Completion Report

Digital Technology for Climate Change Adaptation for Burkina Faso Smallholders, Burkina Faso, NCF7, NCF-C7-049

Grantee: Ignitia AB

Local Partner(s): Orange Burkina Faso

Project start date: *01/11/2018*

Project end date*: 31/01/2021*

31/08/2022	
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1. Executive summary

The purpose of this project was to deliver high accuracy weather forecasts to smallholder farmers in Burkina Faso. Through the delivery of these forecasts, farmers would be empowered to improve their farming activities through enhanced planning and ultimately become more resilient to the impacts of climate change. Forecasts would be made available to end users through mobile network operators in Burkina Faso as well as through partnerships with NGOs, private companies, and aid organisations.

Overall, the project can be considered a major success. In total, 890,721 beneficiaries were reached during the project period and 150,868 individuals signed up for paid subscriptions to Ignitia's weather forecasting service through Orange Burkina Faso, a major mobile network operator in the country. This far exceeded the initial goal of 50,000 paid subscribers despite significant delays that pushed back the launch of a live service by a full year. Moreover, more than 3,000 farmers were provided with subsidised weather forecasts through partnerships with organisations in Burkina Faso.

A key part of the project involved the execution of M&E to evaluate project success. This focused on both evaluation of the service provision and surveys of end users. With respect to service provision, Ignitia achieved a forecast accuracy of 89% in 2020, while a churn rate, a measure of unsubscriptions, was just 4.3%. These measures of quality service provision were echoed by end users. 85% of end users reported both high levels of general satisfaction with the service and high forecast accuracy. Moreover, 97% of end users that engage in farming reported that the forecast enabled them to make improvements to their farming activities such as knowing when to plant, timing their fertiliser application around rainfall, and identifying an ideal harvesting window.

These results are extremely encouraging, showing that subscribers valued the information provided to them in the weather forecasts and actually utilised the information to improve the efficiency of their on-farm activities. With continued use, this improved efficiency should translate to increased yields and incomes, improved livelihoods, and stronger resiliency to the impacts of climate change. Based on the results of the project, Ignitia and Orange Burkina Faso are excited about a long-term partnership to continue providing weather forecasts to farmers and other end users in the country.

2. ACHIEVEMENT OF RESULTS

2.1 Achievement of outcomes and outputs

Expected outcomes and outputs	Indicator(s):	Achievement of outcomes and outputs:
Outcome 1.1: An estimated 285,000 people benefitting from iska weather forecasts	a. Estimated Number of iska weather forecast beneficiaries (285,000) b. Number of individual direct subscribers (50,000)	a. 890,721 b. 150,868
Output 1.1.1: A commercially sustainable agronomic information support model for smallholder farmers is fully designed, including the technical integrations between Ignitia and its partners' technical systems.	a. Business plan finalised (1)	The business plan was completed and finalised as planned. Revision was made to account for the launch with only Orange Burkina Faso and not another mobile network operator.
Output 1.1.2: Train-the-trainers programme completed with 15 trainers active in the field. Farmers in select communities have received information/been made aware of iska and its use.	a. Number of trainers trained by Ignitia (15) b. Trainers trained with updated programme based on feedback and lessons learned from season 1 (15) c. Number of key community stakeholders/farmers trained by Ignitia trainers (1000)	a. 22 b. 0 c. 4259 While indicators a and c were both completed and exceeded just in Season 1, indicator b was not met because no training activities took place during Season 2. The primary reason for this was due to COVID-19 restrictions – both in terms of legal restrictions and financial implications on organisations that would have otherwise engaged with us on training activities.
Output 1.1.3: Technical development and integrations completed	a. Signed User Acceptance Test (UAT) with Orange Burkina Faso (1) b. Signed User Acceptance Test (UAT) with other mobile operator (1)	Indicator a was completed, though it was completed much later than scheduled. Indicator b was not completed; however, we expect that this would be completed later, outside of the project period.

Output 1.1.4: Successful forecast operations and SMS deliveries	a. Churn rate (unsubscriptions) <20% b. More than 85% successful SMS deliveries to free to end user subscribers c. Weather forecast performance analysis report (2)	Forecast operations and SMS deliveries were highly successful. Churn rate of 4.3% was low and within the target of below 20%. SMS delivery rate to free (B2B) subscribers was 82.9%, slightly below target due to technical challenges with SMS routes which were ultimately resolved. Weather forecast performance was strong, with significant improvements made between Season 1 and 2.
Output 1.1.5: Business development and marketing of iska	a. Sales agreements with commercial entities in Burkina Faso (2) b. Free Use Marketing Target (20,000)	a. 4 b. 0 Indicator a was met and exceeded. Indicator b was not met; the reason this was an indicator was to ultimately transition these individuals to paid subscriptions. It was not necessary for us to achieve and exceed our subscriber targets.
Outcome 1.2: Understanding of farmer behaviour, use, and understanding of iska weather forecasts and its impacts on yields and economy of the farmer.	a. B2B M&E Report (1) b. B2C M&E Report (2)	While a B2B M&E Report was developed and shared, only one B2C M&E Report was developed and shared. This is due to the fact that a live B2C service did not start until Season 2. The B2B M&E Report highlighted high levels of weather forecast adoption into farmer activities and improved yields. B2C M&E detailed similarly high adoption rates, especially among farmers, and also high levels of satisfaction, likelihood to continue subscriptions, and valuable feedback from end users.
Output 1.2.1: Monitoring & Evaluation activities as planned out previously split into 3 different evaluation categories: in-person interviews, mobile channel interviews utilising phone surveys, in-depth discussions and focus groups led by Ignitia staff	a. Interviews/surveys via mobile channels (1000) b. Number of in-person interviewed individuals (600)	a. 2098 b. 58 Changes were made to these indicators due to COVID-19 limitations. A shift to 2000 surveys via mobile channels was made, with more than 2000 end users surveyed through mobile channels. The findings on M&E efforts have translated into major focus into

		next ignitia products, specifically development into Good Agricultural Practices and Climate Smart Advisories.
Outcome 1.3: All project aspects summarised in a final report including results from M&E, statistical performance of weather forecasts, SMS transmissions, way forward.	a. Final report (1)	This completion report satisfies this outcome indicator.

2.2 Deviations from the planned outputs and activities

Activity/Outcome	Reason this did not take place
1.1.2 – Number of trainers trained with updated training programme	This was not carried out due to two key challenges resulting from the onset of the COVID-19 pandemic: restrictions on travel and gatherings along with financial implications of the pandemic on partner organisations due to cancelled revenue-generating activities. Planned projects and project activities were cancelled and/or delayed for these reasons, including any training of trainers in Season 2.
1.1.3 – Signed UAT with another mobile network operator	Our team was focused on the launch with Orange Burkina Faso, which experienced significant delays that did not enable a commercial launch until Season 2, originally planned for Season 1. Thus, the planned level of effort for engaging with another mobile network operator was not possible. However, during the project period, active discussions started and have continued with other mobile network operators.
1.1.3 – Technical integration with another mobile network operator	Our team was focused on the launch and technical integrations with Orange Burkina Faso, which experienced significant delays that did not enable a commercial launch until Season 2, originally planned for Season 1. Thus, the planned level of effort for engaging with another mobile network operator was not possible. However, during the project period, active discussions started and have continued with other mobile network operators.
1.1.5 – Free use marketing units delivered	These free use marketing units were planned to encourage early use of the weather forecasts through B2C channels, with the goal being that free users would convert to paid subscribers upon conclusion of their trials. However, subscription rates were high immediately after service

	launch, enabling us to significantly exceed our paid subscriber targets without requiring free trials.

2.3 Achievement of NCF indicators

NCF core indicator	Results (quantitative)			Clarifications/Means of verification
Number of beneficiaries reached	women		409,107	Outcome 1.1 entailed reaching at least 285,000 beneficiaries of iska weather forecasts. This was overwhelmingly surpassed, with an estimated 890,721 beneficiaries. This figure is calculated based on an estimate of 5.7 beneficiaries per recipient of ignitia's weather forecasts. Gender disaggregation here, and in all following figures, based on B2C M&E data indicating 73.2% of subscribers are male and then assuming the non-direct forecast recipient beneficiaries are 50% male 50% female.
	men		481,614	
	total		890,721	
Number of people with increased resilience to climate change	women		362,877	Based on total number of beneficiaries and the following adoption rates of forecasts (use in activities). Based on the survey data collected from the B2C subscribers, the following are the % of subscribers that reported using iska weather forecasts to improve their activities/daily tasks. M&E: Male Farmers: 97.6%, Female Farmers 93.2%, Male Non-Farmers 79.8%, Female non-farmers 83%
	men		424,301	
	total		787,178	
Number of people with improved livelihoods	women		30,023	Based on the total number of individuals that have directly received the forecasts during the project period, the data from the B2C M&E regarding percentage of farmers and farmer adoptions rates, and, based on survey data from the B2B M&E activity, 82.5% of farmers experiencing yield increases.
	men		84,790	
	total		114,813	
New decent jobs created	full-time	women		Based on the proportion of individuals in the B2C M&E directly reporting benefits to their economic activities, further disaggregated by farmers (seasonal) and non-farmers (full time and part time). ignitia's team also experienced growth during the project period to 33 personnel by the end of the project.
		men		
		total	6173	
	part-time	women		
		men		
		total	6173	
	seaso-nal	women		
		men		
		total	13,280	

3. Climate change

It is well established that climate change is causing significant changes to global weather patterns, and that these changes are very likely to continue. Tropical

climates, already prone to volatile weather, are especially vulnerable to negative outcomes of climate change. One of the most harrowing manifestations of climate change in the tropics is the growing unpredictability of once-predictable rainfall patterns. Further compounding this issue is the fact that 96% of cultivated land in Sub-Saharan Africa is rainfed and up to 80% of annual crop yield variability is due to variability in weather conditions. As a result, climate change portends to be a driver for increased food insecurity in the tropics and around the world.

In part due to the threat posed by climate change, as well as the inherent difficulty in predicting tropical weather and, in particular, rainfall, Ignitia's innovative solution enables smallholder farmers in the tropics to build resilience against climate change. By providing highly accurate, GPS location-based rainfall forecasts to farmers on a daily basis, they are well-equipped to adapt to the changing rainfall patterns and mitigate the risk associated with weather events. Farmers do this by using the forecast information as a guide in the planning of their activities on the farm, thereby improving efficiency, reducing waste, minimising run-off of potential pollutants (fertilisers, pesticides, herbicides, etc.), limiting post-harvest loss and improving harvested crop quality, and increasing yields.

Subscribers to Ignitia's weather forecasting service through Orange Burkina Faso were surveyed about their experiences with the forecasts. They were additionally asked about how they integrated the weather forecast information into their farming activities to better understand the value the information provides to farmers. Overall, 96.8% of farmers reported that the forecasts enabled them to make at least one improvement to their farming activities, with a breakdown of the utilisation of the rain forecasts in farming detailed in the table below.

Farming Activity	Percentage of Farmers that Reported Improvement
General Planning	87.4%
Land Preparation	52.9%
Sowing	56.2%
Application of Fertiliser	29.8%
Application of Crop Protection Products	34.9%
Harvesting	22.2%
Drying of Crops	10.0%

4. Development impacts and cross-cutting issues

As discussed in the previous section, the project enabled smallholder farmers in Burkina Faso to adapt to climate change. However, such benefits are not always limited to farmers and farming activities and such was the case for the end users reached through this project as well. During the project period itself, 150,868 individuals in Burkina Faso received the weather forecasts through SMS with an estimated 890,721 total beneficiaries reached during the project period. Nearly half of the direct subscribers indicated that they utilised the forecasts to improve their livelihoods in ways that did not relate to farming at all. The table below highlights the primary use of the weather forecasts among all subscribers.

Primary Use of Iska Weather Forecasts	Percent of Paid Subscribers
Farming	44.1%
Personal Use (General Daily Planning)	19.0%
Business & Trading	13.1%
Schooling & Teaching	7.9%
Transportation & Driving	3.9%
Construction	2.3%
Other	5.8%
No Use of Forecasts	5.8%

The above results highlight the far-reaching benefits of accurate weather forecasts for individuals in Burkina Faso. Though outside the primary scope of the project, it is important to highlight the various ways in which the forecasts offer benefits that ultimately enable people to improve their livelihoods. It is also interesting to note that while female users were underrepresented among those who utilised the forecasts for farming, they were significantly more likely to use the forecasts for general planning, business and tradition, and schooling than their male counterparts were.

5. Assessment of the results and impacts of the project

5.1 Relevance

Ultimately, the primary goal of this project was to enable smallholder farmers in Burkina Faso to improve their livelihoods through the adaptation to climate change. As evidenced by the 96.8% adoption rate of the weather forecast information into farming activities by end users that are farmers, consisting of 44.1% of end users based on survey results, it is clear that for smallholder farmers, the forecasts are enabling farmers to better plan their farm activities around rainfall, thereby improving their productivity as a whole.

Additionally, many subscribers did not fall within the above scope. However, during the surveying of the user base, it became clear that the forecasts also provide value to individuals who engage in activities outside of farming. Because the forecast information is not farming-specific, it offers value to other personal and economic activities because it empowers individuals to make use of reliable and accurate information about how the weather will be over the next 48 hours.

Moreover, because of the mode of forecast transmission (SMS) and partnership with a major mobile network operator in Burkina Faso, Orange, the information is highly accessible and scalable. Through this partnership with Orange Burkina Faso, as well as other private sector partnerships in the country, we have and continue to improve the reach of the forecasting service to people in Burkina Faso, with continued growth experienced even after the conclusion of the project period. Though the project has concluded, there are continued efforts and investments into not only expanding the reach and access of the service to more individuals but also to the improvement of the service to better meet the needs of the end users.

5.2 Effectiveness

Overall, most of the expected project outcomes were met and, in most cases, exceeded. The most important measure of this success comes in the form of the target numbers of forecast beneficiaries and individual direct subscribers. The target number of individual direct subscribers was 50,000; by the end of the project period, this target was tripled, with 150,868 individual direct subscribers as of the project end date of January 31, 2021. Moreover, the target number of beneficiaries was far exceeded. While the target number of beneficiaries was 285,000, we were ultimately able to achieve 890,721 beneficiaries by the end of the project.

Our ability to significantly exceed these key targets was due to not just placing a priority on the number of subscribers or individuals reached but also prioritising service quality. Ignitia's weather forecasting service is based upon years of research and continuous improvement and its value is fundamentally based on providing a superior service. As a result, we additionally ensure that the service best meets the

needs of the specific geographies in which we operate. This involved continued optimisation of our forecasting algorithm for Burkina Faso specifically, with these efforts resulting in measurable improvement; during Season 1, the forecast accuracy was measured at 83% while in Season 2, it was measured at 89%, a highly significant improvement to a service that already offered a much higher level of accuracy than any alternative on the market.

The high level of accuracy and reliability of the service is not just based on the evaluation of forecasts against actual conditions without regard for the experiences of the end user. As part of the project, multiple surveys and evaluations were key to the project activities and, once again, these activities were taken seriously to gather key insights. During these activities, 84.6% of end users expressed a high level of satisfaction with the service, 84.8% expressed confidence in the forecasts provided, and more than half of farmers mentioned the forecast accuracy as the most valuable aspect of the service provided to them. A low churn rate of just 4.3% is further evidence of the fact that subscribers valued and benefited from the forecasts.

However, not everything went as planned. One of the most obvious challenges was with actually launching a live B2C service. Initially, the goal was to launch a live service with Orange Burkina Faso during Season 1 and to launch with another mobile network operator during Season 2. Ultimately, due to legal concerns, technical challenges, and both language and physical barriers (the latter of which caused by the COVID-19 pandemic that prevented international travel), the launch of a live service with Orange Burkina Faso was significantly delayed, with a launch not occurring until Season 2. Moreover, these challenges and delays prevented the launch with a second mobile network operator during the project period due to limited resources and manpower. Nonetheless, as mentioned previously, these delays did not prevent us from tripling our full project target of 50,000 individual direct subscribers.

5.3 Efficiency

Overall, the project was very much in line with the execution of similar activities we have conducted in other, similar geographies as well as future planned activities in Burkina Faso. As such, the costs for major activities such as training, personnel, launching a B2C service, marketing, and M&E were all very much in line with typical expenditures. When it comes to the execution of M&E, the activities carried out were highly cost-effective considering the scope of the evaluations and number of individuals reached. By working with a local contractor and relying on in-house reporting, costs were reduced substantially than if the entire activities were contracted out.

In terms of timeliness, while the delays faced in launching a live B2C service were unexpected based on the work plan, they ultimately were fairly in line with what we experience in other geographies, though slightly on the longer end. However, once we launched, the project enabled us to acquire customers incredibly rapidly that may not have been possible without the assistance of project funds, as significant

investments were made with respect to marketing and customer acquisition to make up for initial delays. Overall, the project enabled us to reach more people and farmers with accurate weather forecasts in a cost-effective and time-effective manner.

5.4 Impact

During the project period, it was observed that 96.8% of farmers made at least one distinct improvement to their farming activities through the utilisation of their weather forecasting information. These activities included changes to sowing timing, fertiliser and crop protection product application, crop harvesting, drying of crops, and selling of crops. Because of climate change's impact on the once-predictable weather patterns, smallholder farmers that predominantly depend on rainfall for their farming activities are empowered to adapt to these changing conditions by receiving accurate rainfall information.

This improved planning on the farm ultimately leads to a number of benefits for farmers and for society as a whole. On the farmer scale, this improved planning helps to reduce waste of farming inputs such as seeds, fertiliser, crop protection products, labour, and even tools and machinery. By reducing wastage of physical inputs as well as time and labour, farmers are naturally able to reduce financial losses and become more efficient on the farm. Farmers are also able to reduce post-harvest loss through proper planning of harvesting and drying. This all ultimately enables farmers to improve their yields, providing them and their families with both improved food security and increased incomes.

As more farmers adopt this technology, higher-level impacts are likely to follow. One of the most obvious impacts is that food security would be more reliable and communities would become more resilient to climate shocks that have the potential to create food shortages that can result in decreased access to adequate nutrition. Another key impact that increased yields can result in is greater value chain stability; with more food available, key food value chains can strengthen, leading to higher and more reliable incomes and the creation of quality jobs throughout the value chain.

With respect to climate, there are additionally key benefits that improved farming efficiency can create. Especially with respect to improved timing of fertiliser and crop protection product application, farmers are better able to ensure that the chemicals they use are used efficiently. What this means is that less chemicals will be wasted through, for example, run-off due to heavy rains or excessive application. Run-off of these chemicals that are used positively on the farm can have devastating impacts on nearby ecosystems, especially if they contaminate water sources.

5.5 Sustainability

It is all but ensured that the positive impacts from this project will be sustainable, and that we will continue to build upon these positive impacts even now that the

project has been completed. Through the partnerships formed, as well as ongoing discussions with potential private sector partners, including another mobile network operator, we consider this project to be a highly successful launching point for long term profitability and impact creation not just in Burkina Faso, but as we continue to expand in West Africa.

Key to sustainability is the partnership with Orange Burkina Faso. A key partnership that enabled us to reach over 150,000 individuals, over half of which are farmers, there is a strong mutual agreement regarding the success of the project activities and, because of this, excitement about the future. Even based on the Season 2 activities, discussions are ongoing about the enhancement of the SMS-based forecasting service currently available as well as launching a mobile application that would provide farmers and other subscribers that requested the same with more detailed weather information to enable them to improve their decision making and continue to build resilience against climate change.

During the project, Ignitia has also engaged in four commercial sales agreements within Burkina Faso, aside from Orange. These entities include Yennenga, SOFITEX, NewPath, and GIZ Burkina Faso, which resulted in around USD 125k sales revenue. Of these four entities, Ignitia has agreements with two, NewPath and SOFITEX, that extend beyond project close. Moreover, ongoing discussions are being held with GIZ Burkina Faso about potential partnerships, as well as linkages with additional leads that can help to ensure a sustainable impact in the country.

From the Project Start until Project end at 31 Jan 2021, a total of USD 100K sales revenue was generated from this service. Out of this, based on revenue sharing agreement between Orange Burkina Faso and ignitia, the service resulted in around USD 50K to Orange Burkina Faso. Since project end this figure has been growing, with an estimated total revenue of USD 758k generated until July 2022, representing sales of around USD 379k to Orange Burkina Faso.

5.6 Coherence

Throughout the project, Ignitia has been in discussions with various stakeholders involved in improving agriculture in Burkina Faso. With West Africa having such significant yield gaps, improving accessibility of accurate weather forecasts is one of many key initiatives through which these yield gaps can be closed. Though we often do face challenges with respect to ensuring that organisations and individuals see the value in the forecasts, in particular due to the level of distrust in weather forecasts in general due to rampant inaccuracy, working with trusted partners has helped us to connect with organisations that might otherwise be unwilling to engage with us. In particular, our work with GIZ Burkina Faso has enabled us to engage with many stakeholders within Burkina Faso's agricultural sector in order to improve the accessibility of accurate weather forecasts to actors within the sector.

6. INNOVATION

This project addressed the pressing need to enable individuals in Burkina Faso to adapt to the changing weather patterns due to climate change. Compounded by the inherent difficulty in predicting the small-scale and fast-moving tropical weather systems, people, especially smallholder farmers that rely primarily or even solely on rainfall, stand to benefit immensely from accurate weather information.

This project enabled 150,868 individuals, of which more than half are farmers, to receive Ignitia's innovative solution directly, through which 890,721 people ultimately benefited. Ignitia's solution is not only localised and highly accessible as it is delivered through SMS but predicts rainfall with 89% accuracy. This accuracy level is virtually unmatched, especially compared to the widely available global forecasting models that are, at best, only around 50% accurate in predicting rainfall in tropical climates.

Ultimately, this innovation enables individuals to better plan their activities, whether on-farm or other economic activities. 96.8% of farmers reported making at least one specific improvement to their farming activities through the utilisation of the weather forecast information provided by Ignitia during the first season of the service's launch. With improved planning on the farm around forecasted rainfall, farmers are empowered to improve their efficiency, reduce waste, and enhance harvest quality, ultimately leading to increased yields and incomes.

7. POTENTIAL FOR SCALING UP AND FOLLOW-UP INVESTMENTS

The project's sustainability/continuity is all but ensured due to the successful partnership between Ignitia and Orange Burkina Faso. Both organisations will continue to work together to deliver Ignitia's weather forecasts, improve and expand product offering, and continue to place a focus on acquiring more customers, especially smallholder farmers. These activities have been ongoing since the project ended and a commercial long-term relationship has been formed between the partners.

In addition, Ignitia has ongoing partnerships with organisations such as SOFITEX, NewPath, and GIZ Burkina Faso that are not only helping to reach more farmers in Burkina Faso but have the important goal of achieving sustainability. Ultimately, the goal in all of the partnerships Ignitia is engaging in is to ensure that there is a long-term plan for end users to continue to receive the forecasts, either as part of an organisation's activities or through a model whereby end users shift from a subsidised service to a paid service, after using the service and experiencing the benefits offered.

Moreover, scale-up and expansion activities are very much in the works due to the project's success. Ignitia is in ongoing talks with another mobile network operator in Burkina Faso that would expand the availability of the service to more individuals. Additionally, based on the success in Burkina Faso, Ignitia is in discussions with Orange about expansion to other countries in which they operate, namely Senegal and Mali.

8. RISKS

Overall, most of the identified risks associated with the project did not materialise during the project period. Based on the results of the first season of commercial forecast provision to end users, it is clear that the following risks ultimately were avoided: low uptake amongst farmers, low network coverage, low weather forecast accuracy, unsustainable costs of weather data services, poor/incorrect interpretations of weather forecasts. Another risk that did not materialise was governmental bureaucratic risk. However, this will be an ongoing risk as we continue to expand in Burkina Faso, as the country is dealing with an increasing level of insecurity that can create additional political risk.

Other risks that were not identified at the beginning of the project that did, in fact, materialise during the project included organisation-level bureaucracy and the COVID-19 pandemic. The bureaucracy within Orange Burkina Faso ultimately contributed to a significant delay in launching a live service; ultimately Ignitia was able to mitigate this risk through two key actions. First, of course, a significant amount of perseverance and understanding by Ignitia's staff was necessary in pushing through the delays, which ultimately paid off through the launch of a highly successful service. Additionally, Ignitia mobilised its project team to counteract the lack of B2C activities in Season 1 with a push towards B2B development that enabled us to significantly exceed the project's B2B sales goals.

Additionally, the COVID-19 pandemic created significant challenges for the project team. It rendered Ignitia unable to carry out key project activities such as training during Season 2. Moreover, it limited the ability of Ignitia to make as much progress in B2B and B2C sales due to the travel restrictions imposed, forcing the vast majority of discussions with partners and potential partners to be held virtually. Finally, the pandemic also limited the ability of Ignitia to carry out in-person M&E activities. However, this was mitigated through the inclusion of additional phone surveys that still provided Ignitia and its partners with valuable information.

9. Monitoring and evaluation

Aside from Ignitia's M&E activities, monitoring was carried out by GIZ Burkina Faso during the Season 1 partnership as well as by Orange Burkina Faso once the B2C service was launched.

As far as GIZ's monitoring and evaluation went, they were highly impressed by the service, specifically noting the feedback from farmers on the forecast accuracy, reports of more efficient use of fertiliser and crop protection products, and improved yields. These results were shared among a number of stakeholders in Burkina Faso, through which we were connected with SOFITEX and a mobile network operator that we are in discussions with, to name two of the key linkages made as a result of the results shared by GIZ.

Additionally, Orange Burkina Faso continuously monitors subscription rates and other related data with respect to our service. They have ultimately been highly impressed with the high levels of subscription by end users, low churn rates, and, ultimately, the income generation they've been able to benefit from. This positive feedback has not just been relayed to Ignitia but has manifested itself in the form of high interest in working with us to continue to improve the service and to expand the product offering to their users.

10. Lessons learnt

Since the launch of this project, both with respect to this particular project and experiences in other West African geographies, we have come to appreciate that launching a service with mobile network operators is a highly resource and time intensive process. Even when, on the surface, there seem to be few barriers to a launch, there is significant bureaucracy and red tape involved in these launches for a handful of reasons. Some of the major reasons include the fact that governments will have a stake in the provision of weather information and it is important for both Ignitia and any mobile network operators that we work with, to carefully navigate any sensitivities and potential legal challenges. In Burkina Faso and in other countries, this has been the source of major delays.

As a result, it has become clear that the original plan, which included launching with two different mobile network operators in the span of just over two years, was overly ambitious. Based on these experiences, we would definitely be better served by reigning in expectations and allowing for more time to nurture these relationships in order to achieve a smooth service launch. Ultimately, we only were able to launch with a single mobile network operator during the project period and while we have been in discussions with another for more than a year, we recognise

that there is still much more groundwork to lay before a partnership can be formed and launch planned.

Additionally, another key lesson was related to monitoring and evaluation. Ultimately, the project team determined that it probably was not necessary to reach more than 2000 end users during the project period. Similarly powerful studies could have been carried out with smaller sample sizes. This ultimately could have resulted in a more cost-effective evaluation or even enabled us to explore hiring an external organisation to carry out monitoring and evaluation activities, which often lends more confidence in the results to potential partners, even though we fully stand by the methodologies and results as being carried out with the utmost integrity.

11. OUTREACH

For now, results have primarily been communicated through NCF. Additionally, results have been shared directly with project partners and key highlights have been featured in presentations delivered during webinars and discussions regarding potential partnerships. Sharing results within the Orange Burkina Faso network has allowed the partnership to expand to other countries Sierra Leone and Ivory Coast. External communications have not taken place.

12. FINANCIAL SUMMARY

Table 1. Project financing per partner

	Financing, EUR			
Expenditures, EUR	NCF	Grantee	Total	Revenues from the project
Ignitia	234,605.34	100,983.45	335,588.79	394,133.30
Orange Burkina Faso	175,460.00	26,660.00	202,120.00	394,133.30
Total	410,065.33	127,643.45	537,708.78	788,266.61

13. CONCLUSIONS AND RECOMMENDATIONS

Overall, the project has been a tremendous success, with most of the project's goals ultimately being achieved during the project period. This success is highlighted by the more than 150,000 paid end users through a live service with Orange Burkina Faso as of the end of the project period, over half of which are farmers. 96.8% of these farmers reported that the forecasts enabled them to improve their farming activities, making changes such as timing fertiliser application around rainfall and

identifying ideal harvesting windows. The overarching goal of enabling smallholder farmers to adapt to climate change was largely realised, with the project laying the key groundwork for continued scale-up and sustainable impact in Burkina Faso and West Africa as a whole.

Based on the successes during the project period, key activities are planned and underway to ensure that the impacts achieved are just the foundation of what the project will ultimately accomplish. Ignitia and Orange Burkina Faso are working closely to continue expanding the subscriber base to Ignitia's weather forecasting service, with the key goal of reaching more smallholder farmers chief to these activities. Additionally, Ignitia has and is continuing to work with B2B partners in the private sector as well as with international aid organisations to continue to expand the accessibility of the weather forecasts to more farmers that will ultimately benefit from the daily, high-accuracy weather forecast information.

ANNEX

Annex 1 Project completion fact sheet

Project Name:			
Project no.			
Country:	Burkina Faso	**Financing:**	
		EUR	**%**
Nordic Partner:	Ignitia	100,983.45	18.78
Local Partner:	Orange Burkina Faso	26,660.00	4.96
	NCF grant disbursed	410,065.33	76.26
	Total	**537,708.78**	**100.00**
Classification:	Adaptation		
Project cycle:	Project start date: November 1, 2018 Original closing date: October 31, 2020 Actual closing date: January 31, 2021		
Short project description:			

Project performance:	**Expected Outcomes and Outputs**	**Achieved**	**End-of-project status**
	Outcome 1.1: 285,000 people benefitting from iska weather forecasts	Yes	890,721 beneficiaries
	Output 1.1.1: Commercially sustainable agronomic information support model for farmers is fully designed	Yes	Business plan completed and executed
	Output 1.1.2: Train the trainers programme completed with 15 active trainers in the field	Partially	22 trainers trained 4259 community stakeholders. No Season 2 training activities due to COVID-19
	Output 1.1.3: Technical development and integrations completed	Partially	Completed with orange Burkina Faso. No launch with other MNO
	Output 1.1.4: Successful forecast operations and SMS deliveries	Yes	4.3% churn rate, 89% day one forecast accuracy in Season 2
	Output 1.1.5: Business development and marketing of iska	Yes	4 sales agreements with commercial entities in Burkina Faso
	Outcome 1.2: Understanding of farmer behaviour, use, and understanding of iska weather forecasts	Yes	B2B and B2C M&E Reports Developed and Acted Upon
	Output 1.2.1: M&E activities	Yes	Total of 2,156 end users surveyed
	Outcome 1.3: All project aspects summarised in a final report	Yes	Completion Report

Climate change outcomes and impacts:	
Development outcomes and impacts:	
NCF core indicators	

NCF core indicator	**Results (quantitative)**	**Clarifications/Means of verification**

Number of beneficiaries reached	women		409,107	Based on an estimate of 5.7 beneficiaries per weather forecasts. Gender disaggregation here, and in all following figures, based on B2C M&E data indicating 73.2% of subscribers are male and then assuming the non-direct forecast recipient beneficiaries are 50% male 50% female.
	men		481,614	
	total		890,721	
Number of people with increased resilience to climate change	women		362,877	Based on total number of beneficiaries and the following adoption rates of forecasts (use in activities), obtained from the survey data collected from the B2C M&E: Male Farmers: 97.6%, Female Farmers 93.2%, Male Non-Farmers 79.8%, Female non-farmers 83%
	men		424,301	
	total		787,178	
Number of people with improved livelihoods	women		30,023	Based on the total number of individuals that have directly received the forecasts during the project period, the data from the B2C M&E regarding percentage of farmers and farmer adoptions rates, and, based on survey data from the B2B M&E activity, 82.5% of farmers experiencing yield increases.
	men		84,790	
	total		114,813	
New decent jobs created	full-time	women		Based on the proportion of individuals in the B2C M&E directly reporting benefits to their economic activities, further disaggregated by farmers (seasonal) and non-farmers (full time and part time).
		men		
		total	6173	
	part-time	women		
		men		
		total	6173	
	seasonal	women		
		men		
		total	13,280	

Annex 2 Results Framework

Table 1 Milestone deliverables Completion

Milestone deliverable	**Target** (include quantitative targets as in Annex 2)	**Progress** (include quantitative/ numerical value)	**Achieved** (yes/no/partially)	**Clarifications**
1.1.1 Business Plan Finalised	1	1	Yes	Completed Milestone 1
1.1.1 Plan the technical integration between Ignitia and Orange's IT systems	Complete	Complete	Yes	Completed Milestone 3
1.1.1 Recruit/form project team	Complete	Complete	Yes	Completed Milestone 1
1.1.2 Number of trainers trained by Ignitia	15	22	Yes	Completed Milestone 1
1.1.2 Production of training materials for use by trainers	Complete	Complete	Yes	Completed Milestone 1
1.1.2 Train the trainer program of 15 project employees	Complete	Complete	Yes	Completed Milestone 1
1.1.3 Signed User Acceptance Test (UAT) Orange Burkina Faso	1	1	Yes	Completed Milestone 3
1.1.3 Optimisation of weather algorithm for accurate weather predictions in Burkina Faso	Complete	Complete	Yes	Completed Milestone 1
1.1.3 Technical integration	Complete	Complete	Yes	Completed Milestone 3

with Orange Burkina Faso				
1.1 Estimated Number of iska weather forecast beneficiaries	285,000	890,721	Yes	Includes total B2C and B2B users using estimate of 5.7 beneficiaries per direct user.
1.1 Number of individual direct subscribers	50,000	150,868	Yes	Based on database of subscribers through Orange's subscription system on January 31, 2021.
1.1.2 Number of key community stakeholders trained by ignitia trainers	500	4259	Yes	Completed Milestone 2
1.1.4 Churn Rate (unsubscriptions) <20%	<20%	4.3%	Yes	November, December, and January average.
1.1.4 Operational forecasting, daily SMS transmission, and performance tracking Season 1	Complete	Complete	Yes	Completed Milestone 2
1.1.5 Free Use Marketing Targets (Units Delivered)	5000	0	No	Original purpose was to achieve direct subscriber targets. We achieved the target without free use marketing units delivered.
1.1.5 Season 1 Execution of Marketing Plan	Complete	Complete	Yes	Completed Milestone 3
1.2.1 Planning of Season 1 M&E	Complete	Complete	Yes	Completed Milestone 2
1.1.2 Number of trainers trained with updated program	15	0	No	COVID-19 impact on potential projects and customer budgets, along with travel restrictions prevented training in Season 2
1.1.3 Signed UAT with	1	0	No	No agreement with another MNO during project period

other mobile operator				
1.1.4 More than 85% successful SMS deliveries	>85%	82.90%	No	Reported Milestone 2 – Challenges with SMS Routes causing lower delivery rates identified and rectified
1.1.3 Technical integration with other MNO	Complete	N/A	No	No agreement with another MNO during project period
1.1.5 Season 2: Execution of the marketing plan	N/A	N/A	Yes	Actively using digital channels such as bulk SMS, end of call and end of SMS notifications to advertise the service and prompt individuals to subscribe.
1.1.5 Sales Agreement with commercial entities in Burkina Faso	2	4	Yes	Yennenga, GIZ BF, NewPath, SOFITEX
1.1.5 Business development for business-to-business clients in Burkina Faso	Complete	Complete	Yes	Overall started B2B development during Season 1 to offset the B2C delays – significant challenges related to COVID but 4 B2B sales agreements were signed during the project period
1.2.1 Interviews/Surveys via Mobile Channels	1,000	2,098	Yes	Significantly exceeded due to change in plans for Season 2 M&E due to COVID-19.
1.2.1 Number of in-person interviewed individuals	600	58	Partially	Due to COVID-19, the plan to conduct in-person interviews in Season 2 was changed.
1.2.1 B2B M&E Planning & execution	Complete	Complete	Yes	Completed Milestone 3
1.2.1 Season 2 B2C M&E Planning and Execution	Complete	Complete	Yes	Planning and execution took place during Milestones 3.5 and 4
1.2 B2B M&E Reports	1	1	Yes	Completed Milestone 3
1.2 B2C M&E Reports	2	1	No	Season 2 B2C M&E executed with report produced. No B2C service

				live during Season 1; as a result, no M&E could be executed during Season 1
1.1.4 Weather Forecast Performance Analysis Report	2	2	Yes	Analysis of weather forecast accuracy, using a variety of metrics, comparing weather forecasts on a daily basis to actual weather conditions as per satellite data from NOAA.
1.3 Final Report	1	0	Yes	Completed Milestone 4

Table 2 Incomplete milestone deliverables

Milestone deliverable	**Target** (include quantitative targets as in Annex 2)	**Progress** (include quantitative/ numerical value)	**Achieved** (yes/no/partially)	**Clarifications**
Free use marketing target (units delivered)	5,000	0	No	Original purpose was to achieve direct subscriber targets. We achieved the target without free use marketing units delivered. For now, this activity will not be carried out in the future for the aforementioned reasons.
1.1.2 Number of trainers trained with updated program	15	0	No	COVID-19 impact on potential projects and customer budgets, along with travel restrictions prevented training in Season 2. With multiple projects with signed contracts in the pipeline for 2021, it is expected the target will be reached and exceeded this year and that we will continue to deliver such trainings annually.
1.1.3 Signed UAT with other mobile operator	1	0	No	No agreement with another MNO during project period. Active discussions in progress with another MNO, with a full expectation to continue working towards an agreement, integration, and launch, which includes a signed UAT.

1.1.4 More than 85% successful SMS deliveries	>85%	82.90%	No	Reported Milestone 2 – Challenges with SMS Routes causing lower delivery rates identified and rectified. This metric is specific to end users subscribed via B2B channels and is monitored for every project carried out. We expect that, based on the improvements to SMS routes made during the project period, that we would achieve the target in our planned activities during 2021.
1.1.3 Technical integration with other MNO	Complete	N/A	No	No agreement with another MNO during project period. Active discussions in progress with another MNO, with a full expectation to continue working towards an agreement, integration, and launch.
1.2.1 Number of in-person interviewed individuals	600	58	Partially	Due to COVID-19, the plan to conduct in-person interviews in Season 2 was changed. We carry out routine M&E during our activities and we would expect to carry out in-person M&E at the end of the 2021 season (and the end of all ensuing seasons).
1.2 B2C M&E Reports	2	1	No	Season 2 B2C M&E executed with report produced. No B2C service live during Season 1; as a result, no M&E could be executed during Season 1. We would expect to carry out additional M&E with our Burkina Faso B2C subscribers in the future, which will involve reporting.

Annex 3 Pictures

Picture 1. Ignitia Training of Trainers Activity 1

Ignitia Training of Trainers Participants and Facilitators upon conclusion of the training programme. Photo credit: Ignitia.

Picture 2. Ignitia Training of Trainers Activity 2

Trainers participating in Ignitia's Training of Trainers Programme, preparing them to deliver trainings to farmers on best practices for incorporating Ignitia's weather forecasts into their farming activities. Photo credit: Ignitia.

Annex 4 Other supplementary deliverables/documentation/links

As per attached GIZ Reports

Annex 5 Impact story

Climate change is impacting the way weather works all around the world. For many, this means that the weather patterns that were once predictable can no longer be treated as such. For people living in the tropics, this is especially true. Rainy seasons are shifting, growing and shrinking, and more extreme weather events are being experienced. In Burkina Faso, 92% of the economically active population is engaged in agriculture, the vast majority relying solely on rainfall. This makes farmers in

Burkina Faso especially vulnerable to the increasingly unpredictable rainy seasons due to climate change.

Compounding the impacts of climate change is the lack of accurate weather forecasts for tropical climates. Tropical weather is inherently difficult to predict, with significantly smaller and faster-moving storm systems than are present in more temperate climates. Most weather forecasts apply models built for temperate climates to the tropics, where these models ultimately suffer from high levels of inaccuracy, rendering them unreliable and providing minimal use to people living in the tropics. Ignitia, however, has developed a model for predicting tropical weather accurately and on a hyper-local scale. With forecasts that have proven to be up to 89% accurate in Burkina Faso, the daily weather forecasts Ignitia provides to smallholders in the country empower farmers with the information necessary to build resilience to climate change, improve yields, and ultimately to protect themselves from the potentially devastating impacts of unpredictable rainfall.

In June 2020, Ignitia, in partnership with telecommunications company Orange Burkina Faso, made its forecasts commercially available to individuals in the country using Orange's networks. Within just seven months, more than 150,000 individuals signed up for paid subscriptions to Ignitia's daily weather forecasts in Burkina Faso. These subscribers commended the accuracy of the forecasts and 97% of farmers subscribed to the service reported that the forecasts enabled them to make improvements to their farming practices. Some direct actions taken through the utilisation of the weather forecast information include timing of planting, application of fertiliser around forecasted rainfall, and the identification of ideal harvesting windows.

Overall, nearly 80% of the subscribers expressed a strong willingness to continue their subscriptions into 2021. These positive results are incredibly exciting for both Ignitia and Orange Burkina Faso, who are looking forward to continuous evaluation and improvement of the service. This long-term partnership is expected to benefit smallholder farmers in Burkina Faso to the tune of increased yields, improved incomes, greater food security, and empowering farmers to build resilience against climate change.