

# AgriCoach evaluation

Report 2nd case study evaluation - season B 2020

Use of AgriCoach and impact on bean yield



This report describes the method and results of the 2nd case study evaluation completed over season B 2020, as part of evaluation of the AgriCoach app for the GAP4All project. This study focuses on the use of AgriCoach and impact of the AgriCoach on bean yield.

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# Infographics dashboard

**Goal** Study use of AgriCoach and impact on bean production

## Set-up

Case study over season B 2020

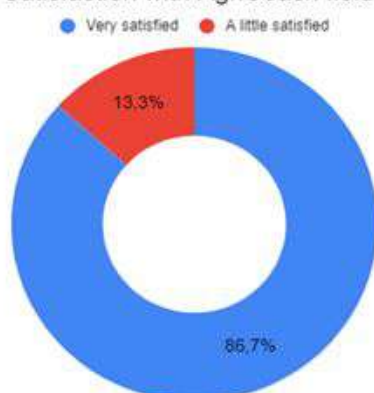
 Sample of farmers  
**34**



Provinces Gitega,  
Karusi and Kayanza

## Outcomes

Satisfaction with AgriCoach field



Farmers rating on AgriCoach

**9.3** out of 10



**227%**

Bean productivity (double)



**65%**

increase in application of GAP's

## Lessons learnt



Access to seed is important  
Train farmers earlier

## Descriptive summary

This report describes the results and insights from the case study evaluation that was executed over season B 2020. This is the second case study, following the case study was conducted in season A 2020, and has the goal is substantiate outcomes with more user experiences and data.

Objectives of the case study are to evaluate the appreciation, use and impact of the AgriCoach. A small number of farmers are studied on their AgriCoach use, management practices and productivity. Additionally it was studied how AgriCoach information is shared in and disseminated within the G50 groups.

In total 34 farmers in the provinces Gitega, Kayanza and Karusi were monitored over season B 2020. Surveys and interviews were conducted to receive feedback on the use and value of the AgriCoach and to monitor field practices. Field measurements were performed to measure the impact on bean productivity.

The case study has shown that:

- (1) Farmers appreciate the AgriCoach and give it an average rating of 9.3 (out of 10). The main added value for them is the positive contribution to productivity, which they observe on their fields.
- (2) Farmers apply most of the recommended practices on their field, not all in the same numbers. AgriCoach farmers apply 65% more Good Agricultural Practices than the control group.
- (3) Bean productivity is double for AgriCoach farmers than the control group (227%). Plants are also higher and have more pods per plant.
- (4) The majority of the group members of G50 groups receive information regularly and participate in AgriCoach discussions. Several group members, outside the farmers of evaluation, also applied the practices on their land.

In general the case study has confirmed that AgriCoach is used and valued by farmers. Several lessons learned need attention and follow-ups to ensure the success:

- (A) Access to quality seed is problematic for farmers. AUXFIN has developed an online seed marketplace app that started testing in September 2020 as a response to this need.
- (B) Farmers need to be trained earlier, to allow time to take in the information. This will be taken into account for future trainings.
- (C) Attention needs to be paid to the use of measuring devices in movies, as farmers have indicated they don't have access to these.

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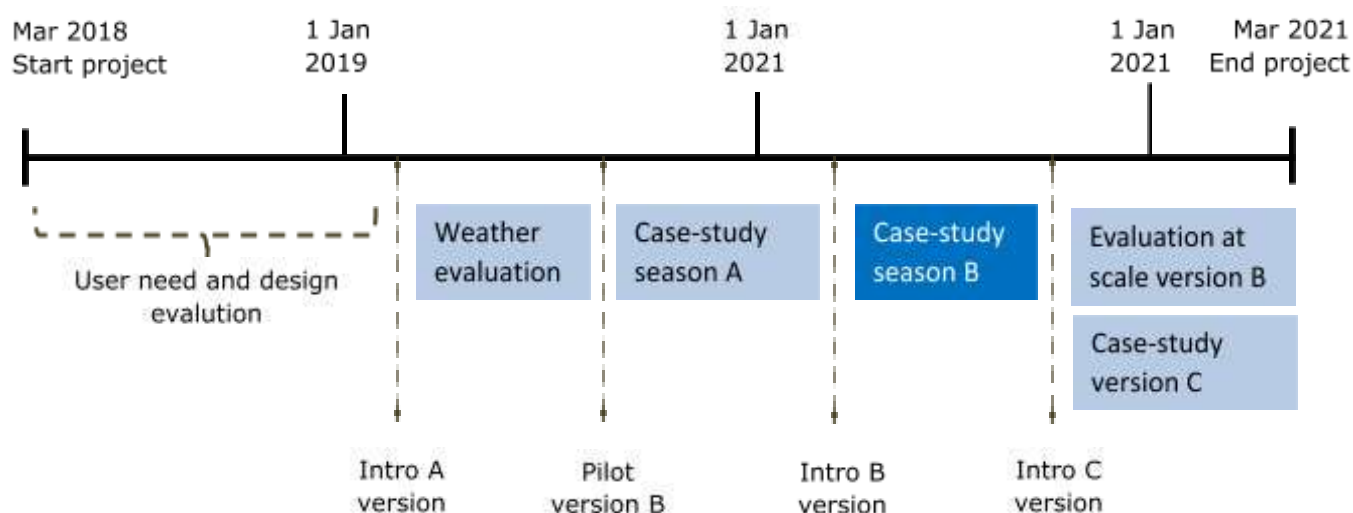
# Context

This report describes the results and insights from the case study evaluation that was executed over season B 2020. This is the second case study, following the case study was conducted in season A 2020 (see Figure 1).

The case study of season A showed farmers use and appreciated the AgriCoach, and that the use has positive impact on the use of Good Agricultural Practices and potato productivity. This second case study will build on the outcomes and insights of the previous case study. It mainly repeats the same objectives to substantiate outcomes with more user experience and measurements, and test a new crop.

The evaluation of season B will have a similar sample size and set-up. Season A focussed on potato, season B focuses on bean yield.

Figure 1: a schematic presentation of the M&E activities for the AgriCoach. This document focuses on the monitoring in season B (dark blue).



## Upcoming evaluations

The evaluation of the AgriCoach continues in season A 2021 with an impact evaluation at scale at 421 groups of AgriCoach version B and a case study to evaluate AgriCoach version C.

The case study of version C focuses on evaluation of the features: CropSelector and Seasonal Outlook (providing an estimation of the start of season and monthly rainfall for upcoming months).

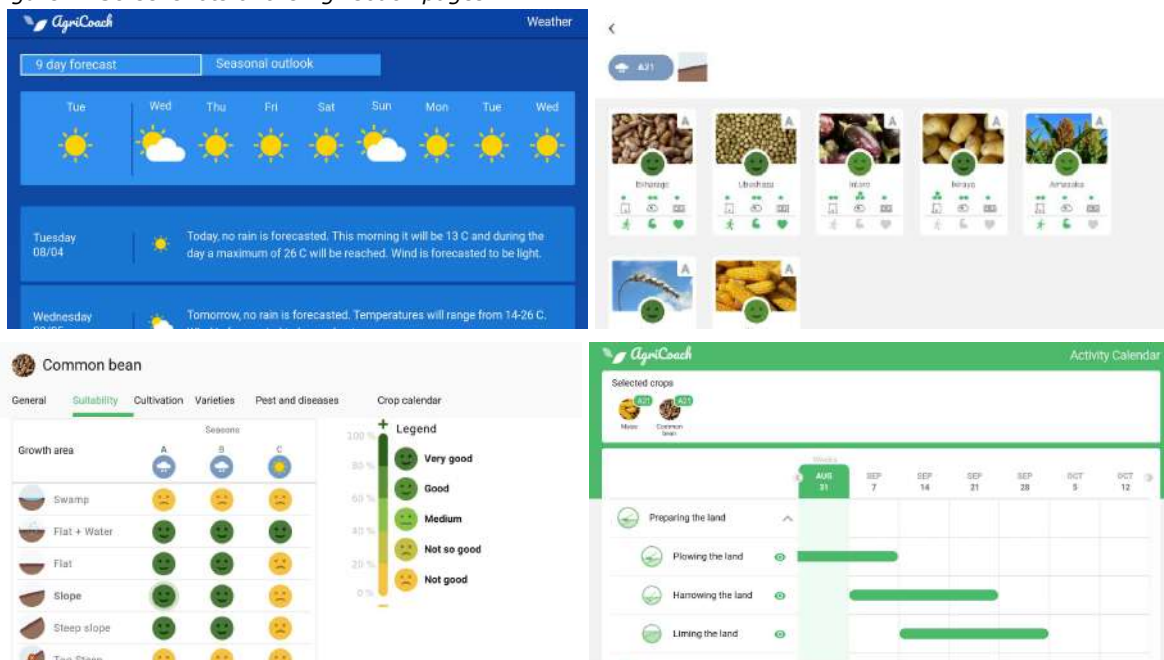
It was originally intended to evaluate the CropSelector in season B 2020 (this report) but for two reasons this evaluation is extended to season A 2021. The first reason is interviews could not take place due to coronavirus restrictions and the second is that it became clear that farmers need to have the CropSelector well in advance before the season starts, and also need more time to get to know it.

## AgriCoach B version

Version B of the AgriCoach app contained (see Figure 2):

- WeatherCentre information: page that shows the weather forecast for the coming week 9 days.
- CropSelector : providing information on crop details and suitability. Crops with crop description in this version are beans, potato, maize, soybean, tomato, dry pea, wheat, onion, groundnut, sunflower, sweet potato, tobacco, African eggplant and sorghum. Crop details are provided on:
  - o a general crop description including nutritional value, market value
  - o cultivation practices including description of planting distances and organic and chemical fertiliser doses per are and pocket
  - o variety
  - o pest and disease (not for all crops provided)
  - o Overview crop calendar for whole year
- ActivityCalendar for selected crops. Crops with full movies in this version are beans and potatoes. The other crops contained text descriptions of activities (filming for these crops was still in progress). The calendar shows the activities that are recommended for selected crops, and the time period in which it is advised to do these.

Figure 2: Screenshots of the AgriCoach pages





# Objectives

The case study focuses on the use of AgriCoach and impact on bean yield. The objectives are largely similar to the first case study, with the goal is substantiate outcomes with more user experiences and data and test this with a new crop: climbing bean.

Objectives of the case study season B 2020:

**(1) How is the AgriCoach used and appreciated by farmers?**

- How do the farmers use the AgriCoach and are they enthusiastic about it?
- How content are farmers with the results on their field?

**(2) What is the impact of the AgriCoach on their management practices?**

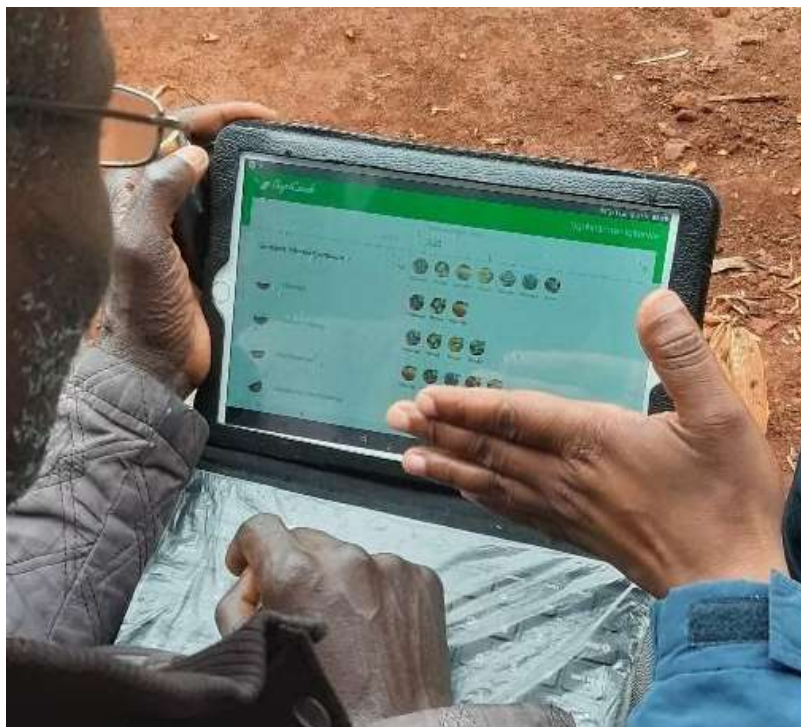
- Do the farmers apply recommended management practices on their bean field? Are these practices influenced by the AgriCoach?

**(3) What is the impact of the AgriCoach on the bean plot and production?**

- Can we measure a production increase caused by the AgriCoach?

**(4) How is information shared in the group?**

- How is the AgriCoach used in the group and information shared with group members?



# Method

## Set-up of case study

The set-up of the study was largely similar to the case study of season A 2020, it is referred to the report 'case study season A 2020' for a description of the methodology. Specifications for this case study are described below:

### Farmer selection

A total number of 34 farming families were selected. The KA were told to look for farmers in the G50 groups that were planning to cultivate climbing beans in season B. These farmers should want to be part of evaluation voluntarily, and did not have to comply to any other criteria than that. Farmers did not receive inputs or compensation for the participation. The group is divided into a target and a comparison group:

- Target group: AgriCoach users. 16 farmer families. These groups were introduced to the AgriCoach in September 2019 or in February 2020.
- Comparison group: control group. 18 farmer families that don't have experience with the AgriCoach. This group was not introduced to the AgriCoach (also not using the Weather Centre) and served as a control group.

Figure 3: Location of case-study farmers



Groups are spreaded out over the provinces of Gitega, Karusi and Kayanza (see Figure 3). For more group properties, see Appendix II.

### Introduction and content of AgriCoach-app

In February 2020 a workshop was held at the Auxfin Office in Gitega and Kayanza to train all the people involved. This consists of the group-leaders of the beneficiary groups and AUXFIN field staff: Key-Activators, Super-Activators and Master-Activators.

AgriCoach beneficiary groups were instructed to follow the ActivityCalendar (weekly activity texts and movies on Good Agricultural Practices) for at least beans. This means that in the weekly meetings, the group leader discusses the recommended practices of beans with the groups. Besides this, the 9-day weather forecast is discussed.

It was emphasised that the farmers are not steered or asked to follow up the recommendations. Information is shared weekly, and group members are free to do with this information what they want. Groups were also free to select other crops beside beans out of interest.

## Data gathering

Data was gathered in the following ways:

1. Questionnaires during growing season
2. Group visit and farmer interviews
3. Field measurements

### Monthly questionnaires

The surveys were done with the JEANNE app, a chatbot operated by AUXFIN for obtaining field feedback. During the growing season farmers were interviewed monthly by the KA on use of AgriCoach and cultivation practices. The Group-leaders of the groups also received questions on the group meetings and group use of the app.

### Group visits and farmer interviews

In March several G50 group meetings were visited in the surrounding of Gitega by Jori Langwerden and Jaffar Rushigaje, to observe the group-process and information sharing of the AgriCoach.

In March 2020 several farmers were interviewed in person by Jori Langwerden and Karine Niyondiko at offices Gitega and Kayanza. More interviews were supposed to take place in May, but due to travel restrictions caused by the coronavirus-crisis these interviews could not take place. The questions were asked through JEANNE app or postponed to the season A 2021 evaluation.

### Field measurements

Field measurements were taken by the KA and SA at two moments in time. Once two weeks before the expected harvest (plants still green), and once right before harvest (plants and beans dried out). The harvest date was indicated by the farmer. Due to this, the dates of these measurements were specific for each farmer.

For each field measurement a square of 2 by 2 meters was outlined with stakes and lines within the bean plot. Within this square, the field measurements were conducted. Firstly measurements were taken for planting distances, number plants (density) and plant height and number of pods per plant. Secondly, all the plants within the square were fully uprooted, and weighted in sequence to retain full plant biomass, weight of consumable product (dried beans) and weight of plant biomass in kilograms.

*Figure 4: Vectors to illustrate bean harvest measurements*





## Definition of Good Agricultural Practices

The application of Good Agricultural Practices is categorised into use and non-use according to Table 1. Use represents the recommended AgriCoach cultivation practice, non-use the common practice. Practices not included in this table such as improved quality seed use and staking did not have sufficient data to be included in results.

Table 1: Criteria to define use and non-use of Good Application Practices.

Practice	Non-use	Use
<b>Planting structure</b>		
P1.0 Structure	Random planting structure	Planting in straight rows
P1.1 Density	Too high or low planting density (more than 20% deviation from advised density)	Correct planting density (40 cm by 20 cm planting density, 20% margin allowed)
<b>Planting practice</b>		
P2.0 Seed and fertiliser application	No separation of seed and chemical fertiliser	Separating seed and chemical fertiliser
<b>Organic fertilisers (compost)</b>		
P3.0 Use of compost	No application of compost	Application of compost
P3.1 Compost dosage	Too much or few compost (>1 or <1 hand per pocket)	Application of correct dosage of compost (1 hand per pocket)
<b>Chemical fertilisers</b>		
P4.0 Use of chemical fertilisers	No application of (right type) chemical fertilisers	Application of (right type) chemical fertilisers
P4.1 Measurement of fertilisers application	Not measuring fertiliser application	Measuring fertiliser application
P4.2 Fertiliser dosage	Too much or few amount of fertilisers	Application of correct dosage of fertilisers (1 bottle cap per pocket)
<b>Weeding</b>		
P5.0 Weeding	Weeded once or not at all	Weeded two times or more
<b>Monitoring</b>		
P6.0 Monitoring	No regular monitoring	Once a week monitoring

## Definition of change

The study retains insight in change by comparing the target group against the comparison group. It was attempted to get also insight in previous practices of farmers, to compare their current practices with previous behaviour. However, the data for this comparison was limited and had a low certainty. Most practices farmers were not well able to remember the details of their previous practices. This is understandable, for example farmers can only make an estimation on the amount of fertiliser applied or frequency of weeding in previous years. It was concluded there was not sufficient data to present as results.

# Results

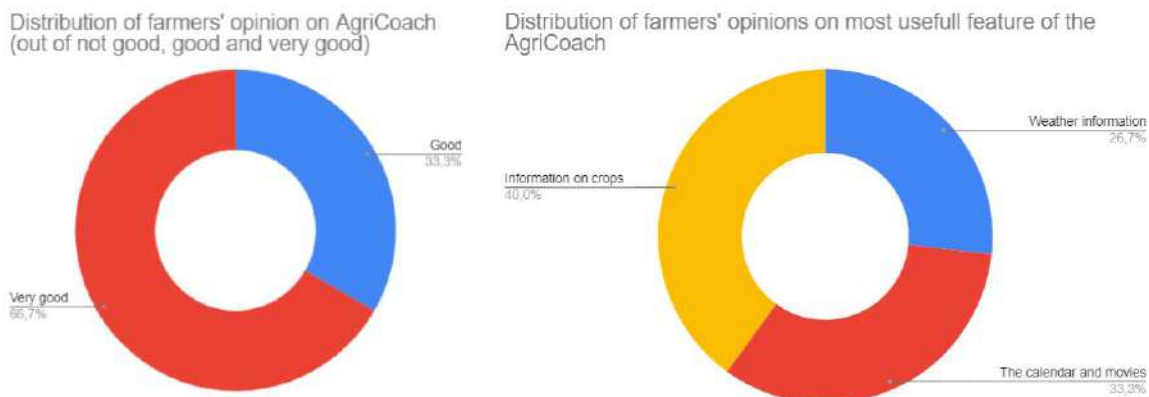
## (1) AgriCoach use and appreciation

Farmers gave the AgriCoach an average rating of 9.3 out of 10. The majority of farmers rated AgriCoach as 'very good' (67% of farmers) and the rest as 'good' (33% of farmers), no farmers gave it a negative rating (see Figure 5).

The major contributing factor for farmers appreciation is the impact on yield (73% of farmers), as they experience a positive impact on yield (see next section). Other contributing factors for farmers are that it helps to plan ahead (20%) and that the AgriCoach is easy to understand and share (7%).

Figure 5: distribution of farmers opinion on AgriCoach

Figure 6: Distribution of farmers opinion on most useful features



Farmers explain the added value in their own words as:

- "It teaches us new agricultural technologies without looking for an extensionist agronomist" – farmer from Karusi.
- "In past years before I knew AgriCoach I grew in the wrong way my crops and the yield was very low but now I get a good yield due to AgriCoach taught by key activators and helped us to apply skills in our farms." farmer from Karusi.
- "The skills provided by Agricoach are improved and we get them without doing any displacement for learning, we learn from home" - farmer from Kayanza.
- "Agronomists come, show, and then go. In the AgriCoach video they see it and it helps them to remind. And the videos are always there, so they can always watch them." - farmer from Kayanza.

Farmers' opinions are more or less equally distributed on what are the most useful features of the AgriCoach. All features are favoured: the WeatherCentre (25%) the ActivityCalendar (33%) and CropSelector (40%) (see Figure 6).

The main critical point about AgriCoach according to farmers is that it does not contain enough information (67%). This is in conformity with request from farmers to add more information on other crops:

- “We wish to know the way to grow all crops following Agricoach instructions” - farmer from Karusi
- Movies are not enough, need to be increased and strengthen also our capacity –farmer from Gitega.
- “We want to be trained for all crops” - farmer from Karusi

Other critical points and requests raised by farmers are:

- Their lack of access to a measuring tape, as is shown in the movie for sowing. Farmers asked for access to a measuring tape or the be given one.
- A request to be trained earlier, so they have sufficient time to absorb the information before the rainy season starts, especially about crop information.
- Recurring requests for helping getting access to quality seeds.

These are elaborated with a follow-up response under the section ‘Conclusions and lessons learnt’.

### Reflection on bean field

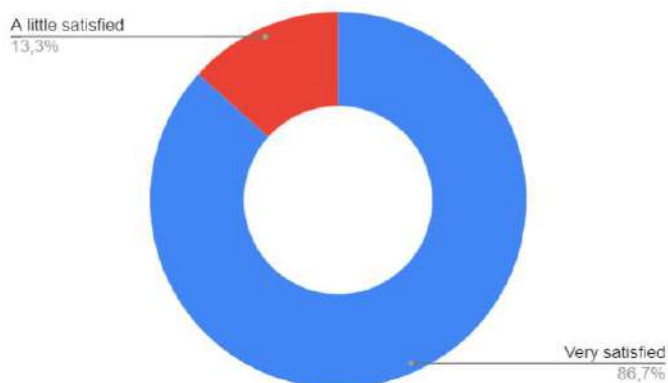
AgriCoach farmers are all content with the outcomes on the plot where they applied the practices recommended by AgriCoach (see Figure 7). Farmers reported on the positive results of their plots:

- “In past years I harvested less because I did not know AgriCoach. But now I harvest a lot, I have enough for my family and the excess is sold to the market and I buy what I have not produced in my farm” - farmer from Karusi.
- “The yield I got when I sowed in disorder is inferior than the yield I got now after AgriCoach trainings” –farmer from Gitega.

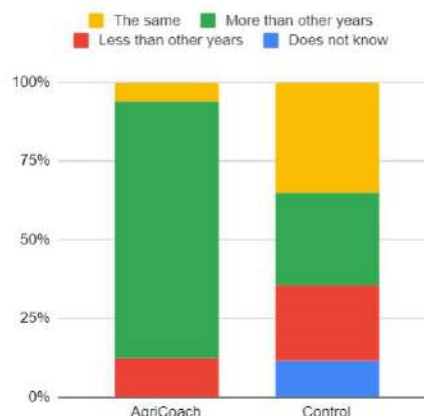
Figure 7: Farmers’ satisfaction with AgriCoach plot (answer options: Very satisfied; A little satisfied; neutral; Not satisfied; Not satisfied at all)

Figure 8: Farmers’ estimation of this year bean yield in comparison to other years.

Satisfaction with AgriCoach plot compared to other bean plots



Farmers’ estimation on this years bean yield compared to other years





Majority of AgriCoach farmers estimated their yield of this year was more than in previous years (72%), where the control group estimated in equal amounts a less, more or the same yield (see Figure 8). AgriCoach farmers attributed a higher yield to use of AgriCoach (see Appendix III). Regarding the specific practices, yield increase is mainly attributed to the increased use of fertiliser and compost, but also the spacing density and increased weeding and monitoring.

Several farmers mention this as an advantage because they don't have much land:

- "AgriCoach is advantage because I used less seeds and got more yield. I don't not have many plots which is why I want to use AgriCoach to get a better harvest with less seeds and land." – farmer from Kayanza

## (2) Impact of the AgriCoach on management practices

Most of the practices were followed up by farmers in the AgriCoach group and AgriCoach farmers applied more Good Agricultural Practices (GAP's) compared to the control group. Out of the 9 categorised GAP's (Table 1), AgriCoach farmers applied on average 7.6 GAP per farmer, against 4.6 GAP's for control group farmers, an increase of 65% (see Figure 9).

Figure 10 presents the application rate per practice for the AgriCoach group and the control group. All practices had a higher application rate in the AgriCoach group than the control group, but rates differ over practices. The change was smallest for application of chemical fertilisers (P4.0) with only a slight difference between groups, and largest for planting density (P1.2), with four times more farmers applying this practice in the AgriCoach group.

Most practices were applied by AgriCoach farmers at a rate of 80% or higher. Three practices that were not used in high counts was the correct planting density (P1.1), separation of seed and chemical fertiliser (P2.0) and the regular weeding (P5.0). For the practice of regular weeding most farmers indicated to have weeded once, where the GAP is categorised as two times weeding or more.

Application of chemical fertiliser showed that control group farmers do apply chemical fertiliser, but not all farmers measure their application and even less also measure the right dosage. For AgriCoach farmers all these practices were applied by 88% of farmers.

Figure 9: Average number of GAP's applied by AgriCoach farmer and control group farmers

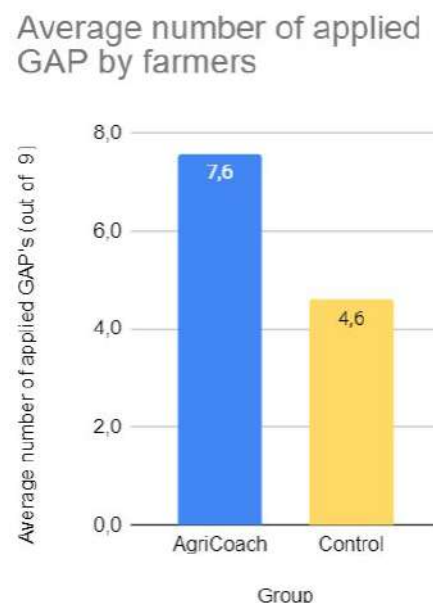
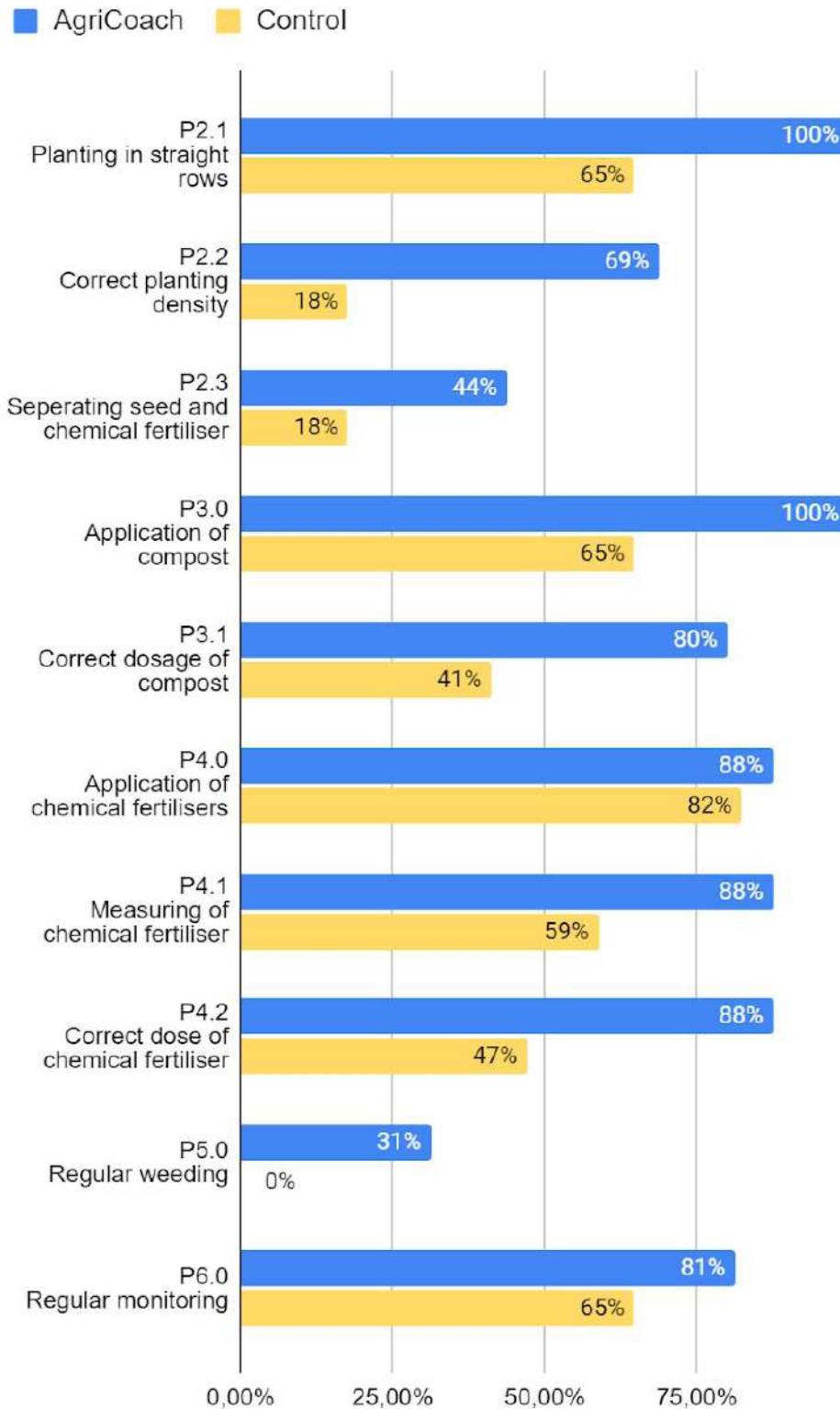


Figure 10: Application of Good Agricultural Practices as percentage per group. An GAP is applied when it fits the criteria of use, according to the categorisation into use versus non-use in Table 1.

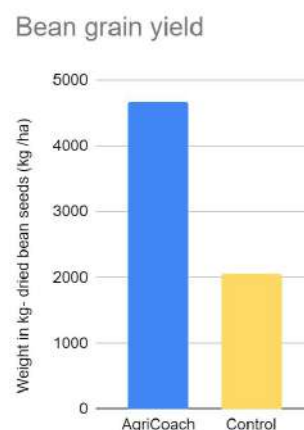
## Application of Good Agricultural Practices (use version non-use) as percentage per group



### (3) Impact of the AgriCoach on bean production

AgriCoach farmers had a higher productivity at their bean plots in comparison to the control farmers (Table 2). The plant density for AgriCoach plots was lower (less plants per surface), but the plants were higher, had more pods per plant which resulted in a higher total plant weight and bean grain yield.

Figure 11: Bean yield for the AgriCoach group and control group in kg/ha



The AgriCoach group had double (227%) the bean grain yield compared to the control group (Figure 11).

Change in crop productivity can be attributed to change management practices influenced by AgriCoach, as farmers indicated. Besides this, environmental conditions as soil properties, weather and circumstances as pest & disease also influence on crop yield. Season B has been a relatively wet season, and crop production was expected to be above-average. <sup>1</sup>

Table 2: Bean field results for AgriCoach group and control group

Group	Plant density (number/ha)	Height (centimetre)	Number of pods per plant	Weight whole plant (kg/ha)	Weight dried bean seeds (kg/ha)
AgriCoach	171718,8	200,2	7,25	6203	4672
Control	232794,1	180,6	5,35	3382	2059
% difference	74%	111%	135%	183%	227%

### (4) Group use app and sharing of information

#### Weekly meetings

Most groups discuss the AgriCoach every week (88%), some discuss it once every two weeks (13%). For half of the groups the discussion on the AgriCoach takes one hour, some take shorter, about 30 minutes, and some take an hour or more.

During group meetings both the Group-Leader and the Key-Activator take part in the AgriCoach explanation. To watch movies, both their tablets are used and passed around in the groups, many farmers join to watch.

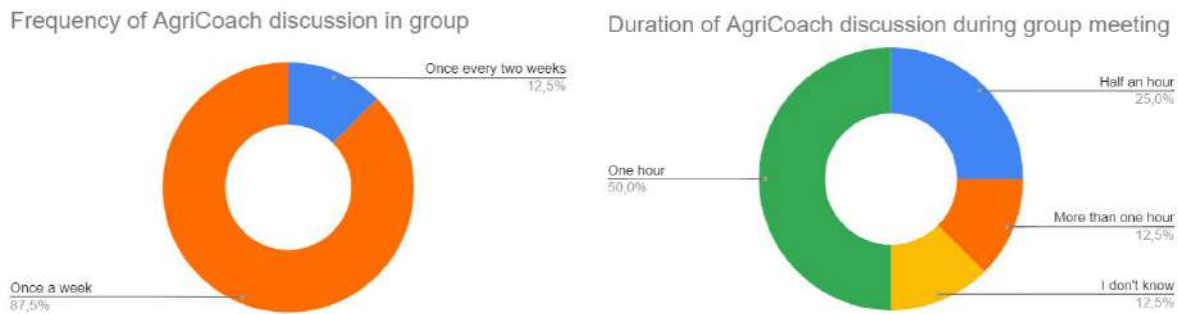
Group meetings take place every week. Groups report that at least between 30 group members take part every week. The main motivation for group members to attend the group meeting is to get AgriCoach information, to do savings and financing and to have group discussion (86%). For some the main interest is AgriCoach in particular (14%).

<sup>1</sup>FAO GIEWS Burundi 27-09-2020 <http://www.fao.org/giews/countrybrief/country.jsp?code=BDI>



Figure 12: Frequency of AgriCoach discussion in G50 groups

Figure 13: Duration of AgriCoach discussion in AgriCoach G50 groups



### Information dissemination

The majority of the group members of G50 groups receive information regularly and participate in AgriCoach discussions. It was reported that in half of the groups, between 10-25 group members watch the movies on a regular basis, in other groups between 1-10 farmers watch it and most of the farmers watch it. Several groups also report that they meet in smaller groups outside the group meeting, to discuss the AgriCoach information and watch the movies, and take more time to read the crop information. In all groups observed, the AgriCoach clearly created enthusiasm under farmers, especially when watching and discussing movies.

In all except one of the evaluation groups there were several more members, beside the evaluation farmers, that also out of their own will were applying AgriCoach practices at their own fields. On average of 7 farmers per group. Besides following the ActivityTimer for beans, almost all the groups were also following potatoes. Four groups also followed the calendar for more than these two crops.

Several Key-Activators and Super-Activators (local AUXFIN coaches) also mentioned to have applied the AgriCoach recommendations on their own land for learning themselves:

- "I have two fields, one with AC and one without that I compare. I was afraid that that the AC plot would not get a good yield because there are few plants in there. Now after a few weeks I see that those plants look good and I am expecting a good yield from that field. In the other field there are a lot of plants but those plants don't look good." – Key Activator from Kayanza

One group in Karusi has used AgriCoach to start a very active learning group of 20 people. This is explained by the group-leader:

- "They organise demonstrations themselves. First they go to the group-leaders field and they watch the movies to see how it should be done. Then the following days they go to other farmers' plots. They look at the text and the movies. They discuss the movies with the group. Some people will ask questions. And then they will simulate the activity to show how it should be done at the field. Farmers are very interested, now they are asking the GL to show the activities. He likes to do that."







# Conclusions & lessons learnt

## Conclusions

The case study has confirmed the outcomes of the first case study: AgriCoach is appreciated by farmers and has a positive impact on the use of Good Agricultural practices and production.

- (1) Farmers appreciate the AgriCoach and give it an average rating of 9.3 (out of 10). The main added value for them is the positive contribution to productivity, which they observe on their fields.
- (2) Farmers apply most of the recommended practices on their field, not all in the same numbers. AgriCoach farmers apply 65% more Good Agricultural Practices than the control group.
- (3) Bean productivity is double for AgriCoach farmers than the control group. Plants are also higher and have more pods per plant.
- (4) The majority of the group members of G50 groups receive information regularly and participate in AgriCoach discussions. Several group members, outside the farmers of evaluation, also applied the practices on their land. This is in line with the expectancy that in the first year several farmers start with applying the practices on their land and over time more farmers will join in.

## Lessons learnt and follow-ups:

In general the case study has confirmed that AgriCoach is used and valued by farmers. Several lessons learned need attention and follow-ups to ensure the success:

- A. Getting access to quality seeds is problematic for farmers. This was already known from previous case study, but the countless requests for help on this issue confirmed it. AUXFIN has launched an online seed marketplace app in September 2020 as a response to this need. First distributions of maize seed started in September to the G50 groups.
- B. Training and AgriCoach introductions need to take place earlier. Farmers request to be allowed sufficient time to absorb the information before the rainy season starts, especially about crop information. Future introductions of the app will take place earlier, to comply to this request.
- C. Attention needs to be paid to the use of measuring devices in movies. Farmers mentioned lack of access to this device and asked for access to a measuring tape or to be given one. A condition for the AgriCoach information and movies is that it must be applicable for farmers and suited to farmers' circumstances, so this will be adjusted accordingly by the film development team.







# Appendices

## Appendix I : Field photos

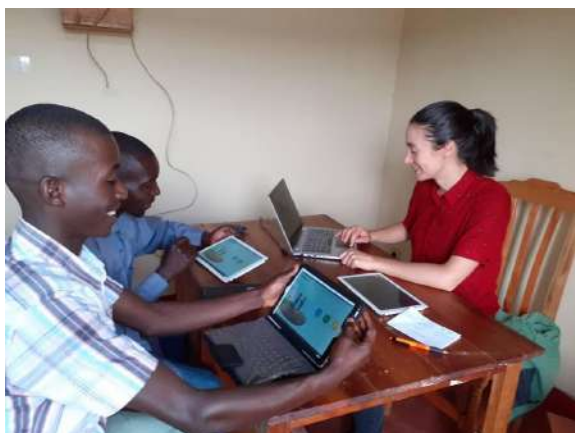
The training session February in Gitega



Visiting of group meetings in March



Farmer interviews in Gitega and Kayanza in March





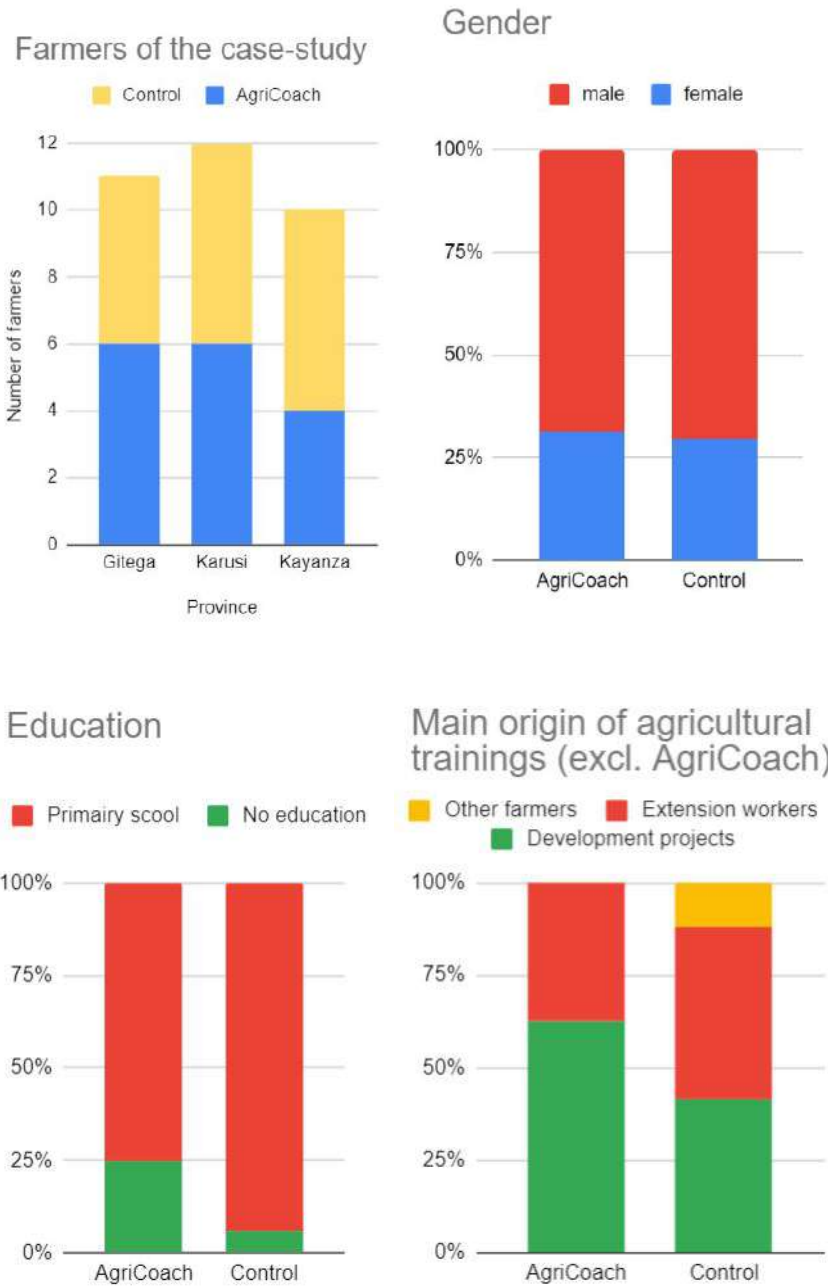
Harvest measurements in May in Gitega, Kayanza and Karusi



# Appendix II : Group properties

- 34 groups in total, spreaded over provinces of Gitega, Karusi and Kayanza.
- The groups contained 71% male and 29% female participants.

Group properties and distribution for the AgriCoach and control group are presented in following graphs:





## Appendix III : Plot explanation by farmer

Does the farmer think the yield is the same or different than other years? Can the farmer explain why?

### AgriCoach group

<b>Less than other years</b>	<p>Diseases did not allow me to monitor my plot</p> <p>Not to use organic fertilizer, to sow late, heavy rain destroyed crops</p>
<b>More than other years</b>	<p>Because agricoach helped me to sow well</p> <p>Because he has been trained on improved technologies of farming</p> <p>Because I applied good agricultural practices the yield is too high</p> <p>Because I knew activity calendar</p> <p>Because I used agricoach</p> <p>He applied agricoach advices, applied organic and chemical fertilizer</p> <p>I see that I have applied modern farming techniques the yield is very good</p> <p>I used skills got from Agricoach, sowed with organic and chemical fertilizer, used good stakes</p> <p>In past years before I knew agricoach, I sowed many seeds and harvested less but now I sowed few seeds and I see that production will be good according to last years</p> <p>It is different because now I applied improved technologies in agriculture and things go well</p> <p>Yes. In past years I harvested less because I did not know agricoach. But now I harvest a lot, I have enough for my family and the excess is sold to the market and I buy what I have not produced in my farm</p>
<b>The same</b>	<p>Because he did not use chemical fertilizer, he thought that is the reason for not increased the yield</p>

### Control group

<b>Does not know</b>	<p>I have not measured in order to know</p> <p>In past years I got a little production the same this year because I did not have someone to train me improved technologies as it was for other farmers. I have not finished to harvest in order to know if I have a lot or little yield</p>
<b>Less than other years</b>	<p>The plot did not receive care as it is recommended</p> <p>The seed she sowed from TUBURA was not suitable to the land, heavy rain and the lack of FOMI IMBURA fertilizer</p> <p>The weather was bad : heavy rain</p> <p>TUBURA gave us the seeds which are not suitable on our land</p>
<b>More than other years</b>	<p>Because I applied organic and chemical fertilizers</p> <p>Because he applied both organic and chemical fertilizer and he sowed on right time</p> <p>Because I respected spacings</p> <p>He sowed well in the way the extensionist has taught him, applied chemical and organic fertilizers</p> <p>I think it is owing to enough spacings I applied and good weather conditions</p>
<b>The same</b>	<p>I don't know</p> <p>I don't know maybe it is because I sowed at the right period and the weather conditions went well</p> <p>If I look at the plot condition and if I compare I don't see difference. I cultivated in the way I am used to do</p> <p>It is the same because I did not have how to grow well my crops</p> <p>Me depending on how I was used to grow in wrong way I got bad yield in these years I lost a lot</p> <p>The yield did not increase because I have not changed how to cultivate</p>