May Report:

Okwagaanana

Uganda

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Content

Preface

Before explaining the work we did as a team over the past 7 months, we would like to say a few words. It's been quite a special year, since the COVID-19 virus has taken us all by surprise. Instead of going to Uganda, we will all be staying at home this summer, which was quite a letdown both for us and the partners. Nevertheless, it was the only right decision to make and we must try to make the best out of it from Belgium.

There are a couple of people that helped us over the past months in realizing this report which we would like to thank here.

First of all, the AFD board for giving us this opportunity, and more specifically our project coordinator Ruth De Vits. We know this must have been a hard year for you as well and we appreciate the transparent communication at every point along the way. We know there is a lot of work going on behind the scenes and we would like to thank you for that!

Secondly, our coach and master in asking questions: Chris. While sometimes we could roll our eyes when you started asking question after question, we cannot tell you how grateful we are to have had you as a coach. You managed to put our heads in the right direction while also making sure you did not interfere too much with the group dynamics: a tough job to say the least. We have greatly appreciated your help throughout the year and since you are planning on staying in Belgium, we really hope to stay in touch after the project!

And finally our partners from Okwagaanana. Frieda and Peter: we would like to thank you for your openness and enthusiasm throughout the whole year. We can see that you have put your heart and soul in this project, and we hope we can match your expectations for the project. Over the past months we have had a number of calls with Michael, Julius and the others which made us become even closer with the project. We are therefore very happy that even though we have to stay in Belgium for now, we can still help Kidiki realize part of the project: webale ino ino ino!

We hope you all enjoy reading our final report!
Laurien, Marlies, Saar, Stef, Stijn and Thijs

Introduction

Okwagaanana is more than just the name of the organization. It also describes the mentality of the organization and this project. Okwagaanana is Lusoga/Ugandan for 'meeting one another'. This emphasizes that true development is a process in which mutual interest leads to learning from each other. There is not one person that knows best: everyone is bound by one's own perspective and only by understanding the perspective of someone else can one improve.

The organisation Okwagaanana and AFD Leuven set up a cooperation between a diverse group of six students and the community of Namwendwa. The purpose of this cooperation is to improve various parts of the community, of which in particular the financial sustainability and educational quality of the Kidiki secondary school.

Project summary

The organization, Okwagaanana, was founded in 2007 by Stephen Mubiru, Jos Kuppens and Frieda de Lannoy. It is a collaboration with the community of Namwendwa (Uganda) of which the purpose is to develop the local community. Okwagaanana collaborates specifically with three initiatives in the village of Namwendwa. These initiatives are the Kidiki primary and secondary school, the Kyebajja tobona women's group (KTWG) and the vocational training center. Each of these collaborations has its own specific purpose. This does not mean that they should be considered completely separate, it only means that the initiatives ultimately exist to support different goals. The Kidiki school collaboration aims to provide the local youth with education. The vocational training center aims to provide agricultural training and knowledge to the local farmers. And the KTWG aims to responsibly and constructively make use of microfinancing and in general raise awareness among the local women.

Since its founding in 2007, some of Okwagaanana's achievements have been the official accreditation of the secondary school that allows the school to award legally recognized degrees and the construction of all sorts of buildings for the school. Furthermore, it systematically upscaled the activities of the KTWG so it can support bigger projects. It also

purchased joint agricultural land and equipment for the vocational center. These are just a few examples of what Okwagaanana has accomplished (a complete overview of its achievements can be found on the website: http://okwagaanana.be).

Okwagaanana is an autonomous sub-organization of the non-profit Don Bosco organisation. It is run by volunteers only. It primarily obtains its funding through institutional sponsors, crowdfunding by them or third parties, and collaborations with external partners.

The Ugandan educational system has multiple levels of accreditation. Each level allows an educational institution to award legally recognized degrees up until a certain year of education. Kidiki secondary school currently operates at the O-level. This means that they can award recognized degrees up until the fourth year of secondary education. Secondary education in Uganda consists of a total of six years. In order to award degrees for the sixth year, an institution needs to obtain the A-level. With a degree from an A-level institution, students can directly apply and get admitted to higher education. Because Kidiki school only has the O-level, the opportunity for students to participate in higher education becomes much harder to achieve because it is difficult for most to complete the last two years of secondary education at another secondary educational institute. This problem is a direct obstruction of the long-term development of Kidiki secondary school and the community of Namwendwa.

The project that Okwagaanana has set up with AFD aims to help the school obtain the A-level accreditation. The primary reason the school has not yet been able to obtain the A-level by itself is because of a lack of financial sustainability and profitability. The school currently, at best, operates at break-even. The objective of this project is to improve financial sustainability.

Furthermore, the project is meant to achieve this in a way that considers the social environment and community of Namwendwa. Many entities exist in the community of Namwendwa that the project can cooperate with to achieve its goals while benefiting them as well. Intuitive examples are the KTWG and the vocational center, but others could be for example local businesses and business cooperatives, local individuals, other NGOs in the region, or specific parts of the school's current operations such as the kitchen that prepares meals for students and staff.

Problem statement & first semester research questions

> *"The major challenge for the school to continue to grow and offer qualitative and future-oriented education to the youth of Namwendwa, is related to accreditation (...) It currently does not have accreditation at the so-called A-level, which would allow it to organize secondary education [from the 5th] up until the 6th year of secondary education (...). The main consequence is that pupils do not have the opportunity to receive the education needed to finish secondary education and possibly go on to higher academic or professional education. Due to the current ... level of accreditation, attrition is high, and pupils often end their education after the 4th year, and this is especially the case for girls. In essence, this situation hinders the development of the entire region. This problem is identified as the number one obstacle for further growth and development of the region by pupils, teachers, and community members. The primary obstacle that stands in the way of Kidiki school to [take the steps needed to qualify for A-level] is the lack of sufficient and sustained financial capacity."* (From the project proposal)

The needs of our local partners are known best by themselves. As their words above express, the problem statement of the AFD Okwagaanana project is to help the school in Namwendwa become financially self-sustainable to serve two broader purposes. First, the project aims to support the school in meeting the criteria of the A-level accreditation so that it can offer its students the last two year of the official curriculum. Second, the region prospers from the extra talent that is enabled through the improved local education.

First semester research questions

During the first semester, we focused on three different leads and formed our research questions around these:

- Crop management
- Women's group
- Kitchen

We will very briefly discuss the different topics here, but we will not be focusing on these too much since these were mainly our focus last semester and by now we have shifted our focus a bit.

Crop management

During the first semester we did a lot of research on the different crops that are cultivated in Africa and more specifically in Uganda and its neighboring countries. Several crops were evaluated with their fit for the local agriculture program of the school, and while this has proven to be useful research which can be passed on towards our project partners, we have moved towards irrigation and livestock management now when considering the agricultural aspect of the project.

Women's group

There were some ideas to work with the women's group of Okagaanana, however, the main focus had to remain the school and how to make the school more financially independent. After our first call over Whatsapp with the partners in February, it became clear that they preferred us working with the school directly instead of also involving the women's group. We have therefore not continued working on this lead during the second semester

Kitchen

Given that the kitchen was the primary cost of the school we considered whether we could change the kitchen's operation to save costs. We also looked into the possibility of expanding the kitchen to serve meals to the residents of the wider community to provide an additional source of revenue for the school. After mapping out all the relevant aspects regarding this topic (kitchen input, production and output) we concluded that the kitchen and its operation was still very primitive. This made us focus on optimizing the kitchen with the aim of cost savings in the long term.

Development & elaboration on research questions

Research question 1: Agricultural aspect

Agriculture was one of the ideas that was initially proposed by Okwagaanana in the project description, and has thus been on our agenda since the first few weeks of our project. While during the first semester, we focused mainly on the environment (soil, weather, infrastructure already in place…), we tried to focus on a few aspects of the agricultural project in the second semester.

After having a few meetings with the local partners in the beginning of the second semester, it soon became clear that they too were very enthusiastic about the idea of expanding their agricultural activities. While they already had some basic infrastructure and activities, such as: a few cows, a small chicken house (note: without chicken), and some small pilot projects on planting more difficult crops such as tomatoes, it became clear that they really wanted to invest in this. Next to the current infrastructure, they also own more or less 2 hectares of unused land which could be used for the agricultural project. This land can be seen on the image on the right (Figure 1).

***Figure 1**: Unused land in Uganda*

Because of the enthusiasm of the local partners, we decided to focus on two different projects within the agricultural aspect. The first one is a further livestock development of the cows they already have. The second project is the implementation of a fully functioning drip irrigation system on the unused land. Both projects will be explained in further detail in the following paragraphs.

Livestock development

During the second semester, it became clear that the partners also wanted to focus on livestock development. The main problem regarding the livestock the partners are facing, is that currently the cows do not give much milk. So, the main goal here was to focus on the improvement of the milk yields of the cows. First, some research about milk production in Africa and mainly Uganda was done. At the same time, we discussed our findings with the partner and gathered some more information. The last step was to set up the implementation plan.

By improving the livestock of the school, they will have more healthy cows which will in turn lead to higher milk yield and a longer life span of the cows. This way, the agricultural programme becomes more sustainable and there will be more milk for the students. While not generating any net yields, this opens the door for potentially having more cows in the future which can then in turn generate income by selling excess milk.

First, some research was done. Regarding the FAO (2011), Napier grass is the most used source of forage on smallholder farms to keep their dairy cattle fit. Many smallholders are also learning to plant improved pastures/fodder crops as alfalfa, Napier grass, forage sorghum and maize. Some farmers are also giving milling by-products such as maize and wheat bran. A lot of farms also give salt to their animals in the form of rock salt. The main problems are that farmers do not know much about what should be in the feed and that commercial feed is expensive. In Uganda, the average price for these commercial feed has always been above the world market price. In 2011, the average farm gate price of milk was UGX 450.000 per ton in comparison with the average price of commercial feed of about UGX 700.000 per ton. This makes it less attractive for the farmer to buy this feed.

It is possible to compose your own feed. The components are then based on the availability, price, and quality of the nutrients they contain. For the animal growth, amino acids are important and are retrieved from oilseed meals. For the primary energy supply, cereal grains and fats are used. The Makerere University Agricultural Research Institute (MUARIK) in Kabanyolo, Uganda, is currently working on feed composition. The main ingredients they are using include soybean concentrate, maize bran, salt gastropod shells obtained from the shores of Lake Victoria and sunflower husks among others (Monitor, 2019).

As we soon found out, we could improve the milk production by giving the cows better feed and looking for better breeds. The different breeds recommended for farmers in Uganda are Friesian cattle, Jersey, Ayrshire, Fleckvieh, and Brown Swiss. For the breeds, it is really helpful to contact a Ugandan veterinarian. We already contacted the NaLIRRI (National Livestock Resources Research Institute) situated in Tororo, Uganda. They have knowledge in many areas of animal health, animal breeding, animal nutrition… We are still waiting on an answer of these research institutes. However, due to COVID-19, we assume they are closed at the moment.

Currently the school has 6 cows from the Friesian type (Figure 2) who mainly get hay, Napier grass, and maize bran as feed. The feed is cultivated by themselves, but they still need to buy some to get enough. The current feed composition is still a bit unclear and has to be further investigated. So the main things here are to improve the feed and help the partners with finding the best composition of feed, and on the other hand get in touch with the research institutes and veterinary to get more insights in the breeds in Uganda. If more milk will be produced, they could even offer their surplus on the market.

***Figure 2**: One of the Friesian cows from our partners in Uganda.*

Irrigation development

As discussed in our report of the first semester, Uganda has a climate that is quite different from Belgium. The southern part of Uganda (which is where we are going) knows two wet seasons (March-May & September-November) and two dry seasons (June-August & December-February). Because of little to no rain during the dry season, the land cannot be

used during these periods for agriculture. This is where an irrigation system can be used to supply the plants with the necessary water to grow.

Since not a lot of farmers can grow crops during the dry season, supply is much lower during this period on the market. Because of this, so-called "cash-crops" like tomatoes or peppers can generate quite some income for the school when cultivated during the dry season. This way, the school can have a steady income stream from their irrigation system, improving their financial independence.

Irrigation is quite a broad term: it can range from sprinkling your plants to a full-blown drip irrigation system where the manure is already mixed in with the water you give your plants. There are a few factors we considered when thinking about which system to install, which will be discussed below.

First and foremost, the pricing of the system. While some funding is available from the Okwagaanana project, costs should be kept at a minimum wherever possible. When looking at the difference between an industrial system and one that is constructed from local materials, the difference can be ten times the price. This is why we decided we should construct the irrigation system ourselves when possible.

The second point that is extremely important is the water usage and water supply for the system. During the dry seasons, there can be as little as 5 days of rain on average during February or July, resulting in only 63 mm of precipitation (Weather Atlas, 2020). Because of this, we have to make sure we have water available for our irrigation system. Since there is no borehole we can draw from, nor is there any spare water in the community, we decided to go for a water tank which can collect the water during the wet season (and the few rainy days in the dry season) and then draw from this to irrigate the land.

When considering the water supply, it is also worth noting that the water usage can differ between irrigation systems. The most economic one from this point-of-view is the drip irrigation system, where you have a water efficiency of 95-100% (AgriSol, 2020).

Because of these reasons, we decided to go for a relatively easy set-up which we can deploy ourselves since several sources online show that this is a good first step to start making money during the dry season (FarmBiz Africa, 2018; Nantege, 2012). An example of such a

set-up can be seen in Figure 3. A list of the necessary components can be found in Appendix A under 'Irrigation system': this list and pricing was based on the first invoice of Gentex Enterprises and based on a 6000 litres water tank. An example of the components that Gentex offers in such a set-up can be seen in Figure 4.

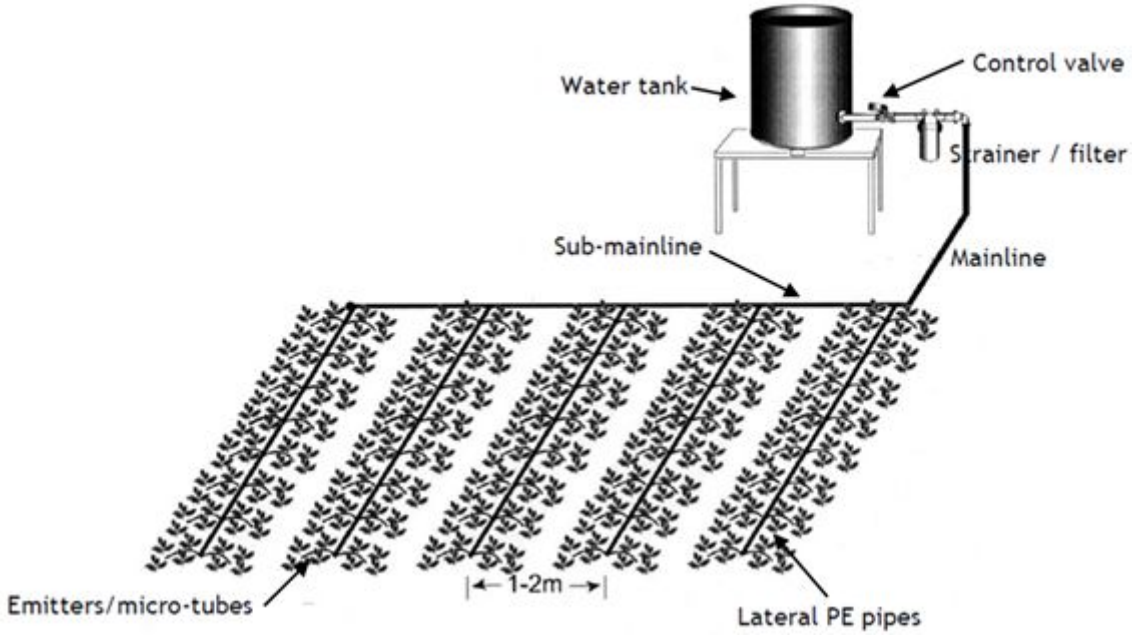


***Figure 3**: Schematic of a low-cost drip irrigation system (RCSD, 2008)*

The main question that still remains then is how big the tank should be, or how many tanks we would need for setting up a drip irrigation system for half an acre or one acre to begin with. Since nor we, nor our local partners have any experience in setting up such a system, we decided to contact a local company in Kampala that offers components for drip irrigation systems: Gentex enterprises (http://gentexenterprises.com/). We have already received a first invoice from them, indicating that for our project we should aim for a price range of more or less 500 EUR. Due to the recent COVID-19 crisis, however, the company has been shut down since the beginning of April and we have therefore not been able to communicate any further on the technical details of our set-up. We aim to contact them as soon as they open, however, to make sure we have an expert view on our set-up and we are doing the right thing when installing the irrigation system. An example set-up by Gentex can be seen in Figure 4.

As soon as we know the recommendation from Gentex, we can give an exact cost of the set-up, while also getting an idea of how much water we will need (and thus how much

water we will need to capture for the irrigation system). Depending on how the current COVID-19 crisis evolves, we see two different options of how the situation can play out:

1) We can go: in this case, the plan is to order the necessary equipment from Gentex Enterprises and install the irrigation system ourselves. This way, we can help the locals in setting up the system while also teaching them on how to use the system or how to perform maintenance.
2) We cannot go: in this case, the plan is to hire some workers (could be from Gentex or not, we are not sure if they offer this) to come and install the irrigation system if possible. While this will cost more than the initial plan, this way we are sure the system will be set up correctly. We can then provide a short 'manual' to the locals in which we describe our research and give them some pointers on the irrigation system and how to work with it. This 'manual' can be developed during the six weeks in which we would normally be there.

***Figure 4**: Example of a drip-irrigation set-up by Gentex Enterprises*

Research question 2: kitchen aspect

The second part of the present research project is related to the school's kitchen or cantine. Current problems that our partners experience with operating the kitchen are related to the costs our partners incur to prepare meals for the students and the working conditions of the kitchen staff. The following section is dedicated to explaining how we intend to contribute in solving these issues.

Kitchen development

Custom to Ugandan culture, the extent to which Ugandan schools carry responsibility for their students is higher than in Belgium. In practice, this translates to the schools providing the students with breakfast, lunch, and diner throughout the day. Kidiki secondary school, therefore, operates a kitchen/canteen to provide their students and staff with these meals. However, the efficiency at which the school at present does this is very low. As a result, the school spends a large portion of its annual budget on operating the kitchen. Appendix B provides information about the essential expenses the school incurs on a two monthly basis. Appendix D provides an overview of the annual income statement of the school with a corresponding graph.[1]

Figure 5: *Kitchen of Kidiki*

The pictures on the side display the kitchen and the meal preparation as they currently exist. The method that the school currently prepares the meals gives rise to two specific issues. First, because the combustion of the firewood does not happen in an isolated space, a large portion of the energy released remains unused. This requires unnecessary large amounts of firewood to be used, which in turn leads to unnecessary large costs for the school. Second, combusting the firewood out in the

Figure 6: *Current way of cooking*

[1] We have unfortunately been unable to properly communicate and inform ourselves about the exact income and expenses of the school. However, we believe Appendix D suffices to sketch a basic picture; The takeaway of which is that even when not accounting for an undoubtedly large amounts of other standard costs, the school is not left with a sizable enough budget at the end of the year to build reserves or to invest in future developments.

open does not allow for properly leading away the generated smoke. This causes an unhealthy environment for the staff that operates the kitchen.

In an attempt to increase the efficiency of the kitchen and to resolve these issues, the kitchen development aspect centres around the purchase and implementation of cooking stoves. Doing so requires solving two practical questions: where to obtain such stoves and whether they can be implemented (that is, whether they physically fit in the kitchen building)?

To answer the first question, contact has been established with the Bold Energy (for more information, see http://boldenergy.co.ug/) company in Kampala that specializes in the production of energy efficient cooking stoves. Detailed technical properties of these stoves can be found in Appendix E. In summation, these stoves reduce the amount of firewood used by up to 40%. Furthermore, combustion will take place in an isolated space which will greatly reduce if not eliminate the air pollution in the kitchen, therefore improving the staff's working conditions.

To answer the second question, it has become clear in communicating with our partners that these stoves will likely not physically fit in the existing kitchen. The kitchen building therefore has to be expanded before the stoves can be put to use. These costs are estimated to be 3.997.000 UGX (Ugandan Shilling) or 960 EUR. This increases the total costs of the kitchen development to 9.197.000 UGX or 2.207 EUR. All of these costs are further specified in Appendix A in the overview of the kitchen development investment cost.

By improving the kitchen of the school, the health and working environment of the people that work in the kitchen is improved, and the energy efficiency goes up. Because of this, the school will need less firewood, cutting a part of this cost, contributing to the financial independence of the school.

Additional aspects: education & fundraising

Additional to the main research questions, two aspects considered to be integral parts of the collaboration are those of education and fundraising. The educational aspect relates to how the present collaboration can contribute to the curriculum as it currently exists. The fundraising aspect relates to possibilities to increase the budget available for the present collaboration. More specifically, the production and distribution of a cookbook about Ugandan cuisine is believed to be a valuable option. The following section further details these two aspects.

Educational aspect

After several meetings with our Ugandan partners, we found the importance of not only including the teachers, but also the students in our projects. One of the main ways to involve the students is by implementing information in the curriculum. In Uganda, classes around agriculture are optitional (National Curriculum Development Centre, 2018). Nonetheless, more than 80% of citizens are working in the agriculture sector (Asimo *et al.*, 2014). The Kidiki school, however, does provide mandatory agriculture classes and we want to work together to implement our project in this curriculum.

Looking at the curriculum, we found that there is not much material on irrigation systems provided (National Curriculum Development Centre, 2020). Therefore, when establishing the irrigation system, we want to additionally provide a manual to involve the students and provide theoretical and practical courses for the different years.

During the six weeks we are working on the project this summer (regarding if we are able to go to Uganda ourselves or not), we will try to build a manual that answers the following question from an educational point of view:

- What is an irrigation system?
- What are the different types and why are we choosing a drip irrigation system?
- How do you set up a drip irrigation system?
- How do you maintain a drip irrigation system?
- What are common problems arising?
- What are the positive and negative factors of an irrigation system?

This manual will be developed by agile working as we do need the influence of the Ugandan teachers that are already tutoring in an effective way. In addition, we would like to look into implementing videos from Access Agriculture to stimulate computer skills and individual working.

Cookbook

The production and distribution of a cookbook is believed to be a valuable option for increasing the budget available for the present collaboration. The current intention is to make a cookbook in collaboration with our partners and another third party and subsequently distribute this book in Belgium through a reward-based fundraiser. The intention to include our partners is primarily to honor the educational aspect of the collaboration. That is, to explore the possibility of including some Kidiki students in the entire process to create a type of commercial learning experience. The intention to include a third party is to increase our knowledge of Ugandan cuisine and explore the feasibility of distributing the book in Uganda. The third party is the company of "A Kitchen In Uganda" (https://linktr.ee/akitcheninuganda). This is an entrepreneurial enterprise that is engaged in selling, blogging, and creating other types of content information about Ugandan cuisine. A collaborative contact regarding the making of a cookbook has already been established with this organisation.The content of the book is by no means definite. However, it is rather certain that it will be some sort of a cookbook about Ugandan cuisine. The recipes will furthermore be supported with a strong narrative based on our experiences in Uganda and many visuals/pictures. The following paragraphs respectively comment on the feasibility study, the distribution/selling of the book, and the timeline.

A survey study has been conducted in order to decide on the feasibility of the book. A summary of the results as well as the identified investment costs can be found in Appendix C. The results of the survey are arguably positive. 65% percent of the respondents have stated that they would buy a cookbook based on the description they had. Furthermore, roughly half (46%) of the respondents stated a willingness to pay up to 20 EUR.

The book will be sold and distributed by means of a reward-based fundraiser. A reward-based fundraiser is a type of fundraiser in which registered participants get a reward as compensation for participating with a pre-specified amount of money. In this case, participants would receive the cookbook as such. Because the number of participants will be

known and the production can happen ex-post instead of ex-ante, this type of fundraiser will prevent overproduction while also allowing for minimal upfront investment costs. Another advantage of selling through a fundraiser as opposed to traditional retailing is that it will allow to emphasize the social aspect of the project. It is speculated people/customers will appreciate this.

The content of the book will be recipes supported by a narrative based on our experience in Uganda and visuals. The timeline for making the book therefore is as follows:

- Define the concept of the book before we arrive in Uganda. That is, we want to definitely decide on the narrative and the way it is presented (before July).
- After we have arrived, we can then really start looking for the information we need and sketch the narrative (until mid August).
- Put everything together and finalize the book after we return from Uganda (the end of August and September).

AFD project impact map

Agricultural lead

Impact Stakeholders	Positive impact	Possible pitfalls
Students	• More varied food • Increased knowledge on farming	• Too much maintenance can seem like 'work' instead of 'education'
School staff	• Increased knowledge on farming	• Be careful not to put too much weight on their shoulders
Kidiki school	• Revenue increases due to crops in dry season • This can lead to financial independence	• They should be able to sell it on the market, if not there is no profit
Namwendwa community	• More revenue → school improves → education improves → better development potential	• Jealousy from other people • Make sure the crops do not get stolen
Okwagaanana project	• The school is further improved • Both research questions fall in the scope of the organisation	• Making sure not to 'let them down' since we can not go now: provide a good alternative plan

Kitchen lead

Impact Stakeholders	Positive impact	Possible pitfalls
Students	• Improved sanitary food	• /
School staff/kitchen personnel	• Improved sanitary & working conditions	• Problems using the new material
Kidiki school	• Reduced costs regarding the usage of firewood expected up to -40% • Reputation increase → possible increases in enrollment	• Difficulties with the supplier of the stoves • Disappointing cost reduction results • Unexpected maintenance costs

	• Decreased ecological footprint	• Wasted savings if the above pitfalls manifest
Namwendwa community	• Reduced costs → school improves → education improves → better development potential • Better health conditions for their enrolled children	• /
Okwagaanana project	• Progress in the expansion of the school aspect of the project	• Wasted savings if the above pitfalls manifest

Budget statement

Our current portfolio consists of four projects, which are characterized by the following specific investments, which are elaborated further below:

1. Livestock development
    a. Cattle stable
    b. Toilet materials
    c. Supervisor house
2. Agricultural development: irrigation system implementation
3. Kitchen development
    a. Stoves
    b. Kitchen expansion
4. Cookbook production: /

The estimated budget for the Okwagaanana project is 4000,- EUR as you can see in the first figure in Appendix A. Furthermore, the collective cost of pursuing all of the four projects are estimated to be 6780,- EUR. It is clearly not possible to pursue all of the projects. Because of three reasons, it has been decided to initially focus on the agricultural development project and the kitchen development projects.

First, pursuing the agricultural project would not leave any budget to allow for pursuing the other projects. Furthermore, it is expected that more time will have to be spent on pursuing this project compared to the other projects. This is because the livestock development project

in the first place consists of building the facilities that will allow for expanding the livestock. This is contrary to the agricultural development project and the kitchen development project that mainly consist of purchasing equipment of a higher efficiency/quality than is currently used and subsequently adapting the already existing facilities for using that equipment.

Second, pursuing agricultural development and the kitchen development project still leaves some extra budget available (1240,72 EUR). This, in the first place, can be considered as a margin of safety and, in the second place, as available budget to spend on other development projects; be it within the scope of the present collaboration (which is probably the livestock development) or be it by the Okwagaanana organisation.

Third and final, diversifying the risks associated with the individual projects should ultimately lead to a more successful and more profitable collaboration. Therefore, it makes sense to divide the available budget over two unrelated projects instead of spending the entirety of the available budget on one project. This is especially true when the real risks associated with pursuing the projects are not fully identified; as is currently the case.

Not displayed here are the estimated costs associated with the cookbook project because it was intended as a way to increase our budget. As was explained previously, the current intention for distributing the cookbook is to organise a reward-based fundraiser. Appendix C details the results of the conducted feasibility analysis and an overview of the estimated investment costs. However, there is still too much uncertainty regarding the profitability of the cookbook project to make any estimations as to how it would influence the available budget at this point in time. Furthermore, given the current timeline, profits that would be made through this project would be made only after the present collaboration has officially already ended.[2] It therefore has not been included in the present budget.

[2] The current intention is to either transfer the profits directly to our partners through the Okwagaanana organisation or keep them as a reserve for the budget of potential future AFD/Okwagaanana project groups.

Planning

Original plan

While we will not be able to travel to Uganda, we believe a short overview of our original plan can help to understand what we were planning on doing. Even though we will not be able to do this, the following shows the timeline of the 6 week implementation phase of the leads.

Irrigation system

Timeline @

First week:
- Assessing the soil/ land conditions for the acre we will work on
- Starting to prepare the land for placing irrigation system
- Contacting Gentex for exact measurements of field and setting a delivery date

Week 2:
- Preparing the land for agriculture (removing rocks, breaking the soil etc.)
- Delivery from Gentex

Weeks 3-5:
- Setting up the irrigation system on the field, involving the partners every step of the way
- This should be plenty of time, calculating that we might also face some difficulties

Week 6:
- Making sure everything is finished
- Going over the system with the partners and making sure they understand how to sustain the system

Kitchen and cookbook

Timeline @

First week:
- COOKSTOVES: Preparing the site for installing the new cookstoves
-
- COOKBOOK: Meeting the women of the village and asking if they would be intere-sted to contribute to making a cookbook and using the revenue for the school

Week 2:
- COOKSTOVES:
  * Continue preparing the site OR
  * helping the BoldEnergy company to install the new stoves AND/OR
  * planning the kitchen expansion
- COOKBOOK: Continue meeting the village women
- COOKBOOK: Organising meetings/cook workshops with the women to gather recipes

Weeks 3-5:
- COOKSTOVES:
  * Helping the BoldEnergy company to install the stoves AND/OR
  * planning the kitchen expansion OR
  * Constructing the expansion
- COOKBOOK: Organising meetings/cook workshops with the women to gather recipes
- COOKBOOK: start drafting the cookbook

Week 6:
- COOKSTOVES: Reporting on construction progress and experience
- COOKBOOK:
  * Reporting on the progress
  * Informing partners of next steps of the publishing and fundraising of the cookbooks in Belgium; and the transfer of the earnings

Educational aspect: The information we currently have is still too limited to decently plan.

Contingency plan

Due to the Covid-19 pandemic the team will not be able to travel to Namwendwa in the summer of 2020. However, this does not mean that we will not continue the project during these months. We tried to adjust our initial plan so that some of the leads could still be implemented from Belgium. We want to keep the plan quite open and flexible, because of the unpredictable evolution of COVID-19 and its consequences. This also means it becomes quite difficult to plan the implementation of the leads week by week at this point in time, as there are still too many uncertain factors involved. We will therefore focus more on the aspects of the leads we believe are possible to implement from Belgium, assuming the ideal scenario (that all resources are accessible).

Regarding the organization of the work and the communication with the partners in Namwendwa, we decided to continue our current way of working, with fixed weekly team meetings and partner meetings until the end of August. This way we will give instructions and advice, as well as follow up on the implementations that are done each week.
Until now, we were only able to communicate via Whatsapp without any form of video calling due to the bad internet connections in Namwendwa, which was often detrimental to the communication exchange. That is why we are currently looking at ways to improve this. One solution that was already suggested by the Belgian partners is to provide the Ugandan partners with mobile data during these months. This way we should also be able to video call with them.

Regarding the leads, the focus will be mainly on the installment and the maintenance of the irrigation system and the stove. Aside from that, we will continue the research we are doing, as well as the information exchange with the partners in Namwendwa regarding the livestock and the educational aspect.

Implementation of the agricultural lead

- Livestock

First, it is important to get a better insight in the exact feed composition the animals get right now. This can be done by sending us some pictures and amounts of the feed. A second thing is to get again in touch with the research institute NaLIRRI and the Makerere University Agricultural Research Institute (MUARIK). A good idea is also to contact these institutes together with our partners in Uganda in order to have a good connection with all parties.

Together we can discuss the composition of the feed and different breeds. The feed can be directly tested on the cows. First, a certain composition is made and then fed to the cows. After that, the partners could measure how much milk the cow produces in order to see if there is an improvement. If we see no improvement after a few days, the composition can be changed. For the breeds, it is important that we also contact a veterinarian in Uganda. The communication aspect is very important here to make sure everything can be executed in the right way.

- Irrigation system

As for the irrigation system the plan is to hire some workers (from Gentex or other companies) to go to Namwendwa and install the irrigation system. Due to the shutdown of the companies in Uganda we did not yet get a reply from the company Gentex on our question of whether they offer this kind of service or not.

Once we know, it is a matter of waiting for when the companies are allowed to reopen again so that we can start the arrangements for the installment. Some of the first steps we will take is to calculate the extra costs, bring the local partners in direct contact with Gentex, and plan a date for the installment of the irrigation system.

While the hiring of workers will cost more than the initial plan, this way we assure that the system will be set up correctly. We know however that a lot of risks are bound to this way of implementing. (We are still looking at these and trying to find preventive solutions) One of those risks could be that the information exchange with the partners regarding the working and the maintenance of the system does not happen properly. That is why we would provide a short 'manual' to the locals in which we describe our research and give them some pointers on the irrigation system and how to work with it. This manual will be developed during the summer.

Implementation of the kitchen lead

- Cookstoves

The plan for the kitchen cookstoves consists mainly of two parts, being on the one hand the preparation for, and installment of, the new stoves by the workers of BoldEnergy; and the possible expansion of the kitchen on the other hand.

The Corona Crisis has impacted this plan in the following two ways. Firstly, probably due to the measures taken by the Ugandan Government, BoldEnergy seems to have currently shut down its operations and does not respond anymore to our information inquiries. Consequently, we currently lack information on the precise measurements of the stoves and the total costs involved. That means that we are currently unsure if the kitchen needs to be expanded yes or no. In other words, we do not know whether the current kitchen has enough room to house the new stoves. The second impact of the Corona Crisis adds up to the uncertainty of the kitchen expansion part because we still have to consider whether it is feasible for our partners to expand the kitchen on their own while also working on the irrigation and cow feed projects.

In the event that the Corona Crisis in Uganda is over and our communication with BoldEnergy is resumed, our role from Belgium will consist of the following tasks. Firstly, based on the additional information BoldEnergy sends us, we will determine whether the benefits of the project outweigh the total costs and whether a kitchen expansion is necessary to fit the new stoves. Given that it is unlikely that our partners will be able to do this expansion work while also tending to the irrigation, education, and cow food projects, the stove project will probably have to be cancelled if an expansion is indeed necessary. In case it is not cancelled, our second set of tasks entails mapping out what preparation is necessary for BoldEnergy to install the stoves and when and how long these preparations will take place. After this planning is complete, our last set of tasks will be to monitor their progress, costs etc. and give advice where necessary.

Implementation of additional aspects

- Education

For education, we can still build a manual with information on how to implement educational instructions about irrigation systems in the curriculum. We want to communicate further with our partners on how to improve this and hopefully be able to implement a decent manual at the end of the six weeks we are working on the project.

- Cookbook

We decided to not take up this aspect of the project in the alternative implementation phase, because it would be too difficult and too time consuming to implement from Belgium. More

specifically, meeting, organising, and communicating with the local women digitally would be very complicated and would most probably demand an overly straining way of working.

Appendices

Appendix A: Project portfolio

Project	UGX	Euro
Livestock expansion		
- Cattle stable	8,298M	€ 1.992,00
- Toilet materials	2,9M	€ 696,00
- Supervisor house	5,555M	€ 1.333,00
Total	**UGX16.753.000**	**€ 4.020,72**
Agricultural development		
- Irrigation system	1,967M	€ 550,00
Seeds	333k	€ 80,00
Total	**UGX2.300.000**	**€ 552,00**
Kitchen improvement		
- Stoves	5,2M	€ 1.250,00
- Kitchen expansion	3,997M	€ 960,00
Total	**UGX9.197.000**	**€ 2.207,28**

Current budget available	UGX	Euro
From Okwagaanana	€ 16.666.666,67	€ 4.000,00

Livestock development	UGX16.753.000	€ 4.020,72
Cattle stable	UGX8.298.000	€ 1.991,52
Toilet materials	UGX2.900.000	€ 696,00
Supervisor house	UGX5.555.000	€ 1.333,20

Cattle stable (30ft by 30ft) (9,1m by 9,1m)

Item	Amount UGX
Poles (60)	600k
Timber for roofing	1400k
Nails	498k
Bricks	800k
Cement (40bags)	1200k
Soft sand (2trips)	300k
Lake sand (2trips)	500k
White stones (2trips)	500k
Gravel (3trips)	450k
Iron sheets (30)	1050k
Labour	1000k
Totals	**8298000**

Toilet materials

Item	Amount UGX
Wire mesh	30k
Iron bars (4)	12k
Bricks (4000)	600k
Sand	150k
Lake sand	250k
Timber for roofin	100k
Iron sheets (6)	180k
Nails	60k
Binding wires	18k
Cement (20bags	600k
Labour	900k
	2900000

House for the cattle supervisor

Item	Amount UGX
Bricks (5000)	800k
Sand	300k
Timber for roofin	700k
Cement (60bags	1050k
Shutters	1000k
Iron sheets (30)	900k
Roofing nails (15	105k
Labour	700k
	5555000

16753000	4020,72	

Agricultural development	UGX2.300.000	€ 552,00	
Irrigation system	UGX1.966.667	€ 472,00	(Gentex offer)
Seeds	UGX333.333	€ 80,00	

Irrigation system

Item	Amount UGX
Water Tank (6000L)	1417k
Valve	16,7k
Filter	187,5k
Driplines	250k
Pipes	95,833k
Totals	**1966667**

Seeds Purchase

Item	Amount UGX
Seeds (2/y)	333k
	333333

2300000	552

Kitchen development	UGX9.197.000	€ 2.207,28
Building expansion	UGX3.997.000	€ 959,28
Stoves purchase	UGX5.200.000	€ 1.248,00

Building expansion		**Stoves purchase**			
Item	**Amount UGX**	**Item**	**Amount UGX**		
Bricks (3000)	480k	Stoves	5,2M		
Iron sheets (18)	630k				
Timber (60)	420k				
Iron nails (15)	90k				
Iron bars (9)	27k				
Soft sand (2trips)	300k				
Lake sand (1trip)	250k				
Hard cores (1trip)	150k				
Gravel (1trip)	150k				
Cement (40bags)	1200k				
Labour	300k				
Totals	**3997000**		**5200000**	9197000	2207,28

Appendix B: Essential costs overview

Budget estimate for two months

Item		**Quantity**	**Cost**	**Amount**	
Food					
	Breakfast				
	- Milk	3litres	1k	3k	
	- Maize flour	5kgs	2k	10k	
	- Sugar	2kgs	3,5k	7k	
	Lunch (350 people)				
	- Posho flour	70kgs	2k	140k	
	- Beans	20kgs	3k	60k	
	- Species			7k	
	Supper				
	- Posho flour	25kgs	2k	50k	
	- Beans	8kgs	3k	24k	
	- Species			4k	
Total food				14,245M	
Staff					
	Teachers	20	600k (300k*2m)	12M	
	Support staff	8	360k (180k*2m	2,880M	
Sanitation				800k	
Academic					
	Materials			2000k	
Overall total				**31,925M**	**€ 7.662,00**

Appendix C: Feasibility study

The description of the project before respondents started the summary was as follows:

"One objective of our collaboration with the local secondary school in Namwendwa is to make an original cookbook about the Ugandan cuisine. We intend to publish this book in Europe with a fundraiser where the participants in the fundraiser get the book as a reward for participating. This survey is for us to determine whether there is a sufficient amount of interest in a cookbook like this to realize this idea."

Survey outcome summary

Representativeness	176 replies
Sales potential	65% of the respondents answered yes to the question whether they would buy the book
Price potential	46% of the respondents would pay up to €20 84% of the respondents would pay up to €15
Content suggestions	The majority of the respondents responded positive to the suggestion of the book containing a narrative and many visuals

Production cost overview (based on 200 colour printed books; incl. 21% VAT; Printed at Impression Galder, Netherlands)

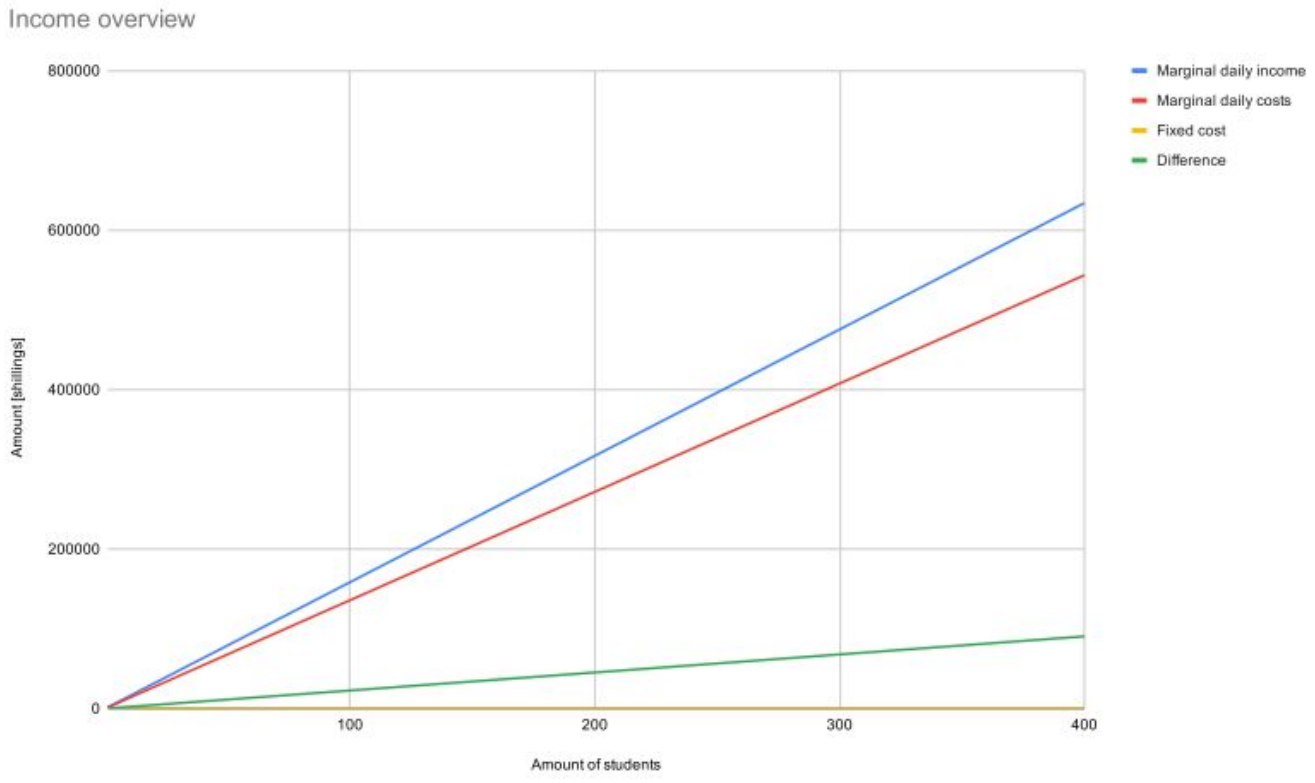
Type of book	**Upfront cost**	**Variable cost**
32 pages & soft cover	€405,35	€2,00/book
32 pages & hard cover	€508,20	€2,50/book
64 pages & soft cover	€629,20	€3,15/book
64 pages & hard cover	€732,05	€3,65/book

Additionally, funds' transfer costs, distribution cost and taxes have to be considered. Out of these three, only distribution cost are likely to be incurred up to some extent. These are €4,70/book if sent through B-post and obviously €0 in case we distribute the books ourselves.

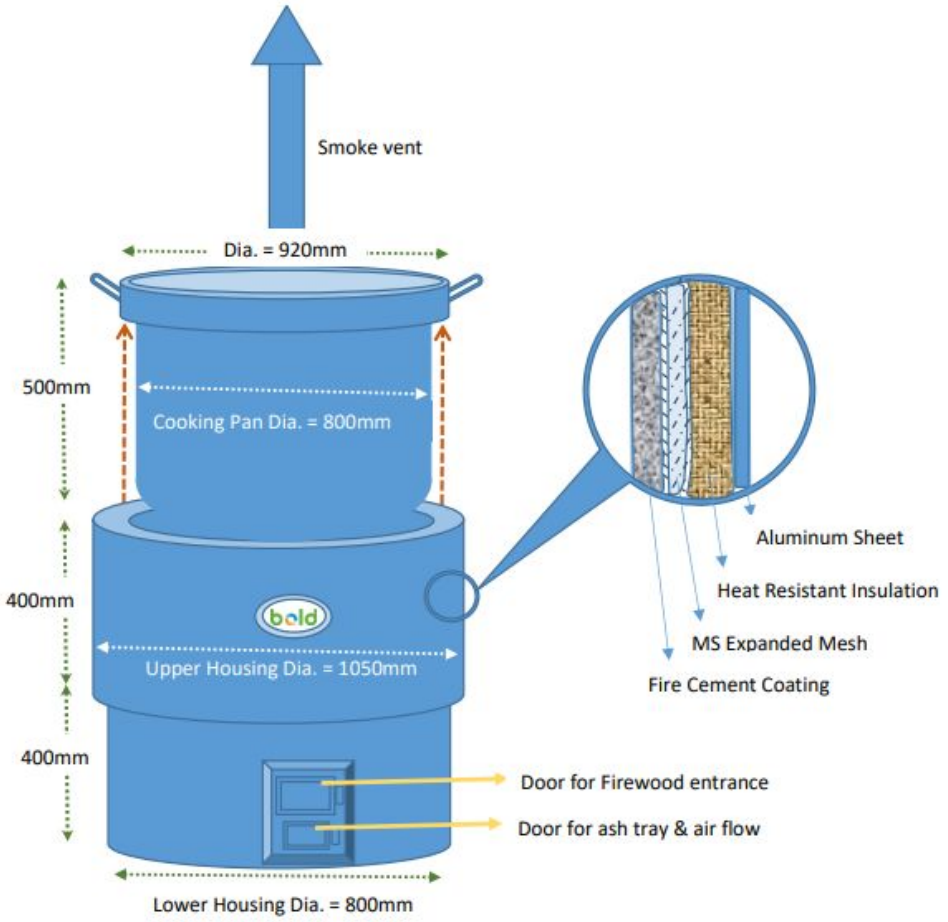
Appendix D: Income overview

Income statement

Income	Amount	Shilings	Euro's		Expenses	Type	Shilings	Euro's		
Daily students tuition		150000				Variable				
Amount of daily students	250				Teacher salaries	21 teachers	88000000			
Total		37500000	9000		Non-teacher salaries	7 non-teachers	12600000			
					Food for students	300+ students	73000000			
					water					
Boarding students tuition		300000			*Electricity*		*Unspecified*			
Amount of boarding students	100				*Firewood*		*Unspecified*			
Total		30000000	7200		*Study materials*		*Unspecified*			
Total students	350				*staff development costs*		*Unspecified*			
					Student healthcare		*Unspecified*			
					Total		173600000	*41664*		
						Fixed				
					Computer management/maintencance		*Unspecified*			
					Infrastucture maintenance		*Unspecified*			
					Animal care		*Unspecified*			
					Total		0	0		
									Balance	
Trimester total income		67500000	16200				57866666,67	13888	9633333,333	2312
Annual total income		202500000	48600				173600000	41664	28900000	6936
Daily total income		554794,5205	133,1506849				475616,4384	114,1479452	79178,08219	19,00273973



Appendix E: Stove technical properties



200Ltrs Stove Boiler.

Dimensions;
External Upper: OD - **1.05Mtrs**
Height – **0.4Mtrs**
External Lower: OD – **0.8Mtrs**
Height – **0.4Mtrs**
Sauce pan dimensions: **(0.8 x 0.5)Mtrs** (i.e.: OD x Height)
Pan seam OD – **0.92Mtrs**.
Vent OD – **140mm**.
Door dimensions: Firewood entry – **(190x120)mm**.
Ashtray entry – **(140x50)mm**.

500Ltrs Stove Boiler.

Dimensions;
External Upper: OD – **1.2Mtrs**
Height – **0.5Mtrs.**
External Lower: OD – **0.97Mtrs**
Height – **0.5Mtrs**.
Sauce Pans dimensions: **0.97Mtrs** (OD) x **0.7Mtrs** (Height)
Door dimensions: Firewood entry – **(210x150)mm**.
Ash tray entry – **(210x90)mm**.
Vent OD – **140mm**.

Description of stove functioning:

1.The stove is enclosed so that the all the energy released is contained inside directed towards the cooking pan. The cooking pan sits through halfway inside the stove to access all the heat energy released. Two things: Ensuring no energy loss and less time cooking because big surface area accesses heat.

2. The inlet for firewood is small enough to allow a few cut short pieces of firewood which are entered a few at a time.

3. There is a smaller air inlet just below the firewood inlet. With this inlet, air flow fans in enough air to brightly light up the burning wood which maintains the burning wood charcoal red hot.

4. The internal lining in the stove is made of heat resistant wool(which doesn't burn). This lining ensures that the burning heat internally remains inside (not conducted outside). Thus, all the heat is directed up towards the sauce pan above making the cooking pan contents ready faster.

5. On top of the heat resistant wool lining, there is a covering of fire cement(vermiculite) rock solid that also withstands heat for purposes of maintaining all heat inside.

6. The fire bar is also important. Made as a strong mesh out of 25mm bars, the firebar helps to separate forming ash from the burning wood by letting it fall through to the ashtray. It also is a sieve through which airflow passes slowly blowing on the burning wood.

7. Smoke vent attached at the back to allow easy escape of unwanted smoke (fire chokers).

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