed together) |
| | | White | & XXL | (large size seeds from locations A,B,C,D) – all origins mixed together) |
| 6 | KPÉKPÉTA | : Brown | & E | (randomly collected and <i>not</i> tested for Germination Vigour) |

All signboards, name plates, documents, tables and other materials dealing with the above locations (origins) carry these colours and letters. Moreover they are almost always presented in the above order!!!!

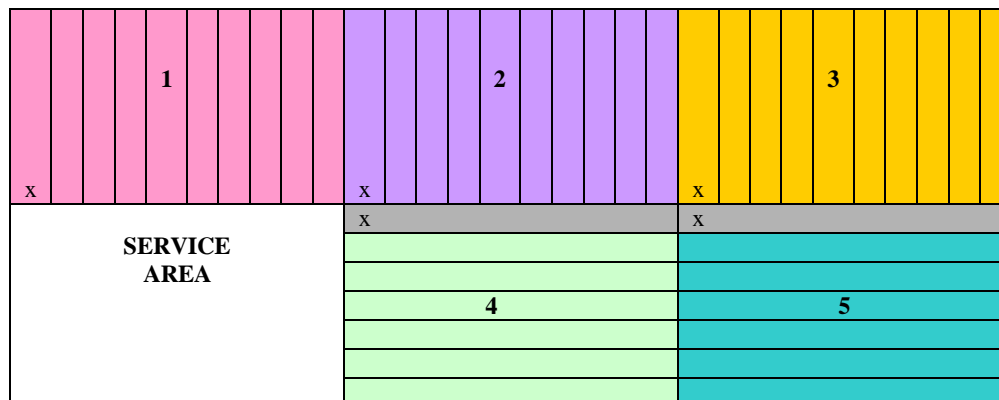
3.3.2 Number the position of each Row and Plant

Numbering is from the Left to the right.

The LEFT side of each field is indicated with a small x – see below in Figure 2

The point of reference is always: the Service Area. When one stands on this Service Area and one turns his face to a Field, then one locates the Left side where the small letter < x > is showing.

Figure 2: Position of Rows on the Experimental Fields of the Pilot Plantation



The rural dirt road leading to Notse is located on this side -- The adjacent TPC PLOT is located on the right of the PP

The colours in Figure 2 have no specific meaning

BLACK = Fields 4 and 5 have a five meters wide unplanted strip which separates them from Fields 2 and 3

This long strip will be used as an < access path > to Fields 2, 3, 4 and 5

Row numbers start with R1, R2, R3 etcetera.

Row 1 is located on the Left of a Field -- see the marking with <x> in the above Figure.

ROW MARKERS (on high piquets) will be placed at the beginning, middle and end of the following 8 rows:

R1, R5, R10, R15, R20, R25, R30, R35 -- See Attachment 5 and the instructions of the Planting Maps in Attachment 4

Quantity of Row Markers needed: 5 Fields X 8 Rows X 3 markers-per row = 120

Plant position numbers start with P1, Pr, P3 etcetera

Plant P1 is located on the boundary of each field: the boundary which is closest to the Service Area.

PLANT POSITION MARKERS (on low piquets) will be placed in the 8 marked Rows (R1, R5, R10, R15, R20, R25, R30, R35)

They are placed next to plants P1, P10, P20, P30 -- See Attachment 5 and the instructions of the Planting Maps in Attachment 4

Quantity of Plant Markers needed: 5 Fields X 8 Rows x 4 position markers = 160

3.3.3 Example of Plant Identity + Plant Position in a particular Field: A-R3-P10

The propagation Material of this plant comes from Agou (A), and we find this plant in Row 3 on Position 10

It will not be necessary to add a Field number, because all analyses and conclusions will specify them in the text.

3.4 Construction Details of the Experimental Fields and their Tests

Another name for <Experimental Field> is Trial Field. In such a case, the term <experiment> is replaced by <trial>. GuKam will use the word <experiment> because we are expressing ourselves in French most of the time. The first paragraph in this Chapter lists the experiments and investigations which have been planned. Paragraph 4.4.2 shows how those Experiments determine the layout of the fields.

3.4.1 Define the Major Tests Questions & turn them into observable phenomena for our Monitoring System

Phrasing test questions is rather simple: we turn our assumptions into a question!

An example:

We assume that we will be able to duplicate the genetic properties of High Yielding Mother Plants by using its seeds and cuttings.

The test question will be: Is the yield of <daughter plants> the same as was the case with the mother plant? Do we get the same high quantity of Jatropha fruits? Are they as healthy as their mothers?

Our major Test & Investigation Questions are as follows:

A) Related to Jatropha's propagation material

- 1 Can we duplicate the high yield & health properties of mother plants?
- 2 If yes: How? Which propagation material is best suiting our demands for large scale production: seeds or cuttings?
- 3 Are some High Yielding mother Plants better than others in terms of duplicating their genetic qualities (in particular the yields of their daughters)?
- 4 Do Big Seeds grow better and faster than small seeds?
- 5 Are crops from Big Seeds better than those from small seeds?

B) Related to agronomic practices⁶

- 1 How much time and cost can be saved when we plant seedlings on the fields in stead of seeds (direct sowing) or cuttings?
- 2 Is a germination test of seeds a good predictor of *growth* on the fields?
- 3 Is a germination test of seeds a good predictor of *future yields*?
- 4 Is a germination test of seeds which have been collected from High Yielding Mother Plants a better *predictor of growth* on the Field than the germination test which has been applied to seeds which have been collected at random from all kinds of mother plants?
- 5 Is a germination test of seeds which have been collected from High Yielding Mother Plants a better predictor of *future yields* than the germination test which has been applied to seeds which have been collected at random from all kinds of mother plants?
- 6 Does Jatropha save on cost for fertilizers and pesticides when we plant maize or beans in between the rows of Jatropha? (Do these two cash crops need less fertilizer than elsewhere?)
- 7 Does Jatropha improve the yield (crop quantity) of those two intercrops (maize and beans)? If so: how wide should the intercrop strips on the fields be?
- 8 Which spacing method is delivering the highest yield?
We will try out 2 of the three most frequently mentioned spacing methods on the Experimental Fields:
a) 2,5m x 3m
b) 2,5m x 2,5m
And we will test the third one on the hedges which we plant around the Property of 50 hectares:
c) 1,5m x 1,5 m – two rows in zig-zag pattern
- 9 How much difference (in growth and future yield) is there between Jatropha planted in pits with good soil (compost) and Jatropha planted in pits without such a good soil?

We will get the answer to the above test questions by first planting the propagation material and then observing the results. We will use the term <monitoring> for <collecting data in a systematic way> . A short **Monitoring Manual** contains the protocols to follow and the Forms which have to be filled in.

This precise, regular and systematic registration of relevant facts (monitoring) will be carried out by the local manager of the Pilot Plantation: the Maître de Champ (MC). Simple forms will direct his observations.

The Monitoring on the Experimental Fields and Nursery will concentrate on:

1. Growth : germination vigour/dates, height, number of side branches, flowering, and fruiting
2. Health : disease and mortality
3. Yield : kilos of fruits and seeds & their germination vigour
4. Inputs : propagation material, hours of labour, quantities of fertilizer, pesticides, transportation
5. Cost : the cost of all inputs

Several growth phenomena – like flowering en fruiting – cannot be observed during the first year. Many test questions can only be answered after 5 years when plant maturity and the point of crop stabilization have been reached.

⁶ AGRONOMY: we recall the standard definition of agronomy: the application of the various soil and plant sciences to soil management and the raising of crops (scientific agriculture)

3.4.2 Design and construction of the Experimental Fields

Attachment 4 contains the design (layout) of each Experimental Field, and the Planting Instructions.

The required quantities of seeds (Fr: semence) are available – See the Summary Sheets of the <Collecte de Semence>

The figure below summarizes all design and agronomic aspects of the Experimental Fields.

Figure 3: Design of Planting & Testing on each Experimental Field 2010

FIELD CONSTRUCTION ITEMS		FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5
1	Name of Experimental Field (in French)	ORIGINE	INTERCROP	TRAITEMENT	GROSSEUR	ESPACEMENT
2	Number of Rows with Jatro plants	34	24	40	38	38
3	Spacing of Jatropha Plants	2,5m x 3m	2,5m x 3m	2,5m x 2,5	2,5m x 2,5m	2,5m x 2,5 m
4	Number of Pits / Jatropha Plants	1.360	960	1.600	1.444	1.520
5	Number of Jatropha Plants via:					
5.1	Direct seeding	720	960	1.600	684Mini M 760Maxi XXL	720
5.2	Cuttings	80	0	0	0	80
5.3	Seedlings	560	0	0	0	720
6	Number of Pits / Intercrop	n.a.	10.000	n.a.	n.a.	n.a.
7	Number of <pieds> Intercrop	n.a.	10.000	n.a.	n.a.	n.a.
8	Percentage of surface for Jatropha	100	60	100	100	100
9	Percentage of surface for Intercrops	0	40	0	0	0
10	Origin of Propagation Material	Five best germinators from A, B, C, D	Untested seed from Kpékpéta	Untested seed from Kpékpéta	Untested seed from Kpékpéta	Five best germinators from A, B, C, D
11	Use of compost in Jatropha Pits	Yes	Yes	50% of Pits	Yes	Yes
12	Completely planted in March	No	Yes	Yes	Yes	No
13	Unplanted boundary strip:					
13.1	on the LEFT side	Yes – 100cm	Yes – 300cm	No	Yes – 500cm	Yes – 500cm
13.2	On the RIGHT side	No	Yes – 200cm	No	No	No
14	Intercrop specifics: type & variety	n.a.	Maize: Ikéna Beans: Vita	n.a.	n.a.	n.a.
15	Future use of fertilizer on Jatropha?	Yes	Yes	50% - 50%	Yes	No
16	Future use of fertilizer on intercrop?	n.a.	No	n.a.	n.a.	n.a.
17	Soil test (in Year Two)	pm	pm	pm	pm	pm
18	Layout Design (in Attachment 4)	Map 1-A Map 1-B	Map 2	Map 3	Map 4	Map 5
19	Direct seeding: number of seeds/pit	3	3	2	3	2

Untested = no germination test has been carried out

3.5 Construction details of the Nursery

It will not be possible to start **planting seedlings** during the First Planting Season in March 2010. The Nursery has to be taken into production first. That is why the total surface of the Pilot Plantation will not be planted right away in March 2010. A completely planted PP will be realized during the second planting season in 2010.

We repeat what has been mentioned before: there will be 6 beds in our nursery, separated by work lanes of 1,20m
Dimensions of each bed: Length 10m and Width 3m (10m x 3m)

Capacity: The above spacing will allow about (10 m X 5 pits/m) X (3m X 5rows)= 750 plants per bed
 Total Nursery Capacity will be (6 beds x 750 young plants) 4.500 seedlings

This capacity is large enough to cover :

- the Planting Needs during the Second Planting Season
- the Replacement Needs on the Experimental Fields where the literature predicts 20% mortality at least
- a part of the Extension Needs in Year 2011

Direct Sowing will be applied in rows without any further marking or distinction. No polybags or other containers.

Spacing probably 20cm X 20cm -- Final decision will be taken by our Nursery Advisor

The soil will be prepared (compost) before sowing will take place.

MARKERS (see Attachment 5) will indicate the identity / origin of the plants in each bed. We repeat:

Six different colours are used in the Nursery to refer to the origin of the propagation material (seeds & cuttings) of each plant (Fr: provenance):

- | | | | | |
|---|----------------|----------|-------|--|
| 1 | AGOU | : Red | & A | (from High Yielding mother plants & Tested for Germination Vigour) |
| 2 | AKATA | : Green | & B | (from High Yielding mother plants & Tested for Germination Vigour) |
| 3 | KPELE GOVIE | : Blue | & C | (from High Yielding mother plants & Tested for Germination Vigour) |
| 4 | TOVE AGBESIA | : Yellow | & D | (from High Yielding mother plants & Tested for Germination Vigour) |
| 5 | ASSORTIE ABCD: | White | & M | (small size seeds from locations A,B,C,D – all mixed together) |
| | | White | & XXL | (large size seeds from locations A,B,C,D) – all mixed together) |
| 6 | KPÉKPÉTA | : Brown | & E | (randomly collected and <i>not</i> tested for Germination Vigour) |

Removing and Planting of seedlings on fields will be carried out carefully in order to avoid damaging of the bare roots.

3.6 Construction details of the Service Area

Attachment 3 contains a schematic map with details about the location of each provision.

In February/March 2010 the following provisions will be constructed if funds will become available:

- 1 Entry (gate) with Signpost (pancarte) and Access Lane
- 2 Central <square> with parking lot
- 3 Jatropha Nursery with 6 beds (separated by work lanes of 1,20m)
- 4 Covered Work Place <Paillote> which contains also a brick (cement) room which will serve as a temporary Field Office, Tool shed & Store for Seeds and other inputs
- 5 Storage Area for Jatropha Cuttings (stockage des boutures)
- 6 Private quarters for On-Site-Personnel
- 7 Water wells : 2 x
- 8 Double Latrine: 1 x
- 9 Incinerator: a small space where garbage will be burnt safely
- 10 Jatropha Boundaries between sections of the Service Area: Hedges Type A

At a later point – when external funding has become available:

- 11 Field Office – containing also ‘sleep-over facilities’ for GuKam and a ‘Meeting Place’ (veranda)
- 12 Crop Storage – small silos or other structure for the temporary storage of Jatropha, Maize and Beans
- 13 Store -- for Tools, Propagation Material, Germination Tests, Piquets, Pesticides, Fertilizer, Bags, etc
- 14 Nursery II for the growth of Trees & Bushes in a GuKam Orchard which will deliver Supplementary Ingredients for Soap Making:
 - Natural Colours (mango, papaya, orange, lemon, hibiscus ...)
 - Natural Fragrances (jasmine, lemon grass, passi flora, herbs, lavender)
 - Supplementary vegetal oil providers (karite? papaya, avocado....)
- 15 Beehives for the pollination of Jatropha, Intercrops, and future Orchard

And in the future – in line with the Extension Program which is presented in the Scenarios which predict Food & Jatropha Crops :

- 16 power house with generator
- 17 constructions for the agro-industrial department
- 18 orchard with the seedlings from Nursery II

Please, note that a **compost area** will be located somewhere on the Fields *outside* the Pilot Plantation in order to avoid nuisance by flies, mosquitoes, and insects.

DIMENSIONS & MATERIAL SPECIFICATIONS of Paillote, Private Quarters, Wells, Latrine, Entry, Sign Post and the Storage for cuttings, are not mentioned here. They are being worked out on the terrain itself.

4 BUILDING THE SOFTWARE: ORGANISATION & TASKS

4.1 On-Site Organisation

A simple organisation format will be introduced in February 2010:

A small Team of 4 fully employed workers will carry out all tasks on the Nursery, the Experimental Fields, the Service Area and on the 10 hectares which are reserved for the Temporary Production of Cash Crops (TPC).

The Function Names will express the idea that the agricultural tasks are *different* from what the local farmers know and do on the small subsistence farms in the Project Area. This is one of the ways by which Gukam will foster a reputation of professionalism and prestige around the cultivation of *Jatropha* and Food Intercrops. Consequently, the salaries paid to the workers will be slightly higher than is customary practice in the Canton of Dawlotu-Tutu. Moreover, employees will receive GuKam-labelled overalls or a T-Shirt for the Monthly Staff Meeting and other official occasions. The Plantation's name will be shown wherever possible.

The major responsibilities / tasks per Function are as follows:

1)- MAITRE DE CHAMP (MC)

One fully employed employee is in charge. He will be addressed to as <Maitre> or <MC>.

His title intends to express that the organisation of the work on the Experimental Fields (Fr: champs) is his major occupancy. However, he is also in charge of the other sections, general security, and prevention of damage and theft.. That is why he is the only employee who has the keys of the Tool Shed (under the Paillote).⁷The MC is furthermore responsible for the monitoring on the Fields, the cleanliness and order on the Service Area, the production of the Nursery, the Agronomic duties on the adjacent TPC-field, and the growth and maintenance of the *Jatropha* hedges on and around the Property.

He divides, supervises and evaluates the work of his 3 assistants and reports his findings to the Directors of GuKam.

He recruits and discharges seasonal workers after he has gotten approval from GuKam's Directors to do so.

He receives eventual visitors, sees to it that they identify themselves and that they sign the Visitors Register, and guides them around. He reports their comments to the Directors.

He keeps a Plantation Logbook in which he records incidents, performance, and eventual absenteeism on a daily basis.

He reports calamities and losses of keys (of the tool shed) to his superior – immediately after noticing the facts.

He has a short, monthly Progress & Planning Meeting with his superior *after* the closure of the Monthly Staff meeting (which is presided by one of the Directors of GuKam).

His immediate superior is one of the Directors: Mr. Gu-Konu

2)- CHEF DE LA PEPINIÈRE (CP)

One fully employed worker is in charge of the Nursery. He will be addressed to as <Pépinieriste> or <CP>.

His title expresses that the maintenance of the Nursery is his major occupancy. However, he will be asked to assist on the Experimental Fields when this is necessary and when this is not endangering the work in the Nursery.

The Pépinieriste will be assisted regularly by one of the other Employees on a rotation basis. This way, the continuation of the Nursery Routines will be assured in case of the CP's absence.

The CP is the highest ranking Assistant on the Pilot Plantation and replaces the Maitre de Champ (MC) in the latter's absence.

He attends the monthly Staff Meeting under presidency of the Directors of GuKam.

His immediate superior is the Maitre de Champ (MC).

3)- ASSISTANT DE CHAMP (AdC)

Two 2 fully employed field hands will be address to as <Assistant de Champ> or <AdC>.

Their title expresses that they carry out the agricultural work on the Experimental Fields and on the adjacent 10 hectares of cash crop production in the TPC Program.

AdC-1 is furthermore responsible for the neatness, cleanliness, hygiene and maintenance of the total Service Area except its Nursery.

AdC-2 is furthermore responsible for the growth and maintenance of all hedges around the property.

The two AdC 's attend the monthly Staff Meeting under presidency of the Directors of GuKam.

Their immediate superior is the maitre de Champ (MC)

Shaping a professional attitude

GuKam will start with two simple arrangements:

1)- The full Name and Functions of all employees are published on the Plantation Bulletin Board where the Monthly Work Calendar, and the Pilot Plantation Map are hanging as well .

2)- Each monthly Staff Meeting will devote a short time to <learning about *Jatropha*>. The Director takes care of such short lessons which deal with subjects which are relevant for a good understanding of *Jatropha* cultivation. Employees will receive a <*Jatropha*

⁷ SPARE KEYS of the Tool Shed : The distance (180 km) between GuKam's Office and the Project Site in Avégamé requires a special provision for spare keys. A full set will be kept in a wax-sealed glass bottle which will be kept in a safe place in one of the houses of the personnel who lives on the Private Section of the Service Area. During the monthly Staff Meeting the seal will be inspected by GuKam's directors.

Folder> in which they will safe keep the pictures and short texts which have been handed out by the Director – even if they have problems with reading.

4.2 Long Distance Management by GuKam Directors

In order to overcome the long distance between GuKam Office and Project Site, Gukam will provide a mobile phone to the Maitre de Champ (MC). Directors will phone him every week on a fixed day and time --- with standard questions which serve as a verbal version of a Meeting Agenda. The Notes of these conversations will be dated and registered for the Files.

The MC only phones to the Directors when there are calamities of other urgent matters. Private use of credits will be deducted from his salary. Eeventually a solar battery charger will be installed on the Pilot Plantation. For the time being, the Directors will replace empty batteries by charged ones when they visit the Project Site.

Monthly Staff Meetings & Progress & Planning Meetings with the Maitre de Champ (MC) will take care of a smooth operation.

A special notice has to be made of the fact that GuKam is going to create a sleep-over facility on the Service Area or will rent a modest place in the nearest village. This is absolutely necessary, because each work visit will last at least two days. This is absolutely necessary for staying in contact with the local population of the Canton, and for the Regular Meetings which will be held with the local Chief and the Village Development Committee with a view to starting-up a local Non-Profit Organisation which will motivate and support the population to participate in the rural development process which GuKam wants to set into motion with this Food & Jatropha (bio-energy) Scheme.

5 BUDGET ESTIMATES FOR THE STARTING UP PHASE

5.1 Investments

The latest estimates for Investments date from 4 January 2010 – see the document <InvestissementPilot.xls.> It has been added to this document in Attachment 6.

The figures presented in Attachment 6 still have to be updated. The January Estimates added up to a Grand Total of F CFA 4,979,940 – an amount which is not available at the moment of writing.

At least the following cost centres can be left out in an effort to slim down new expenditure to manageable proportions:

COST CENTRE	DESCRIPTION	AMOUNT which can be saved F CFA
2.03	Main d'oeuvre pour Préparation du terrain & semis : GuKam's own personnel should start early. Moreover, not all Experimental Fields will be planted already in March A deduction of 30% of the original estimate of F CFA 417.500 seems reasonable	125.250
4.04	Maison : 2 chambres pour personnel permanent (compare with 4.01 which mentions the same house)	300.000
5	75% of several items related to Sleeping Over at the Project site could be postponed. Until then GuKam directors could sleep over in the village; 75% of F CFA 528.000	396.000
7.04	Achat de 2 motos	400.000
7.05	Achat de 2chariots	800.000
	TOTAL SAVINGS	2.0212.250

If the above savings are deducted from the initial estimates, then the Remaining Investments will add up to F CFA 2.958.690

5.2 Operational Budget

The latest estimates of the Operational Budget also date from 4 January 2010 – see the document <Budget – Fonctionnement.xls> It has been added to this document in attachment 6.

The January Estimates added up to F CFA 458.417 per month and F 5.275.992 per year

At least the following cost centres can be left out in an effort to slim down new expenditure to manageable proportions

COST CENTRE	DESCRIPTION	MONTHLY AMOUNT which can be saved F CFA
2.2	Salaire Agric Officer (Apeli)	80.000
3	Télécommunication 50% of the budgeted amount should be saved	50.000
4.2	Visite au Site par Agric Officer: He should join the Directors when they visit the Project	30.000
5.1	Transport de boutures et graines : All propagation material is already in Avégamé in the new plans	10.000
7	Représentation: A deduction of 30% is reasonable	12.500
8.1	Cirage des meubles	1.667
9	Amortissements	45.083
	TOTAL SAVINGS	229.250

If the above savings are deducted from the initial estimates, then the Remaining Monthly Operational Cost will add up to an amount of F CFA 229.167

However, the new Plans – as described in this document – assume that there will be 3 fully employed Assistants who will carry out the agronomic work on the Pilot Plantation and on the adjacent 10 hectares of the Temporary Production of Cash Crops (TPC).

If the salary of the Maitre de Champ (MC) stays at the proposed level of F CFA 25.000, then the Assistants should earn as follows:

-	Chef de la Pépinière (CP)	F CFA 18.000
-	Assistant de Champ (AdC) – 1	F CFA 15.000
-	Assistant de Champ (AdC) -2	F CFA 15.000+
	Additional Cost per Month	F CFA 48.000

This will result in a new Operational Budget of F CFA 277.167 per month.

ATTACHMENT 1

MAP OF THE PRIVATE PROPERTY AT AVEGAME
50 HECTARES
ADJACENT TO THE 1000 HA OBTAINED BY ACTE D'ENGAGEMENT BETWEEN
GUKAM & THE COMMUNAUTÉ DE DAWLOTU-TUTU

INTERNAL PARTITION OF THE PILOT PLANTATION:
See paragraph 3.2

NOT RELEVANT FOR PUBLICATION ON THE WEBSITE

This Attachment will be forwarded to readers upon request

Please, contact us by email: gukamsi@gmail.com

ATTACHMENT 2

NARRATIVE ILLUSTRATING THE DESIRED IMAGE/IMPACT
OF THE LAYOUT
OF THE SERVICE AREA OF THE PILOT PLANTATION AT AVEGAME
(PLANNING PROVISIONS & LAYOUT)

FOR PROMOTION ASPECTS OF THE PILOT PLANTATION:
See paragraph 2.3

NOT RELEVANT FOR PUBLICATION ON THE WEBSITE
This Attachment will be forwarded to readers upon request
Please, contact us by email: gukamsi@gmail.com

ATTACHMENT 3

DESIGN / LAYOUT OF THE SERVICE AREA OF THE PILOT PLANTATION AT AVEGAME (PLANNING PROVISIONS & LAYOUT)

**FOR MORE DETAILS :
See paragraphs 3.5 – 3.6**

***NOT RELEVANT FOR PUBLICATION ON THE WEBSITE
This Attachment will be forwarded to readers upon request
Please, contact us by email: gukamsi@gmail.com***

ATTACHMENT 4

PLANTING INSTRUCTIONS AND MAPS FOR THE 5 EXPERIMENTAL FIELDS OF THE PILOT PLANTATION AT AVEGAME

**FOR MORE DETAILS :
See paragraphs 3.3 – 3.4**

DESIGN OF PLANTING & TESTING ON 5 EXPERIMENTAL FIELDS

FIELD CONSTRUCTION ITEMS		FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5
1	Name of Experimental Field (in French)	ORIGINE	INTERCROP	TRAITEMENT	GROSSEUR	ESPACEMENT
2	Number of Rows with Jatro plants	34	24	40	38	38
3	Spacing of Jatropha Plants	2,5m x 3m	2,5m x 3m	2,5m x 2,5	2,5m x 2,5m	2,5m x 2,5 m
4	Number of Pits / Jatropha Plants	1.360	960	1.600	1.444	1.520
5	Number of Jatropha Plants via:					
5.1	Direct seeding	720	960	1.600	684Mini M 760Maxi XXL	720
5.2	Cuttings	80	0	0	0	80
5.3	Seedlings	560	0	0	0	720
6	Number of Pits / Intercrop	n.a.	10.000	n.a.	n.a.	n.a.
7	Number of <pieds> Intercrop	n.a.	10.000	n.a.	n.a.	n.a.
8	Percentage of surface for Jatropha	100	60	100	100	100
9	Percentage of surface for Intercrops	0	40	0	0	0
10	Origin of Propagation Material	Five best germinators from A, B, C, D	Untested seed from Kpékpéta	Untested seed from Kpékpéta	Untested seed from Kpékpéta	Five best germinators from A, B, C, D
11	Use of compost in Jatropha Pits	Yes	Yes	50% of Pits	Yes	Yes
12	Completely planted in March	No	Yes	Yes	Yes	No
13	Unplanted boundary strip:					
13.1	on the LEFT side	Yes – 100cm	Yes – 300cm	No	Yes – 500cm	Yes – 500cm
13.2	On the RIGHT side	No	Yes – 200cm	No	No	No
14	Intercrop specifics: type & variety	n.a.	Maize: Ikéna Beans: Vita	n.a.	n.a.	n.a.
15	Future use of fertilizer on Jatropha?	Yes	Yes	50% - 50%	Yes	No
16	Future use of fertilizer on intercrop?	n.a.	No	n.a.	n.a.	n.a.
17	Soil test (in Year Two)	pm	pm	pm	pm	pm
18	Layout Design (in Attachment 4)	Map 1-A Map 1-B	Map 2	Map 3	Map 4	Map 5
19	Direct seeding: number of seeds/pit	3	3	2	3	2

Untested = no germination test has been carried out

MONITORING MAP 1-A: IDENTIFICATION OF MONITORING SAMPLE ON EXPERIMENTAL FIELD 1 <ORIGINE>

Area planted in March/April 2010

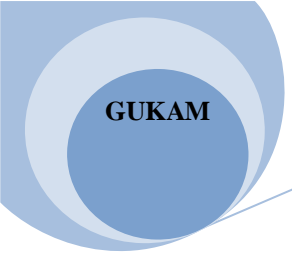
Propagation material: Tested seeds from the 5 Best Germinators per Village/Zone (A,B,C,D): direct sowing (GREY) & cuttings (GREEN) from the same mother plants

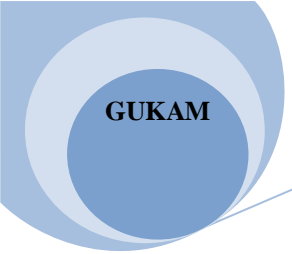
Spacing: à la Henning – 2,5m x 3m – Final Planting Result in March/April: 720 plants direct sowing + 80 cuttings. There will be 1.360 plants at end of the year -- without unplanted Service Strips

	2	3	4	5	6	7	8	10	12	14	16	18	20	22	24	26	28	30	32	34		
39																						39
37																						37
35																						35
33																						33
31																						31
29																						29
27																						27
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17																						17
15																						15
13																						13
11																						11
9																						9
7																						7
5																						5
3																						3
1																						1
	AGOU (A)	5	AKATA (B)	10	KPÉLÉ GOVIÉ (C)	15	TOVE AGBÉSSIA (D)	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
	1	4	6	9	11	14	16	19	---- Numbers of the ROWS which are included in the Monitoring Sample													
	Numbers of the PLANTS which are included in the Monitoring Sample: PLANTS P1, P4, P5, P15, P16, P17, P30, P40 (in rows R1, R4, R6, R9, R11, R14, R16, R19)																					

THIS SECTION WILL BE PLANTED WITH SEEDLINGS
DURING THE SECOND SEASON 2010

SEE MONITORING MAP 1-B





MONITORING MAP 2: IDENTIFICATION OF MONITORING SAMPLE ON EXPERIMENTAL FIELD 2 <INTERCROP>

Area planted in March/April 2010

Propagation material Jatropha: Untested seeds from the Kpekpeta Zone. Propagation material Intercrop: Maize (Ikéna) in March – Beans (haricot Vita) in second Season

Jatropha Spacing: à la Henning – 2,5m x 3m – Final Planting Result: + 60%Jatropha and +40 % Intercrop on the net surface of this field -- There is no unplanted Service Strip

	300	900	120	240	120	80	80	80	120	200	
39	300	300	300	300	120	80	80	80	120		39
37											37
35											35
33											33
31											31
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11											11
9											9
7											7
5											5
3											3
1											1
	J1	J2	J3	J4	M1	M2	M3	M4	J5		
	<p>Numbers of ROWS which are included in the monitoring Sample: J1 and J4 (= the first/left and the last/right Jatropha Row in each of the 6 Blocs)</p> <p>Numbers of PLANTS which are included in the Monitoring Sample: P1, P4, P5, P15, P16, P17, P30, P40</p>										
	LAVENDER = 4 rows with Jatropha GREY = intercrop or unplanted separation space BLACK = unplanted strips of this Field which separate this field from its neighbours										

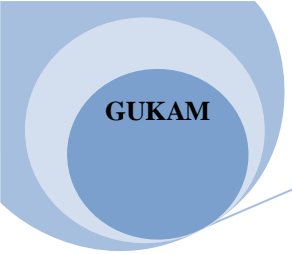
*THE BLOC ON THE LEFT (1380CM)
WILL BE REPEATED HERE
5 MORE TIMES*

+

REMAINING SPACE (1220M) PLANTED WITH 16 ROWS OF MAIZE

FINAL PLANTING RESULT
24 ROWS OF JATROPHA (6 BLOCS OF 4 ROWS)
40 ROWS OF MAIZE (6 BLOCS OF 4 ROWS + 16 REMAINING ROWS)

MONITORING SAMPLE
6 BLOCS x 2 ROWS x 8 JATROPHA PLANTS

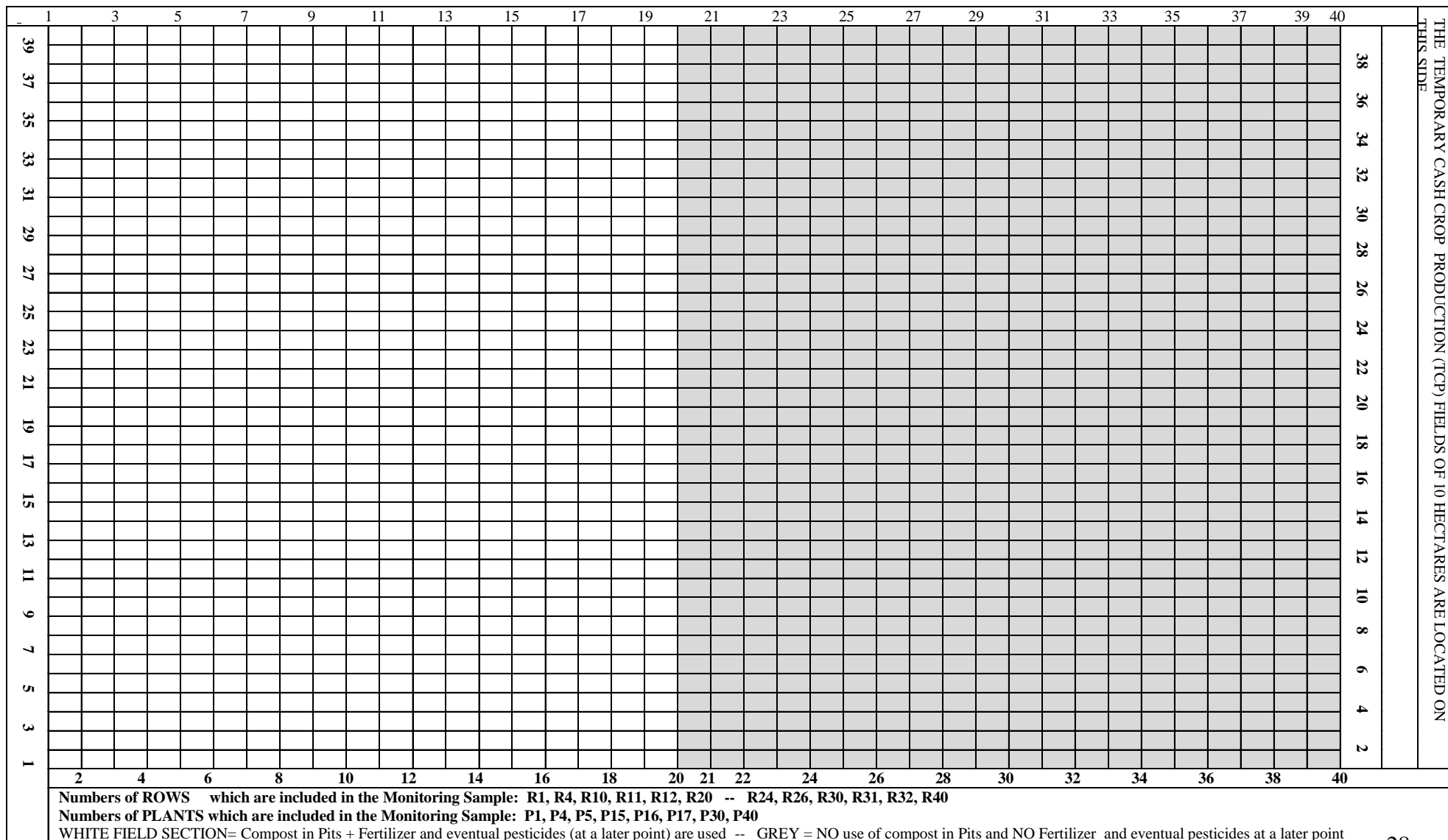


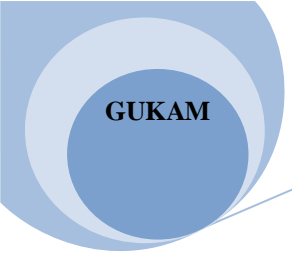
MONITORING MAP 3: IDENTIFICATION OF MONITORING SAMPLE ON EXPERIMENTAL FIELD 3 <TRAITEMENT>

Area planted in March/April 2010

Propagation Material: Untested seed from the Kpekpeta Zone

Spacing: < à la Technologies for Human Development (THD) Senegal>: 2,5m X 2,5m> Final result: 40 rows with 40 plants (=1.600 plants) without Service Strips



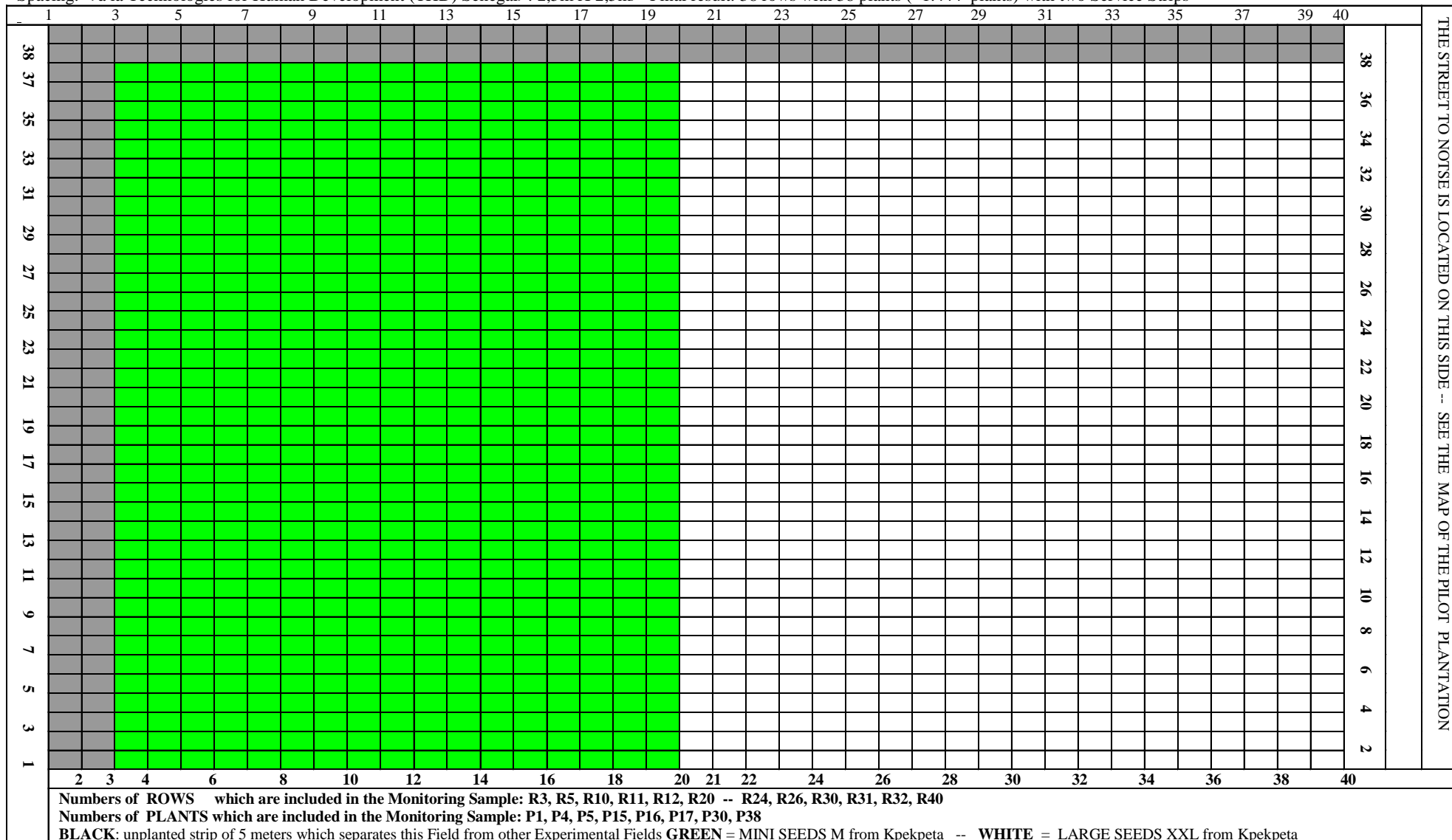


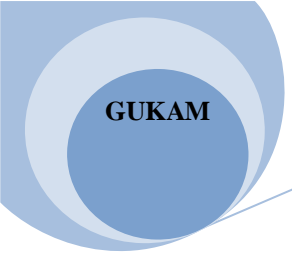
MONITORING MAP 4: IDENTIFICATION OF MONITORING SAMPLE ON EXPERIMENTAL FIELD 4 <GROSSEUR>

Area planted in March/April 2010

Propagation Material: Untested seed from the Kpekpeta Zone . Direct sowing of Seeds No 7 (Code F: M and XXL)

Spacing: < à la Technologies for Human Development (THD) Senegal>: 2,5m X 2,5m> Final result: 38 rows with 38 plants (=1.444 plants) with two Service Strips





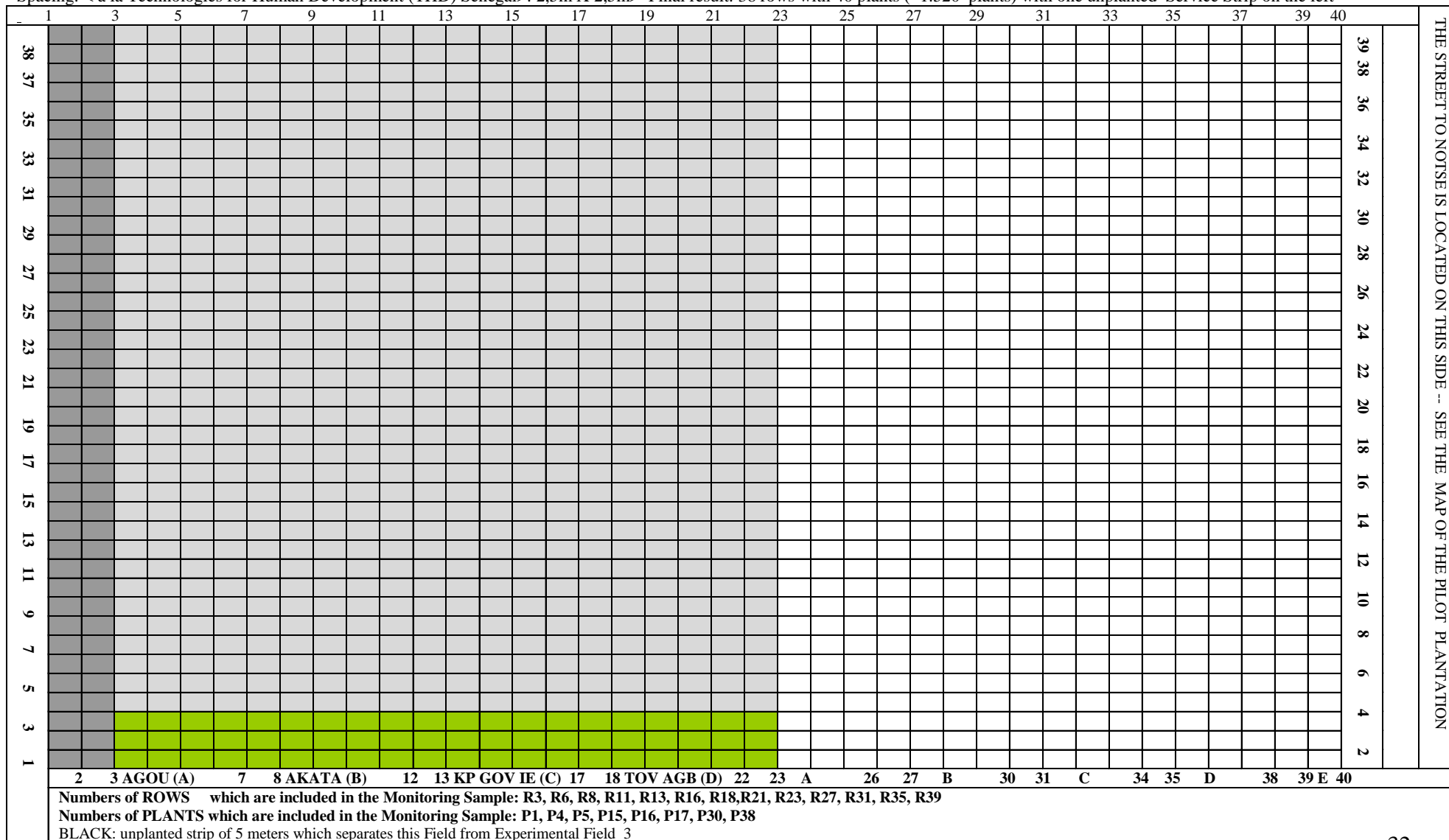
MONITORING MAP 5: IDENTIFICATION OF MONITORING SAMPLE ON EXPERIMENTAL FIELD 5 <ESPACEMENT>

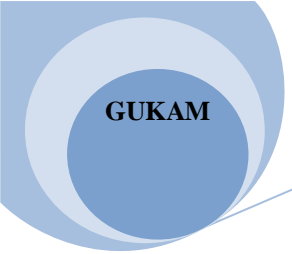
Area planted during Second Planting Season of 2010

Propagation Material: Tested seeds from the 5 Best Germinators per village/Zone (A,B,C,D): direct sowing (GREY) & cuttings (GREEN) & seedlings (WHITE) from the same mother plants

Rows R39 and R40 contain seedlings which stem from Big Seeds (Type E: XXL): assortie from the same four origins A,B,C,D

Spacing: < à la Technologies for Human Development (THD) Senegal>: 2,5m X 2,5m> Final result: 38 rows with 40 plants (=1.520 plants) with one unplanted Service Strip on the left





ATTACHMENT 5

<MARKERS>

Numérotage des rangés (R) et des positions des plantes (P) Sur les Champs de la Plantation Pilote à Avegamé

VOIR LE PARAGRAPE 3.3.2 du Document sur la Construction de la Plantation Pilote

PIQUETTES AVEC NUMÉROS DES RANGÉS (ROWS) SUR LES CHAMPS

R 1 (15 exemplaires)
R 5 (15 exemplaires)
R 10 (15 exemplaires)
R 15 (15 exemplaires)
R 20 (15 exemplaires)
R 25 (15 exemplaires)
R 30 (15 exemplaires)
R 35 (15 exemplaires)

PIQUETTES AVEC NUMÉROS DES POSITIONS DES PLANTES

P1 (40 exemplaires)
P10 (40 exemplaires)
P20 (40 exemplaires)
P30 (40 exemplaires)
éventuellement :
P40 (40 exemplaires)

NOT RELEVANT FOR PUBLICATION ON THE WEBSITE

*This Attachment will be forwarded to readers upon request
Please, contact us by email: gukamsi@gmail.com*

ATTACHMENT 6

INVESTMENTS & OPERATIONAL COST

ESTIMATES
WHICH HAVE BEEN REVISED IN PARAGRAPH 3.7

NOT RELEVANT FOR PUBLICATION ON THE WEBSITE

This Attachment will be forwarded to readers upon request

Please, contact us by email: gukamsi@gmail.com

ATTACHMENT 7

COLLECTE DES GRAINES A KPEKPETA -RECAPITULATION DES EXIGENCES-

UNTESTED SEED FROM KPEKPETA

The word <untested> means that the seeds from Kpékpéta are not tested on the dimension <germination vigour>.

NORMAL REQUIREMENTS FOR SEED & CUTTINGS STAY VALID

Just as is the case with the seeds from Locations A, B,C, and D, the seeds & cuttings collected in the Kpékpéta Zone have to be undamaged and stemming from healthy mother plants which are NOT growing next to a field where <igname> is cultivated or has been cultivated recently.

MANUAL 1 *COLLECTE DES GRAINES ET BOUTURES DES PLANTES 'PROLIFIQUES'* provides more relevant instructions.

SORTING ON SIZE (M OR XXL) FOR EXPERIMENTAL FIELD 4

Experimental Field 4 needs 2.052 (684 pits x 3 seeds) small seeds, and 2.280 (760 pits x 3 seeds) large seeds.

In other words: GuKam needs at least 7 KILOS of seeds to choose from!

This amount is *not* overlapping with the amount needed on Fields 2 and 3

SEEDING ON EXPERIMENTAL FIELDS 2 AND 3

Experimental Fields 2 and 3d 4 will be sown/planted in March / April with <untested seeds from the Kpekpeta Zone> .

Total number of required seeds:

Field 2 : 2.880 seeds (960 pits x 3 seeds)

Field 3 : 3.200 seeds (1.600 x 2 seeds) --- pay attention to the number of seeds per pit please!

TOTAL:6.080 healthy seeds -- <assortie>

In other words: a collection of seeds which still comprise small and big seeds as they have been collected.

TWO BAGS WITH SEEDS FROM KPEKPETA

The collection of seeds from Kpékpéta ends with two Bags full with healthy, undamaged seeds from areas which have not been contaminated by yams (igname).

One of these two bags weighs about 7 kilos in order to get enough M and XXL seeds.